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An Ontology-Aided Computer-Based Approach for Business Model Innovation Ideation

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Abstract

Business model innovation (BMI) is a key leverage for the successful long-term performance of a business. Still, there are almost no computer-based tools to support the BMI process. Most available tools focus on the initiation phase of the BMI process: to map out the current business model. Unfortunately, the later steps, such as the ideation phase, are currently not supported by computer-based tools. However, computer-based tools can assist managers in the decision-making process of elaborating new BMI ideas. This research addresses the research question on how a computer-based tool can suggest BMI cases based on a business's business model, enterprise architecture, business innovation case characteristics, or criteria for which they are looking for in a potential BMI. A particular focus is on the combination of BMI with information technology. The research has shown that although a computer-based and ontology-aided approach for facilitating BMI would be beneficial for managers, additional research is required. A more detailed conceptualization of a business model than the current status quo can contribute to achieving such a computer-based tool for BMI recommendation.

This thesis follows a design science research strategy. As part of the awareness phase, a literature review was conducted as well as three BMI cases were collected for further analysis of their characteristics. Since this research aimed to develop an ontology-aided approach for supporting the BMI ideation, a BMI ontology and a matching method had to be developed. The BMI ontology is built modularly, and therefore, it contains the individual ontologies for a business model, business capability, business innovation case, and enterprise architecture and their interconnections. Additionally, a construction industry-specific ontology was developed and added to the BMI ontology to showcase the possibility for extensions for industry-specific criteria since the developed BMI ontology is an unspecific industry ontology and thus, applicable for every business. Further, the ontology was implemented into a computer-based tool with case-based-reasoning ability to evaluate the possibility of matching BMI cases with a business model, enterprise architecture, or business innovation case criteria. Additionally, to have the functionality of filtering BMI cases, a matching method between BMI cases and filtering criteria was developed and evaluated by leveraging the collected BMI cases during the awareness phase. Through a computer-based tool, browsing, matching, and comparing BMI possibilities become an efficient and straightforward task.

Keywords: business model innovation, business model innovation case representation, business capabilities, enterprise architecture, knowledge management, ontology, case matching, computer-based tool

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Publications

The following conference papers and book chapters were written and submitted during my progress to complete this thesis:

1. Peter, M., Montecchiari, D., Hinkelmann, K., & Gatziu Grivas, S. (2021). Ontology-Aided Approach for Business Model Innovation - An Ontology-Aided Approach to Support the Initiation and Ideation Phases of Business Model Innovation. *Software and Systems Modeling*, [Manuscript submitted for publication].

2. Peter, M. (2021). An Ontology-Based Approach to Structure Business Model Innovation Cases. *Proceedings of the 14th IADIS International Conference Information Systems 2021*, *IS 2021*, 255–258.

3. Peter, M., Montecchiari, D., Hinkelmann, K., & Gatziu Grivas, S. (2020). Ontology-Based Visualization for Business Model Design. In J. Grabis & D. Bork (Eds.), *The Practice of Enterprise Modeling*. Springer International Publishing, 244–258. https://doi.org/10.1007/978-3-030-63479-7_17

4. Adam, M., Peter, M., & Gatziu Grivas, S. (2020). Maturity analysis to assess the capability of an organization to innovate. *Proceedings of the 13th IADIS International Conference Information Systems 2020*, *IS 2020*, 1986, 53–62. https://doi.org/10.33965/is2020_202006l007

5. Witschel, H. F., Peter, M., Seiler, L., Parlar, S., & Gatziu Grivas, S. (2019). Case Model for the RoboInnoCase Recommender System for Cases of Digital Business Transformation: Structuring Information for a Case of Digital Change. *IC3K 2019 - Proceedings of the 11th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management*, *3*, 62–73. https://doi.org/10.5220/0008064900620073

6. Peter, M., Roche, M. De, & Graf, M. (2019). Skills and Competencies for Digital Transformation Initiatives Development of a model to identify relevant skills and competencies for a company's individual digital transformation roadmap. *22nd International Conference on Business Information Systems (BIS)*.

7. Peter, M., Gatziu Grivas, S., Horn, D., Rüegg, F., Barba, R., & Graf, M. (2019). The Technology Matrix – A tool-based method for technology scouting. Proceedings of the *12th IADIS International Conference Information Systems 2019*, *IS 2019*, *2004*, 131–138. https://doi.org/10.33965/is2019_201905l017

8. Graf, M., Peter, M., & Gatziu-Grivas, S. (2019). Foster Strategic Orientation in the Digital Age. *In 21st International Conference on Business Information Systems* (pp. 420–432). https://doi.org/10.1007/978-3-030-04849-5_37

9. Gatziu Grivas, S., Peter, M., Heeb, D., & Lanaia, A. (2018). The Panoramic Lens Model - Assessment of economic, industrial, and social factors to support enterprises in realizing the urgency of a digital transformation. *IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)*. https://doi.org/10.1109/ICE.2018.8436286

10. Peter, M., Graf, M., Gatziu Grivas, S., & Giovanoli, C. (2018). Die ABILI-Methodik : Inspiration und Navigation bei der Digitalen Transformation mit Fokus auf KMU. *Arbeitsberichte Der Hochschule für Wirtschaft FHNW*, *36*.

11. Gatziu Grivas, S., Peter, M., Giovanoli, C., & Hubli, K. (2018). FHNW Maturity Models for Cloud and Enterprise IT. *In Business Information Systems and Technology 4.0* (pp. 133–146). Springer International Publishing. https://doi.org/10.1007/978-3-319-74322-6_9

12. Peter, M., & Gatziu Grivas, S. (2017). An Approach to Model Industry Ecosystems - Enabling an Ecosystem for Service Platforms. *Proceedings of 5th International Conference on Serviceology*, 83–90.

13. Peter, M., & Gatziu Grivas, S. (2016). The Need of a Framework for the Digital Transformation of Industry Ecosystems - Handling Intercompany Collaborative Workflows. COLLA 2016: *The Sixth International Conference on Advanced Collaborative Networks*, *Systems and Applications*, 66–69.

Best Paper Awards

Out of the conference papers mentioned above, the following conference papers received the best paper award from the corresponding conference:

1. Peter, M., Montecchiari, D., Hinkelmann, K., & Gatziu Grivas, S. (2020). Ontology-Based Visualization for Business Model Design. In J. Grabis & D. Bork (Eds.), *The Practice of Enterprise Modeling* (pp. 244–258). Springer International Publishing. https://doi.org/10.1007/978-3-030-63479-7_17

2. Adam, M., Peter, M., & Gatziu Grivas, S. (2020). Maturity analysis to assess the capability of an organization to innovate. *Proceedings of the 13th IADIS International Conference Information Systems 2020, IS 2020, 1986*, 53–62. https://doi.org/10.33965/is2020_202006l007

3. Witschel, H. F., Peter, M., Seiler, L., Parlar, S., & Gatziu Grivas, S. (2019). Case Model for the RoboInnoCase Recommender System for Cases of Digital Business

Transformation: Structuring Information for a Case of Digital Change. *IC3K 2019 - Proceedings of the 11th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management*, *3*, 62–73. https://doi.org/10.5220/0008064900620073

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Abbreviations

Table 1: Abbreviations

Abbreviation	Extended name
ADM	Architecture Development Method
AOAME	Agile and Ontology-Aided Modeling Environment
ArchiMEO	ArchiMate Meta Enterprise Ontology
BIM	Building Information Modeling
BM	Business Model
BMI	Business Model Innovation
CBR	Case-Based Reasoning
DIKW	Data Information Knowledge Wisdom
EA	Enterprise Architecture
ICE-Session	Integrated Concurrent Engineering Session
ICEBERG	Interlinked CasE-BasEd ReasoninG
RBV	Resource-Based View
RDF	Resource Description Framework
SECI	Socialization, Externalization, Combination, Internalization
SIA	Swiss Society of Engineers and Architects
SPARQL	SPARQL Protocol and RDF Query Language

1. Introduction

This chapter introduces the background and motivation for this study in Sub-chapter 1.1, followed by the problem statement in Sub-chapter 1.2 that provides a rationale for this research. The research objectives, described in Sub-chapter 1.3, provide the goals of this study. The thesis statement and the research questions in Sub-chapter 1.4 provide the outline for the research. Sub-chapter 1.5 identifies the significance of the study towards the research base and the practitioners. This chapter closes with a thesis chapter map, depicted in Sub-chapter 1.6, which serves as an overview of this thesis.

1.1   Background and Motivation

Over the last two decades, the topics of business model, process innovation, and product/service innovation have been widely researched, as shown in Figure 1. Business models are a conceptual model of a business on how the business functions in order to generate revenue (Massa et al., 2017; Osterwalder, 2004; Teece, 2010). The research interest in process and product/service innovation has flattened compared to 20 years ago, as depicted in Figure 1. The same phenomenon seems to be happening to the topic of enterprise architecture, as shown in Figure 1, where the most significant increase in generated literature over the years was from two decades until a decade ago. However, according to Scopus's literature base, the research interest stagnated in the past ten years. Nevertheless, researchers agree that an enterprise architecture provides a holistic view of an enterprise (Lankhorst, 2009) and provides a set of models, methods, tools, and principles to design it (Saint-Louis et al., 2017). These characteristics of enterprise architecture are essential for developing and implementing business model innovations since business model innovations impact the business holistically (Taran et al., 2015) and require a method to design and implement the business changes (Frankenberger et al., 2013).
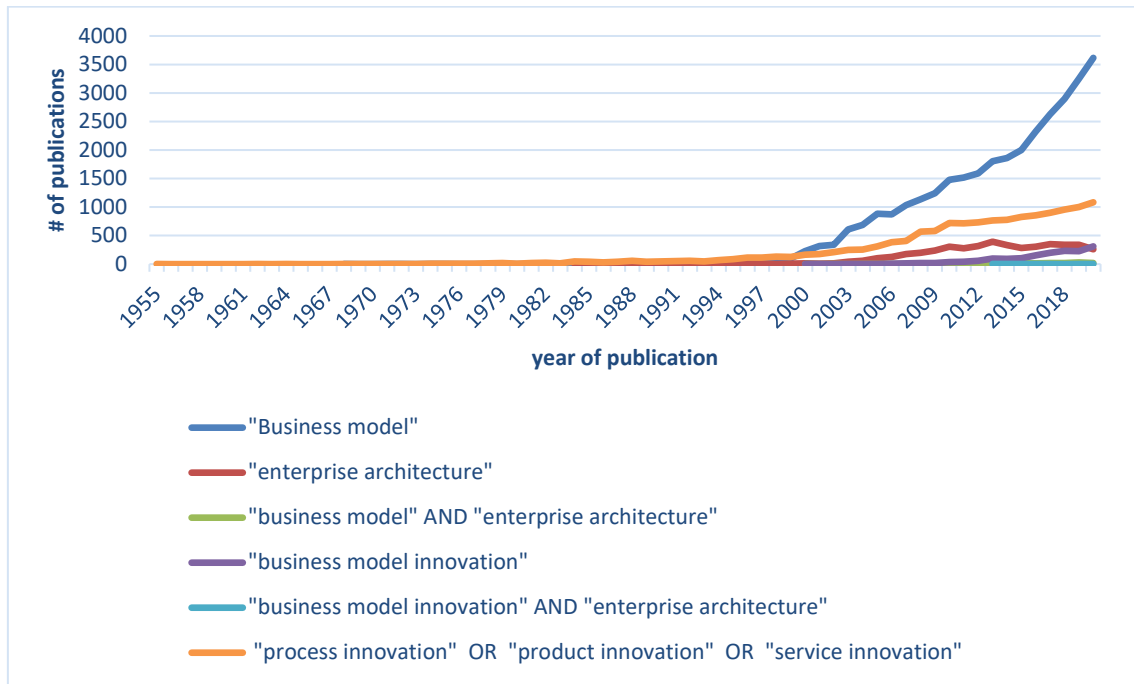
Figure 1: Use in the scholarly literature of some keywords according to the Scopus database until 2020

To achieve new business models and to transform the current ones, business model innovation is essential. Business model innovation has become increasingly important since competition is no longer only between products and services but between business models (Frankenberger et al., 2013; Gassmann et al., 2014; Gissler et al., 2009; Lindgren, 2017). Based on the qualitative research of Frankenberger et al. (2013), "managers consider business model innovation to be more important for achieving competitive advantage than product or service innovation." Business model innovation is more critical for competitive advantage because business models are not as easy to copy as products or services (Taran et al., 2015). Hossain (2017) mentions that business model innovation is essential for long-term success. Taran et al. (2015) mention that innovation research has neglected the type of business model innovation, especially regarding how to achieve it (Lindgren, 2017; Osterwalder & Pigneur, 2010). However, this research is essential since many business model innovations fail (Geissdoerfer et al., 2018; Taran et al., 2015; Weking et al., 2020). Figure 2 depicts the exponential increase in research results for business model innovation over the last decade. With the start of research interest in business model innovation, the interest in combining business model and enterprise architecture started since the business model concept is seen as a part of enterprise architecture (Lankhorst, 2009; Marfo Missah, 2015; Verhagen et al., 2021). Over the last decade, researchers have started to combine enterprise architecture and business model innovation, as depicted in Figure 2, since enterprise architecture fosters business model innovation (Kamogawa & Okada, 2005; Nardello et al., 2016; Verhagen et al., 2021).
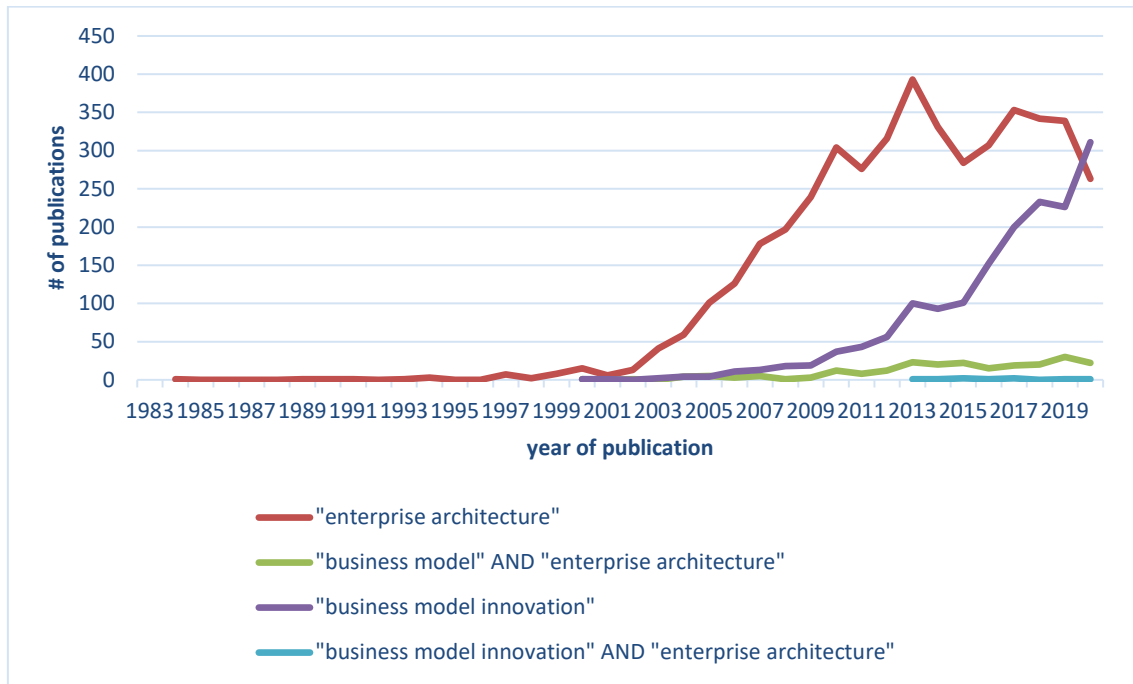
Figure 2: Use in the scholarly literature of some keywords according to the Scopus database until 2020

Weking et al. (2020) state that "learning from recurring phenomena that have proven to be successful in the past in different industries or contexts" facilitates business model innovation. Thus, it would make sense to have a case repository of successful business model innovations in order to learn and get inspired by them. However, most tools are only concerned regarding the design and representation of business models (Osterwalder & Pigneur, 2013; Smit et al., 2016). Frankenberger et al. (2013) and Osterwalder and Pigneur (2013) see a demand for computer-based ideation tools. This has become particularly relevant with digitalization, which offers new opportunities for business models.

Business model innovation facilitates the adaption of the business to fast-paced changing conditions of the environment (Stampfl, 2016). Businesses need to accept these inevitable changes. For this, the businesses must be flexible (Irani & Sharp, 1997). Dynamic capabilities are essential to be a flexible business (Foss & Saebi, 2017; Teece, 2018). Dynamic capabilities are a "firm's ability to integrate, build, and reconfigure internal and external competences" (Teece et al., 1997). Dynamic capabilities combined with the company's underlying business model represent processes of a company, which are needed to match or even create market changes (Eisenhardt & Martin, 2000; Schoemaker et al., 2018). Also, dynamic capabilities are essential to handle fast-changing environments (Bharadwaj et al., 2013; Teece et al., 1997). Further, dynamic capabilities foster rapid scale-up or -down strategies (Bharadwaj et al., 2013).

1.2   Problem Statement

The problem statement was developed based on the approach of Ellis et al. (2008). According to the authors, a well-defined problem statement has to address the questions of what problem the research addresses, how the problem impacts the environment, and why the problem occurs. The problem statement provides the rationale for the study.

Although business model innovation is key leverage for financial and sustainability performance (França et al., 2017; Geissdoerfer et al., 2018; Hossain, 2017; Taran et al., 2015; Weking et al., 2020), it remains an enormous challenge (Lindgardt et al., 2009; Taran et al., 2015). As part of this challenge, managers often fail to recognize business model innovation possibilities (Massa & Tucci, 2014; Taran et al., 2015). Comparing and ideating business model innovation ideas is cumbersome (Frankenberger et al., 2013; Osterwalder et al., 2005). However, a computer-based tool would facilitate the selection of options for business model innovation and make it more efficient (Frankenberger et al., 2013; Osterwalder & Pigneur, 2013). Further, an ontology-based approach for the computer-based tool would facilitate the externalization and reusability of business model innovation case knowledge and the deduction of applicable business model innovation cases (Peter et al., 2020).

Failing to retrieve business model innovation ideas leads to the challenge for managers to identify new business models and overcome the current business and industry logic (Frankenberger et al., 2013; Gassmann, Frankenberger, & Sauer, 2016; Geissdoerfer et al., 2017). Further, experimentation is essential for successful business model innovation, for which business model innovation possibilities need to be acquired (Bland & Osterwalder, 2020; Chesbrough, 2010; Massa & Tucci, 2014).

Business model innovation is knowledge-intensive (den Hertog, 2000; Downs & Velamuri, 2018). Therefore, exploring business model innovation possibilities is a knowledge-intensive task (Massa & Tucci, 2014). There is a lack of computer-based tools that facilitate business model innovation, in theory as well as in practice (Frankenberger et al., 2013; Geissdoerfer et al., 2018; Osterwalder & Pigneur, 2013; Tesch & Brillinger, 2017), and most of the available tools operate only on a conceptual level (Bocken et al., 2019; Smit et al., 2016).

1.3   Research Objectives

This study has the following objectives derived from the problem statement:

- to develop an approach that enables businesses to retrieve ideas for business model innovation.
- to develop an ontology to represent business model innovation cases.
- to develop a matching method to filter for relevant business model innovation cases.
- to develop a matching method to recommend business model innovation cases based on similarities between the business and the cases.

1.4   Thesis Statement and Research Questions

A thesis statement and research questions are defined based on the described problem statement and research objectives in the previous sub-chapters.

1.4.1   Thesis Statement

The following thesis statement acts as overarching guidance for this paper:

It is possible to determine appropriate business model innovations using a computer-based and ontology-aided approach that matches a concrete business situation with business model innovation cases.

1.4.2   Research Questions

According to Creswell (2008), qualitative researchers usually write at least one research question. Derived from the thesis statement, five research questions have been defined that are answered throughout this research paper.

Research question 1: *What are the properties of business model innovation cases?*

This research question aims at identifying the characteristics of a business model innovation case. Through answering this research question, a deeper understanding of business model innovation is gained.

Research question 2: *How can an ontology-aided business model innovation approach foster the business model innovation process's ideation phase?*

This research question aims at figuring out an ontology-based conceptual approach to facilitate business model innovation ideation. Through answering this research question, a suggestion for the solution is provided, which guides the development of the artifacts.

Research question 3: *How can the descriptions of business model innovation cases be formally represented?*

This research question aims at a formal expression to represent the knowledge of the description of business model innovation cases. Through answering this research question, the knowledge gets machine-readable and -interpretable, and thus, it gets suited for the matching functionality of the proposed matching options.

Research question 4: *How can different business model innovation cases be matched to retrieve appropriate business model innovation suggestions?*

This research question aims at describing the matching methods applied to the business model innovation cases based on user inputs. Through answering this research question, the functionalities of the filter service and the similarity-retrieval service get specified.

Research question 5: *How can the ontology-aided approach for the ideation phase of business model innovation be implemented to retrieve business model innovation suggestions?*

This research question aims at demonstrating that the proposed matching methods are applicable to the previously specified ontology for representing business model innovation cases.

The conclusion and outlook chapter of this thesis will reflect on these research questions and give appropriate answers.

1.5   Significance of the Study

Researchers, such as Taran et al. (2015), Teece (2010), Chesbrough (2010), as well as practitioners, such as Magretta (2002), agree that business model innovation matters. Nevertheless, the literature gives strong evidence that businesses struggle in innovating their business models (Andreini & Bettinelli, 2017; Chesbrough, 2010; Frankenberger et al., 2013; Geissdoerfer et al., 2017; Lindgardt et al., 2009; Massa & Tucci, 2014; Villinger & Jung, 2015). As part of it, there is missing a systematic approach for business on how to figure out new business model innovation ideas. Further, businesses struggle regarding the ideation phase as it requires broad knowledge from the involved innovation managers to recommend a new business model, especially if the business model should be decoupled from the standard business logic

(Frankenberger et al., 2013; Geissdoerfer et al., 2017; Osterwalder et al., 2005). Nevertheless, businesses need to be capable of handling business model innovation in order to remain sustainable in a competitive environment (Stampfl, 2016). Through a computer-based tool, it becomes easier for managers to browse through ideas for business model innovation or even get recommendations based on the current business model (Frankenberger et al., 2013; Osterwalder & Pigneur, 2013). Such a solution would even help with an initial effort estimation through the additional information of reusable parts of the current business model and missing parts for the future business model. To achieve such a computer-based tool, an ontology for business model innovation has been developed. Business model innovations depend on the architecture of an enterprise and their implementation will lead to changes of the enterprise architecture. Therefore, the developed computer-based and ontology-aided approach with its dedicated business model innovation ontology contains the concepts of business models and enterprise architecture. Thus, this research delivers among other things an ontology that interconnects both concepts. The representation of knowledge as an ontology provides the opportunity to reuse it for other research projects where a business model innovation ontology or parts of it, such as the business model, enterprise architecture, or business innovation case ontology are required.

1.6   Structure of the Thesis

This sub-chapter briefly describes the chapters and content of this thesis, which is divided into the following ten main chapters:

1. *Introduction:* this chapter introduces the research's topic by describing the background and motivation, the researched problem statement, the research objectives and questions, the thesis statement, and the rationale and significance of this research.

2. *Literature Review:* this chapter provides, based on the research base, insights into the topics of business model innovation, enterprise architecture, business capabilities, and knowledge management. This chapter represents the theoretical basis for developing the artifacts and answering the research questions.

3. *Research Methodology and Design:* this chapter provides insights on what research methodology was followed and how it was applied regarding the aspects of research philosophy, research approach, methodological choice, research strategy, time horizon, and data collection and analysis.

4. *Business Model Innovation Cases:* this chapter provides insights on the three conducted case analyses of business model innovation. It answers the first research question. The findings are used to identify characteristics of business model innovation cases.

5. *An Approach to Support the Ideation of Business Model Innovation:* this chapter provides a suggestion on supporting business model innovation during the ideation phase by matching cases with user inputs. This chapter answers the second research question.

6. *The Business Model Innovation Case Ontology:* this chapter provides the developed artifact of business model innovation case ontology. To showcase that the ontology is extendable by industry specifics, the construction industry specifics are specified and implemented as an extension to the ontology. This chapter answers the third research question.

7. *Matching Method:* this chapter provides a concept to match business model innovation cases with user inputs to filter the results list or identify the most similar cases regarding the user's inputs. This chapter answers the fourth research question.

8. *Matching of Business Model Innovation Cases:* this chapter provides the functions to apply the filter service and the similarity-retrieval service on the case base. This chapter answers the fifth research question.

9. *Evaluation of the Ontology-Aided Business Model Innovation Approach:* this chapter provides the evaluation results as evidence that the two artifacts and the business model innovation case with industry specifics ontology are applicable. Also, the evaluation set-up is provided.

10. *Conclusion and Outlook:* this chapter provides a summary to answer each research question, describes the contribution of this research, and further research topics are identified.

The interrelationships of the chapters are illustrated as a thesis chapter map in Figure 3. Apart from the described chapters, this thesis contains a bibliography chapter and appendices.
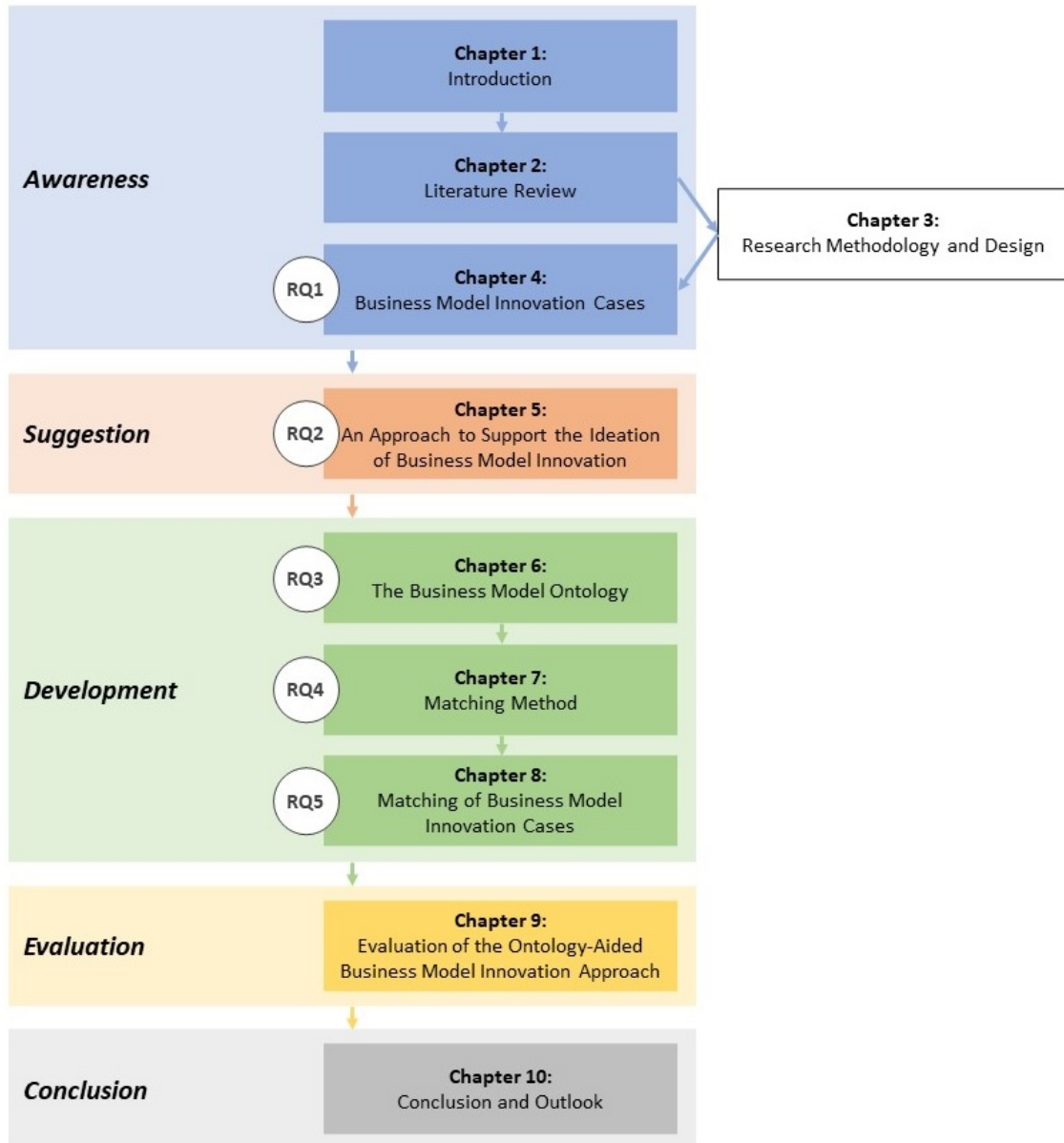
Figure 3: Thesis chapter map

2. Literature Review

This chapter provides an outline of the current state of knowledge relevant to this research. It introduces the topic of business model innovation in Sub-chapter 2.1 with a description of it, methods to perform business model innovation, and challenges organizations have to manage. Sub-chapter 2.2 introduces the enterprise architecture topic and its relation to business model innovation. Sub-chapter 2.3 describes four types of business capabilities and the relevant capabilities for business model innovation. The topic of knowledge management focusing on the creation and representation of knowledge is describes in Sub-chapter 2.4. Last, Sub-chapter 2.5 summarizes the literature review and provides the literature gap that this research closes.

2.1 Business Model Innovation

Oswald and Kleinemeier (2017) mentioned that business model innovation has a higher chance for sustainable market success than service or product innovation because this kind of innovation is easier to be copied by competitors than a business model. Thus, business model innovation is a key leverage for a successful performance of a business (Foss & Saebi, 2017; Geissdoerfer et al., 2018; Taran et al., 2015; Verhagen et al., 2021).

To describe the concept of business model innovation, the two terms wrapped within need to be elaborated. Thus, Sub-chapter 2.1.1 describes the concept of a business model and Sub-chapter 2.1.2 describes the concept of innovation. Sub-chapter 2.1.3 introduces the concept of business model innovation. Sub-chapter 2.1.4 elaborates on methods to perform business model innovation and Sub-chapter 2.1.5 describes challenges that occur if a business decides to perform business model innovation.

2.1.1 Defining Business Model

A business model representation supports businesses in creating a shared understanding regarding the value generation of their business (Cosenz & Noto, 2018). Massa et al. (2017) have a similar perspective on business models as they also see it as a "formal conceptual representation of how a business functions." Thus, a business model represents the function of selling and buying services or goods in order to earn money (Osterwalder, 2004). However, there are different definitions for the term business model within the literature, which emphasize different aspects. According to the Cambridge Dictionary (2014), a business model is "a description of the different parts of a business or organization showing how they will work together successfully to make

money." Therefore, a business model is a conceptual model of a business, which is seen as a blueprint (Osterwalder, 2004; Teece, 2010). As mentioned in the definition from Cambridge Dictionary (2014), there are different parts within a business, which together form a business model. The literature provides different elements to describe a business model (Osterwalder & Pigneur, 2010; Teece, 2010). Also, in-depth literature reviews have been conducted regarding the elements of a business model (Shafer et al., 2005). Researchers agree that the main elements of a business model are the features of the product or service, the market segments, the revenue streams, as well as some mechanism to create value, such as partnerships (Cosenz & Noto, 2018; Osterwalder, 2004; Osterwalder & Pigneur, 2010; Schallmo et al., 2017; Shafer et al., 2005; Teece, 2010).

A widely used tool to describe a business model in a structured way is the Business Model Canvas, developed by Osterwalder and Pigneur (2010). It is a tool to describe a company's business model on a one-pager (Frick & Ali, 2013). The tool consists of nine building blocks: customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure (Osterwalder & Pigneur, 2010). Furthermore, the Business Model Canvas can be divided into four value categories: value creation, value proposition, value delivery, and value capture (Bocken et al., 2014; Davies & Doherty, 2018; Remane et al., 2017). Value creation represents the activities to create value for the business from which the proposed value to customers can be built (Brandenburger & Stuart Jr, 1996; Davies & Doherty, 2018). Value proposition represents the value that is proposed to customers for purchase (Davies & Doherty, 2018). Value delivery represents the activities required to deliver the proposed value to the customers (Brandenburger & Stuart Jr, 1996; Davies & Doherty, 2018). Value capture represents how value is captured within the business (Bocken et al., 2014; Davies & Doherty, 2018). The overlapping of the value categories and the building blocks of the Business Model Canvas is shown in Figure 4. Thus, to describe business models systematically, the two approaches are combined.
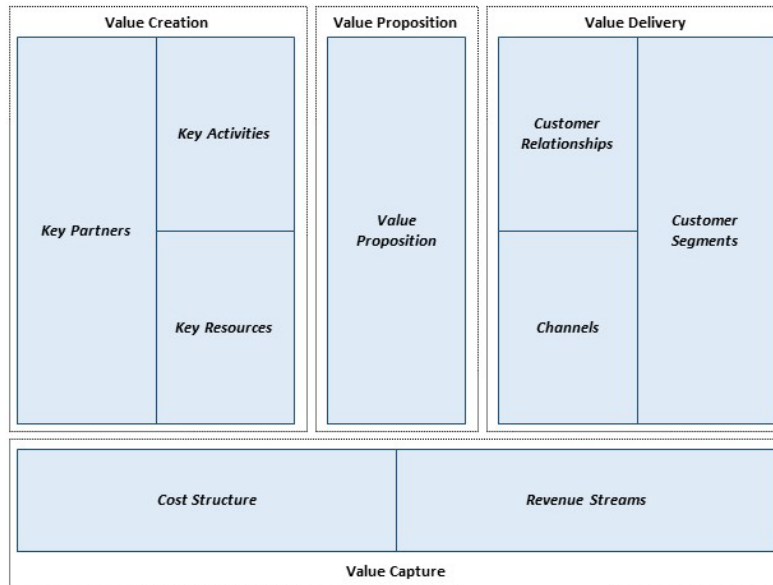
Figure 4: Business Model Canvas mapped to value categories (based on Davies & Doherty, 2018; Osterwalder & Pigneur, 2010; Remane et al., 2017)

Gassmann et al. (2013) introduced a concept to comprehend a business model called the magic triangle, consisting of four elements who, what, how, and value that describe a business model. The element *who* represents the customer and the relationships to maintain them (Gassmann et al., 2013). Further, the element *who* represents the channels set-up to serve the customers (Gassmann et al., 2013). Thus, the element *who* represents the customer segments, customer relationships, and channels of the Business Model Canvas. The element *what* defines what the offering to the customers is (Gassmann et al., 2014) and represents the value proposition of the Business Model Canvas. The element *how* represents the required activities and resources to create and distribute the offering (Gassmann, Frankenberger, & Csik, 2016). Hence, it represents the key partners, key activities, and key resources of the Business Model Canvas. The element *value* represents how the business model achieves viability, and thus, it represents the cost structure and revenue streams of the Business Model Canvas (Gassmann, Frankenberger, & Csik, 2016).

To get to the elementary concept of a business model and simplify the Business Model Canvas, an approach referring to the main components of a business model is applicable. Furthermore, the value categories can be included as well in order to provide further meaning to each component. Table 2 shows the mapping of the Business Model Canvas components, illustrated in Figure 4, the common business model components, the elements of the magic triangle, as well as the naming used within this thesis for business model components, which are derived from Osterwalder (2004) and Zarei et al. (2011), and the relevant value categories for a business model.

Table 2: Mapping of the Business Model Canvas, business model components, and value categories

Business Model Canvas components (Osterwalder & Pigneur, 2010)	Common business model components (Schallmo et al., 2017)	The magic triangle components (Gassmann et al., 2013)	Business model components for this thesis	Value categories (Remane et al., 2017)
Value Proposition	Product/service	What	Offering	Value proposition
• Customer Relationships • Channels • Customer Segments	Market segments	Who	Customer interface	Value delivery
• Cost Structure • Revenue Streams	Revenue streams	Value	Financial aspects	Value capture
• Key Partners • Key Activities • Key Resources	Mechanism to create value	How	Infrastructure	Value creation

Figure 5 illustrates the simplified concept of a Business Model Canvas with its corresponding value categories based on the mapping shown within Table 2. The simplified Business Model Canvas focuses on the main business model components. The component offering focuses on the products and services a company offers its customers (Osterwalder, 2004; Zarei et al., 2011). Customer interface includes the channels used to interact with a customer and thus, the go-to-market strategy, as well as the customer segments and the relationships towards the company's customers (Osterwalder, 2004; Zarei et al., 2011). The infrastructure component is essential to determine the needs to deliver the offering according to the customer interface (Osterwalder, 2004; Zarei et al., 2011). According to Zarei et al. (2011), the component infrastructure "[…] comprises the value configuration of the firm and means the activities to create and deliver value, the interrelationships across the activities, the in-house capabilities and the outsourced ones acquired through the firm's partnership network". Financial aspects involve the cost structure as well as the revenue model of a company. This component is the outcome of the other business model components, it governs the loss- or profit making of a company and thus, it indicates the survival of the company within its market (Osterwalder, 2004; Zarei et al., 2011).
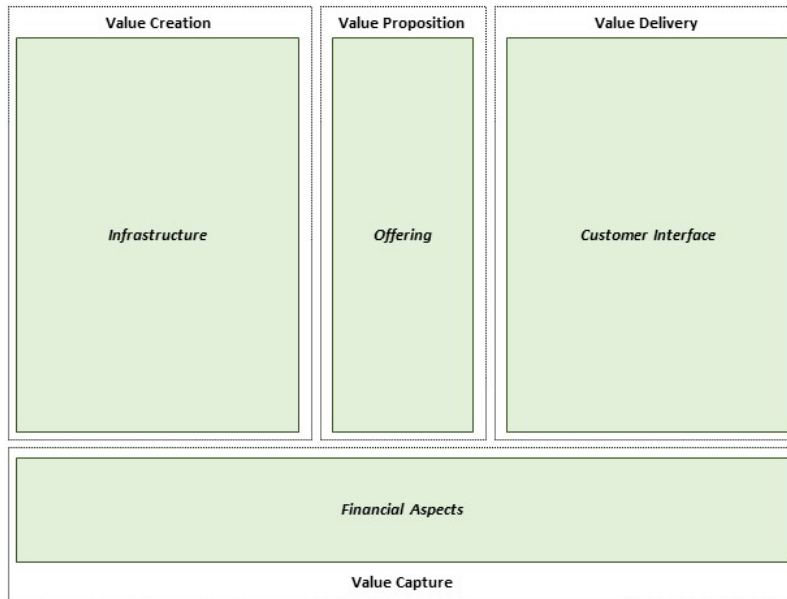
Figure 5: A simplified Business Model Canvas mapped to value categories (based on Davies & Doherty, 2018, p. 5; Osterwalder, 2004, p. 44; Zarei et al., 2011, p. 307)

Figure 6 illustrates the combination of the simplified Business Model Canvas consisting of the entries infrastructure, offering, customer interface, and financial aspects with the value categories value creation, value proposition, value delivers, and value capture and with the nine Business Model Canvas components key partners, key activities, key resources, value proposition, customer relationships, channels, customer segments, cost structure, and revenue streams.
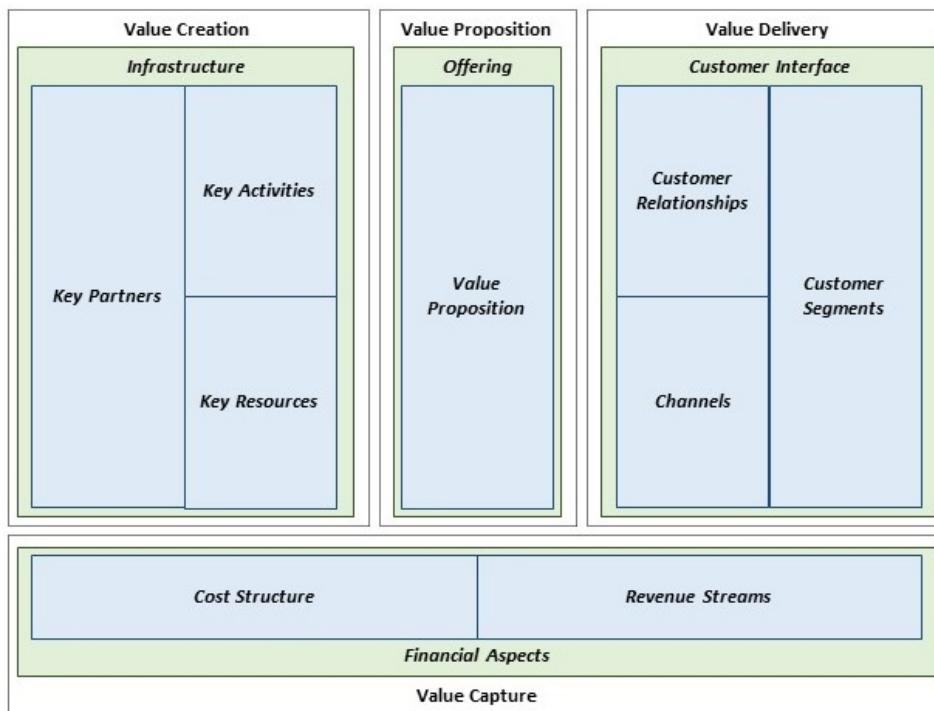
Figure 6: Business Model Canvas mapped to business model components and value categories

2.1.2   Defining Innovation

Through innovation, a new reality can be created by transforming capabilities, such as knowledge, into value (Gardetti & Muthu, 2015). In comparison to change, innovation performs incremental or radical improvements on its objective (Gardetti & Muthu, 2015). Innovation is essential for a business due to the ever-changing customer demands as well as to leverage new technologies and changing structures and markets to remain sustainable (Baregheh et al., 2009; Lee & Trimi, 2016). Baregheh et al. (2009) mention that innovation within a business is related to services, products, processes, and people. Schumpeter (1911), who is considered one of the first writers on the topic of innovation, stated that innovation within an organization is essential to renew the value of the business's resources. According to him, innovation is the arrangement of new products or services, the introduction of new processes, the new formation of raw materials, the introduction of new markets, and the introduction of new organizations (Dalfovo et al., 2011; Taran et al., 2015). Further, Schumpeter (1947) states that innovation is "[…] the doing of new things or the doing of things that are already done, in a new way." Innovation is closely linked to change, as companies use innovation as a tool to affect an environment or because of their changing internal and external environments. As Rogers (1998) states "innovation is a word used to describe a vast number of changes to a firm's activities that lead to improved firm performance." Depending on the resources, skills, strategies, and requirements of the business, however, Baregheh et al. (2009) mention that innovation can bring a variety of different types of change. The authors also claim that frequent types of innovation concern new products, materials, new processes, new services, and new forms of organization.

Based on Baregheh et al. (2009), innovation has been the subject of debates in academic publications on different disciplines, such as operational management, entrepreneurship, research and development, information technology, engineering and product design, and marketing and strategy. Based on the different paradigms of the disciplines, each of these separate fields proposes its separate definitions of innovation (Baregheh et al., 2009). Damanpour and Schneider (2006) also have mentioned this by stating that "innovation is studied in many disciplines and defined from different perspectives." Although there are some intersecting definitions, the quantity and variety of definitions lead to a situation where there is no clear and binding definition of innovation (Baregheh et al., 2009; Prange & Schlegelmilch, 2018; Stampfl, 2016).

To have no single definition that undermines the understanding of the essence of innovation is one of the challenges of innovation (Baregheh et al., 2009). Even though the argumentation that each discipline needs its specific definition of innovation, Baregheh et al. (2009) suggest that "as business and research become more inter- and multi-disciplinary, there is a need for a more

generic, integrative definition." As the term innovation is known to be ambiguous and lacks a common definition, the authors asserted that a general definition that can be applied to different disciplines and addresses different aspects of innovation would be advantageous. The advantages would be that it supports the crossing of disciplinary boundaries and operates as a foundation for extended transparent sharing and transfer of knowledge concerning innovation and its processes (Baregheh et al., 2009). Gault (2018) substantiated that by stating, "with common definitions there would be a standard approach and a common language."

To address the challenge that there is missing an overarching definition of innovation, Baregheh et al. (2009) developed a disciplinary unbiased definition of innovation which is "innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, to advance, compete and differentiate themselves successfully in their marketplace." This definition starts with the phrase *multi-stage process*, indicating that innovation is a process rather than a distinct act. Furthermore, the definition does not define to what context and social entities it applies. Therefore, it is applicable in any possible field where innovation occurs. By combining the terms *multi-stage process* and *transforming ideas into new/improved products,* all the stages that the various scholars gathered by Baregheh et al. (2009) have identified or referred to in their definition of innovation are recognized. The researchers also emphasize that ideas are used and transformed to arrive at *new/improved products, services or processes*, the identified main forms of innovation, and the associated degree of change. Finally, the aim of innovation is described by the terms *successfully advancing* and *competing and differentiating* to mirror not merely the overarching strategic goal of innovation but also the potentially multi-faceted social and environmental contexts in which innovation takes place (Baregheh et al., 2009).

2.1.3   Defining Business Model Innovation

According to innovation literature, there are different types or forms of innovation (Baregheh et al., 2009; Schumpeter, 1911; Stampfl, 2016; Vargo et al., 2015; vom Brocke & Schmiedel, 2015). Researchers agree that two forms of innovation are product or service innovation and process innovation (Baregheh et al., 2009; Chesbrough, 2010; Crossan & Apaydin, 2010; Schumpeter, 1911; Stummer et al., 2010; Vargo et al., 2015; vom Brocke & Schmiedel, 2015). Product or service innovation is usually a task of the R&D department and aims at developing novel products or services to the market (Crossan & Apaydin, 2010). Process innovation represents innovation regarding the applied pattern of the organization to produce value and often aims at efficiency increase for the production (Stummer et al., 2010; vom Brocke & Schmiedel, 2015). However, there are other forms of organizational innovation, such as market innovation and social innovation (Schumpeter, 1911; Stampfl, 2016; Stummer et al., 2010). According to Stampfl

(2016), market innovation aims to identify potential markets and develop existing ones. Social innovation considers innovation in market relationships (Vargo et al., 2015) as well as on an organizational level (Stummer et al., 2010). Further, the form of technological innovation exists. However, technology innovation is regarded as a part of product innovation according to vom Brocke and Schmiedel (2015), OECD (2005), and Stampfl (2016) and also due to technology innovativeness in the organization's activity as a process innovation according to OECD (2005), Crossan and Apaydin (2010), and Dalfovo et al. (2011).

Business model innovation definition

Even though the research focus in the past was mainly on product, process, market, and social innovation, business model innovation has gained popularity in recent years (Hossain, 2017; Massa & Tucci, 2014; Stampfl, 2016; Taran et al., 2015). According to Crossan and Apaydin (2010), business model innovation represents the practice of creating, selling, and delivering value to customers. Frankenberger et al. (2013) define business model innovation "as a novel way of how to create and capture value, which is achieved through a change of one or multiple components in the business model." Based on the research of Gassmann et al. (2014), to achieve business model innovation, at least two of the introduced business model components in Sub-chapter 2.1.1 (offering, customer interface, financial aspects, and infrastructure) need to be significantly affected. Stampfl (2016) describes that business model innovation comes with changes throughout the enterprise architecture, including the structure, content, and governance. Casadesus-Masanell and Zhu (2013) define business model innovation as "business model innovation refers to the search for new logics of the firm and new ways to create and capture value for its stakeholders; it focuses primarily on finding new ways to generate revenues and define value propositions for customers, suppliers, and partners."

Business model innovation compared to other types of innovation

Business model innovation and process and product innovation differ regarding the importance of commitment from the top management for successful integration (Hossain, 2017). Based on Stampfl (2016), process and product innovations can act as triggers to initiate wider organizational innovation in the form of business model innovations. According to Chesbrough (2010) and Caetano et al. (2017), businesses benefit from business model innovation at least as much as from technology or product innovation. Gassmann et al. (2014) goes a step further and states that "Tomorrow's competitive advantage of companies will not be based on innovative products and processes but innovative business models." According to them, as illustrated in Figure 7, a business has higher innovation potential through business model innovation than by applying product or process innovation. According to the research results from Lindgardt et al.

(2009), business model innovators outperform product and process innovators. Stampfl (2016) mentions that since market disruptions are in today's economy happening faster, the importance of business model innovation has increased. The reason for this is that business model innovation usually happens mainly at the beginning of a new market or industry creation and the end of the industry life cycle because businesses need to change themselves to sustain within the new conditions, which is achieved by business model innovations (Stampfl, 2016).
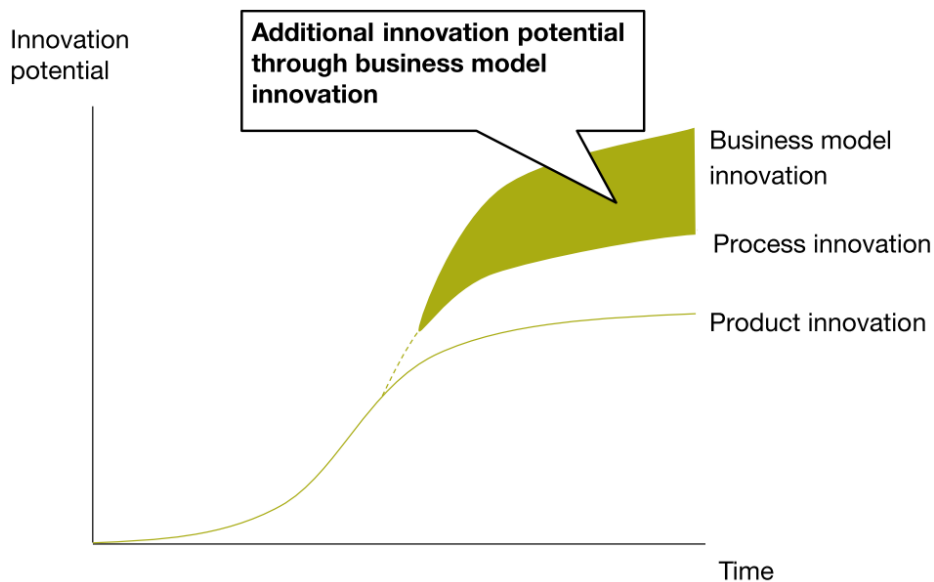
Figure 7: New business models allow for additional innovation potential on top of product and process innovation (Gassmann et al., 2014)

Relevance of business model innovation

Researchers widely agree that for sustainable competitive advantage in today's fast-paced economy, business model innovation is essential (Frankenberger et al., 2013; Magretta, 2002; Teece, 2010; Venkatraman & Henderson, 2008). Gissler et al. (2009) research revealed that "business model innovation will be the most important type of innovation in the future." However, despite this importance of business model innovation, business model innovation is still not researched in-depth (Frankenberger et al., 2013; Hossain, 2017; Taran et al., 2015). Frankenberger et al. (2013) mention that the literature mostly evolves around the importance and benefits of business model innovation. Further, Frankenberger et al. (2013) state that the operationalization of business model innovation and thus, knowledge on the process on how to systematically innovate business models is essential for successful business model innovation. Taran et al. (2015) and Osterwalder and Pigneur (2010) state that the literature has acknowledged the importance to tackle the challenge of the process to achieve business model innovation.

Business model innovation creation

Based on Massa and Tucci (2014), a business model innovation can either be a design of a novel business model or the reconfiguration of an existing one, for example, through acquiring and shifting resources. Lins and Doktor (2014) support this by saying that reconfiguration of a business's resources is the key to a new business model. As mentioned by Chesbrough and Tucci (2020), business model reconfiguration is an exploration activity. Business model reconfiguration is required since the business environment is in constant change, and thus, simple improvements on the current business model are not always enough to be sustainable (Massa & Tucci, 2014; Stampfl, 2016). Gassmann et al. (2013) state that most business model innovations are re-combinations of current business models from other companies and industries. Similar to the statement of Schumpeter (1911), that recombination of resources produces knowledge creation, the recombination of business models from other companies and industries represents a business model innovation. Therefore, business model innovation typically is a combinatorial evolution (Vargo et al., 2015). Business model innovation consists of reconfiguring the existing business model and creating a new and sometimes even novel business model (Stampfl, 2016). According to Hossain (2017) and Santos et al. (2011), reconfiguration within business model innovation can be achieved either through relinking, repartitioning, relocating, or reactivating. Relinking represents a change in the relationship between organizational units (Santos et al., 2011). Repartitioning represents "an alteration in the physical, cultural, and institutional boundaries of the organizational units currently performing activities" (Santos et al., 2011). Relocating represents a change of the organizational unit's distance (Santos et al., 2011). The distance can be cultural, physical, or institutional (Santos et al., 2011). Reactivating represents changing the activities necessary to perform the current business model (Santos et al., 2011). Besides reconfiguring the current business model, companies can create new and novel business models (Andreini & Bettinelli, 2017).

A business model reconfiguration is achieved as soon as the business decides to alter the current business model (Stampfl, 2016). However, depending on the magnitude of the change, the developed business model can be a simple change, an incremental innovation, or a radical business model innovation (Hossain, 2017; Witell & Löfgren, 2013). An incremental business model innovation represents minor changes to the business model, such as continuous improvements or extensions (Crossan & Apaydin, 2010; Taran et al., 2015). For example, through the improvement of the business model's cost structure by cost-cutting in existing processes. On the other hand, radical business model innovation represents the development of something significantly new (Taran et al., 2015). For example, the introduction of a new revenue stream. The same degrees of innovation applies to new and novel business models. New business models

are often associated with giant leaps (Gassmann et al., 2014). Instead, business model innovation is most of the time incremental (Gassmann et al., 2014). However, Andreini and Bettinelli (2017) mentions that the more innovative the business model change is, the higher the impact on performance becomes. Thus, if the organization's business model is innovative, the chances for organizational sustainability are higher (Pedersen et al., 2018). Clack (2017) and Frankenberger et al. (2013)state that the application of an innovative business model supports gaining a competitive advantage. Amit and Zott (2012) mention that "an innovative business model can either create a new market or allow a company to create and exploit new opportunities in existing markets." However, innovative business models "may often conflict with existing industry structures and threaten the ongoing value of the company" (Asswad et al., 2016). Thus, companies need to have ambidexterity capability and thus, not only focus on the new innovative business model (Asswad et al., 2016).

2.1.4   Methods for Business Model Innovation

According to Stampfl (2016), there is a need to conduct further research on how business model innovation is performed. He further mentions that, unfortunately, the applied innovation processes for products and processes, such as the stage-gate model, cannot be transferred easily to the business model innovation approach. According to Gassmann et al. (2014), business model innovation attempts usually start either from a potential capability the business might have and should be leveraged or with a problem, the business is facing and needs to solve. The process for business model innovation is iterative and experimental and often, it is started because of an emergent issue the business has to face (Stampfl, 2016). Mitchell and Bruckner Coles (2004) introduced a four-step approach to business model innovation:

- First, the current business model needs to be understood.
- Second, a business model innovation vision needs to be established and followed.
- Third, the potential business model innovations and improvements need to be designed and tested.
- Last, the defined business model innovation needs to be installed.

Mitchell and Bruckner Coles (2004) further stress that all relevant stakeholders need to be involved in order to achieve successful innovation. Based on Matzler et al. (2013), to achieve a successful business model innovation, the following five key aspects need to be considered: a unique positioning, a matching value creation architecture, a consistent product or service logic, an appropriate sales and marketing, and a sustainable profit mechanism. Bland and Osterwalder (2020) mention that the business model innovation process needs to consider the feasibility,

desirability, and viability of the envisioned business model. Their approach bases on a human-centered design approach (Fenn & Hobbs, 2017) and the Business Model Canvas by Osterwalder and Pigneur (2010), as illustrated in Figure 8. The envisioned business model needs to be feasible. Therefore, the envisioned business model needs to have the appropriate activities, resources, and partners identified and in place to achieve a successful business model innovation (Bland & Osterwalder, 2020). Further, the envisioned business model needs to be desirable. Therefore, the envisioned business model needs to have the appropriate customer segments, channels, customer relationships, and value proposition identified and in place to achieve a successful business model innovation (Bland & Osterwalder, 2020). Last, the envisioned business model needs to be viable. Therefore, the envisioned business model needs to have a cost structure set-up to manage the costs and revenue streams to make enough profit for a sustainable business model (Bland & Osterwalder, 2020).
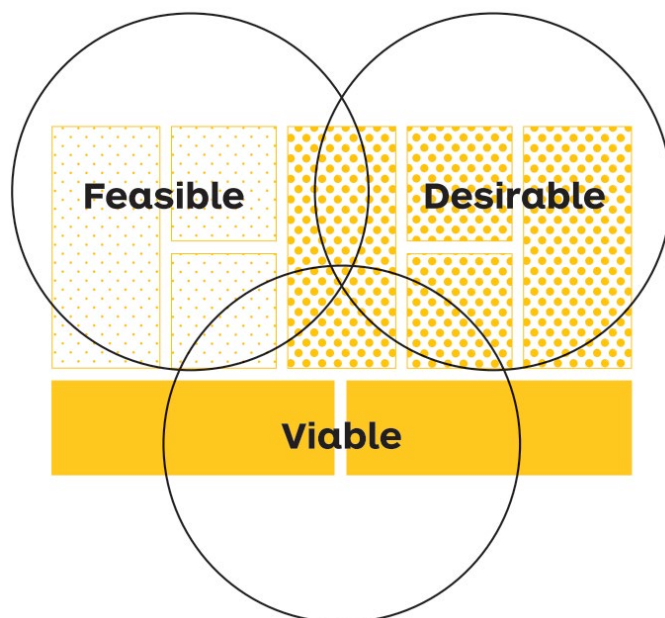
Figure 8: Types of hypotheses on the Business Model Canvas (Bland & Osterwalder, 2020)

A prominent business model innovation approach is the Business Model Navigator by Gassmann et al. (2013), depicted in Figure 9. According to Gassmann et al. (2014), this method applies an action-oriented and iterative development approach. Further, this method is based on the assumption that successful business model innovation is driven by recombination and imitation of other business models (Gassmann et al., 2014).
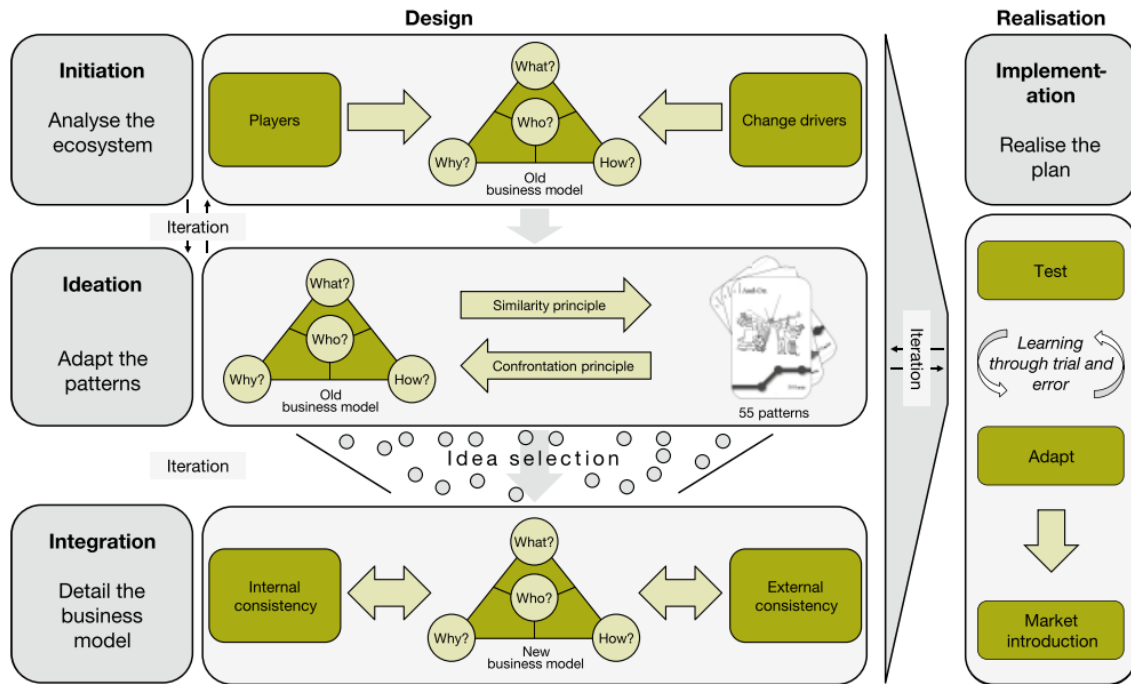
Figure 9: The Business Model Navigator (Gassmann et al., 2014)

The Business Model Navigator distinguishes between two main phases a business model innovation has to go through, the design phase and the realization phase (Gassmann et al., 2013). The design phase consists of three steps: initiation, ideation, and integration. The realization phase consists of the step implementation.

Initiation

The initiation step supports the organization in preparing its business for a business model innovation (Gassmann, Frankenberger, & Csik, 2016). The initiation step's main task is to analyze the ecosystem of the business (Gassmann et al., 2014). The ecosystem consists of stakeholders that influence the operations of the business, such as customers, suppliers, competitors, research institutes, or government agencies (Frankenberger et al., 2013). Besides analyzing the ecosystem, the initiation step focuses on the specification of the currently applied business model (Gassmann, Frankenberger, & Csik, 2016). Further, influencing factors, such as new technologies, new market situations, and regulatory changes, need to be analyzed (Gassmann et al., 2014). In addition, this step facilitates achieving a common understanding of the need for a business model innovation, such as opportunities that could be exploited with an overhauled business model (Gassmann, Frankenberger, & Csik, 2016). Gassmann et al. (2016) suggest addressing the initiation step with open-minded team members from within the organization as well as from outside the organization. Through the inclusion of team members from outside the organization, and

especially outside the own industry, out-of-the-box thinking is promoted for the business model innovation process.

Ideation

The ideation step focuses on developing potential ideas for innovating the current business model (Frankenberger et al., 2013). This is achieved by transforming opportunities, identified in the previous step, into potential ideas (Frankenberger et al., 2013). Gassmann et al. (2014) suggest tackling the ideation step by applying a similarity principle and a confrontation principle to create innovative ideas for new business models. By applying the similarity principle, the goal is first to identify business models similar to the current one (Gassmann et al., 2014). Step by step, business models are taken into consideration that are less similar until the organization discovers a suitable new business model (Gassmann et al., 2014). By applying the confrontation principle, the goal is to directly identify radical changes to the current business model (Gassmann et al., 2014). Even though it is challenging to retrieve insights from business models that are not of the organization's industry, it is necessary to achieve an innovative business model (Gassmann, Frankenberger, & Csik, 2016).

Integration

Unfortunately, new ideas are not elaborated enough to implement them immediately into the organization (Gassmann, Frankenberger, & Csik, 2016). Therefore, the integration step focuses on shaping the new business model into a viable business model (Frankenberger et al., 2013). For this, the organization has to ensure that internal and external consistency is provided (Gassmann et al., 2014). Internal consistency is achieved when the different business model components, such as the revenue stream or the value proposition, fit together (Gassmann et al., 2013). External consistency is achieved by embedding the new business model into the organization's ecosystem (Gassmann et al., 2014).

Implementation

As soon as the design for the new business model is finalized and integrated, the challenging task of implementation starts (Frankenberger et al., 2013; Gassmann et al., 2014). This step involves high risks and huge investments to be made for the organization since implementing the new business model has broad effects on the current business (Frankenberger et al., 2013). Gassmann et al. (2014) suggest taking a step-by-step approach for the implementation of the new business model. They recommend first to develop prototypes that can be tested on a small scale and adapt the prototype based on the test results.

Geissdoerfer et al. (2017) introduced another elaborated method for describing a business model innovation process, the Cambridge Business Model Innovation Process, depicted in Figure 10. This method guides the execution of business model innovation (Geissdoerfer et al., 2017). The method consists of eight steps, described in Table 3, that are iterative in order for the organization to take steps back if necessary.

Figure 10: The Cambridge Business Model Innovation Process (Geissdoerfer et al., 2017)

Table 3: Description of the Cambridge Business Model Innovation Process steps (based on Geissdoerfer et al., 2017)

Step	Description
1. Ideation	This step represents the business model innovation purpose. Further, the relevant stakeholders and the value proposition are defined. Also, first conceptual ideas are generated.
2. Concept design	This step represents the development and documentation of a first concept containing the key business model components.
3. Virtual prototyping	This step represents the development of prototypes to communicate the idea for the new business model. Further, benchmarks against concepts from third parties such as competitors are conducted.
4. Experimenting	This step represents field experiments and simulations to test key assumptions of the concept.
5. Detail design	This step represents a detailed analysis and specification of the new business model.
6. Piloting	This step represents a limited test run of the new business model with a small target market.
7. Launch	This step represents the rollout of the business model across the entire organization. Also, the business model is introduced into the entire target market.
8. Adjustment and diversification	This step represents a retrospect revision of the innovation. Depending on the results of this analysis, adjustments are made.

The Cambridge Business Model Innovation Process is applied to inform practitioners regarding planning and execution within their organization. Also, the method is helpful to identify tools that facilitate certain process steps. (Geissdoerfer et al., 2017)

The individual steps of the two detailed methods for a business model innovation process, the Business Model Navigator from Gassmann et al. (2013) and the Cambridge Business Model

Innovation Process from Geissdoerfer et al. (2017), are related. Thus, a mapping of both methods is achievable, as described in Table 4.

Table 4: Mapping of the Business Model Navigator and Cambridge Business Model Innovation Process

The Business Model Navigator	The Cambridge Business Model Innovation Process	Reason
Initiation	Ideation	The Business Model Navigator separates the initial task to define the current state into the step initiation, while the Cambridge Business Model Innovation Process method integrates this task into the ideation step.
Ideation		
Integration	Concept design	Both steps represent the development of the target business model.
Implementation	Virtual prototyping	The Business Model Navigator incorporates all the Cambridge Business Model Innovation Process method's last six steps into its implementation step.
	Experimenting	
	Detail design	
	Piloting	
	Launch	
	Adjustment and diversification	

2.1.5 Challenges of Business Model Innovation

As mentioned by Chesbrough (2010), organizations face significant challenges for business model innovations. The following tables summarize the identified challenges for business model innovation according to the literature. The identified challenges were synthesized into the four steps of a business model innovation process based on the Business Model Navigator. Challenges that do not match a single process step but are an overarching challenge are grouped and represented as overarching challenges of the business model innovation process.

Table 5 describes the challenges that overarch the business model innovation process. The challenges of the initiation process step for business model innovation are listed in Table 6. Table 7 describes the challenges of the ideation process step for business model innovation. The challenges of the integration process step for business model innovation are listed in Table 8 and the challenges of the implementation process step for business model innovation are listed in Table 9.

Challenges overarching the business model innovation process

Table 5: Overarching business model innovation challenges

Challenge	Description	Reference
Dependency on the current capabilities	It is challenging to overcome the dependency on the current business model's capabilities to succeed in business model innovation attempts.	(Andreini & Bettinelli, 2017)
Bureaucracy	It is challenging to overcome bureaucracy which hinders innovation. This challenge applies mainly to larger companies.	(Andreini & Bettinelli, 2017)
Courage to cannibalize the current business model	It is challenging for organizations to be willing to cannibalize their current business model, especially if they are profiting from the current business model.	(Villinger & Jung, 2015)
Risk tolerance	It is challenging to have risk tolerance as an organization as well as for the involved managers.	(Villinger & Jung, 2015)
Identify appropriate budget and receive approval	It is challenging to identify an appropriate budget and get it granted since resources are required to perform business model innovations.	(Villinger & Jung, 2015) (Geissdoerfer et al., 2017)
Focusing on customer demands	It is challenging not to be focusing too much on solving internal issues instead of focusing on customer demands.	(Lindgardt et al., 2009)
Acquiring stakeholder support	It is challenging to acquire the buy-in of the top management and other relevant stakeholders for a business model innovation.	(Frankenberger et al., 2013) (Andreini & Bettinelli, 2017) (Geissdoerfer et al., 2017)
Obtain feedback early on	It is challenging to receive feedback from stakeholders early on.	(Geissdoerfer et al., 2017)
Identify adequate timeframes	It is challenging to identify adequate timeframes to bring the new business model to market eventually.	(Geissdoerfer et al., 2017)

Challenges of the initiation process step for business model innovation

Table 6: Business model innovation challenges for the initiation process step

Challenge	Description	Reference
Identification of relevant stakeholders	It is challenging to identify the stakeholders relevant for developing a successful business model innovation.	(Geissdoerfer et al., 2017)

Identification of stakeholder demands	It is challenging to identify the needs of the identified stakeholders for the business model innovation.	(Frankenberger et al., 2013)
Identification of drivers of change	It is challenging to be aware of the organization's environment, which in today's economy is changing fast, to identify drivers of change, such as technology and regulatory changes.	(Frankenberger et al., 2013) (Chesbrough, 2010) (Villinger & Jung, 2015)
Identification of opportunities	It is challenging to identify opportunities for innovating.	(Geissdoerfer et al., 2017)

Challenges of the ideation process step for business model innovation

Table 7: Business model innovation challenges for the ideation process step

Challenge	Description	Reference
Great knowledge of business model innovation possibilities required	It is challenging to gain the required knowledge to achieve a new and innovative business model since the definition and exploration of new business model possibilities come along with high cognitive efforts.	(Massa & Tucci, 2014)
"Out-of-the-box"-thinking	It is challenging to think out-of-the-box and, thus, to think outside the current industry and business logic and to think of disruptive business models.	(Lindgardt et al., 2009) (Frankenberger et al., 2013) (Gassmann, Frankenberger, & Csik, 2016) (Geissdoerfer et al., 2017)
Thinking in business models	It is challenging for managers to think in business models instead of product development to solve issues.	(Frankenberger et al., 2013)
No computer-based ideation-supporting tools	It is challenging to build computer-based tools for business model innovation support on the current level of detail of the business model concept.	(Frankenberger et al., 2013) (Gordijn, 2002)
Leveraging business capabilities	It is challenging to identify business model innovation possibilities by leveraging a business's capabilities.	(Gassmann et al., 2014) (Geissdoerfer et al., 2017)

Comparison of business model innovation with the own business	It is challenging to compare business model innovations with the own business model or enterprise architecture since currently, it is a cumbersome task as it needs to be done manually and the comparison needs much time.	(Osterwalder et al., 2005)

Challenges of the integration process step for business model innovation

Table 8: Business model innovation challenges for the integration process step

Challenge	Description	Reference
Integration of the new business model into the current one	It is challenging for organizations to integrate a new business model into a current one because of the interconnectivity of a business model, and thus, changing one element of the business model leads to several changes across the enterprise architecture.	(Frankenberger et al., 2013)
Alignment with the organization's environment	It is challenging to align the new business model with the organization's environment since its environment is constantly changing.	(Frankenberger et al., 2013)
Mutual understanding	It is challenging to achieve a mutual understanding among the stakeholders regarding the goal and the process to achieve the goal.	(Geissdoerfer et al., 2017)

Challenges of the implementation process step for business model innovation

Table 9: Business model innovation challenges for the implementation process step

Challenge	Description	Reference
Admit failure	It is challenging to admit failure as an organization and for managers to let their "pet ideas" go since they are not blooming as expected.	(Lindgardt et al., 2009)
Overcome resistance within the company	It is challenging to overcome the company's internal resistance, which is often the case since managers might feel threatened to lose their company's status.	(Frankenberger et al., 2013) (Chesbrough, 2010)
Overcome implementation complexity	It is challenging to overcome the implementation complexity, and thus, it is challenging to manage it.	(Frankenberger et al., 2013)
Handle the complexity of prototypes	It is challenging to handle the complexity of prototypes since the topic of business model innovation is complex.	(Geissdoerfer et al., 2017)
Detailed specifications of the new business model	It is challenging to have the required documentation to implement the business model and that the documentation is detailed enough.	(Geissdoerfer et al., 2017)

Obtain validation data	It is challenging to obtain validation data since experiments and pilots are not always performed.	(Geissdoerfer et al., 2017)
Appropriate set-up for the pilot	It is challenging to identify the appropriate setting for running the pilot.	(Geissdoerfer et al., 2017)
Identification of the diversification of the new business model	It is challenging to identify the new business model's diversification, especially if the new business model is not highly innovative.	(Geissdoerfer et al., 2017)

2.2   Enterprise Architecture and Business Model Innovation

This chapter describes the enterprise architecture modeling language ArchiMate and how enterprise architecture can foster business innovation. These topics are relevant for the business and IT architecture aspects of a business model innovation. By integrating enterprise architecture into the business model innovation topic, the effects on the lower layers of the enterprise architecture are taken into consideration instead of only taking the strategy layer and the motivation aspects, as business models mainly use these two concepts to be represented. Thus, Sub-chapter 2.2.1 introduces enterprise architecture frameworks and Sub-chapter 2.2.2 the modeling language ArchiMate which is used to develop this research's artifacts. Sub-chapter 2.2.3 describes the relevance of enterprise architecture for the topic of business innovation. Finally, Sub-chapter 2.2.4 introduces the relation between ArchiMate and the Business Model Canvas.

2.2.1   Enterprise Architecture Frameworks

Enterprise architecture provides a holistic view of an enterprise (Lankhorst, 2009) and provides a set of models, methods, tools, and principles (Saint-Louis et al., 2017). Utilizing these, enterprise architecture elements can be analyzed, designed, and redesigned if necessary (Saint-Louis et al., 2017).

Researchers and practitioners have developed various frameworks and models to address the complexity of representing and describing enterprise architecture. The Zachman framework, the TOGAF framework, and the ArchiMate Enterprise Architecture modeling language are three popular ones. According to Zachman (1987), his framework describes an enterprise consisting of different perspectives of different stakeholders. The framework answers the questions of what, how, where, who, when, and why regarding the perspectives of the executives, business management, architect, engineer, and technician (Zachman, 2008). The Zachman framework is seen as an enterprise ontology (Erder & Pureur, 2016; Zachman, 2008). Since the Zachman framework is a metamodel, it does not imply how the architecture is developed nor how the

relations between the different elements within the frameworks are (Zachman, 2008). Zachman (2016) mentions that his framework is a logical structure where one can classify and organize "the descriptive representations of an enterprise," which are significant for management and development. Since the Zachman Framework consists of multiple representations of the enterprise, there is no single language or methodology used for creating these representations (Noran, 2003). Thus, the framework provides a structure with perspectives and abstractions, yet no overarching modeling language for enterprise architecture.

The enterprise architecture framework TOGAF uses an iterative approach and is based on best practices to develop an enterprise architecture (Josey et al., 2016). The method applied by the TOGAF framework to address business needs is called the TOGAF Architecture Development Method (ADM) (Josey et al., 2016). This method contains ten phases to address an enterprise's business requirements, as described in Table 10.

Table 10: Phase description of the TOGAF ADM (based on Josey et al., 2016)

TOGAF ADM phase	Description
Preliminary	This phase prepares a company to develop and integrate an enterprise architecture. During this phase, the company specifies its architecture principles and the tools used for the development and management of the enterprise architecture.
Requirements Management	For the TOGAF ADM phases A to H, the business requirements need to be considered and met. This phase collects, stores, and manages these business requirements.
A. Architecture Vision	This phase's goal is to set the expectations and scope for the enterprise architecture project. To achieve this, the stakeholders need to be identified and the vision needs to be specified. Also, the business context needs to be considered.
B. Business Architecture	This phase analyzes and develops the enterprise architecture regarding its business perspective. To achieve this, the target business architecture needs to be specified. If the enterprise already exists, the current state needs to be specified to retrieve the gaps between the target and the current state of the business architecture.
C. Information Systems Architecture	This phase analyzes and develops the information systems architecture with concerns to the application and the data domain. To achieve this, the target information systems architecture and, if the enterprise already exists, the current state needs to be specified. This enables the company to retrieve the gaps between the target and the current state of the information systems architecture.
D. Technology Architecture	This phase analyzes and develops the enterprise architecture regarding its technology perspective. To achieve this, the target technology architecture and, if the enterprise already exists, the current state needs to be specified. This enables the company to retrieve the gaps between the target and the current state of the technology architecture.

E. Opportunities and Solutions	This phase aims to describe how the target state of phases B to D can be achieved through an implementation plan. The method includes the definition of projects, programs, and, if applicable, portfolios.
F. Migration Planning	This phase specifies the migration and finalizes the implementation plan to transition towards the enterprise architecture's target state successfully.
G. Implementation Governance	This phase is concerned with the governance functions of the implementation. As part of it, this phase defines how the implementation is monitored and how changes during the implementation are managed.
H. Architecture Change Management	This phase's task is to make sure that the architecture lifecycle is ensured. Also, the architecture governance execution as specified needs to be ensured through this phase.

The TOGAF ADM integrates the iterative development approach by enabling the enterprise architecture designer to cycle around a single phase, iterating between the phases, and cycling around the entire TOGAF ADM (Josey et al., 2016).

2.2.2   Enterprise Architecture Modeling

According to Ahlemann et al. (2012), enterprise architecture models are required to manage enterprise architecture. They further mention that by applying modeling artifacts to specify not only the enterprise but also its context, an integrated perspective of the enterprise is achieved.

ArchiMate is a standard for modeling enterprise architectures that comes along with a set of relationships and entities (The Open Group, 2019). As mentioned by The Open Group (2019), ArchiMate is used to analyze, describe, and visualize an enterprise architecture. ArchiMate's modeling language is set up in different aspects and layers, and thus, it allows a holistic enterprise perspective. This set-up is illustrated in Figure 11, the ArchiMate framework. The ArchiMate framework of the ArchiMate version 3.1 evolves around five layers: the strategy layer, the business layer, the application layer, the technology layer, and the implementation and migration layer. According to The Open Group (2019), the strategy layer represents "[…] the strategic direction and choices of an enterprise […]" and the business layer represents the operational organization of a company. While the application layer describes the structure and behavior of the enterprise's applications, the technology layer does the same for the infrastructure of the enterprise (The Open Group, 2019). As part of the technology layer, physical elements can be modeled to describe the enterprise architecture's physical world (The Open Group, 2019). The implementation and migration layer represents the modeling of the projects to implement and migrate the target enterprise architecture (The Open Group, 2019). Each layer considers the aspects of passive structure, behavior, and active structure. According to The Open Group (2019), passive structure "[…] represents the objects on which behavior is performed; these are usually

information objects in the Business Layer and data objects in the Application Layer." Typical active structures are business actors or application components and they are capable of performing a behavior (The Open Group, 2019). Such behavior structure examples are services, processes, or functions (The Open Group, 2019). The fourth aspect of the ArchiMate framework is the motivation aspect. Through the motivation aspects, the design or change decisions to guide the enterprise architecture development are modeled (The Open Group, 2019).
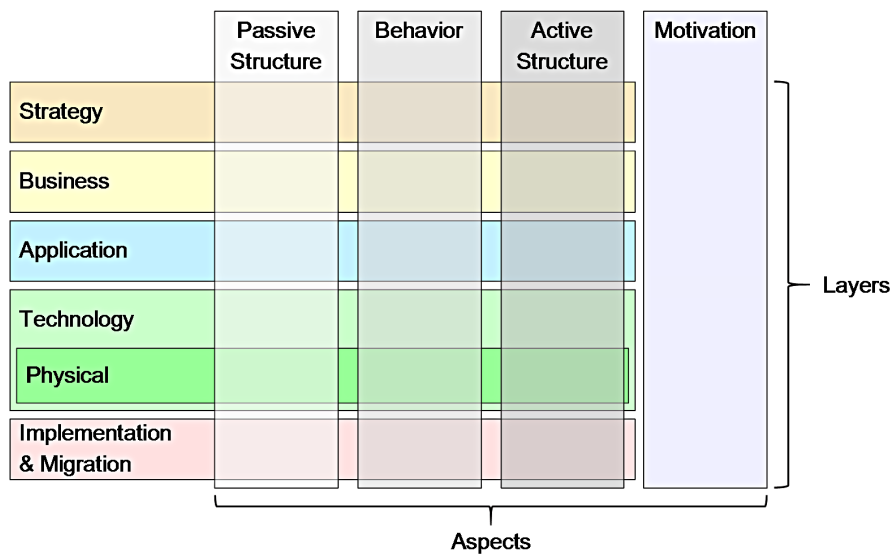
Figure 11: The ArchiMate Full Framework (The Open Group, 2019)

The TOGAF and the ArchiMate standards have a great conceptual alignment (Jonkers et al., 2009). Both standards support the "[…] definition of an architecture development process and the definition of an enterprise architecture modeling language […]" (The Open Group, 2019). Figure 12 illustrates how both standards can be merged and used in conjunction. However, the main difference between the two standards is that TOGAF has additional concepts included, such as deliverables or architecture partitioning, but ArchiMate has the benefit of providing greater detail on architecture viewpoints, descriptions, and examples (Jonkers et al., 2009).
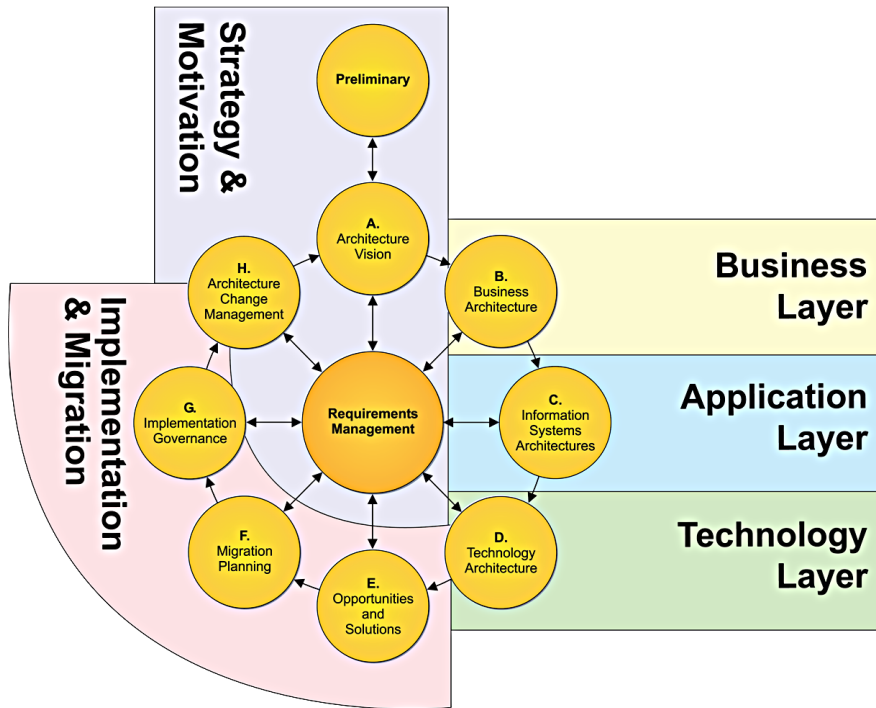
Figure 12: Correspondence between the ArchiMate language and the TOGAF ADM (The Open Group, 2019)

The ArchiMate standard not only provides the layers and aspects to model an enterprise architecture but also the relationships. The relationships are used to connect with other relationships or, as usually used, to connect with elements from the layers (The Open Group, 2019). According to ArchiMate version 3.1 (The Open Group, 2019), there are four different types of relationships: structural, dependency, dynamic, and other. The four types of relationships and the elements they each contain are depicted in Figure 13. As defined by The Open Group (2019), structural relationships are used to model the static composition or construction of elements within the layers. ArchiMate offers the structural relationships of realization, assignment, aggregation, and composition. The authors further specify that dependency relationships are used to model the support function between enterprise architecture elements. The relationships offered by the type dependency are association, influence, access, and serving. The dynamic relationships are used for modeling the behavioral dependencies between layer elements (The Open Group, 2019). Such relationships are defined as triggering and flow. The other type of relationship is the specialization relation that does not belong to any of the other three relationship types (The Open Group, 2019). Besides the relationship elements, ArchiMate also offers two elements to model the junction of relationships of the same type: the and-junction and the or-junction (The Open Group, 2019). While the and-junction is used to model that all connected elements must be true, the or-junction specifies that at least one connected enterprise architecture element has to be true (The Open Group, 2019).
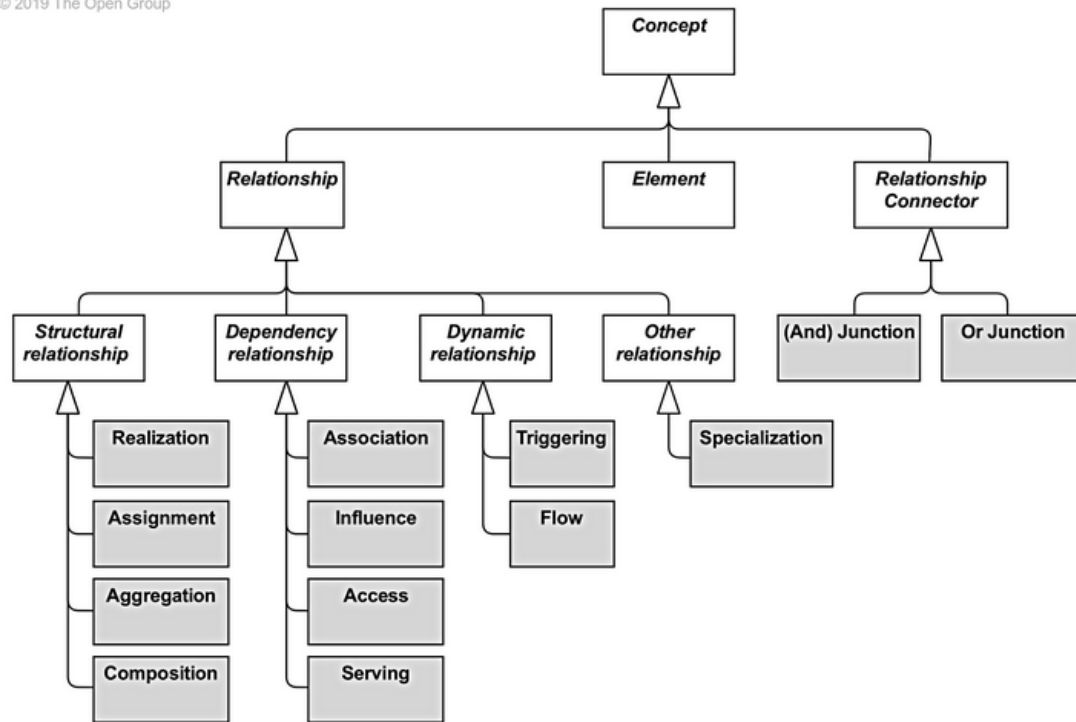
Figure 13: Overview of relationships (The Open Group, 2019)

Enterprise architectures are complex. To handle this complexity, ArchiMate offers the functionality to design the enterprise architecture with different perspectives, each designed specifically for a stakeholder. For this purpose, ArchiMate introduced the concept of concerns, architecture viewpoints, and architecture views. A viewpoint addresses the stakeholder's specific concern and includes either concepts from one layer or spreads across several layers. Architecture viewpoints govern the views, which in return represents an architecture description. (The Open Group, 2019)

2.2.3   Enterprise Architecture Supporting Business Innovation

As stated by Lankhorst (2009), enterprise architecture is not something static hampering innovation. Instead, by means of enterprise architecture, innovation within a business can be fostered (Lankhorst, 2009; Marfo Missah, 2015; Nardello et al., 2016; Rohloff, 2011; Shah & El Kourdi, 2007; Shanks et al., 2018; Wang et al., 2008). According to Nardello et al. (2016), enterprise architecture is becoming more important for successful business innovation. Enterprise architecture supports the leverage of the existing systems, processes, or other assets to identify potentials (Lankhorst, 2009). As Saint-Louis et al. (2017) mentioned, enterprise architecture facilitates reacting to changes either from business or technology and anticipating them. This is achieved through modeling the innovation as a target enterprise architecture model (Gomes et al., 2019). Further, such modeling supports the integration into the current enterprise architecture of

a company (Gomes et al., 2019). Lankhorst (2009) mentions that good practice of enterprise architecture supports the stability and flexibility it provides to a company. Such stability and especially flexibility supports innovative change of a business (Lankhorst, 2009). Marfo Missah (2015) also mentions that enterprise architecture enables the enhancement of business innovation by providing stability. Further, enterprise architecture supports, besides the stability and flexibility, interoperability that increases the innovation power of a company (Lankhorst, 2009). Also, enterprise architecture increases the adaptability a business has to changes (Shah & El Kourdi, 2007). The research from Shah and El Kourdi (2007) revealed that through enterprise architecture, not only the challenge to handle IT efficiency is supported, but also a continuous approach for business innovation is facilitated. Wang et al. (2008) state that by means of enterprise architecture, the innovative competency of a company can be increased. Marfo Missah (2015) also states that enterprise architecture facilitates the increase of the innovation potential of a business. According to Lankhorst (2009), enterprise architecture is used to retrieve insights regarding the needs and priorities a business has regarding changes. The author further mentions that enterprise architecture is leveraged to assess how the business can succeed from applying business innovation attempts. O'Brien (2018) states that enterprise architecture can be seen as a capability that enables business innovation by supporting changes required to achieve the innovation.

Enterprise architecture is a strategic instrument that guides a business through an intended development (Lankhorst, 2009). Shanks et al. (2018) come to the same conclusion that corporate strategic transformation requires enterprise architecture. They elaborate that enterprise architecture is used for decision-making purposes that eventually lead to business innovations. Similar results revealed the research of Marfo Missah (2015), who states that enterprise architecture can be seen as a capability of a business to forecast in long-term perspective the business innovation development. Shah and El Kourdi (2007) mention that an essential benefit of enterprise architecture is the facilitated decision-making process not only on isolated components of a business but on a holistic view of the business. According to them, enterprise architecture is not only a specification tool to model different states of a business but a planning and problem-solving tool. Thus, businesses that engage in business innovation topics actively apply principles of enterprise architecture (Marfo Missah, 2015). After all, business architects have an integral role in creating innovation for their business (Marfo Missah, 2015).

2.2.4 Combining Enterprise Architecture and Business Model

Marfo Missah (2015) stated that the concept of a business model is seen as a part of enterprise architecture. After all, enterprise architecture incorporates the elements a business model typically

has, as described in Sub-chapter 2.1.1. Thus, the enterprise architecture and business model concepts are compatible (Caetano et al., 2017; Fritscher & Pigneur, 2011; Hosiaisluoma, 2020; Iacob et al., 2014; Lankhorst et al., 2017; Meertens et al., 2012; Walters, 2020). Marfo Missah (2015) mentions that it is beneficial for a company to comprise a business model within enterprise architecture. Employing enterprise architecture, business models receive more information and depict the business in more detail (Marfo Missah, 2015). As Caetano et al. (2017) mention, integrating both concepts is attractive to provide information on how the elements and processes of an organization realize a business model.

Fritscher and Pigneur (2011) introduced a mapping of the concepts of business model and enterprise architecture, as illustrated in Figure 14, using the Business Model Canvas as the representation for a business model and ArchiMate as the representation for enterprise architecture. According to their mapping, the customer segments and the key partners are related to ArchiMate's external roles and actors of the business layer. Further, they map the value proposition, customer relationships, and channels from the Business Model Canvas to the business layer's external business services. Fritscher and Pigneur (2011) decided to map the key activities of a business model to the business process internal actors/roles and from the application layer the external application services and application components. Also, they map the key resources of a business model to the external infrastructure services and the infrastructure in general. However, Fritscher and Pigneur (2011) state that the key resources are too high-level to be represented as technical components in most cases. Also, they concluded that the financial aspects of cost structure and revenue streams could not be mapped to ArchiMate.

It is important to point out that the mapping of the Business Model Canvas and ArchiMate by Fritscher and Pigneur (2011) does not rely on the current version 3.1 of ArchiMate, and thus, their mapping could not include the motivation aspect or the strategy layer.

Caetano et al. (2017) also introduced a mapping of the concepts of business model and enterprise architecture. They mapped the Business Model Canvas to the business layer of ArchiMate since they see a business model as part of the business architecture of a company. Their mapping relates to ArchiMate's version 2, and thus, also no strategy layer and motivation aspects are included. Their mapping result is described in Table 11. Caetano et al. (2017) focused on an external view on a business model. Thus, the cost structure is not part of their mapping.

2. Literature Review
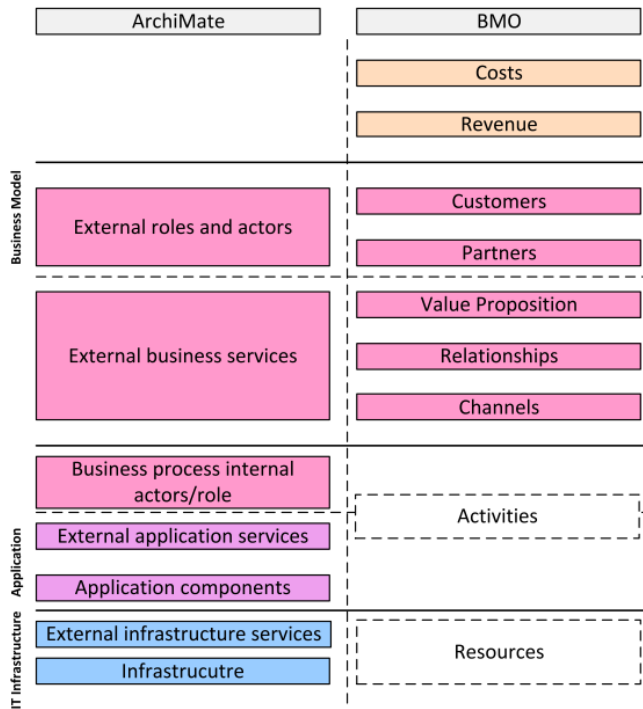
Figure 14: Correspondence between ArchiMate and business model elements (Fritscher & Pigneur, 2011)

Table 11: Mapping from Business Model Canvas to ArchiMate (adapted from Caetano et al., 2017)

Business Model Canvas element	ArchiMate element	Rationale
Customer segment	Business actor	Customer segments are external groups of actors.
Key partner	Business actor	Key partners are external actors that support the operation of the business model.
Channel	Business interface	Channel interfaces with customer segments to deliver value propositions.
Revenue stream	Value	Value depicts the net result of a revenue stream.
Value proposition	Service, product, value	Service or Product represents the externalization to a customer of a value proposition. Value depicts the relative worth of a service or product from the perspective of an actor.
Key activity	Process, function	Key activity is realized as a business process or business function.
Key resources	Business object	Key resources correspond to tangible business objects.

Meertens et al. (2012) also introduce a suggestion on how to map the Business Model Canvas with the ArchiMate standard. The mapping of Meertens et al. (2012) also has no strategy layer and motivation aspects included since they relate to ArchiMate version 1 for their mapping. However, they developed the mapping further than Caetano et al. (2017) and Fritscher and Pigneur (2011) since Meertens et al. (2012) added the motivation extension of ArchiMate to the mapping. Specifically, they used the element goal from the motivation extension to map the business model element value proposition in greater detail. The element goal highlights the usefulness of the product or service a business has (Meertens et al., 2012). Further, Meertens et al. (2012) added a resource extension to ArchiMate to map the business model element key resources. In the meantime, The Open Group (2019) added resource as a modelling element in the strategy layer of the ArchiMate standard. Table 17 shows how the Business Model Canvas elements are mapped to the ArchiMate standard according to the view of Meertens et al. (2012).

Table 12: Mapping of the concepts Business Model Canvas and ArchiMate (Meertens et al., 2012)

Business Model Canvas elements	ArchiMate elements
Customer Segments	Business Actor
	Business Role
Value Propositions	Business Service
	Value
	Product
	Goal
Channels	Business Interface
Customer Relationships	Business Collaboration
	Business Interaction
Revenue Streams	Value
Key Resources	Resource
Key Activities	Business Process
	Business Function
	Business Interaction
Key Partnerships	Business Actor
	Business Role
	Business Collaboration
	Contract
Cost Structure	Value

Iacob et al. (2014) map the Business Model Canvas and ArchiMate similar to the approach of Meertens et al. (2012). Iacob et al. (2014) also included the motivation extension of ArchiMate. However, Iacob et al. (2014) use more elements of the motivation extension. They assign the elements key partners and customer segments to the motivation element stakeholder. Further, Iacob et al. (2014) added a value-related concept as an extension to ArchiMate. This includes the elements of capability and resource, which in the meantime also have been added to the ArchiMate standard (The Open Group, 2019). Based on the mapping of Iacob et al. (2014), the capability element models the key activities and the customer relationships. The key resources and channels of the Business Model Canvas are mapped to the resources element of the extension from Iacob et al. (2014). The entire mapping of the ArchiMate elements and the motivation and value extensions with the Business Model Canvas is depicted in Figure 15.
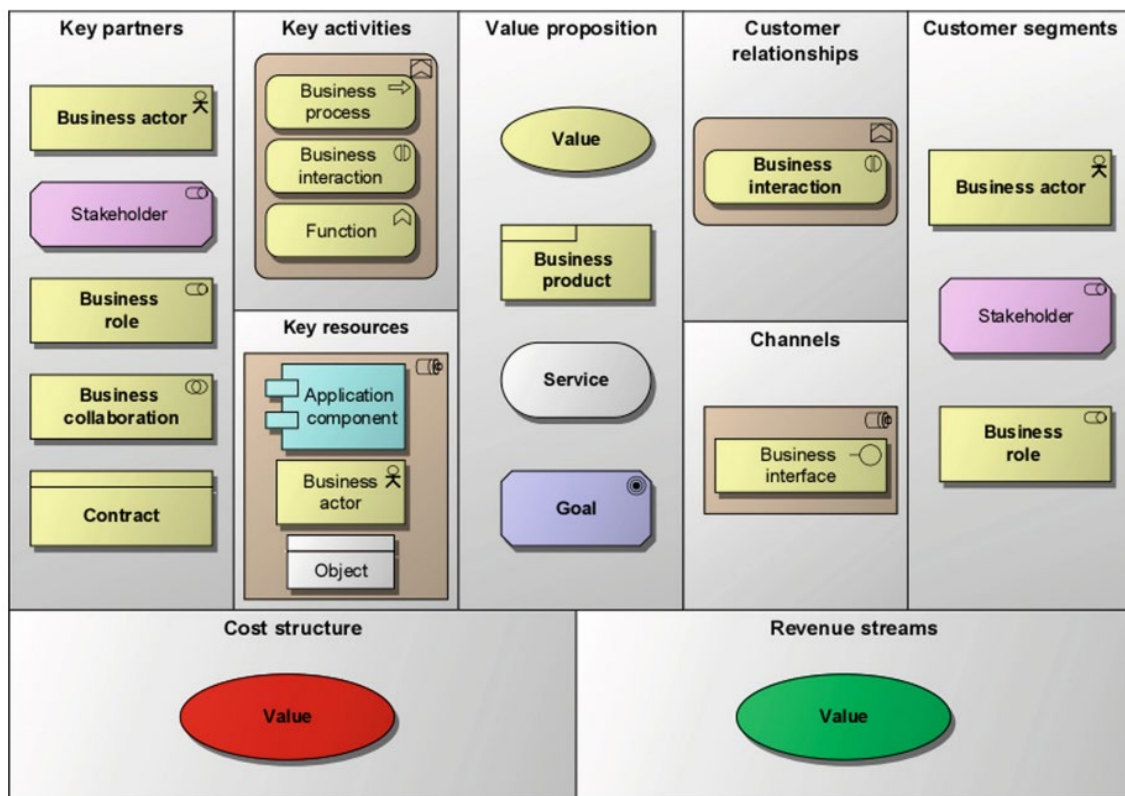
Figure 15: Relating ArchiMate and Business Model Canvas (Iacob et al., 2014)

As research evolved, ArchiMate has been further developed and is of today available as version 3.1, which includes a strategy layer and motivation aspects within the framework. Before version 3 of ArchiMate, strategy elements did not exist within the framework and the motivation elements were an extension. Today, according to Hosiaisluoma (2020), Lankhorst et al. (2017), and Walters (2020), a mapping of ArchiMate on the Business Model Canvas uses strategy, business, and motivation elements from ArchiMate. Hosiaisluoma (2020) introduces a mapping, using the ArchiMate version 3, that is very similar to the solution of Iacob et al. (2014) since Iacob et al.

(2014) as well had the capability and resource elements available, yet, they were not yet part of the official ArchiMate framework. The main difference between the two solutions for mapping the two concepts is that Iacob et al. (2014) map customer relationships to capability and channels to resources, but Hosiaisluoma (2020) does not include these two mappings, as illustrated in Figure 16. However, Lankhorst et al. (2017) agree with Iacob et al. (2014) to map the business model element channel with the ArchiMate strategy element resource.
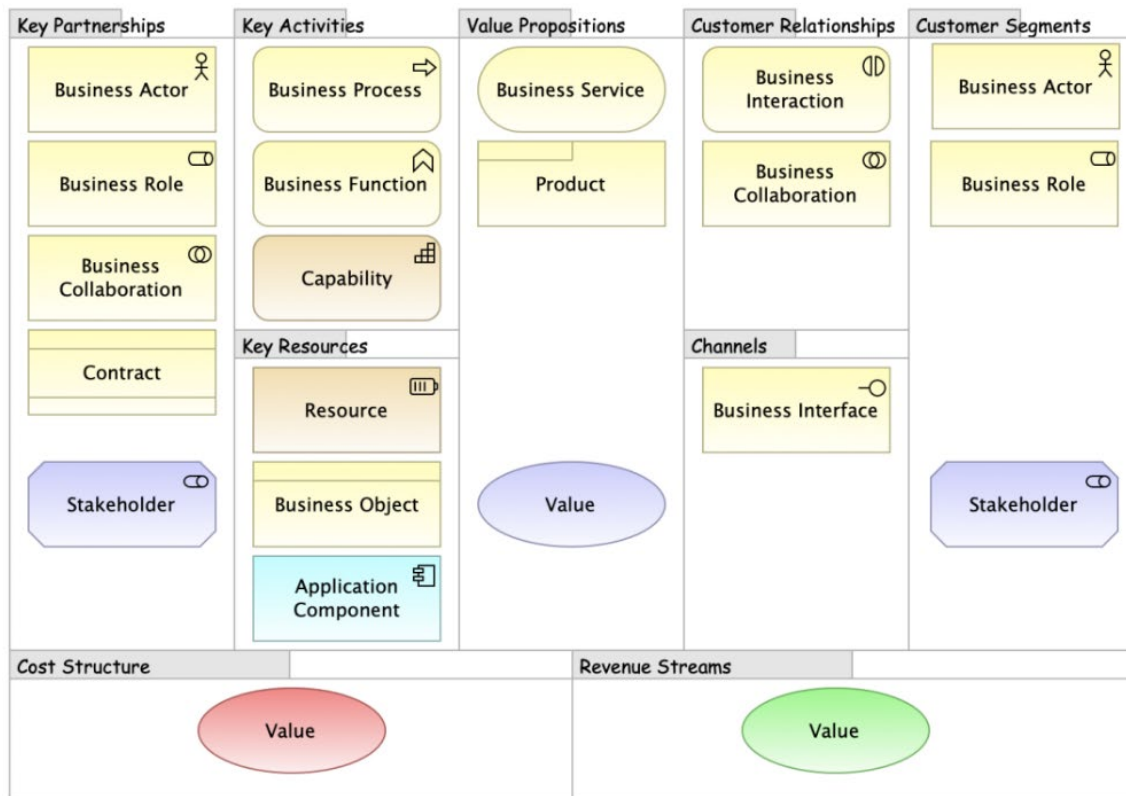
Figure 16: ArchiMate mapped onto the Business Model Canvas (Hosiaisluoma, 2020)

Walters (2020) introduces a mapping of the ArchiMate elements with the Business Model Canvas elements solely by using the available strategy and motivation elements from the ArchiMate modeling language, as depicted in Figure 17. The main difference of his solution is the introduction of the motivation element outcome to represent the cost structure and revenue streams element. This representation of the two business model elements is used since an outcome represents a result and a business model, as its objective, has to generate revenue, as is mentioned by Osterwalder and Pigneur (2010). The outcome of the activities performed within the business results in costs for the business (Walters, 2020). Thus, the mapping of outcome for the cost structure is reasonable.
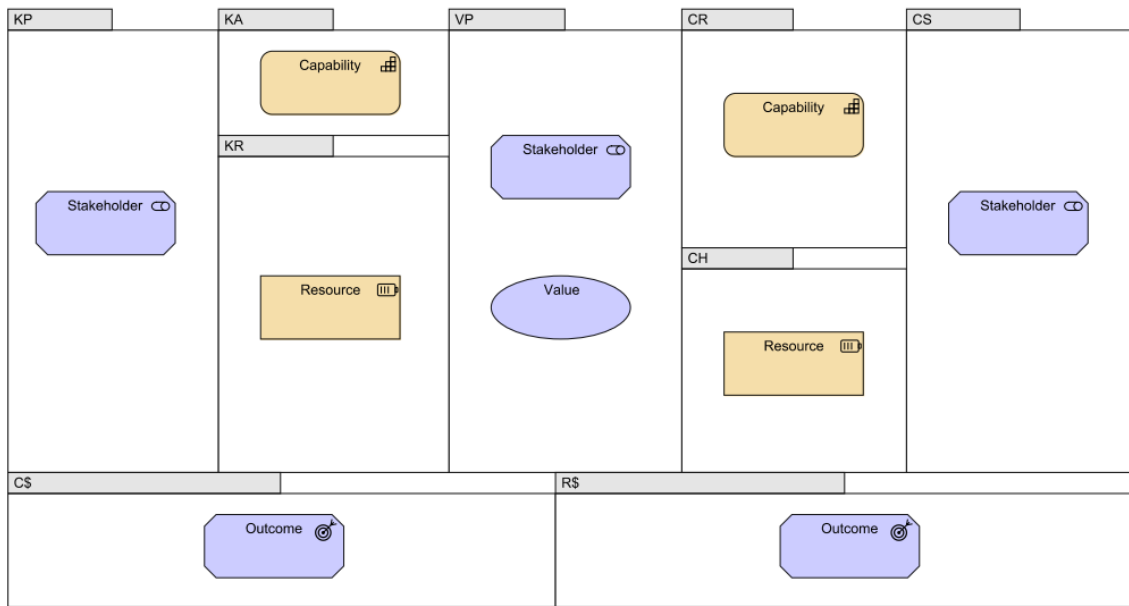
Figure 17: Modeling the Business Model Canvas with ArchiMate (Walters, 2020)

2.3 Business Capabilities

To achieve a competitive advantage, a business has to use the available capabilities and resources effectively. Thus, the need to plan based on a business's capabilities has emerged in recent years. According to the capability-based theories, businesses need to identify the capabilities that they want to leverage. Based on that knowledge, businesses can acquire the appropriate resources that are missing. Unlike resource-based theories, which aim at accumulating resources, the capability-based theories "focus on adapting, integrating, and re-configuring internal and external organizational skills, resources, and functional competences toward a changing environment" (Azevedo et al., 2015). (Azevedo et al., 2015)

TOGAF has already introduced a basic concept of capability-based planning (The Open Group, 2018) to design, plan, and implement organizational change. The aim is to "align strategic decisions with their actual implementation" (Azevedo et al., 2015). Capability-based planning aims to facilitate the discussion between enterprise architects and business leaders by focusing on business outcomes instead of processes or projects. (Azevedo et al., 2015)

Sub-chapter 2.3.1 describes the four types of business capabilities relevant to this research. Sub-chapter 2.3.2 elaborates on capabilities relevant for business model innovation purposes.

2.3.1   Types of Capabilities

This research focuses on the following four types of capabilities: core, dynamic, resource-based, and human-based. Core capabilities are essential to stand out from the competition and gain a competitive advantage (Hsiao & Hsu, 2018). Dynamic capabilities are fundamental for recombining elements of a business model or to replace elements of it (Teece, 2018). Resource-based capabilities give an overview of all the intangible and tangible capabilities a company possesses (Barney, 2001). Human-based capabilities enclose skills and competencies a human being can possess.

Core capabilities

Core capabilities, also referred to as a company's competencies in the literature, define the company's skills to perform its core business. They can be derived from the different products and services an enterprise has to offer. Core capabilities are firm-specific characteristics that enable a company to launch innovative new products and services tailored to the market (Hsiao & Hsu, 2018). According to Teece et al. (1997), the value of core competencies can be increased through the targeted use of new technologies and complementary assets. However, the benefit also depends on how well a company is positioned on the market relative to its competitors and how difficult it is for the competitors to copy their core competencies. Nevertheless, the concept of core competencies assumes a relatively stable market environment, which nowadays hardly is encountered. For this reason, the core capabilities of any company should also include dynamic capabilities to adapt quickly to a rapidly changing environment (Teece et al., 1997).

Dynamic capabilities

The concept of dynamic capabilities emerged in the 1990s and has been the subject of discussion in management research ever since. The focus lies on the ability of companies to gain an advantage over their competitors in dynamic markets by being able to adapt quickly to changing environments. The literature offers some approaches to this subject. Thus, it makes it difficult to make a uniform and generally accepted theory. However, a great majority of researchers derive their definitions from Teece et al. (1997). According to them, the term is defined as follows: "We define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Dynamic capabilities thus reflect an organization's ability to achieve new and innovative forms of competitive advantage given path dependencies and market positions." Teece et al. (1997) refer to the term dynamic as the ability to adapt to changing market conditions and to innovate the individual's skills. Capability, on the other hand, emphasizes the critical role of management, which is responsible

that the strategy meets the demands of a changing environment. Thus, with the company's underlying business model, dynamic capabilities can be seen as processes of a company, which are needed to match or even create market changes (Eisenhardt & Martin, 2000; Schoemaker et al., 2018). Therefore, dynamic capabilities are strategic and organizational tasks, which enable new resource configurations (Eisenhardt & Martin, 2000). These resource configurations are needed since markets are constantly emerging, colliding, splitting, evolving, or dying (Eisenhardt & Martin, 2000). According to Makkonen et al. (2014), dynamic capabilities should transform static resources and competencies into innovative products and processes. These capabilities form the base for an innovative and competitive advantage. Regarding them, dynamic capabilities are the ability of a company to use and enhance existing resources in a targeted and effective manner. The skills foster innovation and allow companies to adapt quickly to unstable markets.

In another article, Teece (2018) states a slightly different definition: "Dynamic capabilities include the sensing, seizing and transforming needed to design and implement a business model." In this context, these terms can be understood as follows. Sensing is the ability to identify new market developments and adapt accordingly. It is not enough for individual employees or managers to observe how new technologies emerge. They have to examine whether these technologies could create opportunities for the company or threaten their existing business. Seizing is the ability to seize opportunities and to avoid threats. To do so, companies need to have the ability to respond to change by setting up programs that search for opportunities and threats for the company. An often challenge in this case is to overcome the internal persistence of current approaches. The third and last term, transforming, is about mastering change management. A company needs to have the capacity to change its organization over and over again. Amazon is a great example: Jeff Bezos, the founder, went online in 1995. Back then, the business model was to sell books online. They have been changing ever since. Today, Amazon sells more than 200 million products to customers all over the world.

Building on these definitions given by prior literature, this study considers a dynamic capability as a capacity to create, extend, and modify the resources of a company, especially core competencies that are a fundamental source for competitiveness, which helps to meet the needs of rapidly changing markets.

Resource-based capabilities

A company's resources can be seen as its capabilities to run its business. Barney (2001) defines firm resources as: "all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness." Company-based resources can be classified into

intangible and tangible resources. Intangible resources are for example the company's culture, the knowledge of its employees, or relationships with partners, such as suppliers, as well as with customers (Andriessen, 2004). Tangible company resources are physical assets of the company, for example, human resources, financial resources, real estate, machines, raw materials, inventory, or patents and trademarks (Andriessen, 2004).

A common framework to describe resources concerning business strategy is the resource-based view (RBV), which is a managerial framework to identify strategic resources (Barney, 1991, 2001; Lin & Wu, 2014; Teece et al., 1997). According to Barney (1991), RBV's strategic resources are essential to have a sustainable competitive advantage, as they are regarded to deliver this advantage. The RBV framework includes three key managerial tasks: to determine a company's potential key resources, to evaluate these resources based on the VRIN-criteria (valuable, rare, imperfectly imitable, non-substitutable), and at last to develop, improve, and protect the resources, which passed the VRIN-evaluation (Lin & Wu, 2014). According to the RBV concept, every company has unique and specific resources that can be bundled into company-capabilities (Teece et al., 1997). According to Teece et al. (1997), such distinctive resources are key drivers for business success and future development. They also mention that the RBV has to be approached from the inside to the outside, which means that a company first needs to define its specific, unique resources and afterward select the market in which it intends to enter with those resources. Nevertheless, these authors criticize the static view of the RBV and its lack of regard for intangible resources, such as knowledge management, which is of great importance for strategic decisions since these resources are somewhat difficult to be acquired by competitors. Thus, this study does not focus on the RBV approach but rather on the general understanding of company resources, where intangible and tangible resources are considered.

Human-based capabilities

Human-based capabilities can be seen as skills and competencies a human being can possess. Nevertheless, through improvement in artificial intelligence, these skills and competencies might become suitable for robots.

Technological improvements had a profound impact on the skills expected by the economy from today's workforce. Today, the focus in skills development changed from technical skills, also known under the term hard skills, to skills that are more related to integrity, communication, and flexibility – the so-called soft skills (Robles, 2012). Skills are an ability, which can be learned and later on applied. Skills are the capacity to use know-how and apply knowledge in order to solve problems or just to complete tasks (Chryssolouris et al., 2013; Orinos, 2012; Rychen & Salganik, 2000; Stasz & Brewer, 1999).

Competencies are an outcome of a combination of knowledge, experience, and intuition in a concrete situation where the action is needed (North & Kumta, 2014). According to North and Kumta (2014), the term competency stands for the "capability to act adequately in a given situation," whereby the situation might appear in any interaction between individuals, groups, or organizations. In contrast to skills, according to Orinos (2012), competencies "refer to experience based and context-dependent knowledge." Thus, a competency can only be established if there is enough organizational experience while acquiring a knowledge-dependent context (Orinos, 2012). Besides, unlike skills, which might be measurable by their nature of characteristics, competencies are not directly measurable, but only through measuring the results achieved from actions since they materialize when knowledge is applied (North & Kumta, 2014). Also, competencies do involve not only cognitive capabilities, such as skills and knowledge, but also more emotional aspects like motivation, ethics, social and behavioral components (Rychen & Salganik, 2000).

A company's ability to innovate depends, among other things, on its core competencies. Therefore, the core competencies of any company should include dynamic capabilities that allow them to adapt quickly to a rapidly moving environment (Hsiao & Hsu, 2018). Consequently, there is an overlap between dynamic and core capabilities, but not every dynamic capability is a core capability and vice versa. The same constraints are between these two types of capabilities and human-based capabilities. Therefore, a person's skill can be a relevant capability, even a dynamic capability, but would not be seen by the company as a core capability. As Barney (2001) mentioned, every company's capability, no matter if it is tangible or intangible, is part of the resource-based capabilities. Thus, the concept of resource-based capabilities can be seen as an overarching construct, including dynamic, human-based, and core capabilities.

These relations between the four types of capabilities introduced in this chapter are illustrated as the capability mapping framework in Figure 19 in the form of a Venn diagram. This capability mapping framework shows how this research sees the different capability concepts introduced in this chapter.
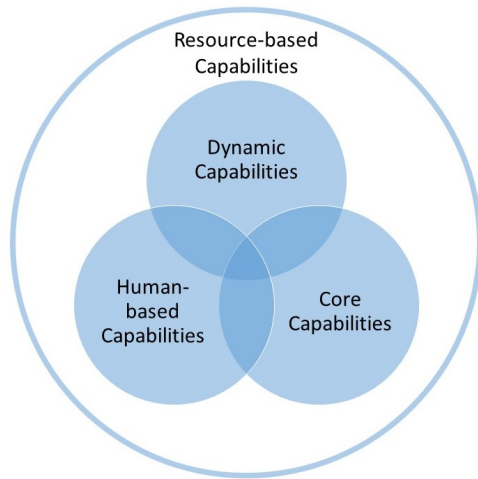
Figure 18: Capability mapping framework

2.3.2 Capabilities for Business Model Innovation

Business model innovation requires businesses to renew, adapt, build, or acquire new competencies and resources and combine these to achieve innovation (Amit & Zott, 2012; Mezger, 2014). Mezger (2014) mentions that capabilities are bundled in business processes and competencies. Researchers agree that an essential capability to handle business model innovation successfully is the dynamic capability (Bocken & Geradts, 2020; Inigo et al., 2017; Leih et al., 2015; Massa & Tucci, 2014; Mezger, 2014; Pang et al., 2019). A core capability to succeed in business model innovation is to be able to identify new business model opportunities (Leih et al., 2015; Lindgardt et al., 2009; Mezger, 2014; Pang et al., 2019). Also, it is essential to have the capability to spot and manage threats for the business (Leih et al., 2015). Further, the capability to design and conceptualize business models as well as to implement them are necessary capabilities (Leih et al., 2015; Mezger, 2014). Organizations need to have partner selection and management capability to efficiently perform business model innovations (Inigo et al., 2017; Pang et al., 2019).

Mezger (2014) mentions the importance of knowing how to integrate the "partners with complementary competences and resources" to succeed in business model innovation attempts. Further integrative capabilities are the capability to integrate not only partners but also stakeholders in general and to acquire and integrate techniques and technologies required for the new business model (Inigo et al., 2017). Thus, to manage the ecosystem of the business (Leih et al., 2015). Integrative capabilities of business model innovation are also the management of risk and resources to enhance the productiveness of the business model (Pang et al., 2019) and to embrace ambiguity (Bocken & Geradts, 2020). As mentioned by Bocken and Geradts (2020) and

Mezger (2014), the capability to agile select, plan, and source required resources facilitates business model innovation.

Another core capability for successful business model innovation is organizational capability (Inigo et al., 2017; Mezger, 2014). Organizational experimentation and learning are capabilities that support business model innovation (Bocken & Geradts, 2020; Mezger, 2014). This results in new knowledge, which is seen as a capability for the business (Bocken & Geradts, 2020). Since the design and implementation of a new business model are organized as a project, the capability of project management is essential (Lindgardt et al., 2009). According to Bocken and Geradts (2020), an organization's incentive system can support business model innovation as it helps to overcome the fear of change within the employees. The capability of capital is vital to fund the investments patiently (Bocken & Geradts, 2020).

Organizations need to have a collaborative innovation culture enabling the generation of innovation (Bocken & Geradts, 2020). In addition, the culture should be open-minded and allow failure to learn from it (Gassmann, Frankenberger, & Csik, 2016). Massa and Tucci (2014) undermine this by mentioning the importance of the capability to challenge current industry standards and assumptions and to experiment to create new things. Further, communication throughout the organizational units has to be enforced to achieve collaboration among the different units (Massa & Tucci, 2014). Leih et al. (2015) mention the importance of an open innovation environment for effective business model innovation. Further, outside-the-box thinking should be promoted by the organization to achieve innovative business models (Mezger, 2014). Also, design thinking capability is a supporting capability to succeed in business model innovation (Massa & Tucci, 2014).

A successful business model innovation has the commitment of the management and the capability to handle ambidexterity (Asswad et al., 2016; Euchner & Ganguly, 2014; Leih et al., 2015; Massa & Tucci, 2014). The management should encourage systems-level thinking for innovative idea development (Massa & Tucci, 2014). Asset orchestration and leverage are important capabilities for business model innovation (Leih et al., 2015). Mezger (2014) states that an essential capability for succeeding in business model innovation is the "ability to recognize alternative business model." Leih et al. (2015) mention that the organization has to have the capability to conceptualize customer needs to derive new ideas from it.

Inigo et al. (2017) mention the importance of the technical capability to specify the architecture for the new business model in detail. According to Gassmann et al. (2016), the "capability to handle iterative processes" is vital for business model innovation. Further, the capability to

identify and leverage technological possibilities into business models is important for business model innovation (Mezger, 2014).

2.4   Knowledge Management

This research is concerned about how business model innovation ideation can be supported employing an ontology-based approach. To achieve this, the topic of knowledge management needs to be understood since, as Nonaka (1994) mentions, innovation is a form of knowledge creation within an organization. He further states that applied innovation within a business leads to change within the business's knowledge system. Also, Marfo Missah (2015) mentions that modeling enterprise architecture is a form of knowledge representation

Sub-chapter 2.4.1 introduces the concept of knowledge and how it is related to information systems. The topic of how knowledge is created from a theoretical point-of-view is described in Sub-chapter 2.4.2. Sub-chapter 2.4.3 introduces how through ontologies, knowledge can be represented.

2.4.1   Knowledge

Knowledge is a broad term with different meanings depending on the context it is used with (Alavi & Leidner, 2001). According to Rowley (2007), knowledge is organized and processed information that in turn is processed data. Zins (2007) states that data can be seen as the raw material to achieve information and information can be regarded as the raw material to achieve knowledge. Grover and Davenport (2001) mention that "typically, data is classified, summarized, transferred or corrected in order to add value, and become information within a certain context." Such a transition is mainly mechanical and is supported by technologies (Grover & Davenport, 2001). While such a transition generates value for the business, the highest value is generated by generating and applying knowledge that is of high relevance for decision-making activities (Grover & Davenport, 2001). Alavi and Leidner (2001) describe knowledge as "the potential to influence action" and as a "process of applying expertise." Zins (2007) explains that organized and structured information results in knowledge. According to him, the information is usually generated through a cognitive system. Thus, researchers agree that data, information, and knowledge are interrelated, yet, how in detail they are related as well as the definition of each concept differs (Zins, 2007). The goal of knowledge is to "[…] convey understanding, experience, accumulated learning, and expertise[…]" (Rowley, 2007).

According to Dalkir (2011), there are three stages of knowledge management history. First, knowledge management was seen as the process to capture, structure, and manage organizational

knowledge. The goal was to increase efficiency, which was achieved by introducing intranets and knowledge management systems (Dalkir, 2011). The second stage tackled the problem of information overload by identifying the tacit knowledge of the employees (Dalkir, 2011). Today we are in a stage where the content is most valuable. Thus, it is important to describe as well as organize it to provide it to the relevant stakeholders for simple application of the content (Dalkir, 2011). As Dalkir (2011) explains, metadata has become a central element to specify the content.

A prominent concept to describe the relationship between data, information, and knowledge is the DIKW framework, illustrated as the pyramid within Figure 19. DIKW stands for data, information, knowledge, and wisdom (Jifa, 2013; Rowley, 2007). The concept is based on the research of Ackoff (1989) regarding the four terms. He describes data as symbols to represent objects, information as the representation of data with a description of it, and knowledge as the know-how and thus represents the information as instructions on how to apply it. According to Jifa (2013), to understand data is to achieve information as it adds context to the data. To understand patterns from the information is to achieve knowledge since now is know how to use the information (Jifa, 2013). To understand the principles is to achieve wisdom since now is know when and why to apply the knowledge (Jifa, 2013). Rowley (2007) explains the four layers as data is to *know nothing*, information is to know *what*, knowledge is to know *how*, and wisdom is to know *why*.
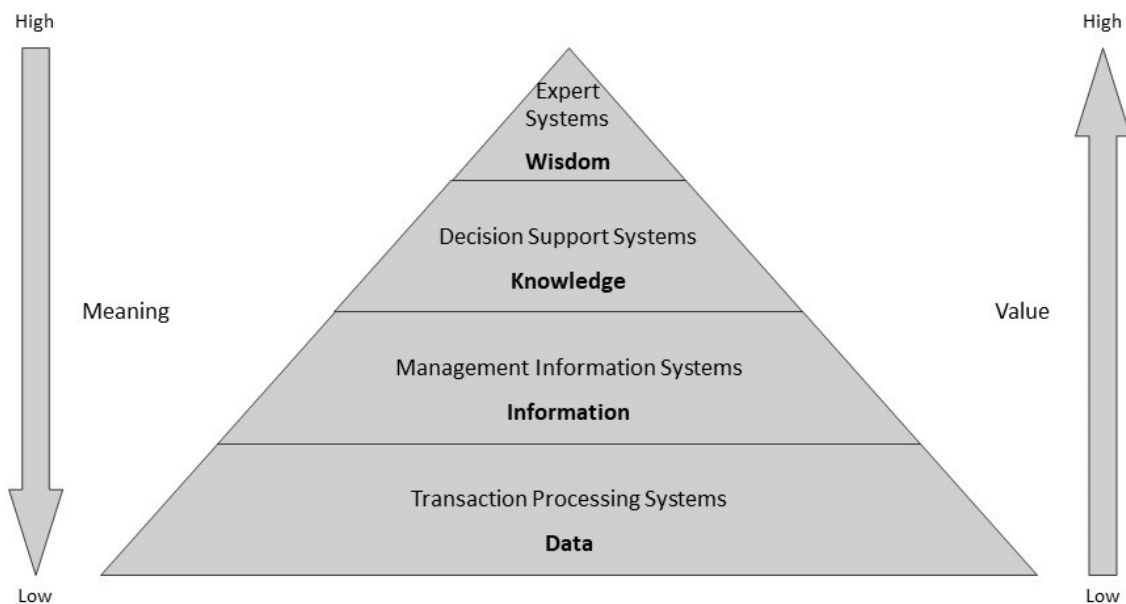
Figure 19: The DIKW hierarchy mapped to information systems types (adapted from Chaffey & Wood, 2005; Rowley, 2007)

Figure 19 further illustrates the relation of the meaning and value between the four layers. According to Chaffey & Wood (2005), the meaning of the context decreases the lower the layer to which the content is mapped to gets. Within data, the meaning of the content is low, while

wisdom provides a high level of meaning within its content. Further, Chaffey & Wood (2005) state that the value for the organization increases the higher the content is within the DIKW hierarchy. To achieve wisdom results in high value while data as it is, has low value since it is seen as a raw material. In addition, Figure 19 shows which information system is applicable for which layer. Based on Rowley (2007), data is used in transaction processing systems, while information is used in management information systems. Decision support systems apply knowledge and expert systems apply wisdom (Rowley, 2007).

2.4.2 Knowledge Creation

Nonaka and Takeuchi (1995) state that to produce innovation, which is required for a competitive advantage, knowledge must be created. Knowledge creation is a process that describes how an organization generates knowledge through the acquisition of new knowledge or the increase of the knowledge existing within the organization (Grover & Davenport, 2001).

According to Nonaka and Takeuchi (1995), two dimensions need to be considered regarding knowledge creation: the epistemological dimension and the ontological dimension. The epistemological dimension describes the interaction between tacit and explicit knowledge (Nonaka, 1994). This interaction of the two kinds of knowledge drives the generation of new concepts and ideas (Nonaka, 1994). Based on the research of Nonaka (1994), the ontological dimension describes the generation of knowledge from an organizational point-of-view. As stated by Nonaka and Takeuchi (1995): "knowledge is created only by individuals." Thus, to create knowledge within an organization, individuals are necessary. Therefore, the ontological dimension describes how an organization amplifies the generation of knowledge by the individuals to integrate it into the organization's knowledge network (Nonaka & Takeuchi, 1995).

Rowley (2007) supports the distinction of the two knowledge types, explicit and tacit. He mentions that information systems are capable of handling explicit knowledge, while tacit knowledge cannot be stored within an information system as it is only within a human mind. Therefore, explicit knowledge is best suited to be shared with others as it is codified and stored knowledge (Rowley, 2007). Grover and Davenport (2001) also mentioned that explicit knowledge is easier to manage and, according to them, this is the reason why Western firms focus mainly on explicit knowledge management. Tacit knowledge consists of cognitive and technical elements (Alavi & Leidner, 2001). The cognitive elements are such as beliefs or viewpoints of an individual, while the technical elements are know-how or skills an individual possesses (Alavi & Leidner, 2001).

Grover and Davenport (2001) describe the knowledge process in three steps. First, the knowledge needs to be generated. This includes the development as well as the acquisition of knowledge. Second, the knowledge needs to be codified to make it accessible as well as applicable to others. Third, the knowledge needs to be transferred from the generated and codified knowledge into used knowledge. A prominent framework on how knowledge creation should be proceeded by organizations is the four-mode SECI-model by Nonaka (1994). The four modes are socialization, externalization, combination, and internalization. Socialization represents the process of turning tacit knowledge into new tacit knowledge (Arijitsatien & Ractham, 2017). Socialization is achieved by sharing experiences between individuals, which is seen as an exchange of inner knowledge (North & Kumta, 2014). Externalization represents the process of turning tacit into explicit knowledge, and thus, it can be shared by many others (Nonaka et al., 2000). Externalization represents the foundation of creating new knowledge for organizations (Arijitsatien & Ractham, 2017). According to North and Kumta (2014), an example of externalization is the codification or documentation of conceptualized knowledge. The combination represents the process to turn different explicit knowledge into more complex explicit knowledge that is more structured (Nonaka et al., 2000). Arijitsatien and Ractham (2017) explain that the combination process is first to capture and collect explicit knowledge (North & Kumta, 2014), then to disseminate this knowledge among groups containing several individuals through IT networks or meetings for example. Last, the knowledge is processed, for example into reports or plans, to make the knowledge more useful (Arijitsatien & Ractham, 2017). The fourth mode is internalization, representing the process to turn explicit into tacit knowledge (Nonaka et al., 2000). This is achieved by accessing explicit knowledge by individuals and applying a learning-by-doing approach (Arijitsatien & Ractham, 2017). Thus, knowledge is put to operational use by individuals (North & Kumta, 2014). Figure 20 illustrates the SECI-model with the four modes.
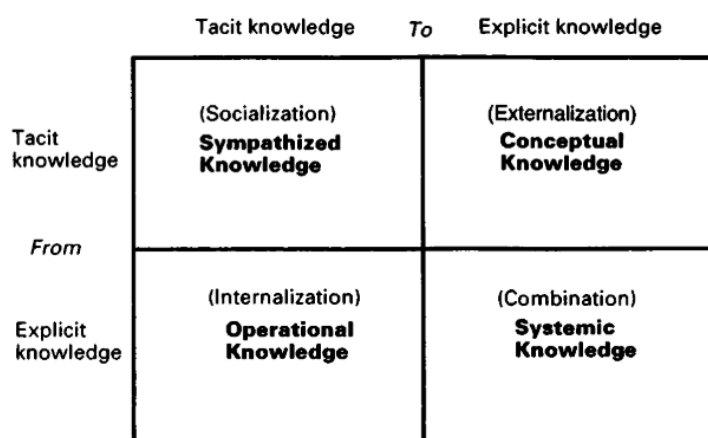
Figure 20: Contents of knowledge created by the four modes (Nonaka & Takeuchi, 1995)

Since the approach for organizational knowledge creation is continuous, it is iterative or, as described by Nonaka and Takeuchi (1995), spiral. According to them, the creation process interacts between the modes by dialogue to achieve externalization from the socialized knowledge, by linking explicit knowledge to achieve combination from the externalized knowledge, by learning by doing to achieve internalization from the combined knowledge, and by field building to achieve socialization from the internalized knowledge (Arijitsatien & Ractham, 2017). The spiral approach is achieved by applying the knowledge across the ontological dimensions. Knowledge is first within individuals, which is spread among small communities, then spread over the organization, and finally, the knowledge is spread among organizations (Arijitsatien & Ractham, 2017; Nonaka & Takeuchi, 1995). This interaction between individuals, communities or groups, and the organization among the four modes socialization, externalization, combination, and internalization is depicted in Figure 21.
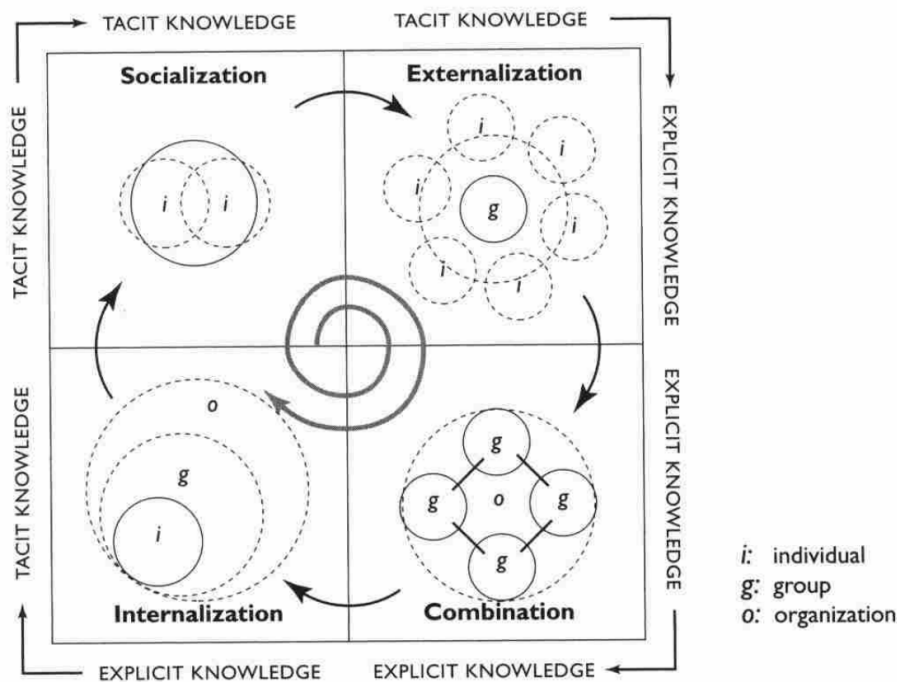
Figure 21: Spiral evolution of knowledge conversion (Nonaka & Konno, 1998)

2.4.3 Knowledge Representation

Knowledge representation is the activity to represent information regarding a domain (Brachman & Levesque, 2004). Knowledge is structured for specific uses based on organizational frameworks or standards (Dalkir, 2011). According to Dalkir (2011), knowledge ontologies are used for this kind of organization. Knowledge ontologies support the representation of the events or environment of the organization (Gayathri & Uma, 2018). The knowledge ontologies represent

conceptual models such as a specification of the attributes of the knowledge to be represented (Dalkir, 2011). Marfo Missah (2015) mentions that modeling enterprise architecture is a form of knowledge representation. Guarino (1997) states that ontology is seen as a meta-level description to represent knowledge. According to Gayathri and Uma (2018), ontology-based knowledge representation "enables knowledge sharing, processing, reuse, capturing and communication." The benefit of representing knowledge using an ontology-based approach is that its description logic enables reasoning techniques (Gayathri & Uma, 2018).

Therefore, ontologies are a perfect fit to represent information semantically (Martinez-Cruz et al., 2012). There exist several definitions for ontology, such as the definition by Schreiber et al. (1995), who state that "an ontology is an explicit, partial specification of a conceptualization that is expressible as a meta-level viewpoint on a set of possible domain theories for the purpose of modular design, redesign and reuse of knowledge-intensive system components." Thus, the ontology is regarded as a model of the reality and the concepts within the ontology have to represent this reality (Noy & McGuinness, 2001). Agarwal (2005) defines ontology as "the manifestation of a shared understanding of a domain that is agreed between a number of agents and such agreement facilitates accurate and effective communications of meaning, which in turn leads to other benefits such as interoperability, reuse and sharing." Thus, ontology representation depends on the view of individuals upon a specific domain.

Ontology development has to fulfill four conditions, as depicted in Figure 22, to have a complete and clarified interpretation of the ontology model and achieve full representation of the ontology (Azevedo et al., 2015; Meertens et al., 2012). The modeler has to ensure that every construct of the model is represented within the ontology to achieve completeness (Meertens et al., 2012). Otherwise, the consequence is a construct excess (Azevedo et al., 2015). Construct overload appears when several elements within the ontology can represent a single modeling construct (Azevedo et al., 2015). Thus, reverse engineering of such an ontology becomes cumbersome (Meertens et al., 2012). Construct redundancy "exists when multiple modeling constructs can be used to represent a single ontological concept" (Azevedo et al., 2015) and increases the modeling language's complexity. Construct deficit appears when there are elements within the ontology that do not have any representation within the modeling construct (Azevedo et al., 2015).
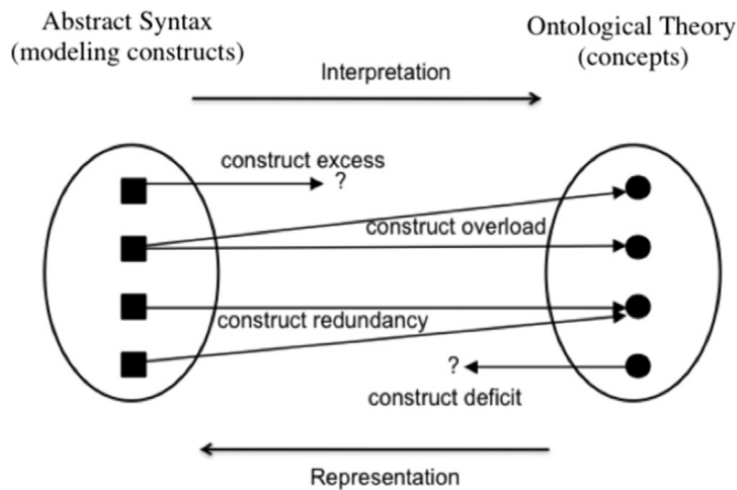
Figure 22: Relation between modeling constructs and ontological concepts (Azevedo et al., 2015)

Turnitsa et al. (2010) state that it is essential to determine the ontological, epistemological, and teleological perspectives for knowledge representations. According to them, the ontological perspective focuses on the perceived reality of the modeler, while the epistemological perspective focuses on the question of what is known regarding the reality. The epistemological view is concerned about "how the knowledge came to be" (Turnitsa et al., 2010). The teleological perspective is concerned with the purpose or goal of the object to be represented (Caetano et al., 2017). As a result, an ontology-based knowledge representation "comes with preconceptions, beliefs and assumptions of modelers that should be captured in an explicit manner in the modeling process" (Turnitsa et al., 2010). For example, the Business Model Canvas, introduced in Sub-chapter 2.1.1, is mainly concerned about the teleological perspective since it views the purpose and goal of the business and not on the detailed operations of it (Caetano et al., 2017). ArchiMate, introduced in Sub-chapter 2.2.2, on the other hand, is concerned about the ontological perspective as it describes the actual enterprise operations (Caetano et al., 2017).

2.5 Summary and Literature Gap

The performed literature review examines business model innovation, enterprise architecture, business capabilities, and knowledge management. The literature review discloses existing definitions for business model innovation. Also, the definitions for a business model and innovation are disclosed since business model innovation consists of these two terms. Process methods to apply business model innovation are introduced, such as the Business Model Navigator or the Cambridge Business Model Innovation Process. Challenges an organization might have during the design and implementation of business model innovation are described as well. Further, the literature review on enterprise architecture concerning business model innovation explores the modeling languages such as ArchiMate. The relations between enterprise

architecture and business innovation and between enterprise architecture and business models are identified. Further, business capabilities are described based on the four capability types core, dynamic, human-based, and resource-based. In addition, the literature review revealed capabilities in general relevant for a successful design and implementation of business model innovation. The literature review on knowledge management focusing on knowledge creation and representation was important since knowledge is required for decision-making systems, which is an artifact developed by this research. Further, the knowledge representation review revealed that ontologies are best suited to represent knowledge in a structured way.

The literature review revealed essential insights to develop the artifacts for this research. However, the literature review revealed gaps within the research base. As stated by Frankenberger et al. (2013), despite the acknowledged importance of business model innovation, "[…] the research base in that field is thin." Research is mainly conducted with the focus of providing evidence that business model innovation is of importance, however, it fails to systematically address the business model innovation process (Frankenberger et al., 2013; Taran et al., 2015). Hossain (2017) and Andreini and Bettinelli (2017) support this by mentioning that business model innovation and its process are still in their infancy. Hoveskog et al. (2015) mention that there is a lack of investigation regarding the early phases of business model innovation. Stampfl (2016) supports this by stating that the "[…] search and discovery processes pertaining to the design of new business models […] regarding business model innovation projects are largely unknown." Further, the literature analysis from Andreini and Bettinelli (2017) reinforces this by identifying that "there is a clear need for further research on the process of business model innovation." Thus, there is a literature gap on how to systematically approach business model innovation, especially the ideation phase.

The literature provides statements that enterprise architecture facilitates business model innovation (Kamogawa & Okada, 2005). Yet, besides some attempts to connect enterprise architecture with business model innovation (Fritscher & Pigneur, 2011; Hosiaisluoma, 2020; Iacob et al., 2014; Meertens et al., 2012; Walters, 2020) by combining ArchiMate and the Business Model Canvas, other relations and the use of enterprise architecture during business model innovation has been neglected (Heikkilä et al., 2016). According to Heikkilä et al. (2016), the focus of enterprise architecture and business model innovation is, in particular, on modeling the current business model and potential business models. Thus, there is a literature gap to apply enterprise architecture as part of the ideation phase for business model innovation.

The literature review on knowledge management, especially knowledge representation, provided another literature gap. Osterwalder et al. (2005) stated that "rigorously defined meta-models of

business models in the form of formal reference models or ontologies can help in developing new software-based management and IS tools." Osterwalder and Pigneur (2013) mention a gap in the research base regarding addressing the potential of computer-based tools at a strategic level to assist managers in their decision-making process. They further state that computer-based tools would facilitate the development of new business models and, thus, facilitate the ideation phase of business model innovation. Smit et al. (2016) support this by mentioning that "there are not sufficient transitions from a theoretical concept to a computer-based implementation that would facilitate [...] business model innovations." Thus, there is a gap within the literature on how computer-based tools facilitate business model innovation.

An ontology-based approach for the computer-based tool would facilitate the externalization and reusability of business model innovation case knowledge and the deduction of applicable business model innovation cases (Peter et al., 2020). Ontologies could support the computer-based tool in two ways. First, ontologies can represent business model innovation cases as instances. Thus, the ArchiMate models (Hinkelmann et al., 2020), as well as business models (Caetano et al., 2017; Iacob et al., 2014), can be represented as ontologies. Second, the ontology-based approach supports the access of business model innovation cases, in form of formal reference models. This access is required to apply a similarity calculation for a case-based reasoning approach (Martin, 2016) to retrieve business model innovation cases.

3. Research Methodology and Design

This chapter describes the applied research method to achieve the research objectives. Sub-chapter 3.1 introduces the meta-model called research onion by Saunders et al. (2019) that acts as the basis to develop the research design. The Sub-chapters 3.2 to 3.7 describe how the research design is applied for this research.

3.1   Research Methodology

Saunders et al. (2019) underpin the importance of any research to explain why certain choices were made during the research process. For this purpose, they introduced a method that encapsulates the relevant aspects to define a research design. This method is illustrated as the research onion, shown in Figure 23. The research onion consists of six layers. The first layer represents the philosophy on which the research stands on. Next is the layer approach for the development, followed by the methodological choice and the research strategy. These layers are followed by choosing a time horizon for the research and the techniques and procedures to collect and analyze data.
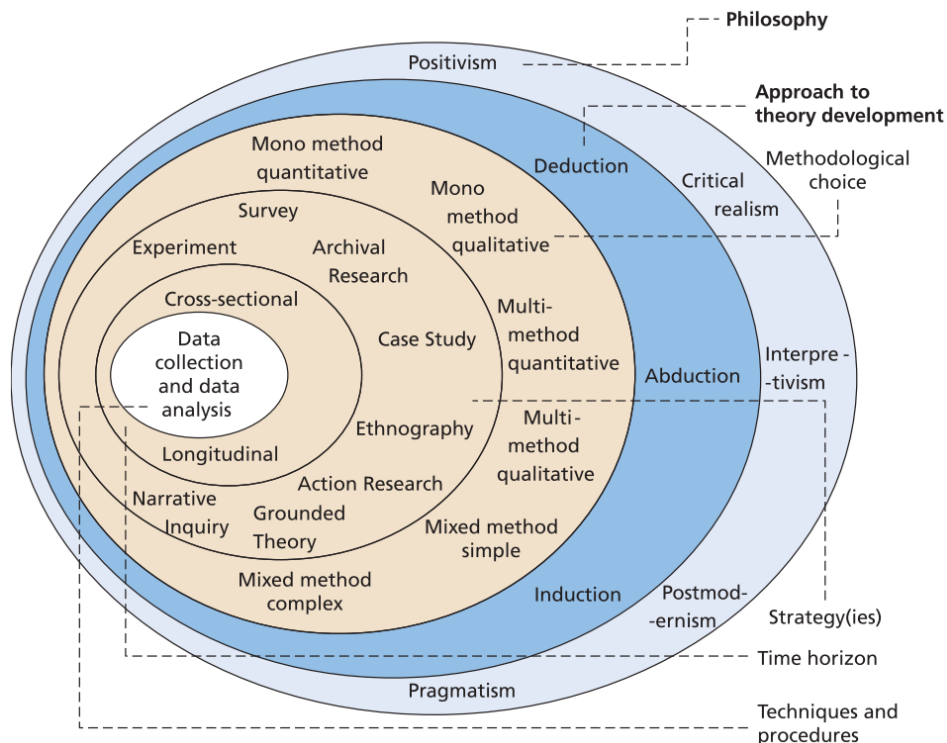
Figure 23: The research onion (Saunders et al., 2019)

For each of the six layers, I chose the most suitable option with the type of this research and with the goal to answer the defined research questions in Sub-chapter 1.4.2.

3.2   Research Philosophy

According to Saunders et al. (2019), the philosophical perspective influences how the research is conducted since it describes how the researcher views the world. Based on the research of Saunders et al. (2019), there are five different philosophies a researcher can consider from: positivism, critical realism, interpretivism, postmodernism, and pragmatism. While positivism and critical realism try to focus on observable behavior, which can be represented as data or facts, interpretivism, postmodernism, and pragmatism also take social phenomena and subjective meanings into account (Saunders et al., 2019). The social phenomena support the consideration of the human factor for research because it is often impossible to deduce certain phenomena into a set of rules or generalizations (Saunders et al., 2019). Thus, in the field of business studies, researchers tend to choose a research philosophy that supports the human factor (Saunders et al., 2019).

Saunders et al. (2019) mention that the pragmatism philosophy follows the research problem and research questions and research applying the pragmatism philosophy emphasize practical solutions and outcome. Due to those facts and the fact that this research represents practical applied research, this research follows the philosophy of *pragmatism*. Further, pragmatism allows the researcher to take observable behavior and subjective meanings into account and mix several data collection techniques (Saunders et al., 2019).

3.3   Research Approach

Based on the research of Saunders et al. (2019), there are three different research approaches: deduction, abduction, and induction. While a deductive approach focuses on testing a hypothesis, an inductive approach focuses on understanding the nature of the problem and getting a feeling of what is going on (Saunders et al., 2019). Thus, deduction and induction are two opposing concepts (Gregory & Muntermann, 2011). The third research approach, abduction, combines the approaches of deduction and induction. Abduction-based research explores existing phenomena through data collection, intending to generate new or modify existing theories, which are then tested using additional data collection (Saunders et al., 2019).

As mentioned by Gregor (2009), design science research typically applies an inductive approach to understand the problem and an abduction approach for the design process to solve the problem.

Further, this research focuses on understanding the problem itself and, as mentioned by Dudovskiy (2016), an inductive approach starts with research questions and research objectives that need to be achieved during the research procedure. Thus, as this research is based on the research questions, copes with the research aims, and develops a new design, it follows an *inductive* approach for the problem understanding and an *abduction* approach for the problem solving.

3.4 Methodological Choice

A research design can have three different methodological choices, according to Saunders et al. (2019). Either it is a quantitative, a qualitative, or a mixed-method research design. A quantitative research design focuses on data collection and analysis with large samples derived, for example, through questionnaires. A qualitative research design uses typically small, non-numeric samples and analyzes the content of a subject. For research that uses a single data collection technique, the distinction of mono-method is made. On the other hand, if the research uses several data collection techniques of the same categorization (either quantitative or qualitative), it is categorized as a multi-method study. The third methodological choice, mixed-method research design, represents research that uses quantitative and qualitative approaches. (Saunders et al., 2019)

All the different methodological choices by Saunders et al. (2019) are illustrated in the following Figure 24.
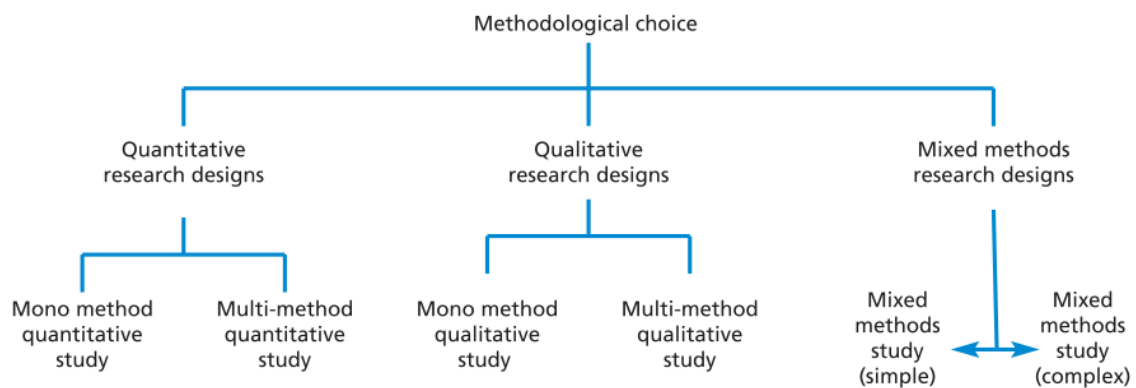
Figure 24: Methodological choice (Saunders et al., 2019)

For this research, a *qualitative multi-method* approach has been applied. The combination of different data sources, which represents a triangulation, supports the findings of a research project (Saunders et al., 2019). In this regard, I conducted a literature review and expert interviews and gathered demonstration cases. While the literature review laid the groundwork to get the current state of knowledge to the topic of business model innovation, the demonstration cases provided information about the characteristics of a business model innovation case. The interviews carried

out with stakeholders for the suggested tool-based approach for business model innovation ideation provided me with information to understand how the business world sees the topic of business model innovation. Further, the conducted interviews with experts from the construction sector provided me with insights into that particular sector and an additional scenario that supported the evaluation of the developed artifact.

3.5   Research Strategy

To choose the best matching research strategy, the research questions, the objectives, the resources available, and the existing knowledge need to be known (Saunders et al., 2019). As reported by Hevner and Chatterjee (2012), the information systems discipline is characterized by two paradigms: the behavioral science that seeks to develop and verify theories that explain or predict human or organizational behavior and design science that seeks to extend the boundaries of human and organizational capabilities by creating new and innovative artifacts. As Hevner and Chatterjee (2012) mention, design science research is a problem-solving process. According to them, design science aims to design an innovative artificial construct, such as a concept or a design. In addition, the authors state that guidelines are usually developed which explain the artificial construct. Vaishnavi and Kuechler (2004) and Iivari and Venable (2009) describe design science research as a research strategy often used in engineering fields such as information systems. Further, design science research usually comes with qualitative research (Iivari & Venable, 2009). It is considered a problem-solving approach, which addresses a business need in a specific context (Hevner & Chatterjee, 2012). Design science research should result in artifacts, such as concepts, methods, models, or IT solutions that are implemented as prototype or production systems. In practice, these artifacts can result in frameworks, guidelines, patents, norms, software solutions, or business models (Österle et al., 2011).

This research applies the research strategy *design science research* based on the problem this research tries to solve, the research questions, and the objectives.

3.5.1   Design Science Research Cycles

The design science research cycle by Hevner and Chatterjee (2012), depicted in Figure 25, lays the basis for a design-oriented research approach. It includes three cycles: the relevance cycle, the design cycle, and the rigor cycle.
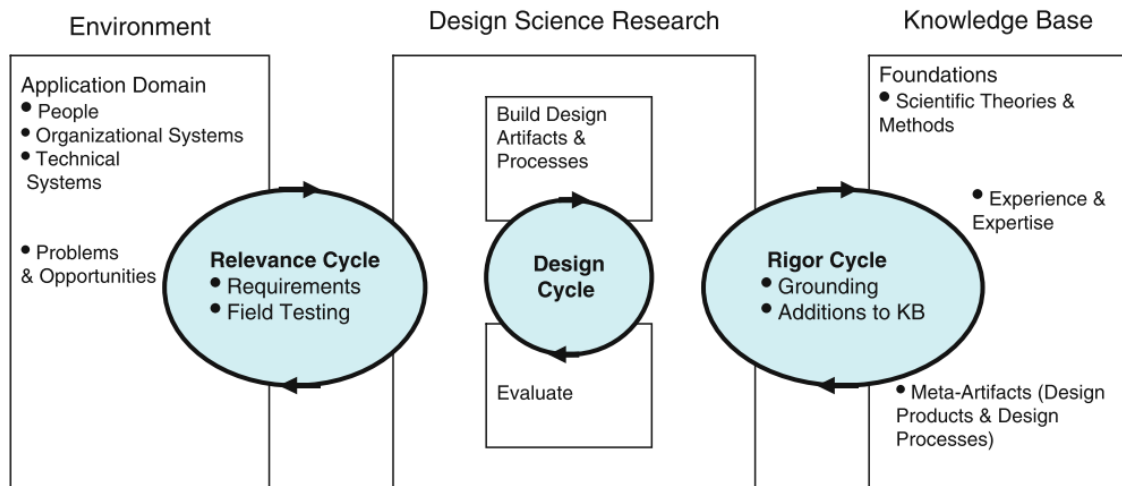
Figure 25: Design science research cycle (Hevner & Chatterjee, 2012)

Relevance Cycle

The relevance cycle brings the design science activities of the research projects with the contextual environment together. This cycle provides the research project's requirements, like opportunities and problems of the research project, and defines acceptance criteria for the research project's evaluation. (Hevner & Chatterjee, 2012)

This research applies the relevance cycle by defining the research problem and developing the research statement and objectives. Those objectives need to be fulfilled as a result of this research. In addition, the objectives and the closely related research questions are used as acceptance criteria for the evaluation of this research. The environment for this research is the construction sector, of which I collected two demonstration cases regarding business model innovations. Furthermore, as part of the environment, the relevance cycle defines the interview partners from the construction sector and the artifact-related stakeholders to evaluate the developed artifact. Further, the application domain is defined as the ideation process for business model innovation.

Rigor Cycle

Research projects are based on a knowledge base from which they can gain insights on state-of-the-art knowledge, current research, and outputs of past research. Based on the research of Hevner and Chatterjee (2012), the rigor cycle provides such knowledge in the form of experience, scientific foundations, and expertise for the design science activities to ensure innovation. The authors further mention that the rigor cycle is needed to ensure that the generated artifact contributes to the research field.

The applied rigor cycle for this research includes the performed literature review to understand business model innovation, enterprise architecture, and knowledge management. Also, possible challenges occurring during a business model innovation attempt are part of the rigor cycle. Furthermore, interviews were performed with experts from the construction sector to get insights into that sector, specifically for the evaluation of the artifact. In addition, to complete the needed knowledge base for this research, interviews with stakeholders were performed to gather information to build three demonstration cases and get insight into the expert's knowledge on the domain.

Design Cycle

Between the main activities of design science research, which are developing and evaluating the artifact and processes, iterates the design cycle. This cycle represents the heart of any research project in design science and is vital for subsequent feedback on the research activities to refine the design of the artifact even further. (Hevner & Chatterjee, 2012)

This research applies the design cycle by evaluating each major step made regarding the relevance for this research to achieve its objectives. The literature review provides relevant information not only for designing the artifact but also for evaluating the current state. This cycle helps to incrementally improve the understanding of the problem, the targeted objectives, and the development of the artifact itself. The analyzed demonstration cases provide insights regarding the understanding of the problem as well as for the evaluation of the developed artifacts. The individual steps applied for this cycle are described in the following chapter as it introduces the applied design science research process.

3.5.2   Design Science Research Process

Ellis and Levy (2010) and Hevner and Chatterjee (2012) state that the research process itself starts with a problem and is resolved by evaluating the artifact, which is designed to solve a defined problem. The design science research framework, illustrated in Figure 31, containing the five process steps awareness of the problem, suggestion, development, evaluation, and conclusion, is based on the methodology by Takeda et al. (1990), who first mentioned the five process steps.
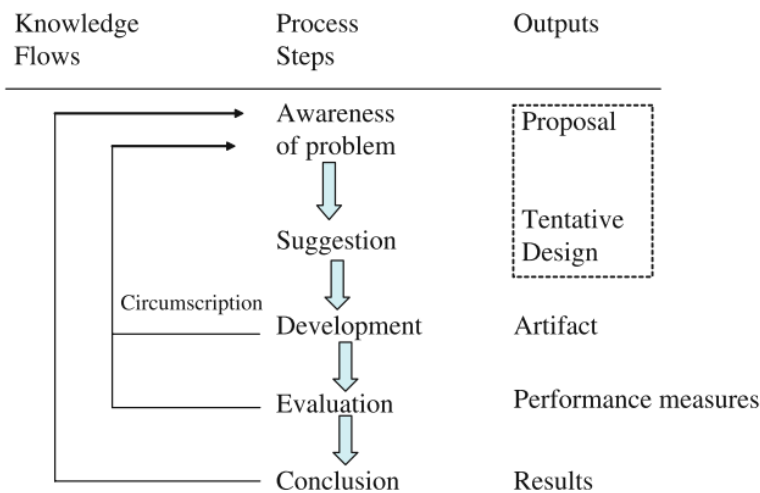
Figure 26: Design science research process (Hevner & Chatterjee, 2012)

As described regarding the design cycle within the chapter before, the process steps are not sequentially from the first step to the last one, but iteratively. The reason for the iteration of the process steps is the fact that the knowledge base evolves during the project duration. Rossi et al. (2013) mention that new data during each process step can drive returns to previous process steps and eventually adapt the problem statement. They further explain that the goal of the first two steps is to create a theoretical construct. Afterward, this theoretical construct is used for the design domain.

Awareness of problem

As described by Rossi et al. (2013), a potential origin for the research problem is the analysis of empirical data as well as similar cases within organizations or applied sciences. The output of this process step is, in general, a research proposal.

As part of this process step, this research gained awareness of the problem by analyzing the current situation of business model innovation, enterprise architecture, and knowledge management. This was done by conducting a literature review, of which the results are formulated in Chapter 2. The formulated literature gap strengthens the need for further research and awareness of the problem. Further, the research objectives, the thesis statement, and the research questions facilitated keeping the focus on the investigated problem.

As a link to the relevance cycle, cases of business model innovation were collected through interviews, which provide insights into the characteristics of such cases. Chapter 4 describes and analyzes the three collected business model innovation cases in detail. For the case selection, companies from different sectors were selected on purpose to be able to derive a generic approach to structure business model innovation cases. Every case is described regarding the motivation

the business followed to innovate, the outcome of the innovation, and which challenges occurred during the transition of the innovation integration. The cases enabled me to develop an in-depth understanding of the properties a business model innovation attempt has in practice. The gathered information and insights combined with the literature review served as the basis to suggest a tentative design.

Suggestion

As mentioned by Rossi et al. (2013), suggestions for the artifact can be found in theory, as described in the section about the rigor cycle in Sub-chapter 3.5.1. The output of this process step is a tentative design that is seen as a potential solution for the identified problem.

As part of the suggestion phase, I developed a proposal on how the ideation process for business model innovation can be supported, as described in Chapter 5. For that purpose, the specific challenges of business model innovations needed to be derived and analyzed as well as related work required for the later development of the artifact. The related work has been identified as the case-based recommender system ICEBERG by Martin (2016) and the enterprise ontology ArchiMEO that represents an ontology-based ArchiMate version 2. The suggestion encompasses an approach overview to match business model innovation cases and a process flow from a user's perspective. Several iterations were required to develop the final suggestion as the design science approach also suggests it, according to Hevner and Chatterjee (2012), since suggestions come from new and evolving knowledge during the research. This happens while studying new literature and from the outcomes of the conducted interviews.

Development

Based on (Rossi et al., 2013), the process step development is concerned about the data gathering exclusively for building the design artifact. Also, the reflection of the project state can yield in the refinement of the current solution and conclusion. This step deals with the codification of the design knowledge (Rossi et al., 2013). The output of this process step is the build of a design artifact.

The development of this research's artifact comprises the ontology to represent business model innovation cases, the matching methods to filter or recommend business model innovation cases, and the actual approach to match business model innovation cases employing the filter or the similarity-retrieval service. For the ontology development, described in Chapter 6, the approach by Noy and McGuinness (2001) has been applied. The collected cases' analysis results and the literature review's insights provided the necessary information to develop the ontology. The

detailed approach to ontology development is described in Sub-chapter 6.1, where among other things, the developed competency questions were specified. During the ontology development, I realized that the ontology would have high complexity. Nevertheless, the ontology-based approach enabled the artifact to systematically structure business model innovation cases and be machine-readable, and thus, deduction from the data could be performed in the future. Due to the complexity, I decided to approach ontology development by developing individual ontologies for the different domains of business model, business capability, enterprise architecture, business innovation case, and construction industry specifics. Though, an ontology containing these individual ontologies is necessary to achieve the research's objectives. Thus, merged ontologies were developed to merge all the five individual ontologies. For future research conducted with the developed ontologies, a researcher or practitioner can take the ontology that suits the domain to which it should be applied. The matching methods to achieve a filtering service and a similarity-retrieval service are described in Chapter 7. For the filtering service, a SPARQL-based Boolean matching method has been developed since SPARQL suits information retrieval from ontologies. The similarity-retrieval service was developed using the case-based reasoning approach by Martin (2016). The method calculates the similarity of case characteristics provided by a user against the case repository cases. The two matching methods are applied to the business model innovation cases in Chapter 8.

Evaluation

According to Rossi et al. (2013), the evaluation phase is the process step to figuring out if the developed artifact helps to solve the problem identified in the first step. The evaluation of the artifact is necessary to have a validation of it in context to the problem (Ellis & Levy, 2010). The output of this process step is to have a performance measurement of the developed artifact.

This research evaluated the developed ontology and the two matching methods applying a scenario from the construction sector as a business model innovation case representation from a tool-user perspective, as described in Chapter 9. Further, to apply the methods and answer the competency questions introduced at the beginning of the ontology development, the business model innovation cases were added to the case repository that is based on the developed business model innovation case with industry specifics ontology. The application scenario from the construction industry was added as well to the case repository to evaluate if the developed ontology could also be used for other cases than the cases collected at the beginning of this research project. The Boolean matching method was applied on the case repository using the SPARQL-queries adjusted for the application scenario. The case-based reasoning matching method was evaluated during interviews with stakeholders representing the three roles for which

the recommender system was developed: transformation manager, C-level manager, and enterprise architect. Through the evaluations, the research objectives have been validated.

Conclusion

As Rossi et al. (2013) explain, the results are communicated and especially the anomalous results are stated for future work on which further research can be conducted. Ellis and Levy (2010) explain that the final process step is important because the contribution to the body of knowledge is made in the process step conclusion.

The summary of the results is collated in the conclusion and outlook of Chapter 10. Derived from the results, some notable topics are brought together as further research. In addition, the conclusion describes the contribution to the body of knowledge and the practical relevance this research has.

The applied design science research methodology for this research combined with the research questions and the relevant chapters of this thesis to answer those questions is shown in Figure 27.
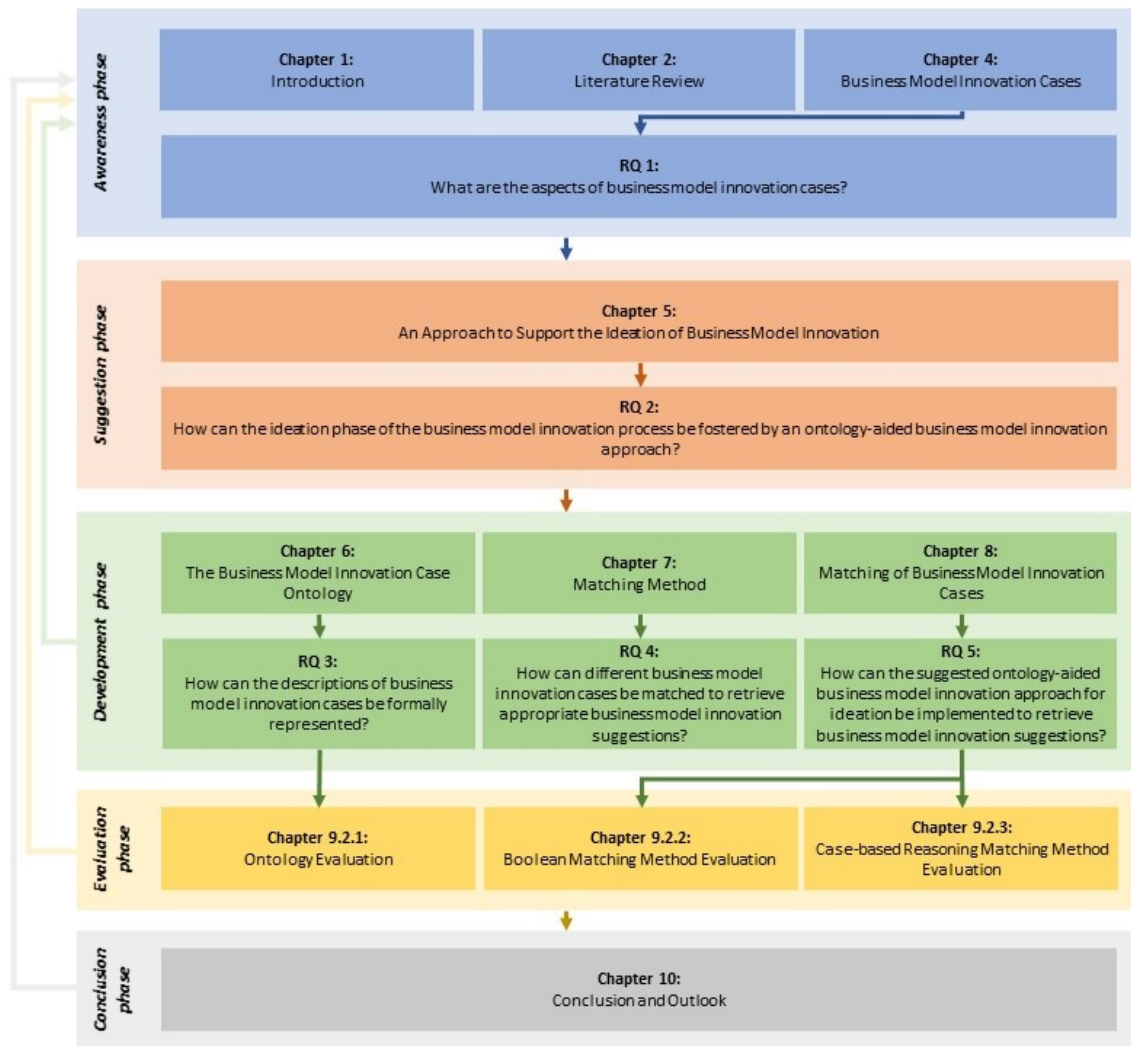
Figure 27: Applied design science research approach for this research

3.6 Time Horizon

According to Saunders et al. (2019), for any research, the question needs to be answered, if the research is a snapshot of a particular moment in time, which is called a cross-sectional time horizon, or if the research represents a series of snapshots over a given period of time, which is called a longitudinal time horizon. According to the authors, this depends on the defined research questions. Since this research aims to provide a snapshot of the current situation, this research follows a *cross-sectional* time horizon. Due to the constant evolution in the business model innovation area, this research provides an approach that is valid at this point in time but might need changes over time.

3.7   Data Collection and Data Analysis

The data collection of this research relies on secondary data and primary data. The secondary data consists of artifact and document studies to understand the knowledge base and the environment as introduced by Hevner and Chatterjee (2012). Thus, secondary data refers to already existing data sources that have been collected for other purposes and that are used by the researcher. The collected secondary data from the literature review is incorporated into the design of the artifacts. Primary data is firsthand data that the researcher collects. The primary data is based on the outcome of expert interviews. This data helped with the design cycle as it generated demonstration cases and supported the development of the artifacts. Further, it helped evaluate the designed artifacts, answer the research questions, and close the loop within design science research.

The applied data collection techniques mapped with the five process steps from the design science research framework introduced by Hevner and Chatterjee (2012) are illustrated in Figure 34.
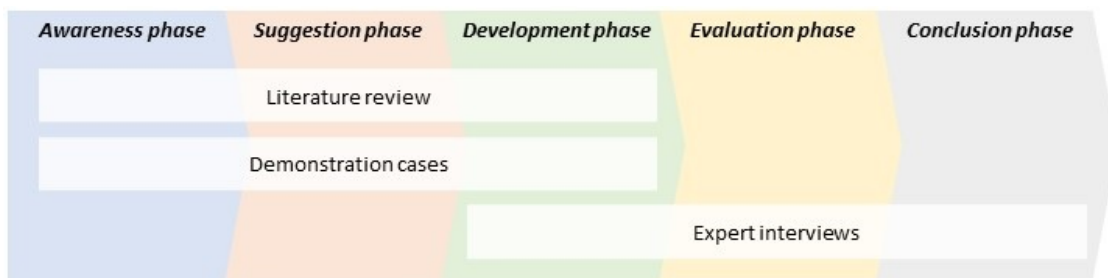
Figure 28: Data collection based on the design science research framework by Hevner and Chatterjee (2012)

Data triangulation supports the research to achieve a deep understanding of the topic and validity of the analysis of it (Carter et al., 2014). To achieve that, the following data sourcing methods have been applied:

Literature review

To get insights into the current body of knowledge, a literature review was conducted to identify the relevant qualitative information for the artifact development. Documentary secondary data is often used in projects and can consist of analyzing books, journals, and magazine articles (Saunders et al., 2019). For this purpose, multiple sources, such as science direct or emerald, were used to retrieve from a broad knowledge base. The literature review helps during the awareness phase to identify a gap in the literature which justifies the need for this research. Further, based on information retrieved from the literature, the suggestion for the ideation approach of business model innovation could be formulated. Also, the literature review results are used to develop the ontologies to structure a business model innovation case.

Demonstration cases

Besides the goal to become more aware of the research problem, the demonstration cases support the goal of understanding the challenges and aspects of business model innovation from an applied perspective. As Yin (2003) mentioned, case studies allow an extensive understanding of the research context. According to him, it is more beneficial to analyze multiple cases over one. Thus, three cases of business model innovations are analyzed as part of this research.

Two cases were collected as part of the research project regarding the digital change within the construction sector, of which I was a part of from 2018 until 2021. The two cases are described in Sub-Chapters 4.1 and 4.2. Further, to not only collect data from only one sector and get more insights regarding the enterprise architecture point of view, I conducted an interview with an enterprise architect expert with more than ten years of working experience as an enterprise architect. He introduced me to a business model innovation case of his employer, a Swiss insurance company. This case became the third collected business model innovation case, described in Sub-Chapter 4.3. The three cases were analyzed regarding the business's motivation to innovate, what the outcome of the innovation was, and what challenges occurred. Further, the different properties were derived to structure a business model innovation case. These results were used to suggest the to-be-developed artifact and the development of the business model innovation case ontology.

Expert interviews

Besides the interviews to collect the three business model innovation cases, additional interviews were conducted. Three interviews were conducted with a transformation manager, a C-level manager, and an IT-transformation manager. The summary of the interviews is shown in Chapter Appendix-F: Expert Interview Summaries. These three interview partners, representing the stakeholders for the suggested artifact, are experts in their area and provided this research with insights from the practice regarding the relevant properties of a business model innovation case for their profession. The output of the three interviews was used for the development of the case-based reasoning matching method. A second interview was performed with the same three experts during the evaluation phase for the recommender system. The experts evaluated the artefact on its usefulness and completeness.

During the development of the construction industry-specific ontology, I required information regarding the specifics of the construction sector. For this purpose, I interviewed a construction expert. The interview summary can be read in the appendix chapter Expert Interview with Construction Expert.

The interviews were qualitative semi-structured and followed the guidelines of Yin (2011). Questions represent an interview direction to be followed by the questioner. However, the direction does not necessarily need to be complete. Thus, further questions and remarks from the interviewer and the interviewee can be made during the interview.

The application scenario to evaluate the developed ontology and the two matching methods is based on a workshop participant's problem from the workshop regarding digital transformation within the construction sector (Workshop Construction Experts, 2018). The participant elaborated on their business's current issue and its need to conduct a business model innovation to sustain within the market.

3.8   Summary

Table 13 summarizes all the necessary characteristics for defining a research design according to Saunders et al. (2019) and provides a short reason for the selected choices of this research's research design. The choices were selected based on this research's topics and the available information to define a research design that best fits the stated objectives of this research.

Table 13: Research design summary

Element	Choice	Reason
Research philosophy	Pragmatism	A pragmatism research philosophy facilitates this research to develop practical solutions and outcomes and, thus, supports practical applied research.
Research approach	Induction and abduction	An emphasis on a multi-pragmatical research approach of induction and abduction allows for a flexible research method based on qualitative data.
Methodological choice	Multi-method qualitative study	This research relies on a multi-method research model applying qualitative methods to achieve triangulation of data.
Research strategy	Design science research	This research is based on a research problem and the research objective to develop a new design artifact to overcome the research problem. A design science approach supports such an approach.
Time horizon	Cross-sectional	This research follows a cross-sectional time horizon since it only concentrates on a specific timeframe.
Data collection and analysis	Literature review, expert interviews, and demonstration cases	An emphasis on data triangulation allows the research to achieve a deep understanding of the topic and the validity of its analysis. This is achieved by applying the qualitative multi-methods mentioned on the left. For each of the five process steps from the design science research framework, analyzed data was used.

4. Business Model Innovation Cases

This chapter addresses research question 1: What are the properties of business model innovation cases? Thus, this chapter's answers, besides the literature review within Chapter 2, contribute to the awareness of the problem phase from the design science research approach, as described in Sub-chapter 3.5.2.

The methodological approach for sourcing and analyzing the business model innovation cases within this chapter is described in Sub-chapter 3.7. Case 1, described in Sub-chapter 4.1, explores a case of the construction sector where the company provides a body leasing service of the own BIM-managers to other companies, amongst others also to competitors. Case 2 also explores a case from the construction sector where containers equipped for specific meetings, called ICE-sessions, are rented to construction companies, as described in Sub-chapter 4.2. Case 3, described in Sub-chapter 4.3, is about the transformation of an insurance company that joint a cooperation with a bank to provide the insurance sales services directly through the bank advisor. Sub-chapter 4.4 provides the results of the analysis of the three cases regarding relevant properties that characterize a business model innovation case. Finally, Sub-chapter 4.5 sums up this chapter regarding business model innovation cases.

4.1   Case 1: Construction – BIM-Managers-as-a-Service

4.1.1   Introduction and Motivation

A Swiss total contractor had the issue of not having sufficient workload for the capacity of BIM-mangers they employed. BIM stands for Building Information Modeling and BIM-managers are project managers of BIM-related projects. BIM is a newer method to build constructions and uses at its core a four-dimensional object as the blueprint for the construction. The fourth dimension is the applied information for each three-dimensional object designed on the four-dimensional object (Smith, 2014). Nevertheless, the construction company needed BIM-managers, as they saw the future of the construction industry becoming more construction projects developed applying the BIM method and technologies. Also, the construction company trained traditional construction managers to become BIM-managers in the field for them to get job qualifications which, according to the construction company, would be necessary to have in the future to keep their construction project management positions. Furthermore, the construction company had the goal to be the number one company for BIM-related knowledge and practices. Thus, the company needed to have a large team of BIM-mangers so that the expertise would stay within the company.

Based on this problem, the construction company came up with the idea to body-lease employed BIM-managers, who did not have enough workload, to other construction companies. This idea of employee body-leasing is not new. The construction company adapted this idea from the IT sector, where body-leasing is typical for IT projects. By body-leasing them to other construction companies, these construction companies, which currently were their competitors, would also become their customers. Similar to the concept of coopetition, where a rival company is not only the competitor but also a partner for collaborations (Peter & Gatziu Grivas, 2017), the competitors would as well become customers in this new business model.

4.1.2   The Solution

As mentioned in the previous section, the new business model introduced a new customer segment to the construction company: their competing total contractors and general planers. This new business model generated a new revenue stream for the construction company, which is a fee-based profit from the body leasing of the BIM-managers. To make the new service of BIM-manager-as-a-service more attractive to potential customers, the construction company decided to split the costs for the customers: half of the body-leasing price was fixed beforehand and half of the price was set to be performance-dependent. Thus, the construction company became well-known for their BIM-managing capability as they were so self-confident of their BIM-manager qualities that they risked earning less upon a bad performance-quality of their BIM-managers. The decision to take this path has turned to be correct, as the model is flourishing for the construction company.

The newly introduced service offers the benefit for the customers that they do not have to risk hiring a BIM-manager for a BIM-related construction project and after the project is completed, no further BIM-related projects are coming in, which would leave the BIM-manager without workload, and thus, only be a cost factor for the customer. Also, the service offers the benefit for customers of offering their services within BIM-projects, as they would not be able to work in such projects otherwise since they do not employ BIM-managers, which are crucial for BIM-related construction projects. Furthermore, the customer benefits from having a BIM-manager with seniority, and thus, no BIM-related support is required from the customer, which means that the customer does not have to build up in-house BIM-related knowledge.

The construction company does train the BIM-managers on the job to stay up to date regarding BIM-related topics, yet, the construction realized that there are not sufficient BIM-managers on the job market. This led to the decision to partner with a training facility where newly hired BIM-

managers could first go through off-the-job training before they started with in-house BIM-based projects, where they would receive on-the-job training.

Based on the collected information regarding this new business model from a Swiss construction company, a business model using the Business Model Canvas has been developed. The construction case for the BIM-manager-as-a-service modeled on the Business Model Canvas is shown in Figure 29.
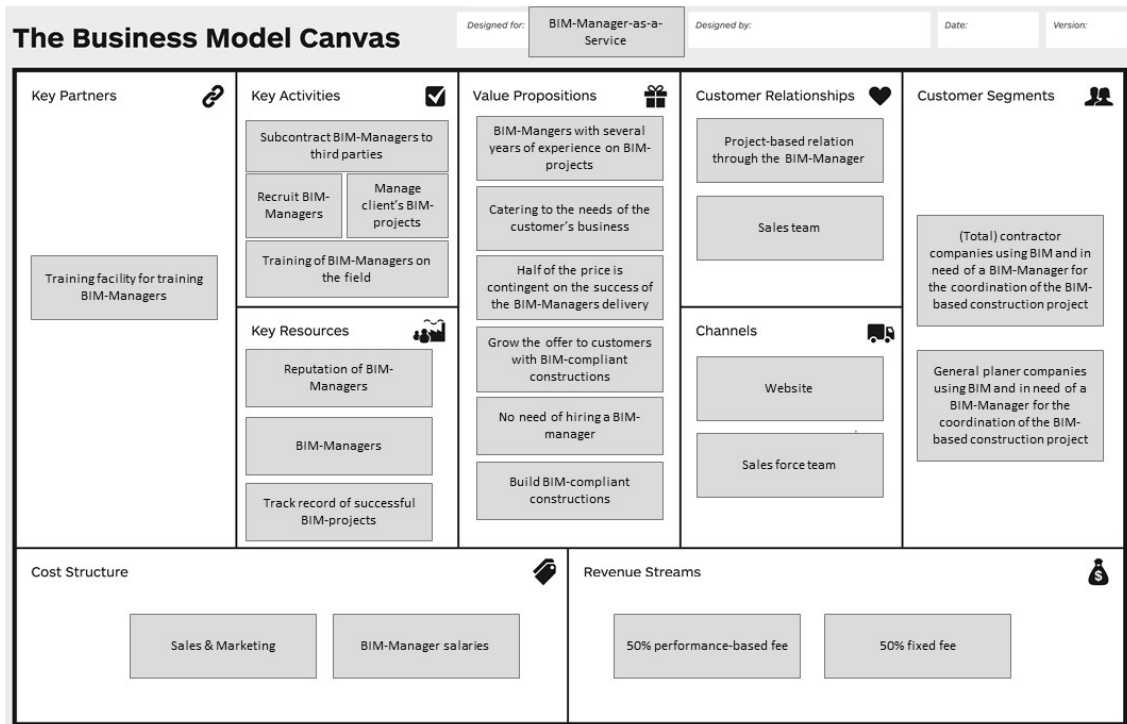
Figure 29: Case 1 modeled with the Business Model Canvas

4.1.3 Transformation Challenges

Since the main goal from a customer's perspective is to have a well-trained BIM-manager on demand, the main challenge of the new business model was to ensure having BIM competency and provide enough BIM-managers based on customers' demand.

To ensure a high level of BIM competency within the construction company, the company decided to set up a training program for each new BIM-manager. The training program has been designed to reflect the need for further BIM education depending on the new employee's previous knowledge of that field. The company would pay an off-the-job training program at a training facility outside of the company for newly hired BIM-managers with none or minimal BIM-related knowledge. This education would prepare the employee for their first BIM-project. On that first

construction project, the employee would not be alone as a BIM-manager but would act as an assistant BIM-manager to a senior BIM-manager, who oversees the project. After a successful off-the-job education and first BIM-project, the BIM-manager would be ready to manage their first BIM-project by themselves.

For experienced BIM-managers or new BIM-managers, which completed the basic training and are now in charge of a BIM-project, the construction company decided as of their training program to have several times during the year workshops for different BIM topics, such as for IT tools related to BIM-projects or new moderation techniques. By applying such a training model, the company could ensure that the BIM-managers would stay up to date within the world of BIM.

The second challenge to comply with the demand of BIM-managers was mainly organizational. This is because the BIM-managers were not used to be body-leased to other companies, and thus, they did not like the idea initially. The same challenge must be overcome for IT companies or consulting companies where such body-leasing models are already familiar. Therefore, the construction company decided to analyze and learn from such companies regarding how they transitioned. This decision led to a smooth transformation of the organization's business architecture and the satisfaction level of the BIM-managers could be maintained on a high level.

Nevertheless, the construction company also had to identify competing construction companies' willingness to hire BIM-managers from them. This identification was crucial as otherwise, the business model would have been doomed from the beginning. Also, the construction had to figure out how big such a BIM-manager-leasing market would be in order to identify the correct number of BIM-managers they would hire and train accordingly. As this number was difficult to determine, the construction company decided to overcome this challenge by slowly introducing this new service into the market. In the beginning, the construction company arranged leasing contracts for the BIM-managers directly through a sales team. At this point, the service was not yet available to the public, and thus, no web sale was yet available for customers. Also, no advertisement was done. Such a slow market introduction allowed the construction company to adapt slowly to the market's demand and keep the customer's satisfaction on a high level. Further, this approach helped the construction company ensure that they always had enough BIM-managers in-house for their construction projects.

4.2 Case 2: Construction – ICE-Session Room Leasing

4.2.1 Introduction and Motivation

This case from a construction company, a large Swiss total contractor for buildings, was developed around the idea of providing containers, which are set up with the necessary equipment to perform ICE-sessions (Integrated Concurrent Engineering-sessions) and to lease them to customers. Simplified, an ICE-session is a repetitive project meeting workshop during a construction project, where all relevant stakeholders are present and discuss issues and, if possible, solve them directly during the meeting (Kunz & Fischer, 2012). Thus, ICE-sessions allow having agile project management. The idea of leasing containers with special equipment for ICE-sessions comes from the necessity of needing such containers at the construction site during the period of a construction project. Thus, customers would only need to pay for the duration they need such a container and would not need to buy the whole equipment as well as the container itself. Therefore, the customer would spend less money on a room to conduct ICE-sessions.

For the construction company the main motivation for this new business model is to attract and build a new customer segment. Currently, their customers are primarily companies or individuals who have the desire to construct a building. With this new business idea, the construction company would pursue attracting companies that are currently their competitors. This is because not the current customers of the construction company need such container rooms but other construction companies. Thus, a new revenue stream would evolve for the construction company. Besides the goal to increase the company's profit, the reason for providing such a service to competitors is to use the capacity of the ICE-session-containers to a full extent. Before this transformation, the construction company had containers equipped for ICE-sessions stored in a storage house, and thus, they became an increasing cost factor.

4.2.2 The Solution

The business model for this case requires resources which the construction company did not possess before the transformation. The company needed a storage place for the containers, ICE-session equipment for the containers, and the containers themselves. Thus, the construction company decided to partner with a storage renter, distributors of office material, and a producer of containers for the construction sites. The construction company decided explicitly not to buy a storage place instead to rent it so that the fix-costs of the company could be held to a minimum.

Besides the resources acquired from the partners, the construction company needs to have a team who can set up the containers to provide them to customers. For this, the team must acquire the furniture and install it within the containers. As soon as a container is ready or a container is no longer needed at a customer's construction site, the sales team tries to lease the container to competing construction companies. Besides the sales team, the construction company set up a website through which a customer can order and lease the containers directly.

As mentioned before, the construction company created a new customer segment with this new business model. Nowadays, they see their competitors, such as total contractors or general planers, as potential customers. Typical building planners, such as architects, can become their customers if they require a mobile ICE-session room. The customers get not only a mobile ICE-session room but a solution that is ready to use right from the spot on, since all the equipment, such as tables or screens, is already installed and ready to use. The leasing option lets the customer pay the leasing fees at a monthly rate, and thus, the customer does not have to come up with the budget for the container upfront.

Naturally, the new business model must generate revenues to be sustainable. This is provided by the leasing fees the customers must pay monthly. The revenue must outnumber the costs appearing because of this new business model, which are acquisition, maintenance, and storage costs for the equipment and the containers.

Based on the collected information regarding this new business model from a Swiss construction company, a business model using the Business Model Canvas has been developed. The result of the construction case for ICE-session room leasing modeled on the Business Model Canvas is shown in Figure 30.
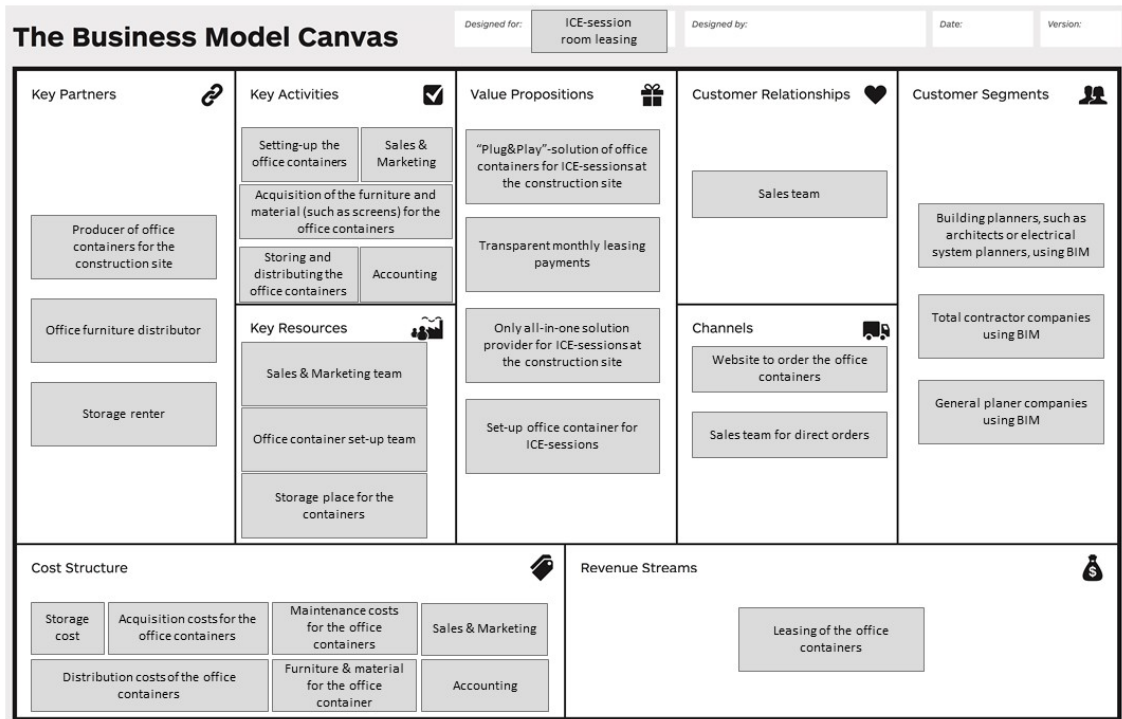
Figure 30: Case 2 modeled with the Business Model Canvas

4.2.3 Transformation Challenges

Besides coming up with the funding for this endeavor, the transformation challenges to implementing this new business model for the construction company were the following:

- Find a storage place
- Build up ICE-session expertise
- Figure out the right number of containers to set up

Today, the construction company has a partner for the concern regarding storage place for the containers and the equipment. Nevertheless, before the transformation, the company was unsure if they should outsource the storage or if the company should buy a storage place or even only land and build a warehouse for the container storage. The company decided to outsource this because they decided that warehousing is not and should not become a core capability of the company. Thus, to be cost-efficient, the company decided to outsource this important task to provide their business idea to customers.

Since the business idea was to deliver pre-equipped containers suited for ICE-session meetings, the construction company had to make sure to have the right equipment for such meetings. To acquire this knowledge, the construction company decided to build up knowledge on how to

perform ICE-sessions for BIM-related projects best. This was done by training BIM-managers on how to best conduct ICE-sessions. The company realized that for ICE-sessions they needed not only a simple screen to share the content of their laptops but at least two screens with touch-functionality so that the participants of the ICE-session could interact directly on the screen with each other. Like this, the meeting would become more of a collaboration among the participants, and thus, from a simple meeting, the ICE-session would transform into a workshop and solve issues on the spot.

Figuring out the correct number of containers to set up was difficult for the construction company. This task was necessary as the company did not want to spend too much budget on this new business model since they did not know if it would be successful, but on the other hand, they wanted to satisfy the new customer group they targeted. This satisfaction was paramount as these customers are also competitors of the company, and thus, the construction company did not want to disgrace themselves. To figure out the correct number, the identification of the customer demand was crucial. As this task was difficult to determine, the construction company decided to overcome this challenge by slowly introducing this new service into the market. In the beginning, the construction company arranged leasing contracts for the containers directly through a sales team. At this point, the service was not yet available to the public, and thus, no web sale was yet available for customers. Also, no advertisement was done. Such a slow market introduction allowed the construction company to adapt slowly to the market's demand and keep the customer's satisfaction on a high level.

4.3 Case 3: Insurance – Cooperation with a Swiss Bank

4.3.1 Introduction and Motivation

This case reflects the cooperation between a Swiss insurance company and a Swiss financial institution. The basic idea is to use the knowledge and resources of both companies to provide a better customer journey. More specifically, to integrate the products of the insurance company with some products of the financial institution. This would enable the customer to have a single point of contact for multiple financial and insurance needs and provide the two business partners with intercompany cross-selling potential.

In this specific case, the cooperation involves the financial product of mortgages and insurance products for new homeowners. The consideration behind the collaboration is that the customer gets automatically in contact with an insurance provider when applying for a mortgage at a bank. With this combination, the customer's financial and risk coverage needs are connected at the point

of sale. Typically, these two kinds of services are separate, so that a customer would need to contact a bank mortgage advisor and an insurance advisor individually.

For the bank, the motivation to cooperate with the insurance company is to provide further services to their customers and thus increase customer satisfaction towards the bank. Also, the bank sees potential for this since fewer customers are going to bank branches because of today's digital change. With the increase of services, the bank could attract more customers to their bank advisors, which could sell further services to the customer, such as retirement plans.

The insurance company's motivation for such a business model is to get in touch with customers who are becoming homeowners. Through such cooperation, the insurance company could earlier recognize who is becoming a homeowner and offer them already an insurance package. This results in higher sales of homeowner-related insurances, and therefore, the insurance company would have higher profits.

4.3.2   The Solution

Multiple insurance products come into consideration when closing a mortgage, such as home insurance, construction insurance, household contents insurance, and building owner's liability. The customer can pick and choose from predefined packages, enabling him to have quick and easy risk coverage. If there are special needs, insurance professionals must provide insurance products tailored to the customer's needs.

This business model sees the bank as a broker for insurance products. Thus, financial advisors need to be licensed to sell insurance products. On the other side, the bank is entitled to some of the earnings generated through its channel, and additionally, its product is more attractive and unique in the market. This helps to distinguish the company from its competitors.

The insurance company needs to teach the bank advisors regarding the insurance products and provide the bank advisors with the necessary tools to check for eligibility of the customer as well as to sign an insurance contract. The insurance company needs to know detailed information on the customers from the bank for the eligibility check.

The simplicity for the customer is the essential value proposition since this case is built on customer convenience. This business model enables a single point of contact for the customers: the financial institute. Thus, the bank branch becomes a one-stop-shop for the customer regarding financial as well as insurance-related concerns. Also, the customer receives an offer for the different insurances regarding owning a house on the spot, and thus, he saves time for inquiring about the price for such an insurance package.

The insurance company has the same expenses as the standard insurance business model before its transformation. Additionally, to the ordinary expenses for an insurance business, the insurance company has the costs for training the bank employee as well as the development and maintenance of the IT integration of their tools into the bank advisor's system.

Based on the collected information regarding this new business model from a Swiss insurance company, a business model using the Business Model Canvas has been developed. The result of the insurance case for cooperation with a Swiss bank modeled on the Business Model Canvas is shown in Figure 31.
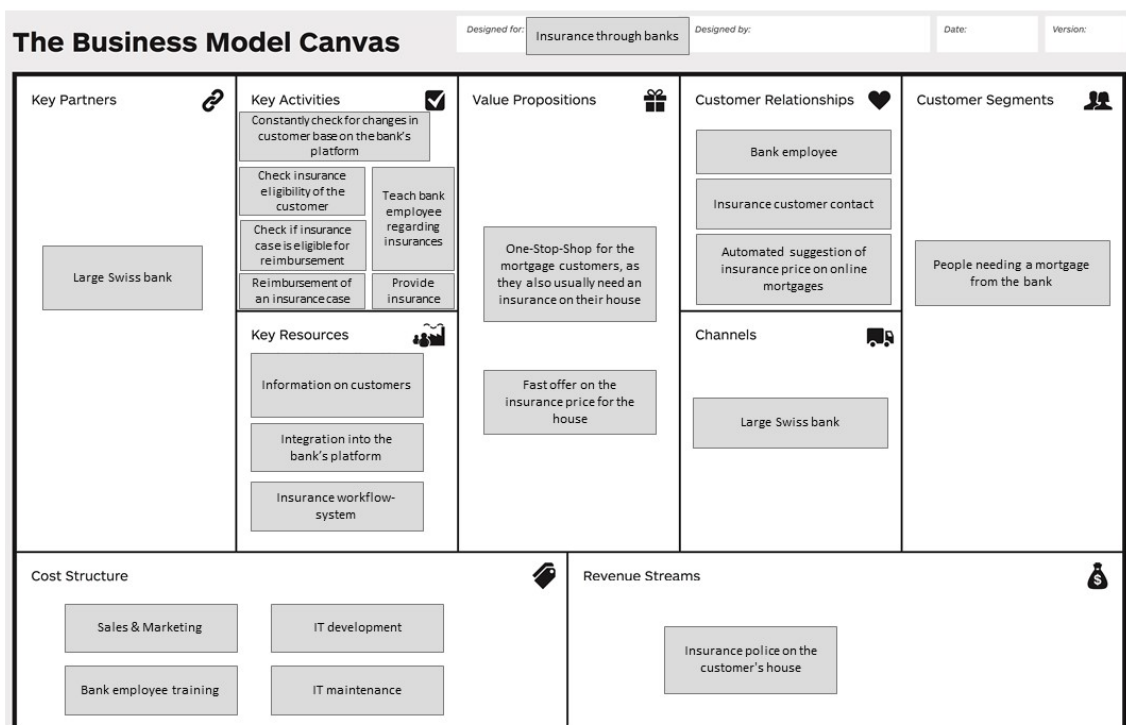
Figure 31: Case 3 modeled with the Business Model Canvas

4.3.3 Transformation Challenges

Since the main goal from a customer's perspective is to have a single point of contact for insurance and financial-related topics, the main challenge of the new business model was to integrate the IT systems of the insurance company with those from the bank. Such integration is required for the bank advisor to provide the insurance services to the customers. The integration of the systems was done in a collaborative IT-project initiative, including both parties. Who would integrate their system was a big question initially, and there were multiple ways to do so. To have a successful integration, both parties needed to come one step towards each other. Both are relatively big players in their industry, and both have their information technology backgrounds. As is often the

case for big companies that are already several decades on the market, the IT systems are sometimes outdated, and the companies fear to change the code within these IT systems. Thus, the solution for this case was to build an application interface (API) through which the insurance company's IT system would not have to change much. The bank decided to develop a new user interface for their bank advisors to facilitate their advisory work and to link those user interfaces with the API from the insurance company. This solution enabled both companies to have manageable changes within their IT systems and have a modest project duration to integrate the new business model.

This integration of information systems between two partners has become part of the strategy of the insurance provider. Their entire enterprise architecture should enable the company to open up its systems and infrastructure for multiple partners to dock and exchange information. Hence, this case with the financial institution was an excellent opportunity to figure out how to build such an ecosystem with other institutions, especially to understand the requirements and gaps compared to the current situation.

Not only the enterprise architecture needs to be adapted to open up towards ecosystems, but the applications also need to be changed as well. An example would be to transfer client data. Insurance advisors should not have to re-enter the customer information into their systems since the bank advisor already has done so. However, the automated information exchange leads to a series of tasks: checking if the client already exists (maybe with a different name due to a typo or marriage), the actual transfer of data, and the connection between the transferred data with the client instance in the system. If it is a new customer, cross-selling potential needs to be identified as well.

It is further planned that the insurance provider can offer multiple ways to connect a partner system with the insurance company's information infrastructure. Since the insurance company identified three different possibilities to do so, the consequence is that the enterprise architecture needs to be designed flexible enough to offer these kinds of integrations:

- Providing business logic. This means that the insurance company is providing knowledge about insurance products. However, the integration in the partner systems is not the responsibility of the insurance provider. The partner needs to integrate the dialog (e. g. sequence of questions, needed information, and input logic) by itself.
- Providing dialog control. This means that the insurance company provides the logic and dialog logic to the partner who needs to integrate the information into their systems,

especially providing a guided user interface that leads the consultants through the necessary information.

- Providing business logic, dialog logic, and user interface. The most convenient way for the partner. However, the partner needs to be able to integrate the final solution into their systems.

For this case of business model innovation, the second option was chosen since both parties preferred that solution.

Unfortunately, the integration is not the end of the story. Special needs are depending on the partner (broker, call center, outbound specialist, and others). Such needs can be configuration changes or making out information not needed by the partner consultant. On the other hand, sales aids need to be designed and training organized. The branding will be the partner institution. However, the standards and guidelines of the insurance provider need to be attained.

Roadmaps for the continuous transformation were developed. The enterprise architecture was transformed step by step to increase the integration ability. Providing modularity is a key requirement for the insurance company. Modularity enables partners to connect fast and easily. In this specific case, the client needs one point of contact, meaning integrating the insurance information into the e-banking system, which emphasizes the importance of a one-way login. In other cases, integration means that the damage or complaint process is seamlessly integrated into the partner system. However, all this reduces the visibility of the insurance company.

According to the insurance provider, a trend to open up the enterprise architecture can lately be seen in the industry. They see the increased connectivity and trend towards ecosystems as core elements in the future. The timetable included a development period of about two years to open up the front-end systems and to enable the docking of multiple partners. After those two years of development, all three possibilities for integration mentioned above have become possible for the insurance company to offer to their partners.

The long-term strategy for the insurance company is to have an overhauled backend system, more flexible, modular, and integrated. The insurance provider aims towards a de-fragmentation of the IT landscape. The main drivers for the development of the IT landscape are digitalization, automatization, data science, and the connection to ecosystems.

4.4 Properties of business model innovation cases

Based on the business model innovation cases introduced in the previous sub-chapters, the properties of business model innovation cases have been identified. The case analysis and the literature review revealed that a business model innovation case consists of mainly three conceptual parts: the business model, the business innovation, and the enterprise architecture. These conceptual parts are seen as viewpoints from a user perspective on a business model innovation case. The following sub-chapters summarize the identified properties of the three concepts that build the groundwork to develop the business model innovation case ontology.

4.4.1 Properties of a Business Model Innovation Case from a Business Model Viewpoint

Based on the analysis of the three cases and enriched with the knowledge from the Business Model Canvas by Osterwalder and Pigneur (2010), 14 business model case properties have been identified. Table 14 lists the results. For each identified business model case property, a description and an example are provided to clarify the meaning of the property.

Table 14: Business model case properties based on the analyzed cases

Business model case property	Description	Example
Key partnership goals	Key partnership goals represent the reason a company decided to do business with a third party (a key partner).	For the insurance case, a reason for the insurance company to partner with the bank is access to customers.
Key partners	Key partners represent the ecosystem of third parties who support the feasibility of the business model.	For case 1, an identified key partner is the training facility, where the BIM-managers get off-the-job training.
Economic advantages	Economic advantages are typically cost advantages through either scaling of a business aspect or the increase of the scope of the business.	For the BIM-manager-as-a-Service case, an economy of scale is present since the on-the-job training costs can be multiplied by having a bigger BIM-manager team.
Key activities	Key activities are the most important activities a business must undertake in order to run the business model.	Case 2 has the key activity of acquiring furniture and material for the ICE-session containers, otherwise, they cannot be equipped and later leased to customers.

Key resources	Key resources represent the things, tangible or intangible, in a company which a business model needs in order to run.	The insurance workflow system is a key resource of case 3 since, without the workflow system, the bank advisor could not provide their customers with insurance products.
Offerings	Business models always provide something, either a service or a product, to their customers. This something is represented as the offering.	For the insurance case, an offering is the insurance of the customer's building.
Offering values	Offering values represent the specific values provided to a customer employing the offering brought to the customer.	Case 2 provides the value of receiving a plug-and-play-solution for customers since the container only needs to have electricity and it is ready to be used.
Cost structure models	To have low costs is a goal for every business model. Nevertheless, this goal can be more important for some business models.	The offering of a plug-and-play-solution for construction companies in case 2 is an example of a value-driven approach as the goal is to create value for the customer.
Cost structure elements	Cost structure elements represent all the different costs that occur while running the business model.	Case 1 has BIM-manager salaries, a cost factor to run the business model of leasing BIM-managers to customers.
Revenue streams	Revenue streams represent ways a business model has to receive money from customers.	The yearly payment of the insurance fees for the house insurance from case 3 is an example of a revenue stream.
Pricing mechanisms	Pricing mechanisms describe how the price is set for a specific offering.	Case 1 has a revenue stream of a performance-based fee. The amount of the fee gets negotiated with the customer.
Channels	Channels represent the form of communication between the company and the customer and how the customer can reach the company.	The case BIM-managers-as-a-service offers its service through a website through which a customer can order a BIM-manager.
Customer relationships	Customer relationships represent the form of relationships between a customer and the company.	The sales team in case 2 establish the relationship between the customer of containers and the construction company.
Customer segments	Customer segments represent the organizations or people to which the company's developed offer is dedicated.	The insurance case has as a customer segment homeowners representing organizations and mainly individuals who require a mortgage, and thus, visit a bank advisor for further advice.

A business model innovation case requires further details besides the information provided from the business model view that includes the properties described in the previous Table 14. Otherwise, a thorough comparative analysis between different business model innovation cases would not be achievable because to differentiate the cases only by 14 properties would lead to too similar results as soon as the case base increases. Thus, the case structure needs to have further details.

4.4.2 Properties of a Business Model Innovation Case from a Business Innovation Viewpoint

The analysis of the three cases resulted in eight business innovation case properties. The results are listed in Table 15. For each identified business innovation case property, a description and an example are provided to clarify the meaning of the property.

Table 15: Business innovation case properties based on the analyzed cases

Business innovation case property	Description	Example
Involved parties	Involved parties represent the organizations and individuals relevant to the success of the business innovation.	For the insurance case, the involved parties are the insurance company and the Swiss bank.
Risks of innovation	Risks of innovation represent the risks an involved party has to manage to introduce the new offer to the market.	Not having enough BIM-managers for the own projects left is a risk of the innovation idea from case 1.
Strategic goals	Strategic goals represent the results an involved party expects from participating in the business innovation.	Case 3 has the strategic goal of interacting with customers at an early stage by connecting with them when applying for a mortgage.
Drivers	Drivers represent the intentions for which an involved party is willing to participate in the business innovation.	The construction company in case 1 had the driver of not having enough workload for their BIM-managers. Therefore, they decided to implement the new business idea.
Barriers to overcome	Barriers to overcome represent the challenges an involved party needs to overcome for a successful business innovation transformation.	Case 1 has the challenge of convincing the BIM-managers to be body-leased, and thus, be working for other companies.s
Required resources	Required resources represent the needed resources, tangible or intangible, for successful business innovation.	Case 2 has containers as one of the required resources for successful business innovation.

Benefits of innovation	Benefits of innovation represent the benefits the involved parties and customers have based on the business innovation.	That the customer does not have to make another appointment with the insurance advisor and gets the offer directly is a benefit of the new business innovation.
Business state characteristics	Business state characteristics represent the specifics of business innovation in order to make it happen.	The ICE-session room leasing case required an entirely new business model for the construction company to make the business innovation possible.

A business model innovation case with details regarding the business model and the business innovation properties provides detailed information. Nevertheless, it is valuable to have the enterprise architecture view included in the case to analyze the impact the business model innovation further has not only on a strategic level but also on a business, application, and technological level. Thus, the case structure needs to have further details regarding the enterprise architecture impact for business model innovation cases.

4.4.3 Properties of a Business Model Innovation Case from an Enterprise Architecture Viewpoint

The analysis of the three cases resulted in 23 relevant enterprise architecture elements for business model innovation cases. The results are listed in Table 16. For each identified relevant enterprise architecture element, a short description based on the ArchiMate specification (The Open Group, 2019) and an example are provided to clarify the meaning of the elements.

Table 16: Relevant enterprise architecture elements based on the analyzed cases

Relevant Enterprise Architecture Elements	Description	Example
Stakeholder	A stakeholder represents an organization or an individual who has interests or impacts in the enterprise.	For the BIM-manager-as-a-service case, the construction company represents a stakeholder.
Outcome	The outcome represents a result.	For case 2, the increased revenue through the new revenue stream of container leasing is an outcome of the business idea.
Value	The value represents a benefit or worth provided by something.	That customers gain value of not needing to employ their own BIM-managers is a value provided by the case1.
Driver	A driver represents a motivation to change the enterprise.	Case 2 has the driver of generating more revenue.

Goal	A goal represents a targeted end state for the enterprise.	Case 2 has the goal of creating a new revenue stream for their current business model.
Requirement	A requirement represents something the enterprise needs for successful architecture.	To body-lease BIM-managers to customers in case 1, the construction company requires BIM-managers.
Constraint	Constraint represents a barrier the enterprise faces in order to achieve its goals.	Case 1 has the constraint that BIM-managers might not want to be body-leased to a third company.
Resource	The resource represents a thing, tangible or intangible, from or for the enterprise.	The insurance case has the resource of knowing how the insurance process works.
Capability	Capability represents an ability possessed by a person, organization, or system.	Case 3 has the capability of interacting with potential insurance customers through a bank advisor.
Value stream	A value stream represents activities, which create an impact on a stakeholder.	A value stream in case 3 is the teaching procedure of bank advisors so that they can advise customers on insurance services.
Product	The product represents the offer provided to customers.	The insurance case has the product of house insurance for insurance customers.
Business actor	A business actor represents a person, system, or organization who is relevant to the enterprise architecture.	Case 1 has an academic institute that plays an active role in the enterprise architecture.
Business service	The business service represents a service that is exposed to the enterprise or a third party.	The BIM-manager-as-a-service case has a recruiting service for BIM-managers.
Business object	A business object represents a concept required for a successful business.	For case 1, the reputation of BIM-managers represents a business object.
Business collaboration	The business collaboration represents the collaborative work of several active business elements, such as business actors.	The insurance case consists of the collaboration between the insurance company and the bank to provide the service to customers.
Business function	A business function represents grouped business behavior such as business processes.	Personal assistance through the sales team is a business function provided by case 1.

Business process	The business process represents a set of activities to gain a specific result.	To answer sales inquiries from customers is a typical business process for the sales team of case 1.
Business interface	The business interface represents a touchpoint for a stakeholder to reach the enterprise.	The BIM-manager-as-a-service case has, for example, the website as a touchpoint for customers.
Business role	A business role represents the responsibility that is given to a business actor.	The business actor academic institute of case 1 has the role of a training facility.
Business interaction	The business interaction represents a collection of performances done by several business actors.	The insurance case has the business interaction between the insurance company and the bank for evaluating the eligibility of a customer.
Application service	The application service represents an application behavior.	Case 3 has as an application service the eligibility check service.
Application interface	The application interface represents the touchpoint between an application service and a user or system.	The insurance case has a new user interface for bank advisors to access the insurance platform.
Application component	The application component represents a set of functionalities of an application.	Case 3 has the system for eligibility checks, which represents an application component.

4.5   Summary and Conclusion

This chapter introduced three business model innovation cases based on interviews with individual case experts. For each case, the business idea and the motivation for the stakeholders of each business model innovation case are provided. Also, the solution is described in detail and mapped to the Business Model Canvas to provide a summarized image of each case. Further, the main transformation challenges for each case are presented to provide case information not only on the result after the business model innovation was implemented but also for challenges that occurred during its implementation. This section continues by analyzing the three business model innovation cases to identify the properties of a business model innovation case based on primary data. The analysis delivered the result that there is a distinction between viewpoints on business model innovation cases. There are properties of it from a business model perspective or a business innovation perspective. Also, the enterprise architecture viewpoint can be considered when discussing business model innovation cases. Thus, this chapter analyses the business model

innovation cases from all three viewpoints in order to make a structured description of such cases possible.

The analysis of the three business model innovation cases points out the need for a structured description for such cases, including the different viewpoints of business model, business innovation, and enterprise architecture, to provide detailed information of business model innovation cases. Using such information, a business model innovation case can be portrayed depending on a viewer's interest. For example, can a C-level manager be more interested in the information from a business model perspective, and thus, the results of the business model innovation case should be shown from the business model viewpoint. A transformation manager might be most interested in the viewpoint of the business innovation and its challenges, while an enterprise architect is probably most interested in having an in-depth view of the actual business and IT properties of the case.

5. An Approach to Support the Ideation of Business Model Innovation

This chapter addresses the second research question: How can an ontology-aided business model innovation approach foster the business model innovation process's ideation phase? Thus, this chapter's answers contribute to the design science research approach's suggestion phase, as described in Sub-chapter 3.5.2.

Sub-chapter 5.1 describes the related work used to develop the approach to support the ideation of business model innovation. Further, the suggested approach and a suggestion for the ideation phase from a user's perspective and a service structure of the computer-based tool are described in Sub-chapter 5.1. This chapter ends with a summary and conclusion on the suggested approach for later developing this research's artifact, as described in Sub-chapter 5.2.

5.1 Approach for Addressing the Challenge of Business Model Innovation Ideation

The analysis of the challenges of the ideation phase during a business model innovation, described in Sub-chapter 2.1.5, revealed six main challenges:

- It is challenging to gain the required knowledge to achieve a new and innovative business model
- It is challenging to think of something different from the typical industry solution or of new ideas in general.
- It is challenging for managers to think in business models to solve issues.
- It is challenging to build a computer-based tool for business model innovation support on the current level of detail of the business model concept.
- It is challenging to identify business model innovation possibilities by leveraging a business's capabilities.
- It is challenging to compare business model innovations with the own business model or enterprise architecture.

Since the task of comparing a business's enterprise architecture or business model with a possible business model innovation is cumbersome when done manually, the solution should include a computer-based case-based recommender system to have a comparison functionality. Besides,

such a comparison functionality would support the challenge of leveraging a business's capabilities to gain insights into possible business model innovations. The knowledge could be stored within the application using an ontology-based approach for knowledge representation through a computer-based solution. The challenge to think of something different of the industry solutions or to gain new ideas of business model innovations can be achieved by a case explorer of business model innovations where specific filtering parameters can be set, such as only to provide cases that are not from a specific industry. The challenge that the current business model concepts are not detailed enough demands creating a more detailed business model concept than the status quo.

5.1.1   Related Work

The approach for supporting the ideation of business model innovation relies on existing knowledge. This sub-chapter describes the used related work for developing the approach and developing the artifacts of this research.

5.1.1.1   *Case-based Reasoning*

According to Aamodt and Plaza (1994), case-based reasoning (CBR) uses similar situations that have happened in the past to solve current problems. Thus, CBR reuses knowledge of past cases to apply it to a particular current situation (Witschel et al., 2019). CBR is a field within artificial intelligence and its roots are in knowledge-based systems, machine learning, and cognitive science (Bergmann et al., 2009).

Based on Bergmann (2002), a case for CBR consists of a problem description that is applied for a certain solution. The process model for CBR, called the CBR cycle, is depicted in Figure 32. The cycle consists of four sequential phases: retrieve, reuse, revise, and retain.

- The retrieve phase chooses the most similar cases based on the similarity mechanism from the case base, which represents the knowledge base (Bergmann et al., 2009).
- The reuse phase takes the solutions from the retrieved cases, which represent the knowledge of these cases, and adapts them according to the query (Bergmann et al., 2009).
- The revise phase is concerned with the evaluation of the suggested solution by testing it in the real world and, if necessary, the solution is modified to match the expected outcome (Bergmann et al., 2009).

- The retain phase aims at storing the experience from the revise phase of the solution but also of failures for reuse of future queries by updating the knowledge base accordingly (Bergmann et al., 2009).

The four CBR cycle steps are organized around the knowledge base of the CBR system, which contains the knowledge of the previously collected cases (Bergmann et al., 2009). Further, the first three phases, retrieve, reuse, and revise, are necessary for the application of a case-based reasoning recommending system. The step retain is a maintenance task to make sure, that the case base gets filled with appropriate cases that have been learned by the CBR system (Martin, 2016).
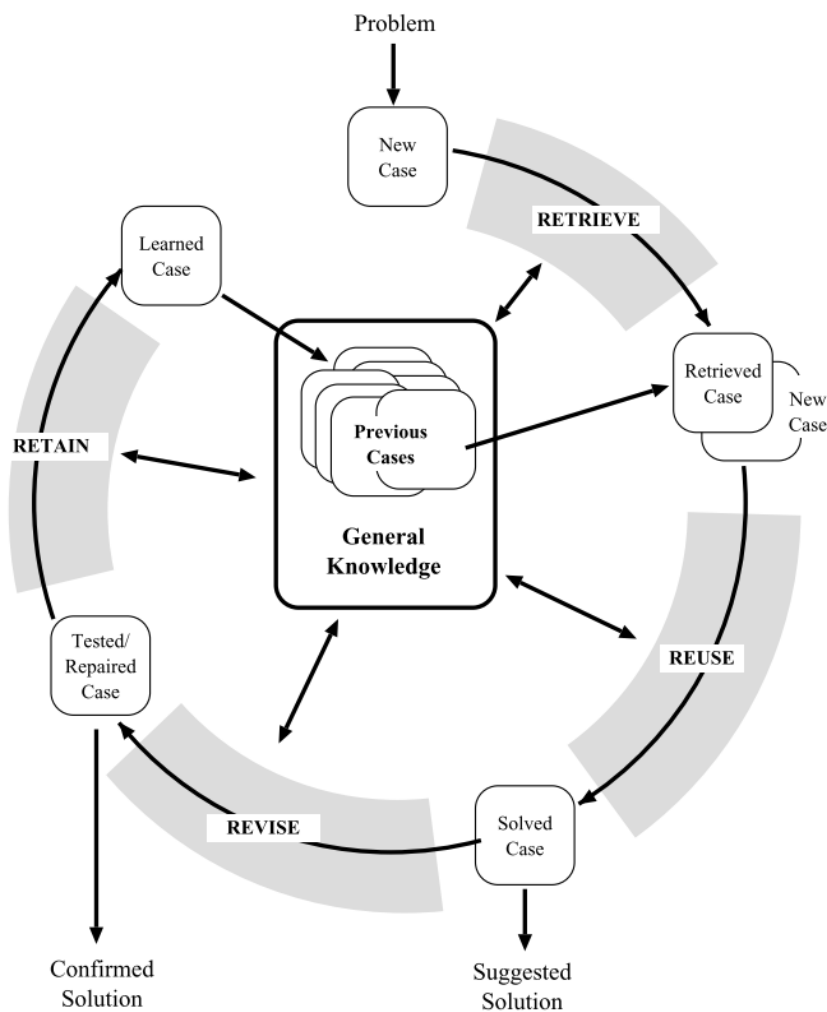
Figure 32: The CBR cycle (Bergmann et al., 2009)

This research requires a recommending system based on a case-based reasoning approach and that is interoperable with the concept of ontologies. Such a system is the ICEBERG (Interlinked Case-based Reasoning) tool developed by Martin (2016) with the approach for an ontology-based case-based reasoning solution. The ICEBERG tool supports the challenge that different stakeholders have different information needs. This challenge is overcome by providing different

views, viewpoints, concerns, stakeholders, and their thing of interest, based on the ISO/IEC/IEEE 420101 standard, as illustrated in Figure 33.
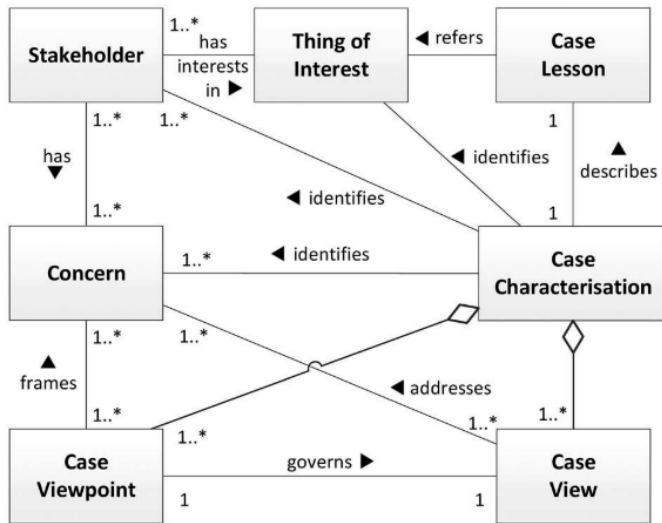
Figure 33: Case viewpoint model (Martin et al., 2016)

The ICEBERG tool uses similarity measures (functions) and weights of the properties depending on the chosen characterization viewpoint to which these values are assigned in order to calculate the similarity of each case within the case repository with the proposed case by the user (Martin, 2016). The ontology-based case-based reasoning approach of the ICEBERG tool has been applied to a research project called [sic!] (Hinkelmann et al., 2020; Martin et al., 2013, 2016; Witschel et al., 2015).

5.1.1.2   Enterprise Ontology

The challenges of business model innovation ideation revealed a need to include enterprise architecture into the concept of business model innovation. Based on Hinkelmann et al. (2016), enterprise architecture becomes machine-readable by interlinking or relating it with enterprise ontologies. Since this research uses the ArchiMate standard (The Open Group, 2019) as an enterprise architecture modeling language, an enterprise ontology to represent ArchiMate is required.

An enterprise ontology based on ArchiMate is ArchiMEO (Hinkelmann et al., 2020). ArchiMEO was developed since a machine cannot interpret ArchiMate, and thus, its concepts and relations were transformed into an ontological representation (Emmenegger et al., 2013). The ontology is represented in RDF format and, therefore, can be re-used. ArchiMEO is based on the ArchiMate version 2.0 (Hinkelmann et al., 2016). ArchiMEO has been successfully applied in contract management (Thönssen & Lutz, 2012), risk management (Emmenegger et al., 2012), and case-based reasoning (Martin et al., 2013). According to Martin (2016), the case-based recommender

system ICEBERG has the enterprise ontology ArchiMEO included. Thus, it is evident to re-use the enterprise ontology ArchiMEO in combination with the ICEBERG tool.

5.1.1.3   Business Model Ontology

To create a tool that supports the ideation of business model innovation based on a case-based reasoning approach such as the ICEBERG tool, an ontology for a business model is required to achieve machine-readability of the represented business model knowledge. Osterwalder (2004) introduced an ontological representation of a business model, which laid the groundwork for today's popular Business Model Canvas (Osterwalder & Pigneur, 2010) to represent business models systematically. His view of a business model ontology is shown in Figure 34. The ontology consists of eleven elements. These eleven elements consist of the nine building blocks capability, partnership, value configuration, value proposition, relationship, channel, customer, cost, and revenue. In addition, there are two more elements: actor and profit. Each of the nine building blocks has a sub-element towards the relation always is *isA* and *setOff*. This ontological representation of a business model is still today one of the most detailed representations of the business model concept.
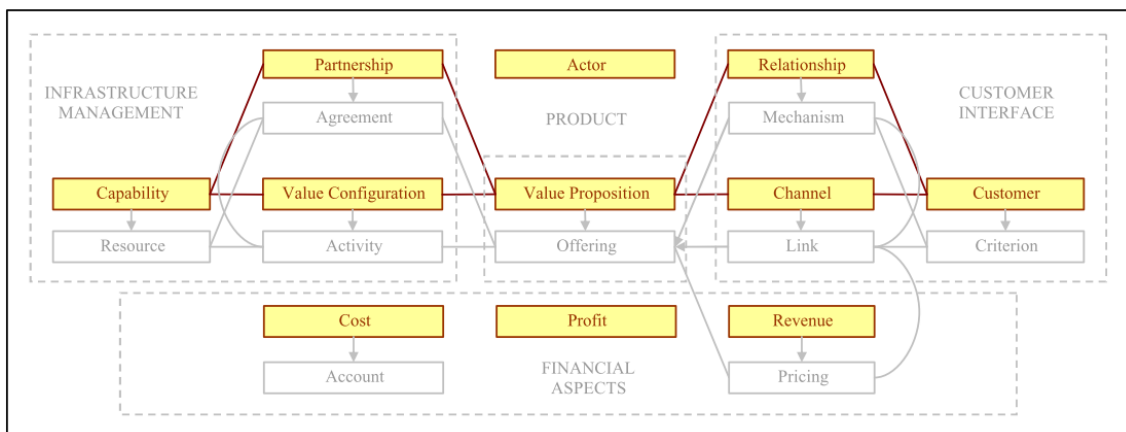
Figure 34: The business model ontology by Osterwalder (2004)

Based on the description of each element, sub-element, and relation, Meertens et al. (2012) derived a business model ontology, shown in Figure 35, to illustrate not only the elements but also the relations at one glance.

Figure 35: The business model ontology by Meertens et al. (2012)

Today, most business model ontologies are based on the ontological representations by Osterwalder (2004) and Meertens et al. (2012) and represent the structure of the Business Model Canvas. Examples are the business model ontologies from Iacob et al. (2014) and Caetano et al. (2017), depicted in Figure 36 and Figure 37. Both are based on the nine building blocks of the Business Model Canvas by Osterwalder & Pigneur (2010), even though Caetano et al. (2017) renamed some elements, such as key partners to partner network.

Figure 36: The business model ontology by Iacob et al. (2014)

Figure 37: The business model ontology by Caetano et al. (2017)

5.1.2 Overview of the Approach

For a computer-based tool to support business model innovation during the ideation phase to overcome the six identified challenges for business model innovation ideation, I suggest an approach that

- introduces a case-based reasoning approach for a recommender system of business model innovation cases,
- introduces an ontology for business model innovation cases consisting of the topics business model, enterprise architecture, business capabilities, and business innovation transformation,
- combines these topics with case-based reasoning to match a business's business model, enterprise architecture, or business innovation transformation characteristics, and
- introduces a filtering service to match specific user search queries for retrieving business model innovation ideas.

The overview of the approach is depicted in Figure 38. It consists of three layers: the user's perspective, the required knowledge, and the formal models representing the knowledge. The three layers are described in the following sub-chapters.
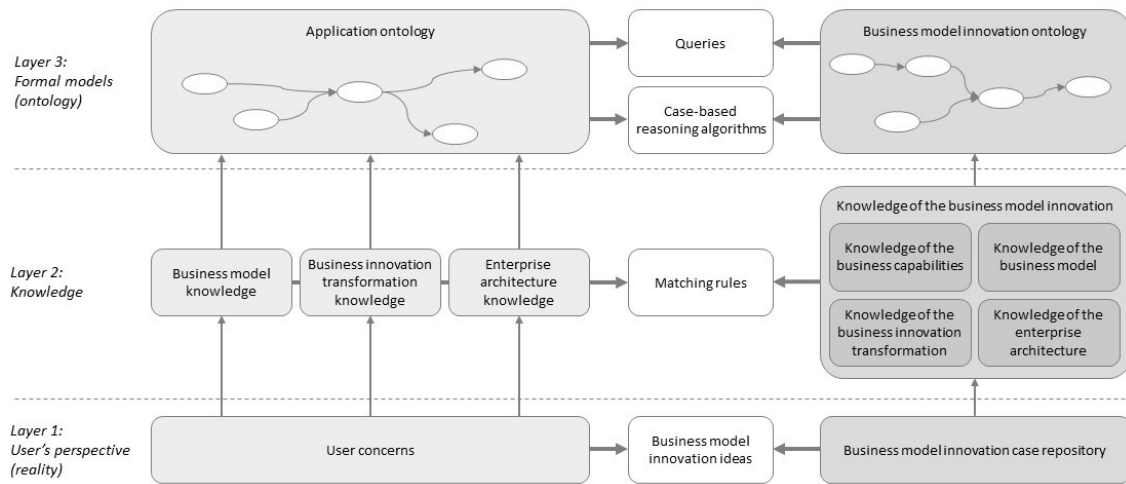
Figure 38: Overview of the approach

5.1.2.1 Layer 1: User's perspective

The first layer of the ideation approach for business model innovation represents the business reality from a user's perspective. A business user has, in general, the concern to get inspired by receiving business model innovation ideas from which the user can create a new business model innovation for its own business. These ideas are provided from a case repository of business model innovations. A process view from the user's perspective on handling the approach for business model innovation ideation is shown in Figure 39. The process is based on the four-phases approach for business model innovation by Gassmann et al. (2014). Since this research focuses on the second phase, the ideation phase, this research assumes that the business user already knows how its current business model looks like since it needs to be specified within the first step, the initiation phase, in order to provide this data to the recommender tool.

The ideation phase starts with the user task to decide which ideation approach the user wants to follow. The user can either explore through the repository of business model innovation cases or start the recommender system to receive individual suggestions for business model innovations based on the business's circumstances. If the user decides to follow the exploration approach, the tool offers filtering parameters to specify which cases should be shown to the user. A possible filtering parameter could be to show all cases except those including the user's industry. This filter would help overcome the challenge of having only an inside-industry-focus while thinking about new business model innovations for the own business. On the other hand, if the user decides to start the business model innovation recommender system, the user would overcome the challenges of receiving ideas that are based on the goal to leverage a business's capabilities as well as to compare the business model innovation ideas with the own business model or enterprise architecture.
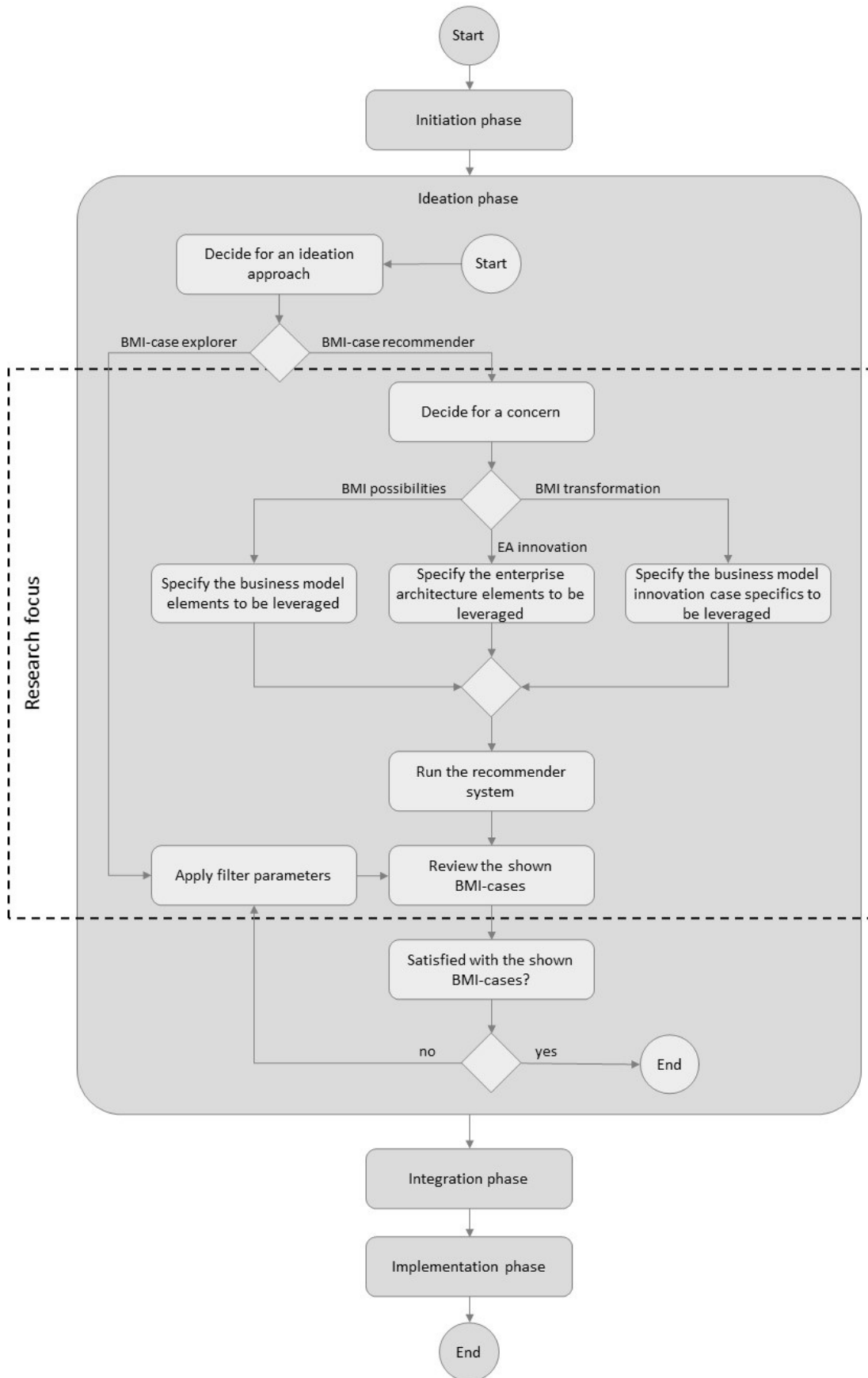
Figure 39: Process view of the approach from a user's perspective

After starting the recommender system, the first user task is to decide for a concern for which the user needs to retrieve business model innovation cases. The user has three options to choose from:

- if the user selects the concern of business model innovation possibilities, the user has to specify the business model elements that the recommender system should leverage.
- if the user selects the concern of enterprise architecture innovation, the details of the enterprise architecture elements, which the recommender system should leverage, need to be provided by the user.
- if the user selects the concern of business model innovation transformation, the focus lies on the change characteristics of the business model innovation case, such as required resources to get the case implemented.

As soon as one of the concerns is selected and the required data from the user is entered, the recommender system runs its calculations to provide the similarity of each case within the case repository against the provided data from the user. The higher the similarity, the closer the case matches the provided data from the user. The user now has to review the results and decide if one or a combination of the provided results are satisfactory. If the results are satisfying, the ideation phase ends and the user proceeds with the integration and the implementation phases to incorporate the business model innovation into the business. On the other hand, if the results are not satisfying, the user can further apply filtering parameters to specify the shown business model innovation cases further.

5.1.2.2   Layer 2: Knowledge

The second layer depicts the conceptualization of the user's perspective reality from a knowledge perspective. The literature review and the case analysis in Chapter 4 provide the insights to derive the knowledge base for this layer. The knowledge layer enables the different users to express their knowledge regarding their business model, enterprise architecture, or business innovation transformation characteristics. Also, the knowledge layer describes the specifics of a business model innovation case, including the topics of business model, business innovation transformation characteristics, enterprise architecture, and business capabilities. Further, this layer represents the creation of the matching rules to match a user's concern with the business model innovation case repository to retrieve possible business model innovation ideas. These knowledge insights are the groundwork to develop the formal models in layer three.

5.1.2.3   Layer 3: Formal Models

The knowledge described in layer two gets formalized to become machine-readable and re-useable in layer three. The developed business model innovation ontology, containing the

knowledge concepts of business model, business innovation transformation characteristics, enterprise architecture, and business capabilities, is described in detail within Chapter 6. For the development of the enterprise architecture ontology, the existing enterprise ontology ArchiMEO (Hinkelmann et al., 2020) is re-used since the ontology development approach by Noy and McGuinness (2001) suggests re-using ontologies if possible. Besides, for the business model ontology development, existing ontologies are re-used and extended to create a more detailed business model ontology to overcome the challenge that the current level of detail regarding business model concepts is not detailed enough for a computer-based tool supporting business model innovation attempts. Since the formal models are ontology-based representations, the knowledge gets machine-interpretable. This enables querying the ontology-based models for decision-making purposes. The case model ontology, specifically for the ICEBERG recommender system (Martin, 2016), is described in Sub-chapter 8.2.1.2 to provide the knowledge representation of the user's concern in a formal model.

Figure 40 depicts this approach's two core services: a similarity-retrieval service and a filtering service. Also, the figure shows the required ontologies and their dependencies for the different services. The filtering service requires the ontologies of the business model innovation case repository as well as of the business model innovation ontology to perform the filtering parameters on the cases. The similarity-retrieval service involves the case-based reasoning ontology of the ICEBERG tool to specify the case characterizations, as shown in Figure 33. This ontology is imported by the case model ontology, which describes a business model innovation case's structure. The import is needed since, as depicted in Figure 33, a case consists, among other things, of a case view, a concern, and a stakeholder. Thus, each case has to be mapped to the case model and specified to, for example, to which concern they are relevant. The case model imports, besides the case-based reasoning ontology, the business model innovation ontology to describe the cases on the concept of business model innovation. The business model innovation ontology is a meta-model to describe the topic of business model innovation, including the topics of business capabilities, business models, enterprise architecture, and business innovation transformation. The similarity ontology, which imports the case model ontology, is required in order to have the ability to calculate the similarity measures to provide the information on which case is the most similar to the provided information on the user's case. The business model innovation case repository imports the similarity ontology to specify for each case within the repository, which instances and relations it contains based on the imported ontologies.
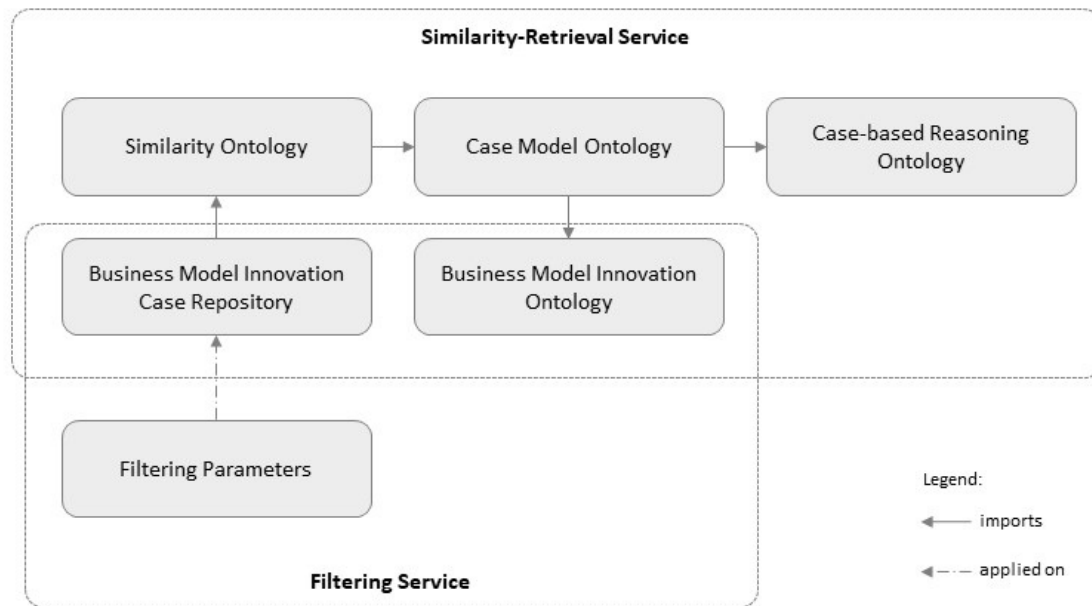
Figure 40: Overview of the similarity-retrieval and filtering services

The similarity-retrieval tool uses the case model ontology to know which entries the form for the case insertion by the user must have. Afterward, as soon as the user runs the similarity-retrieval service, the similarity ontology is used to calculate the similarity measures between the user's input data and the business model innovation case repository. The outcome is a list of the results of the similarity measurement between the user's input data and the business model innovation cases relevant for the selected concern.

5.2   Summary and Conclusion

The approach to supporting the ideation of business model innovation is based on the business model innovation process by Gassmann et al. (2014), consisting of four phases. This research focuses on the second phase, the ideation phase, which is about exploring new ideas of business model innovations. The relevant challenges during the ideation phase that need to be overcome are to compare business model innovation, to leverage the business's capabilities, to think of new ideas outside of the own market, to handle the required knowledge, to think in business models, to build a computer-based too for this complex topic, and the need for a more detailed business model concept. To overcome these challenges, a new approach aiming to support users in either receiving recommendations for business model innovations based on their business characteristics or exploring cases of business model innovation to get an idea of what could be possible for their business regarding business model innovation. An ontology-based case-based reasoning approach for the similarity-retrieval tool is applied. Such an approach requires specific ontologies that need to be developed. Further, matching rules need to be developed to extract knowledge from the system regarding which cases should be provided to a user's request.

6. The Business Model Innovation Case Ontology

This chapter addresses the third research question: How can the descriptions of business model innovation cases be formally represented? Thus, this chapter's answers contribute to the development phase from the design science research approach described in Sub-chapter 3.5.2.

Sub-chapter 6.1 introduces the detailed approach on how the ontologies were developed. Sub-chapter 6.2 describes the individual ontologies of business model, business capability, enterprise architecture, business innovation case, and construction industry specifics. The merged ontologies to achieve an ontology representing business model innovation cases with industry specifics are described in Sub-chapter 6.3. This chapter ends with a summary and conclusion on the developed ontologies.

6.1 Ontology Development

This chapter outlines how the ontologies were developed. First, a seven-step approach for ontology development from literature is introduced. Afterward, a sub-chapter outlines how these steps have been applied to build the business model innovation ontology.

6.1.1 Approach for Ontology Development

A well-cited approach to develop an ontology was published by Noy and McGuinness (2001). As they state, there are three fundamental rules when it comes to ontology development. The first rule says that a correct way for ontology modeling does not exist and that the best solution depends on the expected application area for the ontology. The second rule emphasizes the importance of an iterative approach for ontology development instead of a linear approach. The third rule from Noy and McGuinness (2001) states that the ontological concepts need to be close to the real-world objects as well as the relationships of the domain.

The iterative process for ontology development by Noy and McGuinness (2001) contains seven steps. These steps are explained in the following:

1. **Specify the ontology's scope and domain**
   According to Noy and McGuinness (2001), the first step for ontology development is to determine the scope and domain of the to-be-developed ontology. Important questions to

ask oneself are regarding the distinguishment of the ontology's user, the domain area of the ontology, the purpose of the ontology, and for what the ontology should provide conclusions. Further, for scope determination, competency questions should be defined. The competency questions help to clarify if the ontology can provide the information needed and thus if all necessary concepts are included within the ontology. Through determining the scope of the ontology, the limitations of the ontology are made clear. (Noy & McGuinness, 2001)

2. **Look for existing ontologies to reuse them**

   After the scope and domain of the ontology are defined, one should check if there is already an ontology existing that could be reused, altered, or extended. Reusing an existing ontology not only saves time but already provides oneself with a good evaluated starting point. Also, if the ontology should interact with a specific system, it makes sense to check if there are already ontologies existing for that system in order to ease integration into the system. (Noy & McGuinness, 2001)

3. **List important terms of the ontology**

   The ontology development is eased by determining a list of important terms required in the ontology. The list usually consists of classes and properties of the ontology used to explain the ontology to a user or are used to explain a statement. Also, overlapping of concepts is possible and should not be a concern at this development stage. (Noy & McGuinness, 2001)

4. **Define the classes and their hierarchy**

   Defining the classes and their hierarchy and specifying the class properties (step 5) are the most important tasks of the ontology development process. There are three different approaches for class hierarchy development as introduced by Uschold and Gruninger (1996): a top-down approach, a bottom-up approach, and a combination of both approaches. The top-down approach develops the ontology by first specifying the general concepts, and afterward, the specializations of the concepts are developed. Using the bottom-up approach, the most specific concepts are defined at the beginning. Later, these concepts are grouped into more general concepts in order to specify the top-level classes. The combined approach of the top-down and bottom-up approaches is the third option. In this case, the most central concepts are defined first as those are the easiest to start with. Afterward, the specialization, as well as the generalization of these central concepts, are created. Nonetheless, no approach is superior to one of the other approaches. The

approach should be taken which best suits the personal interpretation of the domain. (Noy & McGuinness, 2001)

5. **Specify the class properties**

   Usually, concepts of classes alone cannot answer all the competency questions. Therefore, the internal structure of the ontology needs to be specified. For this task, the appropriate class properties need to be determined. The properties can be either of an intrinsic or extrinsic nature as well as a relation between classes. The benefit of the properties is that they present further information on a class, and thus, the knowledge represented within the ontology can be structured in more detail. (Noy & McGuinness, 2001)

6. **Specify the data types and cardinalities**

   A class can have different values, such as allowed values or the number of allowed values. Common value types are string, Boolean, number, or enumerated. Further, a class can have the value of relation, which is described in the form of an instance within the ontology. To describe such an instance, the range and domain of the instance need to be set. A range is the class to which the instance is linked. The class to which the instance is attached is called domain. (Noy & McGuinness, 2001)

7. **Develop instances**

   According to Noy and McGuinness (2001), the last step of ontology development is to develop individual instances of classes. To create the instances, first, the corresponding class needs to be selected. Next, the individual instance needs to be created, and as a final step, the values previously defined for the class need to be filled. (Noy & McGuinness, 2001)

6.1.2 Applied Approach for Business Model Innovation Case Ontology Development

This sub-chapter elaborates the approach taken for the development of the business model innovation case ontology.

1. Specify the ontology's scope and domain

The domain of the ontology has been introduced as part of Chapter 1. Also, the described cases in Chapter 4 further elaborate on the properties a business model innovation case has. Thus, the domain of the to-be-developed ontology is regarding business model innovation and how

suggestions for new business models can be derived for a user. Expected users of such a tool would be, as described in Sub-chapter 4.5, C-level managers, transformation managers/consultants, or enterprise architects concerned regarding new business model transformation attempts. Based on this knowledge, I created competency questions to determine the scope further, as suggested by Noy and McGuinness (2001).

Since each user type has a different view on a business model innovation case, as described in Sub-chapter 4.5, the main competency question must include all three views. The main question is further divided into questions and sub-questions for a more specific scoping of the ontology.

- For a C-level manager, the topic of business model with its view on customers and the value provided to them and how value can be retained is essential.
- For the transformation manager, the details of the change and the challenges during the transformation of the business model are of interest.
- Enterprise architects require information on the business and IT changes when it comes to business model innovations.

The following Table 17 lists the defined competency questions for the main competency question *"what information about a business model innovation case do C-level users, transformation manager or enterprise architects require?"*. By analyzing for which user type each sub-question is of relevance, the scope for the ontology development can be further specified.

Table 17: Competency questions for the specification of the ontology's scope and domain

Competency question	Competency sub-question	Relevant for the user perspective		
		C-level manager	Transforma-tion manager	Enterprise architect
1. What business model properties are of interest for a business model innovation case?	Which are the infrastructure properties of a business model innovation case?	Yes	Yes	No
	Which are the customer interaction properties of a business model innovation case?	Yes	Yes	No
	Which are the offering properties of a business model innovation case?	Yes	Yes	No
	Which are the financial properties of a business model innovation case?	Yes	Yes	No

2. What business innovation transformation properties are of interest for a business model innovation case?	Which are the involved parties of the represented business model innovation case?	Yes	Yes	No
	To which sectors do the involved parties belong?	Yes	Yes	No
	Which are the motives of the involved parties to change?	Yes	Yes	No
	Which challenges did occur during the transformation?	Yes	Yes	No
	Which are the results from the transformation of the business model?	Yes	Yes	No
	Which resources are required to achieve the business model innovation?	Yes	Yes	No
3. What enterprise architecture properties are of interest for a business model innovation case?	Which are the motivational properties of the business model innovation case from an enterprise architecture point of view?	No	Yes	Yes
	Which are the strategic properties of the business model innovation case from an enterprise architecture point of view?	No	Yes	Yes
	Which are the business properties of the business model innovation case from an enterprise architecture point of view?	No	Yes	Yes
	Which are the application properties of the business model innovation case from an enterprise architecture point of view?	No	Yes	Yes
	Which are the technological properties of the business model innovation case from an enterprise architecture point of view?	No	Yes	Yes
4. What business capability	Which are the resource-based capabilities of a business?	Yes	Yes	No

properties are of interest for a business model innovation case?	Which are the dynamic capabilities of a business?	Yes	Yes	No
	Which are the human-based capabilities of a business?	Yes	Yes	No
	Which are the core capabilities of a business?	Yes	Yes	No
5. What construction industry properties are of interest for a business model innovation case?	Which are the construction-related companies of a business model innovation case?	Yes	Yes	No
	Which are the execution models of construction-related companies?	Yes	Yes	No
	Which are the stakeholder types of construction-related companies?	Yes	Yes	No
	Which are the construction planning phases of construction-related companies?	Yes	Yes	No
	Which are the execution areas of construction-related companies?	Yes	Yes	No

2. Look for existing ontologies to reuse them

As Noy and McGuinness (2001) suggest, I investigated ontologies that represent business model innovation cases in order to reuse these ontologies. As I could not find any, I focused on ontologies representing parts of a business model innovation case. Based on a literature review, I retrieved different existing ontologies for business models, such as from the publications of Osterwalder (2004), Fritscher and Pigneur (2011), Meertens et al. (2012), Iacob et al. (2014), and Caetano et al. (2017). For the business innovation and enterprise architecture properties, I decided to use the ArchiMate modeling language, which can be seen as an ontology. The reason to use ArchiMate for the enterprise architecture representation is based on four reasons.

- First, ArchiMate is a well-known standard for enterprise architecture (Iacob et al., 2014; Meertens et al., 2012; The Open Group, 2019).
- Second, research has been conducted and published to merge the concepts of a business model and ArchiMate (Caetano et al., 2017; Fritscher & Pigneur, 2011; Hosiaisluoma,

2020; Iacob et al., 2014; Meertens et al., 2012; Walters, 2020), and thus, proof to merge both ontologies is given.

- Third, ArchiMate has successfully been used for the case-based reasoning method applied for this research (Hinkelmann et al., 2020; Martin, 2016; Martin et al., 2013, 2016), as described in Chapter 7, and thus, a reuse of the same enterprise architecture representation modeling language is evident, as Noy and McGuinness (2001) suggest to reuse ontologies which are already in use for a specific application.

- Fourth, the motivation elements have been enhanced since the release of version 3 of the ArchiMate framework (The Open Group, 2019) and cover properties of business innovation.

Thus, it fits the already reused enterprise architecture ontology of the ArchiMate enterprise architecture representation.

3. List important terms of the ontology

As a third step, based on the competency questions from step one of the ontology development, I analyzed the retrieved ontologies for business models and the metamodel of the enterprise architecture modeling language ArchiMate. The objective of the analysis was to retrieve a list of relevant terms for developing the ontology business model innovation case. For this purpose, the case analysis results described in Sub-chapter 4.4 and knowledge retrieved from the literature review are included.

These third ontology development step results are shown in Table 18 as a list of general terms for each competency question.

Table 18: List of terms for the ontology mapped to the competency questions

Question	Sub-question	Terms
1. What business model properties are of interest for a business model innovation case?	Which are the infrastructure properties of a business model innovation case?	• Infrastructure • Customer interaction • Offering • Financial properties
	Which are the customer interaction properties of a business model innovation case?	
	Which are the offering properties of a business model innovation case?	
	Which are the financial properties of a business model innovation case?	

2. What business innovation transformation properties are of interest for a business model innovation case?	Which are the involved parties of the represented business model innovation case?	• Involved parties • Sectors • Motives for change • Transformation challenges • Transformation results • Required resource
	To which sectors do the involved parties belong?	
	Which are the motives of the involved parties to change?	
	Which challenges did occur during the transformation?	
	Which are the results from the transformation of the business model?	
	Which resources are required to achieve the business model innovation?	
3. What enterprise architecture properties are of interest for a business model innovation case?	Which are the motivational properties of the business model innovation case from an enterprise architecture point of view?	• Motivational properties • Strategic properties • Business properties • Application properties • Technological properties
	Which are the strategic properties of the business model innovation case from an enterprise architecture point of view?	
	Which are the business properties of the business model innovation case from an enterprise architecture point of view?	
	Which are the application properties of the business model innovation case from an enterprise architecture point of view?	
	Which are the technological properties of the business model innovation case from an enterprise architecture point of view?	
4. What business capability properties are of interest for a business model innovation case?	Which are the resource-based capabilities of a business?	• Resource-based capabilities • Dynamic capabilities • Human-based capabilities • Core capabilities
	Which are the dynamic capabilities of a business?	
	Which are the human-based capabilities of a business?	
	Which are the core capabilities of a business?	

5. What construction industry properties are of interest for a business model innovation case?	Which are the construction-related companies of a business model innovation case?	• Construction-related companies • Construction execution models • Construction stakeholder types • Construction planning phases • Construction execution areas
	Which are the execution models of construction-related companies?	
	Which are the stakeholder types of construction-related companies?	
	Which are the construction planning phases of construction-related companies?	
	Which are the execution areas of construction-related companies?	

4. Define the classes and their hierarchy and 5. specify the class properties

Based on Noy and McGuinness (2001) recommendation to develop the classes, their hierarchy, and their properties in close iterations, I proceeded with the fourth and fifth step of the ontology development in a close loop.

Since there are ontologies available for business models, I did not have to start from scratch. Therefore, I applied the combination approach since I added higher classes and sub-classes to the already existing business model ontology. Afterward, I added properties to the business model ontology, especially to conceptualize the relations between the different classes, based on the literature review as well as on the case exploration.

Since ArchiMate provides a generic metamodel of enterprise architecture, I could remodel the ArchiMate metamodel by defining its elements as classes and the relations as object properties. Also, the ArchiMate metamodel provides the hierarchy of the elements through the relations. Thus, the class hierarchy of the enterprise architecture was conceptually given.

During the development and evaluation of the business model innovation case ontology, I concluded that not all potential ontology users are familiar with the ArchiMate modeling language. Thus, I decided to develop a class hierarchy for the topic of business innovation case to provide the relevant properties of the strategy layer and the motivational aspects of the ArchiMate metamodel in a more business user-friendly language. Also, I added relevant properties to the business innovation case ontology based on the literature review and the case exploration. Through the possibility of properties, I could specify the relations between the different concepts.

6. Specify the data types and cardinalities

To specify the data types, I listed all the previously defined properties and specified for each of them if they are either a string, integer, object property (relation property), Boolean, or an enumerated property. This result enabled the implementation of the business model innovation case ontology into the integrated development environment of TopBraid Composer by TopQuadrant.

7. Develop instances

As suggested by Noy and McGuinness (2001), I developed the business model innovation case ontology instances at last. During the development phase of the ontology, I added the instances to the ontology which are generally relevant for all business model innovation cases, such as the fact that according to the literature by Osterwalder and Pigneur (2010), there are eight pricing mechanisms: list price, product feature dependent, customer segment dependent, volume dependent, negotiation, yield management, real-time-market, or auctions.

For evaluating the business model innovation case ontology, I created sample cases in the ontology to represent the cases employing the ontology. For this purpose, I created new instances depending on the individual cases for several classes and provided them with the corresponding values (the values have been already developed in step 6).

6.2   Individual Ontologies

Based on the literature review results and the case analysis, a modular approach to ontology development was chosen. A modular approach has the benefit of building a flexible and adaptable system (Bondar et al., 2017). Based on the findings of (Gorkhali & Xu, 2016), a modular approach supports the management of the complexity. Further, modularity promotes, according to Gong and Janssen (2013), interoperability to other ontologies, and thus, reusability of the results is provided, which should be an objective of ontology development (Abraham et al., 2018; Gorkhali & Xu, 2016; Poli et al., 2010; Studer et al., 1998; van Harmelen et al., 2008).

Thus, I developed individual ontologies for the identified topics of business model, business capability, enterprise architecture, and business innovation case. Furthermore, because of the evaluation cases for the construction sector and to prove that individual inputs for sectors are possible, a fifth ontology, the construction industry specifics ontology, was developed. The following sub-chapters describe these five developed ontology modules.

6.2.1   The Business Model Ontology

This chapter describes the business model ontology module of the business model innovation case ontology. The development of this ontology started by analyzing the ontologies found in the literature of business models. Since the Business Model Canvas by Osterwalder and Pigneur (2010) is a well-known framework for structuring business models, research has been conducted to model this framework into an ontology (Caetano et al., 2017; Iacob et al., 2014; Meertens et al., 2012; Osterwalder, 2004). Based on their research, I developed the Business Model Canvas ontology as illustrated in Figure 41. This ontology includes the four main perspectives on a business model, infrastructure, offering, customer interface, and financial properties, as well as the nine building blocks of the Business Model Canvas, which are key partners, key activities, key resources, cost structure, revenue streams, value proposition, customer relationships, channels, and customer segments. Also, the relations between these concepts are shown within the illustration.
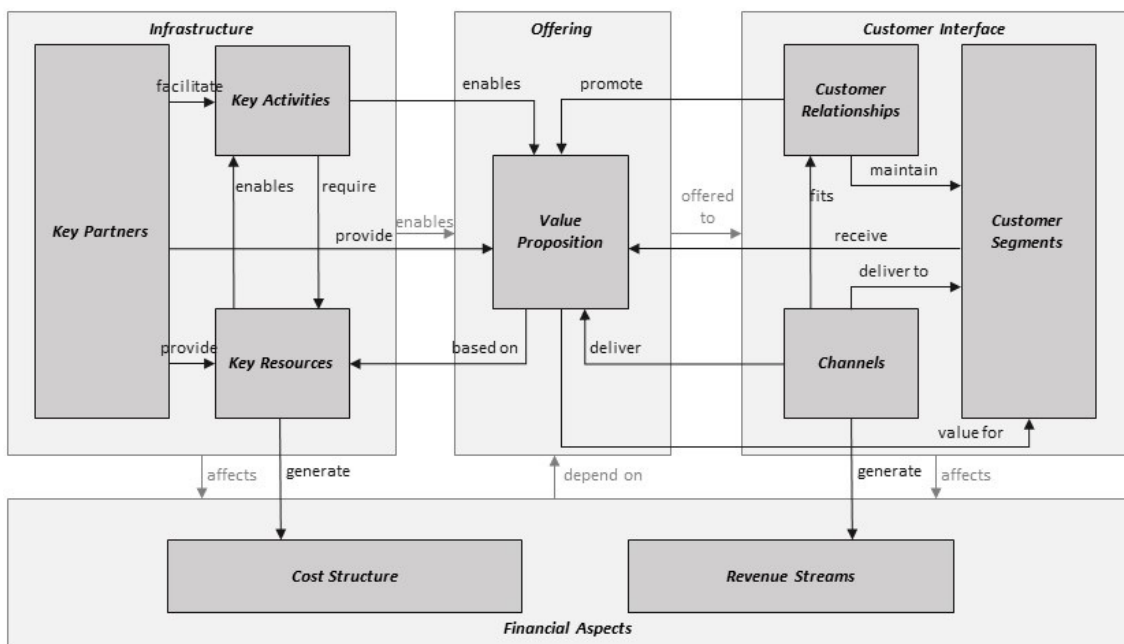
Figure 41: Overview of the initial business model ontology based on the Business Model Canvas

Unfortunately, this ontology representing the Business Model Canvas does not map all the knowledge I gathered through the literature review of business model and the analyzed cases. Thus, I had to enhance this ontology. For this purpose, I introduced all the details of the information regarding business models from Osterwalder and Pigneur (2010), such as the existence of pricing mechanisms. In addition, more concepts such as the quadruple helix model for structuring ecosystems or networks (Carayannis & Campbell, 2009; Schütz et al., 2018) are conceptualized within the class key partners, as they form the partner network for the business.

The result, a snapshot of the entire business model ontology with all the classes, instances, and properties, is not shown in greater detail since, because of the size of the ontology, the image would not be readable. Instead, the main classes and relational properties are illustrated in Figure 42.
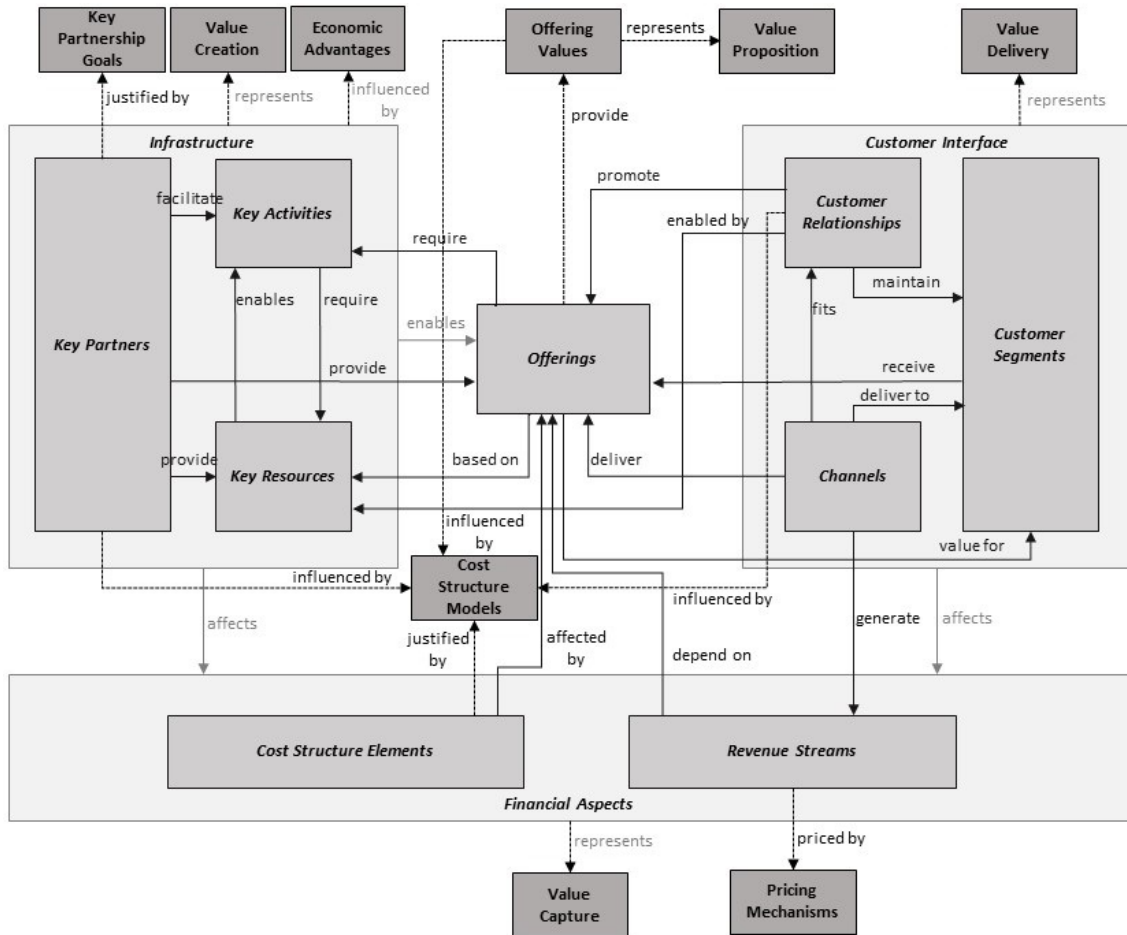
Figure 42: Overview of the business model ontology

The following sub-chapters describe the details of the developed business model ontology. For that, all classes, instances, and properties of the business model ontology are described in groups of their top-level class. The source code for the implemented business model ontology is shown in Appendix-B: Source Code of the Developed Ontologies Source Code of the Business Model Ontology.

6.2.1.1 Infrastructure Component

This chapter explains the infrastructure component of the business model ontology and answers the competency sub-question *Which are the infrastructure properties of a business model innovation case?* of the first competency question *What business model properties are of interest*

for a business model innovation case? from Table 17 in Sub-chapter 6.1.2. The class hierarchy developed for this part of the ontology is shown in Figure 43.
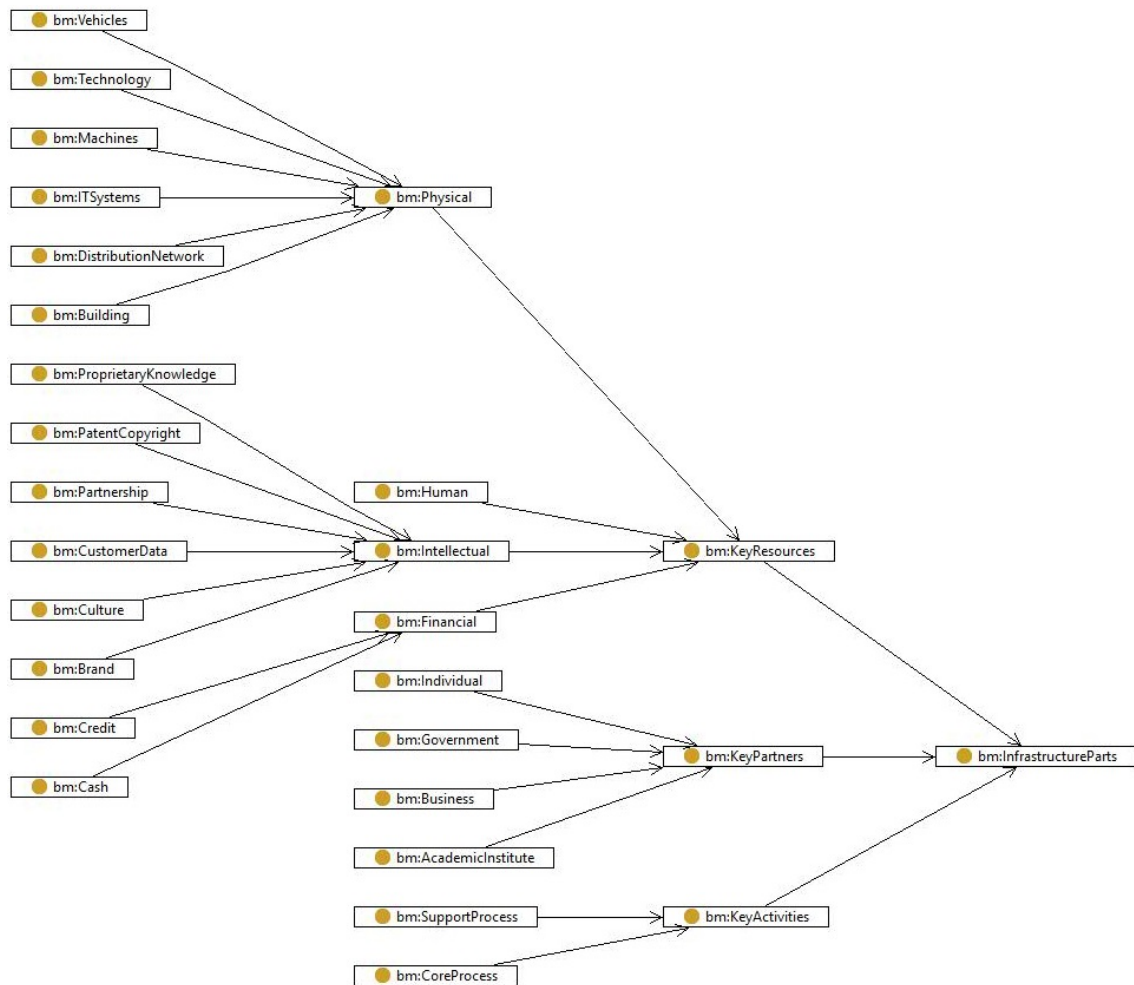
Figure 43: Class hierarchy of the business model ontology for the infrastructure component

A snapshot of the class hierarchy of the infrastructure component from the business model ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Business Model Ontology.

The infrastructure component, described in Table 19, from the business model ontology consists of three components:

- Key resources, described in Table 20, consists of the resource types human (Table 23), intellectual (Table 24), physical (Table 25), and financial (Table 26).
  - o There are six different types of intellectual resources: brand (Table 27), culture (Table 28), customer data (Table 29), partnership (Table 30), patent/copyright (Table 31), and proprietary knowledge (Table 32).

> o There are six different types of physical resources: building (Table 33), distribution network (Table 34), IT systems (Table 35), machines (Table 36), technology (Table 37), and vehicles (Table 38).
>
> o There are two different types of financial resources: cash (Table 39) and credit (Table 40).

- Key partners, described in Table 21, consists of the resource types academic institute (Table 41), business (Table 42), government (Table 43), and individual (Table 44).

- Key activities, described in Table 22, consists of the resource types support process (Table 45) and core process (Table 46).

Table 19: Specification of the class InfrastructureParts

Name of element	**InfrastructureParts**
Description	The infrastructure parts describe how the company can create the offering (Zarei et al., 2011). They represent the value creation of a business model (Davies & Doherty, 2018) and affect financial aspects (Zarei et al., 2011). Further, companies usually decide to set up their infrastructure to support a specific economic advantage (Osterwalder & Pigneur, 2010).
Properties	Relation: • infrastructureParts_represents_ValueCreation • infrastructureParts_influencedBy_EconomicAdvantages • infrastructureParts_enables_Offerings • infrastructureParts_affects_FinancialAspectParts
Child elements	• KeyResources • KeyPartners • KeyActivities

Table 20: Specification of the class KeyResources

Name of element	**KeyResources**
Description	Key resources represent tangible or intangible things in a company that a business model needs in order to run (Osterwalder & Pigneur, 2010) and they enable the key activities (Iacob et al., 2014).
Properties	Relation: • keyResources_enables_KeyActivities • customerRelationships_enabledBy_KeyResources • keyActivities_require_KeyResources • keyPartners_provide_KeyResources • offerings_basedOn_KeyResources
Parent elements	InfrastructureParts

Child elements	- Human - Intellectual - Physical - Financial

Table 21: Specification of the class KeyPartners

Name of element	**KeyPartners**
Description	Key partners represent the ecosystem of third parties who support the feasibility of the business model (Osterwalder & Pigneur, 2010). Further, they provide key resources and key activities and sometimes even offerings to customers (Caetano et al., 2017; Iacob et al., 2014). Also, key partners are selected based on missing resources or activities for the business to run (Osterwalder & Pigneur, 2010).
Properties	Relation: - keyPartners_facilitate_KeyActivities - keyPartners_influencedBy_CostStructureModels - keyPartners_justifiedBy_KeyPartnershipGoals - keyPartners_provide_KeyResources - keyPartners_provide_Offerings
Parent element	InfrastructureParts
Child elements	- AcademicInstitute - Business - Government - Individual

Table 22: Specification of the class KeyActivities

Name of element	**KeyActivities**
Description	Key activities are the most important activities a business must undertake in order to run the business model (Osterwalder & Pigneur, 2010). Key activities require key resources to run (Caetano et al., 2017).
Properties	Relation: - keyActivities_require_KeyResources - keyPartners_facilitate_KeyActivities - keyResources_enables_KeyActivities - offerings_require_KeyActivities
Parent element	InfrastructureParts
Child elements	- CoreProcess - SupportProcess

Table 23: Specification of the class Human

Name of element	**Human**
Description	Human resources represent people and are essential for knowledge-intensive or creative tasks (Osterwalder & Pigneur, 2010).
Parent element	KeyResources

Table 24: Specification of the class Intellectual

Name of element	**Intellectual**
Description	Intellectual resources are intangible and hard to develop but essential to differentiate the business from the competition (Osterwalder & Pigneur, 2010).
Parent element	KeyResources
Child elements	- Brand - Culture - CustomerData - Partnership - PatentCopyright - ProprietaryKnowledge

Table 25: Specification of the class Physical

Name of element	**Physical**
Description	Physical resources represent tangible resources, except for financial or human resources, and are often capital-intensive (Osterwalder & Pigneur, 2010).
Parent element	KeyResources
Child elements	- Building - DistributionNetwork - ITSystems - Machines - Technology - Vehicles

Table 26: Specification of the class Financial

Name of element	**Financial**
Description	Financial resources represent the monetary resources of a business (Osterwalder & Pigneur, 2010).
Parent element	KeyResources
Child elements	- Cash - Credit

Table 27: Specification of the class Brand

Name of element	**Brand**
Description	A brand is a name or trademark related to the business.
Parent element	Intellectual

Table 28: Specification of the class Culture

Name of element	**Culture**
Description	A company's culture represents the values and practices that guide the employees' actions (Adam et al., 2020).
Parent element	Intellectual

Table 29: Specification of the class CustomerData

Name of element	**CustomerData**
Description	Customer data is data that the company has collected regarding their customers.
Parent element	Intellectual

Table 30: Specification of the class Partnership

Name of element	**Partnership**
Description	A partnership represents an intellectual resource as the exchange with a partner, an individual, or an organization creates value for the business.
Parent element	Intellectual

Table 31: Specification of the class PatentCopyright

Name of element	**PatentCopyright**
Description	Patents and copyrights represent the intellectual property of the company and prevent other businesses from doing the same.
Parent element	Intellectual

Table 32: Specification of the class ProprietaryKnowledge

Name of element	**ProprietaryKnowledge**
Description	Proprietary knowledge is the knowledge that only the specific business has and it belongs to the business.
Parent element	Intellectual

Table 33: Specification of the class Building

Name of element	**Building**
Description	A building is anything that has been built, such as a warehouse.
Parent element	Physical

Table 34: Specification of the class DistributionNetwork

Name of element	**DistributionNetwork**
Description	A distribution network represents a supply chain, including storage and transportation for the goods.
Parent element	Physical

Table 35: Specification of the class ITSystems

Name of element	**ITSystems**
Description	An IT system refers to any type of electronic data processing system.
Parent element	Physical

Table 36: Specification of the class Machines

Name of element	**Machines**
Description	A machine is used to run something, such as a machine within a manufacturing company.
Parent element	Physical

Table 37: Specification of the class Technology

Name of element	**Technology**
Description	Technology represents techniques to produce a service or a product.
Parent element	Physical

Table 38: Specification of the class Vehicles

Name of element	**Vehicles**
Description	A vehicle usually consists of wheels and an engine to transport something.
Parent element	Physical

Table 39: Specification of the class Cash

Name of element	**Cash**
Description	Cash represents money that belongs to the business.
Parent element	Financial

Table 40: Specification of the class Credit

Name of element	**Credit**
Description	Credit is a monetary thing where the company borrows money from a third party.
Parent element	Financial

Table 41: Specification of the class AcademicInstitute

Name of element	**AcademicInstitute**
Description	Academic institutes represent organizations that perform research in order to create new knowledge (Schütz et al., 2018).
Parent element	KeyPartners

Table 42: Specification of the class Business

Name of element	**Business**
Description	The business represents a company that is not academic-oriented (Schütz et al., 2018).
Parent element	KeyPartners

Table 43: Specification of the class Government

Name of element	**Government**
Description	Government represents the state and organizations controlled by the government (Schütz et al., 2018).
Parent element	KeyPartners

Table 44: Specification of the class Individual

Name of element	**Individual**
Description	The individual represents the society and thus the people (Schütz et al., 2018).
Parent element	KeyPartners

Table 45: Specification of the class SupportProcess

Name of element	**SupportProcess**
Description	Support processes represent a business's activities that support the primary activities (Merli, 2013; Porter, 1985).
Parent element	KeyActivities

Table 46: Specification of the class CoreProcess

Name of element	**CoreProcess**
Description	The core process represents the main activities to create value (Merli, 2013; Porter, 1985).
Parent element	KeyActivities

6.2.1.2 Customer Interface Component

This chapter explains the customer interface component of the business model ontology and answers the competency sub-question *Which are the customer interaction properties of a business*

model innovation case? of the first competency question *What business model properties are of interest for a business model innovation case?* from Table 17 in Sub-chapter 6.1.2. The class hierarchy developed for this part of the ontology is shown in Figure 44.
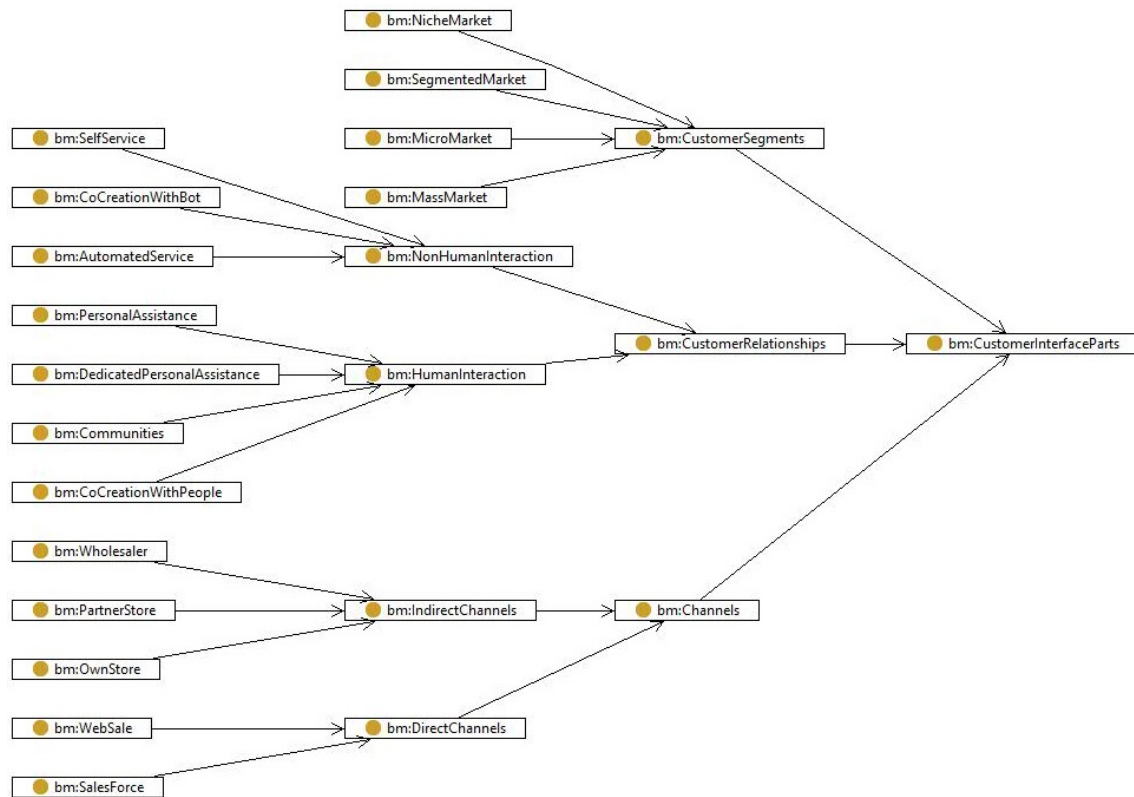
Figure 44: Class hierarchy of the business model ontology for the customer interface component

A snapshot of the class hierarchy of the customer interface component from the business model ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Business Model Ontology.

The customer interface component, described in Table 47, from the business model ontology consists of three components:

- Customer segments, described in Table 48, consists of niche market (Table 51), segmented market (Table 52), micro market (Table 53), and mass market (Table 54).
- Customer relationships, described in Table 49, consists of non-human interaction (Table 55) and human interaction (Table 56).
  - There are three different types of non-human interactions: self-service (Table 57), co-creation with a bot (Table 58), and automated service (Table 59).

o There are four different types of human interactions: personal assistance (Table 60), dedicated personal assistance (Table 61), communities (Table 62), and co-creation with people (Table 63).

- Channels, described in Table 50, consists of indirect channels (Table 64) and direct channels (Table 65).

    o There are three different types of indirect channels: wholesaler (Table 66), partner store (Table 67), and own store (Table 68).

    o There are two different types of direct channels: web sale (Table 69) and sales force (Table 70).

Table 47: Specification of the class CustomerInterfaceParts

Name of element	**CustomerInterfaceParts**
Description	The customer interface parts describe how the company can deliver the offering (Zarei et al., 2011). They represent the value delivery of a business model (Davies & Doherty, 2018) and affect financial aspects (Zarei et al., 2011).
Properties	Relation: • customerInterfaceParts_represents_ValueDelivery • customerInterfaceParts_affects_FinancialAspectParts
Child elements	• CustomerSegments • CustomerRelationships • Channels

Table 48: Specification of the class CustomerSegments

Name of element	**CustomerSegments**
Description	Customer segments represent the organizations or people for which the company's developed offer is dedicated (Caetano et al., 2017; Osterwalder & Pigneur, 2010). Further, a business model can be set up as a multi-sided platform which results in the company serving several interdependent customer segments at once (Osterwalder & Pigneur, 2010). Also, the customer base can be specified as diversified if the business model has several unrelated customer segments requiring different needs (Osterwalder & Pigneur, 2010).
Properties	Relation: • customerSegments_receive_Offerings • offerings_valueFor_CustomerSegments • customerRelationships_maintain_CustomerSegments • channels_deliverTo_CustomerSegments Boolean: • customerSegments_isAMultiSidedPlatform • customerSegments_isDiversified

Parent element	CustomerInterfaceParts
Child elements	- NicheMarket - SegmentedMarket - MicroMarket - MassMarket

Table 49: Specification of the class CustomerRelationships

Name of element	**CustomerRelationships**
Description	Customer relationships represent the form of relationships between a customer and the company (Osterwalder & Pigneur, 2010). They promote the offering and maintain customer segments (Iacob et al., 2014). Further, a value-driven or cost-driven approach of the business model impacts the specification of customer relationships (Osterwalder & Pigneur, 2010).
Properties	Relation: - customerRelationships_promote_Offerings - customerRelationships_maintain_CustomerSegments - customerRelationships_influencedBy_CostStructureModels - customerRelationships_enabledBy_KeyRessources - channels_fits_CustomerRelationships
Parent element	CustomerInterfaceParts
Child elements	- NonHumanInteraction - HumanInteraction

Table 50: Specification of the class Channels

Name of element	**Channels**
Description	Channels represent the form of communication between the company and the customer and how the customer can reach the company (Osterwalder & Pigneur, 2010). Through the channels, revenue for the business is generated by delivering the offerings to the customers (Caetano et al., 2017). There are five phases during a customer journey for a channel: awareness, evaluation, purchase, delivery, and after-sales (Osterwalder & Pigneur, 2010). Also, the channel can belong to the business itself or be paid or earned and thus be run by a third party (Osterwalder & Pigneur, 2010). Sales channels can be differentiated by specifying if they belong to the company, if the channel is paid for or if it is earned such as word-to-mouth (Mansour & Barandas, 2017).

Properties	Relation:
	• channels_generate_RevenueStreams
	• channels_fits_CustomerRelationships
	• channels_deliver_Offerings
	• channels_deliverTo_CustomerSegments
	Arrays:
	• channels_hasChannelPhaseType
	o Awareness
	o Evaluation
	o Purchase
	o Delivery
	o After Sales
	• channels_hasChannelOwnerType
	o Earned
	o Own
	o Paid
Parent element	CustomerInterfaceParts
Child elements	• IndirectChannels
	• DirectChannels

Table 51: Specification of the class NicheMarket

Name of element	**NicheMarket**
Description	Niche markets are specialized customer segments where the offering is tailored to the customer segment (Kara & Kaynak, 1997; Osterwalder & Pigneur, 2010).
Parent element	CustomerSegments

Table 52: Specification of the class SegmentedMarket

Name of element	**SegmentedMarket**
Description	Segmented markets represent several different customer segments which all have their own needs (Kara & Kaynak, 1997; Osterwalder & Pigneur, 2010).
Parent element	CustomerSegments

Table 53: Specification of the class MicroMarket

Name of element	**MicroMarket**
Description	Micro markets represent a small unit of a customer base, such as a small group of people, a specific small region, or even individuals (Kara & Kaynak, 1997).
Parent element	CustomerSegments

Table 54: Specification of the class MassMarket

Name of element	**MassMarket**
Description	Mass markets represent one customer segment, and thus, the offering is the same for the entire customer base (Kara & Kaynak, 1997; Osterwalder & Pigneur, 2010).
Parent element	CustomerSegments

Table 55: Specification of the class NonHumanInteraction

Name of element	**NonHumanInteraction**
Description	Non-human interaction represents a type of customer relationship where no humans interact with the customer.
Parent element	CustomerRelationships
Child elements	• SelfService • CoCreationWithBot • AutomatedService

Table 56: Specification of the class HumanInteraction

Name of element	**HumanInteraction**
Description	Human interaction represents a type of customer relationship where humans interact with the customer.
Parent element	CustomerRelationships
Child elements	• PersonalAssistance • DedicatedPersonalAssistance • Communities • CoCreationWithPeople

Table 57: Specification of the class SelfService

Name of element	**SelfService**
Description	Self-service represents a customer relationship type where the business provides necessary information for the customer to help himself (Osterwalder & Pigneur, 2010).
Parent element	NonHumanInteraction

Table 58: Specification of the class CoCreationWithBot

Name of element	**CoCreationWithBot**
Description	Co-creation with a bot represents a customer relationship type where the customer can create value together with the business, which is represented through software (Osterwalder & Pigneur, 2010).
Parent element	NonHumanInteraction

Table 59: Specification of the class AutomatedService

Name of element	**AutomatedService**
Description	Automated service represents a customer relationship type where the self-service approach is enhanced by automated processes (Osterwalder & Pigneur, 2010).
Parent element	NonHumanInteraction

Table 60: Specification of the class PersonalAssistance

Name of element	**PersonalAssistance**
Description	Personal assistance represents a customer relationship type where the customer can interact with a human (Osterwalder & Pigneur, 2010).
Parent element	HumanInteraction

Table 61: Specification of the class DedicatedPersonalAssistance

Name of element	**DedicatedPersonalAssistance**
Description	Dedicated personal assistance represents a customer relationship type where the customer can interact with a human who is dedicated to that customer, and thus, the customer will always interact with the same person (Osterwalder & Pigneur, 2010).
Parent element	HumanInteraction

Table 62: Specification of the class Communities

Name of element	**Communities**
Description	Communities represent a customer relationship type where several customers join and become a group (Osterwalder & Pigneur, 2010). This group can support each other for different issues.
Parent element	HumanInteraction

Table 63: Specification of the class CoCreationWithPeople

Name of element	**CoCreationWithPeople**
Description	Co-creation with people represents a customer relationship type where the customer can create value together with the business, which is represented through people (usually employees) (Osterwalder & Pigneur, 2010).
Parent element	HumanInteraction

Table 64: Specification of the class IndirectChannels

Name of element	**IndirectChannels**
Description	Indirect channels represent a channel type where the business has no direct interaction with the customer, for example, to provide further services (Nicolau, 2013).

Parent element	Channels
Child elements	• Wholesaler • PartnerStore • OwnStore

Table 65: Specification of the class DirectChannels

Name of element	**DirectChannels**
Description	Direct channels represent a channel type where the business can directly interact with the customer, for example, to provide further services (Nicolau, 2013).
Parent element	Channels
Child elements	• WebSale • SalesForce

Table 66: Specification of the class Wholesaler

Name of element	**Wholesaler**
Description	A wholesaler represents a business that buys goods in large amounts and sells them to other businesses.
Parent element	IndirectChannels

Table 67: Specification of the class PartnerStore

Name of element	**PartnerStore**
Description	A partner store represents a store owned by a partner of the business but sells the offering of the business.
Parent element	IndirectChannels

Table 68: Specification of the class OwnStore

Name of element	**OwnStore**
Description	An own store represents a store that is owned by the business.
Parent element	IndirectChannels

Table 69: Specification of the class WebSale

Name of element	**WebSale**
Description	Web sale represents a channel through which the customer can buy the offering online.
Parent element	DirectChannels

Table 70: Specification of the class SalesForce

Name of element	**SalesForce**

Description	The sales force represents the employees whose job is to sell the offering to customers.
Parent element	DirectChannels

6.2.1.3 Financial Properties Component

This chapter explains the financial properties component of the business model ontology and answers the competency sub-question *Which are the financial properties of a business model innovation case?* of the first competency question *What business model properties are of interest for a business model innovation case?* from Table 17 in Sub-chapter 6.1.2. The class hierarchy developed for this part of the ontology is shown in Figure 45.
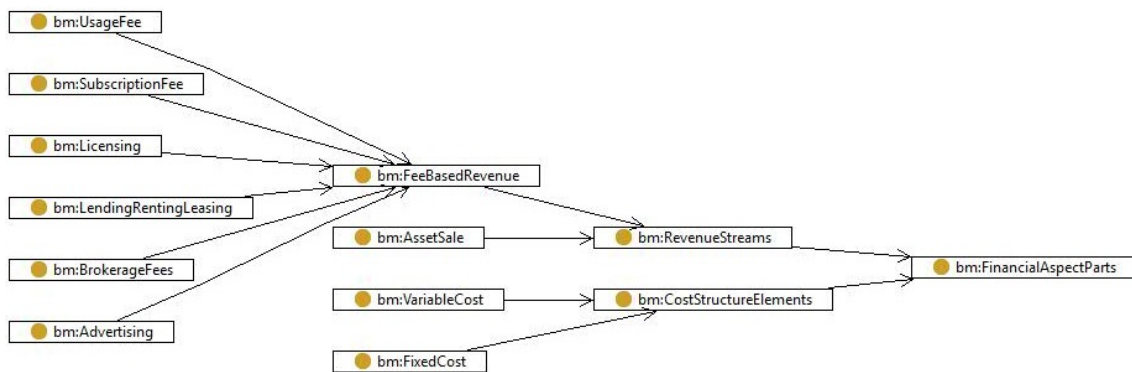
Figure 45: Class hierarchy of the business model ontology for the financial properties component

A snapshot of the class hierarchy of the financial properties component from the business model ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Business Model Ontology.

The financial properties component, described in Table 71, from the business model ontology consists of two components:

- Revenue streams, described in Table 72, consists of fee-based revenue (Table 74) and asset sale (Table 75).
  - o There are six different types of fee-based revenue: usage fee (Table 76), subscription fee (Table 77), licensing (Table 78), lending/renting/leasing (Table 79), brokerage fee (Table 80), and advertising (Table 81).
- Cost structure elements, described in Table 73, consists of variable cost (Table 82) and fixed cost (Table 83).

Table 71: Specification of the class FinancialAspectParts

Name of element	**FinancialAspectParts**
Description	The financial aspect parts represent how the company captures the created value within the company (Zarei et al., 2011).
Properties	Relation: • financialAspectParts_represents_ValueCapture • infrastructureParts_affects_FinancialAspectParts • customerInterfaceParts_affects_FinancialAspectParts
Child elements	• RevenueStreams • CostStructureElements

Table 72: Specification of the class RevenueStreams

Name of element	**RevenueStreams**
Description	Revenue streams represent ways a business model has to receive money from customers (Osterwalder & Pigneur, 2010). Each revenue stream has a pricing set (Meertens et al., 2012; Osterwalder, 2004; Zarei et al., 2011) and the revenue depends on the business model's offering (Caetano et al., 2017; Iacob et al., 2014).
Properties	Relation: • revenueStreams_pricedBy_PricingMechanisms • revenueStreams_dependOn_Offerings • channels_generate_RevenueStreams
Parent element	FinancialAspectParts
Child elements	• AssetSale • FeeBasedRevenue

Table 73: Specification of the class CostStructureElements

Name of element	**CostStructureElements**
Description	Cost structure elements represent all the different costs that occur while running the business model (Osterwalder & Pigneur, 2010). They are affected by the offering (Caetano et al., 2017) since the business model has to produce an offering for which costs emerge.
Properties	Relation: • costStructureElements_justifiedBy_CostStructureModels • costStructureElements_affectedBy_Offerings
Parent element	FinancialAspectParts
Child elements	• VariableCost • FixedCost

Table 74: Specification of the class FeeBasedRevenue

Name of element	**FeeBasedRevenue**
Description	Fee-based revenue represents, in contrast to an asset sale, the different forms of revenues a business can receive based on fees.
Parent element	RevenueStreams
Child elements	• UsageFee • SubscriptionFee • Licensing • LendingRentingLeasing • BrokerageFees • Advertising

Table 75: Specification of the class AssetSale

Name of element	**AssetSale**
Description	Asset sale represents revenue generated by selling ownership rights on an offering (Osterwalder & Pigneur, 2010).
Parent element	RevenueStreams

Table 76: Specification of the class UsageFee

Name of element	**UsageFee**
Description	Usage fee represents revenue generated through the use of a service or product and the revenue amount depends on the amount the service or product is used (Osterwalder & Pigneur, 2010).
Parent element	FeeBasedRevenue

Table 77: Specification of the class SubscriptionFee

Name of element	**SubscriptionFee**
Description	Subscription fee represents revenue generated through selling continuous access, which can be, for example, monthly, to a business's offering (Osterwalder & Pigneur, 2010).
Parent element	FeeBasedRevenue

Table 78: Specification of the class Licensing

Name of element	**Licensing**
Description	Licensing represents revenue generated by providing intellectual property to customers in exchange for a fee (Osterwalder & Pigneur, 2010).
Parent element	FeeBasedRevenue

Table 79: Specification of the class LendingRentingLeasing

Name of element	**LendingRentingLeasing**
Description	Lending, renting, or leasing represent revenue generated by providing customers with exclusive rights to use a specific asset for a limited time in exchange for a fee (Osterwalder & Pigneur, 2010).
Parent element	FeeBasedRevenue

Table 80: Specification of the class BrokerageFees

Name of element	**BrokerageFees**
Description	Brokerage fees represent revenue generated by receiving a fee for mediating or connecting between several parties (Osterwalder & Pigneur, 2010).
Parent element	FeeBasedRevenue

Table 81: Specification of the class Advertising

Name of element	**Advertising**
Description	Advertising represents revenue generated by receiving fees for the advertisement of a specific offering or brand (Osterwalder & Pigneur, 2010).
Parent element	FeeBasedRevenue

Table 82: Specification of the class VariableCost

Name of element	**VariableCost**
Description	Variable cost represents costs depending on the volume of produced offerings (Osterwalder & Pigneur, 2010).
Parent element	CostStructureElements

Table 83: Specification of the class FixedCost

Name of element	**FixedCost**
Description	Fixed cost represents costs that are independent of the volume of produced offerings and, thus, remain the same no matter the produced volume (Osterwalder & Pigneur, 2010).
Parent element	CostStructureElements

6.2.1.4   *Offerings and Offering Values Component*

The concepts of the business model ontology components offerings and offering values are described in this chapter since they represent the Value Proposition building block from the Business Model Canvas and answer the competency sub-question *Which are the offering properties of a business model innovation case?* of the first competency question *What business*

model properties are of interest for a business model innovation case? from Table 17 in Sub-chapter 6.1.2. The class hierarchies developed for this part of the ontology are shown in Figure 46.
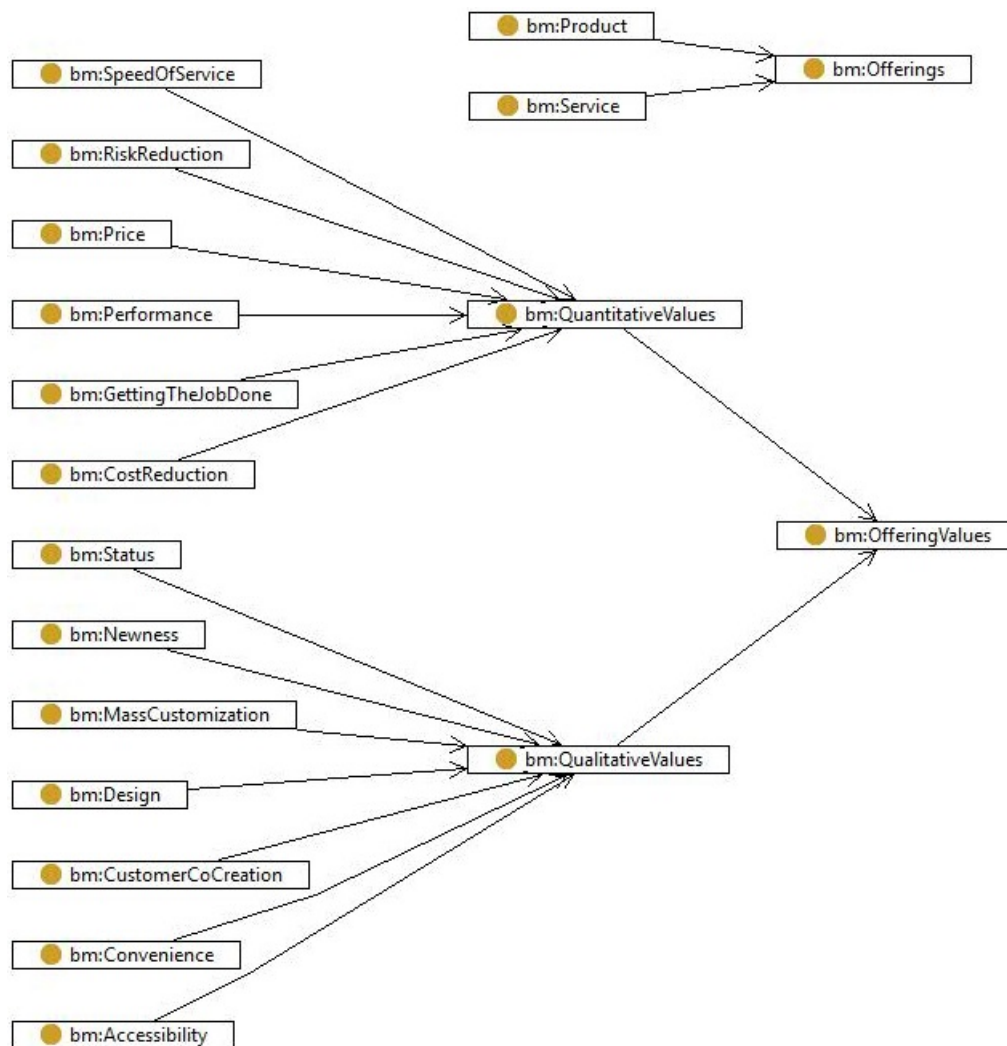
Figure 46: Class hierarchy of the business model ontology for the offerings and offering values components

A snapshot of the class hierarchies for the offering and the offering values components from the business model ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Business Model Ontology.

The offerings component, described in Table 84, from the business model ontology consists of the two components product (Table 85) and service (Table 86).

The offering values component, described in Table 87, from the business model ontology consists of two components:

- Quantitative values, described in Table 88, consists of cost reduction (Table 90), getting the job done (Table 91), performance (Table 92), price (Table 93), risk reduction (Table 94), and speed of service (Table 95).
- Qualitative values, described in Table 89, consists of status (Table 96), newness (Table 97), mass customization (Table 98), design (Table 99), customer co-creation (Table 100), convenience (Table 101), and accessibility (Table 102).

Table 84: Specification of the class Offerings

Name of element	**Offerings**
Description	Business models always provide something, either a service or a product, to their customers (Osterwalder & Pigneur, 2010). This something is represented as the offering (Caetano et al., 2017). The offerings provide different offering values (Meertens et al., 2012) for the customer segments (Iacob et al., 2014; Meertens et al., 2012). Further, offerings are based on key resources of the business model and require key activities to build the offerings (Caetano et al., 2017; Iacob et al., 2014).
Properties	Relation: • offerings_basedOn_KeyResources • offerings_provide_OfferingValues • offerings_valueFor_CustomerSegments • offerings_require_KeyActivities • channels_deliver_Offerings • costStructureElements_affectedBy_Offerings • keyPartners_provide_Offerings • infrastructureParts_enables_Offerings • revenueStreams_dependOn_Offerings • customerSegments_receive_Offerings • customerRelationships_promote_Offerings
Child elements	• Product • Service

Table 85: Specification of the class Product

Name of element	**Product**
Description	The product represents the goods offered to customers (Zarei et al., 2011).
Parent element	Offerings

Table 86: Specification of the class Service

Name of element	**Service**

Description	Service represents service offerings to customers (Zarei et al., 2011).
Parent element	Offerings

Table 87: Specification of the class OfferingValues

Name of element	**OfferingValues**
Description	Offering values represent the specific values provided to a customer employing the offering brought to the customer (Osterwalder & Pigneur, 2010). Offering values represent the value proposition (Meertens et al., 2012) and are influenced by the cost structure models (Osterwalder & Pigneur, 2010).
Properties	Relation: • offeringValues_represents_ValueProposition • offeringValues_influencedBy_CostStructureModels • offerings_offersValue_OfferingValues
Child elements	• QualitativeValues • QuantitativeValues

Table 88: Specification of the class QuantitativeValues

Name of element	**QuantitativeValues**
Description	Quantitative values represent the offering values that are of a quantitative nature (Osterwalder & Pigneur, 2010).
Parent element	OfferingValues
Child elements	• CostReduction • GettingTheJobDone • Performance • Price • RiskReduction • SpeedOfService

Table 89: Specification of the class QualitativeValues

Name of element	**QualitativeValues**
Description	Qualitative values represent the offering values that are of a qualitative nature (Osterwalder & Pigneur, 2010).
Parent element	OfferingValues

Child elements	- Status - Newness - MassCustomization - Design - CustomerCoCreation - Convenience - Accessibility

Table 90: Specification of the class CostReduction

Name of element	**CostReduction**
Description	Cost reduction represents the value offered to customers for them to reduce their costs (Osterwalder & Pigneur, 2010).
Parent element	QuantitativeValues

Table 91: Specification of the class GettingTheJobDone

Name of element	**GettingTheJobDone**
Description	Getting the job done represents the value offered to customers for helping them with performing specific jobs (Osterwalder & Pigneur, 2010).
Parent element	QuantitativeValues

Table 92: Specification of the class Performance

Name of element	**Performance**
Description	Performance represents the value offered to customers to improve performance for specific offerings (Osterwalder & Pigneur, 2010).
Parent element	QuantitativeValues

Table 93: Specification of the class Price

Name of element	**Price**
Description	Price represents the value offered to customers for providing them with lower prices than the competition but for a similar offering (Osterwalder & Pigneur, 2010).
Parent element	QuantitativeValues

Table 94: Specification of the class RiskReduction

Name of element	**RiskReduction**
Description	Risk reduction represents the value offered to customers reducing potential risks that might occur to them in the future (Osterwalder & Pigneur, 2010).
Parent element	QuantitativeValues

Table 95: Specification of the class SpeedOfService

Name of element	**SpeedOfService**
Description	Speed of service represents the value offered to customers for supporting the customers with a fast service (Osterwalder & Pigneur, 2010).
Parent element	QuantitativeValues

Table 96: Specification of the class Status

Name of element	**Status**
Description	Status represents the value offered to customers for receiving a specific offering that lifts the customer's status(Osterwalder & Pigneur, 2010).
Parent element	QualitativeValues

Table 97: Specification of the class Newness

Name of element	**Newness**
Description	Newness represents the value offered to customers for an entirely new offering for which no similar offerings exist (Osterwalder & Pigneur, 2010).
Parent element	QualitativeValues

Table 98: Specification of the class MassCustomization

Name of element	**MassCustomization**
Description	Mass customization represents the value offered to customers for tailoring the offering to the needs of a customer segment (Osterwalder & Pigneur, 2010).
Parent element	QualitativeValues

Table 99: Specification of the class Design

Name of element	**Design**
Description	The design represents the value offered to customers for providing a superior design (Osterwalder & Pigneur, 2010).
Parent element	QualitativeValues

Table 100: Specification of the class CustomerCoCreation

Name of element	**CustomerCoCreation**
Description	Customer co-creation represents the value offered to customers for building the offering based on customer's requirements (Osterwalder & Pigneur, 2010).
Parent element	QualitativeValues

Table 101: Specification of the class Convenience

Name of element	**Convenience**
Description	Convenience represents the value offered to customers for providing them with easy-to-use offerings (Osterwalder & Pigneur, 2010).
Parent element	QualitativeValues

Table 102: Specification of the class Accessibility

Name of element	**Accessibility**
Description	Accessibility represents the value offered to customers for providing them with offerings that they previously could not access (Osterwalder & Pigneur, 2010).
Parent element	QualitativeValues

6.2.1.5 *Additional Business Model Components*

The concepts of the business model ontology components economic advantages, cost structure models, pricing mechanisms, value types, and key partnership goals are described in this chapter. These concepts are relevant for the nine building blocks from the Business Model Canvas by providing further information to individual classes. The class hierarchies developed for this part of the ontology are shown in Figure 47.
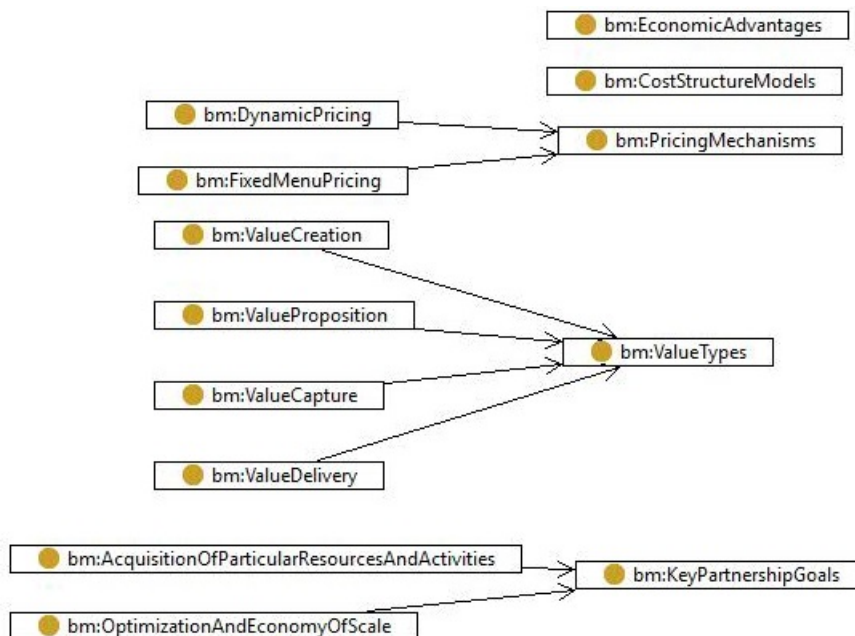
Figure 47: Class hierarchy of the business model ontology for the economic advantages, cost structure models, pricing mechanisms, value types, and key partnership goals components

A snapshot of the class hierarchies for the economic advantages, cost structure models, pricing mechanisms, value types, and key partnership goals components from the business model

ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Business Model Ontology.

Table 103 describes the component economic advantages from the business model ontology. Table 104 describes the component cost structure models. The pricing mechanisms component, described in Table 105, from the business model ontology consists of the two components dynamic pricing (Table 106) and fixed menu pricing (Table 107). The value types component (Table 108) consists of the four components value delivery (Table 109), value capture (Table 110), value creation (Table 111), and value proposition (Table 112). The key partnership goals component, described in Table 113, consists of the two components acquisition of particular resources and activities (Table 114) and optimization and economy of scale (Table 115).

Table 103: Specification of the class EconomicAdvantages

Name of element	**EconomicAdvantages**
Description	Economic advantages are typically cost advantages through either scaling of a business aspect or the increase of the scope of the business (Osterwalder & Pigneur, 2010).
Properties	Relation: • infrastructureParts_influencedBy_EconomicAdvantages
Instances	• EconomiesOfScope • EconomiesOfScale

Table 104: Specification of the class CostStructureModels

Name of element	**CostStructureModels**
Description	To have low costs is a goal for every business model. Nevertheless, this goal can be more important for certain business models than others (Osterwalder & Pigneur, 2010).
Properties	Relation: • offeringValues_influencedBy_CostStructureModels • keyPartners_influencedBy_CostStructureModels • customerRelationships_influencedBy_CostStructureModels • costStructureElements_justifiedBy_CostStructureModels
Instances	• ValueDriven • CostDriven

Table 105: Specification of the class PricingMechanisms

Name of element	**PricingMechanisms**
Description	Pricing mechanisms describe how the price is set for a specific offering (Osterwalder & Pigneur, 2010).

Properties	Relation: • revenueStreams_pricedBy_PricingMechanisms
Child elements	• DynamicPricing • FixedMenuPricing

Table 106: Specification of the class DynamicPricing

Name of element	**DynamicPricing**
Description	Dynamic pricing represents the pricing mechanisms for prices that change based on different market conditions (Osterwalder & Pigneur, 2010).
Instances	• RealTimeMarket • Negotiation • Auctions • YieldManagement
Parent element	PricingMechanisms

Table 107: Specification of the class FixedMenuPricing

Name of element	**FixedMenuPricing**
Description	Fixed menu pricing represents the pricing mechanisms for prices that are already fixed based on non-changing variables (Osterwalder & Pigneur, 2010).
Instances	• VolumeDependent • ProductFeatureDependent • ListPrice • CustomerSegmentDependent
Parent element	PricingMechanisms

Table 108: Specification of the class ValueTypes

Name of element	**ValueTypes**
Description	Value types represent the different values a business model requires to be established (Bocken et al., 2014; Davies & Doherty, 2018; Teece, 2010).
Child elements	• ValueDelivery • ValueCapture • ValueCreation • ValueProposition

Table 109: Specification of the class ValueDelivery

Name of element	**ValueDelivery**

Description	Value delivery represents the activities required to deliver the proposed value to the customers (Brandenburger & Stuart Jr, 1996; Davies & Doherty, 2018).
Properties	as a range: • customerInterfaceParts_represents_ValueDelivery
Parent element	ValueTypes

Table 110: Specification of the class ValueCapture

Name of element	**ValueCapture**
Description	Value capture represents how value is captured within the business (Bocken et al., 2014; Davies & Doherty, 2018).
Properties	as a range: • financialAspectsParts_represents_ValueCapture
Parent element	ValueTypes

Table 111: Specification of the class ValueCreation

Name of element	**ValueCreation**
Description	Value creation represents the activities to create value for the business from which the proposed value to customers can be built (Brandenburger & Stuart Jr, 1996; Davies & Doherty, 2018).
Properties	as a range: • infrastructureParts_represents_ValueCreation
Parent element	ValueTypes

Table 112: Specification of the class ValueProposition

Name of element	**ValueProposition**
Description	Value proposition represents the value proposed to customers for purchase (Davies & Doherty, 2018).
Properties	as a range: • offeringValues_represents_ValueProposition
Parent element	ValueTypes

Table 113: Specification of the class KeyPartnershipGoals

Name of element	**KeyPartnershipGoals**
Description	Key partnership goals represent why a company decided to do business with a third party (a key partner) (Osterwalder & Pigneur, 2010).
Properties	Relation: • keyPartners_justifiedBy_KeyPartnershipGoals
Instances	• ReductionOfRiskAndUncertainty

| Child elements | • AcquisitionOfParticularResourcesAndActivities |
| | • OptimizationAndEconomyOfScale |

Table 114: Specification of the class AcquisitionOfParticularResourcesAndActivities

Name of element	**AcquisitionOfParticularResourcesAndActivities**
Description	Acquisition of particular resources and activities represents how businesses acquire resources or specific activities from third parties to perform their business model as expected (Osterwalder & Pigneur, 2010).
Instances	• Licenses
	• Knowledge
	• AccessToCustomers
Parent element	KeyPartnershipGoals

Table 115: Specification of the class OptimizationAndEconomyOfScale

Name of element	**OptimizationAndEconomyOfScale**
Description	Optimization and economy of scale represent how businesses optimize their resources or activities through partnership with a third party (Osterwalder & Pigneur, 2010).
Instances	• SharingInfrastructure
	• ReduceCosts
	• OutsourcingInfrastructure
Parent element	KeyPartnershipGoals

6.2.2 The Business Capability Ontology

This chapter describes the business capability ontology module of the business model innovation case ontology. The development of this ontology required the analysis of the literature regarding business capabilities and their structure, as described in Sub-chapter 2.3. This analysis resulted in the business capability ontology illustrated in Figure 48, which includes the classes resource-based capabilities, dynamic capabilities, human-based capabilities, and core capabilities. The literature analysis has revealed that the dynamic, human-based, and core capabilities are specializations of resource-based capability. Except for the relation *acquired through*, which describes that a human-based capability is acquired by a human-based capability acquisition type, which is already predefined, the relations use the modeling language from ArchiMate (The Open Group, 2019) so that the model is best comprehensible for enterprise modelers.
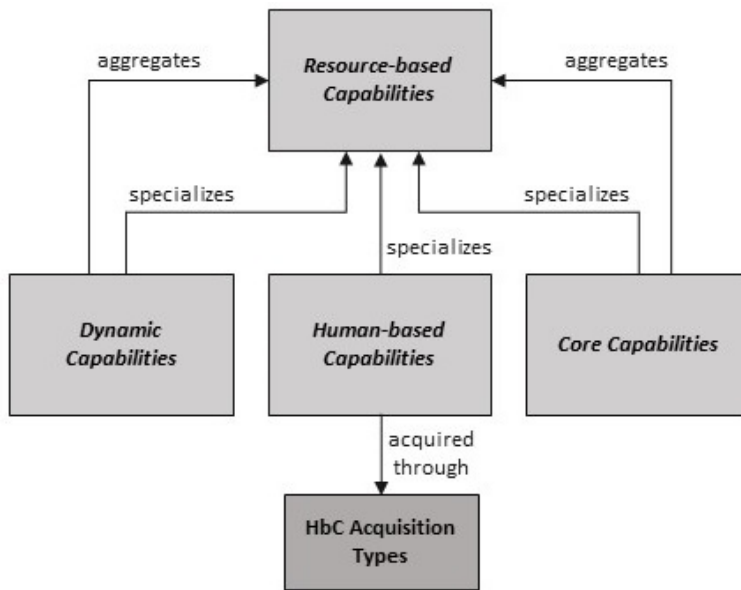
Figure 48: Overview of the business capability ontology

Using the business capability ontology, a modeler can describe the capabilities its company has in a machine-interpretable language, and thus, the knowledge can be reused by other intelligent IT systems (Peter et al., 2020).

The following sub-chapters describe the details of the developed business capability ontology. The source code for the implemented business capability ontology is shown in Appendix-B: Source Code of the Developed Ontologies Source Code of the Business Capability Ontology.

6.2.2.1   Resource-Based Capabilities Component

This chapter explains the resource-based capabilities component of the business capability ontology and answers the fourth competency question *What business capability properties are of interest for a business model innovation case?* from Table 17 in Sub-chapter 6.1.2. The class hierarchy developed for this part of the ontology is shown in Figure 49.
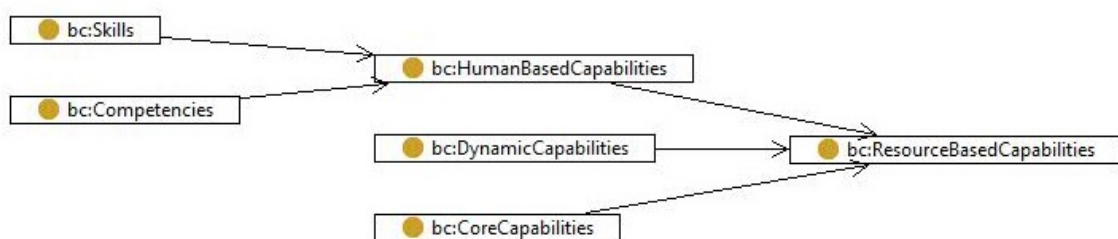
Figure 49: Class hierarchy of the business capability ontology for the resource-based capabilities component

A snapshot of the class hierarchy of the resource-based capabilities component from the business capability ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Business Capability Ontology.

The resource-based capabilities component, described in Table 116, from the business capability ontology consists of the three components dynamic capabilities (Table 117), core capabilities (Table 118), and human-based capabilities (Table 119). Human-based capabilities has two sub-classes: skills (Table 120) and competencies (Table 121).

Table 116: Specification of the class ResourceBasedCapabilities

Name of element	**ResourceBasedCapabilities**
Description	Resource-based capabilities represent the capabilities to run a business, such as processes, data, or assets (Barney, 1991).
Properties	Relation: • coreCapabilities_aggregates_ResourceBasedCapabilities • coreCapabilities_specializes_ResourceBasedCapabilities • dynamicCapabilities_aggregates_ResourceBasedCapabilities • dynamicCapabilities_specializes_ResourceBasedCapabilities • humanBasedCapabilities_specializes_ResourceBasedCapabilities
Child elements	• DynamicCapabilities • CoreCapabilities • HumanBasedCapabilities

Table 117: Specification of the class DynamicCapabilities

Name of element	**DynamicCapabilities**
Description	Dynamic capabilities represent the ability to adapt to changing market conditions and their demands and to reconfigure and innovate the individual's skills (Teece et al., 1997).
Properties	Relation: • dynamicCapabilities_specializes_ResourceBasedCapabilities • dynamicCapabilities_aggregates_ResourceBasedCapabilities
Parent element	ResourceBasedCapabilities

Table 118: Specification of the class CoreCapabilities

Name of element	**CoreCapabilities**
Description	Core capabilities represent firm-specific characteristics that enable a company to perform its core business and to launch innovative new products and services tailored to the market (Hsiao & Hsu, 2018).

Properties	Relation: • coreCapabilities_specializes_ResourceBasedCapabilities • coreCapabilities_aggregates_ResourceBasedCapabilities
Parent element	ResourceBasedCapabilities

Table 119: Specification of the class HumanBasedCapabilities

Name of element	**HumanBasedCapabilities**
Description	Human-based capabilities represent skills and competencies a human being can possess (Robles, 2012).
Properties	Relation: • humanBasedCapabilities_specializes_ResourceBasedCapabilities
Parent element	ResourceBasedCapabilities
Child elements	• Skills • Competencies

Table 120: Specification of the class Skills

Name of element	**Skills**
Description	Skills represent capabilities that can be acquired by a human individual either by appropriate education/training or by on-the-job practice and are looked at as techniques and methods that are needed to perform a particular position or role (Peter, de Roche, et al., 2019).
Properties	Relation: • skills_hasAcquisitionType_PersonalProfessionalPractice • skills_hasAcquisitionType_EducationTraining
Instances	• Teamwork • ProjectManagement • ProblemSolving • Leadership • ICTSkill • Communication • Analytical
Parent element	HumanBasedCapabilities

Table 121: Specification of the class Competencies

Name of element	**Competencies**
Description	Competencies represent a human's personal attributes that cannot be adopted easily as they result from a person's experience and self-development. Obtaining them helps a person to apply knowledge and use skills in a certain environment and context and to continuously improve the same. (Peter, de Roche, et al., 2019)

Properties	Relation: • competencies_hasAcquisitionType_MotivationAttitude • competencies_hasAcquisitionType_PersonalProfessionalExperience
Instances	• Integrity • Adaptive • Interpersonal • PositiveAttitude • Flexibility • WorkEthic • TeamPlayer • Responsibility • Courtesy • Professionalism
Parent element	HumanBasedCapabilities

6.2.2.2   *Human-Based Capability Acquisition Types Component*

This chapter explains the human-based capability acquisition types component of the business capability ontology. The class hierarchy developed for this part of the ontology is shown in Figure 50.
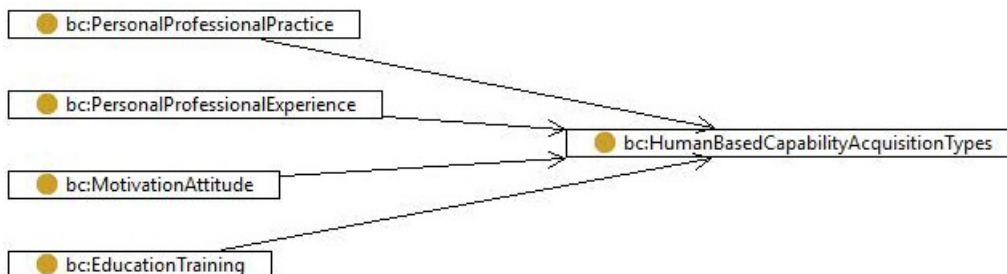
Figure 50: Class hierarchy of the business capability ontology for the human-based capability acquisition types component

A snapshot of the class hierarchy of the human-based capability acquisition types component from the business capability ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Business Capability Ontology.

The human-based capability acquisition types component, described in Table 122, from the business capability ontology consists of the four components personal and professional practice (Table 123), personal and professional experience (Table 124), motivation and attitude (Table 125), and education and training (Table 126).

Table 122: Specification of the class HumanBasedCapabilityAcquisitionTypes

Name of element	**HumanBasedCapabilityAcquisitionTypes**
Description	Human-based capability acquisition types represent different methods to acquire skills or competencies (Peter, de Roche, et al., 2019).
Child elements	- PersonalProfessionalPractice - PersonalProfessionalExperience - MotivationAttitude - EducationTraining

Table 123: Specification of the class PersonalProfessionalPractice

Name of element	**PersonalProfessionalPractice**
Description	Personal and professional practice represents skills that can be acquired by practicing on-the-job. A particular skill might be developed by fulfilling specific tasks without having the theoretical background or an appropriate certificate for it. Furthermore, skills might also be acquired in the personal life while practicing a hobby. (Peter, de Roche, et al., 2019)
Properties	Relation: skills_hasAcquisitionType_PersonalProfessionalPractice
Instances	- FunctionalCapabilities - TechniquesMethods
Parent element	HumanBasedCapabilityAcquisitionTypes

Table 124: Specification of the class PersonalProfessionalExperience

Name of element	**PersonalProfessionalExperience**
Description	Personal and professional experience affects the way humans act or react in a particular situation or environment. Based on their experience, people may handle similar situations differently and they may fulfill tasks in a distinct manner. (Peter, de Roche, et al., 2019)
Properties	Relation: competencies_hasAcquisitionType_PersonalProfessionalExperience
Instances	- SelfDevelopment - StrategiesRoutines
Parent element	HumanBasedCapabilityAcquisitionTypes

Table 125: Specification of the class MotivationAttitude

Name of element	**MotivationAttitude**

Description	Motivation and attitude represent controlled behavioral competencies that can be used in either a personal or professional life. Motivation and attitude might influence the execution of tasks positively or negatively. (Peter, de Roche, et al., 2019)
Properties	Relation: • competencies_hasAcquisitionType_MotivationAttitude
Instances	• EmotionsAttitude • PersonalAttributes
Parent element	HumanBasedCapabilityAcquisitionTypes

Table 126: Specification of the class EducationTraining

Name of element	**EducationTraining**
Description	Education/training classifies all skills that can be acquired by learning them on a theoretical foundation. In many cases, certificates are issued for this kind of skill. (Peter, de Roche, et al., 2019)
Properties	Relation: • skills_hasAcquisitionType_EducationTraining
Instances	• ContinuativeTraining • FundamentalEducation
Parent element	HumanBasedCapabilityAcquisitionTypes

6.2.3   The Enterprise Architecture Ontology

This chapter describes the enterprise architecture ontology module of the business model innovation case ontology. The development of this ontology started by analyzing already existing ontologies for enterprise architecture. For this research, the decision was made to use ArchiMate as the enterprise architecture framework, as it is well-known, described in great detail by The Open Group (2019), and also an ontology, called ArchiMEO and available for re-use, is already existing. The ArchiMEO ontology is described in Sub-chapter 5.1.1.2. Since ArchiMEO is based on the ArchiMate version 2.0 (Hinkelmann et al., 2020), I extended the ArchiMEO ontology with the motivation aspect and the strategy layer to match the ArchiMate version 3.1 (The Open Group, 2019).

The following sub-chapters describe the implementation of the motivation and strategy elements into the ArchiMEO ontology. The source code for the enterprise architecture ontology extension is shown in Appendix-B: Source Code of the Developed Ontologies Source Code of the Enterprise Architecture Ontology.

6.2.3.1   Motivation Elements Component

This chapter explains the motivation elements component of the enterprise architecture ontology and answers the competency sub-question *Which are the motivational properties of the business model innovation case from an enterprise architecture point of view?* of the third competency question *What enterprise architecture properties are of interest for a business model innovation case?* from Table 17 in Sub-chapter 6.1.2. The class hierarchy developed for this part of the ontology is shown in Figure 51.
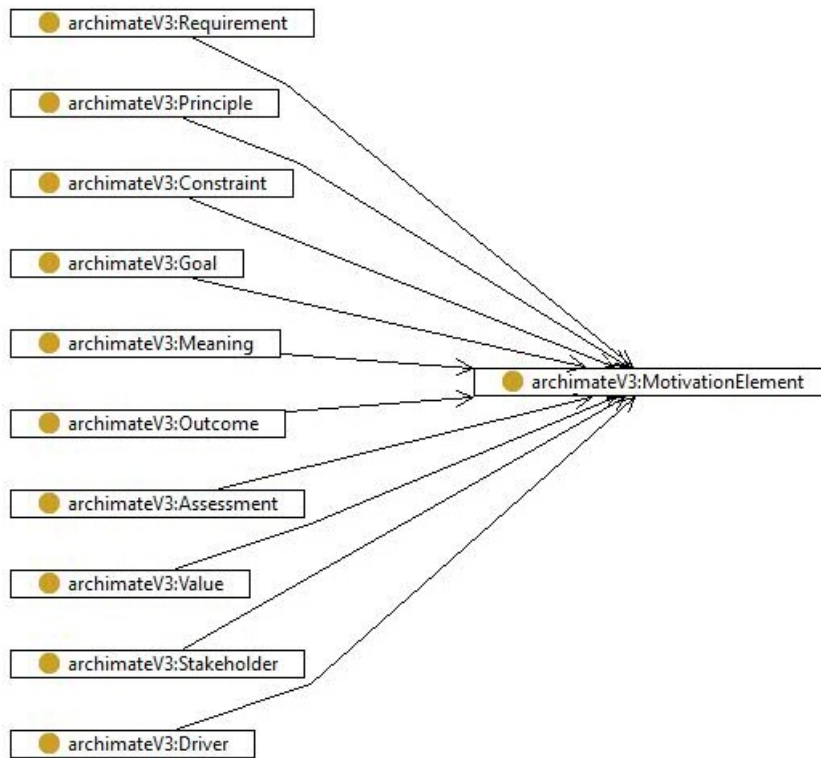
Figure 51: Class hierarchy of the enterprise architecture ontology for the motivation elements component

A snapshot of the class hierarchy of the motivation elements component from the enterprise architecture ontology, including the properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Enterprise Architecture Ontology.

The motivation element component, described in Table 127, from the enterprise architecture ontology consists of the ten components requirement (Table 128), principle (Table 129), constraint (Table 130), goal (Table 131), meaning (Table 132), outcome (Table 133), assessment (Table 134), value (Table 135), stakeholder (Table 136), and driver (Table 137).

Table 127: Specification of the class MotivationElement

Name of element	**MotivationElement**

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Description	The motivation element represents all the individual motivation elements included within the motivation aspects of the ArchiMate framework.
Properties	Relation: • motivationElement_influences_MotivationElement
Parent element	EnterpriseObject
Child elements	• Requirement • Principle • Constraint • Goal • Meaning • Outcome • Assessment • Value • Stakeholder • Driver

Table 128: Specification of the class Requirement

Name of element	**Requirement**
Description	A requirement represents something the enterprise needs for successful architecture (The Open Group, 2019).
Properties	Relation: • requirement_realizes_Outcome • requirement_realizes_Principle • constraint_specializes_Requirement
Parent element	MotivationElement

Table 129: Specification of the class Principle

Name of element	**Principle**
Description	The principle represents a policy statement defining a general characteristic (The Open Group, 2019).
Properties	Relation: • principle_realizes_Outcome • principle_associatedWith_Directive • requirement_realizes_Principle
Parent element	MotivationElement

Table 130: Specification of the class Constraint

Name of element	**Constraint**

Description	Constraint represents a barrier the enterprise faces to achieve its goals (The Open Group, 2019).
Properties	Relation: • constraint_specializes_Requirement
Parent element	MotivationElement

Table 131: Specification of the class Goal

Name of element	**Goal**
Description	A goal represents a targeted end state for the enterprise (The Open Group, 2019).
Properties	Relation: • goal_associatedWith_Goal • driver_associatedWith_Goal • assessment_associatedWith_Goal • outcome_realizes_Goal
Parent element	MotivationElement

Table 132: Specification of the class Meaning

Name of element	**Meaning**
Description	Meaning represents the interpretation or knowledge of a specific concept (The Open Group, 2019).
Properties	Relation: • meaning_specializedBy_Meaning • stakeholder_associatedWith_Meaning
Parent element	MotivationElement

Table 133: Specification of the class Outcome

Name of element	**Outcome**
Description	The outcome represents a result (The Open Group, 2019).
Properties	Relation: • outcome_realizes_Goal • outcome_associatedWith_Objective • requirement_realizes_Outcome • principle_realizes_Outcome • value_associatedWith_Outcome
Parent element	MotivationElement

Table 134: Specification of the class Assessment

Name of element	**Assessment**

Description	An assessment represents the outcome of an analysis (The Open Group, 2019).
Properties	Relation: • assessment_associatedWith_Goal • assessment_associatedWith_Assessment • driver_associatedWith_Assessment
Parent element	MotivationElement

Table 135: Specification of the class Value

Name of element	**Value**
Description	The value represents a benefit or worth provided by something (The Open Group, 2019).
Properties	Relation: • value_associatedWith_Outcome • value_specializedBy_Value • stakeholder_associatedWith_Value
Parent element	MotivationElement

Table 136: Specification of the class Stakeholder

Name of element	**Stakeholder**
Description	A stakeholder represents an organization or an individual with interest or impact in the enterprise (The Open Group, 2019).
Properties	Relation: • stakeholder_associatedWith_Driver • stakeholder_associatedWith_Value • stakeholder_associatedWith_Meaning • stakeholder_associatedWith_Stakeholder • stakeholder_associatedWith_Partner • stakeholder_associatedWith_BusinessPartner
Parent element	MotivationElement

Table 137: Specification of the class Driver

Name of element	**Driver**
Description	A driver represents a motivation to change the enterprise (The Open Group, 2019).
Properties	Relation: • driver_associatedWith_Goal • driver_associatedWith_Assessment • stakeholder_associatedWith_Driver

Parent element	MotivationElement

Since the ArchiMEO ontology already has the business motivation model extension from OMG (2010) represented within the ontology (Hinkelmann et al., 2016), the relevant connections between the ArchiMate version 3.1 motivation aspect and the business motivation model of ArchiMEO were developed. Also, further connections between the older ArchiMate version 2.0 and the ArchiMate version 3.1 were developed to support the use of data added to the old version of ArchiMEO and the new version of ArchiMEO including the ArchiMate version 3.1.

Table 138 describes the connection between the motivation aspect of the ArchiMate version 3.1 with related classes within the ArchiMEO ontology. The prefixes in front of the range classes represent the ontology in which the class is represented. *iso42010* represents the ISO/IEC/IEEE 42010 standard which is an international standard for enterprise architecture descriptions regarding software and systems. *eo* represents the enterprise objects and their relations to different model types. The *bmm* represents the business motivation model by OMG (2010) and the *archi* represents the ArchiMate 2.0 framework (The Open Group, 2012) as an ontology representation.

Table 138: ArchiMate version 3.1 related classes to ArchiMEO regarding the motivation elements

Domain class (ArchiMate version 3.1)	Relation Property	Range class (existing ArchiMEO class)	Description
Stakeholder	associated with	• iso42010:Stakeholder • eo:BusinessPartner • eo:Partner	Since a stakeholder often is a business partner or a partner in general, the stakeholder class is connected to these classes.
Assessment	associated with	bmm:Assessment	The class assessment already existed within the motivation extension of ArchiMate version 2.0 (The Open Group, 2012).
Goal	associated with	bmm:Goal	The class goal already existed within the motivation extension of ArchiMate version 2.0 (The Open Group, 2012).
Outcome	associated with	bmm:Objective	The class outcome is associated with the class objective from the business motivation model as both represent a target in order to achieve the defined goals, according to OMG (2010).

Principle	associated with	bmm:Directive	The class principle is associated with the class directive from the business motivation model as it indicates intent and how it should be carried out, according to OMG (2010).
Meaning	specialized by	archi:Meaning	The class meaning already existed within the ArchiMate version 2.0 as part of the business layer (The Open Group, 2012) but was moved to the motivation aspect for the ArchiMate version 3.1 (The Open Group, 2019).
Value	specialized by	archi:Value	The class value already existed within the ArchiMate version 2.0 as part of the business layer (The Open Group, 2012) but was moved to the motivation aspect for the ArchiMate version 3.1 (The Open Group, 2019).

6.2.3.2   Strategy Elements Component

This chapter explains the strategy elements component of the enterprise architecture ontology and answers the competency sub-question *Which are the strategic properties of the business model innovation case from an enterprise architecture point of view?* of the third competency question *What enterprise architecture properties are of interest for a business model innovation case?* from Table 17 in Sub-chapter 6.1.2. The relevant class hierarchy developed for this part of the ontology is shown in Figure 52.
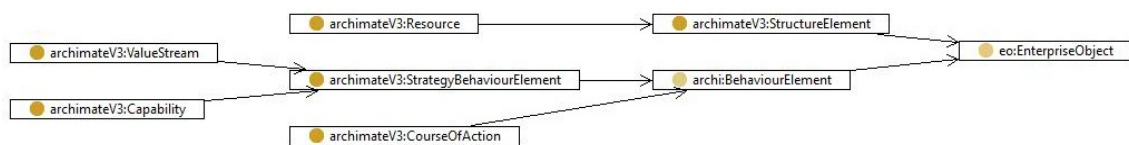

Figure 52: Class hierarchy of the enterprise architecture ontology for the strategy elements component

A snapshot of the class hierarchy of the strategy elements component from the enterprise architecture ontology, including the properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Enterprise Architecture Ontology.

The enterprise architecture ontology consists of four strategy elements: resource (Table 140), course of action (Table 141), value stream (Table 143), and capability (Table 144). To structure the strategy elements accordingly within the enterprise object ontology, the classes structure element (Table 139), containing the sub-class resource, and strategy behaviour element (Table 142), containing the sub-classes value stream and capability, were created.

Table 139: Specification of the class StructureElement

Name of element	**StructureElement**
Description	The structure element represents active and passive elements as well as the element resource, which is neither one (The Open Group, 2019).
Parent element	EnterpriseObject
Child element	• Resource • ActiveStructureElement • PassiveStructureElement

Table 140: Specification of the class Resource

Name of element	**Resource**
Description	The resource represents a thing, tangible or intangible, from or for the enterprise (The Open Group, 2019).
Properties	Relation: • resource_assignedTo_StrategyBehaviourElement
Parent element	StructureElement

Table 141: Specification of the class CourseOfAction

Name of element	**CourseOfAction**
Description	The course of action represents how resources or capabilities need to be arranged to achieve a particular goal (The Open Group, 2019).
Properties	Relation: • courseOfAction_associatedWith_CourseOfAction • courseOfAction_flowsTo_CourseOfAction • courseOfAction_serves_CourseOfAction • courseOfAction_triggers_CourseOfAction • strategyBehaviourElement_realizes_CourseOfAction • strategyBehaviourElement_serves_CourseOfAction
Parent element	BehaviourElement

Table 142: Specification of the class StrategyBehaviourElement

Name of element	**StrategyBehaviourElement**
Description	The strategy behaviour element represents the behavior elements of the strategy layer (The Open Group, 2019).

Properties	Relation:
	• strategyBehaviourElement_realizes_CourseOfAction
	• strategyBehaviourElement_serves_CourseOfAction
	• strategyBehaviourElement_flowsTo_StrategyBehaviourElement
	• strategyBehaviourElement_serves_StrategyBehaviourElement
	• strategyBehaviourElement_triggers_StrategyBehaviourElement
	• resource_assignedTo_StrategyBehaviourElement
Parent element	BehaviourElement
Child elements	• ValueStream
	• Capability

Table 143: Specification of the class ValueStream

Name of element	**ValueStream**
Description	A value stream represents activities, which create an impact on a stakeholder (The Open Group, 2019).
Parent element	StrategyBehaviourElement

Table 144: Specification of the class Capability

Name of element	**Capability**
Description	Capability represents an ability possessed by a person, organization, or system (The Open Group, 2019).
Parent element	StrategyBehaviourElement

Since the ArchiMEO ontology already has the business motivation model extension from OMG (2010) represented within the ontology (Hinkelmann et al., 2016), the relevant connections between the ArchiMate version 3.1 strategy layer and the business motivation model of ArchiMEO were developed.

Table 145 describes the connection between the strategy layer of the ArchiMate version 3.1 with related classes within the ArchiMEO ontology. The prefix in front of the range classes represents the ontology in which the class is represented. The *bmm* represents the business motivation model by OMG (2010).

Table 145: ArchiMate version 3.1 related classes to ArchiMEO regarding the strategy elements

Domain class (ArchiMate version 3.1)	Relation Property	Range class (existing ArchiMEO class)	Description
Course of action	associated with	bmm:CourseOfAction	The class course of action already existed within the motivation extension of ArchiMate version 2.0 (The Open Group, 2012).

6.2.4 The Business Innovation Case Ontology

This chapter describes the business innovation case ontology module of the business model innovation case ontology. The development of this ontology required the analysis of the cases collected in Chapter 4. These cases of business model innovations provided the data to form a structure for business innovation cases, illustrated in Figure 53, in order to develop the business innovation case ontology from it.
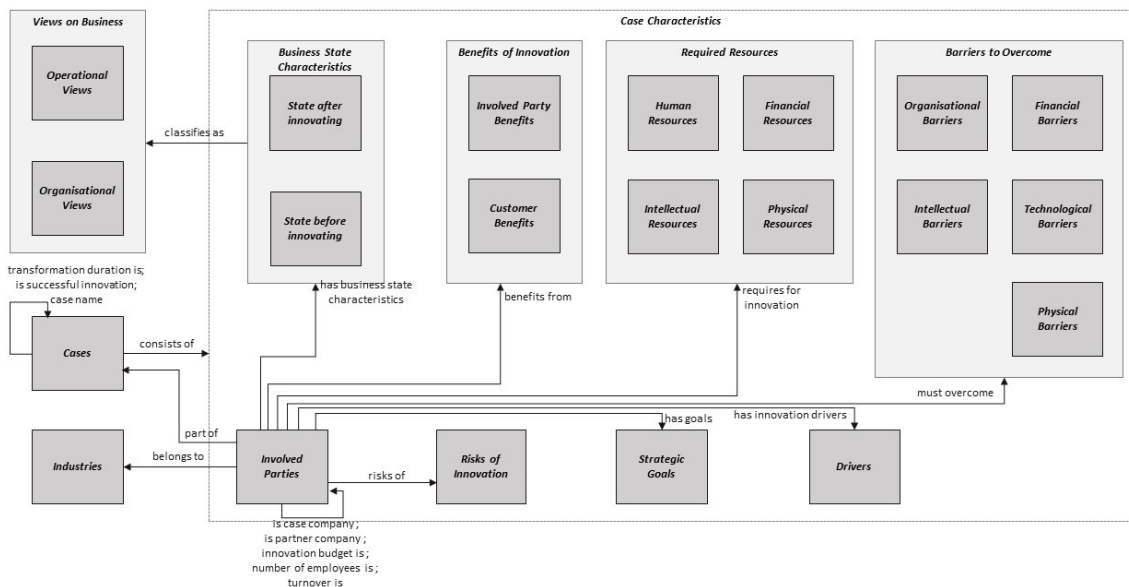
Figure 53: Overview of the business innovation case ontology

The ontology consists of several elements, which are as well included in the business aspect of the ArchiMate version 3.1 from The Open Group (2019). The elements which represent the case characteristics can all be mapped to the business aspects of ArchiMate. Nevertheless, more elements are required than what the ArchiMate framework can provide to describe a business innovation case in detail. The elements which can be mapped are listed in the following Table 146.

Table 146: Mapping of business innovation case elements and ArchiMate version 3.1 elements

Business innovation case element	ArchiMate version 3.1 element
Benefits of Innovation	Value
Required Resources	Requirement
Barriers to Overcome	Constraint
Drivers	Driver
Strategic Goals	Goal
Risks of Innovation	Constraint
Involved Parties	Stakeholder
State after Innovating	Outcome

The following sub-chapters describe the details of the developed business innovation case ontology. The source code for the implemented business innovation case ontology is shown in Appendix-B: Source Code of the Developed Ontologies Source Code of the Business Innovation Case Ontology.

6.2.4.1   Case Characteristics Component

This chapter explains the case characteristics component of the business innovation case ontology and answers the second competency question *What business innovation transformation properties are of interest for a business model innovation case?* from Table 17 in Sub-chapter 6.1.2. The class hierarchy developed for this part of the ontology is shown in Figure 54.

A snapshot of the class hierarchy of the case characteristics component from the business innovation case ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Business Innovation Case Ontology.
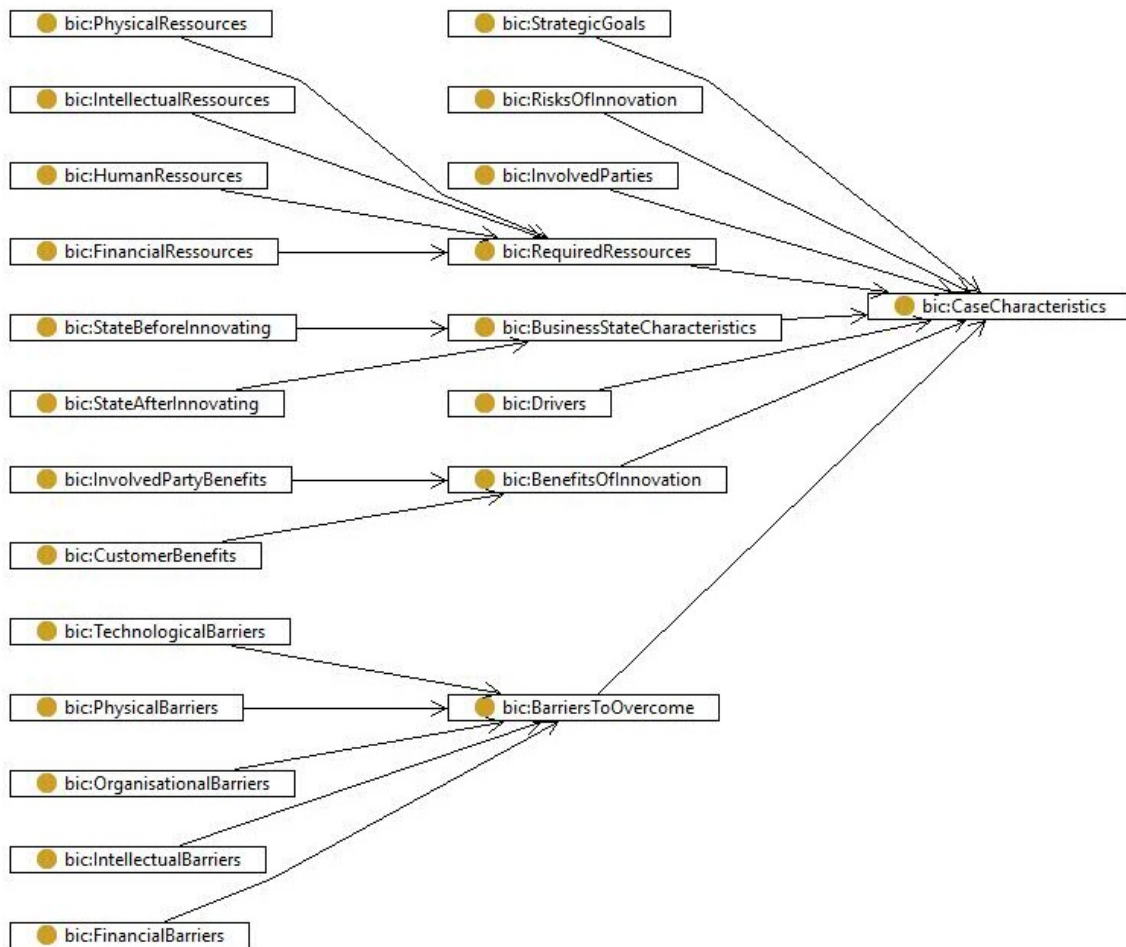
Figure 54: Class hierarchy of the business innovation case ontology for the case characteristics component

The case characteristics component, described in Table 147, from the business innovation case ontology consists of eight components:

- Strategic goals, described in Table 148.
- Risks of innovation, described in Table 149.
- Involved parties, described in Table 150.
- Required resources, described in Table 151, consists of physical resources (Table 156), intellectual resources (Table 157), human resources (Table 158), and financial resources (Table 159).
- Business state characteristics, described in Table 152, consists of state before innovating (Table 160) and state after innovating (Table 161).
- Drivers, described in Table 153.
- Benefits of innovation, described in Table 154, consists of involved party benefits (Table 162) and customer benefits (Table 163).

- Barriers to overcome, described in Table 155, consists of technological barriers (Table 164), physical barriers (Table 165), organizational barriers (Table 166), intellectual barriers (Table 167), and financial barriers (Table 168).

Table 147: Specification of the class CaseCharacteristics

Name of element	**CaseCharacteristics**
Description	Case characteristics represent the different aspects that describe a case.
Properties	Relation: • cases_consistsOf_CaseCharacteristics
Child elements	• StrategicGoals • RisksOfInnovation • InvolvedParties • RequiredRessources • BusinessStateCharacteristics • Drivers • BenefitsOfInnovation • BarriersToOvercome

Table 148: Specification of the class StrategicGoals

Name of element	**StrategicGoals**
Description	Strategic goals represent the results an involved party expects from participating in the business innovation.
Properties	Relation: • involvedParties_hasGoals_StrategiecGoals
Parent element	CaseCharacteristics

Table 149: Specification of the class RisksOfInnovation

Name of element	**RisksOfInnovation**
Description	Risks of innovation represent the risks an involved party has to manage to introduce the new offer to the market.
Properties	Relation: • involvedParties_risksOfRisksOfInnovation
Parent element	CaseCharacteristics

Table 150: Specification of the class InvolvedParties

Name of element	**InvolvedParties**

Description	Involved parties represent the organizations and individuals relevant to the success of the business innovation. Involved parties have goals they target, require resources to perform the case, overcome specific barriers and risks for a successful case implementation, have drivers to motivate the party to participate in the case, benefit from the case, and belong to a specific industry.
Properties	Relation: • involvedParties_partOf_Cases • involvedParties_hasGoals_StrategicGoals • involvedParties_requiresForInnovation_RequiredRessources • involvedParties_mustOvercome_BarriersToOvercome • involvedParties_belongsTo_Industry • involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics • involvedParties_hasInnovationDrivers_Drivers • involvedParties_benefitsFrom_BenefitsOfInnovation • involvedParties_risksOf_RisksOfInnovation Integer: • involvedParties_innovationBudgetIs • involvedParties_numberOfEmployeesIs • involvedParties_turnoverIs Boolean: • involvedParties_isPartnerCompany • involvedParties_isCaseCompany
Parent element	CaseCharacteristics

Table 151: Specification of the class RequiredRessources

Name of element	**RequiredRessources**
Description	Required resources represent the needed resources, tangible or intangible, for successful business innovation.
Properties	Relation: • involvedParties_requiresForInnovation_RequiredRessources
Parent element	CaseCharacteristics
Child elements	• FinancialRessources • HumanRessources • IntellectualRessources • PhysicalRessources

Table 152: Specification of the class BusinessStateCharacteristics

Name of element	**BusinessStateCharacteristics**
Description	Business state characteristics represent the specifics of business innovation to make it happen and can be classified as viewpoints on the business.

Properties	Relation: • businessStateCharacteristics_classifiesAs_viewsOnBusiness • involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics
Parent element	CaseCharacteristics
Child elements	• StateBeforeInnovating • StateAfterInnovating

Table 153: Specification of the class Drivers

Name of element	**Drivers**
Description	Drivers represent the intentions for which an involved party is willing to participate in the business innovation.
Properties	Relation: • involvedParties_hasInnovationDrivers_Drivers
Parent element	CaseCharacteristics

Table 154: Specification of the class BenefitsOfInnovation

Name of element	**BenefitsOfInnovation**
Description	Benefits of innovation represent the benefits the involved parties and customers have based on the business innovation.
Properties	Relation: • involvedParties_benefitsFrom_BenefitsOfInnovation
Parent element	CaseCharacteristics
Child elements	• CustomerBenefits • InvolvedPartyBenefits

Table 155: Specification of the class BarriersToOvercome

Name of element	**BarriersToOvercome**
Description	Barriers to overcome represent the challenges an involved party needs to overcome for a successful business innovation transformation.
Properties	Relation: • involvedParties_mustOvercome_BarriersToOvercome
Parent element	CaseCharacteristics
Child elements	• FinancialBarriers • IntellectualBarriers • OrganisationalBarriers • PhysicalBarriers • TechnologicalBarriers

Table 156: Specification of the class PhysicalRessources

Name of element	**PhysicalRessources**
Description	Physical resources represent tangible resources, excluding financial and human resources, required for the case implementation.
Parent element	RequiredRessources

Table 157: Specification of the class IntellectualRessources

Name of element	**IntellectualRessources**
Description	Intellectual resources are intangible, hard to acquire, resources required for the case implementation.
Parent element	RequiredRessources

Table 158: Specification of the class HumanRessources

Name of element	**HumanRessources**
Description	Human resources represent people and are essential for knowledge-intensive or creative tasks for a successful case implementation.
Parent element	RequiredRessources

Table 159: Specification of the class FinancialRessources

Name of element	**FinancialRessources**
Description	Financial resources represent monetary resources required for the case implementation.
Parent element	RequiredRessources

Table 160: Specification of the class StateBeforeInnovating

Name of element	**StateBeforeInnovating**
Description	The state before innovating represents the business innovation case state before the case was implemented.
Parent element	BusinessStateCharacteristics

Table 161: Specification of the class StateAfterInnovating

Name of element	**StateAfterInnovating**
Description	The state after innovating represents the business innovation case state after the case has been implemented.
Parent element	BusinessStateCharacteristics

Table 162: Specification of the class InvolvedPartyBenefits

Name of element	**InvolvedPartyBenefits**
Description	Involved party benefits represent the benefits of the case implementation for the involved case parties.

Parent element	BenefitsOfInnovation

Table 163: Specification of the class CustomerBenefits

Name of element	**CustomerBenefits**
Description	Customer benefits represent the benefits of the case implementation for the customers affected by the case.
Parent element	BenefitsOfInnovation

Table 164: Specification of the class TechnologicalBarriers

Name of element	**TechnologicalBarriers**
Description	Technological barriers represent the hurdles for a successful case implementation regarding technological challenges.
Parent element	BarriersToOvercome

Table 165: Specification of the class PhysicalBarriers

Name of element	**PhysicalBarriers**
Description	Physical barriers represent the hurdles for a successful case implementation regarding physical challenges, such as needing a specific ground.
Parent element	BarriersToOvercome

Table 166: Specification of the class OrganisationalBarriers

Name of element	**OrganisationalBarriers**
Description	Organizational barriers represent the hurdles for a successful case implementation regarding organizational challenges.
Parent element	BarriersToOvercome

Table 167: Specification of the class IntellectualBarriers

Name of element	**IntellectualBarriers**
Description	Intellectual barriers represent the hurdles for a successful case implementation regarding intellectual challenges, such as missing information.
Parent element	BarriersToOvercome

Table 168: Specification of the class FinancialBarriers

Name of element	**FinancialBarriers**
Description	Financial barriers represent the hurdles for a successful case implementation regarding financial challenges.
Parent element	BarriersToOvercome

6.2.4.2 Additional Business Innovation Case Components

This chapter explains the cases, industries, and views on business components of the business innovation case ontology. The class hierarchy developed for this part of the ontology is shown in Figure 55.
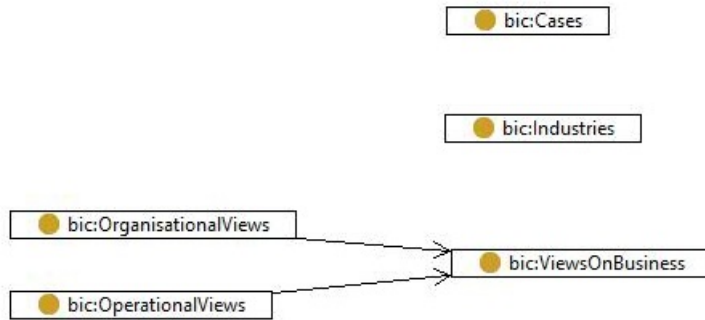
Figure 55: Class hierarchy of the business innovation case ontology for the business innovation case components cases, industries, and views on business

A snapshot of the class hierarchy of the cases, industries, and views on business components from the business innovation case ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshots of the Business Innovation Case Ontology.

The business innovation case ontology has additional components besides the case characteristics, as described in the previous sub-chapter. The business innovation case ontology consists as well of the classes cases (Table 169) and industries (Table 170). In addition, the ontology includes the component views on business (Table 171), which consists of the classes organizational views (Table 172) and operational views (Table 173).

Table 169: Specification of the class Cases

Name of element	**Cases**
Description	Cases represent the different cases within the case collection and each case consists of different case characteristics.
Properties	Relation: • cases_consistsOf_CaseCharacteristics • involvedParties_partOf_Cases Boolean: • cases_isSuccessfullInnovation String: • cases_caseName Integer: • cases_transformationDurationIs

Table 170: Specification of the class Industries

Name of element	**Industries**
Description	Industries represent the different industries to which a company could belong and are based on the industries list of Statista (n.d.).
Properties	Relation: • involvedParties_belongsTo_Industry
Instances	• Agriculture • ChemicalsAndResources • Construction • ConsumerGoods • CrimeAndLawEnforcement • ECommerce • EducationAndScience • EnergyAndEnvironmentalServices • Finance • HealthAndPharmaceuticals • Insurance • Manufacturing • MediaAndAdvertising • PoliticsAndGovernment • RealEstate • Religion • RetailAndTrade • Services • SportsAndRecreation • TechnologyAndTelecommunications • TransportationAndLogistics • TravelAndTourismAndHospitality

Table 171: Specification of the class ViewsOnBusiness

Name of element	**ViewsOnBusiness**
Description	Views on business represent the different aspects to which a business innovation case can relate, such as an organizational or an operational view.
Properties	Relation: • businessStateCharacteristics_classifiesAs_ViewsOnBusiness
Child elements	• OrganisationalViews • OperationalViews

Table 172: Specification of the class OrganisationalViews

Name of element	**OrganisationalViews**
Description	An organizational view focuses on the business aspects evolving around the organizational aspects.
Instances	• Leadership • Culture
Parent element	ViewsOnBusiness

Table 173: Specification of the class OperationalViews

Name of element	**OperationalViews**
Description	An operational view focuses on the business aspects evolving around the operations.
Instances	• IT • BusinessProcess
Parent element	ViewsOnBusiness

6.2.5 The Construction Industry Specifics Ontology

This chapter describes the construction industry specifics ontology module of the extended business model innovation case ontology with industry specifics. The development of this ontology required the analysis of the characteristics of the construction sector. For this purpose, I interviewed Prof. Dr. Manfred Huber (see also the interview summary in the appendix chapter Expert Interview with Construction Expert), an expert in the construction sector. Further, construction-specific literature has been analyzed to develop the construction industry specifics ontology. The outcome is shown in Figure 56.

The developed construction industry specifics ontology answers the fifth competency question *What construction industry properties are of interest for a business model innovation case?* from Table 17 in Sub-chapter 6.1.2.
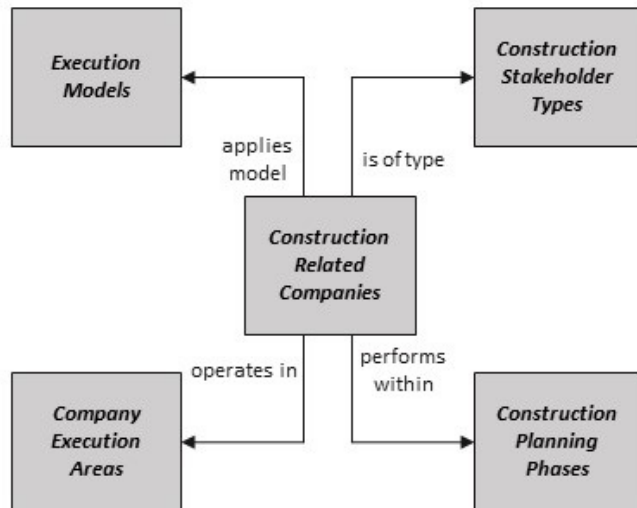
Figure 56: Overview of the construction industry specifics ontology

The class hierarchy developed for this ontology is shown in Figure 57. Since there are no subclasses existent, the class hierarchy is flat and has no subclasses included.
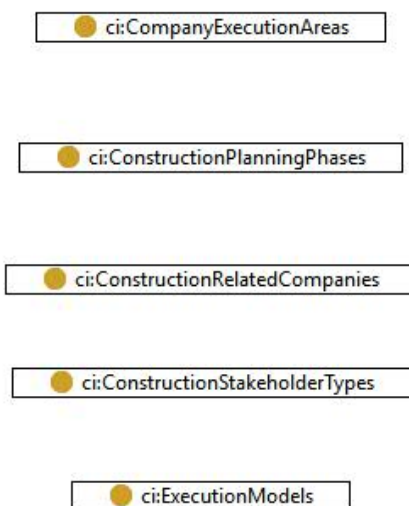
Figure 57: Class hierarchy of the construction industry specifics ontology

A snapshot of the class hierarchy of the construction industry specifics ontology, including the instances and properties, is shown in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Snapshot of the Construction Industry Specifics Ontology. The source code for the implemented construction industry specifics ontology is shown in Appendix-B: Source Code of the Developed Ontologies Source Code of the Construction Industry Specifics Ontology.

The construction industry specifics ontology consists of the classes company execution areas (Table 174), construction planning phases (Table 175), construction-related companies (Table 176), construction stakeholder types (Table 177), and execution models (Table 178).

Table 174: Specification of the class CompanyExecutionAreas

Name of element	**CompanyExecutionAreas**
Description	Company execution areas represent the different geographical areas where constructions can be made, according to the construction expert Prof. Dr. Manfred Huber (see also Sub-chapter Expert Interview with Construction Expert).
Properties	Relation: • constructionRelatedCompanies_operatesIn_CompanyExecutionAreas
Instances	• Rural • Urban

Table 175: Specification of the class ConstructionPlanningPhases

Name of element	**ConstructionPlanningPhases**
Description	Construction planning phases represent the six phases of a construction project based on SIA (swiss society of engineers and architects) 112 norm (SIA, 2014).
Properties	Relation: • constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases
Instances	• FacilityManagement • PreliminaryStudy • ProjectPlanning • Realization • StrategicPlanning • Tendering

Table 176: Specification of the class ConstructionRelatedCompanies

Name of element	**ConstructionRelatedCompanies**
Description	Construction-related companies represent the companies that are part of a construction project.
Properties	Relation: • constructionRelatedCompanies_appliesModel_executionModels • constructionRelatedCompanies_isOfType_ConstructionStakeholderTypes • constructionRelatedCompanies_operatesIn_CompanyExecutionAreas • constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases
Instances	• LosingerMarazzi

Table 177: Specification of the class ConstructionStakeholderTypes

Name of element	**ConstructionStakeholderTypes**

Description	Construction stakeholder types represent typical project participants of a construction project based on the SIA 112 norm (SIA, 2014).
Properties	Relation: • constructionRelatedCompanies_isOfType_ConstructionStakeholderTypes
Instances	• Architecture • BuildingOperator • BuildingOwner • BuildingUser • Contractor • Engineering • PublicAuthority

Table 178: Specification of the class ExecutionModels

Name of element	**ExecutionModels**
Description	Execution models represent the different forms a construction project can be set up based on Dal Gallo and Wilson (2017) and Paulus (2015).
Properties	Relation: • constructionRelatedCompanies_appliesModel_executionModels
Instances	• GeneralContractor • GeneralPlanner • IPD • TotalContractor • Traditional

6.3   Merged Ontologies

As the previous chapter describes the individual ontology modules relevant for developing a comprehensive business model innovation case ontology, this chapter describes the merging of the ontologies to reach a connection between all the five individual ontologies.

As Poli et al. (2010) state, an ontology merger is the development of an ontology consisting of two or more existing ontologies. According to them, there are two approaches when it comes to ontology merger. Either a new stand-alone ontology is created based on the original ontologies, or the original ontologies are not replaced but instead imported into a bridge ontology, which contains the connections between the imported ontologies using bridge relations (Poli et al., 2010).

As described before, there are different users interested in the topic of business model innovation, such as C-level managers, transformation managers, or enterprise architects. To support each user type results in the challenge of semantic interoperability of their individual but overlapping domains, as they use different notations and vocabulary to depict their domain (Dou et al., 2005). Nevertheless, it is essential to reach a common understanding of the domain business model innovation in order to describe such cases. Thus, a merger of the different domains and overcoming the challenge of semantic interoperability is crucial for developing the business model innovation case ontology. Also, the option of a bridge ontology is more suitable to this research problem to provide ontology modules that can be re-used and a bridge ontology connecting the individual ontologies if needed, as is the case for this research.

Since the approach of merging the ontologies using a bridge ontology has been chosen, a description of such a procedure is essential. According to Dou et al. (2005), the approach to developing a bridge ontology is first to erase any syntactic differences to achieve interoperability between the ontologies. Second, the semantic challenge of the different domains between the source ontologies needs to be approached. For this challenge, bridging relations need to be developed. To connect the individual ontologies, the bridging relations support the connection between the overlapping aspects of the imported ontologies (Poli et al., 2010). Therefore, the bridging relations are relations between the individual terms of the source ontologies (Dou et al., 2005). The result, the merged ontology, can be seen as a new ontology, which requires the individual ontologies for the import, and this merged ontology can then again be used for a bridge ontology, and thus, reusability of the bridge ontology is ensured (Dou et al., 2005).

The following sub-chapters describe the four developed ontology mergers (bridge ontologies) of the business model and business capability ontologies, of the business model and enterprise architecture ontologies, of the business innovation case and the business model and enterprise architecture ontologies, as well as the business model innovation case and the construction industry specifics ontologies. The following Figure 58 depicts the modular approach of ontology development. The individual ontologies are colored in grey and the bridge ontologies, which are described in the following sub-chapters, are colored in green.
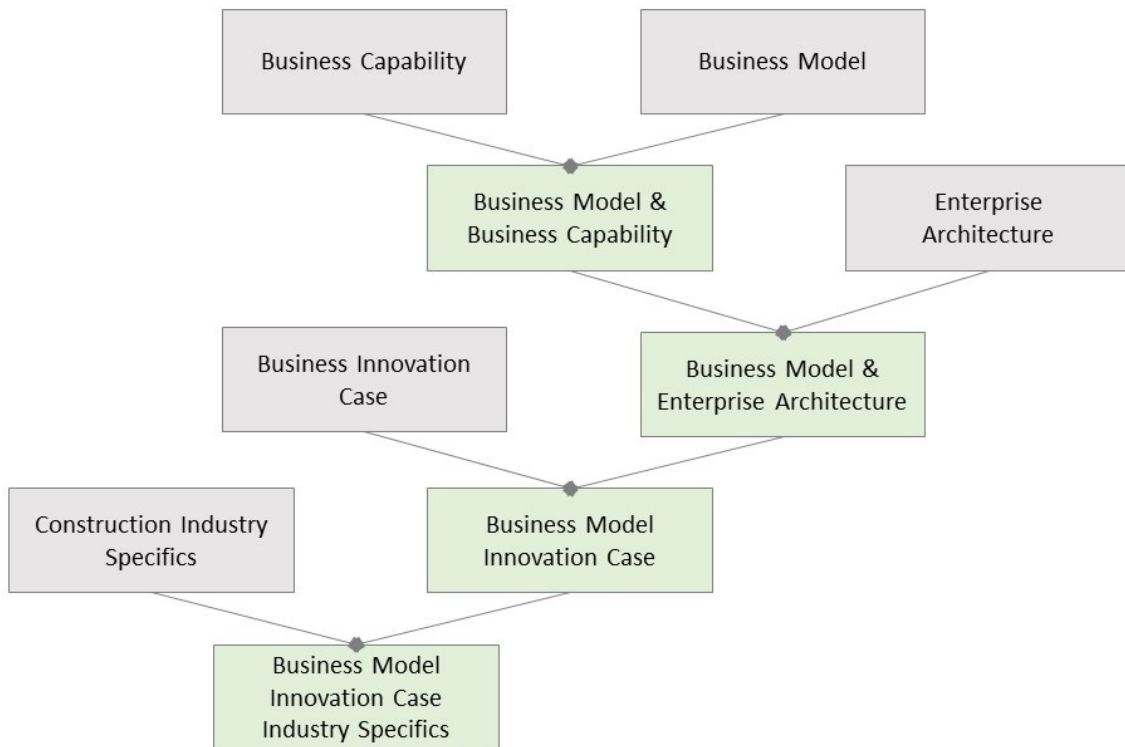
Figure 58: Modular approach for the ontology development

6.3.1 The Business Model & Business Capability Ontology

The reason to merge the business capability and the business model ontologies is grounded in the fact that the literature mentions the importance to figure out the business capabilities when mapping out a business model (Breuer, 2013; Breuer et al., 2018; Gassmann et al., 2013; Geissdoerfer et al., 2017; Meertens et al., 2012). Gassmann et al. (2013) mention that a business needs to figure out which capabilities they currently have and which ones they are missing to succeed with their business model. Further, the capabilities of a business make it unique and functioning (Meertens et al., 2012; Osterwalder, 2004). Also, capabilities can be complementary to the business model and be provided by third parties (Breuer, 2013; Geissdoerfer et al., 2017).

The bridge ontology resulting from the merged business capability and business model ontology is shown in Figure 59.
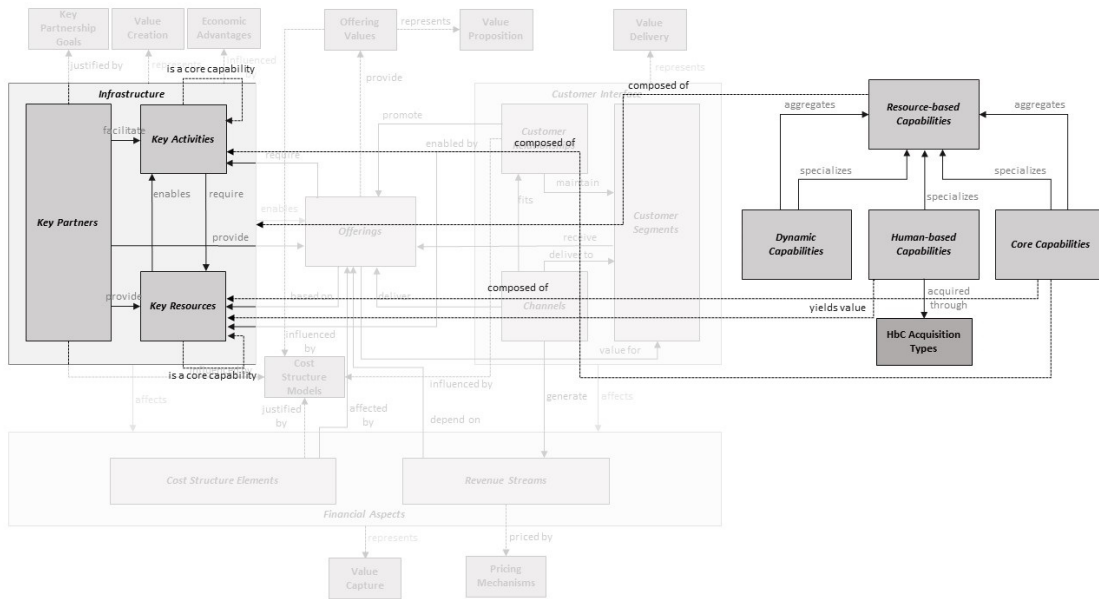
Figure 59: Overview of the business model & business capability ontology

Since the business capabilities overlap with the infrastructure component of the business model ontology, the bridge relations are between these two aspects. Further, key activities and key resources can be core capabilities, and thus, the property *is a core capability* for both classes is created to specify if a key resource or key activity has this characteristic. Table 179 describes the two new properties specific for the business model ontology based on the knowledge of business capabilities as well as the four bridge relations to connect the two ontologies.

Table 179: Description of the properties to merge the business model and business capability ontologies

Domain class	Property	Range class	Description
KeyResource	isACoreCapability (Boolean)	-	Key resources can be core capabilities if they are essential for the success of the business model (Meertens et al., 2012).
KeyActivity	isACoreCapability (Boolean)	-	Key activities can be core capabilities if they are essential for the success of the business model (Iacob et al., 2014; Osterwalder, 2004).
HumanBased Capabilities	yieldsValue (Relation)	Human	As Osterwalder (2004) mentions, a specific capability or resource besides tangible and intangible capabilities is a human-based capability. Thus, the key resource human is connected with the human-based capability class as it gains value from the specific skills and competencies from the human-based capabilities class within the business capability ontology.

CoreCapabilities	composedOf (Relation)	KeyActivities	Since key activities can be core capabilities if they are essential for the success of the business model (Iacob et al., 2014; Osterwalder, 2004), the bridge relation is created to specify that a core capability is composed of key activities.
CoreCapabilities	composedOf (Relation)	KeyResources	Since key resources can be core capabilities if they are essential for the success of the business model (Meertens et al., 2012), the bridge relation is created to specify that a core capability is composed of key resources.
ResourceBased Capabilities	composedOf (Relation)	Infrastructure Parts	A resource-based capability is the top class of dynamic, human-based, and core capabilities. Thus, resource-based capabilities is a composition of infrastructure parts containing besides the key activities and key resources also the key partners, as key partners can be seen as well as a resource-based capability, if they are essential for the success of the business model (Breuer, 2013; Foss & Saebi, 2017; Geissdoerfer et al., 2017; Osterwalder, 2004).

The source code for the implemented business model & business capability ontology is shown in Appendix-B: Source Code of the Developed Ontologies Source Code of the Business Model & Business Capability Ontology.

6.3.2 The Business Model & Enterprise Architecture Ontology

According to the literature (Caetano et al., 2017; Fritscher & Pigneur, 2011; Hosiaisluoma, 2020; Iacob et al., 2014; Lankhorst et al., 2017; Meertens et al., 2012; Walters, 2020), the concepts of the business model and enterprise architecture are closely related and have several overlapping elements. As Caetano et al. (2017) mention, integrating both concepts is attractive to provide information on how the elements and processes of an organization realize a business model. According to Hosiaisluoma (2020), Iacob et al. (2014), and Walters (2020), a business model can be modeled by using strategy, business, and motivation elements from ArchiMate.

Figure 60 illustrates the relevant elements of the strategy layer and the motivation aspect from ArchiMate to depict the Business Model Canvas. Since, according to Meertens et al. (2012), the value proposition not only includes the values offered to customers through the offered service or product but the service or product itself as well, the business layer element *product* from

ArchiMate is also included within the mapping representation for ArchiMate and the Business Model Canvas.
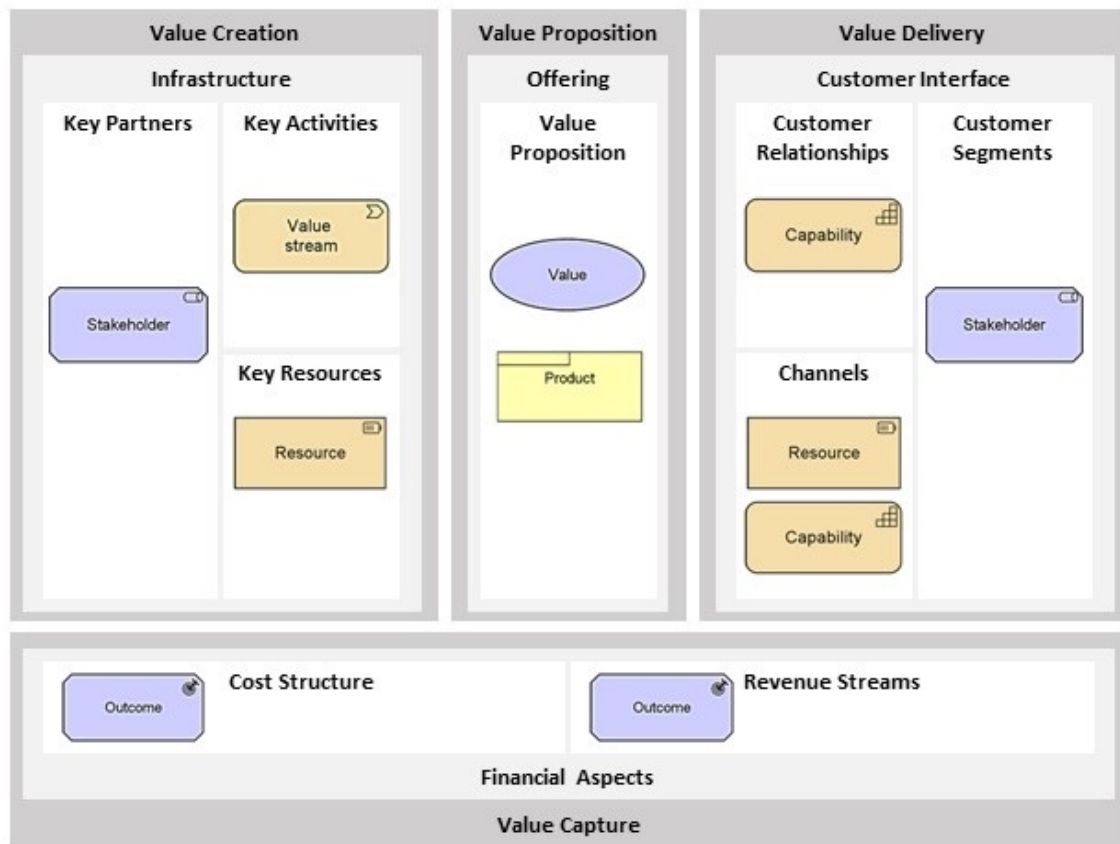
Figure 60: Mapping of ArchiMate elements with the Business Model Canvas

Based on Fritscher and Pigneur (2011) research, ArchiMate has limitations to perform a strategic analysis of a business model, and thus, it is essential to expand an enterprise architecture ontology representing ArchiMate's model with a business model ontology. Therefore, this research developed an ontology consisting of the enterprise architecture concept from ArchiMate and the business model concept. The result, a bridge ontology consisting of the business model & business capability ontology and the enterprise architecture ontology and their merging properties, is depicted in Figure 61.

The developed bridge ontology uses relations from ArchiMate to connect the two concepts. The decision to use ArchiMate relationships is supported by Meertens et al. (2012). Further, ArchiMate's relationships are a standard within the enterprise architecture domain (Lankhorst et al., 2017; The Open Group, 2019) and therefore, enterprise modelers are used to reading such models and thus, can interpret the ontology.
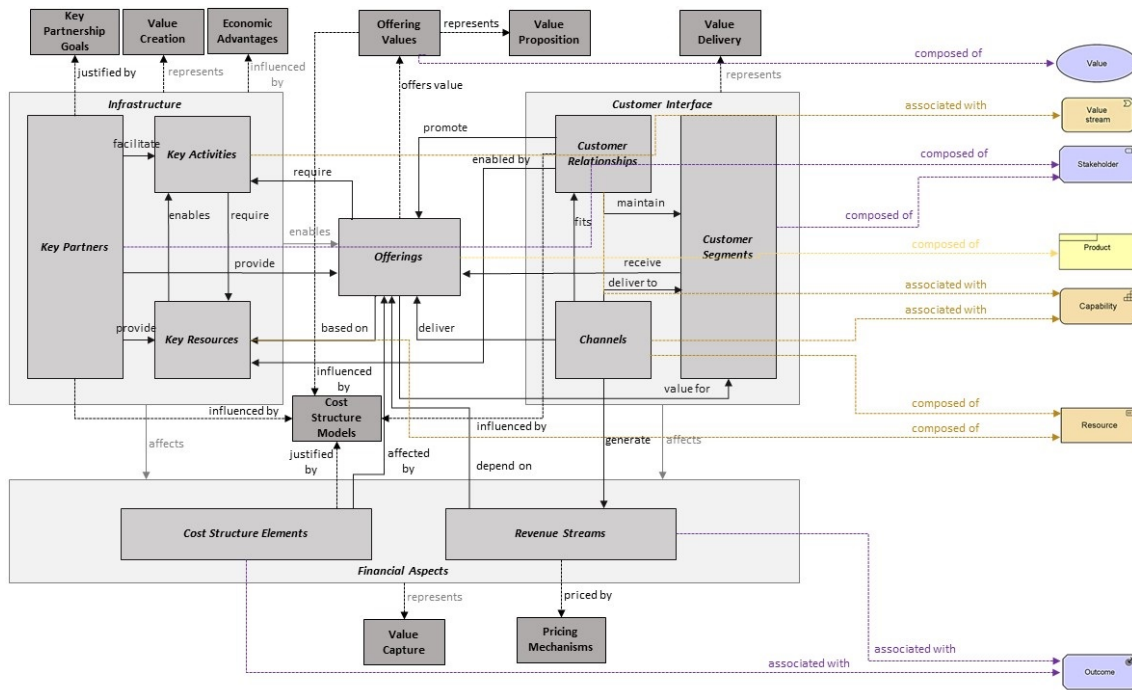
Figure 61: Overview of the business model & enterprise architecture ontology

Table 180 describes the eleven bridge relations to connect the enterprise architecture ontology with the bridge ontology business model & business capability.

Table 180: Description of the relation properties to merge the business model & business capability and enterprise architecture ontologies

Domain class	Relation property	Range class	Description
KeyPartners	composedOf	Stakeholder	Key partners of a business model represent stakeholders from ArchiMate's motivation elements since key partners are external parties that support the business model's operations (Hosiaisluoma, 2020; Iacob et al., 2014; Walters, 2020).
CustomerSegments	composedOf	Stakeholder	Similar to the concept of key partners and stakeholders, customer segments consist of stakeholders interested in the purchase of the offering (Hosiaisluoma, 2020; Iacob et al., 2014; Walters, 2020).
RevenueStreams	associatedWith	Outcome	As Walters (2020) shows, a business's revenue stream is associated with ArchiMate's concept of the outcome as both represent an end result of the goal to make money.

CostStructureElements	associatedWith	Outcome	Similar to the concept of revenue stream that is associated with the concept outcome, cost structure elements are also associated with the concept of outcome because the outcome of the different activities leads to costs (Walters, 2020).
OfferingValues	composedOf	Value	The offering's value consists of motivation values as it depicts an offering's worth for a stakeholder (Caetano et al., 2017; Hosiaisluoma, 2020; Iacob et al., 2014; Meertens et al., 2012; Walters, 2020).
CustomerRelationships	associatedWith	Capability	Based on Walters (2020) research, the concepts customer relationships from a business model and capability from ArchiMate are closely related since both represent an ability of the business.
Channels	composedOf	Resource	Since the concept of resources from ArchiMate consists of business interfaces and a business model's channels represent business interfaces towards the stakeholder customer, it can be derived that channels are composed of an enterprise's resources (Iacob et al., 2014; Walters, 2020).
Channels	associatedWith	Capability	Channels can be regarded as abilities, and thus it is a capability of a business since a business might have channels that differentiate its business model from competitors' business model.
KeyActivities	associatedWith	ValueStream	As key activities represent tasks to run the business to sell the business's offering to customers, key activities can be regarded as a value stream, which is defined as a set of activities to create an impact on a stakeholder, such as a customer (Iacob et al., 2014; Walters, 2020).
KeyResources	composedOf	Resource	The definition of key resources, to represent the things, tangible or intangible, in a company which a business model needs to run, reproduces almost literally the definition of ArchiMate's concept of resource (Hosiaisluoma, 2020; Iacob et al., 2014; Meertens et al., 2012; Walters, 2020).

Offerings	composedOf	Product	Since a product represents the offer provided to customers, the concept of offerings is a composition of the enterprise architecture's product element (Caetano et al., 2017; Hosiaisluoma, 2020; Meertens et al., 2012; Walters, 2020).

The source code for the implemented business model & enterprise architecture ontology is shown in Appendix-B: Source Code of the Developed Ontologies Source Code of the Business Model & Enterprise Architecture Ontology.

6.3.3   The Business Model Innovation Case Ontology

The business model innovation case ontology consists of the four individual ontologies business capability, business model, enterprise architecture, and business innovation case. Further, it includes the bridge ontologies business model & business capability and business model & enterprise architecture.

The case analysis, elaborated in Chapter 4, has revealed that for a business model innovation case ontology that should be interpretable for users from the business as well as from the IT area, the ontology should include not only the properties of the business model and enterprise architecture but the business innovation property in general as well. Therefore, this research developed the bridge ontology business model innovation case to merge the three domains.

The following sub-chapters describe first the merge of the business innovation case ontology with the business model ontology. Since the property of business capabilities has no effect on the business model innovation case but is instead an extension for it, the bridge ontology business model & business capability is part of the business model innovation case but not further elaborated in the following sub-chapters. Second, the merge of the business innovation case ontology with the enterprise architecture ontology is described. The source code for the implemented business model innovation case ontology is shown in Appendix-B: Source Code of the Developed Ontologies Source Code of the Business Model Innovation Case Ontology.

6.3.3.1   Merging of the business model and business innovation case ontologies

To perform a business innovation, specific resources are required (Löfsten, 2016). Lendel et al. (2015) state that the goal of business innovations is to generate internal and external (customer or third parties) benefits. Also, the individual parties represent key partners from the business model point of view. Such overlapping and closely related elements made it clear that the connection, and thus a merger of the two ontologies, is beneficial.

The bridge ontology resulting from the merged business innovation case ontology and business model ontology is shown in Figure 62. A larger and more readable depiction of Figure 62 can be found in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Overview of the Business Model Innovation Case Ontology.
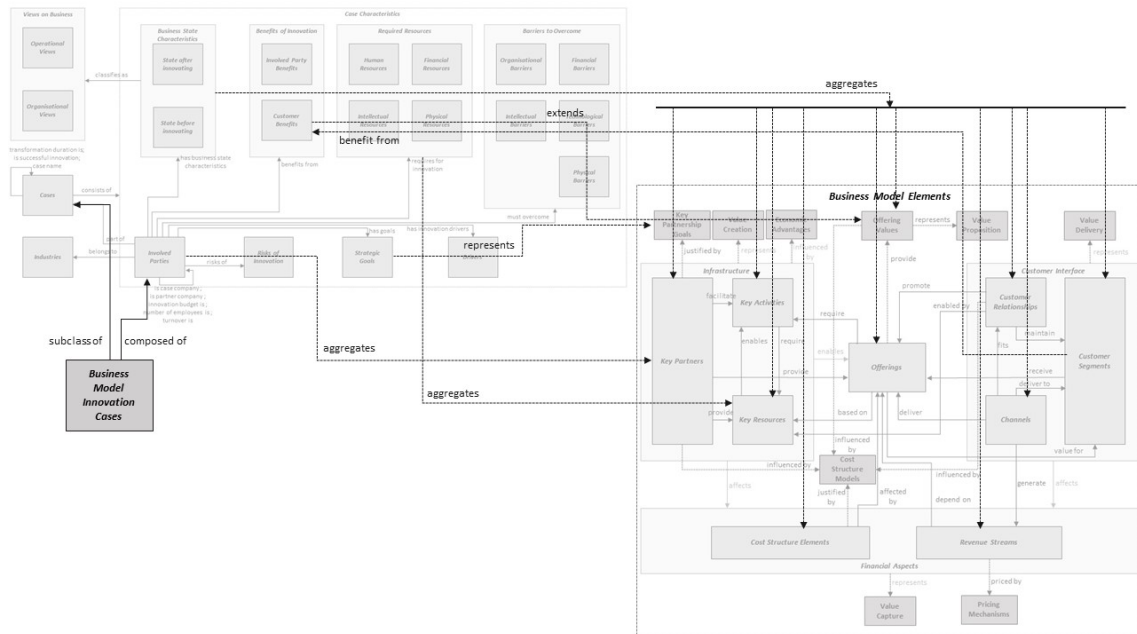
Figure 62: Overview of the business model innovation case ontology regarding the connection between the business model ontology and the business innovation case ontology

Table 181 describes the 16 bridge relations to connect the business innovation case ontology with the business model ontology.

Table 181: Description of the properties to merge the business innovation case and business model ontologies

Domain class	Relation property	Range class	Description
BusinessModel InnovationCases	subclass of	Cases	The ontology business innovation case is developed as an ontology for any kind of business innovation, such as product innovation. However, since this bridge ontology focuses on a specific kind of business innovation, business model innovation, it is necessary to specify the subclass BusinessModelInnovationCases of the class Cases to map the business innovation cases accordingly.
BusinessModel InnovationCases	composedOf	InvolvedParties	Business model innovation cases consist of parties, such as organizations or individuals. Without parties, a business model innovation case could not succeed.

InvolvedParties	aggregates	KeyPartners	Involved parties of a business model innovation case are often represented as key partners within the business model. Nevertheless, not every involved party needs to be a key partner and vice versa.
StrategicGoals	represents	KeyPartnership Goals	Since involved parties can be key partners, the strategic goals of an involved party represent the key partnership goals of a key partner.
RequiredResources	aggregates	KeyResources	The same key resources an organization has can be relevant for the success of a business model innovation case, and thus, required resources combine key resources.
CustomerSegments	benefitFrom	CustomerBenefits	A business model innovation case usually reveals a customer benefit. Since the customers targeted within the business model innovation case are represented within the business model's customer segments, the customer segment benefits from the identified customer benefits of the business model innovation case.
CustomerBenefits	extends	OfferingValues	The customer benefits of a business model innovation case extend the specified values of the business model's offering since customer benefits not only focus on offering values but also values for the customer.
BusinessState Characteristics	aggregates	Channels	The class business state characteristics specific for a business model innovation case represent the involved parties' business model before and after the transformation. Therefore, in this case, the class business state characteristics combines the main elements of a business model: the channels, cost structure elements, customer relationships, customer segments, key activities, key partners, key resources, offerings, offering values, and revenue streams.
BusinessState Characteristics	aggregates	CostStructure Elements	
BusinessState Characteristics	aggregates	Customer Relationships	
BusinessState Characteristics	aggregates	Customer Segments	
BusinessState Characteristics	aggregates	KeyActivities	
BusinessState Characteristics	aggregates	KeyPartners	
BusinessState Characteristics	aggregates	KeyResources	
BusinessState Characteristics	aggregates	Offerings	
BusinessState Characteristics	aggregates	OfferingValues	

BusinessState Characteristics	aggregates	RevenueStreams	

6.3.3.2   Merging of the enterprise architecture and business innovation case ontologies

To use ArchiMate as an enterprise architecture representation model to model a business innovation case is reasonable, yet, Gomes et al. (2019) stated, ArchiMate's metamodel should be extended to provide a higher detailed representation for business innovation cases. Thus, this research developed a business innovation case ontology and a bridge ontology to merge that ontology with the ontological representation of ArchiMate's metamodel since both domains have several related elements.

The bridge ontology resulting from the merged business innovation case ontology and enterprise architecture ontology is shown in Figure 63.
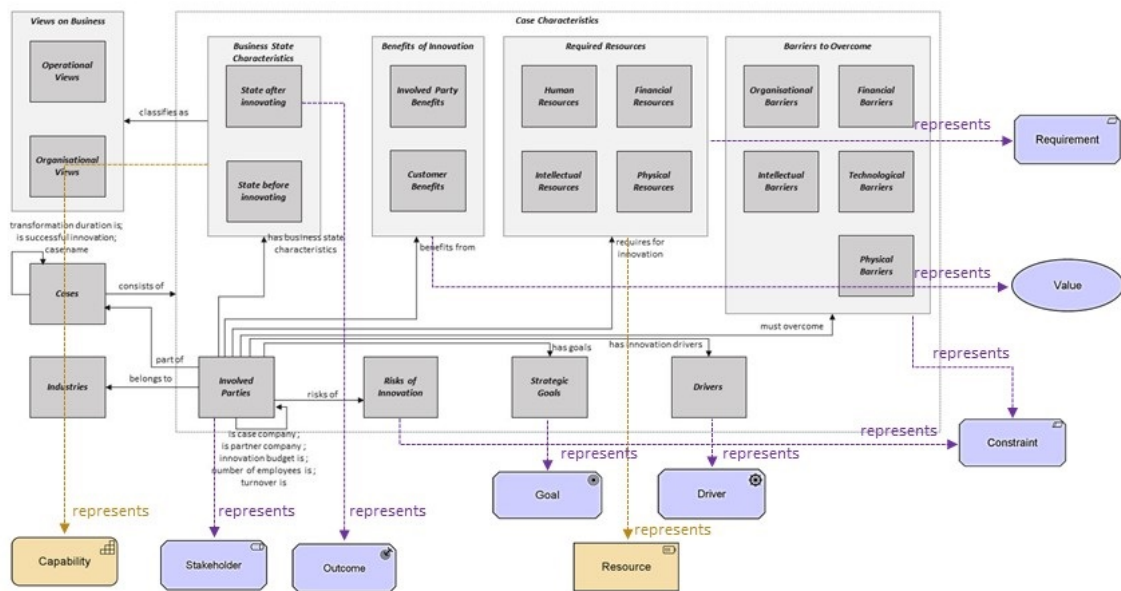
Figure 63: Overview of the business model innovation case ontology regarding the connection between ArchiMate and the business innovation case ontology

Table 182 describes the ten bridge relations to connect the business innovation case ontology with the enterprise architecture ontology.

Table 182: Description of the properties to merge the business innovation case ontology with ArchiMate

Domain class	Relation property	Range class	Description
BusinessState Characteristics	represents	Capability	A business innovation case has characteristics regarding its business state, which can be seen as the involved party's business abilities. According to ArchiMate's language, this would be represented as a capability of the strategy layer since a capability represents, among other things, an ability of a business.
InvolvedParties	represents	Stakeholder	Involved parties of a business innovation case are third parties or individuals, just like the concept of a stakeholder.
StateAfterInnovating	represents	Outcome	The state after innovating represents an end result of the business innovation case after the business's transformation, and thus, it is an outcome of the business innovation case.
RisksOfInnovation	represents	Constraint	Risks of the innovation limit the realization of successful business innovation, and therefore, risks are constraints in this case.
StrategicGoals	represents	Goal	A strategic goal is a specific goal regarding a strategic aspect of the business's innovation.
RequiredResources	represents	Resource	Business innovations require specific resources for successful innovation. These required resources can be modeled within ArchiMate as resources within the strategy layer.
Drivers	represent	Driver	Divers represent motivations for the involved parties to participate in the innovation case. The concept of a driver within the ArchiMate language represents as well motivations of an organization to achieve its goals, such as successful business innovation.
BarriersToOvercome	represents	Constraint	Business innovation cases usually have barriers which they need to overcome to be successful, and therefore, they represent limitations of the business, which can be modeled as constraints, which need to be overcome.
BenefitsOfInnovation	represents	Value	Business innovations come along with benefits for different parties. Benefits can be represented as a value since both represent a relative worth of the concept, which in this case is the business innovation itself.
RequiredRessources	represents	Requirement	Since business innovations require specific resources for successful innovation, they represent requirements that need to be achieved for successful innovation.

6.3.4 The Business Model Innovation Case with Industry Specifics Ontology

The business model innovation case ontology is a generic ontology applicable to any industry. Nevertheless, industries have individual characteristics that would help to specify knowledge within the ontology further. Since this research applies the business innovation case ontology on the construction industry's specific domain, an ontology for the specifics of that industry was developed, as described in Sub-chapter 6.2.5. A bridge ontology, called business model innovation case with industry specifics ontology, was created to integrate the construction industry-specific ontology into the generic business model innovation case ontology. Additional ontologies of other industries with their specifics could be imported into that bridge ontology in the future to provide more industry-specific characterizations within the business model innovation case ontology.

The following sub-chapters describe the merger of the business innovation case ontology with the construction industry specifics ontology. Since the business innovation case ontology is a bridge ontology consisting of several ontologies, the first sub-chapter describes the merger of the business model & business innovation case ontologies with the construction industry specifics ontology, and the second sub-chapter the merger of the business innovation case & enterprise architecture ontology with the construction industry specifics ontology. The source code for the implemented business model innovation case with industry specifics ontology is shown in Appendix-B: Source Code of the Developed Ontologies Source Code of the Business Model Innovation Case with Industry Specifics Ontology.

6.3.4.1 Merging of the business model & business innovation case ontologies and the construction industry specifics ontology

The construction industry specifics ontology specifies, for example, the types of stakeholders, such as architecture or engineering. These stakeholder types can further classify a customer segment and are in itself a specialization of the class industry for the instance *Construction*. Such relations demonstrate how the construction industry specifics ontology has relations towards the business model as well as the business innovation case ontologies. Thus, this research developed a bridge ontology to bring the different domains together.

The bridge ontology resulting from the merged business model & business innovation case ontologies and the construction industry specifics ontology is shown in Figure 64. A larger and more readable depiction of Figure 64 can be found in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Overview of the Business Model Innovation Case with Industry Specifics Ontology.
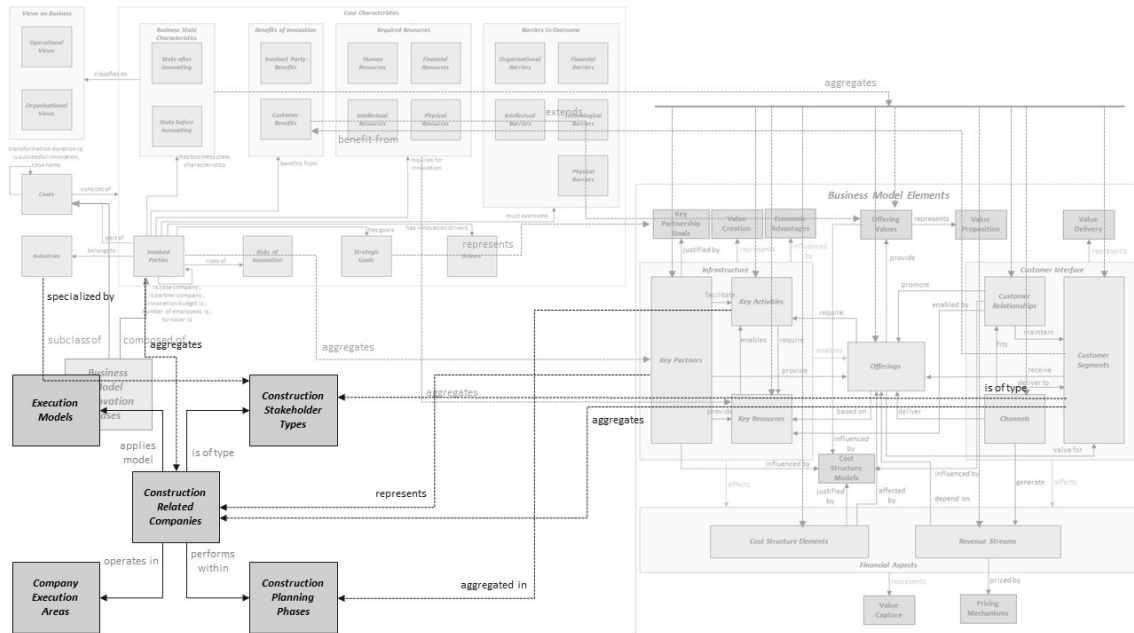
Figure 64: Overview of the business model innovation case with industry specifics ontology regarding the connection between the business model ontology, the business innovation case ontology, and the construction industry specifics ontology

Table 183 describes the six bridge relations to connect the business model & business innovation case ontologies with the construction industry specifics ontology.

Table 183: Description of the properties to merge the business innovation case & business model ontology with the construction industry specifics ontology

Domain class	Relation property	Range class	Description
Industries	specializedBy	Construction StakeholderTypes	The construction sector has specific stakeholder types. The business innovation case ontology has the specification of industries and within the instance *Construction*, the class construction stakeholder types is a specialization of that instance.
InvolvedParties	aggregates	Construction RelatedCompanies	A business innovation case has involved parties, and if the case is related to the construction sector, most of the involved parties are part of the construction-related companies.

CustomerSegments	aggregates	Construction RelatedCompanies	Similar to the concept of involved parties aggregate construction-related companies, customer segments aggregate as well construction-related companies as the customer segment can be a company from the construction sector, such as a contractor's customer segment are building engineers.
CustomerSegments	isOfType	Construction StakeholderTypes	Since construction stakeholder types specify the kind of stakeholders there typically are for a construction business, the customer segments of their business can be of such a type, like the building user is a customer segment for an architecture firm.
KeyActivities	aggregatedIn	Construction PlanningPhases	Construction planning phases represent activities performed for the construction of something, and thus, they combine key activities of the construction company's business model.
KeyPartners	represents	Construction RelatedCompanies	Key partners are third parties essential for the success of a company's business model and if that company is a construction company, several key partners usually are construction-related companies.

6.3.4.2   *Merging of the enterprise architecture ontology and the construction industry specifics ontology*

The construction industry specifics ontology includes the class of construction-related companies. Since that class represents stakeholders, a connection between ArchiMate's stakeholder element and the class construction-related companies of the construction industry specifics ontology can be concluded. Such a relation demonstrates how the construction industry specifics ontology has relations towards the domain of enterprise architecture. Thus, this research developed a bridge ontology to bring both domains together.

The bridge ontology resulting from the merged enterprise architecture ontology and the construction industry specifics ontology is shown in Figure 65. A larger and more readable depiction of Figure 65 can be found in Appendix-A: Detailed Snapshots of the Ontology within the Sub-chapter Overview of the Business Model Innovation Case with Industry Specifics Ontology.
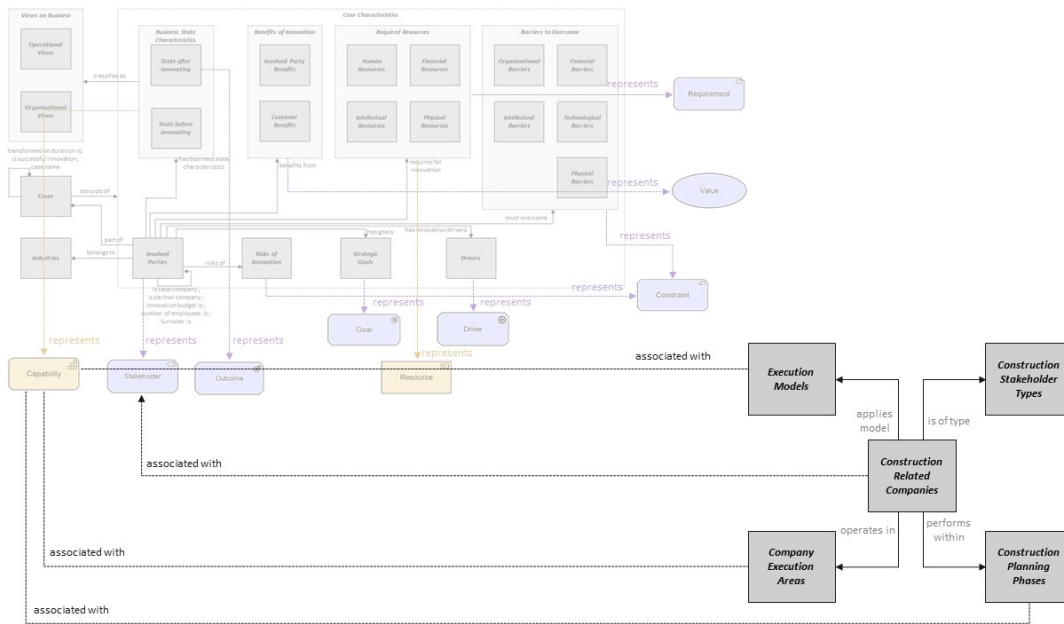
Figure 65: Overview of the business model innovation case with industry specifics ontology regarding the connection between the enterprise architecture ontology and the construction industry specifics ontology

Table 184 describes the four bridge relations to connect the enterprise architecture ontology with the construction industry specifics ontology.

Table 184: Description of the properties to merge the enterprise architecture ontology with the construction industry specifics ontology

Domain class	Relation property	Range class	Description
ExecutionModels	associatedWith	Capability	A construction company performs their building projects using specific execution models and since it is not simple to change such execution models, for example, specific technologies are required for specific execution models, it becomes a capability of a company to have the ability to perform such construction projects.
CompanyExecution Areas	associatedWith	Capability	For a construction company to have the ability to execute construction projects in different areas, such as in a city, is an ability worth mentioning of the company.
Construction PlanningPhases	associatedWith	Capability	Construction companies specialize their activities to support specific phases of a construction project, and thus, they have specific abilities for specific phases of the construction planning.

Construction RelatedCompanies	associatedWith	Stakeholder	Companies of the construction sector are organizations, and thus, can be modeled as stakeholders within ArchiMate's modeling language.

6.4   Summary and Conclusion

This chapter introduced the developed business model innovation case ontology with its extension for construction industry specifics. The business model innovation case ontology consists of the four individual ontologies business capability, business model, enterprise architecture, and business innovation case. In order to merge these ontologies, three bridge ontologies have been developed. First, a bridge ontology mapping the connections between the business capability ontology and the business model ontology is developed. Second, this bridge ontology is merged with the enterprise ontology to create a new bridge ontology called business model & enterprise architecture ontology. Third, this bridge ontology is merged with the ontology business innovation case to include the concept of business innovation cases into the concepts of the business model and enterprise architecture. Last, the bridge ontology business model innovation case ontology is merged with the construction industry specifics ontology to include characteristics of the industry sector for business model innovation cases.

The ontology development method by Noy and McGuinness (2001) suggests reusing existing ontologies if possible. Thus, for the development of the business model ontology, the concept of the Business Model Canvas by Osterwalder and Pigneur (2010) is used which has been modeled as an ontology by different researchers (Caetano et al., 2017; Iacob et al., 2014; Meertens et al., 2012; Osterwalder, 2004). This research extends the proposed ontology of a business model with other concepts, such as the quadruple helix model for structuring ecosystems or networks (Carayannis & Campbell, 2009; Schütz et al., 2018) for the concept of key partners, as they form the partner network for the business. By adding further concepts, the business model ontology becomes more detailed so that business models can be specified in more detail, and thus, the ontology provides increased reasoning capability.

The well-known framework and model from ArchiMate in version 3.1 is incorporated to develop the enterprise architecture ontology. There exists an enterprise architecture ontology called ArchiMEO (Hinkelmann et al., 2020), which is based on the ArchiMate version 2.0 model language. Therefore, I reused this ontology and extended it with the strategy layer and the motivation aspect for enterprise architecture of ArchiMate's version 3.1, which were not yet part of version 2.0 but are necessary for the modeling of business model innovation cases since such

cases are mainly strategy-driven and contain several motivation elements to justify the implementation of business model innovations.

The ontologies business capability, business innovation case, and construction industry specifics are developed from scratch based on literature reviews and interviews. The business innovation case ontology, similar to the business model ontology, can be used as an extension of the enterprise architecture, which is of interest to enterprise architects. Transformation managers are the leading target group for the business innovation case ontology. They are usually not familiar with enterprise architecture languages, such as ArchiMate. Therefore, the ontology needs to be easy to interpret. The construction industry specifics ontology provides evidence that each sector has specific characteristics that can extend the generic business model innovation case ontology. Also, it shows that such specific characteristics can simply be extended of the business model innovation case ontology by modeling the characteristics individually and importing them into the bridge ontology business model innovation case with industry specifics by creating the connections between the newly developed industry ontology and the business model innovation case ontology.

7. Matching Method

This chapter addresses the fourth research question: How can different business model innovation cases be matched to retrieve appropriate business model innovation suggestions? As explained in Sub-chapter 3.5.2, this chapter contributes to the design science research approach's development phase.

Sub-chapter 7.1 introduces the concept applied for this research to match business model innovation cases with user inputs. Two matching methods are applied for that goal: a binary matching method and a case-based reasoning matching method. Sub-chapter 7.2 summarizes and concludes the two matching methods.

7.1   The Matching Concept

The approach to support business model innovation ideation, as explained in Sub-chapter 5.1.2.1, suggests that a user has two different ways to retrieve business model innovation cases from the case repository.

- The user has the option to reduce the result list of business model innovation cases by filtering it with pre-defined rules, such as showing only cases where a specific sector is not existing. This matching method is used for the filtering service of the business model innovation ideation approach.
- The second option a user has is to retrieve a similarity value for each business model innovation case within the repository according to the user's specific input value, such as the current business model of the user's business, to calculate the similarity between the user input and the case repository. This matching method is used for the similarity-retrieval service of the business model innovation ideation approach.

Figure 66 illustrates the general overview of the matching methods. Both matching methods, the Boolean matching for filtering purposes and the case-based reasoning matching to retrieve recommendations of similar cases, have the same overarching goal, which is to figure out which business model innovation cases meet the user's input data best. The Boolean matching method uses filtering parameters that are applied to the entire business model innovation case repository. To represent the business model innovation cases of the case repository, the cases are specified according to the business model innovation ontology. The other matching option to retrieve recommendations of business model innovation possibilities is based on a similarity function for

ontology-based case-based reasoning. This function is applied to the business model innovation case repository to retrieve the value for each case on how similar it is to the user's input. For this matching method to work, the different ontologies similarity ontology, case model ontology, case-based reasoning ontology, and business model innovation ontology are required.

The following sub-chapters describe the function of both matching methods in more detail.
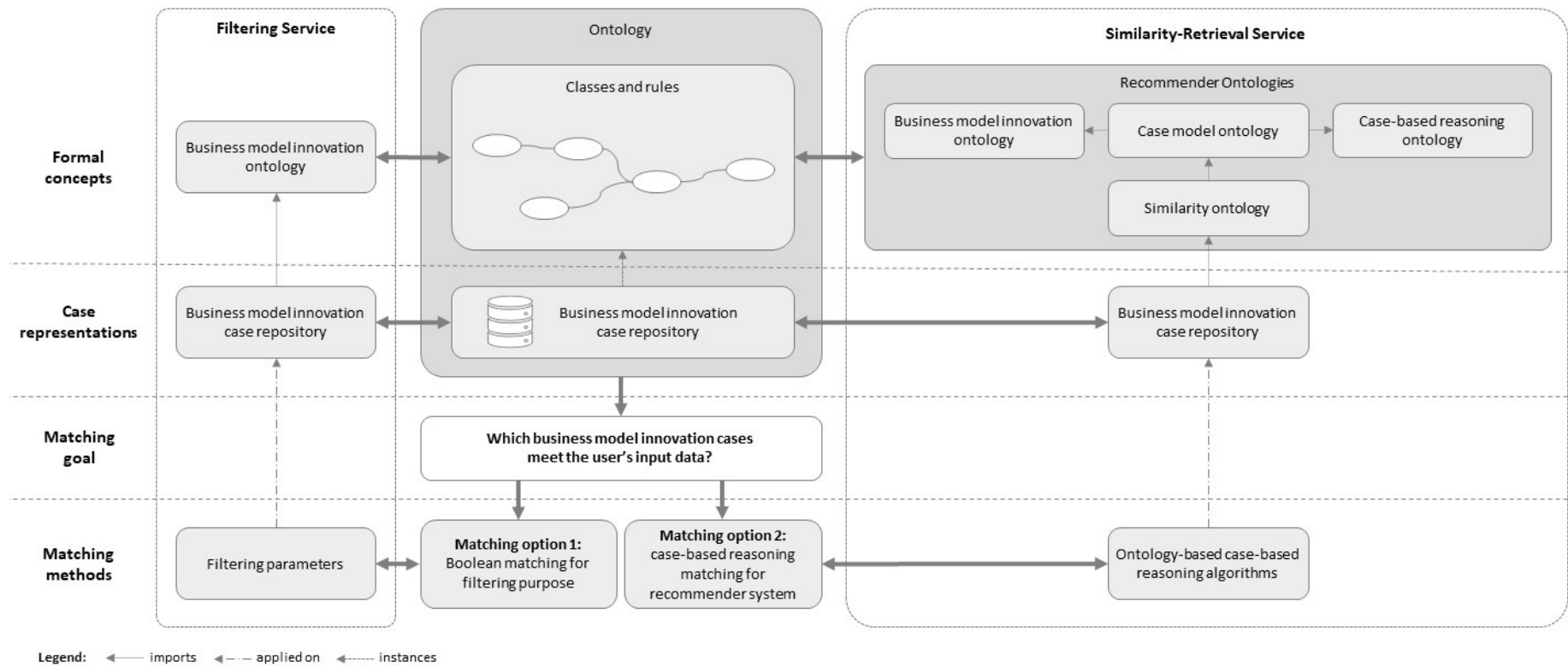
Figure 66: Overview of the matching methods

7.1.1 Boolean Matching Method

The suggested approach to support business model innovation ideation requires a Boolean matching functionality. A Boolean function can have the logical operators AND, NOT, OR, and XOR (Zadegan et al., 2015). Thus, the output is always binary: either 0 or 1, which is the equivalent of a false or true statement (Zadegan et al., 2015). Such an output best matches the requirement to have a filtering function to provide only business model innovation cases relevant from a user's point of view. Otherwise, the user would receive all business model innovation cases stored within the repository, which would take the user much time to go through all the cases.

Since this research uses an ontology-based approach and the data within the ontology is specified using the RDF format primarily, the RDF-based query language SPARQL was selected to perform the Boolean matchings. The reason to select SPARQL is that Sirin and Parsia (2007) and Pivert et al. (2016) mentioned that SPARQL is well suited to query RDF-based databases and applies Boolean logic. SPARQL achieves a Boolean functionality through the FILTER expression (Polleres, 2007).

To demonstrate the Boolean matching method, an example of the filtering service is provided. For this purpose, we assume that a user starts the business model innovation case explorer to retrieve all the cases that are not interlinked with the construction sector. Such a filtering query makes sense, for example, if the user wants to look for business model innovation ideas from other sectors to integrate them into the construction sector and thus, be the first business to have such a business model innovation in the construction sector.

The required classes of the business model innovation ontology to perform the simple example of the user's filtering parameter are illustrated in green in Figure 67.

The SPARQL-based query to perform the filtering of the example is as follows:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_belongsTo_Industry ?Industry.
?Industry rdfs:label ?IndustryName.
FILTER (
?Case = ?InvolvedPartyCase &&
!regex(?IndustryName, "Construction")
)}
```
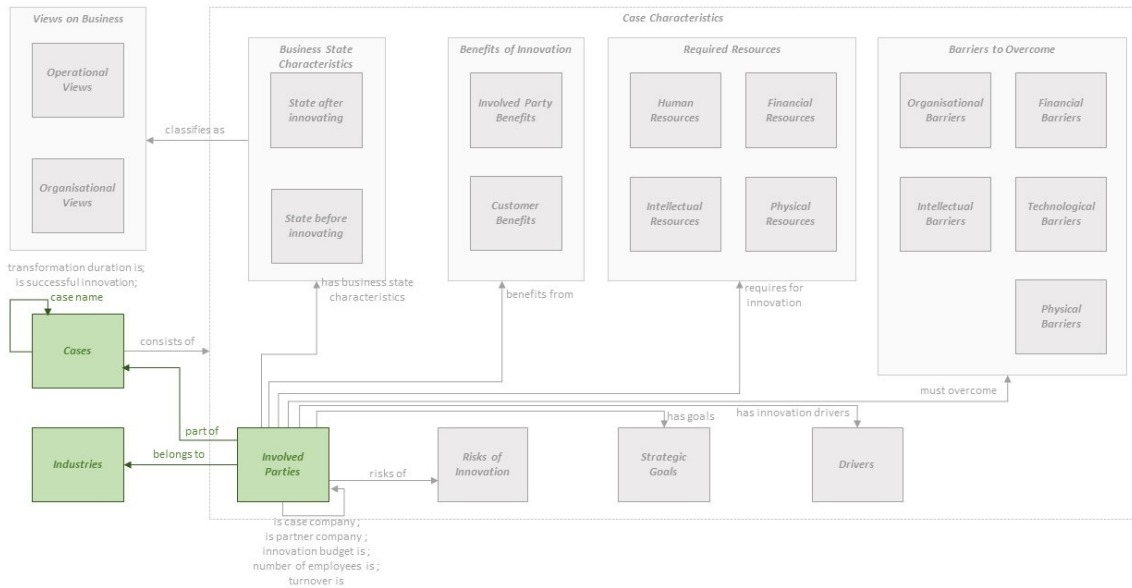
Figure 67: The required classes and properties of the business model innovation ontology to perform the user's filtering example

This query retrieves the case name of all the cases where the involved party does not belong to the construction industry. All possible industry names are stored as instances within the class *Industries,* of which one is the instance *Construction*.

7.1.2   Case-based Reasoning Matching Method

Managers require support during the decision-making process to explore business model innovation ideas (Frankenberger et al., 2013; Geissdoerfer et al., 2017; Osterwalder et al., 2005). For this purpose, a more human-like decision-making process that results in suggestions of best matching results and not in- or exclusions of cases is suggested. As Bezděk (2014) states, Boolean logic cannot support such functionality while a fuzzy logic approach can simulate a human-like decision-making process. Further, business model innovation processes often have a fuzzy approach during the ideation phase (Winterhalter et al., 2017). Such an approach can provide a selection of possible relevant cases to create a new business model based on that selection of business model innovation cases. This research applies the ICEBERG system (Martin, 2016), as it combines an ontology-based reasoning with case-based reasoning. It has been applied successfully with the enterprise ontology ArchiMEO (Martin, 2016).

ICEBERG uses a case-based reasoning approach, as illustrated in Figure 68. First, a user, such as a transformation manager, has to provide the data for the case query to be performed to retrieve a ranked list of the cases from the case repository (Martin, 2016). The system provides a form to enter the input data for the case query that differs based on the selected concern by the user. Second, the provided query case by the user is compared with the different characterizations of the cases within the case repository (Martin, 2016). The outcome is a list ranked by the similarity

of the query case to the repository's case (Martin, 2016). The similarity value is calculated to be between 0 and 1 (Martin, 2016).
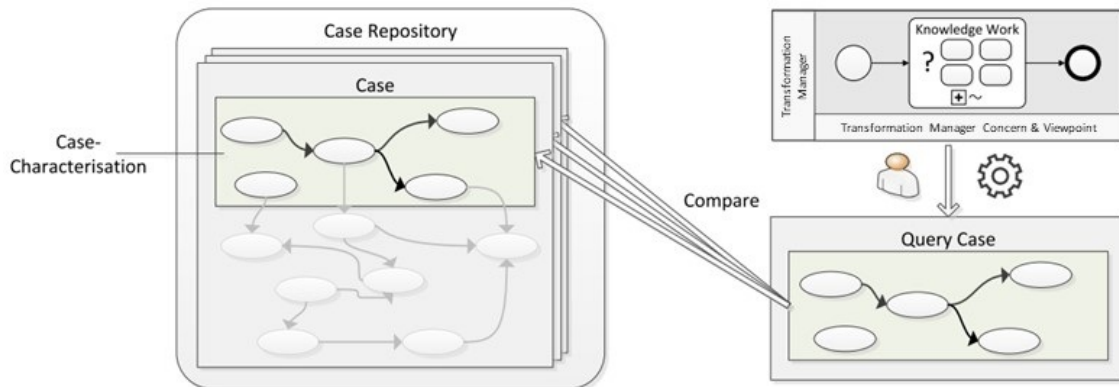
Figure 68: Case-based reasoning approach (adapted from Martin, 2016)

As Martin (2016) describes, the ICEBERG approach compares the instances and relations of the query case with the cases of the case repository. The computation of that comparison is done by a similarity function of the ICEBERG system. Martin (2016) explains that a global-local principle is applied, which means that the global similarities are specified on a class level while the local similarities are specified on an attribute level. This leads to an individually specified similarity function for the attributes of the class instances (Martin, 2016). According to the author, all local similarity values are being aggregated into a global similarity value. Further, all attributes have individual weights defined individually for each implemented case view (Martin, 2016).

The similarity function is modeled within ICEBERG using a dedicated developed similarity ontology (Martin, 2016). Since ICEBERG applies the global-local principle, different similarity functions are implemented for the global and the local similarity functions (Martin, 2016). The local similarity functions implemented into ICEBERG by Martin (2016) are the following:

- Equals: this function represents a Boolean function where the input value has to match the case's value strictly.
- Levenshtein: according to Martin (2016), this function represents "…a recursive field matching algorithm using Levenshtein edit-distance (Cunningham, 2009), which is the amount of edit operations required when changing one string into another."
- Jaro-Winkler: according to Martin (2016), this function represents a "…token-matching function, which is not based on edit-distance, [but] performs well for short strings (Cohen et al., 2003)."
- SoftTFIDF: according to Martin (2016), this function represents "…a TFIDF-based distance metric, which is extended with "soft" token-matching (Cohen et al., 2003)."

TFIDF stands for Term Frequency Inverse Document Frequency and is an algorithm to determine documents that best match certain words through a query (Ramos, 2003).

As this research requires to have the local similarity to lower the value for cases that do not match certain inputs, such as if the provided industry instance should not be part of the results, a fifth local similarity function, the unequals similarity function, is required.

- Unequals: this function represents a Boolean function where the input value must strictly not match the case's value.

Therefore, this new local similarity function has led to an adaption of the current similarity ontology of ICEBERG by extending it with this fifth local similarity function.

The five available local similarity functions, implemented within the similarity ontology and application details described in Sub-chapter 8.2.1.3, are shown in the following code snippet of the similarity ontology. As mentioned before, each case view can have different weights for the attributes. This local similarity function can be assigned to classes in two ways. Either as a `sim:AnnotationPropertySimilarity` to consider the annotations of the classes for inclusion into the similarity calculation or as a `sim:DatatypePropertySimilarity` to consider the property attached to a class for inclusion into the similarity calculation if the property is a datatype property (Martin, 2016).

```
sim:localSimilarityFunction
  rdf:type owl:ObjectProperty ;
  rdfs:domain [
      rdf:type owl:Class ;
      owl:unionOf (
          sim:AnnotationPropertySimilarity
          sim:DatatypePropertySimilarity
        ) ;
    ] ;
  rdfs:range [
      rdf:type owl:Class ;
      owl:oneOf (
          sim:equals
          sim:levenshtein
          sim:jaroWinkler
          sim:softTFIDF
          sim:unequals
        ) ;
    ] ;
  rdfs:subPropertyOf sim:similarityFunction ;
.
```

As mentioned, all local similarity values are being aggregated into a global similarity value. To calculate that global similarity value, there are the following three global similarity functions that have been implemented into ICEBERG by Martin (2016):

- Average: this function represents the weighted arithmetic mean of the local similarity values.

- Probabilistic: according to Martin (2016), this function is based on the research results from Witschel et al. (2015), stating that local similarities are aggregated more conjunctively than with other functions to calculate the global similarity.

- Cosine: according to Martin (2016), this function is based on the research results from Hefke et al. (2006).

The three available global similarity functions, implemented within the similarity ontology and application details described in Sub-chapter 8.2.1.3, are shown in the following code snippet of the similarity ontology. The global similarity functions can be assigned to properties through `sim:ObjectPropertySimilarity`. This allows calculating the global similarity value by taking into account the different instances and the local similarity values (Martin, 2016).

```
sim:globalSimilarityFunction
  rdf:type owl:ObjectProperty ;
  rdfs:domain [
      rdf:type owl:Class ;
      owl:unionOf (
          sim:ObjectPropertySimilarity
          sim:RootCaseClassSimilarity
        ) ;
    ] ;
  rdfs:range [
      rdf:type owl:Class ;
      owl:oneOf (
          sim:average
          sim:probabilistic
          sim:cosine
        ) ;
    ] ;
  rdfs:subPropertyOf sim:similarityFunction ;
.
```

For the ICEBERG tool to know where to start the similarity calculation, the top-level class needs to be provided. This is achieved by assigning the root similarity, the `sim:RootCaseClassSimilarity`, to the start case class. For the business model innovation ideation extension of the ICEBERG, the start case class is the class `bmic:BusinessModelInnovationCases`.

This class of the bridge ontology business model innovation case is described in Sub-chapter 6.3.3.1. The following code snippet from the business model innovation case similarity ontology shows exemplary how the root similarity is assigned to the case class.

```
bmic:BusinessModelInnovationCases
  sim:similarity bmiciscsm:simCS_Cases_BMIPossibilitiesView ;
.
bmiciscsm:simCS_Cases_BMIPossibilitiesView
  rdf:type sim:RootCaseClassSimilarity ;
  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
  sim:globalSimilarityFunction sim:average ;
  rdfs:label "RootCaseClassSimiliarity Cases for BMIPossibilitiesView"@en ;
.
```

7.2   Summary and Conclusion

This chapter describes how this research's business model innovation ideation approach matches the user's input data with the cases within the case repository. There are two matching options available. The first one, a Boolean matching method for filtering the case repository for in- or exclusion, allows filtering the case repository to reduce the result list to a clear list of cases. The second one, a case-based reasoning matching method, applies a fuzzy approach by calculating similarity measures to provide insight into how similar the user's input data is compared to the cases within the case repository.

Both matching methods are necessary to achieve the suggested approach to support business model innovation ideation, as described in Sub-chapter 5.1.2. Further, the benefit of using the existing ontology-based case-based reasoning tool ICEBERG for the second matching option is given since it is a proven approach for a successful matching of complex case queries that can be retrieved on a fuzzy-logic approach.

8. Matching of Business Model Innovation Cases

This chapter addresses the fifth research question: How can the suggested ontology-aided approach for the ideation phase of business model innovation be implemented to retrieve business model innovation suggestions? As explained in Sub-chapter 3.5.2, this chapter contributes to the design science research approach's development phase.

While Chapter 6 introduces the domain ontology for structuring business model innovation cases and Chapter 7 provides insights regarding the approach to match the user input with the business model innovation case repository, this chapter shows how the two matching methods can be applied using the developed ontology to support the ideation process for business model innovation.

Sub-chapter 8.1 introduces how the Boolean matching method is applied to the business model innovation cases using the developed SPARQL queries. Sub-chapter 8.2 introduces how the case-based reasoning matching method is applied to the business model innovation cases using the ICEBERG tool. This chapter ends with a summary and conclusion of the business model innovation case matching.

8.1 Boolean Matching of Business Model Innovation Cases

As introduced in Sub-chapter 7.1, this research developed two matching methods for retrieving cases for business model innovation. The Boolean matching method is used to provide the users with a filtering service to shrink the list of business model innovation cases to a set of cases that match specific criteria of the user. This chapter aims to describe how the different filtering services match with the developed competency questions and sub-questions to create the business model innovation case ontology, as described in Sub-chapter 6.1.2. Further, for each competency sub-question, the filtering parameters are provided to answer the filtering service questions. Thus, this chapter provides the information to implement the Boolean matching method to filter business model innovation cases based on the accordingly developed ontology.

8.1.1 Filtering Service Relation Towards the Competency Questions

Sub-chapter 6.1.2 introduced the competency questions and sub-questions as part of the first step of the ontology development process by Noy and McGuinness (2001) to specify the domain and scope of the ontology. Based on the competency sub-questions, questions that should be answered through the filtering service were developed. The questions for the filtering service were developed, applying two types of questions to filter the case repository. Either the case repository gets filtered by applying a full-text search on a class within the ontology, or the case repository gets filtered based on specific class characteristics, specified as sub-classes.

Filter based on a full-text search of a class

Each class of the business model innovation case ontology related to the domain of the competency sub-question is included within the filtering service. Since cases consist of instances and attributes related to the classes and properties of the ontology, these instances and attributes can be searched. For example, the competency sub-question "Which are the involved parties of the represented business model innovation case?" has three questions to be answered by the filtering service. One of them is the question of which business model innovation cases do have a specific involved party included. Thus, the filtering service was implemented to be searched by the involved parties of a business model innovation case based on a user's input of a *string*, such as to search for the involved parties named *Losinger*.

Filter based on sub-classes

If a class within the domain ontology of the competency question consists of sub-classes, these sub-classes are seen as specific types of the class that can be filtered by. For example, the competency sub-question "Which are the infrastructure properties of a business model innovation case?" has eight questions to be answered by the filtering service. Since the class *key partner* has the four sub-classes *academic institute, business, government,* and *individual*, the filtering service provides the capability to filter the case repository for either one of the four sub-classes. The benefit for a user to get a filtering service of the sub-classes is that the user gets the capability to shrink the result list based on pre-defined domain characteristics. This enables the user to receive business model innovation cases that include specific types of instances or attributes.

A similar filtering service is often seen within online shops. Usually, online shops provide the users with a full-text search and a filter functionality so they can specify what kind of products they want to see. For example, they can decide to only see products within a specific segment, such as snowboards within the segment of winter sport. Thus, the user does not have to browse

all the business model innovation cases, or in this case, the products, but can filter out all the cases/products the user does not want to see included in the results list.

The developed questions for the filtering service mapped to the competency questions and sub-questions are listed in Table 185.

Table 185: Overview of the competency questions mapped with the filtering service questions

Competency question	Competency sub-question	Question for the filtering service
What business model properties are of interest for a business model innovation case?	Which are the **infrastructure properties** of a business model innovation case?	Which business model innovation cases have a specific key partner type?
		Which business model innovation cases have a specific key partner?
		Which business model innovation cases have a specific key activity type?
		Which business model innovation cases have a specific key activity?
		Which business model innovation cases have a specific key resource type?
		Which business model innovation cases have a specific key resource?
		Which business model innovation cases have a specific key partnership goal?
		Which business model innovation cases have a specific economic advantage?
	Which are the **customer interaction properties** of a business model innovation case?	Which business model innovation cases have a specific channel type?
		Which business model innovation cases have a specific channel?
		Which business model innovation cases have a specific customer relationships type?
		Which business model innovation cases have a specific customer relationship?
		Which business model innovation cases have a specific customer segments type?
		Which business model innovation cases have a specific customer segment?
	Which are the **offering properties** of a business model innovation case?	Which business model innovation cases have a specific offering value type?
		Which business model innovation cases have a specific offering value?

		Which business model innovation cases have a specific offerings type?
		Which business model innovation cases have a specific offering?
	Which are the **financial properties** of a business model innovation case?	Which business model innovation cases have a specific cost structure model?
		Which business model innovation cases have a specific cost structure elements type?
		Which business model innovation cases have a specific cost structure element?
		Which business model innovation cases have a specific revenue streams type?
		Which business model innovation cases have a specific revenue stream?
		Which business model innovation cases have a specific pricing mechanism type?
		Which business model innovation cases have a specific pricing mechanism?
What business innovation transformation properties are of interest for a business model innovation case?	Which are the **involved parties** of the represented business model innovation case?	Which business model innovation cases have a specific involved party?
		Which business model innovation cases have a specific case company?
		Which business model innovation cases have a specific partner company?
	To which **sectors** do the involved parties belong?	Which business model innovation cases have a specific sector?
		Which business model innovation cases have not a specific sector?
	Which are the **motives** of the involved parties to change?	Which business model innovation cases have a specific driver?
		Which business model innovation cases have a specific strategic goal?
	Which **challenges** did occur during the transformation?	Which business model innovation cases have a specific barrier to overcome type?
		Which business model innovation cases have a specific barrier to overcome?
		Which business model innovation cases have a specific risk?
		Which business model innovation cases have a specific benefits type?

	Which are the **results** from the transformation of the business model?	Which business model innovation cases have a specific benefit?
	Which **resources** are **required** to achieve the business model innovation?	Which business model innovation cases have a specific required resources type?
		Which business model innovation cases have a specifically required resource?
What enterprise architecture properties are of interest for a business model innovation case?	Which are the **motivational properties** of the business model innovation case from an enterprise architecture point of view?	Which business model innovation cases have a specific assessment?
		Which business model innovation cases have a specific constraint?
		Which business model innovation cases have a specific driver?
		Which business model innovation cases have a specific goal?
		Which business model innovation cases have a specific meaning?
		Which business model innovation cases have a specific outcome?
		Which business model innovation cases have a specific principle?
		Which business model innovation cases have a specific requirement?
		Which business model innovation cases have a specific stakeholder?
		Which business model innovation cases have a specific value?
	Which are the **strategic properties** of the business model innovation case from an enterprise architecture point of view?	Which business model innovation cases have a specific capability?
		Which business model innovation cases have a specific course of action?
		Which business model innovation cases have a specific resource?
		Which business model innovation cases have a specific value stream?
	Which are the **business properties** of the business model innovation case from an enterprise architecture point of view?	Which business model innovation cases have a specific business actor?
		Which business model innovation cases have a specific business collaboration?
		Which business model innovation cases have a specific business event?

		Which business model innovation cases have a specific business function?
		Which business model innovation cases have a specific business interaction?
		Which business model innovation cases have a specific business interface?
		Which business model innovation cases have a specific business object?
		Which business model innovation cases have a specific business process?
		Which business model innovation cases have a specific business role?
		Which business model innovation cases have a specific business service?
		Which business model innovation cases have a specific contract?
		Which business model innovation cases have a specific product?
		Which business model innovation cases have a specific representation?
	Which are the **application properties** of the business model innovation case from an enterprise architecture point of view?	Which business model innovation cases have a specific application collaboration?
		Which business model innovation cases have a specific application component?
		Which business model innovation cases have a specific application event?
		Which business model innovation cases have a specific application function?
		Which business model innovation cases have a specific application interaction?
		Which business model innovation cases have a specific application interface?
		Which business model innovation cases have a specific application process?
		Which business model innovation cases have a specific application service?
		Which business model innovation cases have a specific data object?
	Which are the **technological properties** of the business	Which business model innovation cases have a specific artifact?

	model innovation case from an enterprise architecture point of view?	Which business model innovation cases have a specific path?
		Which business model innovation cases have a specific device?
		Which business model innovation cases have a specific technology function?
		Which business model innovation cases have a specific technology interface?
		Which business model innovation cases have a specific technology service?
		Which business model innovation cases have a specific communication network?
		Which business model innovation cases have a specific node?
		Which business model innovation cases have a specific system software?
		Which business model innovation cases have a specific technology collaboration?
		Which business model innovation cases have a specific technology event?
		Which business model innovation cases have a specific technology interaction?
		Which business model innovation cases have a specific technology process?
What business capability properties are of interest for a business model innovation case?	Which are the **resource-based capabilities** of a business?	Which business model innovation cases have a specific resource-based capability?
	Which are the **dynamic capabilities** of a business?	Which business model innovation cases have a specific dynamic capability?
	Which are the **human-based capabilities** of a business?	Which business model innovation cases have a specific human-based capabilities type?
		Which business model innovation cases have a specific human-based capability?
	Which are the **core capabilities** of a business?	Which business model innovation cases have a specific core capability?
What construction industry properties are of interest for a	Which are the **construction-related companies** of a business model innovation case?	Which business model innovation cases have a specific construction-related company?
	Which are the **execution models** of construction-related companies?	Which business model innovation cases have a specific construction execution model?

business model innovation case?	Which are the **stakeholder types** of construction-related companies?	Which business model innovation cases have a specific construction-related stakeholder type?
	Which are the **construction planning phases** of construction-related companies?	Which business model innovation cases have a specific construction planning phase?
	Which are the **execution areas** of construction-related companies?	Which business model innovation cases have a specific construction execution area?

8.1.2 Application of the Filtering Service

The previous sub-chapter introduced the developed questions the filtering service has to answer. This sub-chapter aims at providing the SPARQL queries to deliver the filtered result sets based on the different filtering service questions. As introduces in Sub-chapter 7.1.1, SPARQL is best suited to query RDF-based databases, such as the business model innovation case ontology.

The following sub-chapters are structured based on each of the five competency questions' domain property and provide the queries to answer each filtering service question. For each query, the bold highlighted query part can be replaced as needed by the user. Also, the bold highlighted part of the query can be left empty in order to not include that filtering statement within the filtering service.

8.1.2.1 Filtering of the Business Model Property

The first competency question encompasses properties of the business model ontology. The following sub-chapters reflect the four competency sub-questions based on which the filtering service questions were developed.

8.1.2.1.1 Filtering of the Infrastructure Property

The competency sub-question "Which are the infrastructure properties of a business model innovation case?" consists of eight corresponding filtering service questions comprised of the classes *key partners*, *key activities*, *key resources*, *key partnership goals,* and *economic advantages*.

Key partners

The filtering service provides both options to filter the key partners of a business model innovation case: full-text search on the instances of the class key partners and a filter using key partners' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific key partner type?
- Which business model innovation cases have a specific key partner?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_KeyPartner
s ?KeyPartners.
?KeyPartners rdfs:label ?KeyPartner.
?KeyPartners rdf:type ?KeyPartnerType.
?KeyPartnerType rdfs:label ?KeyPartnerTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?KeyPartner, "Storage", "i") &&
regex(?KeyPartnerTypeName, "Business", "i")
)}
```

This query uses as an example the string *Storage* for applying the full-text search on the instances of the class key partners as well as the string *Business* to retrieve only business model innovation cases that have instances within the key partners' sub-class business.

Key activities

The filtering service provides both options to filter the key activities of a business model innovation case: full-text search on the instances of the class key activities and a filter using key activities' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific key activity type?
- Which business model innovation cases have a specific key activity?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_KeyActivit
ies ?KeyActivities.
```

```
?KeyActivities rdfs:label ?KeyActivity.
?KeyActivities rdf:type ?KeyActivityType.
?KeyActivityType rdfs:label ?KeyActivityTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?KeyActivity, "check", "i") &&
regex(?KeyActivityTypeName, "core process", "i")
)}
```

This query uses as an example the string *check* for applying the full-text search on the instances of the class key activities as well as the string *core process* to retrieve only business model innovation cases that have instances within the key activities' sub-class core process.

Key resources

The filtering service provides both options to filter the key resources of a business model innovation case: full-text search on the instances of the class key resources and a filter using key resources' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific key resource type?
- Which business model innovation cases have a specific key resource?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_KeyResourc
es ?KeyResources.
?KeyResources rdfs:label ?KeyResource.
?KeyResources rdf:type ?KeyResourceType.
?KeyResourceType rdfs:label ?KeyResourceTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?KeyResource, "sales", "i") &&
regex(?KeyResourceTypeName, "human", "i")
)}
```

This query uses as an example the string *sales* for applying the full-text search on the instances of the class key resources as well as the string *human* to retrieve only business model innovation cases that have instances within the key resources' sub-class human.

Key partnership goals

The filtering service provides the option of filtering the key partnership goals of a business model innovation case using a full-text search on the instances of the class key partnership goals. Thus, the following filtering service question is answered:

- Which business model innovation cases have a specific key partnership goal?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_KeyPartner
s ?KeyPartners.
?KeyPartners bm:keyPartners_justifiedBy_KeyPartnershipGoals ?KeyPartnershipGoalTypes.
?KeyPartnershipGoalTypes rdfs:label ?KeyPartnershipGoal.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?KeyPartnershipGoal, "access", "i")
)}
```

This query uses as an example the string *access* for applying the full-text search on the instances of the class key partnership goals to retrieve the matching business model innovation cases.

Economic advantages

The filtering service provides the option of filtering the economic advantages of a business model innovation case using a full-text search on the instances of the class economic advantages. Thus, the following filtering service question is answered:

- Which business model innovation cases have a specific economic advantage?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
```

```
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_KeyPartner
s ?KeyPartners.
?KeyPartners bm:infrastructureParts_influencedBy_EconomicAdvantages ?KeyPartnersEcono
micAdvantages.
?KeyPartnersEconomicAdvantages rdfs:label ?KeyPartnersEconomicAdvantageName.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_KeyActivit
ies ?KeyActivities.
?KeyActivities bm:infrastructureParts_influencedBy_EconomicAdvantages ?KeyActivitiesE
conomicAdvantages.
?KeyActivitiesEconomicAdvantages rdfs:label ?KeyActivitiesEconomicAdvantageName.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_KeyResourc
es ?KeyResources.
?KeyResources bm:infrastructureParts_influencedBy_EconomicAdvantages ?KeyResourcesEco
nomicAdvantages.
?KeyResourcesEconomicAdvantages rdfs:label ?KeyResourcesEconomicAdvantageName.
values ?EconomicAdvantage { "economies of scope" }
FILTER (
?Case = ?InvolvedPartyCase &&
(regex(?KeyPartnersEconomicAdvantageName, ?EconomicAdvantage, "i") ||
regex(?KeyActivitiesEconomicAdvantageName, ?EconomicAdvantage, "i") ||
regex(?KeyResourcesEconomicAdvantageName, ?EconomicAdvantage, "i") )
)}
```

The class economic advantages consist of instances related to other instances, particularly instances from the classes key partners, key activities, or key resources. Thus, these relations of the type object property need to be queried to retrieve the appropriate results. This query uses as an example the string *economies of scope* for applying the full-text search on the relations from the classes key partners, key activities, and key resources towards the class economic advantages to retrieve the matching business model innovation cases.

8.1.2.1.2   *Filtering of the Customer Interaction Property*

The competency sub-question "Which are the customer interaction properties of a business model innovation case?" consists of six associated filtering service questions comprised of the classes *channels, customer relationships,* and *customer segments*.

Channels

The filtering service provides both options to filter the channels of a business model innovation case: full-text search on the instances of the class channels and a filter using channels' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific channel type?
- Which business model innovation cases have a specific channel?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_Channels ?
Channels.
?Channels rdfs:label ?Channel.
?Channels rdf:type ?ChannelsType.
?ChannelsType rdfs:label ?ChannelsTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?Channel, "website", "i") &&
regex(?ChannelsTypeName, "web sale", "i")
)}
```

This query uses as an example the string *website* for applying the full-text search on the instances of the class channels as well as the string *web sale* to retrieve only business model innovation cases that have instances within the channels' sub-class web sale.

Customer Relationships

The filtering service provides both options to filter the customer relationships of a business model innovation case: full-text search on the instances of the class customer relationships and a filter using customer relationships' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific customer relationships type?
- Which business model innovation cases have a specific customer relationship?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_CustomerRe
lationships ?CustomerRelationships.
?CustomerRelationships rdfs:label ?CustomerRelationship.
?CustomerRelationships rdf:type ?CustomerRelationshipsType.
?CustomerRelationshipsType rdfs:label ?CustomerRelationshipsTypeName.
```

```
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?CustomerRelationship, "sales", "i") &&
regex(?CustomerRelationshipsTypeName, "personal assistance", "i")
)}
```

This query uses as an example the string *sales* for applying the full-text search on the instances of the class customer relationships as well as the string *personal assistance* to retrieve only business model innovation cases that have instances within the customer relationships' sub-class personal assistance.

Customer segments

The filtering service provides both options to filter the customer segments of a business model innovation case: full-text search on the instances of the class customer segments and a filter using customer segments' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific customer segments type?
- Which business model innovation cases have a specific customer segment?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_CustomerSe
gments ?CustomerSegments.
?CustomerSegments rdfs:label ?CustomerSegment.
?CustomerSegments rdf:type ?CustomerSegmentsType.
?CustomerSegmentsType rdfs:label ?CustomerSegmentsTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?CustomerSegment, "private", "i")  &&
regex(?CustomerSegmentsTypeName, "segmented market", "i")
)}
```

This query uses as an example the string *private* for applying the full-text search on the instances of the class customer segments as well as the string *segmented market* to retrieve only business model innovation cases that have instances within the customer segments' sub-class segmented market.

8.1.2.1.3   Filtering of the Offering Property

The competency sub-question "Which are the offering properties of a business model innovation case?" consists of four associated filtering service questions comprised of the classes *offering values* and *offerings*.

Offering values

The filtering service provides both options to filter the offering values of a business model innovation case: full-text search on the instances of the class offering values and a filter using offering values' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific offering value type?
- Which business model innovation cases have a specific offering value?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_OfferingVa
lues ?OfferingValues.
?OfferingValues rdfs:label ?OfferingValue.
?OfferingValues rdf:type ?OfferingValuesType.
?OfferingValuesType rdfs:label ?OfferingValuesTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?OfferingValue, "solution", "i") &&
regex(?OfferingValuesTypeName, "convenience", "i")
)}
```

This query uses as an example the string *solution* for applying the full-text search on the instances of the class offering values as well as the string *convenience* to retrieve only business model innovation cases that have instances within the offering values' sub-class convenience.

Offerings

The filtering service provides both options to filter the offerings of a business model innovation case: full-text search on the instances of the class offerings and a filter using offerings' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific offerings type?

- Which business model innovation cases have a specific offering?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_Offerings
?Offerings.
?Offerings rdfs:label ?Offering.
?Offerings rdf:type ?OfferingsType.
?OfferingsType rdfs:label ?OfferingsTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?Offering, "BIM", "i") &&
regex(?OfferingsTypeName, "service", "i")
)}
```

This query uses as an example the string *BIM* for applying the full-text search on the instances of the class offerings as well as the string *service* to retrieve only business model innovation cases that have instances within the offerings' sub-class service.

8.1.2.1.4   Filtering of the Financial Property

The competency sub-question "Which are the financial properties of a business model innovation case?" consists of seven associated filtering service questions comprised of the classes *cost structure models, cost structure elements, revenue streams,* and *pricing mechanisms*.

Cost structure models

The filtering service provides the option of filtering the cost structure models of a business model innovation case using a full-text search on the class cost structure models' instances. Thus, the following filtering service question is answered:

- Which business model innovation cases have a specific cost structure model?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
```

```
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_OfferingVa
lues ?OfferingValues.
?OfferingValues bm:offeringValues_influencedBy_CostStructureModels ?OfferingValuesCos
tStructureModels.
?OfferingValuesCostStructureModels rdfs:label ?OfferingValuesCostStructureModelsName.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_KeyPartner
s ?KeyPartners.
?KeyPartners bm:keyPartners_influencedBy_CostStructureModels ?KeyPartnersCostStructur
eModels.
?KeyPartnersCostStructureModels rdfs:label ?KeyPartnersCostStructureModelsName.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_CostStruct
ureElements ?CostStructureElements.
?CostStructureElements bm:costStructureElements_justifiedBy_CostStructureModels ?Cost
StructureElementsCostStructureModels.
?CostStructureElementsCostStructureModels rdfs:label ?CostStructureElementsCostStruct
ureModelsName.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_CustomerRe
lationships ?CustomerRelationships.
?CustomerRelationships bm:customerRelationships_influencedBy_CostStructureModels ?Cus
tomerRelationshipsCostStructureModels.
?CustomerRelationshipsCostStructureModels rdfs:label ?CustomerRelationshipsCostStruct
ureModelsName.
values ?CostStructureModel { "cost driven" }
FILTER (
?Case = ?InvolvedPartyCase
&&
(regex(?OfferingValuesCostStructureModelsName, ?CostStructureModel, "i") ||
regex(?KeyPartnersCostStructureModelsName, ?CostStructureModel, "i") ||
regex(?CostStructureElementsCostStructureModelsName, ?CostStructureModel, "i") ||
regex(?CustomerRelationshipsCostStructureModelsName, ?CostStructureModel, "i") )
)}
```

The class cost structure models consist of instances related to other instances, particularly instances from the classes offering values, key partners, cost structure elements, and customer relationships. Thus, these relations of the type object property need to be queried to retrieve the appropriate results. This query uses as an example the string *cost driven* for applying the full-text search on the relations from the classes offering values, key partners, cost structure elements, and customer relationships towards the class cost structure models to retrieve the matching business model innovation cases.

Cost structure elements

The filtering service provides both options to filter the cost structure elements of a business model innovation case: full-text search on the instances of the class cost structure elements and a filter using cost structure elements' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific cost structure elements type?
- Which business model innovation cases have a specific cost structure element?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_CostStruct
ureElements ?CostStructureElements.
?CostStructureElements rdfs:label ?CostStructureElement.
?CostStructureElements rdf:type ?CostStructureElementsType.
?CostStructureElementsType rdfs:label ?CostStructureElementsTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?CostStructureElement, "maintenance", "i") &&
regex(?CostStructureElementsTypeName, "variable cost", "i")
)}
```

This query uses as an example the string *maintenance* for applying the full-text search on the instances of the class cost structure elements as well as the string *variable cost* to retrieve only business model innovation cases that have instances within the cost structure elements' sub-class variable cost.

Revenue streams

The filtering service provides both options to filter the revenue streams of a business model innovation case: full-text search on the instances of the class revenue streams and a filter using revenue streams' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific revenue streams type?
- Which business model innovation cases have a specific revenue stream?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_RevenueStr
eams ?RevenueStreams.
?RevenueStreams rdfs:label ?RevenueStream.
?RevenueStreams rdf:type ?RevenueStreamsType.
?RevenueStreamsType rdfs:label ?RevenueStreamsTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?RevenueStream, "fee", "i") &&
regex(?RevenueStreamsTypeName, "lending", "i")
)}
```

This query uses as an example the string *fee* for applying the full-text search on the instances of the class revenue streams as well as the string *lending* to retrieve only business model innovation cases that have instances within the revenue streams' sub-class lending/renting/leasing.

Pricing mechanisms

The filtering service provides both options to filter the pricing mechanisms of a business model innovation case: full-text search on the instances of the class pricing mechanisms and a filter using pricing mechanisms' sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific pricing mechanism type?
- Which business model innovation cases have a specific pricing mechanism?

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateChara
cteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_RevenueStr
eams ?RevenueStreams.
?RevenueStreams bm:revenueStreams_pricedBy_PricingMechanisms ?PricingMechanisms.
?PricingMechanisms rdfs:label ?PricingMechanism.
?PricingMechanisms rdf:type ?PricingMechanismsType.
?PricingMechanismsType rdfs:label ?PricingMechanismsTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
```

```
regex(?PricingMechanism, "negotiation", "i") &&
regex(?PricingMechanismsTypeName, "dynamic pricing", "i")
)}
```

This query uses as an example the string *negotiation* for applying the full-text search on the instances of the class pricing mechanisms as well as the string *dynamic* to retrieve only business model innovation cases that have instances within the pricing mechanisms' sub-class dynamic pricing.

8.1.2.2 Filtering of the Business Transformation Property

The second competency question encompasses properties of the business innovation case ontology. The following sub-chapters reflect the six competency sub-questions based on which the filtering service questions were developed.

8.1.2.2.1 Filtering of the Involved Parties

The competency sub-question "Which are the involved parties of the represented business model innovation case?" consists of three associated filtering service questions:

- Which business model innovation cases have a specific involved party?
- Which business model innovation cases have a specific case company?
- Which business model innovation cases have a specific partner company?

The filtering service provides the option of filtering the involved parties of a business model innovation case using a full-text search on the class involved parties' instances. Further, the attributes, which are datatype properties, of the instances of the class involved parties can be queried as well.

The SPARQL-query to perform this filter service is the following:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParties bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParties rdfs:label ?InvolvedParty.
?InvolvedParties bic:involvedParties_isCaseCompany ?isCaseCompany.
?InvolvedParties bic:involvedParties_isPartnerCompany ?isPartnerCompany.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?InvolvedParty, "Losinger", "i") &&
?isCaseCompany = true &&
?isPartnerCompany = false
)}
```

This query uses as an example the string *Losinger* for applying the full-text search on the instances of the class involved parties to retrieve the requested business model innovation cases. Also, this filter provides the functionality to query the attributes of the involved parties instance, if it is a case company or a partner company of the business model innovation case.

8.1.2.2.2 *Filtering of the Sectors*

The competency sub-question "To which sectors do the involved parties belong to?" consists of two associated filtering service questions comprised of the class *sector*.

Either the user filters for business model innovation cases including a specific sector, such as the sector construction, or they want to explicitly exclude business model innovation cases comprised of a specific sector.

Sector inclusion

The filtering service provides the option of filtering the sectors of a business model innovation case using a full-text search on the instances of the class industries. Thus, the following filtering service question is answered:

- Which business model innovation cases have a specific sector?

The SPARQL-query to perform this filter service is the following:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_belongsTo_Industry ?Industries.
?Industries rdfs:label ?Industry.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?Industry, "Construction", "i")
)}
```

This query uses as an example the string *Construction* for applying the full-text search on the instances of the class industries assigned to the involved parties to retrieve the requested business model innovation cases. Thus, only business model innovation cases are retrieved that consist of an involved party from the construction sector.

Sector exclusion

The filtering service provides the option of filtering out the business model innovation case including a specific sector, using a full-text search on the instances of the class industries. Thus, the following filtering service question is answered:

- Which business model innovation cases have not a specific sector?

The SPARQL-query to perform this filter service is the following:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_belongsTo_Industry ?Industries.
?Industries rdfs:label ?Industry.
FILTER (
?Case = ?InvolvedPartyCase &&
!regex(?Industry, "Construction", "i")
)}
```

This query uses as an example the string *Construction* for applying the full-text search on the instances of the class industries assigned to the involved parties to retrieve the requested business model innovation cases. Thus, only business model innovation cases are retrieved that do not include an involved party from the construction sector.

8.1.2.2.3 Filtering of the Motives to Transform

The competency sub-question "Which are the motives of the involved parties to change?" consists of two associated filtering service questions comprised of the classes *drivers* and *strategic goals*.

Drivers

The filtering service provides the option of filtering the drivers of a business model innovation case using a full-text search on the instances of the class drivers. Thus, the following filtering service question is answered:

- Which business model innovation cases have a specific driver?

The SPARQL-query to perform this filter service is the following:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParties bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
```

```
?InvolvedParties bic:involvedParties_hasInnovationDrivers_Drivers ?Drivers.
?Drivers rdfs:label ?Driver.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?Driver, "revenue", "i")
)}
```

This query uses as an example the string *revenue* for applying the full-text search on the instances of the class drivers to retrieve business model innovation cases.

Strategic goals

The filtering service provides the option of filtering the strategic goals of a business model innovation case using a full-text search on the instances of the class strategic goals. Thus, the following filtering service question is answered:

- Which business model innovation cases have a specific strategic goal?

The SPARQL-query to perform this filter service is the following:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParties bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParties bic:involvedParties_hasGoals_StrategicGoals ?StrategicGoals.
?StrategicGoals rdfs:label ?StrategicGoal.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?StrategicGoal, "segment", "i")
)}
```

This query uses as an example the string *segment* for applying the full-text search on the instances of the class strategic goals to retrieve business model innovation cases.

8.1.2.2.4   Filtering of the Transformation Challenges

The competency sub-question "Which challenges did occur during the transformation?" consists of three associated filtering service questions comprised of the classes *barriers to overcome* and *risks*.

Barriers to overcome

The filtering service provides both options to filter the barriers to overcome of a business model innovation case: full-text search on the instances of the class barriers to overcome as well as a

filter using barriers to overcome's sub-classes. Thus, the following filtering service questions are answered:

- Which business model innovation cases have a specific barrier to overcome type?
- Which business model innovation cases have a specific barrier to overcome?

The SPARQL-query to perform this filter service is the following:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_mustOvercome_BarriersToOvercome ?BarriersToOvercom
e.
?BarriersToOvercome rdfs:label ?BarrierToOvercome.
?BarriersToOvercome rdf:type ?BarriersToOvercomeType.
?BarriersToOvercomeType rdfs:label ?BarriersToOvercomeTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?BarrierToOvercome, "team", "i") &&
regex(?BarriersToOvercomeTypeName, "intellectual", "i")
)}
```

This query uses as an example the string *team* for applying the full-text search on the instances of the class barriers to overcome as well as the string *intellectual* to retrieve only business model innovation cases that have instances within the barriers to overcome's sub-class intellectual barriers.

Risks

The filtering service provides the option of filtering the risks of a business model innovation case using a full-text search on the instances of the class risks of innovation. Thus, the following filtering service question is answered:

- Which business model innovation cases have a specific risk?

The SPARQL-query to perform this filter service is the following:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_risksOf_RisksOfInnovation ?Risks.
?Risks rdfs:label ?Risk.
FILTER (
```

```
?Case = ?InvolvedPartyCase &&
regex(?Risk, "not having enough", "i")
)}
```

This query uses as an example the string *not having enough* for applying the full-text search on the instances of the class risks of innovation to retrieve business model innovation cases.

8.1.2.2.5 *Filtering of the Transformation Results*

The competency sub-question "Which are the results from the transformation of the business model?" consists of two associated filtering service questions using the class benefits of innovation:

- Which business model innovation cases have a specific benefits type?
- Which business model innovation cases have a specific benefit?

The filtering service provides both options to filter the benefits of a business model innovation case: full-text search on the instances of the class benefits of innovation and a filter using benefits of innovation's sub-classes.

The SPARQL-query to perform this filter service is the following:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_benefitsFrom_BenefitsOfInnovation ?BenefitsOfInnovation.
?BenefitsOfInnovation rdfs:label ?Benefit.
?BenefitsOfInnovation rdf:type ?BenefitsOfInnovationType.
?BenefitsOfInnovationType rdfs:label ?BenefitsOfInnovationTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?Benefit, "BIM", "i") &&
regex(?BenefitsOfInnovationTypeName, "involved party benefits", "i")
)}
```

This query uses as an example the string *BIM* for applying the full-text search on the instances of the class benefits of innovation as well as the string *involved party benefits* to retrieve only business model innovation cases that have instances within the benefits of innovation's sub-class involved party benefits.

8.1.2.2.6   Filtering of the Required Resources for the Transformation

The competency sub-question "Which resources are required to achieve the business model innovation?" consists of two associated filtering service questions using the class required resources:

- Which business model innovation cases have a specific required resources type?
- Which business model innovation cases have a specific required resource?

The filtering service provides both options to filter the required resources of a business model innovation case: full-text search on the instances of the class required resources and a filter using required resources' sub-classes.

The SPARQL-query to perform this filter service is the following:

```
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_requiresForInnovation_RequiredRessources ?Required
Ressources.
?RequiredRessources rdfs:label ?RequiredRessource.
?RequiredRessources rdf:type ?RequiredRessourcesType.
?RequiredRessourcesType rdfs:label ?RequiredRessourcesTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?RequiredRessource, "BIM", "i") &&
regex(?RequiredRessourcesTypeName, "human", "i")
)}
```

This query uses as an example the string *BIM* for applying the full-text search on the instances of the class required resources as well as the string *human* to retrieve only business model innovation cases that have instances within the required resources' sub-class human resources.

8.1.2.3   Filtering of the Enterprise Architecture Property

The third competency question encompasses properties of the enterprise architecture ontology. The following sub-chapters reflect the five competency sub-questions based on which the filtering service questions were developed.

8.1.2.3.1   Filtering of the Motivational Property

The competency sub-question "Which are the motivational properties of the business model innovation case from an enterprise architecture point-of-view?" consists of ten associated filtering

service questions comprised of the classes *assessment, constraint, driver, goal, meaning, outcome, principle, requirement, stakeholder,* and *value*. The filtering service questions are:

- Which business model innovation cases have a specific assessment?
- Which business model innovation cases have a specific constraint?
- Which business model innovation cases have a specific driver?
- Which business model innovation cases have a specific goal?
- Which business model innovation cases have a specific meaning?
- Which business model innovation cases have a specific outcome?
- Which business model innovation cases have a specific principle?
- Which business model innovation cases have a specific requirement?
- Which business model innovation cases have a specific stakeholder?
- Which business model innovation cases have a specific value?

The filtering service provides the option to filter the motivational elements of a business model innovation case as a full-text search on the instances of the classes assessment, constraint, driver, goal, meaning, outcome, principle, requirement, stakeholder, and value.

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_aggregates_MotivationAspectElements ?Motivat
ionAspectElements.
OPTIONAL
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Assessment ?I
nstanceAssessment.
?InstanceAssessment rdfs:label ?Assessment.}
OPTIONAL
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Constraint ?I
nstanceConstraint.
?InstanceConstraint rdfs:label ?Constraint.}
OPTIONAL
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Driver ?Insta
nceDriver.
?InstanceDriver rdfs:label ?Driver.}
OPTIONAL
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Goal ?Instanc
eGoal.
?InstanceGoal rdfs:label ?Goal.}
OPTIONAL
```

```
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Meaning ?Inst
anceMeaning.
?InstanceMeaning rdfs:label ?Meaning.}
OPTIONAL
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Outcome ?Inst
anceOutcome.
?InstanceOutcome rdfs:label ?Outcome.}
OPTIONAL
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Principle ?In
stancePrinciple.
?InstancePrinciple rdfs:label ?Principle.}
OPTIONAL
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Requirement ?
InstanceRequirement.
?InstanceRequirement rdfs:label ?Requirement.}
OPTIONAL
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Stakeholder ?
InstanceStakeholder.
?InstanceStakeholder rdfs:label ?Stakeholder.}
OPTIONAL
{?MotivationAspectElements bmicm:motivationAspectElements_specializedBy_Value ?Instan
ceValue.
?InstanceValue rdfs:label ?Value.}
FILTER (
?Case = ?InvolvedPartyCase && (
regex(?Assessment, "Assessment", "i") ||
regex(?Constraint, "Constraint", "i") ||
regex(?Driver, "Driver", "i") ||
regex(?Goal, "Goal", "i") ||
regex(?Meaning, "Meaning", "i") ||
regex(?Outcome, "Outcome", "i") ||
regex(?Principle, "Principle", "i") ||
regex(?Requirement, "Requirement", "i") ||
regex(?Stakeholder, "Stakeholder", "i") ||
regex(?Value, "Value", "i") )
)}
```

This query uses as an example the string *Assessment* for applying the full-text search on the instances of the class assessment to retrieve the appropriate business model innovation cases. The query requires the OPTIONAL tag since it is not mandatory for a business model innovation case to have values within every class, and thus, some classes, such as the class assessment, might be without entries. Without the tag OPTIONAL, the query would not retrieve cases that do not have values within the motivational element classes.

8.1.2.3.2   *Filtering of the Strategic Property*

The competency sub-question "Which are the strategic properties of the business model innovation case from an enterprise architecture point-of-view?" consists of four associated filtering service questions comprised of the classes *capability, course of action, resource,* and *value stream.* The filtering service questions are:

- Which business model innovation cases have a specific capability?
- Which business model innovation cases have a specific course of action?
- Which business model innovation cases have a specific resource?
- Which business model innovation cases have a specific value stream?

The filtering service provides the option to filter the strategic elements of a business model innovation case as a full-text search on the instances of the classes capability, course of action, resource, and value stream.

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_aggregates_StrategyLayerElements ?StrategyLayerElements.
OPTIONAL
{?StrategyLayerElements bmicm:strategyLayerElements_specializedBy_Capability ?InstanceCapability.
?InstanceCapability rdfs:label ?Capability.}
OPTIONAL
{?StrategyLayerElements bmicm:strategyLayerElements_specializedBy_CourseOfAction ?InstanceCourseOfAction.
?InstanceCourseOfAction rdfs:label ?CourseOfAction.}
OPTIONAL
{?StrategyLayerElements bmicm:strategyLayerElements_specializedBy_Resource ?InstanceResource.
?InstanceResource rdfs:label ?Resource.}
OPTIONAL
{?StrategyLayerElements bmicm:strategyLayerElements_specializedBy_ValueStream ?InstanceValueStream.
?InstanceValueStream rdfs:label ?ValueStream.}
FILTER (
?Case = ?InvolvedPartyCase && (
regex(?CourseOfAction, "CourseOfAction", "i") ||
regex(?Capability, "Capability", "i") ||
regex(?Resource, "Resource", "i") ||
```

```
regex(?ValueStream, "ValueStream", "i") )
)}
```

This query uses as an example the string *Capability* for applying the full-text search on the instances of the class capability to retrieve the appropriate business model innovation cases. The query requires the OPTIONAL tag since it is not mandatory for a business model innovation case to have values within every class, and thus, some classes, such as the class capability, might be without entries. Without the tag OPTIONAL, the query would not retrieve cases that do not have values within the strategic element classes.

8.1.2.3.3   *Filtering of the Business Property*

The competency sub-question "Which are the business properties of the business model innovation case from an enterprise architecture point-of-view?" consists of 13 associated filtering service questions comprised of the classes *business actor, business collaboration, business event, business function, business interaction, business interface, business object, business process, business role, business service, contract, product,* and *representation*. The filtering service questions are:

- Which business model innovation cases have a specific business actor?
- Which business model innovation cases have a specific business collaboration?
- Which business model innovation cases have a specific business event?
- Which business model innovation cases have a specific business function?
- Which business model innovation cases have a specific business interaction?
- Which business model innovation cases have a specific business interface?
- Which business model innovation cases have a specific business object?
- Which business model innovation cases have a specific business process?
- Which business model innovation cases have a specific business role?
- Which business model innovation cases have a specific business service?
- Which business model innovation cases have a specific contract?
- Which business model innovation cases have a specific product?
- Which business model innovation cases have a specific representation?

The filtering service provides the option to filter the business elements of a business model innovation case as a full-text search on the instances of the classes business actor, business collaboration, business event, business function, business interaction, business interface, business object, business process, business role, business service, contract, product, and representation.

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_aggregates_BusinessLayerElements ?BusinessLa
yerElements.
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessActor ?Inst
anceBusinessActor.
?InstanceBusinessActor rdfs:label ?BusinessActor.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessCollaborati
on ?InstanceBusinessCollaboration.
?InstanceBusinessCollaboration rdfs:label ?BusinessCollaboration.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessEvent ?Inst
anceBusinessEvent.
?InstanceBusinessEvent rdfs:label ?BusinessEvent.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessFunction ?I
nstanceBusinessFunction.
?InstanceBusinessFunction rdfs:label ?BusinessFunction.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessInteraction
 ?InstanceBusinessInteraction.
?InstanceBusinessInteraction rdfs:label ?BusinessInteraction.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessInterface ?
InstanceBusinessInterface.
?InstanceBusinessInterface rdfs:label ?BusinessInterface.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessObject ?Ins
tanceBusinessObject.
?InstanceBusinessObject rdfs:label ?BusinessObject.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessProcess ?In
stanceBusinessProcess.
?InstanceBusinessProcess rdfs:label ?BusinessProcess.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessRole ?Insta
nceBusinessRole.
?InstanceBusinessRole rdfs:label ?BusinessRole.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_BusinessService ?In
stanceBusinessService.
?InstanceBusinessService rdfs:label ?BusinessService.}
OPTIONAL
```

```
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_Contract ?InstanceC
ontract.
?InstanceContract rdfs:label ?Contract.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_Product ?InstancePr
oduct.
?InstanceProduct rdfs:label ?Product.}
OPTIONAL
{?BusinessLayerElements bmicm:businessLayerElements_specializedBy_Representation ?Ins
tanceRepresentation.
?InstanceRepresentation rdfs:label ?Representation.}
FILTER (
?Case = ?InvolvedPartyCase && (
regex(?BusinessActor, "BusinessActor", "i") ||
regex(?BusinessCollaboration, "BusinessCollaboration", "i") ||
regex(?BusinessEvent, "BusinessEvent", "i") ||
regex(?BusinessFunction, "BusinessFunction", "i") ||
regex(?BusinessInteraction, "BusinessInteraction", "i") ||
regex(?BusinessInterface, "BusinessInterface", "i") ||
regex(?BusinessObject, "BusinessObject", "i") ||
regex(?BusinessProcess, "BusinessProcess", "i") ||
regex(?BusinessRole, "BusinessRole", "i") ||
regex(?BusinessService, "BusinessService", "i") ||
regex(?Contract, "Contract", "i") ||
regex(?Product, "Product", "i") ||
regex(?Representation, "Representation", "i") )
)}
```

This query uses as an example the string *BusinessActor* for applying the full-text search on the instances of the class business actor to retrieve the appropriate business model innovation cases. The query requires the OPTIONAL tag since it is not mandatory for a business model innovation case to have values within every class, and thus, some classes, such as the class business actor, might be without entries. Without the tag OPTIONAL, the query would not retrieve cases that do not have values within the business element classes.

8.1.2.3.4 Filtering of the Application Property

The competency sub-question "Which are the application properties of the business model innovation case from an enterprise architecture point-of-view?" consists of nine associated filtering service questions comprised of the classes *application collaboration, application component, application event, application function, application interaction, application interface, application process, application service,* and *data object*. The filtering service questions are:

- Which business model innovation cases have a specific application collaboration?

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- Which business model innovation cases have a specific application component?

- Which business model innovation cases have a specific application event?

- Which business model innovation cases have a specific application function?

- Which business model innovation cases have a specific application interaction?

- Which business model innovation cases have a specific application interface?

- Which business model innovation cases have a specific application process?

- Which business model innovation cases have a specific application service?

- Which business model innovation cases have a specific data object?

The filtering service provides the option to filter the application elements of a business model innovation case as a full-text search on the instances of the classes application collaboration, application component, application event, application function, application interaction, application interface, application process, application service, and data object.

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_aggregates_ApplicationLayerElements ?Applica
tionLayerElements.
OPTIONAL
{?ApplicationLayerElements bmicm:applicationLayerElements_specializedBy_ApplicationCo
llaboration ?InstanceApplicationCollaboration.
?InstanceApplicationCollaboration rdfs:label ?ApplicationCollaboration.}
OPTIONAL
{?ApplicationLayerElements bmicm:applicationLayerElements_specializedBy_ApplicationCo
mponent ?InstanceApplicationComponent.
?InstanceApplicationComponent rdfs:label ?ApplicationComponent.}
OPTIONAL
{?ApplicationLayerElements bmicm:applicationLayerElements_specializedBy_ApplicationEv
ent ?InstanceApplicationEvent.
?InstanceApplicationEvent rdfs:label ?ApplicationEvent.}
OPTIONAL
{?ApplicationLayerElements bmicm:applicationLayerElements_specializedBy_ApplicationFu
nction ?InstanceApplicationFunction.
?InstanceApplicationFunction rdfs:label ?ApplicationFunction.}
OPTIONAL
{?ApplicationLayerElements bmicm:applicationLayerElements_specializedBy_ApplicationIn
teraction ?InstanceApplicationInteraction.
?InstanceApplicationInteraction rdfs:label ?ApplicationInteraction.}
OPTIONAL
```

```
{?ApplicationLayerElements bmicm:applicationLayerElements_specializedBy_ApplicationIn
terface ?InstanceApplicationInterface.
?InstanceApplicationInterface rdfs:label ?ApplicationInterface.}
OPTIONAL
{?ApplicationLayerElements bmicm:applicationLayerElements_specializedBy_ApplicationPr
ocess ?InstanceApplicationProcess.
?InstanceApplicationProcess rdfs:label ?ApplicationProcess.}
OPTIONAL
{?ApplicationLayerElements bmicm:applicationLayerElements_specializedBy_ApplicationSe
rvice ?InstanceApplicationService.
?InstanceApplicationService rdfs:label ?ApplicationService.}
OPTIONAL
{?ApplicationLayerElements bmicm:applicationLayerElements_specializedBy_DataObject ?I
nstanceDataObject.
?InstanceDataObject rdfs:label ?DataObject.}
FILTER (
?Case = ?InvolvedPartyCase && (
regex(?ApplicationCollaboration, "ApplicationCollaboration", "i") ||
regex(?ApplicationComponent, "ApplicationComponent", "i") ||
regex(?ApplicationEvent, "ApplicationEvent", "i") ||
regex(?ApplicationFunction, "ApplicationFunction", "i") ||
regex(?ApplicationInteraction, "ApplicationInteraction", "i") ||
regex(?ApplicationInterface, "ApplicationInterface", "i") ||
regex(?ApplicationProcess, "ApplicationProcess", "i") ||
regex(?ApplicationService, "ApplicationService", "i") ||
regex(?DataObject, "DataObject", "i") )
)}
```

This query uses as an example the string *ApplicationEvent* for applying the full-text search on the instances of the class application event to retrieve the appropriate business model innovation cases. The query requires the OPTIONAL tag since it is not mandatory for a business model innovation case to have values within every class, and thus, some classes, such as the class application event, might be without entries. Without the tag OPTIONAL, the query would not retrieve cases that do not have values within the application element classes.

8.1.2.3.5 *Filtering of the Technology Property*

The competency sub-question "Which are the technological properties of the business model innovation case from an enterprise architecture point-of-view?" consists of 13 associated filtering service questions comprised of the classes *artifact, path, device, technology function, technology interface, technology service, communication network, node, system software, technology collaboration, technology event, technology interaction,* and *technology process*. The filtering service questions are:

- Which business model innovation cases have a specific artifact?

- Which business model innovation cases have a specific path?

- Which business model innovation cases have a specific device?

- Which business model innovation cases have a specific technology function?

- Which business model innovation cases have a specific technology interface?

- Which business model innovation cases have a specific technology service?

- Which business model innovation cases have a specific communication network?

- Which business model innovation cases have a specific node?

- Which business model innovation cases have a specific system software?

- Which business model innovation cases have a specific technology collaboration?

- Which business model innovation cases have a specific technology event?

- Which business model innovation cases have a specific technology interaction?

- Which business model innovation cases have a specific technology process?

The filtering service provides the option to filter the technology elements of a business model innovation case as a full-text search on the instances of the classes artifact, path, device, technology function, technology interface, technology service, communication network, node, system software, technology collaboration, technology event, technology interaction, and technology process.

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_aggregates_TechnologyLayerElements ?Technolo
gyLayerElements.
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_Artifact ?Insta
nceArtifact.
?InstanceArtifact rdfs:label ?Artifact.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_CommunicationPa
th ?InstanceCommunicationPath.
?InstanceCommunicationPath rdfs:label ?Path.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_Device ?Instanc
eDevice.
?InstanceDevice rdfs:label ?Device.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_InfrastructureF
unction ?InstanceInfrastructureFunction.
```

```
?InstanceInfrastructureFunction rdfs:label ?TechnologyFunction.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_InfrastructureI
nterface ?InstanceInfrastructureInterface.
?InstanceInfrastructureInterface rdfs:label ?TechnologyInterface.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_InfrastructureS
ervice ?InstanceInfrastructureService.
?InstanceInfrastructureService rdfs:label ?TechnologyService.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_Network ?Instan
ceNetwork.
?InstanceNetwork rdfs:label ?CommunicationNetwork.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_Node ?InstanceN
ode.
?InstanceNode rdfs:label ?Node.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_SystemSoftware
?InstanceSystemSoftware.
?InstanceSystemSoftware rdfs:label ?SystemSoftware.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_TechnologyColla
boration ?InstanceTechnologyCollaboration.
?InstanceTechnologyCollaboration rdfs:label ?TechnologyCollaboration.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_TechnologyEvent
 ?InstanceTechnologyEvent.
?InstanceTechnologyEvent rdfs:label ?TechnologyEvent.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_TechnologyInter
action ?InstanceTechnologyInteraction.
?InstanceTechnologyInteraction rdfs:label ?TechnologyInteraction.}
OPTIONAL
{?TechnologyLayerElements bmicm:technologyLayerElements_specializedBy_TechnologyProce
ss ?InstanceTechnologyProcess.
?InstanceTechnologyProcess rdfs:label ?TechnologyProcess.}
FILTER (
?Case = ?InvolvedPartyCase && (
regex(?Artifact, "Artifact", "i") ||
regex(?Path, "Path", "i") ||
regex(?Device, "Device", "i") ||
regex(?TechnologyFunction, "TechnologyFunction", "i") ||
regex(?TechnologyInterface, "TechnologyInterface", "i") ||
regex(?TechnologyService, "TechnologyService", "i") ||
regex(?CommunicationNetwork, "CommunicationNetwork", "i") ||
regex(?Node, "Node", "i") ||
regex(?SystemSoftware, "SystemSoftware", "i") ||
```

```
regex(?TechnologyCollaboration, "TechnologyCollaboration", "i") ||
regex(?TechnologyEvent, "TechnologyEvent", "i") ||
regex(?TechnologyInteraction, "TechnologyInteraction", "i") ||
regex(?TechnologyProcess, "TechnologyProcess", "i") )
)}
```

This query uses as an example the string *Path* for applying the full-text search on the instances of the class path to retrieve the appropriate business model innovation cases. The query requires the OPTIONAL tag since it is not mandatory for a business model innovation case to have values within every class, and thus, some classes, such as the class path, might be without entries. Without the tag OPTIONAL, the query would not retrieve cases that do not have values within the technology element classes.

8.1.2.4 Filtering of the Business Capability Property

The fourth competency question encompasses properties of the business capability ontology. The following sub-chapters reflect the four competency sub-questions based on which the filtering service questions were developed.

8.1.2.4.1 Filtering of the Resource-Based Capabilities

The competency sub-question "Which are the resource-based capabilities of a business?" has been translated into the following filtering service question, which is comprised of the class *resource-based capabilities*:

- Which business model innovation cases have a specific resource-based capability?

The filtering service provides the option to filter the resource-based capabilities of a business model innovation case as a full-text search on the instances of the class resource-based capabilities. The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements ?Busin
essCapabilityElements.
?BusinessCapabilityElements bmicm:businessCapabilityElements_specializedBy_ResourceBa
sedCapabilities ?ResourceBasedCapabilities.
?ResourceBasedCapabilities rdfs:label ?ResourceBasedCapability.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?ResourceBasedCapability, "system", "i")
)}
```

This query uses as an example the string *system* for applying the full-text search on the instances of the class resource-based capabilities to retrieve the appropriate business model innovation cases.

8.1.2.4.2   *Filtering of the Dynamic Capabilities*

The competency sub-question "Which are the dynamic capabilities of a business?" has been translated into the following filtering service question, which is comprised of the class *dynamic capabilities*:

- Which business model innovation cases have a specific dynamic capability?

The filtering service provides the option to filter a business model innovation case's dynamic capabilities as a full-text search on the instances of the class dynamic capabilities. The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements ?Busin
essCapabilityElements.
?BusinessCapabilityElements bmicm:businessCapabilityElements_specializedBy_DynamicCap
abilities ?DynamicCapabilities.
?DynamicCapabilities rdfs:label ?DynamicCapability.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?DynamicCapability, "agile", "i")
)}
```

This query uses as an example the string *agile* for applying the full-text search on the instances of the class dynamic capabilities to retrieve the appropriate business model innovation cases.

8.1.2.4.3   *Filtering of the Human-Based Capabilities*

The competency sub-question "Which are the human-based capabilities of a business?" consists of two associated filtering service questions using the class human-based capabilities:

- Which business model innovation cases have a specific human-based capabilities type?
- Which business model innovation cases have a specific human-based capability?

The filtering service provides both options to filter the human-based capabilities of a business model innovation case: full-text search on the instances of the class human-based capabilities and a filter using human-based capabilities' sub-classes.

The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements ?Busin
essCapabilityElements.
?BusinessCapabilityElements bmicm:businessCapabilityElements_specializedBy_HumanBased
CapabilityElements ?HumanBasedCapabilityElements.
?HumanBasedCapabilityElements rdfs:label ?HumanBasedCapability.
?HumanBasedCapabilityElements bmicm:humanBasedCapabilityElements_specializedBy_Compet
encies ?Competencies.
?Competencies rdfs:label ?Competency.
?Competencies rdf:type ?CompetenciesType.
?CompetenciesType rdfs:label ?CompetenciesTypeName.
?HumanBasedCapabilityElements bmicm:humanBasedCapabilityElements_specializedBy_Skills
 ?Skills.
?Skills rdfs:label ?Skill.
?Skills rdf:type ?SkillsType.
?SkillsType rdfs:label ?SkillsTypeName.
values ?HumanBasedCapabilityQuery {"responsibility"}
FILTER (
?Case = ?InvolvedPartyCase && (
regex(?Competency, ?HumanBasedCapabilityQuery, "i") ||
regex(?Skill, ?HumanBasedCapabilityQuery, "i")) &&
regex(?CompetenciesTypeName, "Competencies", "i") &&
regex(?SkillsTypeName, "Skills", "i")
)}
```

This query uses as an example the string *responsibility* for applying the full-text search on the instances of the sub-classes skills and competencies to retrieve the appropriate business model innovation cases. Further, the user has to add the string *Competencies* as shown in the query if the result list should show business model innovation cases that contain entries within the sub-class competencies. The same procedure applies to the string *Skills* for the sub-class skills to deliver results that include entries within the sub-class skills.

8.1.2.4.4   *Filtering of the Core Capabilities*

The competency sub-question "Which are the core capabilities of a business?" has been translated into the following filtering service question, which is comprised of the class *core capabilities*:

- Which business model innovation cases have a specific core capability?

The filtering service provides the option to filter a business model innovation case's core capabilities as a full-text search on the instances of the class core capabilities. The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements ?Busin
essCapabilityElements.
?BusinessCapabilityElements bmicm:businessCapabilityElements_specializedBy_CoreCapabi
lities ?CoreCapabilities.
?CoreCapabilities rdfs:label ?CoreCapability.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?CoreCapability, "planning", "i")
)}
```

This query uses as an example the string *planning* for applying the full-text search on the instances of the class core capabilities to retrieve the appropriate business model innovation cases.

8.1.2.5 Filtering of the Construction Industry Property

The fifth competency question encompasses properties of the construction industry specifics ontology. The following sub-chapters reflect the five competency sub-questions based on which the filtering service questions were developed.

8.1.2.5.1 Filtering of the Construction-Related Companies

The competency sub-question "Which are the construction-related companies of a business model innovation case?" has been translated into the following filtering service question, which is comprised of the class *construction-related companies*:

- Which business model innovation cases have a specific construction-related company?

The filtering service provides the option to filter the construction-related companies of a business model innovation case as a full-text search on the instances of the class construction-related companies. The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics ?Co
nstructionIndustrySpecifics.
```

```
?ConstructionIndustrySpecifics bmicm:constructionIndustrySpecifics_specializedBy_Cons
tructionRelatedCompanies ?ConstructionRelatedCompanies.
?ConstructionRelatedCompanies rdfs:label ?ConstructionRelatedCompany.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?ConstructionRelatedCompany, "Losinger", "i")
)}
```

This query uses as an example the string *Losinger* for applying the full-text search on the instances of the class construction-related companies to retrieve the appropriate business model innovation cases.

8.1.2.5.2 *Filtering of the Construction's Execution Models*

The competency sub-question "Which are the execution models of construction-related companies?" has been translated into the following filtering service question, which is comprised of the class *execution models*:

- Which business model innovation cases have a specific construction execution model?

The filtering service provides the option to filter the execution models of a business model innovation case as a full-text search on the instances of the class execution models. The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics ?Co
nstructionIndustrySpecifics.
?ConstructionIndustrySpecifics bmicm:constructionIndustrySpecifics_specializedBy_Exec
utionModels ?ExecutionModels.
?ExecutionModels rdfs:label ?ExecutionModel.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?ExecutionModel, "Contractor", "i")
)}
```

This query uses as an example the string *Contractor* for applying the full-text search on the instances of the class execution models to retrieve the appropriate business model innovation cases.

8.1.2.5.3   Filtering of the Construction-Related Stakeholder Types

The competency sub-question "Which are the stakeholder types of construction-related companies?" has been translated into the following filtering service question, which is comprised of the class *construction stakeholder types*:

- Which business model innovation cases have a specific construction-related stakeholder type?

The filtering service provides the option to filter the construction stakeholder types of a business model innovation case as a full-text search on the instances of the class construction stakeholder types. The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics ?ConstructionIndustrySpecifics.
?ConstructionIndustrySpecifics bmicm:constructionIndustrySpecifics_specializedBy_ConstructionStakeholderTypes ?ConstructionStakeholderTypes.
?ConstructionStakeholderTypes rdfs:label ?ConstructionStakeholderType.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?ConstructionStakeholderType, "Architect", "i")
)}
```

This query uses as an example the string *Architect* for applying the full-text search on the instances of the class construction stakeholder types to retrieve the appropriate business model innovation cases.

8.1.2.5.4   Filtering of the Construction Planning Phases

The competency sub-question "Which are the construction planning phases of construction-related companies?" has been translated into the following filtering service question, which is comprised of the class *construction planning phases*:

- Which business model innovation cases have a specific construction planning phase?

The filtering service provides the option to filter the construction planning phases of a business model innovation case as a full-text search on the instances of the class construction planning phases. The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
```

```
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics ?Co
nstructionIndustrySpecifics.
?ConstructionIndustrySpecifics bmicm:constructionIndustrySpecifics_specializedBy_Cons
tructionPlanningPhases ?ConstructionPlanningPhases.
?ConstructionPlanningPhases rdfs:label ?ConstructionPlanningPhase.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?ConstructionPlanningPhase, "planning", "i")
)}
```

This query uses as an example the string *planning* for applying the full-text search on the instances of the class construction planning phases to retrieve the appropriate business model innovation cases.

8.1.2.5.5 Filtering of the Construction's Execution Areas

The competency sub-question "Which are the execution areas of construction-related companies?" has been translated into the following filtering service question, which is comprised of the class *company execution areas*:

- Which business model innovation cases have a specific construction execution area?

The filtering service provides the option to filter the construction company's execution areas of a business model innovation case as a full-text search on the class company execution areas' instances. The SPARQL-query to perform this filter service is the following:

```
SELECT  DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics ?Co
nstructionIndustrySpecifics.
?ConstructionIndustrySpecifics bmicm:constructionIndustrySpecifics_specializedBy_Comp
anyExecutionAreas ?CompanyExecutionAreas.
?CompanyExecutionAreas rdfs:label ?CompanyExecutionArea.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?CompanyExecutionArea, "rural", "i")
)}
```

This query uses as an example the string *rural* for applying the full-text search on the instances of the class company execution areas to retrieve the appropriate business model innovation cases.

8.2 Case-based Reasoning Matching of Business Model Innovation Cases

The case-based reasoning matching method is used to provide the users with a similarity-retrieval service to suggest similar business model innovation cases based on their input. This chapter aims to describe how the similarity-retrieval service matches with the user input and how it is related to the initially developed competency questions, described in Sub-chapter 6.1.2, to develop the business model innovation case ontology. Further, this chapter provides the information to implement the case-based reasoning matching method to recommend business model innovation cases based on the accordingly developed ontology.

8.2.1 Development of the Similarity-Retrieval Service

This chapter depicts the development of the similarity-retrieval service. This includes integrating the business model innovation case ontology into the ICEBERG tool developed by Martin (2016) and the required case model ontology and similarity ontology to run the similarity-retrieval service.

8.2.1.1 Prerequisites for the Integration into ICEBERG

The similarity-retrieval service is based on the ICEBERG tool, developed by Martin (2016), to calculate the similarity of the user input with the business model innovation cases within the case repository. As described in Sub-chapter 5.1.1.1, the ICEBERG tool requires a specification of which stakeholders the tool supports, what the concerns of these stakeholders are, and how the case views address these concerns.

As described in the case analysis in Sub-chapter 4.5, three stakeholders need to be addressed. These stakeholders are C-level managers, transformation managers, and enterprise architects. Further, the stakeholders were mapped to the competency questions from Sub-chapter 6.1.2 to get insights regarding which content of the business model innovation case would be of interest for each stakeholder. The interviews with the transformation manager, C-level manager, and IT-transformation manager revealed that for a transformation manager, all the properties of the business model innovation case are of interest since such a stakeholder usually is capable of reading enterprise architecture models, such as ArchiMate, and business model based on the Business Model Canvas. Also, a transformation manager requires information regarding the transformation itself, and thus, all the properties are of interest to this stakeholder. A C-level manager is interested in the company's current and targeted business model to know towards which goal the company is driving. Also, the transformation characteristics such as the risks, benefits, or resources are of interest to the C-level manager. An enterprise architect is focused on

the architecture side of the business and the IT, and thus, this stakeholder is mainly solely interested in regards to the enterprise architecture properties of the business model innovation case. The concerns regarding business model innovation possibilities, their transformations, and the innovation applied to the business' enterprise architecture were formulated from these insights. Figure 69 depicts the relevant ontologies for each of the three concerns.
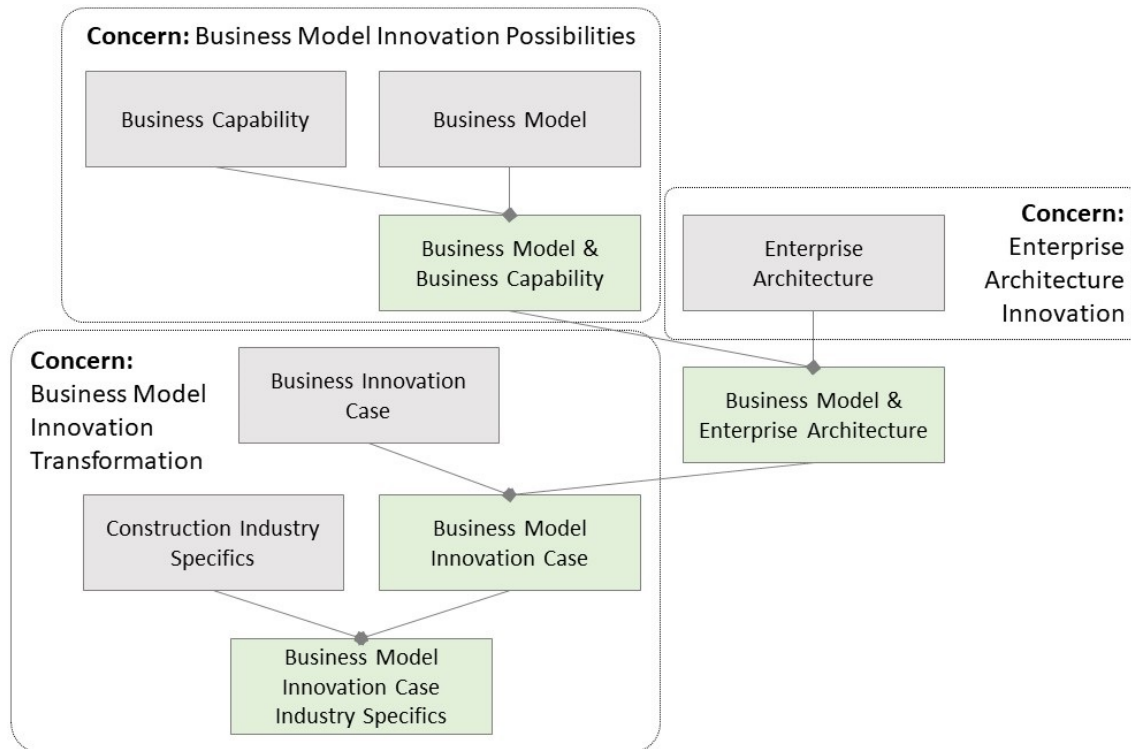
Figure 69: Overview of the main ontologies for each concern

Business model innovation possibilities

This concern represents the concern of stakeholders of finding out what kind of possibilities there could be for a business to innovate on its business model. This concern applies to the stakeholders C-level manager and transformation manager since the focus of the business model innovation possibilities concern lies in the properties of the business model and the capabilities of a business and how to leverage them. Thus, this concern is associated with the business model innovation challenges of leveraging the own business capabilities and comparing business model innovation ideas with the own business model, as described in Sub-chapter 5.1. The implementation of this concern is as follows:

```
cbr:BMIPossibilitiesConcern
  rdf:type cbr:Concern ;
  cbr:concernsBelongToRole bmicm:CLevelManager ;
```

```
    cbr:concernsBelongToRole bmicm:TransformationManager ;
    rdfs:label "BMI Possibilities Concern"@en ;
.
```

The code snippet shows that the business model innovation possibilities concern belongs to the roles C-level manager and transformation manager, which represent the stakeholders.

Business model innovation transformation

The business model innovation transformation concern represents the concern of retrieving insights on what the characteristics of the actual business transformation were, such as which resources were required and what kind of obstacles need to be overcome for a successful transformation. This concern applies to the stakeholders C-level manager and transformation manager since the focus of the business model innovation transformation concern lies on the properties of the business innovation case itself. This concern supports overcoming the challenge to think of something different since it shows the stakeholders what was required to implement the innovation successfully, and thus, the challenge to innovate by transforming the business model might be less daunting. The implementation of this concern is as follows:

```
cbr:BMITransformationConcern
    rdf:type cbr:Concern ;
    cbr:concernsBelongToRole bmicm:CLevelManager ;
    cbr:concernsBelongToRole bmicm:TransformationManager ;
    rdfs:label "BMI Transformation Concern"@en ;
.
```

The code snippet shows that the business model innovation transformation concern belongs to the roles C-level manager and transformation manager, which represent the stakeholders.

Enterprise architecture innovation

This concern represents the stakeholder enterprise architect's point-of-view on a business model innovation case since this stakeholder's main interest lies in knowing how the transformation impacts the current enterprise architecture. Thus, this concern handles the business model innovation challenge of comparing a business model innovation case with the current enterprise architecture to retrieve insights regarding the missing resources or processes or no longer required resources or processes. This concern not only applies to the stakeholder enterprise architect but also to transformation managers since they need to know how the enterprise architecture of the business might be impacted due to an integration of a business model innovation into the current environment. The implementation of this concern is as follows:

```
cbr:EAInnovationConcern
  rdf:type cbr:Concern ;
  cbr:concernsBelongToRole bmicm:EnterpriseArchitect ;
  cbr:concernsBelongToRole bmicm:TransformationManager ;
  rdfs:label "EA Innovation Concern"@en ;
.
```

The code snippet shows that the enterprise architecture innovation concern belongs to the roles enterprise architect and transformation manager, which represent the stakeholders.

The following Table 186 shows the mapping of the three stakeholders and which of the three concerns each of them has.

Table 186: Mapping of the concerns with the identified stakeholders

Concern	Stakeholder		
	C-level manager	Transformation manager	Enterprise architect
Business model innovation possibilities	X	X	
Business model innovation transformation	X	X	
Enterprise architecture innovation		X	X

The similarity-retrieval service's goal is to answer the question of how well the business model innovation cases match with specific parameters given by a user. Based on this and the description of the concerns within this sub-chapter, Table 187 depicts the relation between the five competency questions, introduced in Sub-chapter 6.1.2 as part of the first step of the ontology development process by Noy and McGuinness (2001), and the stakeholders and concerns. It shows which competency questions are of interest for the stakeholder and which concern encompasses which competency questions.

Table 187: Mapping of competency questions with the stakeholders and the concerns

Competency question	Relevant for the stakeholders			Concern		
	C-level manager	Transformation manager	Enterprise architect	Business model innovation possibilities	Business model innovation transformation	Enterprise architecture innovation
What **business model properties** are of interest for a business model innovation case?	Yes	Yes	No	X		
What **business innovation transformation properties** are of interest for a business model innovation case?	Yes	Yes	No		X	
What **enterprise architecture properties** are of interest for a business model innovation case?	No	Yes	Yes			X
What **business capability properties** are of interest for a business model innovation case?	Yes	Yes	No	X		
What **construction industry properties** are of interest for a business model innovation case?	Yes	Yes	No		X	

The integration of the business model innovation case ontology to be used for case-based reasoning requires a dedicated case ontology for the ICEBERG tool as well as a dedicated similarity ontology that provides the required information to perform the similarity measurements. The case ontology and the similarity ontology are described in the following sections.

8.2.1.2 *Business Model Innovation Case Ontology Integration into ICEBERG*

Martin (2016) explains the importance of designing a dedicated case model for the ICEBERG tool for each concern. Since for this application the relations between the concerns and the case views are always 1:1, the case views are named after the concerns. The case views allow providing only the required data to a stakeholder using the ICEBERG tool to not overload the stakeholder with non-essential concepts. Thus, only the dedicated concern is targeted when viewing a case view. Figure 70 depicts how each of the three case views is related to the structure of the business model innovation case with industry specifics ontology.
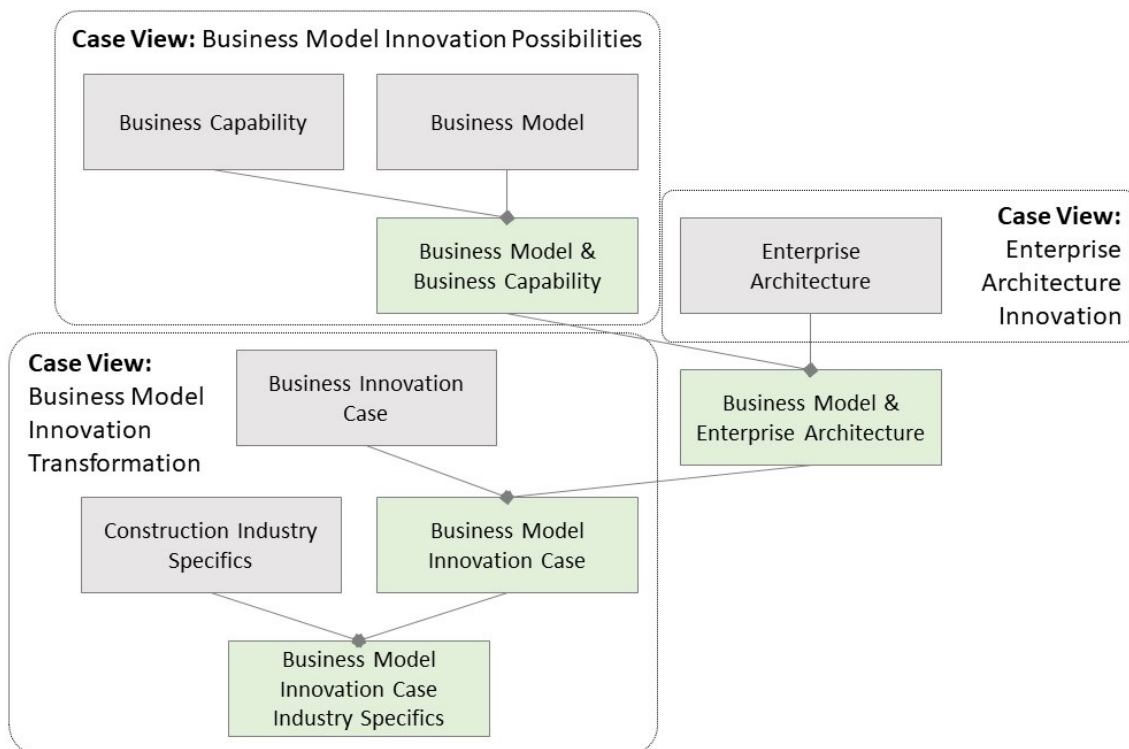
Figure 70: Overview of the main ontologies for each case view

The developed case model for the ICEBERG tool to represent the case views is explained based on the example for the concept of niche markets as part of the business model component customer segment. The case model indicated as `bmicm` within the code snippets starts by defining the different concepts of which a business model innovation case is composed. Since this example

shows the case view business model innovation possibilities, the business model innovation case is composed amongst other components with the component customer interface elements. The code snippet for this looks as follows:

```
bmicm:businessModelInnovationCases_composedOf_CustomerInterfaceElements
  rdf:type owl:ObjectProperty ;
  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
  rdfs:label "Customer Interface Elements" ;
  rdfs:range bmicm:CustomerInterfaceElements ;
.
```

The customer interface elements are specialized by three concepts, on of them is the customer segment elements. The following code snippet represents this.

```
bmicm:customerInterfaceElements_specializedBy_CustomerSegmentElements
  rdf:type owl:ObjectProperty ;
  rdfs:domain bmicm:CustomerInterfaceElements ;
  rdfs:label "Customer Segments" ;
  rdfs:range bmicm:CustomerSegmentElements ;
.
bmicm:CustomerSegmentElements
  rdf:type owl:Class ;
  rdfs:label "Customer Segment Elements" ;
  rdfs:subClassOf bmicm:BusinessModelElements ;
.
```

There are four different types of customer segments, as specified in Sub-chapter 6.2.1.2. One of them is the niche-market. The code snippet for the representation of the niche-market within the ontology is as follows:

```
bmicm:customerSegmentElements_specializedBy_NicheMarket
  rdf:type owl:ObjectProperty ;
  rdfs:domain bmicm:CustomerSegmentElements ;
  rdfs:label "Niche-Market" ;
  rdfs:range bm:NicheMarket ;
.
```

The entire case model represented as an ontology is shown within Appendix-C: Source Code of the Developed Similarity-Retrieval Service Source Code of the Business Model Innovation Case Model Ontology.

8.2.1.3   *Similarity Ontology for Business Model Innovation Cases*

Martin (2016) explains that within the ICEBERG tool for each case view, the similarity measurements can be different, depending on the values provided to each annotation property,

object property, or datatype property that should be measured. Therefore, a dedicated similarity ontology encompassing the case views and the similarity measures has been developed.

This research identified the three case views business model innovation possibilities view, business model innovation transformation view, and enterprise architecture innovation view, as described in the previous sub-chapter. The following code snippet shows the case views and how they address the individual concerns:

```
bmiciscsm:BMIPossibilitiesView
  rdf:type cbr:CaseView ;
  cbr:caseViewAddressesConcerns cbr:BMIPossibilitiesConcern ;
  rdfs:label "BMI Possibilities View"@en ;
.
bmiciscsm:BMITransformationView
  rdf:type cbr:CaseView ;
  cbr:caseViewAddressesConcerns cbr:BMITransformationConcern ;
  rdfs:label "BMI Transformation View"@en ;
.
bmiciscsm:EAInnovationView
  rdf:type cbr:CaseView ;
  cbr:caseViewAddressesConcerns cbr:EAInnovationConcern ;
  rdfs:label "EA Innovation View"@en ;
.
```

The ICEBERG tool requires for each case view a root case class. The similarity ontology represents the root case class, for example, for the case view business model innovation possibilities view as follows:

```
bmic:BusinessModelInnovationCases
  sim:similarity bmiciscsm:simCS_Cases_BMIPossibilitiesView ;
.
bmiciscsm:simCS_Cases_BMIPossibilitiesView
  rdf:type sim:RootCaseClassSimilarity ;
  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
  sim:globalSimilarityFunction sim:average ;
  rdfs:label "RootCaseClassSimiliarity Cases for BMIPossibilitiesView"@en ;
.
```

The code snippet shows that the class Business Model Innovation Cases is the root class. Also, the calculation for the similarity measurement of this global similarity function is set as average. The different global similarity functions, which are average, probabilistic, and cosine, are described in Sub-chapter 7.1.2 in detail.

The following code snippet shows exemplary the similarity calculation for the concept of niche market from the business model's customer segment elements as part of the case view business model innovation possibilities view:

```
bm:NicheMarket
  sim:similarity bmiciscsm:simAP_NicheMarket_BMIPossibilitiesView ;
.
bmiciscsm:simAP_NicheMarket_BMIPossibilitiesView
  rdf:type sim:AnnotationPropertySimilarity ;
  sim:annotationProperty rdfs:label ;
  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
  sim:localSimilarityFunction sim:levenshtein ;
  sim:weight "1"^^xsd:float ;
  rdfs:label "AnnotationPropertySimilarity NicheMarket for BMIPossibilitiesView"@en ;
.
```

This code snippet depicts that the similarity measurement for the case view business model innovation possibilities view includes the annotation property of the class niche market from the business model ontology. Also, the calculation technique Levenshtein with the weight 1 has been assigned as the local similarity function to this annotation property. The different local similarity functions, which are equals, unequals, Levenshtein, Jaro-Winkler, and SoftTFIDF, are described in Sub-chapter 7.1.2 in detail.

Since the class niche market has a relation from the class customer segment elements, the similarity calculation includes this relation as well. The following code snippet shows exemplary the similarity calculation for this relation as part of the case view business model innovation possibilities view:

```
bmicm:customerSegmentElements_specializedBy_NicheMarket
  sim:similarity bmiciscsm:simOP_customerSegmentElements_specializedBy_NicheMarket_BM
IPossibilitiesView ;
.
bmiciscsm:simOP_customerSegmentElements_specializedBy_NicheMarket_BMIPossibilitiesVie
w
  rdf:type sim:ObjectPropertySimilarity ;
  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
  sim:globalSimilarityFunction sim:average ;
  sim:weight "1"^^xsd:float ;
  rdfs:label "ObjectPropertySimilarity customerSegmentElements_specializedBy_NicheMar
ket for BMIPossibilitiesView"@en ;
.
```

This code snippet shows that the similarity measurement for the case view business model innovation possibilities view includes the object property of the relation between the class

customer segment elements and the class niche market. Further, the calculation technique average with the weight 1 has been assigned as the global similarity function to this object property.

Besides the object properties and the annotation properties, the business model innovation case ontology includes as well datatype properties. For such kind of properties, the similarity is calculated as well. The following code snippet shows exemplary the similarity calculation for the datatype property hasChannelOwnerType that is assigned to the business model ontology class channel of the case view business model innovation possibilities view:

```
bm:channel_hasChannelOwnerType
  sim:similarity bmiciscsm:simDP_channel_hasChannelOwnerType_BMIPossibilitiesView ;
.
bmiciscsm:simDP_channel_hasChannelOwnerType_BMIPossibilitiesView
  rdf:type sim:DatatypePropertySimilarity ;
  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
  sim:localSimilarityFunction sim:equals ;
  sim:weight "1"^^xsd:float ;
  rdfs:label "DatatypePropertySimilarity channel_hasChannelOwnerType for BMIPossibili
tiesView"@en ;
.
```

This code snippet shows that the calculation technique applied for the similarity measurement of the datatype property hasChannelOwnerType is set as equals with the weight 1.

The entire similarity ontology is represented within Appendix-C: Source Code of the Developed Similarity-Retrieval Service Source Code of the Business Model Innovation Case Similarity Ontology.

8.2.2 Application of the Similarity-Retrieval Service

The similarity-retrieval service implemented as part of this research aims to prove that it is possible to support the ideation phase of the business model innovation process by applying recommendations of business model innovation cases based on the similarity measurement of the own businesses against the case repository. For this purpose, this chapter describes the process a user has to go through to run the similarity-retrieval service.

The first step for a user of the similarity-retrieval service is to open the ICEBERG tool. The start page consists of the case repository cases and the function to create a new case. The case-based reasoning approach implemented by Martin (2016) defines that the user input is regarded as a new case since the goal is to compare cases. The user selects the dropdown *New Case* to follow the process to retrieve business model innovation case recommendations. The result of this step is shown in Figure 126.
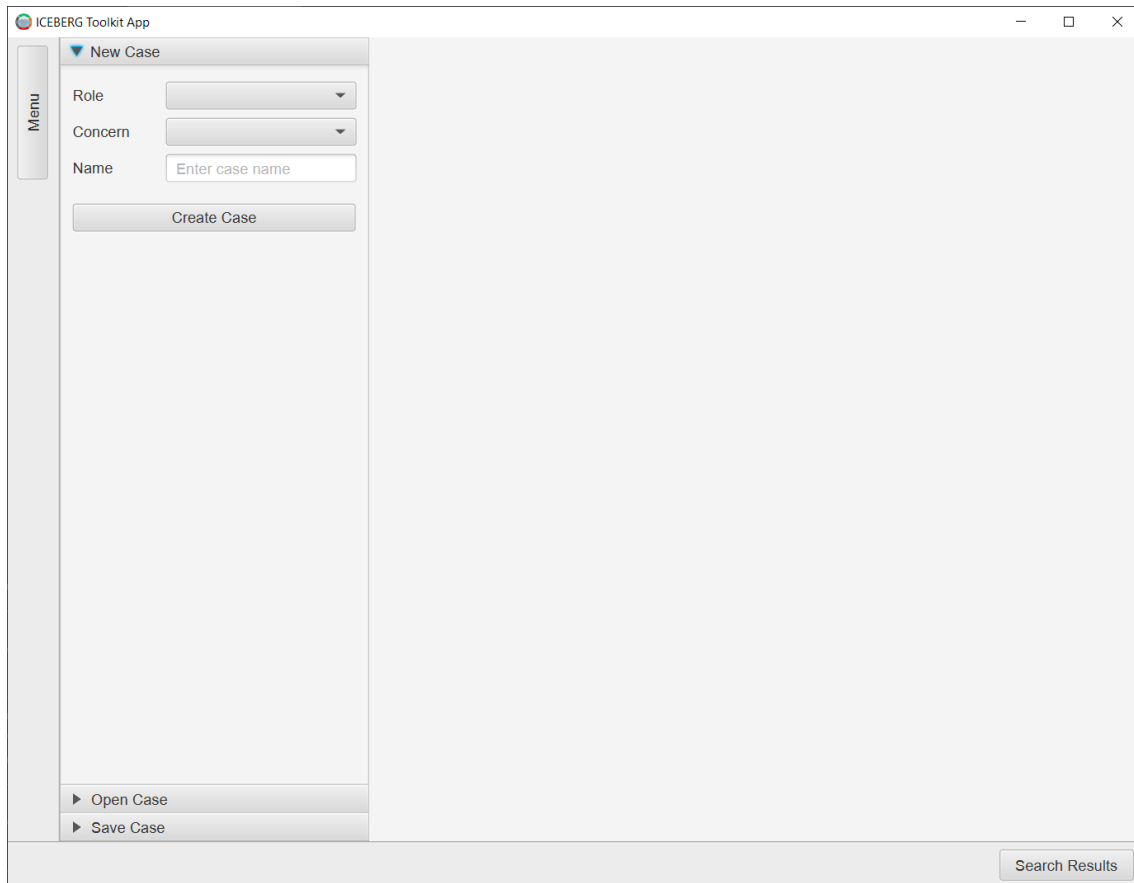
Figure 71: Start page of the ICEBERG tool

The second step for the user is to create a new case, as illustrated in Figure 127. To do so, the user has to select the role in which the tool is to be used. The user can select from the three specified stakeholders: *Transformation Manager, C-level Manager,* and *Enterprise Architect.* Further, the user has to select the concern the role should consider in order for the tool to know which case view to provide to the user in the next step. The concern-dropdown provides only the applicable concerns based on the role selected previously. Which concerns are provided to which role is described in Table 186. The last input required from the user to start creating a case is to specify a name given to the new case. This name is required if the user decides to store the newly created case later on since the ICEBERG tool provides the option to save new cases within the case repository.
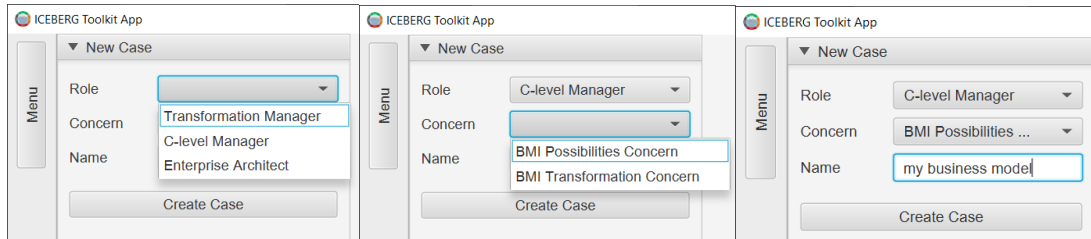
Figure 72: Creation of a new case

The third step is to specify the current business as the new case. Depending on the selected concern, a different hierarchy of the problem description is provided within the ICEBERG tool. Figure 73 shows an example of the user's view if the concern *BMI Possibilities Concern* was selected. The case model for the business model & business capability ontology is shown within the user interface because of that selection. The user now has to input all the information the user wants to have compared with the business model innovation cases within the case repository. For example, the user can provide information on which niche market should be matched to, if that customer segment should be seen as diversified or not, and if it is a multi-sided platform.
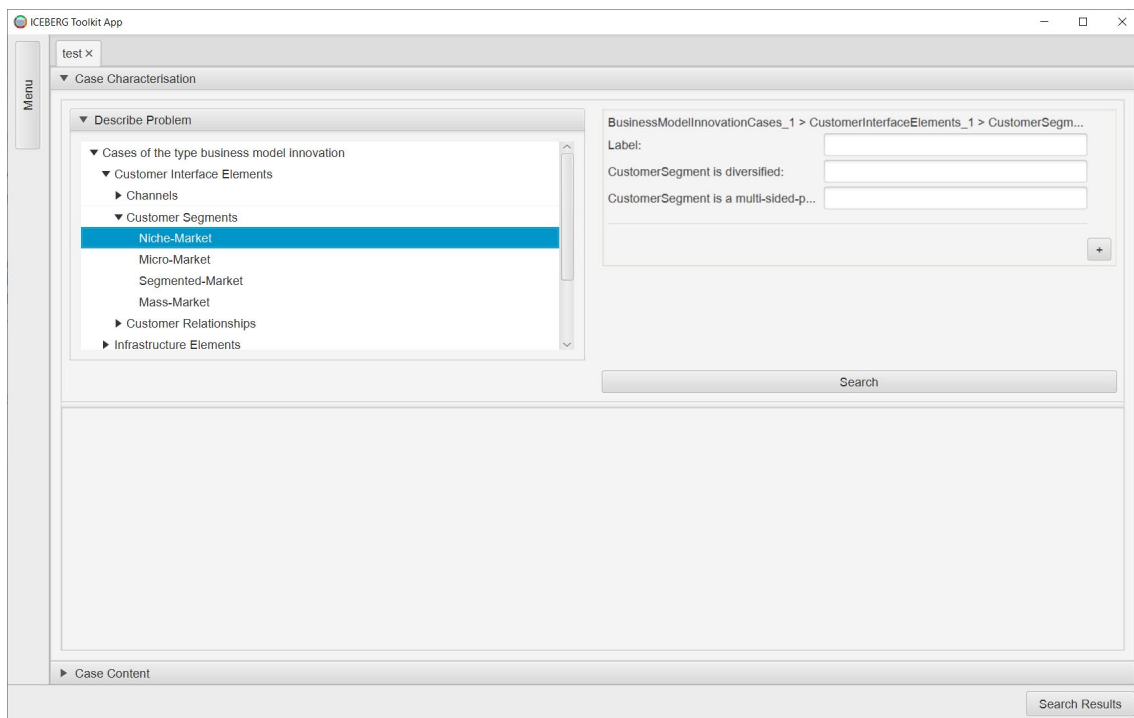
Figure 73: Description of the new case

As soon as the user presses the *Search* button, the ICEBERG tool starts the similarity measurement of the user's provided data against the data within the case repository. The outcome of the search is twofold. The user gets the case model for the previously selected concern added with the user's data as a tree hierarchy, as shown in Figure 129. Also, the user receives an overview of the business model innovation cases assigned to the previously selected concern, as shown in

Figure 130. For each case, the calculated similarity is shown next to the case name. This list of cases is assorted by showing the case with the highest similarity on top and going down the list when the similarity results decrease.
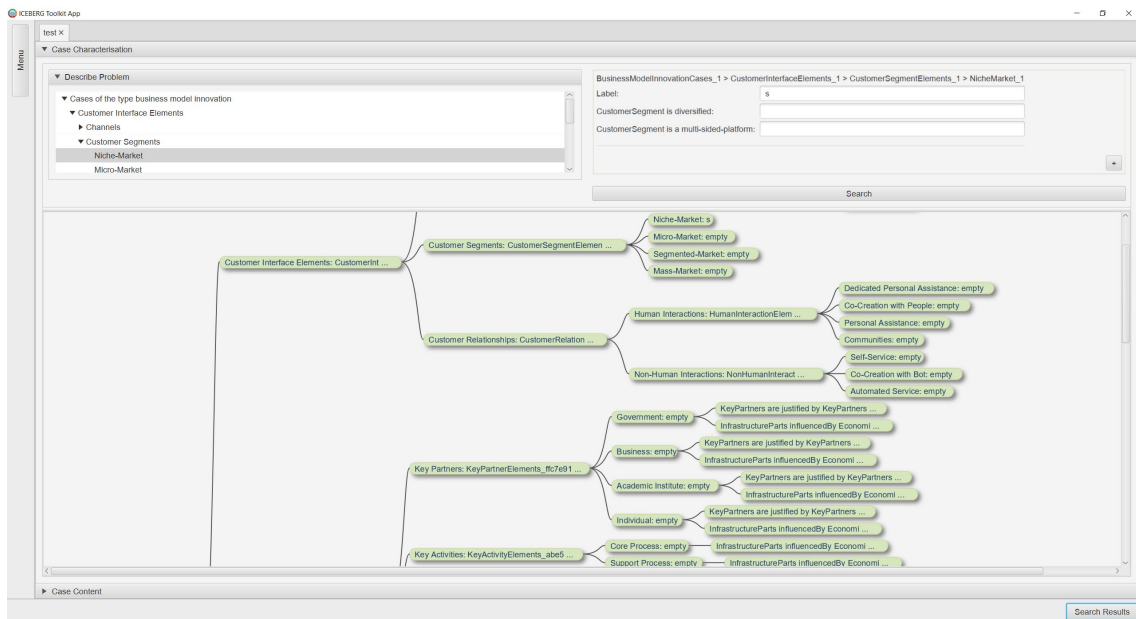
Figure 74: Tree hierarchy of the selected concern and the user's input data

Figure 75: List of the cases from the case repository with the similarity calculation

8.3   Summary and Conclusion

This chapter describes how based on the defined competency questions for developing the business model innovation case ontology, the Boolean and case-based reasoning matching was developed and how it is applied. The Boolean matching method requires SPARQL-based queries to be applied to the RDF-based business model innovation case repository. The case-based reasoning matching method requires two new ontologies, including the case model for the concerns of each stakeholder and its case view as well as the similarity measures for each object property, annotation property, or datatype property that should be considered during the calculation of the similarity of the user's case and the case repository.

The application of both matching methods revealed that the two different methods to support users to ideate for business model innovation ideas are feasible. For the business model innovation challenge of thinking outside the industry boundaries, the Boolean matching method is helpful since it can filter out the business model innovation cases from the user's sector and provide ideas of business model innovation from other sectors. For the business model innovation challenge of comparing a business model or enterprise architecture with a possible business model or enterprise architecture, the case-based reasoning matching method is helpful. It provides the opportunity for users to compare the entered business model or enterprise architecture with business models or enterprise architectures from a selection of business model innovation cases. This comparison is based on a similarity function, and thus, the users receive the information of how close a possible business model innovation case is regarding the own business characteristics. Further, the business model innovation challenge of leveraging the own business capabilities is supported by the similarity-retrieval service since the user can provide its business capabilities and receive recommendations of business model innovation cases that require similar capabilities.

9. Evaluation of the Ontology-Aided Business Model Innovation Approach

This chapter addresses the evaluation phase of the design science research approach by Hevner and Chatterjee (2010), described in Sub-chapter 3.5.2. The authors mention that for design science, a scenario-based approach regarding the evaluation is recommendable. Thus, this research applied a scenario-based evaluation approach. Therefore, Sub-chapter 9.1 describes the set-up for the scenario which is to be used for the evaluation. Further, Sub-chapter 9.2 describes the evaluation itself that encompasses the developed ontology for structuring business model innovation cases, described in Chapter 6, and the two matching methods to filter and recommend business model innovation cases to users, described in Chapter 8. This chapter ends with a summary of the evaluation and a conclusion of it.

9.1 Evaluation Set-up

To perform the evaluation the application scenario needs to be defined as well as the technical environment on which the ontologies and the two matching methods have to run. Further, the case repository needs to be set-up so that the matching methods can be performed.

9.1.1 Application Scenario for the Evaluation

The application scenario for evaluating the artifacts draws upon the information and experience gained from the project of digital transformation within the construction sector. The application scenario is based on a problem communicated by a workshop participant on the workshop regarding digital transformation within the construction sector (Workshop Construction Experts, 2018).

According to the workshop participant, their company, an architectural office, was concerned about adapting the BIM (building information modeling) method within their company. For this method, they would need either to hire experience employees on BIM techniques, such as BIM-managers, or train their current staff on the BIM method. In addition, they would need to modernize their IT infrastructure in order to handle BIM-based construction projects. The main benefit for the company would be that they could participate in tenders for construction projects for which BIM-supported construction knowledge was required. In the meantime, this company has adopted the BIM method to its business capabilities. Nowadays, they can offer traditional

construction planning techniques as well as BIM-based planning techniques. They hired experienced BIM-managers and trained off-the-job architects willing to learn the BIM method and the knowledge required to handle the new IT tools for BIM-based projects. Figure 76 illustrates the targeted business model during the workshop in 2018, which has been implemented for the architectural office.
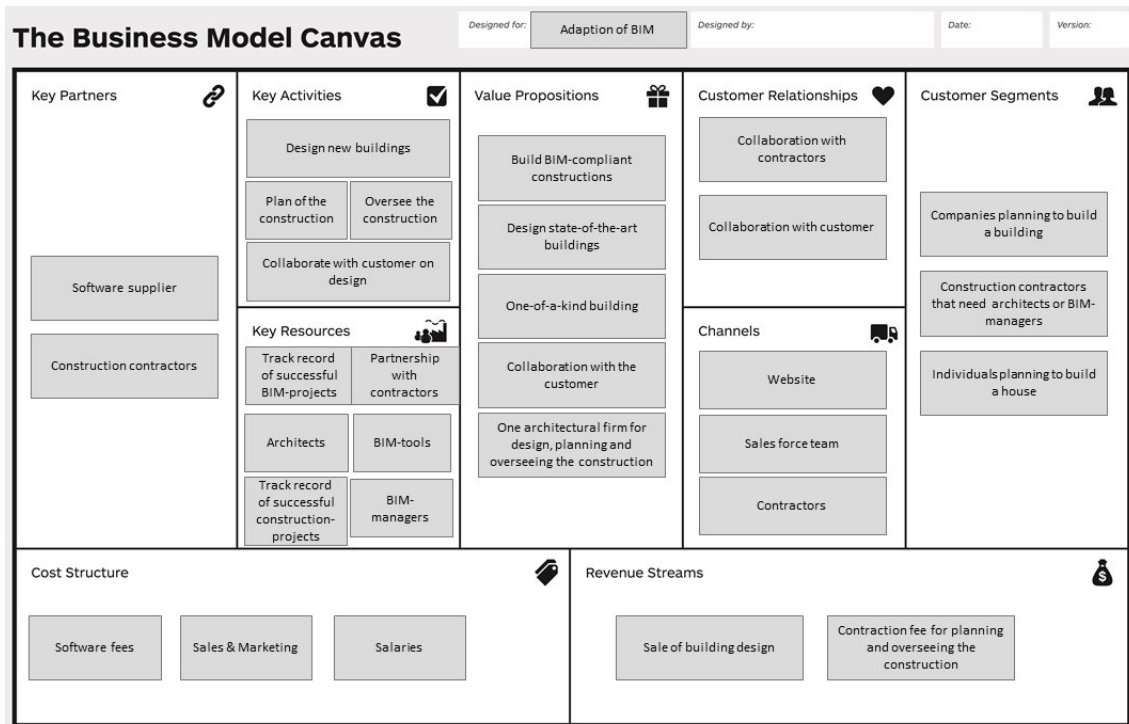
Figure 76: Business Model Canvas designed for the application scenario case

This application scenario was selected because it is from the construction sector, for which this research extended the generic business model innovation case ontology and the matching methods. Further, the application scenario is a common scenario for architectural or engineering firms in today's construction sector, as the research project of the digital transformation in the construction sector has revealed.

9.1.2   Evaluation Environment

The evaluation environment was set-up during the development of the ontologies, described in Chapter 6, since as part of the development the ontologies were implemented into an integrated development environment for ontology development. There exist several software applications for this purpose. For this research, the software application TopBraid Composer (TopQuadrant, 2019) was used. Figure 77 illustrates a screenshot of the TopBraid Composer. Another benefit of using TopBraid Composer, besides the fact that it suits perfectly as an environment for ontology

development, is that this software is capable of applying SPARQL queries. This function is essential for the evaluation of the Boolean matching method described in Sub-chapter 8.1.
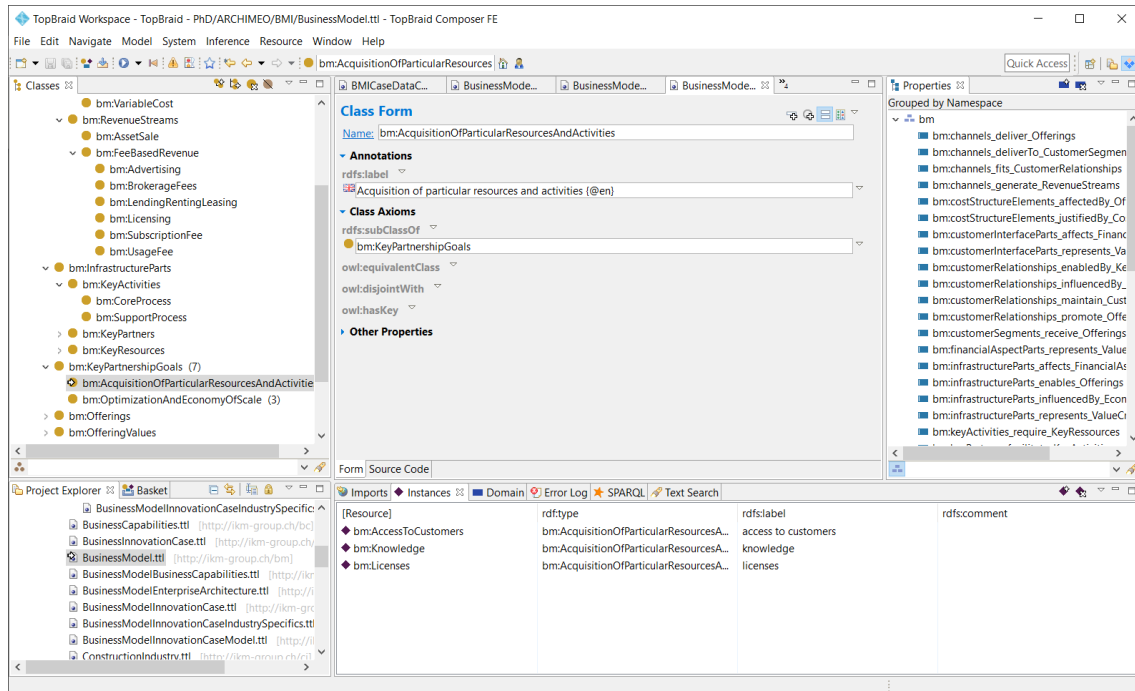
Figure 77: Screenshot of the TopBraid Composer

To evaluate the case-based reasoning matching method, an appropriate technical environment is required. For this purpose, the ICEBERG tool from Martin (2016) was adjusted to support the ontology for business model innovation cases with industry specifics. Further, the tool is used to apply the case-based reasoning matching method for business model innovation cases. The application of the tool is further described in Sub-chapter 8.2.2.

9.1.3   Business Model Innovation Case Repository Set-up

The research requires a case repository consisting of business model innovation cases to apply the matching methods. Thus, the ontology needs to be populated with the instances and properties that describe the individual business model innovation cases. For this purpose, the three business model innovation cases described in Chapter 4 are implemented using the software application TopBraid Composer. To implement these cases, first, the ontologies described in Sub-chapters 6.2 and 6.3 needed to be implemented. Afterward, the three business model innovation cases were implemented based on the business model innovation case with industry specifics ontology. In addition, a fourth case was created representing the Add-on business model pattern by Gassmann et al. (2014). To represent the Add-on business model pattern, the company Ryanair was used as a case example since Ryanair is a prime example for the add-on concept, according to Gassmann et al. (2014). The reason to add a fourth case is to evaluate if the generic business model

innovation case ontology can be used for other cases than the three cases used during the data collection, representing the basis for the development of several properties of the ontology.

The code to represent the four business model innovation cases is shown in Appendix-D: Case Repository. As an example, Figure 78 shows the part for the business model innovation transformation properties of the ontology representing the business model innovation case BIM-Manager-as-a-Service that has been described in Sub-chapter 4.1.

[Resource]	rdf:type
◆ bmicdca:BIMManagers	bic:HumanRessources
◆ bmicdca:BetterWorkloadUtilizationOfBIMManagers	bic:InvolvedPartyBenefits
◆ bmicdca:BusinessModelAfterInnovating	bic:StateAfterInnovating
◆ bmicdca:CreateANewCustomerSegment	bic:StrategicGoals
◆ bmicdca:HiringTooManyBIMManagers	bic:RisksOfInnovation
◆ bmicdca:ImprovedWorkloadOptimization	bic:StrategicGoals
◆ bmicdca:LosingerMarazzi	bic:InvolvedParties
◆ bmicdca:MaintainAHighLevelOfBIMCompetency	bic:IntellectualBarriers
◆ bmicdca:NewValueStream	bic:InvolvedPartyBenefits
◆ bmicdca:NotEnoughWorkloadForBIMManagers	bic:Drivers
◆ bmicdca:NotHavingEnoughBIMManagersForCustomerDemands	bic:RisksOfInnovation
◆ bmicdca:NotHavingEnoughBIMManagersForOwnProjects	bic:RisksOfInnovation
◆ bmicdca:ReputationForBIM	bic:IntellectualRessources
◆ bmicdca:WillingnessOfBIMManagersToBeOutsourced	bic:OrganisationalBarriers

Figure 78: Snippet of the instances for the case characteristics of a business model innovation transformation

During the integration of the four business model innovation cases, some adjustments needed to be done on the ontologies since some relations could not be implemented as required. Thus, this integration of the cases acted also like an evaluation of the business model innovation case with industry specifics ontology as it represented an integration of the ontology development process.

9.2   Evaluation

This chapter's aim is two-fold. First, this chapter aims to demonstrate that it is possible to represent business model innovation cases in a structured form using an ontology-based approach. Thus, the approach becomes machine-readable by using an ontology for representation. Second, this evaluation demonstrates that it is possible to implement a filtering service as well as a similarity-retrieval service as described in Sub-chapter 5.1.2 since the ontology is represented within a triple store database that can be queried.

Sub-chapter 9.2.1 evaluates the business model innovation case ontology by depicting the details of the ontology and providing insight of how the application scenario, described in Sub-chapter 9.1.1, is represented within the ontology. Sub-chapter 9.2.2 evaluates the Boolean matching method and thus, the filtering service of the proposed solution. Both evaluations, the ontology

evaluation and the Boolean matching method evaluation, use the competency questions, which were specified at the beginning of the ontology development process, to structure the evaluation. The similarity-retrieval service, which is based on a case-based reasoning approach, is evaluated in Sub-chapter 9.2.3 by comparing the results of the tool with expected results by the experts.

9.2.1   Ontology Evaluation

This chapter deals with the final evaluation of the developed ontologies to represent a business model innovation case. This is achieved by checking if the ontology is capable of answering the competency questions from Sub-chapter 6.1.2. This is achieved by adding the application scenario, described in Sub-chapter 9.1.1, to the ontology and checking if the competency sub-questions can be answered by looking at the application scenario case. The competency questions were defined at the beginning of the ontology development process and, as suggested by Noy and McGuinness (2001), these competency questions act as evaluation criteria to make sure the ontology can answer them. Further, the application scenario acts as proof that it is feasible to add other cases to the business model innovation case repository.

Each of the following sub-chapters is dedicated to one of the five competency questions.

9.2.1.1   *Ontology Evaluation of the First Competency Question*

The first competency question regarding the properties of the business model concept within a business model innovation case encompasses four sub-questions as described in Sub-chapter 6.1.2. To answer each of these competency sub-questions, a graph has been created using TopBraid Composer to illustrate the business model properties of the ontology. Further, to showcase the representation of a case within the ontology, the instances of the application scenario case are shown within the graph.

Competency sub-question: *Which are the infrastructure properties of a business model innovation case?*

Figure 79 illustrates the ontology graph for answering the competency sub-question regarding the business model innovation case's infrastructure properties from a business model perspective. Also, the figure includes the infrastructure instances for the application scenario case. To showcase the relationship between the instances themselves for the application scenario case, Figure 80 has been created. The relations between the instances demonstrate the complexity of a business model that the ontology can represent. For example, the application scenario has a key resource of the type IT-systems called *BIM-tools*. This instance has a relation to the four instances of the core processes from the key activities. *BIM-tools* is required for the execution of the core

processes *Plan of the construction, Oversee the construction, Design new buildings*, as well as *Collaborate with customer on design*. Further, *BIM-tools* has a relation called *KeyPartners provide KeyRessources* from the instance *Software supplier* of the type *Business* from the class *KeyPartners*.

Competency sub-question: *Which are the customer interaction properties of a business model innovation case?*

Figure 81 illustrates the ontology graph for answering the competency sub-question regarding the business model innovation case's customer interaction properties from a business model perspective. Also, the figure includes the customer interaction instances for the application scenario case. To showcase the relationship between the instances themselves for the application scenario case, Figure 82 has been created. The relations between the instances demonstrate the complexity of a business model that the ontology can represent. For example, the application scenario has a customer relationship of the type human interaction and sub-type co-creation with people called *Collaboration with customer*. This instance has a relation to the customer segment of the type segmented market called *Individuals planning to build a house* and to the instance of the same class called *Companies planning to build a building*. The reason for this relation is that the customer relationship maintains these two customer segments. Further, the customer relationship instance *Collaboration with customer* has a relation from the direct channel instance *Sales force team* called *Channels fits Customer Relationships* since the sales force team supports the activity of collaborating with customers for a successful customer relationship.

Competency sub-question: *Which are the offering properties of a business model innovation case?*

Figure 83 illustrates the ontology graph for answering the competency sub-question regarding the business model innovation case's offering properties from a business model perspective. Also, the figure includes the offering and offering values instances for the application scenario case. To showcase the relationship between the instances themselves for the application scenario case, Figure 84 has been created. The relations between the instances demonstrate the complexity of a business model that the ontology can represent. For example, the application scenario has a qualitative offering value of the type design called *Design state-of-the-art buildings*. This instance has a relation to the offering's sub-class service instance called *Design a building*. The reason for this relation is that the offering *Design a building* provides the offering value *Design state-of-the-art buildings* to the customer segments.
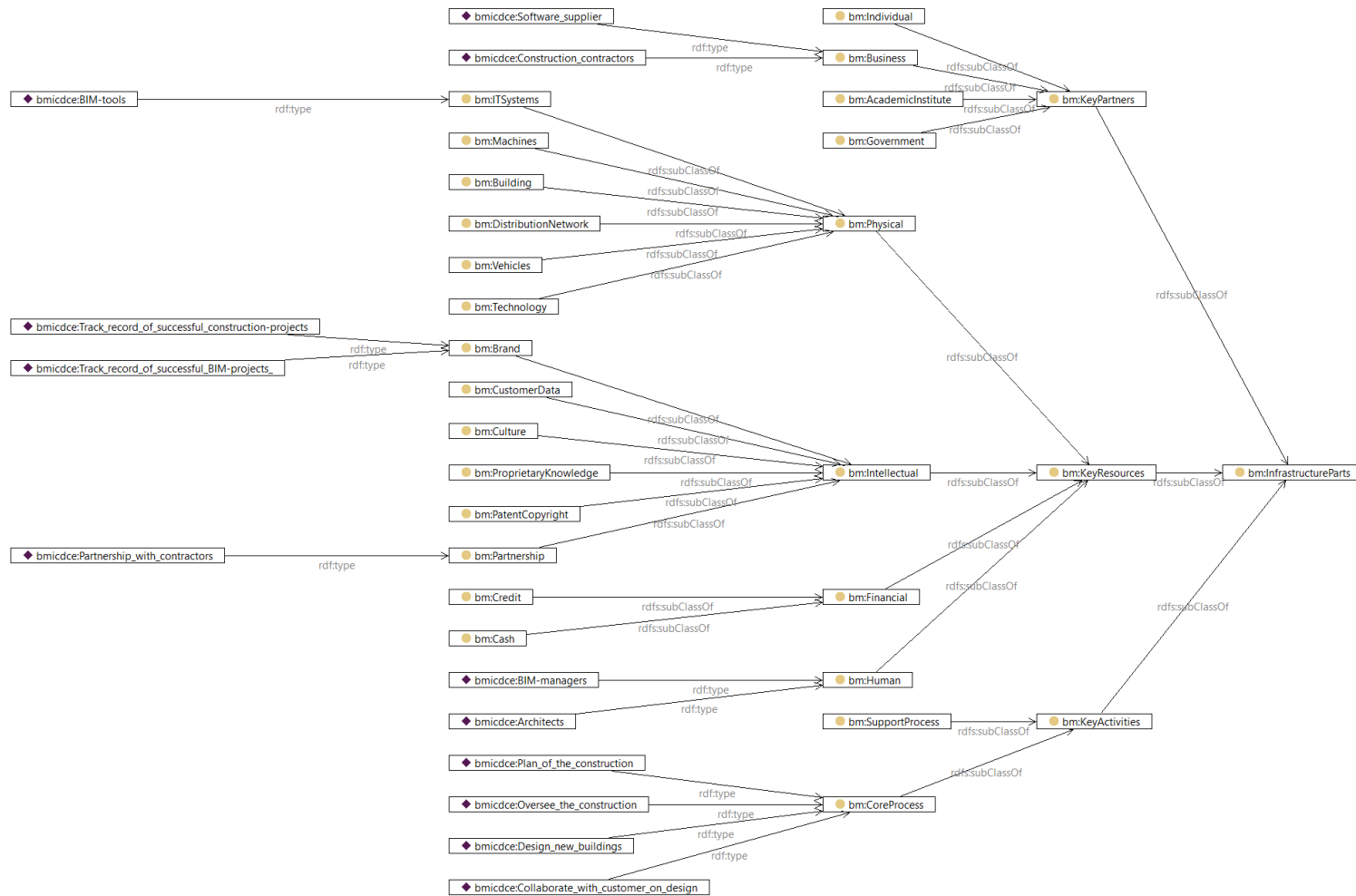
Figure 79: Ontology representation of the infrastructure properties containing the instances of the application scenario case
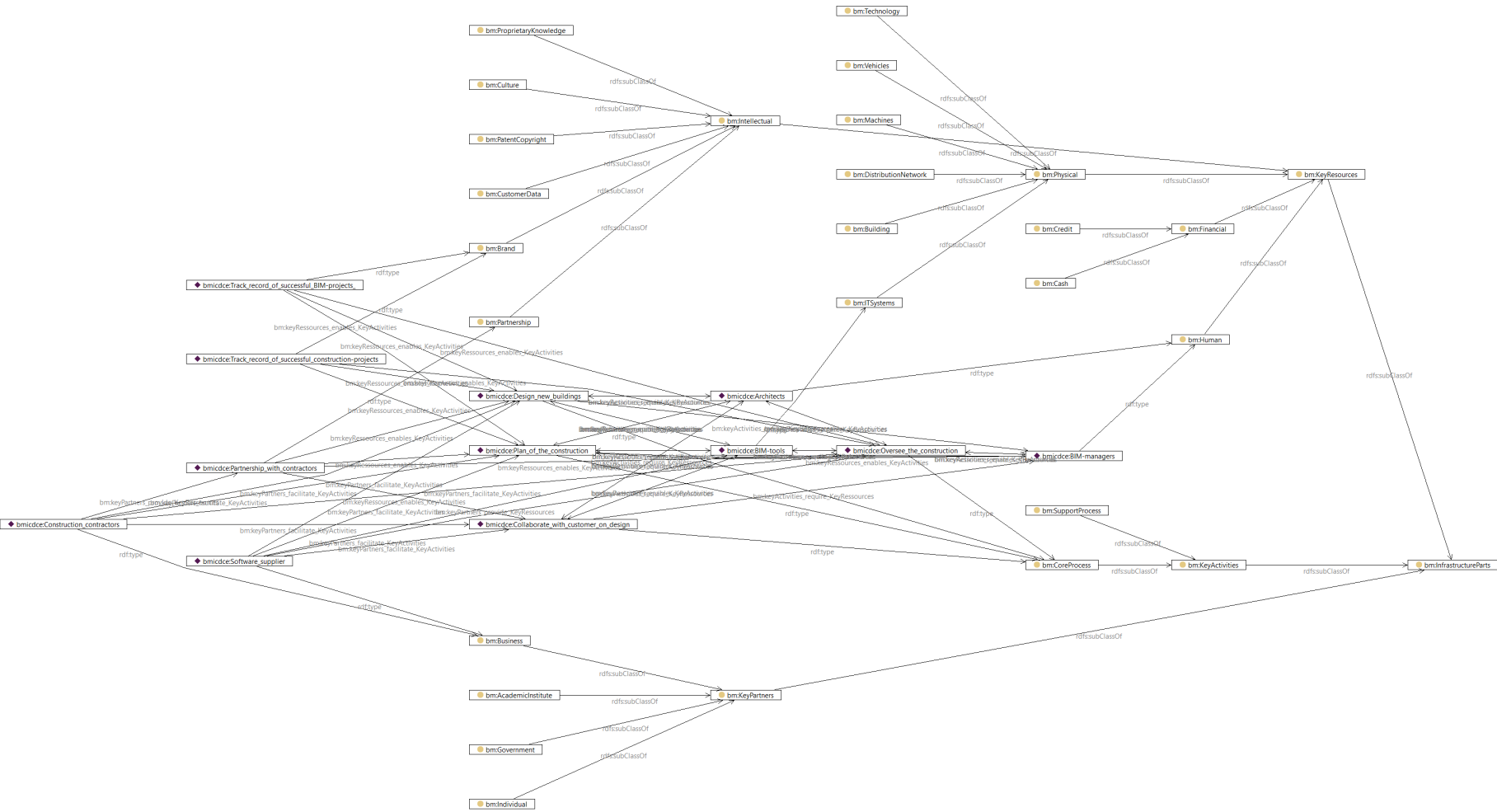
Figure 80: Ontology representation of the infrastructure properties containing the instances of the application scenario case and the relations between them
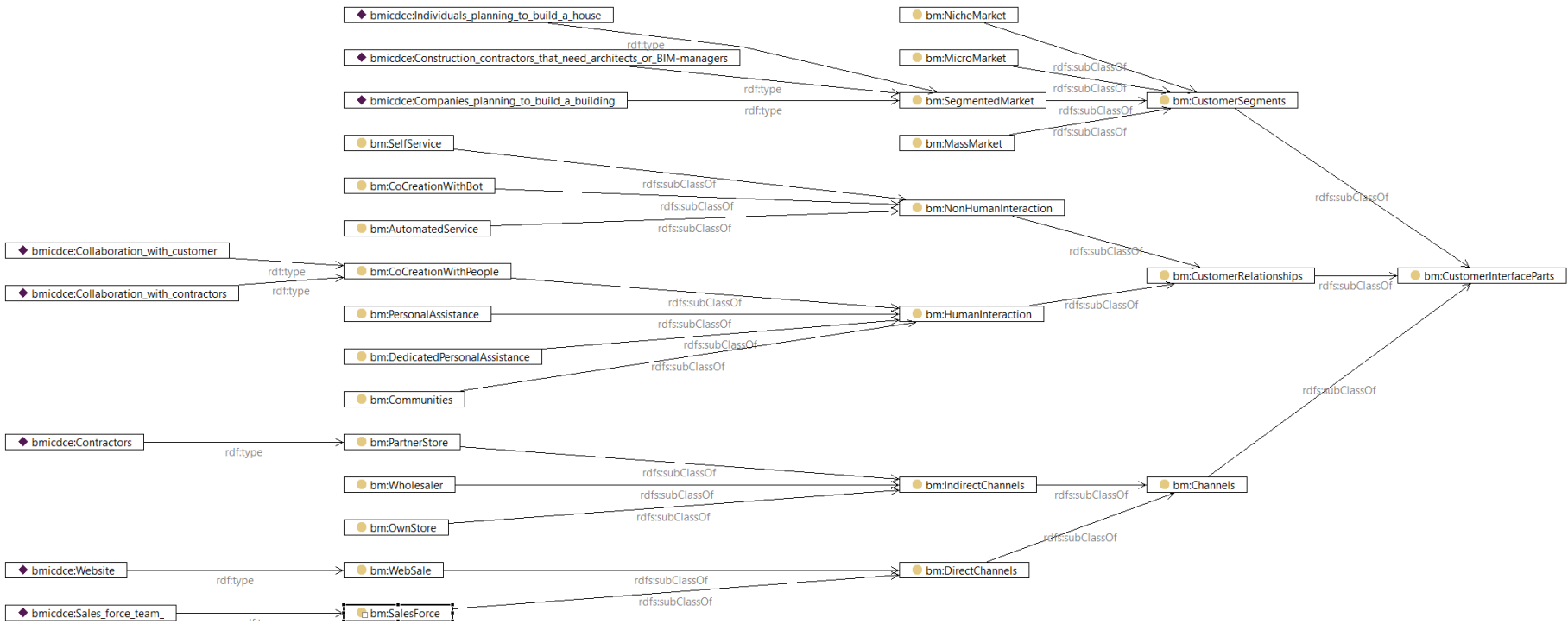
Figure 81: Ontology representation of the customer interaction properties containing the instances of the application scenario case
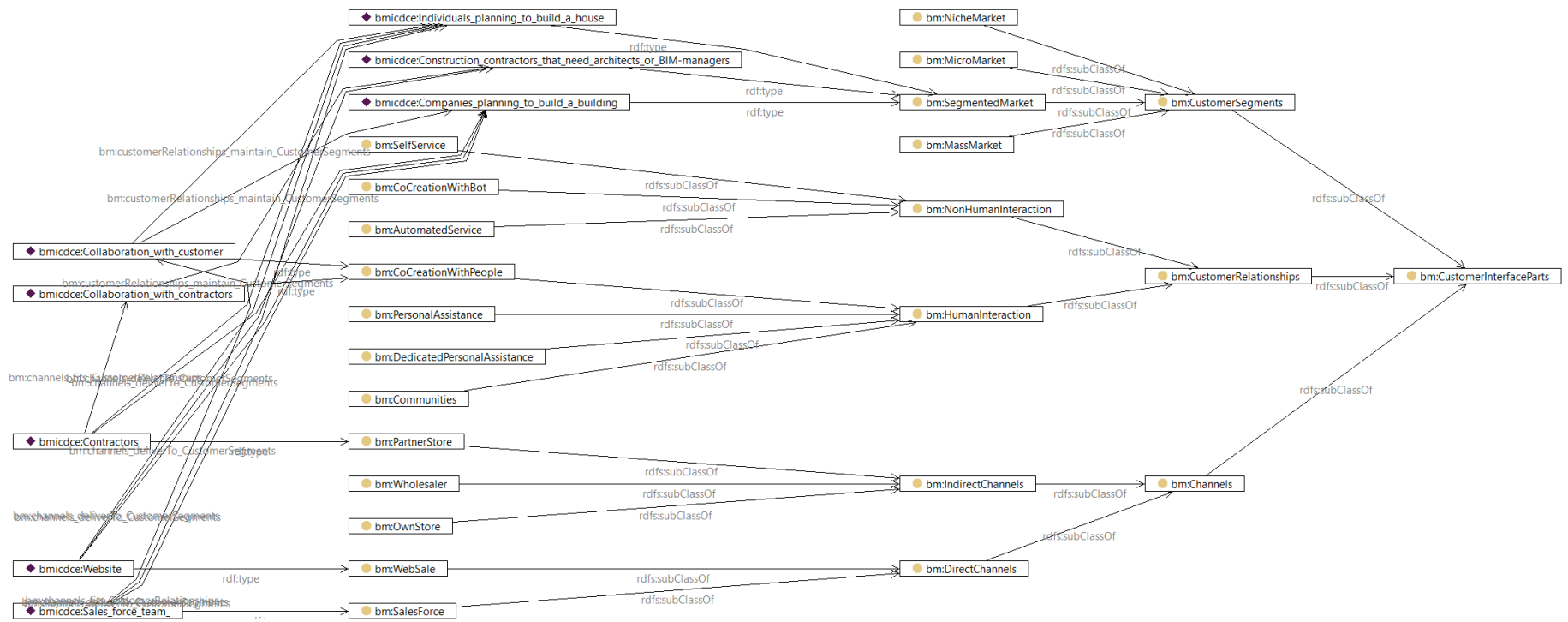
Figure 82: Ontology representation of the customer interaction properties containing the instances of the application scenario case and the relations between them
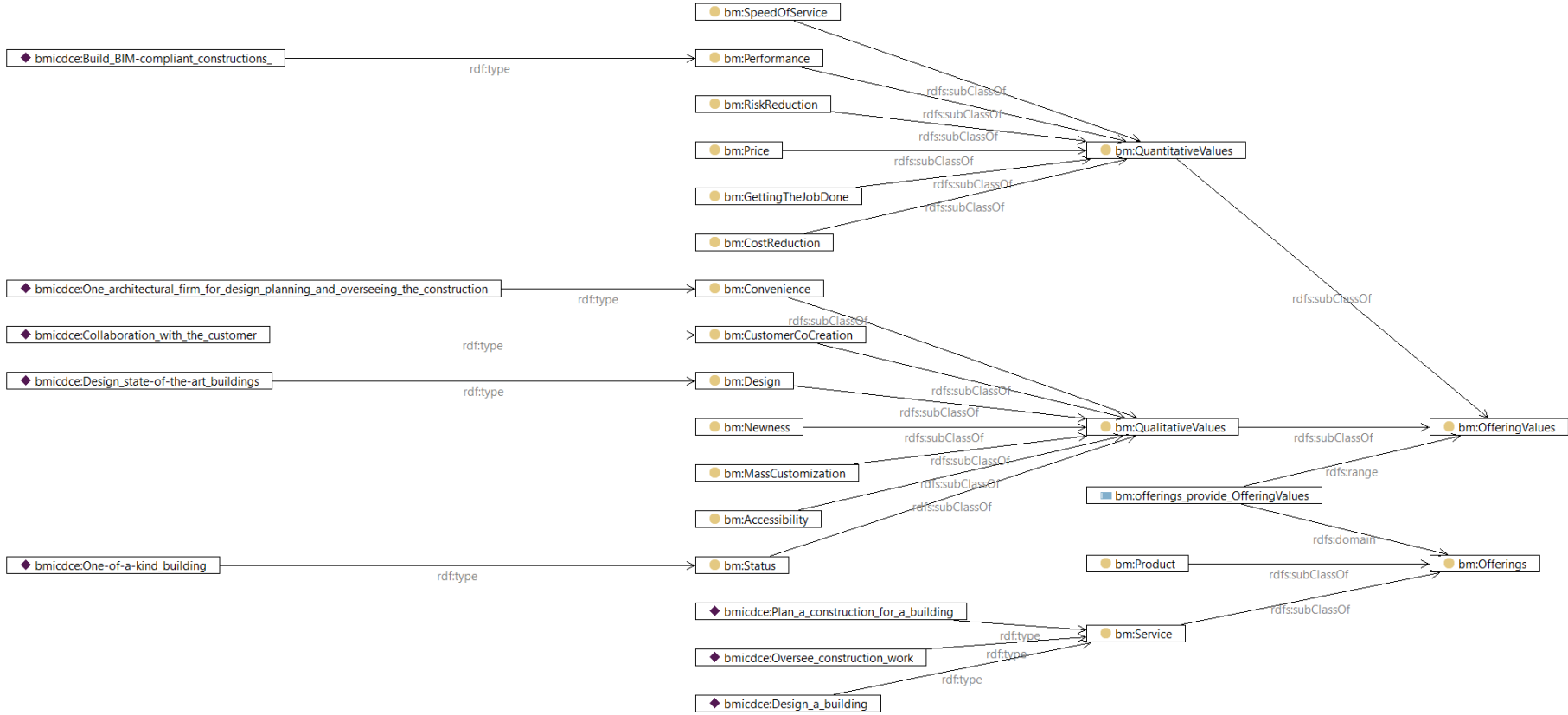
Figure 83: Ontology representation of the offering properties containing the instances of the application scenario case
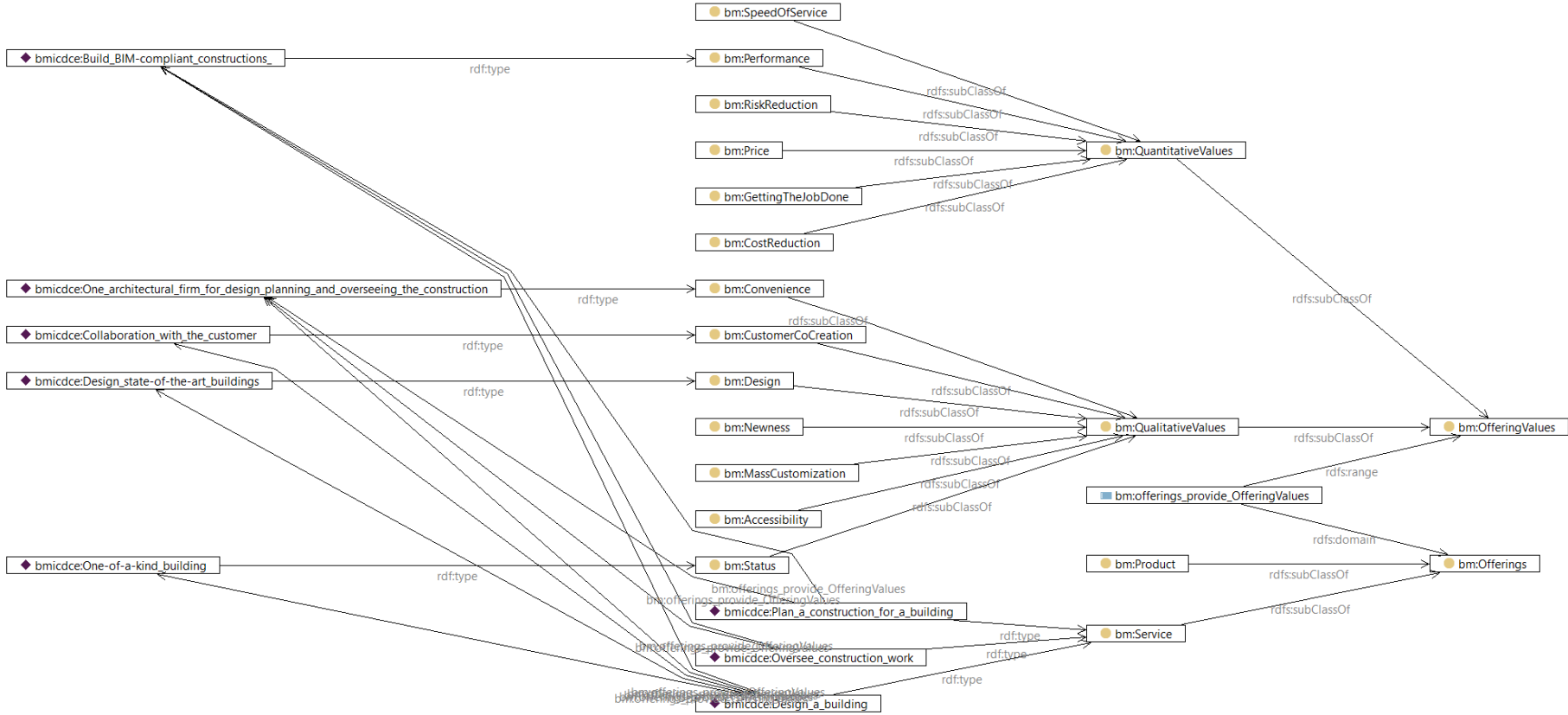
Figure 84: Ontology representation of the offering properties containing the instances of the application scenario case and the relations between them

Competency sub-question: *Which are the financial properties of a business model innovation case?*

Figure 85 illustrates the ontology graph for answering the competency sub-question regarding the business model innovation case's financial properties from a business model perspective. Also, the figure includes the financial property instances for the application scenario case. To showcase the relationship between the instances themselves for the application scenario case, Figure 86 has been created. The relations between the instances demonstrate the complexity of a business model that the ontology can represent. For example, the application scenario has a revenue stream of the type asset sale called *Sale of building design*. This instance has a relation towards the pricing mechanisms of the class *DynamicPricing* called *Negotiation*. The reason for this relation is that every revenue stream has a mechanism to determine the pricing. The same relation applies to the instance *Contraction fee for planning and overseeing the construction* that belongs to the class *Lending/Renting/Leasing,* a fee-based revenue stream.

There are further relationships between the instances. This chapter only showed the relationships within a specific property since this was required to answer the competency question. However, the business model ontology contains other relationships, such as the relationship between the offerings and the customer segments. This relation is called *Offerings value for CustomerSegments*. An example showcasing this relation between parts of the offering properties and the customer interaction properties is depicted in Figure 87, where the service offering *Design a building* is a value for the three segmented markets *Individuals planning to build a house, Construction contractors that need architects of BIM-managers*, and *Companies planning to build a building*.
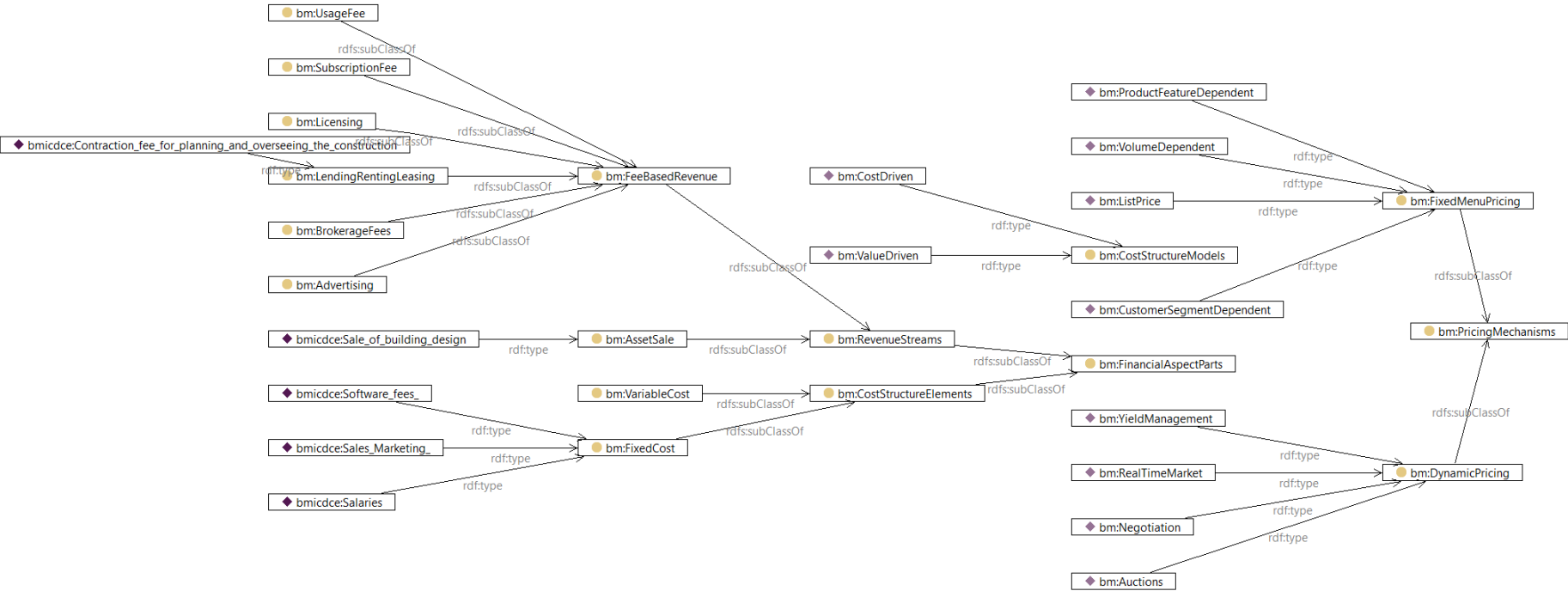
Figure 85: Ontology representation of the financial properties containing the instances of the application scenario case

Figure 86: Ontology representation of the financial properties containing the instances of the application scenario case and the relations between them
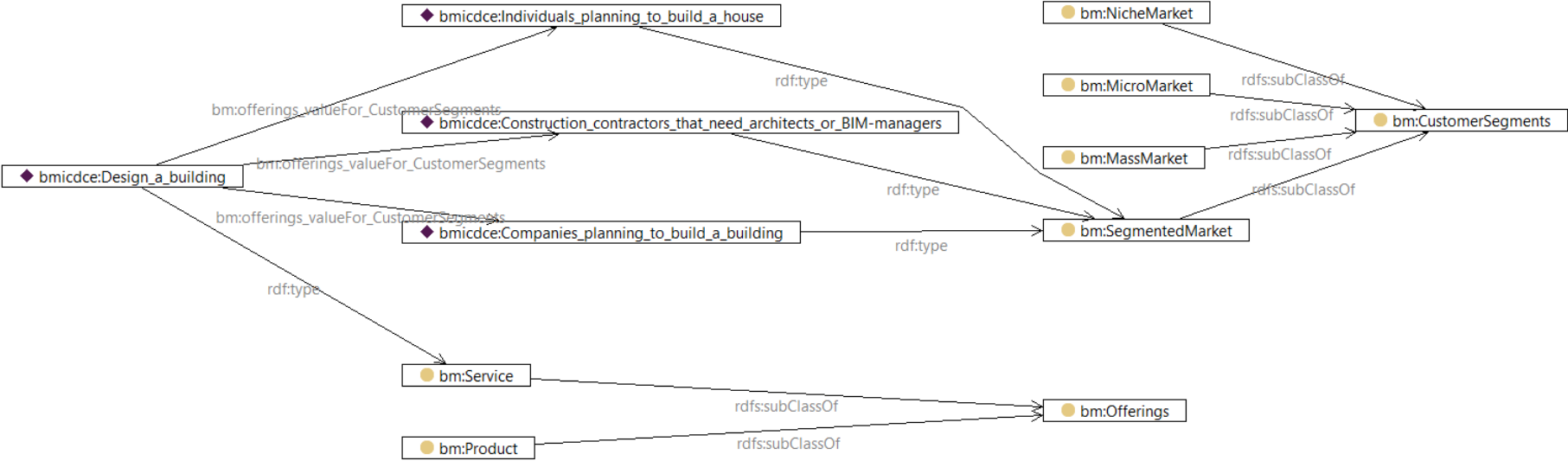
Figure 87: Ontology representation of the relationship between the offering and customer interaction properties containing the instances of the application scenario case

9.2.1.2   Ontology Evaluation of the Second Competency Question

The second competency question regarding the properties of the business innovation transformation concept within a business model innovation case encompasses six sub-questions as described in Sub-chapter 6.1.2. To answer each of these competency sub-questions, a graph has been created using TopBraid Composer to illustrate the business innovation transformation properties included within the ontology. Further, to showcase the representation of a case within the ontology, the instances of the application scenario case are shown within the graph.

Competency sub-question: *Which are the involved parties of the represented business model innovation case?*

Figure 88 illustrates the ontology graph for answering the competency sub-question regarding the representation of the involved parties of a business model innovation case, in this case, the application scenario case. The ontology snapshot represents that it is possible to represent a case that is composed of the concept *InvolvedParties*. For this application scenario, the *BMICase E* is composed of the involved party called *Architectural office*.
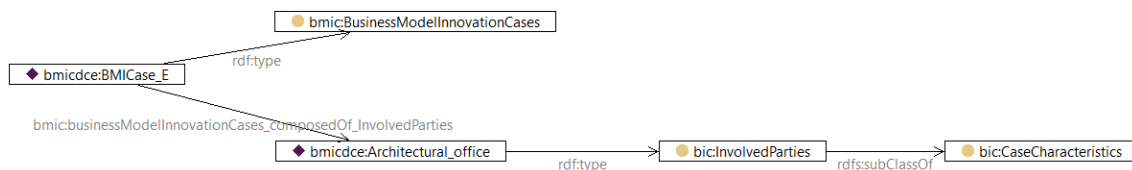
Figure 88: Ontology representation of the involved parties instances of the application scenario case

Competency sub-question: *To which sectors do the involved parties belong?*

Figure 89 illustrates the ontology graph for answering the competency sub-question regarding the representation of the sectors to which the involved parties of a business model innovation case belong. The graph depicts that the involved party *Architectural office* from the business model innovation case *BMICase E* belongs to the industry *Construction*. Thus, it is possible to represent the sectors to which an involved party belongs within the business model innovation case ontology.
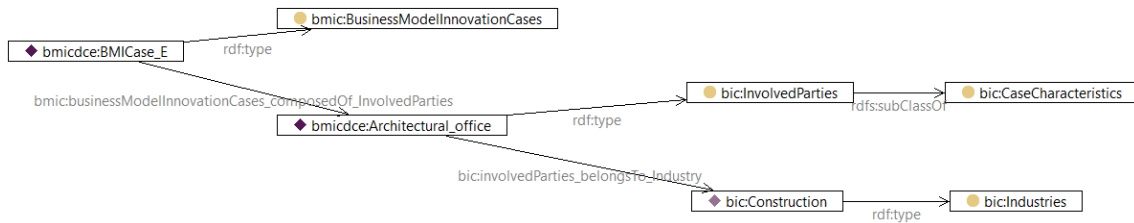
Figure 89: Ontology representation of the involved parties' sectors instances of the application scenario case

Competency sub-question: *Which are the motives of the involved parties to change?*

Figure 90 illustrates the ontology graph for answering the competency sub-question regarding the representation of the motives to change for each involved party of a business model innovation case. The business innovation case ontology represents the concept of motives to change as drivers an involved party had and strategic goals an involved party had to perform the innovation. Thus, the ontology representation contains the classes *Strategic goals* and *Drivers* as motives to change.

The graph in Figure 90 depicts that for the application scenario example, the involved party *Architectural office* from the business model innovation case *BMICase E* has one driver called *Modernize the portfolio*. In addition, the involved party *Architectural office* has two strategic goals: *Offer a new value proposition to customers* and *Maintain or even increase revenue*. Thus, it is possible to represent the motives of an involved party to change within the business model innovation case ontology.
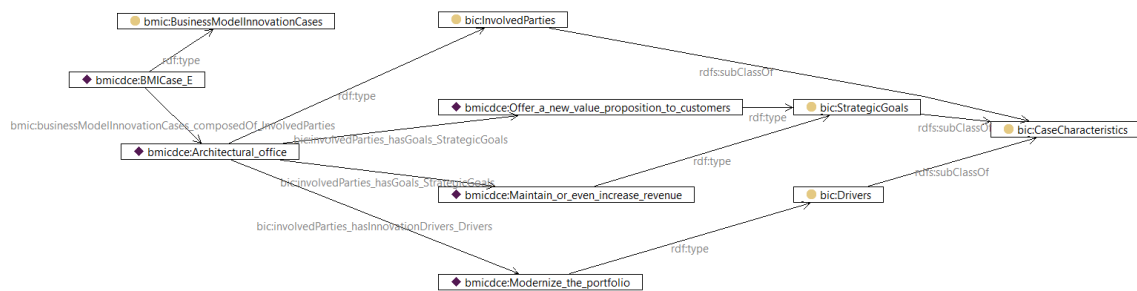
Figure 90: Ontology representation of the involved parties' motives to change instances of the application scenario case

Competency sub-question: *Which challenges did occur during the transformation?*

Figure 91 illustrates the ontology graph for answering the competency sub-question regarding the representation of the challenges that did occur during the transformation of a business model innovation case. The business innovation case ontology represents transformation challenges as barriers that need to be overcome and risks for implementing the innovation. Thus, the ontology

representation contains the classes *Barriers to overcome* and *Risks of Innovation* as transformation challenges.

The graph in Figure 91 depicts that two risks have been identified for the application scenario example: the risk that *BIM becomes obsolete* and the risks of *Not having enough BIM-projects for the BIM-managers*. Further, four barriers that need to be overcome for a successful transformation have been identified. The barriers *Maintain the competency of construction* and *Get the knowledge for BIM-projects* have been identified as intellectual barriers. The barrier *Resilience from architects not willing to adapt to the BIM-method* is a barrier of the type organisational barrier. The fourth barrier, *Adapt to new BIM-supporting tools*, is a technological barrier that needs to be overcome. Thus, it is possible to represent the transformation challenges of the implementation of a business model innovation within the business model innovation case ontology.
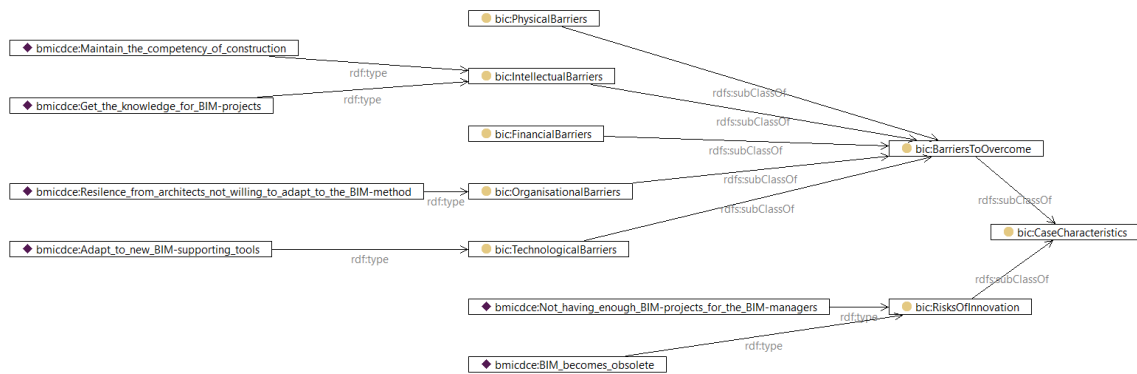
Figure 91: Ontology representation of the instances for the challenges of the transformation of the application scenario case

Competency sub-question: *Which are the results from the transformation of the business model?*

Figure 92 illustrates the ontology graph for answering the competency sub-question regarding representing the transformation results of a business model innovation case. The business innovation case ontology represents the concept of transformation results as benefits for the involved parties and the customers. The graph in Figure 92 depicts that for the application scenario example, three benefits of the innovation have been identified: the customer benefit *BIM-based projects can be bought*, the involved party benefits *Capable of performing BIM-projects* and *Adaption to modern construction method*. Thus, it is possible to represent the transformation results as benefits of the innovation for the involved parties and the customers of a business model innovation within the business model innovation case ontology.

Figure 92: Ontology representation of the instances for the results of the transformation of the application scenario case

Competency sub-question: *Which resources are required to achieve the business model innovation?*

Figure 93 illustrates the ontology graph for answering the competency sub-question regarding the representation of the required resources for a successful innovation of a business model innovation case. The ontology snapshot represents, based on the application scenario, that it is possible to represent the required resources of a business model innovation case. The example illustrated in Figure 93 shows how the four required resources types have instances representing the application scenario case. *Physical resources* has the instance *BIM-software*, *Intellectual resources* contains the instance *BIM-knowledge*, *Human resources* has the instance *Architects with BIM experience*, and *Financial resources* has the instance *Funds to hire experience BIM-managers*. This demonstrates the importance of the BIM topic for a successful implementation of the application scenario case.
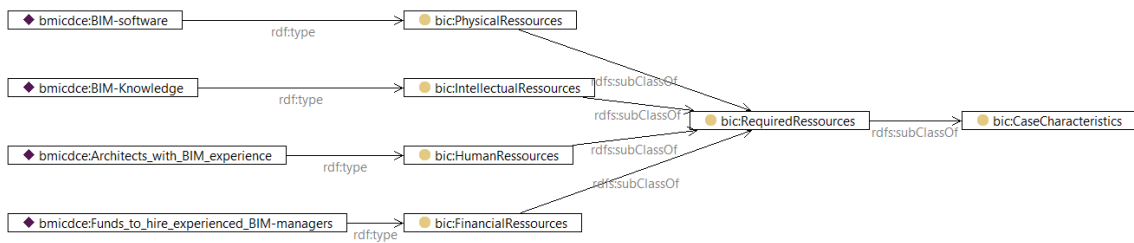
Figure 93: Ontology representation of the required resources instances of the application scenario case

9.2.1.3   Ontology Evaluation of the Third Competency Question

The third competency question regarding the properties of the enterprise architecture innovation concept within a business model innovation case encompasses five sub-questions as described in Sub-chapter 6.1.2. To answer each of these competency sub-questions, a graph has been created using TopBraid Composer to illustrate how the enterprise architecture properties are included within the ontology. Further, to showcase the representation of a case within the ontology, the instances of the application scenario case are shown within the graph.

Competency sub-question: *Which are the motivational properties of the business model innovation case from an enterprise architecture point of view?*

Figure 94 illustrates the ontology graph for answering the competency sub-question regarding representing the enterprise architecture's motivational properties of a business model innovation case. The ontology snapshot represents, based on the application scenario, that it is possible to represent the motivational properties of a business model innovation case. As an example, Figure 94 depicts the instance *Value one of a kind building* of the sub-class *Value* is part of the *Motivation element* class, which again is a sub-class of *Enterprise object*.

Competency sub-question: *Which are the strategic properties of the business model innovation case from an enterprise architecture point of view?*

Figure 95 illustrates the ontology graph for answering the competency sub-question regarding representing the enterprise architecture's strategic layer elements of a business model innovation case. The ontology snapshot represents, based on the application scenario, that it is possible to represent the strategic layer elements of a business model innovation case. Figure 95 depicts, for example, the instance *ValueStream Design new buildings* of the sub-class *Value stream,* which in turn is a sub-class of *Strategy behaviour element. Strategy behaviour element* is a sub-class of *Behaviour element,* which in turn is a sub-class of *Enterprise object*.

Competency sub-question: *Which are the business properties of the business model innovation case from an enterprise architecture point of view?*

Figure 96 illustrates the ontology graph for answering the competency sub-question regarding representing the enterprise architecture's business layer elements of a business model innovation case. The ontology snapshot represents, based on the application scenario, that it is possible to represent the business layer elements of a business model innovation case. Figure 96 depicts, for example, the instance *IntangibleProduct Oversee construction work* of the sub-class *Intangible product,* which in turn is a sub-class of *Product. Product* is a sub-class of *Passive structure element,* which in turn is a sub-class of *Structure element. Structure element* is a sub-class of *Enterprise object.*
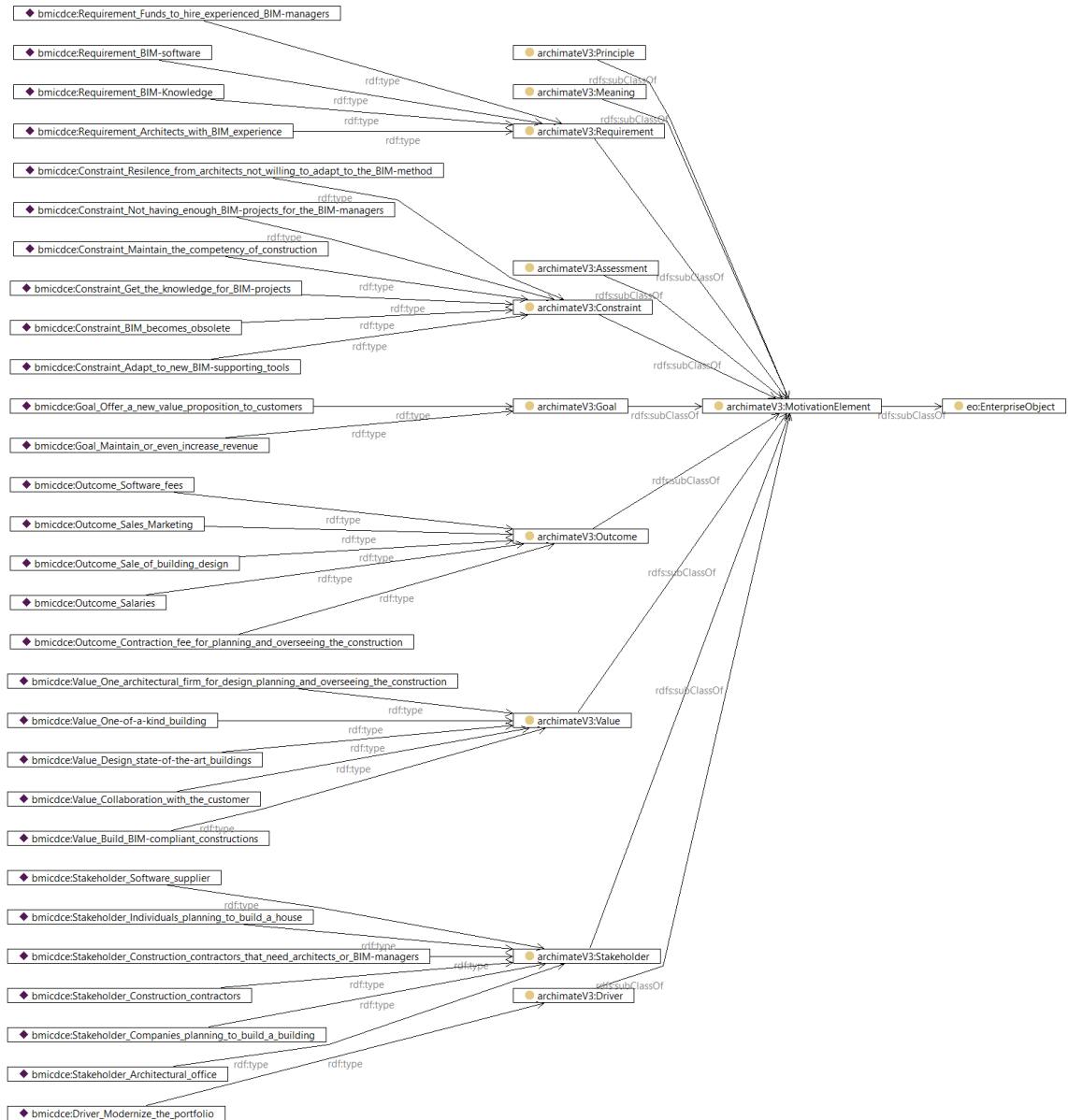
Figure 94: Ontology representation of the motivational properties instances of the application scenario case
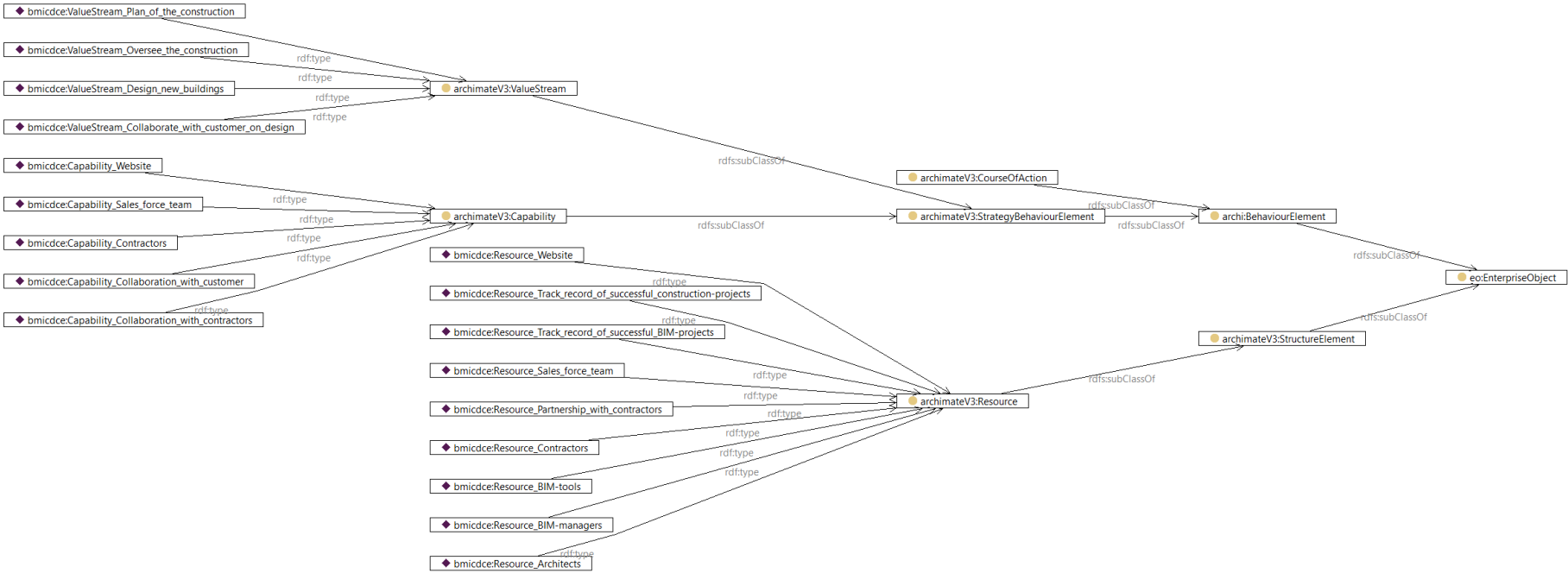
Figure 95: Ontology representation of the strategic properties instances of the application scenario case
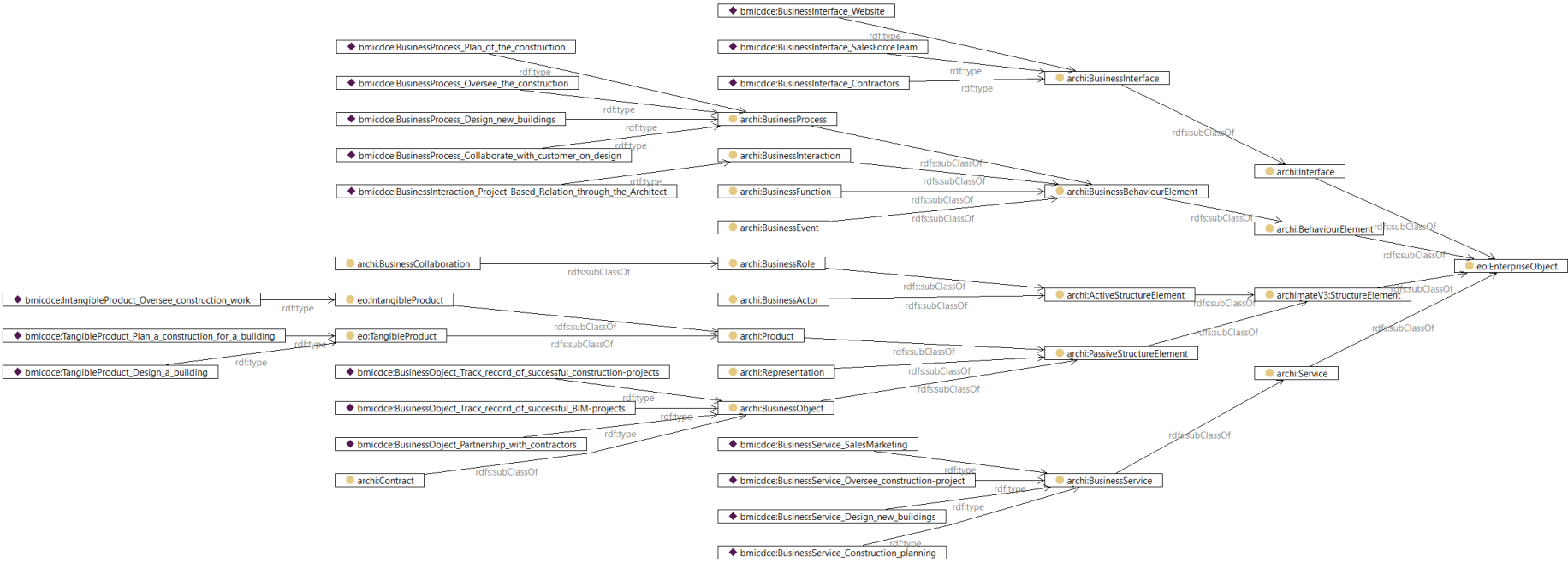
Figure 96: Ontology representation of the business properties instances of the application scenario case

Competency sub-question: *Which are the application properties of the business model innovation case from an enterprise architecture point of view?*

Figure 97 illustrates the ontology graph for answering the competency sub-question regarding representing the enterprise architecture's application layer elements of a business model innovation case. The ontology snapshot represents, based on the application scenario, that it is possible to represent the application layer elements of a business model innovation case. Figure 97 depicts, for example, the instance *ApplicationInterface BIM-tool-GUI* of the sub-class *Application interface,* which in turn is a sub-class of *Interface*. *Interface* is a sub-class of *Enterprise object*.

Competency sub-question: *Which are the technological properties of the business model innovation case from an enterprise architecture point of view?*

Figure 98 illustrates the ontology graph for answering the competency sub-question regarding representing the enterprise architecture's technology layer elements of a business model innovation case. The ontology snapshot represents, based on the application scenario, that it is possible to represent the technology layer elements of a business model innovation case. Figure 98 depicts, for example, the instance *SystemSoftware Colibri* of the sub-class *System software,* which in turn is a sub-class of *Infrastructure element*. *Infrastructure element* is a sub-class of *Active structure element,* which in turn is a sub-class of *Structure element*. *Structure element* is a sub-class of *Enterprise object*.
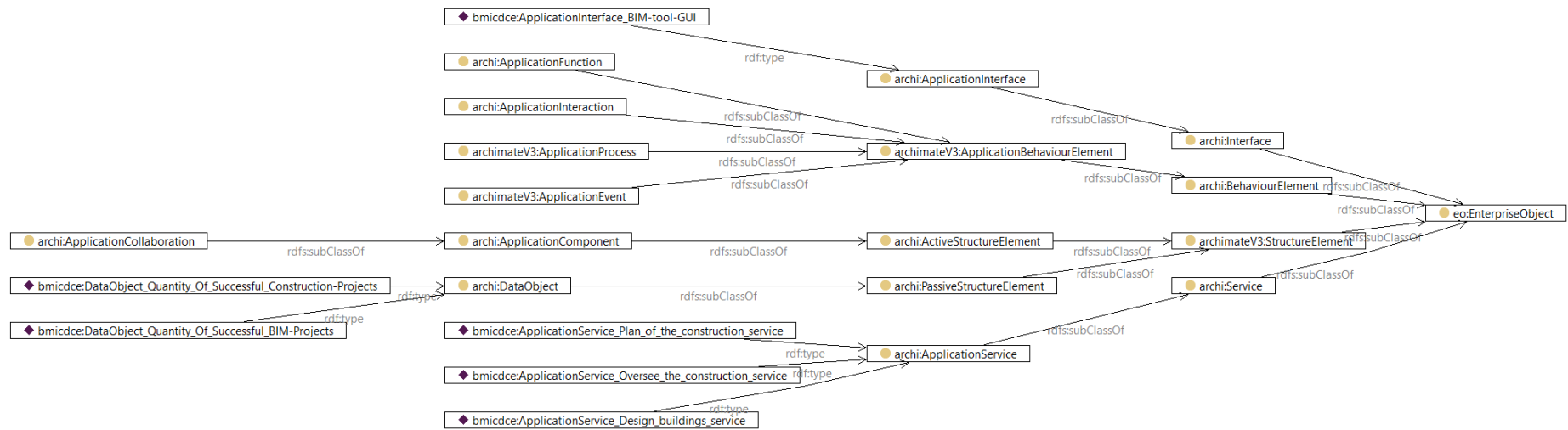
Figure 97: Ontology representation of the application properties instances of the application scenario case
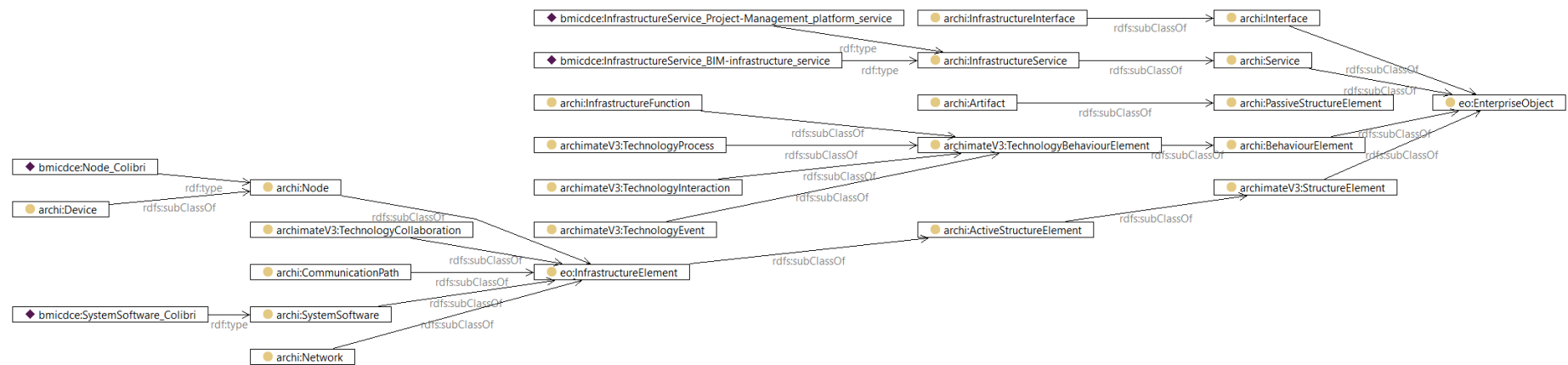
Figure 98: Ontology representation of the technology properties instances of the application scenario case

9.2.1.4   Ontology Evaluation of the Fourth Competency Question

The fourth competency question regarding the properties of the business capabilities concept within a business model innovation case encompasses the following four sub-questions, as described in Sub-chapter 6.1.2:

- *Which are the resource-based capabilities of a business?*
- *Which are the dynamic capabilities of a business?*
- *Which are the human-based capabilities of a business?*
- *Which are the core capabilities of a business?*

To answer these competency sub-questions, a graph, shown in Figure 99, has been created using TopBraid Composer to illustrate how the business capabilities properties are included within the ontology. Further, to showcase the representation of a case within the ontology, the instances of the application scenario case are shown within the graph.

The integration of the application scenario as a business model innovation case provides evidence that the concept of a resource-based capability, composed of dynamic, human-based, and core capabilities, can be implemented. Further, the figure depicts how the ontology structure looks like if an instance is added to a case. For example, the instance *Overseeing construction* is assigned to the sub-class *Core capability,* which in turn is a sub-class of *Resource-based capabilities*.
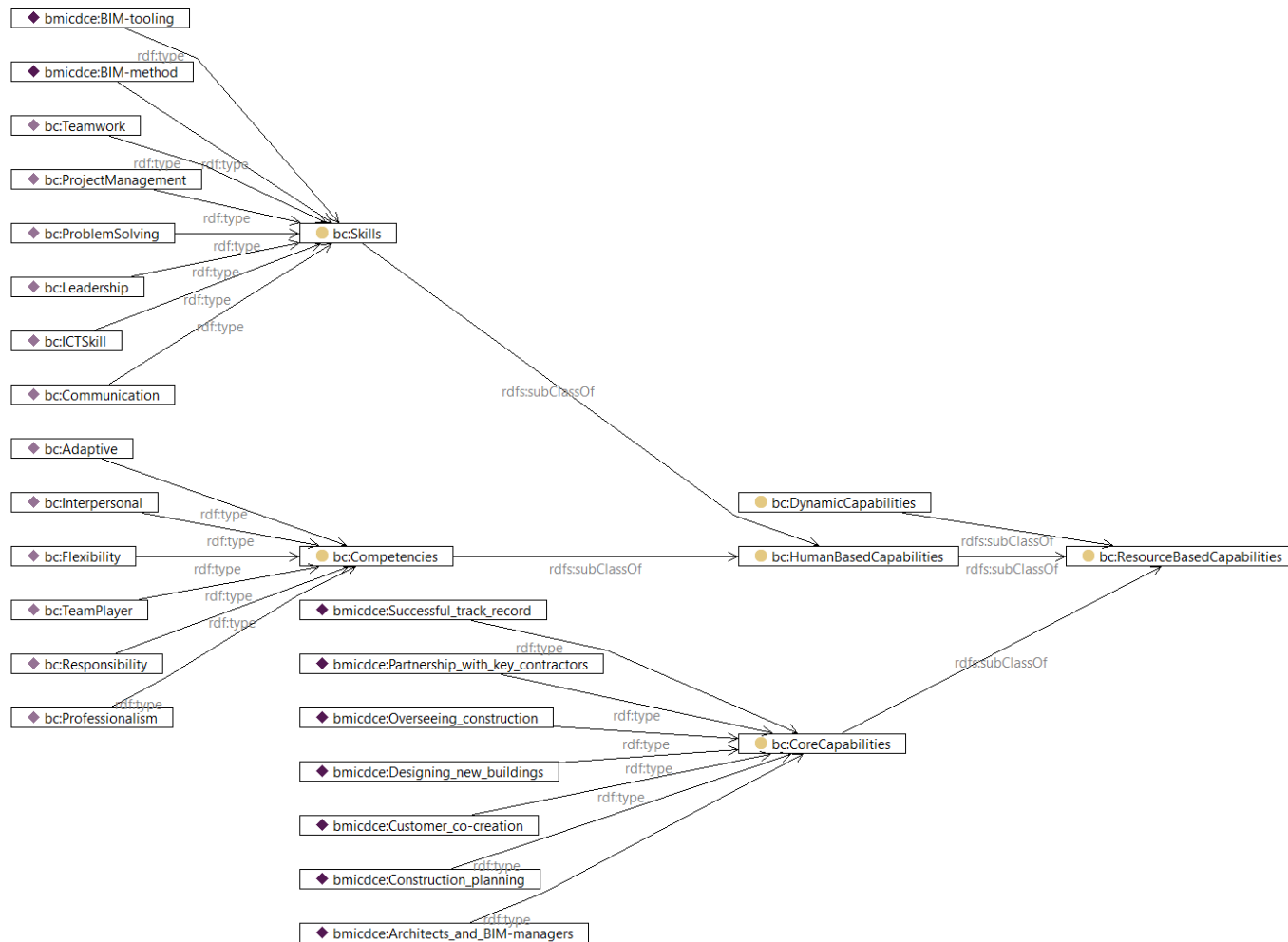
Figure 99: Ontology representation of the business capabilities instances of the application scenario case

9.2.1.5   Ontology Evaluation of the Fifth Competency Question

The fifth and last competency question regarding the properties of the construction industry properties within a business model innovation case encompasses the following five sub-questions, as described in Sub-chapter 6.1.2:

- *Which are the construction-related companies of a business model innovation case?*
- *Which are the execution models of construction-related companies?*
- *Which are the stakeholder types of construction-related companies?*
- *Which are the construction planning phases of construction-related companies?*
- *Which are the execution areas of construction-related companies?*

To answer these competency sub-questions, a graph, shown in Figure 100, has been created using TopBraid Composer to illustrate how the construction industry properties are included within the ontology. Further, to showcase the representation of a case within the ontology, the instances of the application scenario case are shown within the graph.

The integration of the application scenario as a business model innovation case provides evidence that the industry-specific properties for the construction sector can be implemented. These specifics are the execution models, the construction-related companies, the construction stakeholder-types, the company execution areas, and the construction planning phases. Figure 100 depicts how the ontology structure looks like if an instance of a case is added. For example, the instance *Architectural office from case E* is a subclass of *Construction-related companies*. The same instance is related to the instance *IPD*, *General planer*, and *Traditional*, which are instances of the sub-class *Execution models*. This relation demonstrates that the instances within the construction-industry specifics ontology are related to each other.
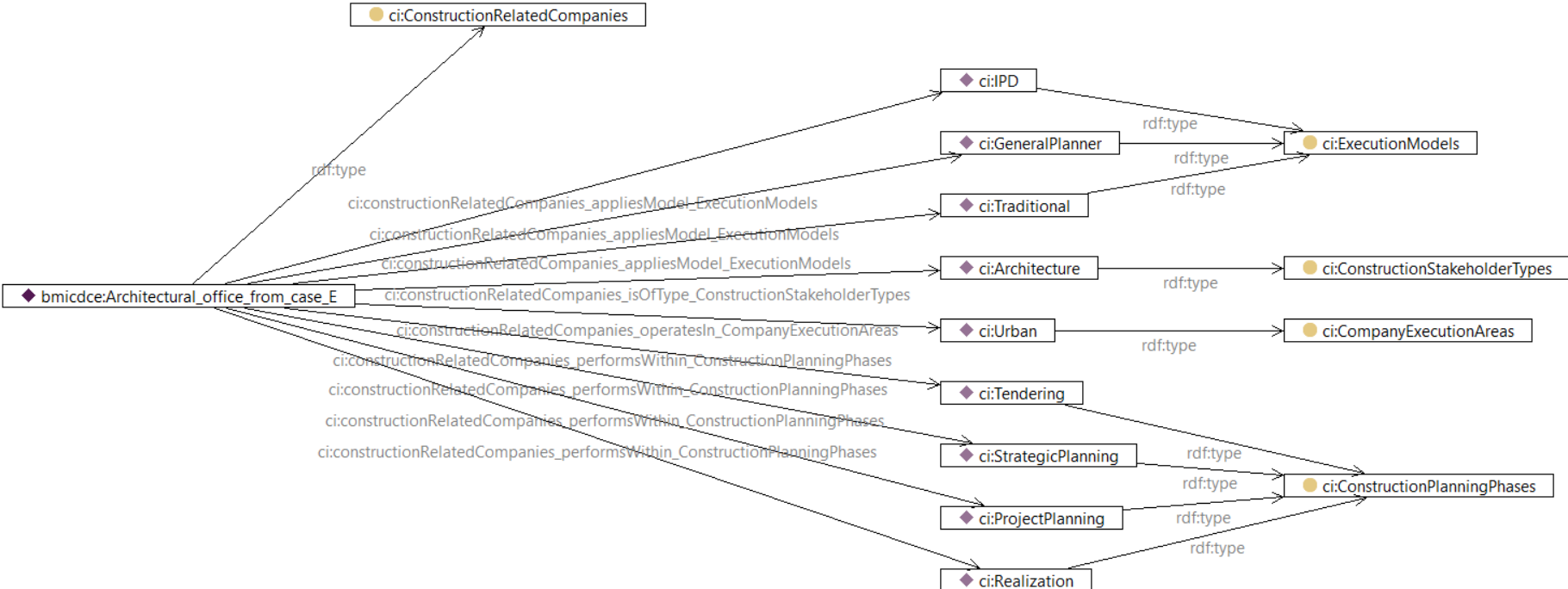
Figure 100: Ontology representation of the construction industry-specifics instances of the application scenario case

9.2.2   Boolean Matching Method Evaluation

This chapter deals with the final evaluation of the developed Boolean matching method for the filtering service of business model innovation cases. This is achieved by checking if the filtering service is capable of answering the filtering service questions described in Sub-chapter 8.1.1 that are mapped to the competency questions from Sub-chapter 6.1.2. This is accomplished by applying the SPARQL queries of the Boolean matching method developed in Sub-chapter 8.1.2.

Each of the following sub-chapters is dedicated to one of the five competency questions.

9.2.2.1   *Boolean Matching Method Evaluation of the First Competency Question*

The first competency question regarding the properties of the business model concept within a business model innovation case encompasses four sub-questions as described in Sub-chapter 6.1.2. To answer each of these competency sub-questions, an example that applies the SPARQL query for the filtering service using TopBraid Composer is provided.

Competency sub-question: *Which are the infrastructure properties of a business model innovation case?*

The first competency sub-question is regarding the business model innovation case's infrastructure properties from a business model perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific key partner type?
- Which business model innovation cases have a specific key partner?
- Which business model innovation cases have a specific key activity type?
- Which business model innovation cases have a specific key activity?
- Which business model innovation cases have a specific key resource type?
- Which business model innovation cases have a specific key resource?
- Which business model innovation cases have a specific key partnership goal?
- Which business model innovation cases have a specific economic advantage?

The filtering service questions contain the concepts for key partners, key activities, key resources, key partnership goal, and economic advantage. Thus, this research developed five SPARQL queries to filter regarding these five concepts. This composes the Boolean matching method for this competency sub-question. The individual queries representing the filtering options for this competency sub-question are described in Sub-chapter 8.1.2.1.1. To provide evidence that the

SPARQL queries provide the expected values in return, the filter query for the concept of *key resources* is used as an example.

In 2018, before the transformation of the application scenario case company, the architectural firm, was interested in learning more about business models containing the resource BIM-manager. Therefore, the example query for key resources is applied with *BIM* as the key resource and *human* as the type of key resource since a BIM-manager is represented as a human key resource. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, the case BIM-Manager-as-a-Service meets the application scenario needs. The query with the outcome is depicted in Figure 101.

Figure 101: Boolean matching method example for key resources of the infrastructure properties

Competency sub-question: *Which are the customer interaction properties of a business model innovation case?*

This competency sub-question is concerned with the business model innovation case's customer interaction properties from a business model perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific channel type?
- Which business model innovation cases have a specific channel?
- Which business model innovation cases have a specific customer relationships type?
- Which business model innovation cases have a specific customer relationship?
- Which business model innovation cases have a specific customer segments type?
- Which business model innovation cases have a specific customer segment?

The filtering service questions contain the concepts for channels, customer relationships, and customer segments. Thus, this research developed three SPARQL queries to filter regarding these

three concepts. This composes the Boolean matching method for this competency sub-question. The individual queries representing the filtering options for this competency sub-question are described in Sub-chapter 8.1.2.1.2. To provide evidence that the SPARQL queries provide the expected values in return, the filter query for the concept of *customer segments* is used as an example.

In 2018, the application scenario case company, the architectural firm, did not have in mind to create a new customer base. Therefore, the example query demands that the shown cases need to have the name *contractor* as part of a customer segment. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service* and *BIM-room leasing*. Thus, these two cases meet the application scenario needs. The query with the outcome is depicted in Figure 102.
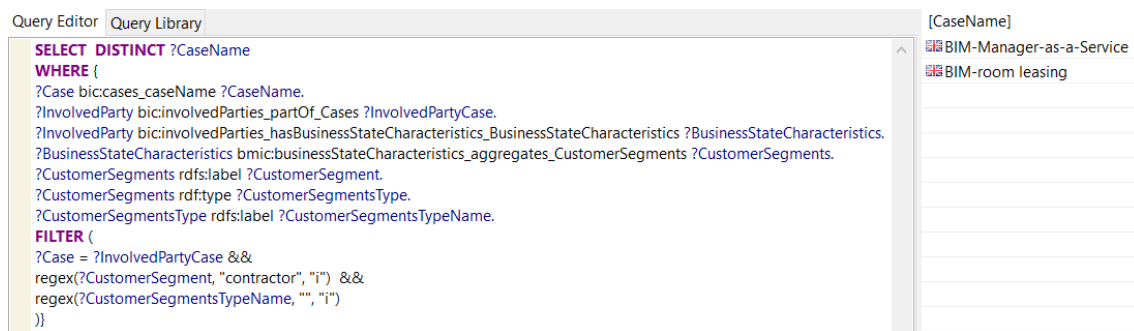
Figure 102: Boolean matching method example for customer segments of the customer interaction properties

Competency sub-question: *Which are the offering properties of a business model innovation case?*

This competency sub-question is regarding the offering properties of the business model innovation case from a business model perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific offering value type?
- Which business model innovation cases have a specific offering value?
- Which business model innovation cases have a specific offerings type?
- Which business model innovation cases have a specific offering?

The filtering service questions contain the concepts for offering values and the offerings themselves. Thus, this research developed two SPARQL queries to filter regarding these two concepts. This composes the Boolean matching method for this competency sub-question. The

individual queries representing the filtering options for this competency sub-question are described in Sub-chapter 8.1.2.1.3. To provide evidence that the SPARQL queries provide the expected values in return, the filter query for the concept of *offering values* is used as an example.

In 2018, it was important for the application scenario case company, the architectural firm, that their offering maintained a certain status level for their customers. Therefore, the example query demands that the shown cases need to have entries within the class *Status*. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 103.

Figure 103: Boolean matching method example for offering values of the offering properties

Competency sub-question: *Which are the financial properties of a business model innovation case?*

This competency sub-question is regarding the business model innovation case's financial properties from a business model perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific cost structure model?
- Which business model innovation cases have a specific cost structure elements type?
- Which business model innovation cases have a specific cost structure element?
- Which business model innovation cases have a specific revenue streams type?
- Which business model innovation cases have a specific revenue stream?
- Which business model innovation cases have a specific pricing mechanism type?
- Which business model innovation cases have a specific pricing mechanism?

The filtering service questions contain the concepts for cost structure models, cost structure elements, revenue streams, and pricing mechanisms. Thus, this research developed four SPARQL

queries to filter regarding these four concepts. This composes the Boolean matching method for this competency sub-question. The individual queries representing the filtering options for this competency sub-question are described in Sub-chapter 8.1.2.1.4. To provide evidence that the SPARQL queries provide the expected values in return, the filter query for the concept of *pricing mechanisms* is used as an example.

In 2018, it was important for the application scenario case company, the architectural firm, to maintain their pricing mechanism of negotiation to derive the price since they had a positive experience with it. Therefore, the example query demands that the shown cases need to have entries of revenue streams with *Negotiation* as the pricing mechanism. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service* and *Insurance through banks*. Thus, these two cases meet the application scenario needs. The query, including the outcome, is depicted in Figure 104.


```
Query Editor  Query Library                                                    [CaseName]
SELECT DISTINCT ?CaseName                                             ⌃      🏳BIM-Manager-as-a-Service
WHERE {                                                                      🏳Insurance through banks
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_RevenueStreams ?RevenueStreams.
?RevenueStreams bm:revenueStreams_pricedBy_PricingMechanisms ?PricingMechanisms.
?PricingMechanisms rdfs:label ?PricingMechanism.
?PricingMechanisms rdf:type ?PricingMechanismsType.
?PricingMechanismsType rdfs:label ?PricingMechanismsTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?PricingMechanism, "negotiation", "i") &&
regex(?PricingMechanismsTypeName, "", "i")
)}                                                                    ⌄
```

Figure 104: Boolean matching method example for pricing mechanisms of the financial properties

Figure 105 depicts how the filtering service applies all the individual filtering options selected within this chapter for the concepts of pricing mechanisms, offering values, customer segments, and key resources. Thus, it is possible to aggregate the Boolean matching options into one SPARQL query to retrieve the business model innovation cases that match all selected options. In this case, the case BIM-Manager-as-a-Service applies to all the filtering criteria.

```
Query Editor  Query Library                                                              [CaseName]
SELECT DISTINCT ?CaseName                                                                🏳 BIM-Manager-as-a-Service
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics ?BusinessStateCharacteristics.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_RevenueStreams ?RevenueStreams.
?RevenueStreams bm:revenueStreams_pricedBy_PricingMechanisms ?PricingMechanisms.
?PricingMechanisms rdfs:label ?PricingMechanism.
?PricingMechanisms rdf:type ?PricingMechanismsType.
?PricingMechanismsType rdfs:label ?PricingMechanismsTypeName.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_OfferingValues ?OfferingValues.
?OfferingValues rdfs:label ?OfferingValue.
?OfferingValues rdf:type ?OfferingValuesType.
?OfferingValuesType rdfs:label ?OfferingValuesTypeName.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_CustomerSegments ?CustomerSegments.
?CustomerSegments rdfs:label ?CustomerSegment.
?CustomerSegments rdf:type ?CustomerSegmentsType.
?CustomerSegmentsType rdfs:label ?CustomerSegmentsTypeName.
?BusinessStateCharacteristics bmic:businessStateCharacteristics_aggregates_KeyResources ?KeyResources.
?KeyResources rdfs:label ?KeyResource.
?KeyResources rdf:type ?KeyResourceType.
?KeyResourceType rdfs:label ?KeyResourceTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?PricingMechanism, "negotiation", "i") &&
regex(?PricingMechanismsTypeName, "", "i") &&
regex(?OfferingValue, "", "i") &&
regex(?OfferingValuesTypeName, "status", "i") &&
regex(?CustomerSegment, "contractor", "i")  &&
regex(?CustomerSegmentsTypeName, "", "i") &&
regex(?KeyResource, "BIM", "i") &&
regex(?KeyResourceTypeName, "human", "i")
)}
```

Figure 105: Boolean matching method example for the entire business model properties

9.2.2.2 Boolean Matching Method Evaluation of the Second Competency Question

The second competency question regarding the properties of the business innovation transformation concept within a business model innovation case encompasses six sub-questions as described in Sub-chapter 6.1.2. To answer each of these competency sub-questions, an example that applies the SPARQL query for the filtering service using TopBraid Composer is provided.

Competency sub-question: *Which are the involved parties of the represented business model innovation case?*

This competency sub-question is regarding the involved parties represented within the business model innovation case from a business innovation perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific involved party?
- Which business model innovation cases have a specific case company?
- Which business model innovation cases have a specific partner company?

The filtering service questions contain the concept for involved parties and the datatype properties that can be assigned to an instance of it, that is, if it is a case company or a partner company. Thus, this research developed one SPARQL query to filter regarding these three characteristics. This

composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.2.1. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, did not care what kind of construction company would be part of the provided business model innovation cases, no restrictions need to be applied to the filtering service. Still, applying the query on the case repository results in no actual filtering of the business model innovation cases, and thus, it returns all of the cases within the case repository. The query, including the outcome, is depicted in Figure 106.
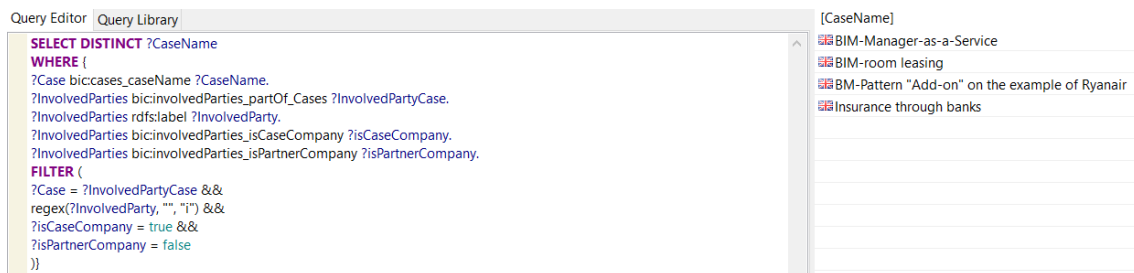
Figure 106: Boolean matching method example for involved parties

Competency sub-question: *To which sectors do the involved parties belong?*

This competency sub-question is regarding the sectors of the involved parties represented within the business model innovation case from a business innovation perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific sector?
- Which business model innovation cases have not a specific sector?

The filtering service questions contain the concepts for inclusion or exclusion of specific sectors. Thus, this research developed two SPARQL queries to filter regarding these two concepts. This composes the Boolean matching method for this competency sub-question. The individual queries representing the filtering options for this competency sub-question are described in Sub-chapter 8.1.2.2.2. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, wanted to receive business model innovation cases from the construction sector, the query regarding the sector inclusion has been taken for this evaluation example. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the cases *BIM-Manager-as-a-Service* and *BIM-room leasing*. Thus, these two

cases meet the application scenario needs. The query, including the outcome, is depicted in Figure 107.
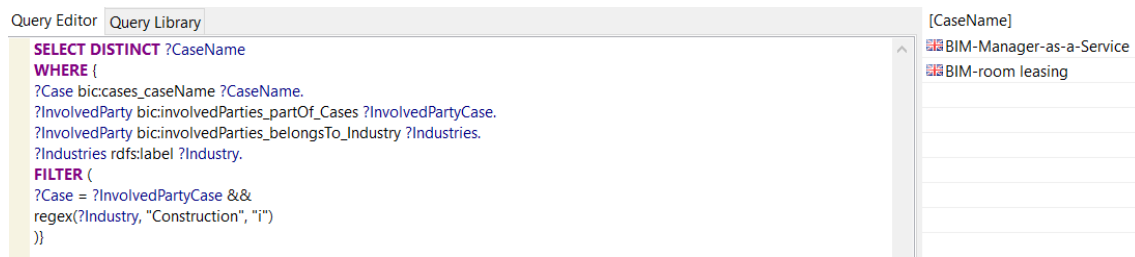
Figure 107: Boolean matching method example for a specific sector

Competency sub-question: *Which are the motives of the involved parties to change?*

This competency sub-question is concerned with the motives of the involved parties represented within the business model innovation case from a business innovation perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific driver?
- Which business model innovation cases have a specific strategic goal?

The filtering service questions contain the concepts for drivers and strategic goals. Thus, this research developed two SPARQL queries to filter regarding these two concepts. This composes the Boolean matching method for this competency sub-question. The individual queries representing the filtering options for this competency sub-question are described in Sub-chapter 8.1.2.2.3. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, wanted to receive business model innovation cases that focus on increasing revenue as a goal, the strategic goal query with the term *revenue* is applied for this evaluation example. Applying the query to the case repository results in the filtering of the business model innovation cases and returns the case *BIM-room leasing*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 108.
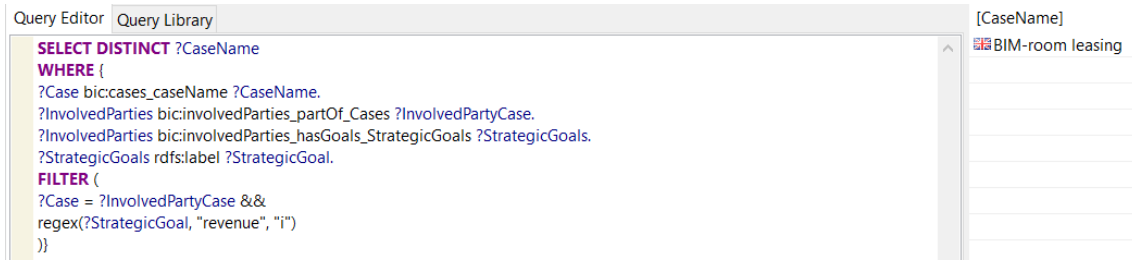
Figure 108: Boolean matching method example for strategic goals of the motives properties

Competency sub-question: *Which challenges did occur during the transformation?*

This competency sub-question is regarding the transformation challenges represented within the business model innovation case from a business innovation perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific barrier to overcome type?
- Which business model innovation cases have a specific barrier to overcome?
- Which business model innovation cases have a specific risk?

The filtering service questions contain the concepts for barriers to overcome and risks of the innovation. Thus, this research developed two SPARQL queries to filter regarding these two concepts. This composes the Boolean matching method for this competency sub-question. The individual queries representing the filtering options for this competency sub-question are described in Sub-chapter 8.1.2.2.4. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, struggled with integrating BIM within their business, the barrier to overcome property is filtered for business model innovation cases that have the topic of *BIM* included as a barrier that needed to be overcome. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 109.

Figure 109: Boolean matching method example for barriers to overcome the challenges properties

Competency sub-question: *Which are the results from the transformation of the business model?*

This competency sub-question is regarding the transformation results represented within the business model innovation case from a business innovation perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific benefits type?
- Which business model innovation cases have a specific benefit?

The filtering service questions contain the concept of benefits from a business model innovation. Thus, this research developed one SPARQL query to filter regarding this characteristic. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.2.5. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, sought a BIM-supported benefit from a business model innovation, the benefit property is filtered for business model innovation cases that have the topic of *BIM* included. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 110.

Figure 110: Boolean matching method example for benefits of the results properties

Competency sub-question: *Which resources are required to achieve the business model innovation?*

This competency sub-question is regarding the required resources represented within the business model innovation case from a business innovation perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific required resources type?
- Which business model innovation cases have a specific required resource?

The filtering service questions contain the concept of required resources from a business model innovation. Thus, this research developed one SPARQL query to filter regarding this characteristic. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.2.6. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, sought a BIM-supported business model, but the BIM-related resources were missing, the *BIM* property is filtered for business model innovation cases. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 111.


```
Query Editor  Query Library                                          [CaseName]
                                                                     🏴 BIM-Manager-as-a-Service
SELECT DISTINCT ?CaseName
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?InvolvedParty bic:involvedParties_requiresForInnovation_RequiredResources ?RequiredRessources.
?RequiredRessources rdfs:label ?RequiredRessource.
?RequiredRessources rdf:type ?RequiredRessourcesType.
?RequiredRessourcesType rdfs:label ?RequiredRessourcesTypeName.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?RequiredRessource, "BIM", "i") &&
regex(?RequiredRessourcesTypeName, "", "i")
)}
```

Figure 111: Boolean matching method example for required resources

9.2.2.3   *Boolean Matching Method Evaluation of the Third Competency Question*

The third competency question regarding the properties of the enterprise architecture innovation concept within a business model innovation case encompasses five sub-questions as described in Sub-chapter 6.1.2. To answer each of these competency sub-questions, an example that applies the SPARQL query for the filtering service using TopBraid Composer is provided.

Competency sub-question: *Which are the motivational properties of the business model innovation case from an enterprise architecture point of view?*

This competency sub-question is regarding the motivational properties represented within the business model innovation case from an enterprise architecture perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific assessment?
- Which business model innovation cases have a specific constraint?
- Which business model innovation cases have a specific driver?
- Which business model innovation cases have a specific goal?
- Which business model innovation cases have a specific meaning?
- Which business model innovation cases have a specific outcome?
- Which business model innovation cases have a specific principle?
- Which business model innovation cases have a specific requirement?
- Which business model innovation cases have a specific stakeholder?
- Which business model innovation cases have a specific value?

The filtering service questions contain the concepts of assessment, constraint, driver, goal, meaning, outcome, principle, requirement, stakeholder, and value from a business model innovation. Out of this, this research developed one SPARQL query to filter regarding these concepts. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.3.1. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, sought a BIM-supported business model innovation, the applied filter has *BIM* as an *Outcome* for the business model innovation cases for which are searched. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 112.

Figure 112: Boolean matching method example for the outcome of the motivational properties

Competency sub-question: *Which are the strategic properties of the business model innovation case from an enterprise architecture point of view?*

This competency sub-question is regarding the strategic properties represented within the business model innovation case from an enterprise architecture perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific capability?
- Which business model innovation cases have a specific course of action?
- Which business model innovation cases have a specific resource?
- Which business model innovation cases have a specific value stream?

The filtering service questions contain the concepts of capability, course of action, resource, and value stream from a business model innovation. Out of this, this research developed one SPARQL

query to filter regarding these concepts. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.3.2. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, sought a BIM-supported business model innovation, the applied filter has *BIM* for the aspects of *Resource* and *Value stream* of the business model innovation cases for which are searched. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 113.

Figure 113: Boolean matching method example for resource and value stream of the strategic layer

Competency sub-question: *Which are the business properties of the business model innovation case from an enterprise architecture point of view?*

This competency sub-question is regarding the business properties represented within the business model innovation case from an enterprise architecture perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific business actor?
- Which business model innovation cases have a specific business collaboration?
- Which business model innovation cases have a specific business event?
- Which business model innovation cases have a specific business function?
- Which business model innovation cases have a specific business interaction?
- Which business model innovation cases have a specific business interface?

- Which business model innovation cases have a specific business object?

- Which business model innovation cases have a specific business process?

- Which business model innovation cases have a specific business role?

- Which business model innovation cases have a specific business service?

- Which business model innovation cases have a specific contract?

- Which business model innovation cases have a specific product?

- Which business model innovation cases have a specific representation?

The filtering service questions contain the concepts of business actor, business collaboration, business event, business function, business interaction, business interface, business object, business process, business role, business service, contract, product, and representation from a business model innovation. Out of this, this research developed one SPARQL query to filter regarding these concepts. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.3.3. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, sought a BIM-supported business model innovation, the applied filter has *BIM* for the property of *Product* of the business model innovation cases for which are searcheds. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 114.

Figure 114: Boolean matching method example for the product of the business layer

Competency sub-question: *Which are the application properties of the business model innovation case from an enterprise architecture point of view?*

This competency sub-question is regarding the application properties represented within the business model innovation case from an enterprise architecture perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific application collaboration?
- Which business model innovation cases have a specific application component?
- Which business model innovation cases have a specific application event?
- Which business model innovation cases have a specific application function?
- Which business model innovation cases have a specific application interaction?
- Which business model innovation cases have a specific application interface?
- Which business model innovation cases have a specific application process?

- Which business model innovation cases have a specific application service?
- Which business model innovation cases have a specific data object?

The filtering service questions contain the concepts of application collaboration, application component, application event, application function, application interaction, application interface, application process, application service, and data object from a business model innovation. Out of this, this research developed one SPARQL query to filter regarding these concepts. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.3.4. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, sought a BIM-supported business model innovation, the applied filter has *BIM* for the property of *Application service* of the business model innovation cases for which are searched. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 115.

Figure 115: Boolean matching method example for application service of the application layer

Competency sub-question: *Which are the technological properties of the business model innovation case from an enterprise architecture point of view?*

This competency sub-question is regarding the technological properties represented within the business model innovation case from an enterprise architecture perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific artifact?
- Which business model innovation cases have a specific path?
- Which business model innovation cases have a specific device?
- Which business model innovation cases have a specific technology function?
- Which business model innovation cases have a specific technology interface?
- Which business model innovation cases have a specific technology service?
- Which business model innovation cases have a specific communication network?
- Which business model innovation cases have a specific node?
- Which business model innovation cases have a specific system software?
- Which business model innovation cases have a specific technology collaboration?
- Which business model innovation cases have a specific technology event?
- Which business model innovation cases have a specific technology interaction?
- Which business model innovation cases have a specific technology process?

The filtering service questions contain the concepts of artifact, path, device, technology function, technology interface, technology service, communication network, node, system software, technology collaboration, technology event, technology interaction, and technology process from a business model innovation. Out of this, this research developed one SPARQL query to filter regarding these concepts. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.3.5. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, got recommendations from peers to use the software Solibri, the applied filter has *solibri* for the property of *System software* of the business model innovation cases for which are searched. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 116.

Figure 116: Boolean matching method example for system software of the technology layer

9.2.2.4 Boolean Matching Method Evaluation of the Fourth Competency Question

The fourth competency question regarding the properties of the business capabilities concept within a business model innovation case encompasses four sub-questions as described in Sub-chapter 6.1.2. To answer each of these competency sub-questions, an example that applies the SPARQL query for the filtering service using TopBraid Composer is provided.

Competency sub-question: *Which are the resource-based capabilities of a business?*

This competency sub-question is concerned with the resource-based capabilities property represented within the business model innovation case from a business capabilities perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific resource-based capability?

The filtering service question contains the concept of resource-based capabilities from a business model innovation. Out of this, this research developed a SPARQL query to filter regarding this concept. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.4.1. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, sought a BIM-supported business model innovation, the applied filter has *BIM* for the property of *Resource-based capability* to identify business model innovation cases that identified BIM as a capability. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 117.


```
Query Editor  Query Library                                                    [CaseName]
SELECT DISTINCT ?CaseName                                                      🇬🇧 BIM-Manager-as-a-Service
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements ?BusinessCapabilityElements.
?BusinessCapabilityElements bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities ?ResourceBasedC
?ResourceBasedCapabilities rdfs:label ?ResourceBasedCapability.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?ResourceBasedCapability, "BIM", "i")
)}
```

Figure 117: Boolean matching method example for resource-based capability

Competency sub-question: *Which are the dynamic capabilities of a business?*

This competency sub-question is regarding the dynamic capability property represented within the business model innovation case from a business capabilities perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific dynamic capability?

The filtering service question contains the concept of dynamic capabilities from a business model innovation. Out of this, this research developed a SPARQL query to filter regarding this concept. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.4.2. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, did not seek a specific dynamic capability, no filtering is applied in this

regard. Thus, applying the query on the case repository returns all the business model innovation cases within the case repository. The query, including the outcome, is depicted in Figure 118.
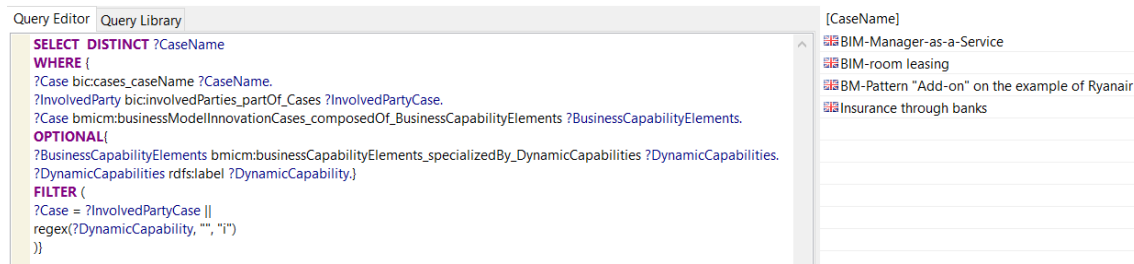
Figure 118: Boolean matching method example for dynamic capability

Competency sub-question: *Which are the human-based capabilities of a business?*

This competency sub-question is regarding the human-based capabilities property represented within the business model innovation case from a business capabilities perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific human-based capabilities type?
- Which business model innovation cases have a specific human-based capability?

The filtering service questions contain the concept of human-based capabilities from a business model innovation. Out of this, this research developed a SPARQL query to filter regarding this concept. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.4.3. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, sought a BIM-supported business model innovation, the applied filter has *BIM* for the property of *Human-based capability* to identify business model innovation cases that include BIM either as a skill or a competency. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 119.

Figure 119: Boolean matching method example for human-based capabilities

Competency sub-question: *Which are the core capabilities of a business?*

This competency sub-question is regarding the core capabilities property represented within the business model innovation case from a business capabilities perspective. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific core capability?

The filtering service question contains the concept of core capabilities from a business model innovation. Out of this, this research developed a SPARQL query to filter regarding this concept. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.4.4. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, sought a BIM-supported business model innovation, the applied filter has *BIM* for the property of *core capability* to identify business model innovation cases that include BIM as a core capability. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 120.

```
Query Editor  Query Library                                                              [CaseName]
SELECT DISTINCT ?CaseName                                                    BIM-Manager-as-a-Service
WHERE {
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements ?BusinessCapabilityElements.
?BusinessCapabilityElements bmicm:businessCapabilityElements_specializedBy_CoreCapabilities ?CoreCapabilities.
?CoreCapabilities rdfs:label ?CoreCapability.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?CoreCapability, "BIM", "i")
)}
```
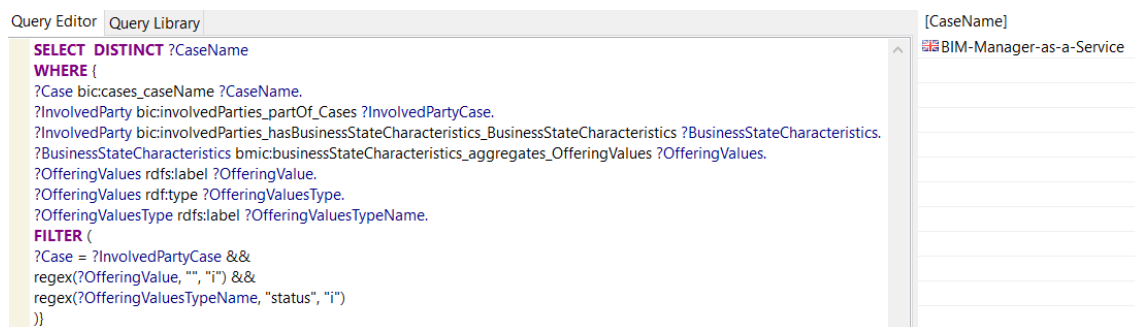
Figure 120: Boolean matching method example for core capability

9.2.2.5 Boolean Matching Method Evaluation of the Fifth Competency Question

The fifth competency question regarding the properties of the construction industry concept within a business model innovation case encompasses five sub-questions as described in Sub-chapter 6.1.2. To answer each of these competency sub-questions, an example that applies the SPARQL query for the filtering service using TopBraid Composer is provided.

Competency sub-question: *Which are the construction-related companies of a business model innovation case?*

This competency sub-question is regarding the construction-related companies represented within the business model innovation case. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific construction-related company?

The filtering service question contains the concept of construction-related companies from a business model innovation. Out of this, this research developed a SPARQL query to filter regarding this concept. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.5.1. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company, the architectural firm, did not seek a specific construction-related company, no filtering is applied in this regard. Thus, applying the query on the case repository returns all the business model innovation cases within the case repository. The query, including the outcome, is depicted in Figure 121.
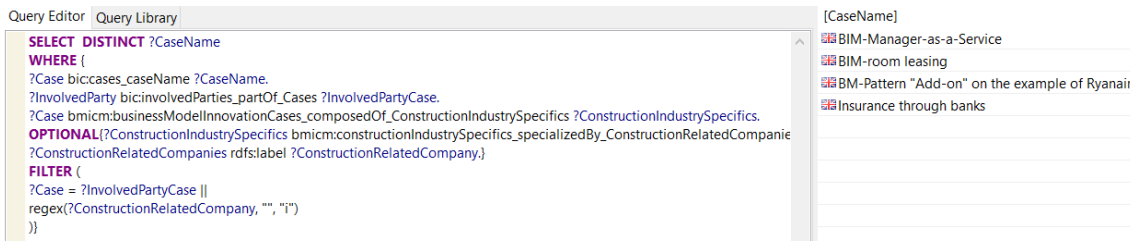
Figure 121: Boolean matching method example for construction-related companies property

Competency sub-question: *Which are the execution models of construction-related companies?*

This competency sub-question is regarding the execution models of construction-related companies represented within the business model innovation case. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific construction execution model?

The filtering service question contains the concept of construction execution models from a business model innovation. Out of this, this research developed a SPARQL query to filter regarding this concept. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.5.2. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company is an architectural firm, they sought a business model innovation that also included planners. Thus, the applied filter has *planner* for the property of *execution model* to identify the relevant business model innovation cases. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the cases *BIM-Manager-as-a-Service* and *BIM-room leasing*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 122.
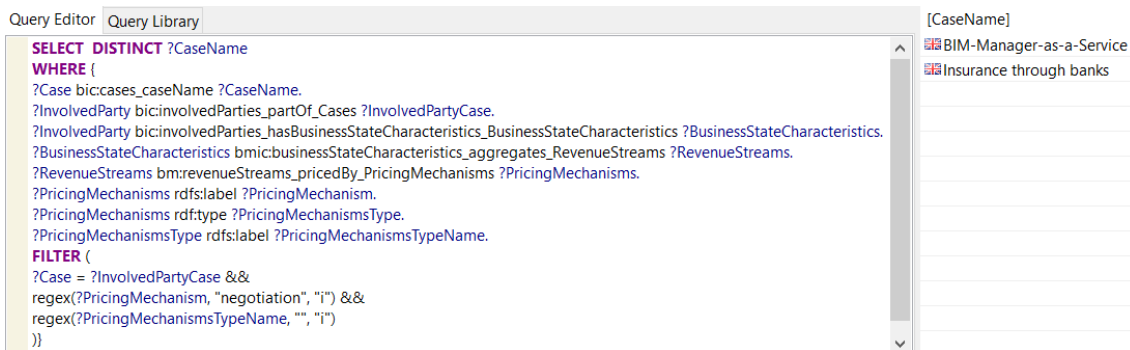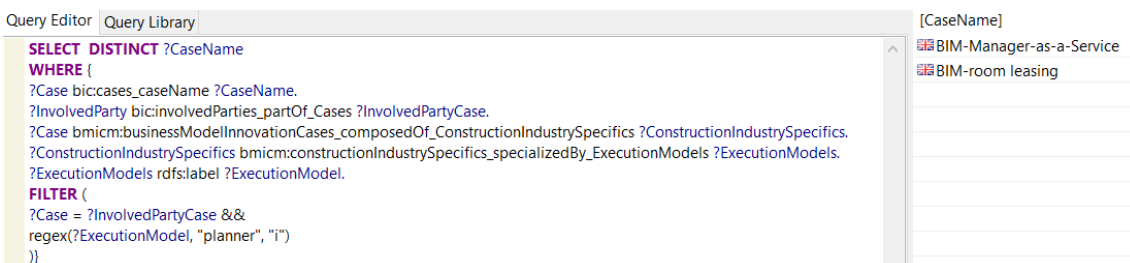

Figure 122: Boolean matching method example for execution model of construction-related companies

Competency sub-question: *Which are the stakeholder types of construction-related companies?*

This competency sub-question is regarding the stakeholder types of construction-related companies represented within the business model innovation case. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific construction-related stakeholder type?

The filtering service question contains the concept of construction stakeholder types from a business model innovation. Out of this, this research developed a SPARQL query to filter regarding this concept. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.5.3. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company is an architectural firm, they sought a business model innovation that also included architects. Thus, the applied filter has *Architect* for the property of *Construction stakeholder type* to identify the relevant business model innovation cases. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the case *BIM-Manager-as-a-Service*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 123.

Figure 123: Boolean matching method example for stakeholder type of construction-related companies

Competency sub-question: *Which are the construction planning phases of construction-related companies?*

This competency sub-question is regarding the construction planning phases of construction-related companies represented within the business model innovation case. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific construction planning phase?

The filtering service question contains the concept of construction planning phases from a business model innovation. Out of this, this research developed a SPARQL query to filter regarding this concept. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.5.4. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company is an architectural firm specialized in strategic planning, they sought a business model innovation that included the phase of strategic planning. Thus, the applied filter has *planning* for the property of *Construction planning phase* to identify the relevant business model innovation cases. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the cases *BIM-Manager-as-a-Service* and *BIM-room leasing*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 124.
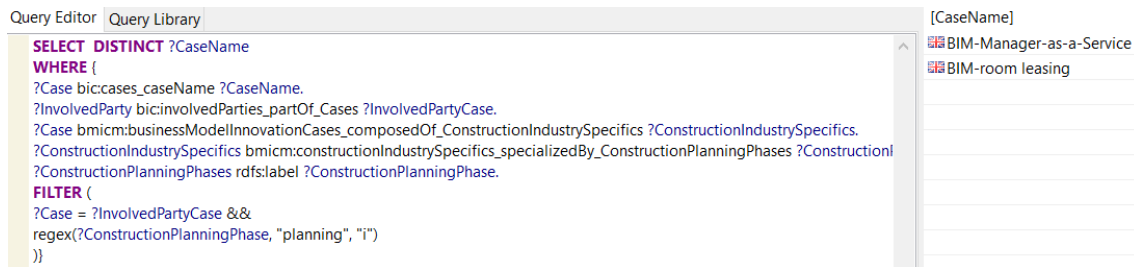
Figure 124: Boolean matching method example for construction planning phases

Competency sub-question: *Which are the execution areas of construction-related companies?*

This competency sub-question is regarding the execution areas of construction-related companies represented within the business model innovation case. The filtering service questions related to this competency sub-question are:

- Which business model innovation cases have a specific construction execution area?

The filtering service question contains the concept of execution areas of construction-related companies from a business model innovation. Out of this, this research developed a SPARQL query to filter regarding this concept. This composes the Boolean matching method for this competency sub-question. The query, representing the filtering option for this competency sub-question, is described in Sub-chapter 8.1.2.5.5. To provide evidence that the SPARQL query provides the expected values in return, the application scenario case is used as an example. Since the application scenario case company is an architectural firm specialized in urban areas, they

sought a business model innovation that included the urban areas. Thus, the applied filter has *urban* for the property of *Company execution area* to identify the relevant business model innovation cases. Applying the query on the case repository results in the filtering of the business model innovation cases and returns the cases *BIM-Manager-as-a-Service* and *BIM-room leasing*. Thus, this case meets the application scenario needs. The query, including the outcome, is depicted in Figure 125.



```
Query Editor  Query Library                                                        [CaseName]
SELECT DISTINCT ?CaseName                                                          ⊞ BIM-Manager-as-a-Service
WHERE {                                                                            ⊞ BIM-room leasing
?Case bic:cases_caseName ?CaseName.
?InvolvedParty bic:involvedParties_partOf_Cases ?InvolvedPartyCase.
?Case bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics ?ConstructionIndustrySpecifics.
?ConstructionIndustrySpecifics bmicm:constructionIndustrySpecifics_specializedBy_CompanyExecutionAreas ?CompanyExecut
?CompanyExecutionAreas rdfs:label ?CompanyExecutionArea.
FILTER (
?Case = ?InvolvedPartyCase &&
regex(?CompanyExecutionArea, "urban", "i")
)}
```

Figure 125: Boolean matching method example for execution areas of construction-related companies

9.2.3 Case-Based Reasoning Matching Method Evaluation

This chapter deals with the final evaluation of the developed case-based reasoning matching method for the similarity-retrieval service of business model innovation cases. This is achieved by checking if the similarity-retrieval service provides the same ranking results as expected by the three experts, the transformation manager, the C-level manager, and the IT-transformation manager, with which I conducted a second interview to retrieve their insights for the evaluation of the case-based reasoning matching method.

As part of Martin's (2016) research, an evaluation of the ICEBERG tool with two projects and two experts has been performed. Thus, this research does not focus on the process execution of the ICEBERG tool, described in Sub-chapter 8.2.2. Further, Martin's (2016) evaluation already contains an evaluation of the similarity model implemented for the cases of his research. Thus, no further evaluation of the different algorithms described in Sub-chapter 7.1.2 is needed since it can be assumed that the calculations of the similarities work as specified by Martin (2016). Nevertheless, this research evaluated the implemented similarity model for the use of the ICEBERG tool to support the business model innovation ideation. For this purpose, the three experts that have been interviewed to develop the integration of the business model innovation ontology into the ICEBERG tool have been interviewed again to evaluate the outcome of the recommender system. Thus, each expert, represented as a stakeholder within the ICEBERG tool, evaluated the concerns assigned to their role.

The evaluation procedure was conducted as follows. First, the application scenario case as it is today was shown and explained in detail to the experts. Based on that information, the experts were asked to rank the cases based on the order they thought the cases matched best with the application scenario case. Before the interview started, I applied the application scenario case in the ICEBERG tool. The detailed inputs of the application scenario case are provided in Appendix-E: Application Scenario Case. The goal of this application was to receive the results based on the developed similarity model. The results are being represented as similarity percentages.

Table 188 shows the evaluation results for the concern of business model innovation possibilities performed with the transformation and C-level managers. The ICEBERG tool recommends the BIM-Manager-as-a-Service case to be the best matching case for the application scenario business by far. This outcome matches the expectation of the transformation and C-level managers. While the ICEBERG tool recommends the insurance case to be the second-best matching case, both interviewees expected it to be the other construction case, the BIM-room leasing case. This case is set to be the third-best option according to the ICEBERG tool. It needs to be emphasized that the margin between the two cases is only 1.6% from the recommender system, and thus, the results are close. The similarity calculation's outcome suggests that the case regarding the business model pattern "Addon" is the least matching case, as it already was expected by the transformation manager.

Table 188: Evaluation results of business model innovation possibilities concern

Repository	Transformation Manager	C-Level Manager	ICEBERG tool	
	Expectation	Expectation	Rank	Result
BMI Case: BIM-Manager-as-a-Service	1	1	1	28.2%
BMI Case: BIM-room leasing	2	2	3	19.6%
BMI Case: Insurance through banks	3	4	2	21.2%
BMI Case: BM-Pattern "Add-on" (Ryanair)	4	3	4	17%

Table 189 shows the evaluation results for the concern of business model innovation transformation performed with the transformation and C-level managers. The ICEBERG tool recommends the BIM-Manager-as-a-Service case to be the best matching case for the application scenario business by far. This outcome matches the expectation of the transformation and C-level managers. The second-best matching case is also the same among both experts and the ICEBERG tool: the BIM-room leasing case. The third- and fourth-best matching cases are close according to the similarity calculation of the recommender system. The outcome that the insurance case is

third-best and the business model pattern case is fourth matches the expectation of the transformation manager. The C-level manager expected it to be the other way around. However, since the margin is only 2.7% between the two cases according to the ICEBERG tool, it makes sense that not even the experts have the same opinion regarding which case should be third and which one should be fourth on the ranking list.

Table 189: Evaluation results of business model innovation transformation concern

Repository	Transformation Manager	C-Level Manager	ICEBERG tool	
	Expectation	Expectation	Rank	Result
BMI Case: BIM-Manager-as-a-Service	1	1	1	30.7%
BMI Case: BIM-room leasing	2	2	2	23.5%
BMI Case: Insurance through banks	3	4	3	16.7%
BMI Case: BM-Pattern "Add-on" (Ryanair)	4	3	4	14%

Table 190 shows the evaluation results for enterprise architecture innovation's concern performed with the transformation and IT-transformation managers. The ICEBERG tool recommends the BIM-Manager-as-a-Service case to be the best matching case for the application scenario business. This outcome matches the expectation of the transformation and IT transformation managers. The second-best matching case is also the same among both experts and the ICEBERG tool: the BIM-room leasing case. The third- and fourth-best matching cases are close according to the similarity calculation of the recommender system. The outcome that the business model pattern "Addon" case is third-best and the insurance case is fourth matches the IT transformation manager's expectation. The transformation manager expected it to be the other way around. However, since the margin is only 0.2% between the two cases according to the ICEBERG tool, it makes sense that not even the experts have the same opinion regarding which case should be third and which one should be fourth on the ranking list.

Table 190: Evaluation results of enterprise architecture innovation concern

Repository	Transformation Manager	IT-Transformation Manager	ICEBERG tool	
	Expectation	Expectation	Rank	Result
BMI Case: BIM-Manager-as-a-Service	1	1	1	10.1%
BMI Case: BIM-room leasing	2	2	2	9.2%

BMI Case: Insurance through banks	3	4	4	7.6%
BMI Case: BM-Pattern "Add-on" (Ryanair)	4	3	3	7.8%

In general, the three experts stated that a recommender system such as the ICEBERG tool would be beneficial for their business model innovation ideation process. The main benefit is attested to the time reduction regarding processing all the possible cases as soon as the case repository increases in size. Thus, the ranked list of the business model innovation cases provided by the recommender system helps to focus on the best matching cases.

9.3   Summary and Conclusion

This chapter describes the evaluation of the artifacts developed as part of this thesis. First, the evaluation set-up is described containing the application scenario case, which is used as the case to test the developed Boolean matching method and the case-based reasoning matching method and to answer the competency questions developed during the ontology development process to prove that the business model innovation ontology can match the expectations to it. Further, the business model innovation case repository needs to be set up in order to perform the evaluation.

The evaluation of the business model innovation case ontology, developed in Chapter 6, proves that it is possible to structure such a case using an ontology. Every specified competency question at the beginning of the ontology development can be answered with the ontology.

The evaluation of the Boolean matching method for the filtering service proves that filtering can be performed and the developed queries in Sub-chapter 8.1.2 are applicable. The filtering service supports listing only those business model innovation cases relevant for a user according to the user's criteria.

The case-based reasoning matching method for the similarity-retrieval service proves that the ICEBERG tool can recommend cases that are matching a business's criteria based on a predefined similarity model within the ontology. Also, the results from the ICEBERG tool were mostly matching to the expected results from the experts.

10. Conclusion and Outlook

This chapter summarizes the findings of this thesis. Sub-chapter 10.1 provides answers to the research questions defined at the beginning of this research. The contributions to the body of knowledge and practice as well as the developed artifacts are provided in Sub-chapter 10.2. Recommendation for further research to extend the developed results is provided in Sub-chapter 10.3.

10.1   Answers to Research Questions

Based on the literature research insights, the development of the artifacts, and the evaluation of those, this chapter discusses and answers the five research questions of this thesis, defined in Sub-chapter 1.4.2. After all, the main goal of this research is to answer the research questions. Further, each sub-chapter answers a research question and references the relevant chapters within this thesis. The conclusion sub-chapter refers to the defined objectives for this research, defined in Sub-chapter 1.3, and verifies if the thesis statement, defined in Sub-chapter 1.4.1, has been proven to be valid.

10.1.1   Research Question 1

What are the properties of business model innovation cases?

This research question has been investigated by analyzing three demonstration cases in Chapter 4 that have been collected as part of this research and enriched with findings from the literature review. This question aimed to determine the characteristics of a business model innovation case in order to formally represent it as an ontology for business model innovation cases.

The analysis results show that a business model innovation case has three main properties: the business model property, the business innovation property, and the enterprise architecture property. The business model property represents the case characteristics that are concerned with the business manager's viewpoint. The analysis resulted in 14 main characteristics for the business model property that are described in Sub-chapter 4.4.1. For example, a business manager needs to successfully determine the key resources required to run the new business model. The business innovation property represents the case characteristics that are concerned with the innovation manager's viewpoint. The analysis resulted in eight main characteristics for the business innovation property that are elaborated in Sub-chapter 4.4.2. For example, an innovation manager is interested in knowing the barriers the case company had to overcome to successfully implement

the business model innovation. The enterprise architecture property represents the case characteristics that are concerned with the IT manager's viewpoint. The analysis resulted in 23 main characteristics for the enterprise architecture property that are elaborated in Sub-chapter 4.4.3. For example, as part of introducing a business model innovation, an IT manager is interested in knowing the application services required to run the business model innovation. The three main properties of a business model innovation case are applicable independent of the sector.

The definitions of all the elements for the three different properties of business model innovation are described in Chapter 6 since the elements are represented within the ontology described in that chapter.

10.1.2   Research Question 2

How can an ontology-aided business model innovation approach foster the business model innovation process's ideation phase?

This research question has been investigated by developing an approach to facilitate the ideation phase of business model innovation by applying an ontology-based approach. The approach is described in Sub-chapter 5.1.2 in detail. This question aimed to determine how a computer-based approach could facilitate the process step ideation of a business model innovation design phase. Further, the computer-based approach applies an ontology-based approach to achieve interoperability to other systems, reusability of the results, and reasoning of information stored within the ontology.

To develop a concept for the ontology-based approach for ideation of a business model innovation, the ideation phase's specific challenges during a business model innovation were investigated. The outcome, as described in Sub-chapter 5.1, is that there are six main ideation challenges: comparing business models or enterprise architectures, leveraging business capabilities to generate business model innovation possibilities, overcoming the business and industry logic, thinking in business model concepts, obtain the required knowledge for generating new business model innovation ideas, and building computer-based tools to support business model innovation ideation. Based on these results, the concept of an ontology-based approach for business model innovation ideation was developed to minimize the challenges and provide a suitable solution for a computer-based approach for business model innovation ideation.

The developed approach consists of three layers: a user perspective layer, a knowledge layer, and a formal model layer. The user perspective layer describes the approach from a user perspective

by describing how user concerns are matched with business model innovation cases from the case repository in order to generate new business model ideas for the user. The knowledge layer describes how the approach matches the knowledge representation of the user's concerns that are of the types business model knowledge, business innovation transformation knowledge, and enterprise architecture knowledge with the knowledge representation from the business model innovation cases that consist of knowledge of business capabilities, business models, enterprise architecture, and business innovation transformation. The third layer, the formal models layer, describes the approach from an ontology perspective on how the knowledge representation of the user's concerns are formalized into an ontology and how that ontology is matched with the ontology-based representation of the business model innovation cases.

10.1.3   Research Question 3

How can the descriptions of business model innovation cases be formally represented?

This research question has been investigated through the development of an ontology to represent business model innovation cases. The ontology is described in Sub-chapters 6.2 and 6.3 in detail. This question aimed to determine how a business model innovation case with all its complexity can be represented using an ontology.

To answer this research question, five competency questions were developed to drill down a business model innovation case to represent it formally. The five competency questions were regarding the properties of business models, business innovation transformations, enterprise architectures, business capabilities, and construction industry specifics. For each of these competency questions, an ontology was developed representing the individual properties. The business model ontology consists of 97 classes and 37 properties. The business capability ontology consists of eleven classes and nine properties. The enterprise architecture ontology consists of the representation of the ArchiMate modeling language and reuses the ArchiMEO ontology from the knowledge base and extended it with ArchiMate elements of version 3.1. Thus, additional 25 classes and 32 properties were defined for the enterprise architecture ontology. The business innovation case ontology, representing the business innovation transformation properties, consists of 27 classes and 19 properties. The construction industry specifics ontology consists of five classes and four properties. The five developed individual ontologies are described in detail in Sub-chapter 6.2.

Besides developing five ontologies, each representing a property of a business model innovation case, an ontology was developed to merge the five individual ontologies, called the business model innovation industry specifics ontology. Further, three additional merged ontologies were

developed, as described in Sub-chapter 6.3. One to represent the compatibility of the concepts of business capabilities and business model through six properties. One to represent the compatibility of the concept enterprise architecture with the concepts business models and business capabilities through 32 properties. A third merged ontology is the generic business model innovation case ontology through 25 properties which is the same as the business model innovation industry specifics ontology except for leaving out the construction industry specifics ontology. The reason to apply such an approach of developing first individual ontologies and later merging them is that such a modular approach improves the reusability of the ontology since researchers or practitioners can use the ontology that is best suited for their application.

10.1.4 Research Question 4

How can different business model innovation cases be matched to retrieve appropriate business model innovation suggestions?

This research question has been investigated through the development of two matching methods to filter or recommend business model innovation cases to users. The matching methods are described in Sub-chapter 7.1 in detail. This question aimed to determine how a business model innovation case can be suggested to a user based on the user's input.

The goal of the matching is to answer the question of which business model innovation cases meet the user's input data. For this, the user has two options. Either a Boolean matching method is selected through applying a filtering service, as described in Sub-chapter 7.1.1, or a case-based reasoning matching method is selected through applying a similarity-retrieval service, as described in Sub-chapter 7.1.2. The Boolean matching method uses the RDF-based query language SPARQL to apply a filtering functionality on the business model innovation cases. This method allows users to reduce the result list of business model innovation cases towards cases that apply the requested parameters. The case-based reasoning matching method recommends business model innovation cases based on the user's input data. Hereto, the calculated similarity from the user's input data against all the business model innovation cases within the case repository is retrieved. For this matching method, the tool ICEBERG is reused.

10.1.5 Research Question 5

How can the suggested ontology-aided approach for the ideation phase of business model innovation be implemented to retrieve business model innovation suggestions?

This research question has been investigated by applying the two matching methods to filter or recommend business model innovation cases on the business model innovation case industry

specifics ontology. The application is described in Chapter 8 in detail. This question aimed to determine how the two matching methods can be applied using the developed ontology to support the ideation phase of business model innovation.

The developed artifacts of this research demonstrate how the proposed ideation approach to retrieve suggestions for business model innovation is feasible. The filter service retrieves matching results based on either a full-text search on the instances or based on the fact if there are instances within a specific class. Thus, a user can retrieve, for example, business model innovation cases based on the fact if the case has the string *Losinger* as part of the class *involved parties*. Also, the user can retrieve, for example, business model innovation cases that have instances within the class *academic institute*. To develop the filter functions for each competency sub-question appropriate filtering service questions were developed. In total, there have been 98 filtering service questions created. The developed SPARQL snippets answer all the filtering service questions, as described in Sub-chapter 8.1.2 in detail.

The similarity-retrieval service retrieves matching results through the application of the ICEBERG tool. To use the ICEBERG tool, the user has first to select which role applies to him/her. The user can choose from the roles transformation manager, C-level manager, and enterprise architect. Second, the user has to select which concern he/she has: BMI possibilities concern, BMI transformation concern, or EA innovation concern. Depending on the previously chosen role, only the applicable concerns are shown to the user. Afterward, the user gets a form to input the elements of the own business model, enterprise architecture, or business transformation specifics. The similarity is calculated against all the business model innovation cases stored within the case repository from this data. The user receives a list of all business model innovation cases with the value of how close the similarity is towards the input data. Based on these results, the user should first review the business model innovation cases that are the most similar to the input data in order to save time by browsing through all the available business model innovation cases. The configuration of the ICEBERG tool, the additionally developed case model to represent the different role viewpoints, the developed similarity ontology for the similarity calculation, and the description of the application of the ICEBERG tool are elaborated in Sub-chapter 8.2.

10.1.6 Conclusion

Based on the answers to the research questions discussed in the previous sub-chapters, it can be concluded that all the research objectives for this thesis, described in Sub-chapter 1.3, have been achieved. Therefore, an approach that enables businesses to retrieve ideas for business model

innovation, an ontology to represent business model innovation cases, a matching method to filter out not relevant business model innovation cases, and a matching method to recommend business model innovation cases based on similarities between the business and the cases has been developed.

As a result, the thesis statement has been proven to be valid. Concluding, it can be endorsed that:

It is possible to match business model innovation cases with specific business criteria that are related to business model innovation or enterprise architecture through the use of a computer-based and ontology-aided approach.

10.2 Contributions

This study has made several contributions to the body of knowledge as well as to the practice. This chapter describes the developed artifacts as part of this research in Sub-chapter 10.2.1. The contribution to the body of knowledge represents the scientific contribution of this research and is described in Sub-chapter 10.2.2. This study had a real-world context to ensure that the developed artifacts have a contribution to the practice. The contribution to the business practice is described in Sub-chapter 10.2.3.

10.2.1 Artifact Contribution

As mentioned by Hevner and Chatterjee (2012), design science research aims to produce artifacts, which are used to retrieve knowledge and understanding regarding a particular research problem. Table 191 provides an overview and description of the developed artifacts of this study, mentions the gained knowledge through the artifact, and points out in which chapter the artifact is introduced.

Table 191: Artifact contribution

Artifact	Description	Gained knowledge	Reference
Approach	The conceptual description of the approach provides a three-layered approach to retrieve business model innovation ideas	Conceptual understanding of the elements required to achieve the approach and the integration of them.	Sub-chapter 5.1.2

Ontology	The ontology provides a formal specification of the concepts of business model, business capability, enterprise architecture, business innovation case, and construction industry specifics to describe a business model innovation case in detail.	Conceptual understanding of the elements and structure of an ontology to represent business model innovation cases. Integration of different domain and contextual knowledge to represent business model innovation cases.	Sub-chapters 6.2 and 6.3
Boolean matching method	The Boolean matching method describes how business model innovation cases are retrieved through matching based on the user's filtering parameters.	Conceptual understanding of a Boolean approach as a filtering function.	Sub-chapter 7.1.1
Case-based reasoning matching method	The case-based reasoning matching method describes how business model innovation cases are matched towards the user input based on ontology-based case-based reasoning algorithms that retrieve similarity values.	Conceptual understanding of a case-based reasoning approach. Conceptual understanding of the ICEBERG tool to apply the case-based reasoning matching method.	Sub-chapter 7.1.2
Filtering service prototype	The computer-based prototype filtering service embeds all the required components to run the Boolean matching method to retrieve cases and thus, acts as a case explorer.	Conceptual and practical understanding of the query language application and the integration of business model innovation cases into the case repository.	Sub-chapter 8.1
Similarity-retrieval service prototype	The computer-based prototype similarity-retrieval service embeds all the required components to run the case-based reasoning matching method to match cases based on user inputs.	Conceptual and practical understanding of the similarity configuration, the case-based reasoning integration, the case model integration, and the integration of business model innovation cases into the case repository.	Sub-chapter 8.2

10.2.2 Contribution to the Body of Knowledge

The contribution to the body of knowledge from this research spans over the research fields of business model innovation, enterprise architecture, business model innovation case representation, ontologies, and case matching. This study contributed primarily to the body of knowledge by closing the identified literature gaps, described in Sub-chapter 2.5:

- This thesis contributes to the body of knowledge regarding how to approach the ideation phase of business model innovation systematically. The approach is based on the ideation phase suggestion by Gassmann et al. (2014) to apply similarity principles and

confrontation principles. The confrontation is achieved by providing the user with a business model innovation case exploration tool to retrieve new ideas from other industries. The similarity principle is applied through a case recommender to suggest business model innovation cases based on the similarity of the case towards the business criteria.

- The insights of this thesis contribute to the body of knowledge by demonstrating the applicability of enterprise architecture for the ideation phase of business model innovation. This thesis shows that enterprise architecture is closely related to the topic of business model innovation. Also, to structure business model innovation cases as well applying enterprise architecture provides the cases with additional information, especially regarding the lower layers, technology, application, and business, by providing information to the user on how those layers looked like for the case as well as to provide comparison towards the business's enterprise architecture.

- This thesis extends the knowledge about the applicability of computer-based tools to facilitate business model innovation during the ideation phase. It shows that the use of similarity adoption, as proposed by Gassmann et al. (2014), is applicable through a computer-based tool. This tool uses an ontology-based approach to structure business model innovation cases. The tool also uses an ontology-based approach to calculate the similarity of the business model innovation cases stored within the case repository and with the user's input data.

Further, this thesis provides a concept on how to describe business model innovation cases. This is achieved through a dedicated ontology for such case representation. The developed ontologies are provided to be used for further research either on the ontologies or by applying the ontologies to other research problems.

The communication occurred primarily through publications in conference proceedings, scientific books, and a journal as well as through conference presentations. Overall, this research published 13 research papers, as listed in Chapter Publications.

- Four research papers contributed results for the approach towards business model innovation and ontologies (Peter, 2021; Peter et al., 2018, 2020, 2021).
- Two research papers contributed results of the similarity-retrieval service to the research community (Peter et al., 2021; Witschel et al., 2019).
- Two research papers contributed results concerning the topic of business capabilities (Adam et al., 2020; Peter, de Roche, et al., 2019).

- Six research papers contributed to the awareness of the research problem (Gatziu Grivas, Peter, Giovanoli, et al., 2018; Gatziu Grivas, Peter, Heeb, et al., 2018; Graf et al., 2019; Peter, Gatziu Grivas, et al., 2019; Peter & Gatziu Grivas, 2016, 2017).

10.2.3 Contribution to Practice

According to Hevner and Chatterjee (2012), it is a principle of design science research that research results, such as artifacts and acquired knowledge and understanding, need to be communicated to practice in order for it to be further used in a practical context.

This research contributes to practice through the communication process of the participated three-year research project of digital transformation in the construction sector. The research project of digital transformation in the construction sector generated a report containing different research results. One of these results was the developed approach to facilitate the ideation process for business model innovation within the construction sector. Further, the business model innovation case with industry specifics ontology to formally represent business model innovation cases from the construction sector has been communicated within the report. The research project report also contains the similarity-retrieval and filtering service prototypes to match business model innovation cases from the case repository to the needs of the construction companies. Besides communicating the research results from this thesis by means of a research project report, they are communicated through a presentation towards practitioners from the construction sector. This presentation has been organized to actively communicate the research project results and discuss them with practitioners.

10.3 Recommendation for Further Research

This research focused on developing an approach to facilitate business model innovation during the ideation phase by matching business model innovation cases based on specific business criteria. There have been three areas identified to conduct further research based on the results of this study.

This research proved that a computer-based ideation process is feasible. However, to improve the benefits of a computer-based solution for business model innovation, the business model innovation process's initiation phase should also be computer-based. There exist computer-based tools to design business models or enterprise architectures. However, there is missing a computer-based tool to design all the properties of a business model innovation case. Also, this computer-

based tool needs to be integrated with the filtering service and the similarity-retrieval service developed through this study. The integration of this study's artifacts with a computer-based modeling tool would facilitate the application of the similarity-retrieval service since the user could design the current state based on already known modeling tools, such as a computer-based Business Model Canvas. For example, there exists the modeling tool AOAME that has been developed by researchers from the University of Applied Sciences and Arts Northwestern Switzerland (Laurenzi et al., 2018). AOAME represents an agile and ontology-aided modeling environment. AOAME has the capacity to model the Business Model Canvas as well as an enterprise architecture based on the ArchiMate language. Thus, AOAME is best suited to integrate this research's artifacts to derive recommendations of business model innovations to users.

The research results from this study facilitate the ideation phase of the business model innovation process. Thus, researchers should take this research's results and further develop them to also support the integration phase of the business model innovation process with a computer-based tool. Further development of the similarity-retrieval service's comparison functionality would enable it to derive a rough estimation of changing costs through the introduction of the new business model innovation. Further, the challenges of identifying the appropriate budget and adequate timeframes for the integration of the innovation would be facilitated. However, to achieve this, the ontology needs to be enriched by the capacity of providing effort costs of each applied transformation activity, such as acquisition and integration of new resources.

This research applied a qualitative approach for the evaluation of the artifacts. However, a quantitative evaluation would help validate the approach, the ontology-based case repository, and the matching methods in a real-world scenario. For practical use, the case repository would need to have many business model innovation cases stored within to produce the best recommendation results. Unfortunately, it is challenging to obtain such data from organizations since they might not be willing to share their business model innovation transformation data and enterprise architecture. Thus, the third area for further research to be made based on this research's results is to gather many business model innovation cases for the case repository. This would facilitate a quantitative evaluation of the research results from this thesis.

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Appendices

The following appendices are mentioned within the body of this thesis. They complement the information provided within the text of the thesis by providing supplementary information.

Appendix-A: Detailed Snapshots of the Ontology

Appendix-B: Source Code of the Developed Ontologies

Appendix-C: Source Code of the Developed Similarity-Retrieval Service

Appendix-D: Case Repository

Appendix-E: Application Scenario Case

Appendix-F: Expert Interview Summaries

Appendix-A: Detailed Snapshots of the Ontology

This appendix illustrates the different snapshots of the ontologies in detail. A snapshot of the entire business model innovation case ontology is not possible since, because of the size of the ontology, the image would not be readable.

Snapshots of the Business Model Ontology

This appendix section illustrates the different components of the business model ontology in detail.
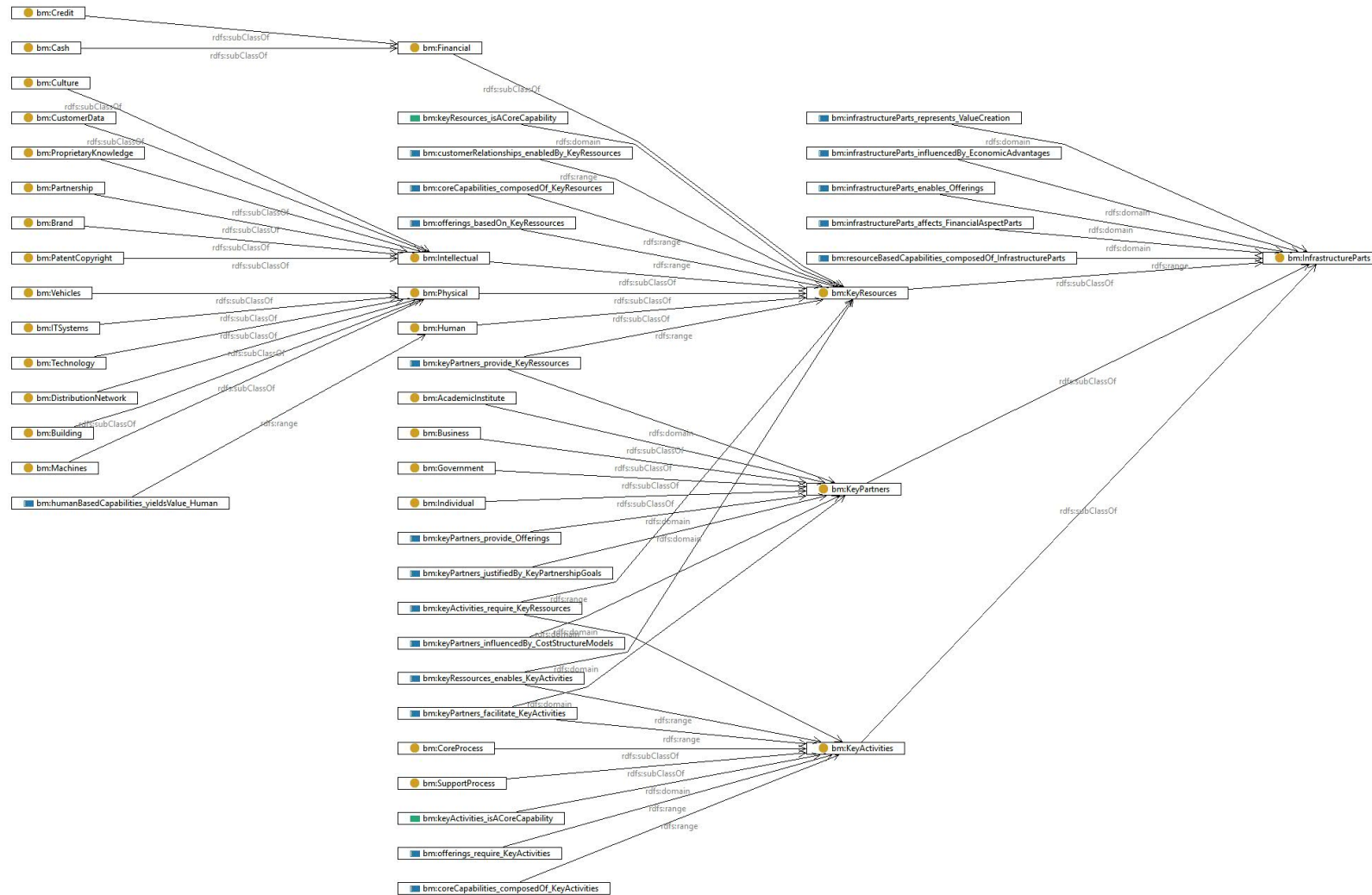
Figure 126: Snapshot of the business model ontology - infrastructure component with all corresponding properties
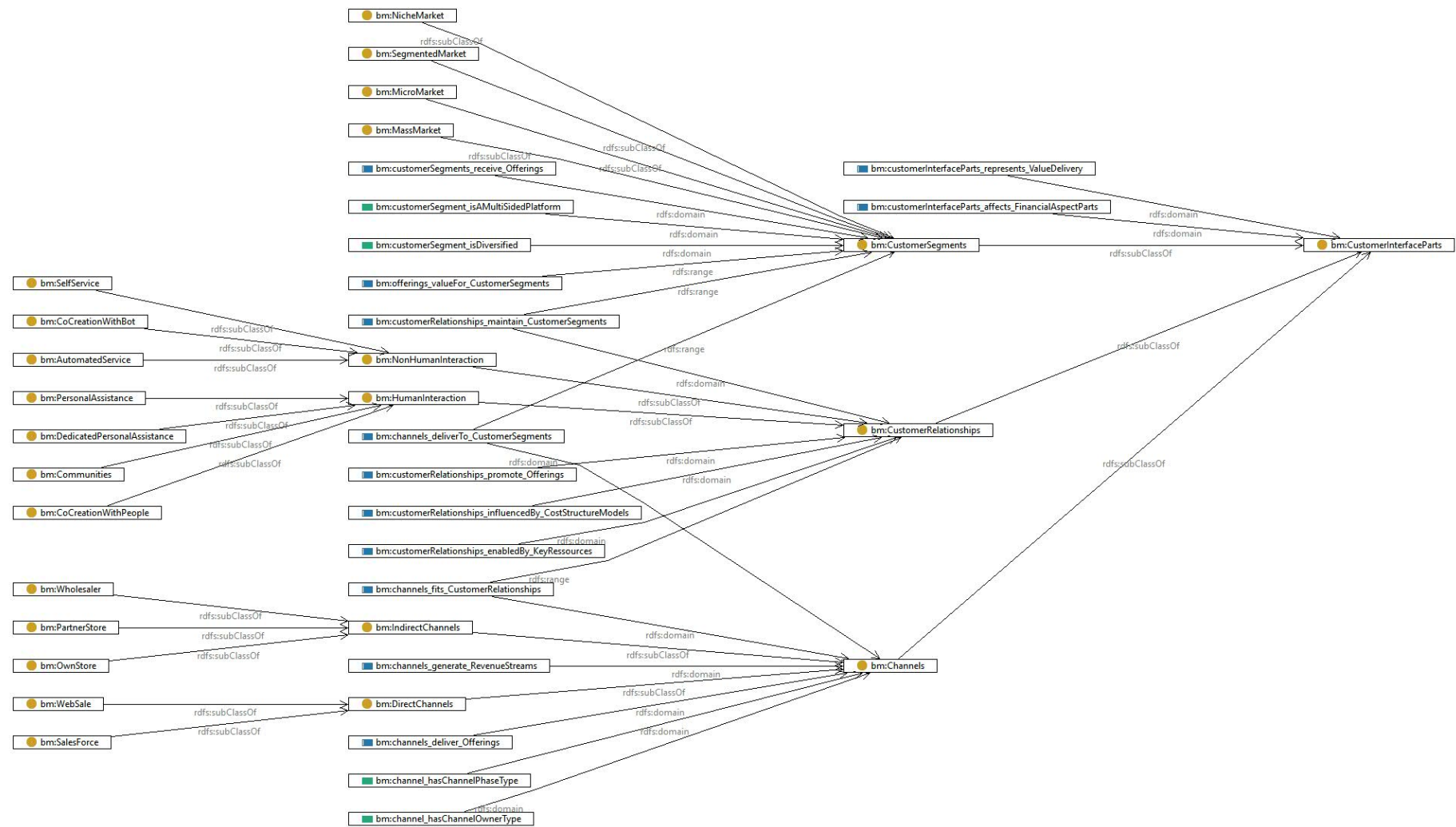
Figure 127: Snapshot of the business model ontology – customer interface component with all corresponding properties
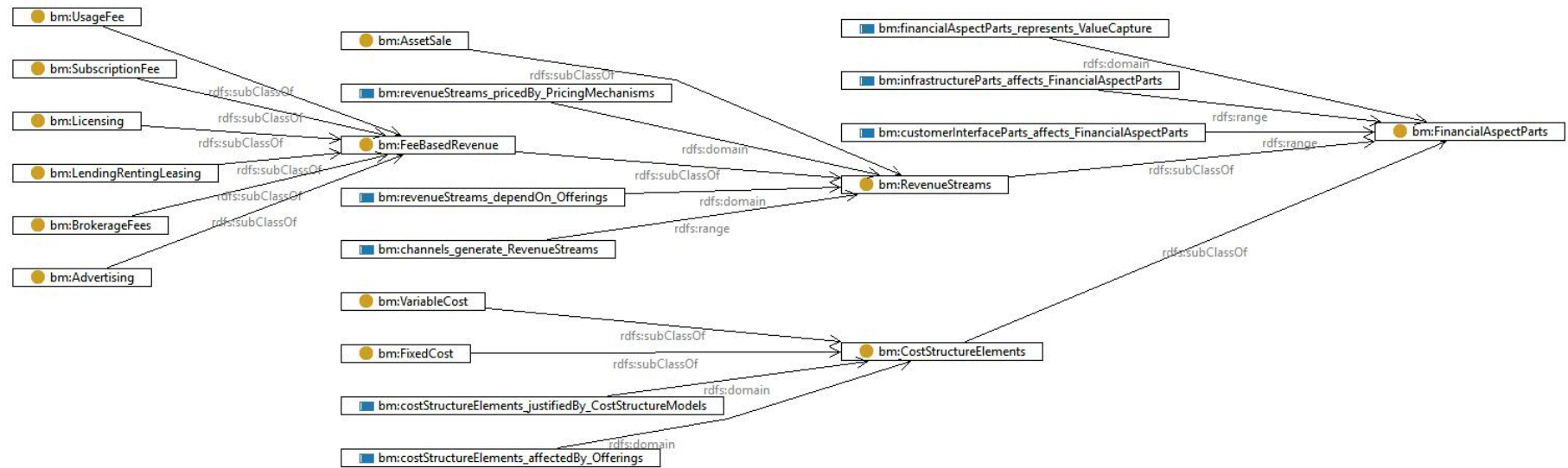
Figure 128: Snapshot of the business model ontology – financial properties component with all corresponding properties
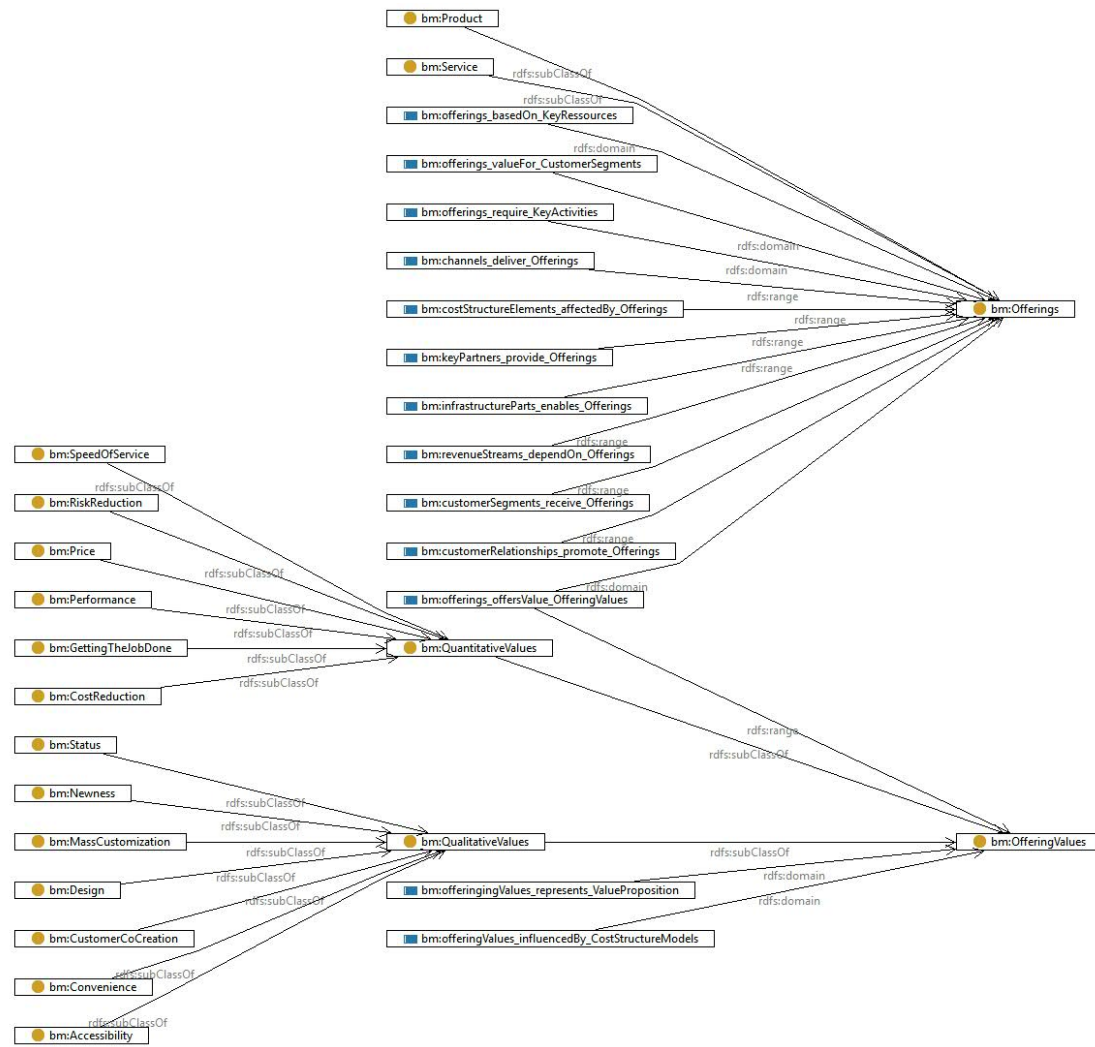
Figure 129: Snapshot of the business model ontology – offerings and offering values components with all corresponding properties
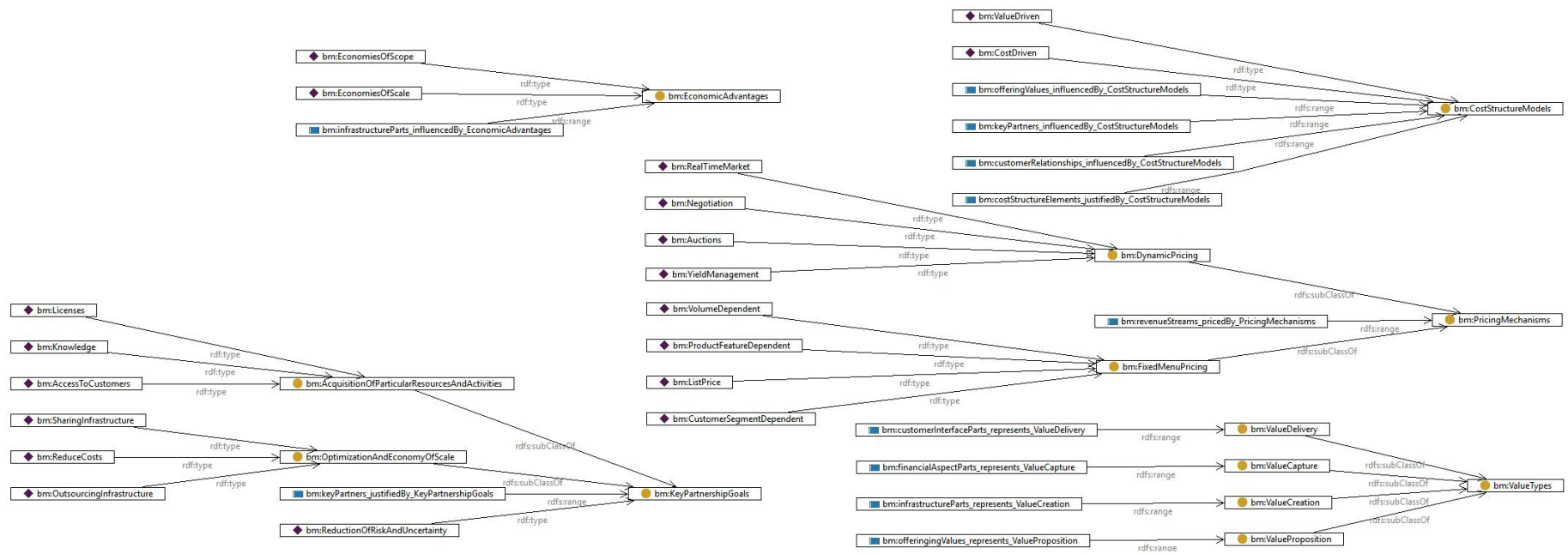
Figure 130: Snapshot of the business model ontology – economic advantages, cost structure models, pricing mechanisms, value types, and key partnership goals components with all corresponding properties and instances

Snapshots of the Business Capability Ontology

This appendix section illustrates the different components of the business capability ontology in detail.
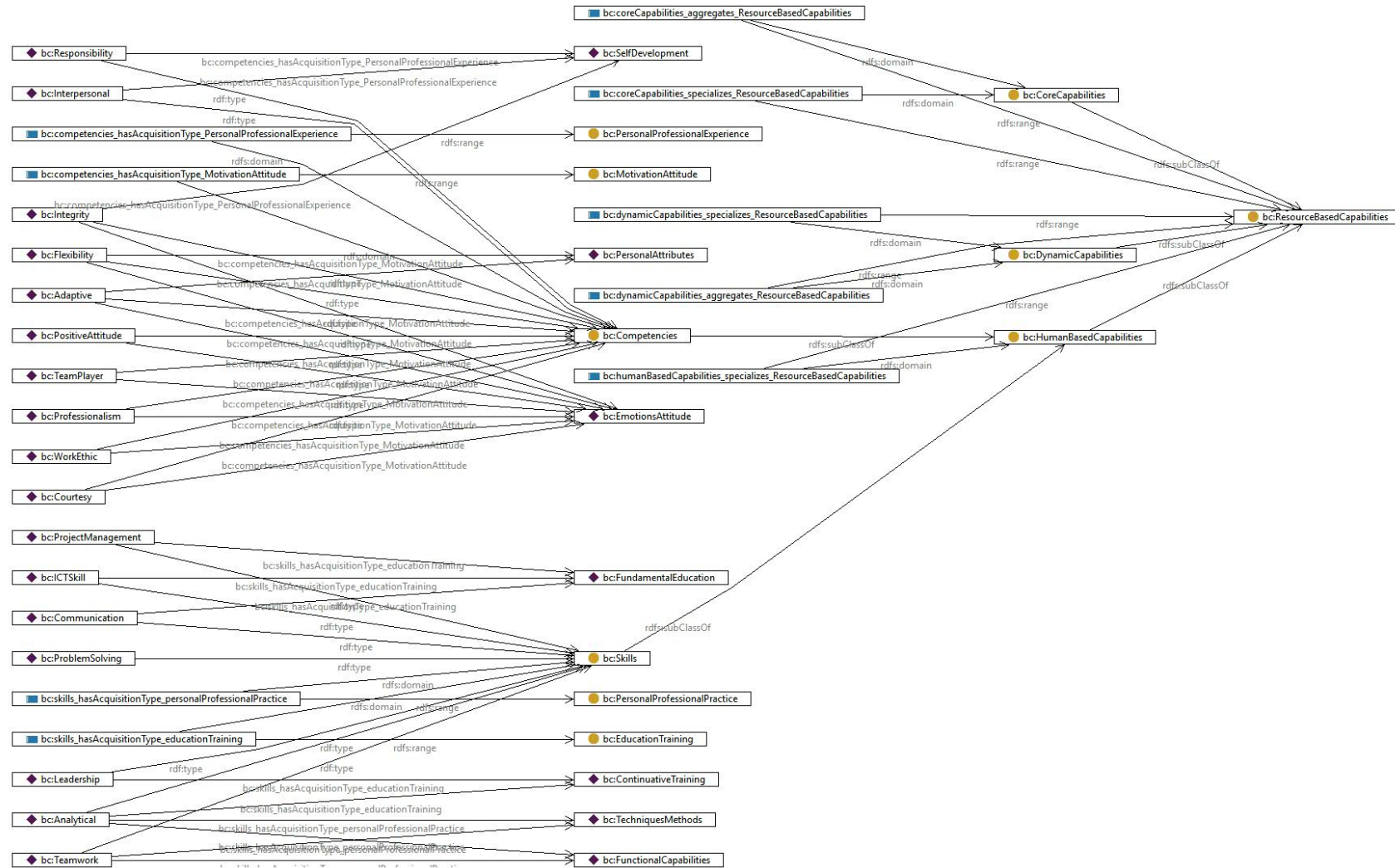
Figure 131: Snapshot of the business capability ontology – resource-based capabilities component with all corresponding properties and instances
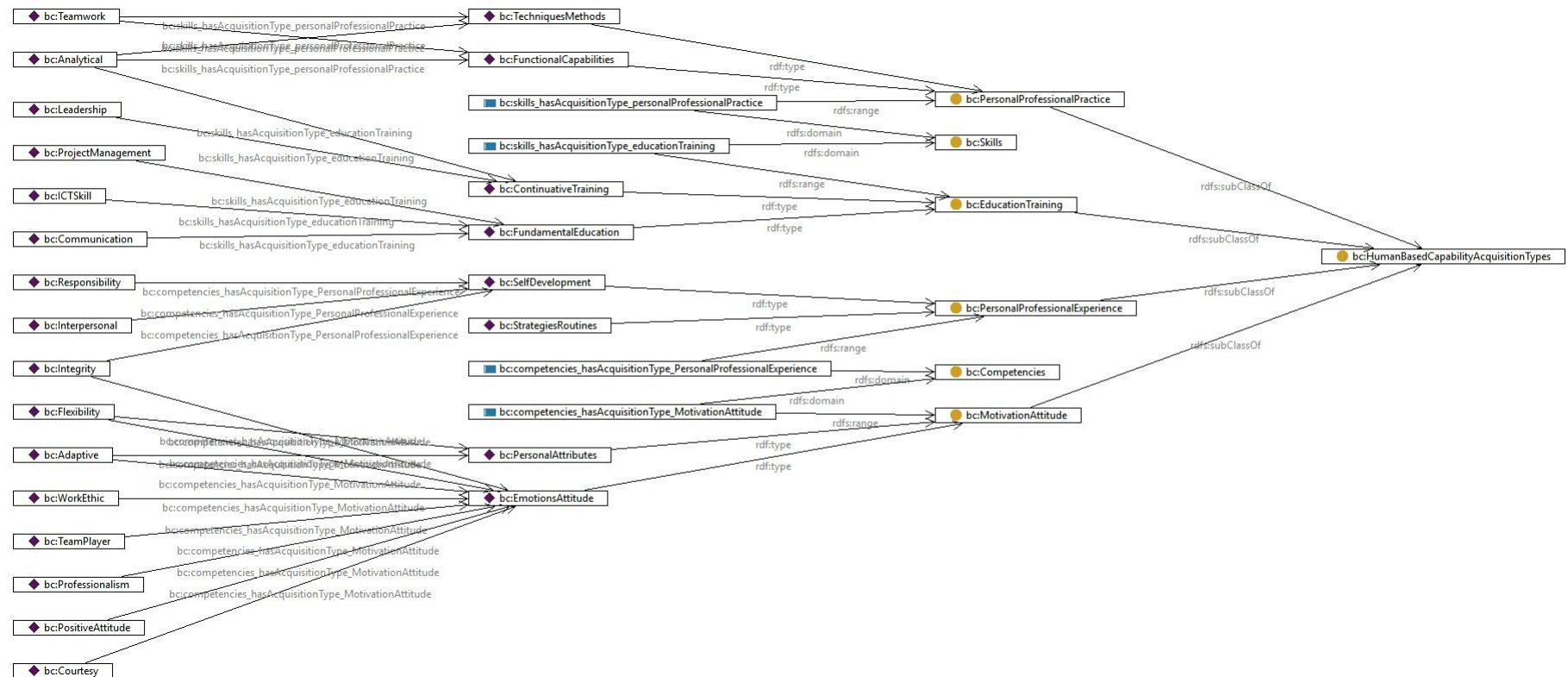
Figure 132: Snapshot of the business capability ontology – human-based capability acquisition types component with all corresponding properties and instances

Snapshots of the Enterprise Architecture Ontology

This appendix section illustrates the different components of the enterprise architecture ontology in detail.
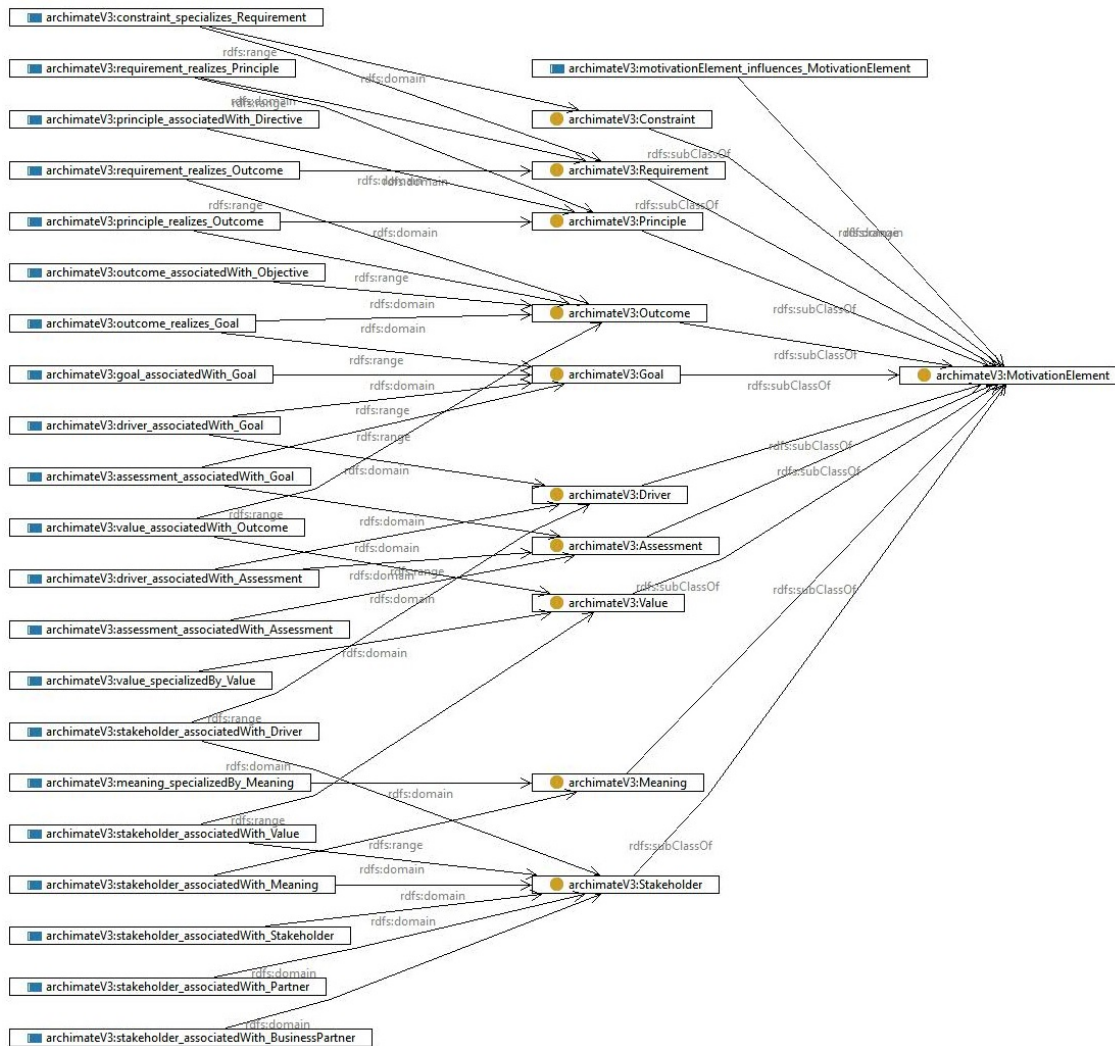
Figure 133: Snapshot of the enterprise architecture ontology – motivation elements component with all corresponding properties
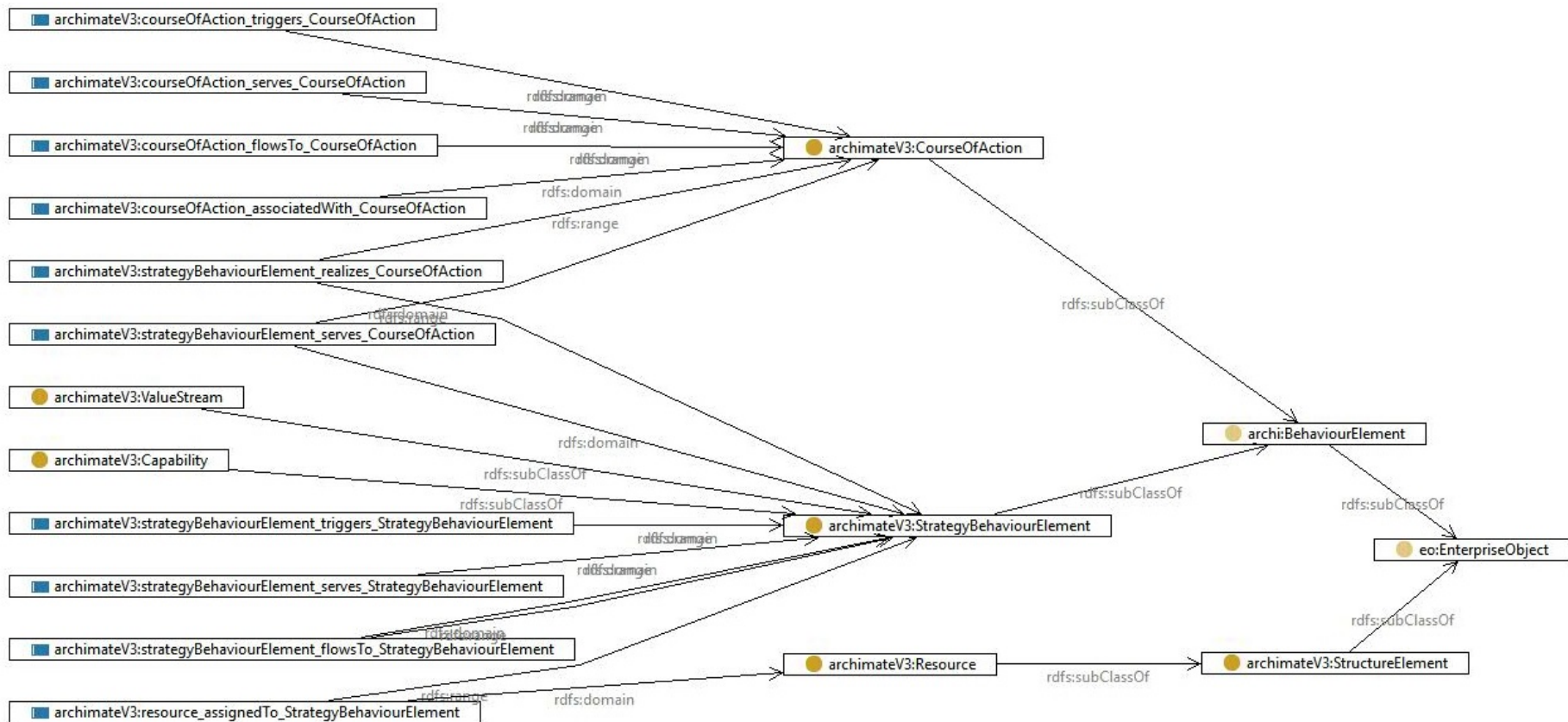
Figure 134: Snapshot of the enterprise architecture ontology – strategy elements component with all corresponding properties

Snapshots of the Business Innovation Case Ontology

This appendix section illustrates the different components of the business innovation case ontology in detail.
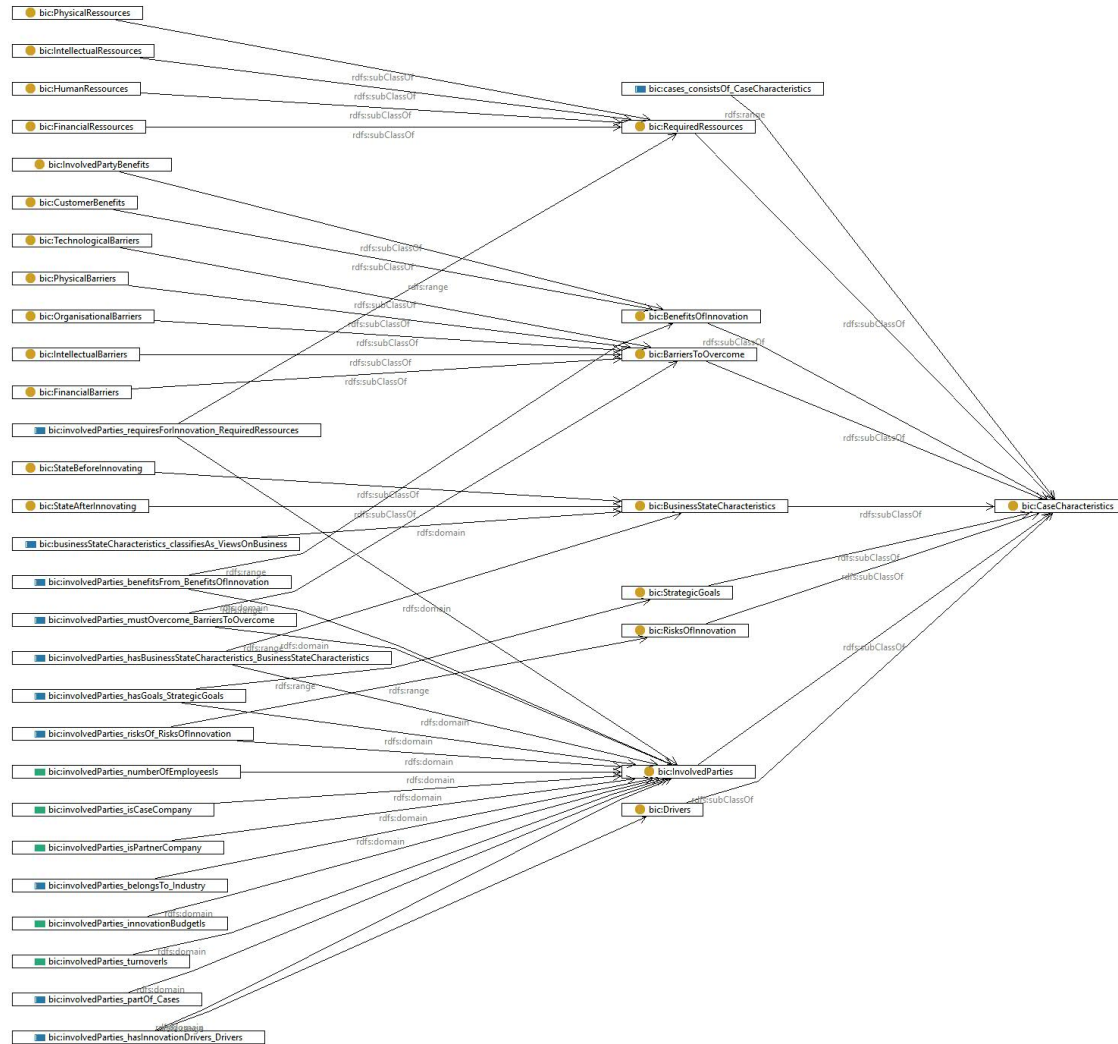
Figure 135: Snapshot of the business innovation case ontology – case characteristics component with all corresponding properties
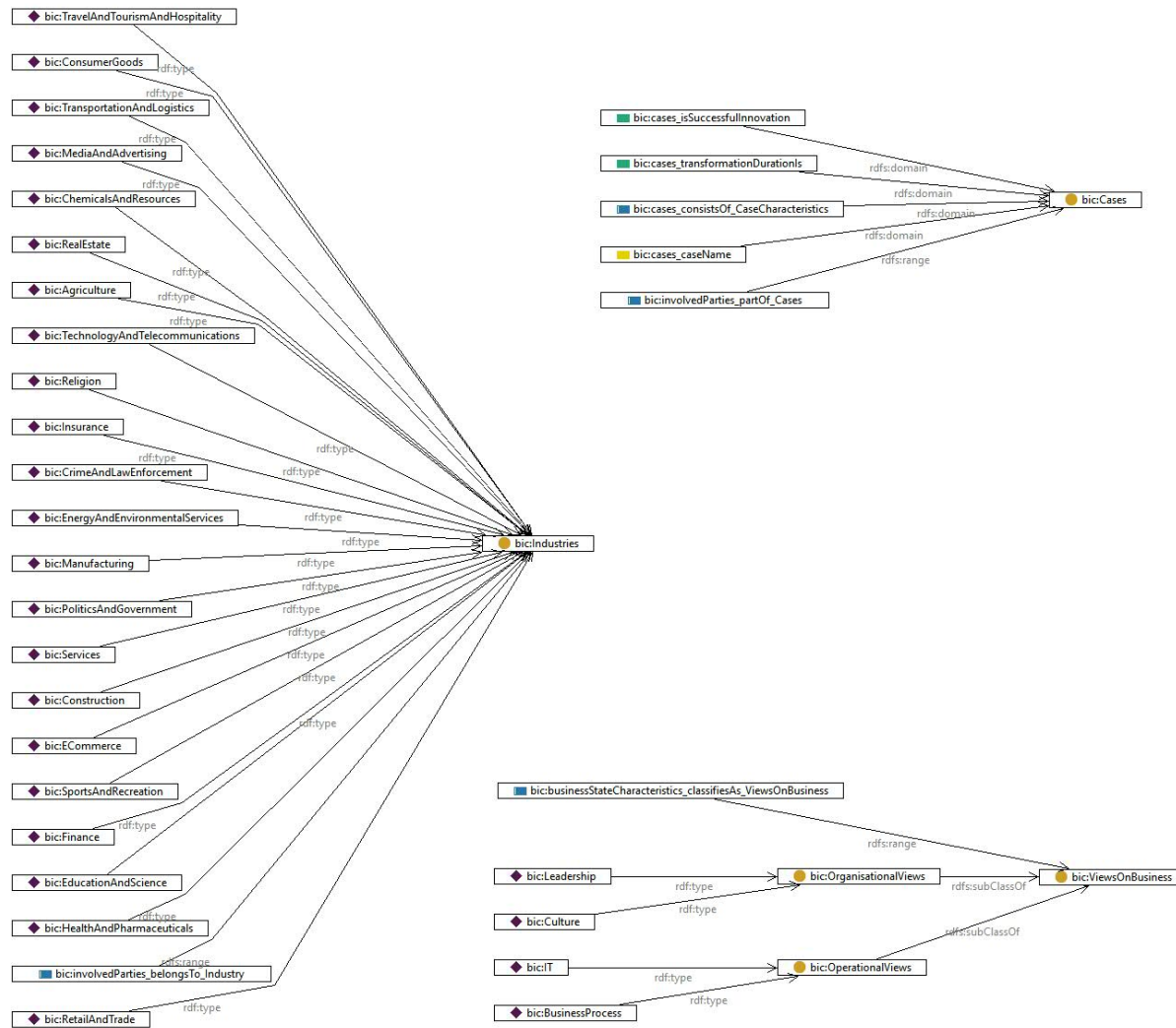
Figure 136: Snapshot of the business innovation case ontology – cases, industries, and views on business components with all corresponding properties and instances

Snapshot of the Construction Industry Specifics Ontology

This appendix section illustrates the construction industry specifics ontology in detail.

Figure 137: Snapshot of the construction industry specifics ontology

Overview of the Business Model Innovation Case Ontology

This appendix section illustrates the business model innovation case ontology in detail.
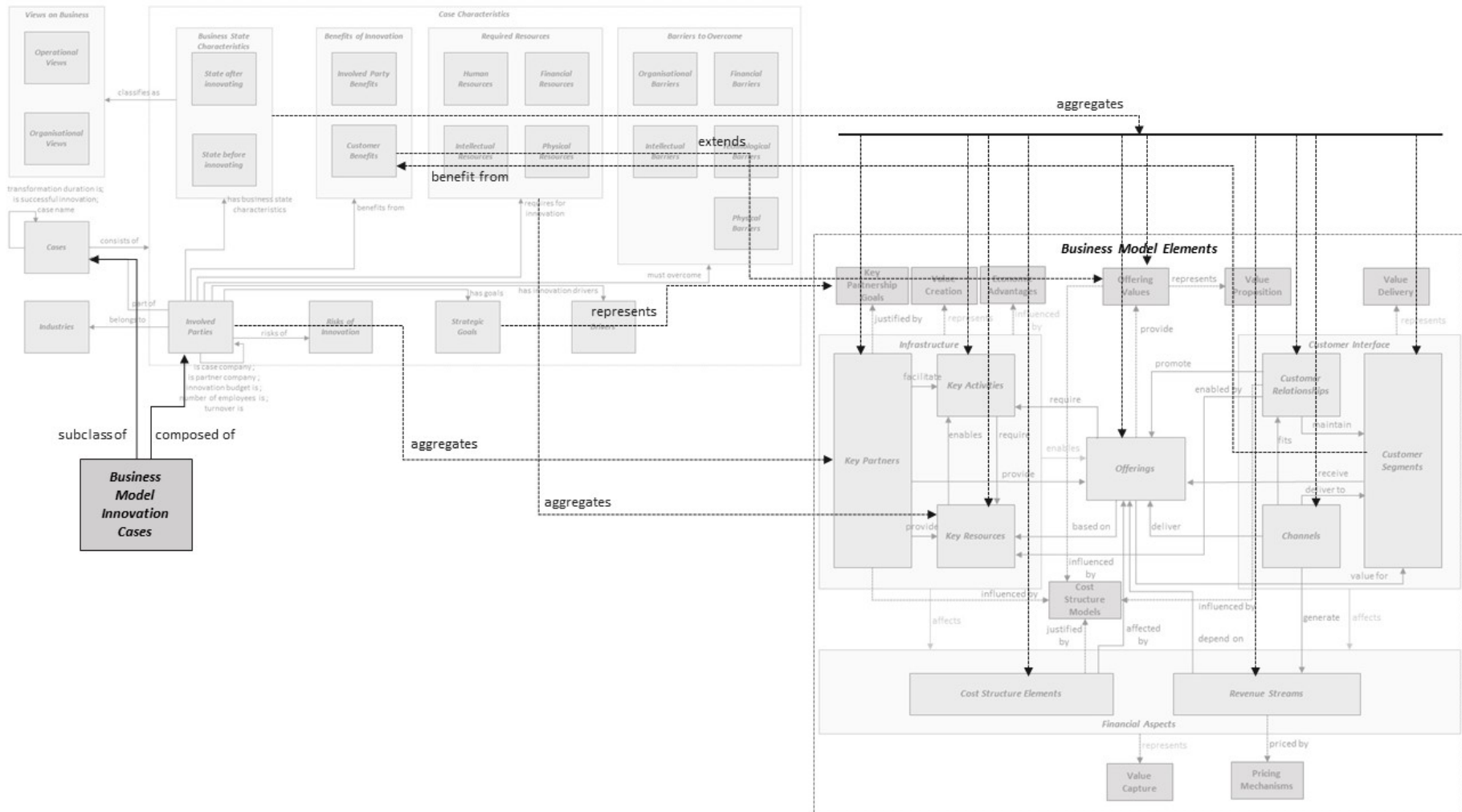
Figure 138: Overview of the business model innovation case ontology regarding the connection between the business model ontology and the business innovation case ontology

Overview of the Business Model Innovation Case with Industry Specifics Ontology

This appendix section illustrates the business model innovation case with industry specifics ontology in detail.
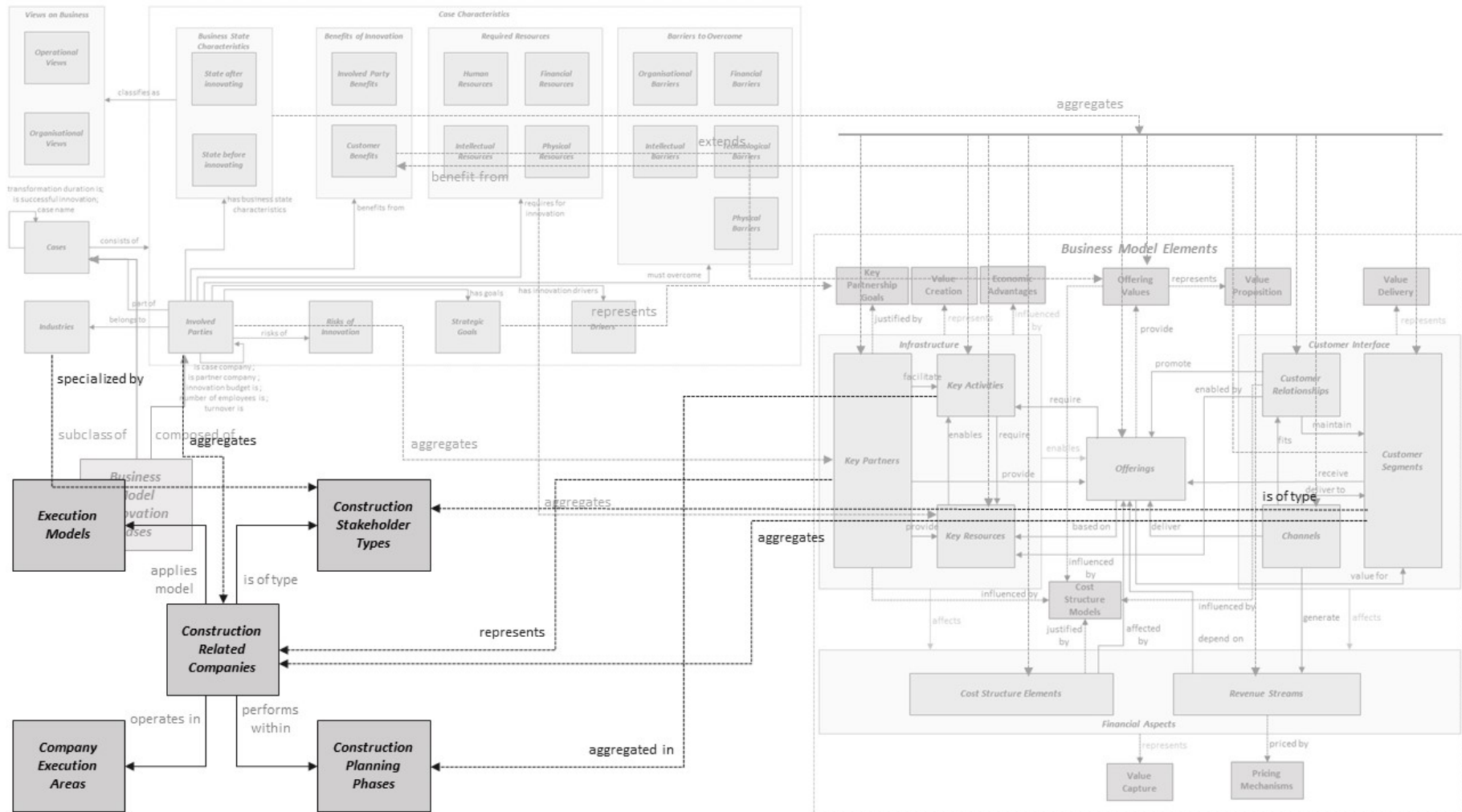
Figure 139: Overview of the business model innovation case with industry specifics ontology regarding the connection between the business model ontology, the business innovation case ontology, and the construction industry specifics ontology

Figure 140: Overview of the business model innovation case with industry specifics ontology regarding the connection between the business innovation case ontology, the relevant ArchiMate elements, and the construction industry specifics ontology

Appendix-B: Source Code of the Developed Ontologies

This appendix shows the code developed as part of this research to create the ontologies.

Source Code of the Business Model Ontology

This appendix section shows the code for the business model ontology stored within the file BusinessModel.ttl.

```
1.    # baseURI: http://ikm-group.ch/bm
2.    # prefix: bm
3.
4.    @prefix bm: <http://ikm-group.ch/bm#> .
5.    @prefix owl: <http://www.w3.org/2002/07/owl#> .
6.    @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
7.    @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
8.    @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
9.
10.   <http://ikm-group.ch/bm>
11.   rdf:type owl:Ontology ;
12.   owl:versionInfo "Created with TopBraid Composer"@en ;
13.   .
14.   bm:AcademicInstitute
15.   rdf:type owl:Class ;
16.   rdfs:label "Academic Institute"@en ;
17.   rdfs:subClassOf bm:KeyPartners ;
18.   .
19.   bm:AccessToCustomers
20.   rdf:type bm:AcquisitionOfParticularResourcesAndActivities ;
21.   bm:keyPartners_influencedBy_CostStructureModels bm:CostDriven ;
22.   bm:keyPartners_influencedBy_CostStructureModels bm:ValueDriven ;
23.   rdfs:label "access to customers"@en ;
24.   .
25.   bm:Accessibility
26.   rdf:type owl:Class ;
27.   rdfs:label "Accessibility"@en ;
28.   rdfs:subClassOf bm:QualitativeValues ;
29.   .
30.   bm:AcquisitionOfParticularResourcesAndActivities
31.   rdf:type owl:Class ;
32.   rdfs:label "Acquisition of particular resources and activities"@en ;
33.   rdfs:subClassOf bm:KeyPartnershipGoals ;
34.   .
35.   bm:Advertising
36.   rdf:type owl:Class ;
37.   rdfs:label "Advertising"@en ;
38.   rdfs:subClassOf bm:FeeBasedRevenue ;
39.   .
40.   bm:AssetSale
41.   rdf:type owl:Class ;
42.   rdfs:label "Asset Sale"@en ;
43.   rdfs:subClassOf bm:RevenueStreams ;
44.   .
45.   bm:Auctions
46.   rdf:type bm:DynamicPricing ;
47.   rdfs:comment "Price determined by outcome of competitive bidding"@en ;
48.   rdfs:label "Auctions"@en ;
49.   .
50.   bm:AutomatedService
51.   rdf:type owl:Class ;
```

```
52.    rdfs:label "Automated Service"@en ;
53.    rdfs:subClassOf bm:NonHumanInteraction ;
54.    .
55.    bm:Brand
56.    rdf:type owl:Class ;
57.    rdfs:label "Brand"@en ;
58.    rdfs:subClassOf bm:Intellectual ;
59.    .
60.    bm:BrokerageFees
61.    rdf:type owl:Class ;
62.    rdfs:label "Brokerage Fees"@en ;
63.    rdfs:subClassOf bm:FeeBasedRevenue ;
64.    .
65.    bm:Building
66.    rdf:type owl:Class ;
67.    rdfs:label "Building"@en ;
68.    rdfs:subClassOf bm:Physical ;
69.    .
70.    bm:Business
71.    rdf:type owl:Class ;
72.    rdfs:label "Business"@en ;
73.    rdfs:subClassOf bm:KeyPartners ;
74.    .
75.    bm:Cash
76.    rdf:type owl:Class ;
77.    rdfs:label "Cash"@en ;
78.    rdfs:subClassOf bm:Financial ;
79.    .
80.    bm:Channels
81.    rdf:type owl:Class ;
82.    rdfs:label "Channel Types"@en ;
83.    rdfs:subClassOf bm:CustomerInterfaceParts ;
84.    .
85.    bm:CoCreationWithBot
86.    rdf:type owl:Class ;
87.    rdfs:label "Co-Creation with a Bot"@en ;
88.    rdfs:subClassOf bm:NonHumanInteraction ;
89.    .
90.    bm:CoCreationWithPeople
91.    rdf:type owl:Class ;
92.    rdfs:label "Co-Creation with People"@en ;
93.    rdfs:subClassOf bm:HumanInteraction ;
94.    .
95.    bm:Communities
96.    rdf:type owl:Class ;
97.    rdfs:label "Communities"@en ;
98.    rdfs:subClassOf bm:HumanInteraction ;
99.    .
100.   bm:Convenience
101.   rdf:type owl:Class ;
102.   rdfs:label "Convenience / usability"@en ;
103.   rdfs:subClassOf bm:QualitativeValues ;
104.   .
105.   bm:CoreProcess
106.   rdf:type owl:Class ;
107.   rdfs:label "Core Process"@en ;
108.   rdfs:subClassOf bm:KeyActivities ;
109.   .
110.   bm:CostDriven
111.   rdf:type bm:CostStructureModels ;
112.   rdfs:label "Cost-Driven"@en ;
113.   .
114.   bm:CostReduction
115.   rdf:type owl:Class ;
116.   rdfs:label "Cost Reduction"@en ;
```

```
117.    rdfs:subClassOf bm:QuantitativeValues ;
118.    .
119.    bm:CostStructureElements
120.    rdf:type owl:Class ;
121.    rdfs:subClassOf bm:FinancialAspectParts ;
122.    .
123.    bm:CostStructureModels
124.    rdf:type owl:Class ;
125.    rdfs:label "Cost Structure Types"@en ;
126.    .
127.    bm:Credit
128.    rdf:type owl:Class ;
129.    rdfs:label "Credit"@en ;
130.    rdfs:subClassOf bm:Financial ;
131.    .
132.    bm:Culture
133.    rdf:type owl:Class ;
134.    rdfs:label "Culture"@en ;
135.    rdfs:subClassOf bm:Intellectual ;
136.    .
137.    bm:CustomerCoCreation
138.    rdf:type owl:Class ;
139.    rdfs:label "Customer Co-Creation"@en ;
140.    rdfs:subClassOf bm:QualitativeValues ;
141.    .
142.    bm:CustomerData
143.    rdf:type owl:Class ;
144.    rdfs:label "CustomerData"@en ;
145.    rdfs:subClassOf bm:Intellectual ;
146.    .
147.    bm:CustomerInterfaceParts
148.    rdf:type owl:Class ;
149.    rdfs:label "Customer Interface"@en ;
150.    .
151.    bm:CustomerRelationships
152.    rdf:type owl:Class ;
153.    rdfs:subClassOf bm:CustomerInterfaceParts ;
154.    .
155.    bm:CustomerSegmentDependent
156.    rdf:type bm:FixedMenuPricing ;
157.    rdfs:comment "Price depends on the type and characteristic of a Customer Segment
        "@en ;
158.    rdfs:label "Customer Segment Dependent"@en ;
159.    .
160.    bm:CustomerSegments
161.    rdf:type owl:Class ;
162.    rdfs:subClassOf bm:CustomerInterfaceParts ;
163.    .
164.    bm:DedicatedPersonalAssistance
165.    rdf:type owl:Class ;
166.    rdfs:comment "e.g. account manager"@en ;
167.    rdfs:label "Dedicated Personal Assistance"@en ;
168.    rdfs:subClassOf bm:HumanInteraction ;
169.    .
170.    bm:Design
171.    rdf:type owl:Class ;
172.    rdfs:label "Design"@en ;
173.    rdfs:subClassOf bm:QualitativeValues ;
174.    .
175.    bm:DirectChannels
176.    rdf:type owl:Class ;
177.    rdfs:label "Direct"@en ;
178.    rdfs:subClassOf bm:Channels ;
179.    .
180.    bm:DistributionNetwork
```

```
181.  rdf:type owl:Class ;
182.  rdfs:label "Distribution Network"@en ;
183.  rdfs:subClassOf bm:Physical ;
184.  .
185.  bm:DynamicPricing
186.  rdf:type owl:Class ;
187.  rdfs:comment "Prices change based on market conditions"@en ;
188.  rdfs:label "Dynamic Pricing"@en ;
189.  rdfs:subClassOf bm:PricingMechanisms ;
190.  .
191.  bm:EconomicAdvantages
192.  rdf:type owl:Class ;
193.  rdfs:label "Cost Structure Scaling"@en ;
194.  .
195.  bm:EconomiesOfScale
196.  rdf:type bm:EconomicAdvantages ;
197.  rdfs:label "Economies of Scale"@en ;
198.  .
199.  bm:EconomiesOfScope
200.  rdf:type bm:EconomicAdvantages ;
201.  rdfs:label "Economies of Scope"@en ;
202.  .
203.  bm:FeeBasedRevenue
204.  rdf:type owl:Class ;
205.  rdfs:label "Fee-based Revenue"@en ;
206.  rdfs:subClassOf bm:RevenueStreams ;
207.  .
208.  bm:Financial
209.  rdf:type owl:Class ;
210.  rdfs:label "Financial"@en ;
211.  rdfs:subClassOf bm:KeyResources ;
212.  .
213.  bm:FinancialAspectParts
214.  rdf:type owl:Class ;
215.  rdfs:label "Financial Aspects"@en ;
216.  .
217.  bm:FixedCost
218.  rdf:type owl:Class ;
219.  rdfs:label "Fixed Costs"@en ;
220.  rdfs:subClassOf bm:CostStructureElements ;
221.  .
222.  bm:FixedMenuPricing
223.  rdf:type owl:Class ;
224.  rdfs:comment "Predefined prices are based on static variables"@en ;
225.  rdfs:label "Fixed Menu Pricing"@en ;
226.  rdfs:subClassOf bm:PricingMechanisms ;
227.  .
228.  bm:GettingTheJobDone
229.  rdf:type owl:Class ;
230.  rdfs:label "Getting the Job Done"@en ;
231.  rdfs:subClassOf bm:QuantitativeValues ;
232.  .
233.  bm:Government
234.  rdf:type owl:Class ;
235.  rdfs:label "Government"@en ;
236.  rdfs:subClassOf bm:KeyPartners ;
237.  .
238.  bm:Human
239.  rdf:type owl:Class ;
240.  rdfs:label "Human"@en ;
241.  rdfs:subClassOf bm:KeyResources ;
242.  .
243.  bm:HumanInteraction
244.  rdf:type owl:Class ;
245.  rdfs:label "Human interaction involved"@en ;
```

```
246.    rdfs:subClassOf bm:CustomerRelationships ;
247.    .
248.    bm:ITSystems
249.    rdf:type owl:Class ;
250.    rdfs:label "IT-systems"@en ;
251.    rdfs:subClassOf bm:Physical ;
252.    .
253.    bm:IndirectChannels
254.    rdf:type owl:Class ;
255.    rdfs:label "Indirect"@en ;
256.    rdfs:subClassOf bm:Channels ;
257.    .
258.    bm:Individual
259.    rdf:type owl:Class ;
260.    rdfs:label "Individual Person"@en ;
261.    rdfs:subClassOf bm:KeyPartners ;
262.    .
263.    bm:InfrastructureParts
264.    rdf:type owl:Class ;
265.    rdfs:label "Infrastructure"@en ;
266.    .
267.    bm:Intellectual
268.    rdf:type owl:Class ;
269.    rdfs:label "Intellectual"@en ;
270.    rdfs:subClassOf bm:KeyResources ;
271.    .
272.    bm:KeyActivities
273.    rdf:type owl:Class ;
274.    rdfs:label "Key Activities"@en ;
275.    rdfs:subClassOf bm:InfrastructureParts ;
276.    .
277.    bm:KeyPartners
278.    rdf:type owl:Class ;
279.    rdfs:label "Key Partnership Types"@en ;
280.    rdfs:subClassOf bm:InfrastructureParts ;
281.    .
282.    bm:KeyPartnershipGoals
283.    rdf:type owl:Class ;
284.    rdfs:label "Goal of Key Partnership"@en ;
285.    .
286.    bm:KeyResources
287.    rdf:type owl:Class ;
288.    rdfs:label "Key Resource Parts"@en ;
289.    rdfs:subClassOf bm:InfrastructureParts ;
290.    .
291.    bm:Knowledge
292.    rdf:type bm:AcquisitionOfParticularResourcesAndActivities ;
293.    bm:keyPartners_influencedBy_CostStructureModels bm:ValueDriven ;
294.    rdfs:label "knowledge"@en ;
295.    .
296.    bm:LendingRentingLeasing
297.    rdf:type owl:Class ;
298.    rdfs:label "Lending/Renting/Leasing"@en ;
299.    rdfs:subClassOf bm:FeeBasedRevenue ;
300.    .
301.    bm:Licenses
302.    rdf:type bm:AcquisitionOfParticularResourcesAndActivities ;
303.    bm:keyPartners_influencedBy_CostStructureModels bm:ValueDriven ;
304.    rdfs:label "licenses"@en ;
305.    .
306.    bm:Licensing
307.    rdf:type owl:Class ;
308.    rdfs:label "Licensing"@en ;
309.    rdfs:subClassOf bm:FeeBasedRevenue ;
310.    .
```

```
311.  bm:ListPrice
312.  rdf:type bm:FixedMenuPricing ;
313.  rdfs:comment "Fixed prices for individual products, services, or other Value Pro
      positions"@en ;
314.  rdfs:label "List Price"@en ;
315.  .
316.  bm:Machines
317.  rdf:type owl:Class ;
318.  rdfs:label "Machines"@en ;
319.  rdfs:subClassOf bm:Physical ;
320.  .
321.  bm:MassCustomization
322.  rdf:type owl:Class ;
323.  rdfs:label "Mass Customization"@en ;
324.  rdfs:subClassOf bm:QualitativeValues ;
325.  .
326.  bm:MassMarket
327.  rdf:type owl:Class ;
328.  rdfs:label "Mass Market Customers"@en ;
329.  rdfs:subClassOf bm:CustomerSegments ;
330.  .
331.  bm:MicroMarket
332.  rdf:type owl:Class ;
333.  rdfs:label "Micro Market Customers"@en ;
334.  rdfs:subClassOf bm:CustomerSegments ;
335.  .
336.  bm:Negotiation
337.  rdf:type bm:DynamicPricing ;
338.  rdfs:comment "Price negotiated between two or more partners depending on negotia
      tion power and/or negotiation skills"@en ;
339.  rdfs:label "Negotiation (bargaining)"@en ;
340.  .
341.  bm:Newness
342.  rdf:type owl:Class ;
343.  rdfs:label "Newness"@en ;
344.  rdfs:subClassOf bm:QualitativeValues ;
345.  .
346.  bm:NicheMarket
347.  rdf:type owl:Class ;
348.  rdfs:label "Niche Market Customers"@en ;
349.  rdfs:subClassOf bm:CustomerSegments ;
350.  .
351.  bm:NonHumanInteraction
352.  rdf:type owl:Class ;
353.  rdfs:label "no human interaction involved"@en ;
354.  rdfs:subClassOf bm:CustomerRelationships ;
355.  .
356.  bm:OfferingValues
357.  rdf:type owl:Class ;
358.  rdfs:label "Offering Types"@en ;
359.  .
360.  bm:Offerings
361.  rdf:type owl:Class ;
362.  rdfs:label "Offering forms"@en ;
363.  .
364.  bm:OptimizationAndEconomyOfScale
365.  rdf:type owl:Class ;
366.  rdfs:label "Optimization and economy of scale"@en ;
367.  rdfs:subClassOf bm:KeyPartnershipGoals ;
368.  .
369.  bm:OutsourcingInfrastructure
370.  rdf:type bm:OptimizationAndEconomyOfScale ;
371.  bm:keyPartners_influencedBy_CostStructureModels bm:CostDriven ;
372.  rdfs:label "outsourcing infrastructure"@en ;
373.  .
```

```
374.  bm:OwnStore
375.  rdf:type owl:Class ;
376.  rdfs:label "Own Store"@en ;
377.  rdfs:subClassOf bm:IndirectChannels ;
378.  .
379.  bm:PartnerStore
380.  rdf:type owl:Class ;
381.  rdfs:label "Partner Store"@en ;
382.  rdfs:subClassOf bm:IndirectChannels ;
383.  .
384.  bm:Partnership
385.  rdf:type owl:Class ;
386.  rdfs:label "Partnership"@en ;
387.  rdfs:subClassOf bm:Intellectual ;
388.  .
389.  bm:PatentCopyright
390.  rdf:type owl:Class ;
391.  rdfs:label "Patents and Copyrights"@en ;
392.  rdfs:subClassOf bm:Intellectual ;
393.  .
394.  bm:Performance
395.  rdf:type owl:Class ;
396.  rdfs:label "Performance"@en ;
397.  rdfs:subClassOf bm:QuantitativeValues ;
398.  .
399.  bm:PersonalAssistance
400.  rdf:type owl:Class ;
401.  rdfs:label "Personal Assistance"@en ;
402.  rdfs:subClassOf bm:HumanInteraction ;
403.  .
404.  bm:Physical
405.  rdf:type owl:Class ;
406.  rdfs:comment "Physical is everything tangible (except people) and everything IT-
      related, which is not mapped to a single person but to the company"@en ;
407.  rdfs:label "Physical"@en ;
408.  rdfs:subClassOf bm:KeyResources ;
409.  .
410.  bm:Price
411.  rdf:type owl:Class ;
412.  rdfs:label "Price"@en ;
413.  rdfs:subClassOf bm:QuantitativeValues ;
414.  .
415.  bm:PricingMechanisms
416.  rdf:type owl:Class ;
417.  rdfs:label "Pricing Mechanisms Types"@en ;
418.  .
419.  bm:Product
420.  rdf:type owl:Class ;
421.  rdfs:label "Product"@en ;
422.  rdfs:subClassOf bm:Offerings ;
423.  .
424.  bm:ProductFeatureDependent
425.  rdf:type bm:FixedMenuPricing ;
426.  rdfs:comment "Price depends on the number or quality of Value Proposition featur
      es"@en ;
427.  rdfs:label "Product Feature Dependent"@en ;
428.  .
429.  bm:ProprietaryKnowledge
430.  rdf:type owl:Class ;
431.  rdfs:label "Proprietary Knowledge"@en ;
432.  rdfs:subClassOf bm:Intellectual ;
433.  .
434.  bm:QualitativeValues
435.  rdf:type owl:Class ;
436.  rdfs:label "Qualitative Value Offering Types"@en ;
```

```
437.    rdfs:subClassOf bm:OfferingValues ;
438.    .
439.    bm:QuantitativeValues
440.    rdf:type owl:Class ;
441.    rdfs:label "Quantitative Value Offering Types"@en ;
442.    rdfs:subClassOf bm:OfferingValues ;
443.    .
444.    bm:RealTimeMarket
445.    rdf:type bm:DynamicPricing ;
446.    rdfs:comment "Price is established dynamically based on supply and demand"@en ;
447.    rdfs:label "Real-time-market"@en ;
448.    .
449.    bm:ReduceCosts
450.    rdf:type bm:OptimizationAndEconomyOfScale ;
451.    bm:keyPartners_influencedBy_CostStructureModels bm:CostDriven ;
452.    rdfs:label "reduce costs"@en ;
453.    .
454.    bm:ReductionOfRiskAndUncertainty
455.    rdf:type bm:KeyPartnershipGoals ;
456.    rdfs:label "Reduction Of Risk And Uncertainty"@en ;
457.    .
458.    bm:RevenueStreams
459.    rdf:type owl:Class ;
460.    rdfs:label "Types of revenue stream "@en ;
461.    rdfs:subClassOf bm:FinancialAspectParts ;
462.    .
463.    bm:RiskReduction
464.    rdf:type owl:Class ;
465.    rdfs:label "Risk Reduction"@en ;
466.    rdfs:subClassOf bm:QuantitativeValues ;
467.    .
468.    bm:SalesForce
469.    rdf:type owl:Class ;
470.    rdfs:label "Sales Force"@en ;
471.    rdfs:subClassOf bm:DirectChannels ;
472.    .
473.    bm:SegmentedMarket
474.    rdf:type owl:Class ;
475.    rdfs:label "Segmented Market Customers"@en ;
476.    rdfs:subClassOf bm:CustomerSegments ;
477.    .
478.    bm:SelfService
479.    rdf:type owl:Class ;
480.    rdfs:label "Self-Service"@en ;
481.    rdfs:subClassOf bm:NonHumanInteraction ;
482.    .
483.    bm:Service
484.    rdf:type owl:Class ;
485.    rdfs:label "Service"@en ;
486.    rdfs:subClassOf bm:Offerings ;
487.    .
488.    bm:SharingInfrastructure
489.    rdf:type bm:OptimizationAndEconomyOfScale ;
490.    bm:keyPartners_influencedBy_CostStructureModels bm:CostDriven ;
491.    rdfs:label "sharing infrastructure"@en ;
492.    .
493.    bm:SpeedOfService
494.    rdf:type owl:Class ;
495.    rdfs:label "Speed of Service"@en ;
496.    rdfs:subClassOf bm:QuantitativeValues ;
497.    .
498.    bm:Status
499.    rdf:type owl:Class ;
500.    rdfs:label "Status / Brand"@en ;
501.    rdfs:subClassOf bm:QualitativeValues ;
```

```
502.    .
503.    bm:SubscriptionFee
504.    rdf:type owl:Class ;
505.    rdfs:label "Subscription Fees"@en ;
506.    rdfs:subClassOf bm:FeeBasedRevenue ;
507.    .
508.    bm:SupportProcess
509.    rdf:type owl:Class ;
510.    rdfs:label "Support Process"@en ;
511.    rdfs:subClassOf bm:KeyActivities ;
512.    .
513.    bm:Technology
514.    rdf:type owl:Class ;
515.    rdfs:label "Technology"@en ;
516.    rdfs:subClassOf bm:Physical ;
517.    .
518.    bm:UsageFee
519.    rdf:type owl:Class ;
520.    rdfs:comment "Provide a tailored solution to each customer"@en ;
521.    rdfs:label "Subscription Fees"@en ;
522.    rdfs:subClassOf bm:FeeBasedRevenue ;
523.    .
524.    bm:ValueCapture
525.    rdf:type owl:Class ;
526.    rdfs:label "Value capture"@en ;
527.    rdfs:subClassOf bm:ValueTypes ;
528.    .
529.    bm:ValueCreation
530.    rdf:type owl:Class ;
531.    rdfs:label "Value creation"@en ;
532.    rdfs:subClassOf bm:ValueTypes ;
533.    .
534.    bm:ValueDelivery
535.    rdf:type owl:Class ;
536.    rdfs:label "Value delivery"@en ;
537.    rdfs:subClassOf bm:ValueTypes ;
538.    .
539.    bm:ValueDriven
540.    rdf:type bm:CostStructureModels ;
541.    rdfs:label "Value-Driven"@en ;
542.    .
543.    bm:ValueProposition
544.    rdf:type owl:Class ;
545.    rdfs:label "Value proposition"@en ;
546.    rdfs:subClassOf bm:ValueTypes ;
547.    .
548.    bm:ValueTypes
549.    rdf:type owl:Class ;
550.    rdfs:label "Value Types"@en ;
551.    .
552.    bm:VariableCost
553.    rdf:type owl:Class ;
554.    rdfs:label "Variable Costs"@en ;
555.    rdfs:subClassOf bm:CostStructureElements ;
556.    .
557.    bm:Vehicles
558.    rdf:type owl:Class ;
559.    rdfs:label "Vehicles"@en ;
560.    rdfs:subClassOf bm:Physical ;
561.    .
562.    bm:VolumeDependent
563.    rdf:type bm:FixedMenuPricing ;
564.    rdfs:comment "Price as a function of the quantity purchased"@en ;
565.    rdfs:label "Volume Dependent"@en ;
566.    .
```

```
567.    bm:WebSale
568.    rdf:type owl:Class ;
569.    rdfs:label "Web Sale"@en ;
570.    rdfs:subClassOf bm:DirectChannels ;
571.    .
572.    bm:Wholesaler
573.    rdf:type owl:Class ;
574.    rdfs:label "Wholesaler"@en ;
575.    rdfs:subClassOf bm:IndirectChannels ;
576.    .
577.    bm:YieldManagement
578.    rdf:type bm:DynamicPricing ;
579.    rdfs:comment "Price depends on inventory and time of purchase (normally used for
         perishable resources such as hotel rooms or airline seats)"@en ;
580.    rdfs:label "Yield management"@en ;
581.    .
582.    bm:channel_hasChannelOwnerType
583.    rdf:type owl:DatatypeProperty ;
584.    rdfs:domain bm:Channels ;
585.    rdfs:label "Channel has channel owner type"@en ;
586.    rdfs:range [
587.    rdf:type rdfs:Datatype ;
588.    owl:oneOf (
a.      "Earned"
b.      "Own"
c.      "Paid"
d.      ) ;
589.    ] ;
590.    .
591.    bm:channel_hasChannelPhaseType
592.    rdf:type owl:DatatypeProperty ;
593.    rdfs:domain bm:Channels ;
594.    rdfs:label "Channel has channel phase type"@en ;
595.    rdfs:range [
596.    rdf:type rdfs:Datatype ;
597.    owl:oneOf (
a.      "Awareness"
b.      "Evaluation"
c.      "Purchase"
d.      "Delivery"
e.      "After Sales"
f.      ) ;
598.    ] ;
599.    .
600.    bm:channels_deliverTo_CustomerSegments
601.    rdf:type owl:ObjectProperty ;
602.    rdfs:domain bm:Channels ;
603.    rdfs:label "Channels deliver to CustomerSegments"@en ;
604.    rdfs:range bm:CustomerSegments ;
605.    .
606.    bm:channels_deliver_Offerings
607.    rdf:type owl:ObjectProperty ;
608.    rdfs:domain bm:Channels ;
609.    rdfs:label "Channels deliver Offering"@en ;
610.    rdfs:range bm:Offerings ;
611.    .
612.    bm:channels_fits_CustomerRelationships
613.    rdf:type owl:ObjectProperty ;
614.    rdfs:domain bm:Channels ;
615.    rdfs:label "Channels fits CustomerRelationships"@en ;
616.    rdfs:range bm:CustomerRelationships ;
617.    .
618.    bm:channels_generate_RevenueStreams
619.    rdf:type owl:ObjectProperty ;
620.    rdfs:domain bm:Channels ;
```

```
621.    rdfs:label "Channels generate RevenueStreams"@en ;
622.    rdfs:range bm:RevenueStreams ;
623.    .
624.    bm:costStructureElements_affectedBy_Offerings
625.    rdf:type owl:ObjectProperty ;
626.    rdfs:domain bm:CostStructureElements ;
627.    rdfs:label "CostStructureElements affected by Offerings"@en ;
628.    rdfs:range bm:Offerings ;
629.    .
630.    bm:costStructureElements_justifiedBy_CostStructureModels
631.    rdf:type owl:ObjectProperty ;
632.    rdfs:domain bm:CostStructureElements ;
633.    rdfs:label "CostStructureElements is justified by CostStructureModels"@en ;
634.    rdfs:range bm:CostStructureModels ;
635.    .
636.    bm:customerInterfaceParts_affects_FinancialAspectParts
637.    rdf:type owl:ObjectProperty ;
638.    rdfs:domain bm:CustomerInterfaceParts ;
639.    rdfs:label "CustomerInterfaceParts affects FinancialAspects"@en ;
640.    rdfs:range bm:FinancialAspectParts ;
641.    .
642.    bm:customerInterfaceParts_represents_ValueDelivery
643.    rdf:type owl:ObjectProperty ;
644.    rdfs:domain bm:CustomerInterfaceParts ;
645.    rdfs:label "CustomerInterfaceParts represents ValueDelivery"@en ;
646.    rdfs:range bm:ValueDelivery ;
647.    .
648.    bm:customerRelationships_enabledBy_KeyRessources
649.    rdf:type owl:ObjectProperty ;
650.    rdfs:domain bm:CustomerRelationships ;
651.    rdfs:label "CustomerRelationships enabled by KeyRessources"@en ;
652.    rdfs:range bm:KeyResources ;
653.    .
654.    bm:customerRelationships_influencedBy_CostStructureModels
655.    rdf:type owl:ObjectProperty ;
656.    rdfs:domain bm:CustomerRelationships ;
657.    rdfs:label "CustomerRelationships are influenced by CostStructureModels"@en ;
658.    rdfs:range bm:CostStructureModels ;
659.    .
660.    bm:customerRelationships_maintain_CustomerSegments
661.    rdf:type owl:ObjectProperty ;
662.    rdfs:domain bm:CustomerRelationships ;
663.    rdfs:label "CustomerRelationships maintain CustomerSegments"@en ;
664.    rdfs:range bm:CustomerSegments ;
665.    .
666.    bm:customerRelationships_promote_Offerings
667.    rdf:type owl:ObjectProperty ;
668.    rdfs:domain bm:CustomerRelationships ;
669.    rdfs:label "CustomerRelationships promote Offering"@en ;
670.    rdfs:range bm:Offerings ;
671.    .
672.    bm:customerSegment_isAMultiSidedPlatform
673.    rdf:type owl:DatatypeProperty ;
674.    rdfs:domain bm:CustomerSegments ;
675.    rdfs:label "CustomerSegment is a multi-sided-platform"@en ;
676.    rdfs:range xsd:boolean ;
677.    .
678.    bm:customerSegment_isDiversified
679.    rdf:type owl:DatatypeProperty ;
680.    rdfs:domain bm:CustomerSegments ;
681.    rdfs:label "customerSegment is diversified"@en ;
682.    rdfs:range xsd:boolean ;
683.    .
684.    bm:customerSegments_receive_Offerings
685.    rdf:type owl:ObjectProperty ;
```

```
686.    rdfs:domain bm:CustomerSegments ;
687.    rdfs:label "CustomerSegments receive Offering"@en ;
688.    rdfs:range bm:Offerings ;
689.    .
690.    bm:financialAspectParts_represents_ValueCapture
691.    rdf:type owl:ObjectProperty ;
692.    rdfs:domain bm:FinancialAspectParts ;
693.    rdfs:label "FinancialAspectParts represents ValueCapture"@en ;
694.    rdfs:range bm:ValueCapture ;
695.    .
696.    bm:infrastructureParts_affects_FinancialAspectParts
697.    rdf:type owl:ObjectProperty ;
698.    rdfs:domain bm:InfrastructureParts ;
699.    rdfs:label "InfrastructureParts affect FinancialAspectParts"@en ;
700.    rdfs:range bm:FinancialAspectParts ;
701.    .
702.    bm:infrastructureParts_enables_Offerings
703.    rdf:type owl:ObjectProperty ;
704.    rdfs:domain bm:InfrastructureParts ;
705.    rdfs:label "Infrastructure enables Offering"@en ;
706.    rdfs:range bm:Offerings ;
707.    .
708.    bm:infrastructureParts_influencedBy_EconomicAdvantages
709.    rdf:type owl:ObjectProperty ;
710.    rdfs:domain bm:InfrastructureParts ;
711.    rdfs:label "InfrastructureParts influencedBy EconomicAdvantages"@en ;
712.    rdfs:range bm:EconomicAdvantages ;
713.    .
714.    bm:infrastructureParts_represents_ValueCreation
715.    rdf:type owl:ObjectProperty ;
716.    rdfs:domain bm:InfrastructureParts ;
717.    rdfs:label "InfrastructureParts represents ValueCreation"@en ;
718.    rdfs:range bm:ValueCreation ;
719.    .
720.    bm:keyActivities_require_KeyRessources
721.    rdf:type owl:ObjectProperty ;
722.    rdfs:domain bm:KeyActivities ;
723.    rdfs:label "KeyActivities require KeyRessources"@en ;
724.    rdfs:range bm:KeyResources ;
725.    .
726.    bm:keyPartners_facilitate_KeyActivities
727.    rdf:type owl:ObjectProperty ;
728.    rdfs:domain bm:KeyPartners ;
729.    rdfs:label "KeyPartners facilitate KeyActivities"@en ;
730.    rdfs:range bm:KeyActivities ;
731.    .
732.    bm:keyPartners_influencedBy_CostStructureModels
733.    rdf:type owl:ObjectProperty ;
734.    rdfs:domain bm:KeyPartners ;
735.    rdfs:label "KeyPartners are influenced by CostStructureModels"@en ;
736.    rdfs:range bm:CostStructureModels ;
737.    .
738.    bm:keyPartners_justifiedBy_KeyPartnershipGoals
739.    rdf:type owl:ObjectProperty ;
740.    rdfs:domain bm:KeyPartners ;
741.    rdfs:label "KeyPartners are justified by KeyPartnershipGoals"@en ;
742.    rdfs:range bm:KeyPartnershipGoals ;
743.    .
744.    bm:keyPartners_provide_KeyRessources
745.    rdf:type owl:ObjectProperty ;
746.    rdfs:domain bm:KeyPartners ;
747.    rdfs:label "KeyPartners provide KeyRessources"@en ;
748.    rdfs:range bm:KeyResources ;
749.    .
750.    bm:keyPartners_provide_Offerings
```

```
751.   rdf:type owl:ObjectProperty ;
752.   rdfs:domain bm:KeyPartners ;
753.   rdfs:label "KeyPartners provide Offering"@en ;
754.   rdfs:range bm:Offerings ;
755.   .
756.   bm:keyRessources_enables_KeyActivities
757.   rdf:type owl:ObjectProperty ;
758.   rdfs:domain bm:KeyResources ;
759.   rdfs:label "KeyRessources enables KeyActivities"@en ;
760.   rdfs:range bm:KeyActivities ;
761.   .
762.   bm:offeringValues_influencedBy_CostStructureModels
763.   rdf:type owl:ObjectProperty ;
764.   rdfs:domain bm:OfferingValues ;
765.   rdfs:label "OfferingValues can be influenced by CostStructureModels"@en ;
766.   rdfs:range bm:CostStructureModels ;
767.   .
768.   bm:offeringingValues_represents_ValueProposition
769.   rdf:type owl:ObjectProperty ;
770.   rdfs:domain bm:OfferingValues ;
771.   rdfs:label "OfferingingValues represents ValueProposition"@en ;
772.   rdfs:range bm:ValueProposition ;
773.   .
774.   bm:offerings_basedOn_KeyRessources
775.   rdf:type owl:ObjectProperty ;
776.   rdfs:domain bm:Offerings ;
777.   rdfs:label "Offering based on KeyRessources"@en ;
778.   rdfs:range bm:KeyResources ;
779.   .
780.   bm:offerings_provide_OfferingValues
781.   rdf:type owl:ObjectProperty ;
782.   rdfs:domain bm:Offerings ;
783.   rdfs:label "Offering provide value OfferingValues"@en ;
784.   rdfs:range bm:OfferingValues ;
785.   .
786.   bm:offerings_require_KeyActivities
787.   rdf:type owl:ObjectProperty ;
788.   rdfs:domain bm:Offerings ;
789.   rdfs:label "Offerings require Key Activities"@en ;
790.   rdfs:range bm:KeyActivities ;
791.   .
792.   bm:offerings_valueFor_CustomerSegments
793.   rdf:type owl:ObjectProperty ;
794.   rdfs:domain bm:Offerings ;
795.   rdfs:label "Offering value for CustomerSegments"@en ;
796.   rdfs:range bm:CustomerSegments ;
797.   .
798.   bm:revenueStreams_dependOn_Offerings
799.   rdf:type owl:ObjectProperty ;
800.   rdfs:domain bm:RevenueStreams ;
801.   rdfs:label "RevenueStreams depend on Offering"@en ;
802.   rdfs:range bm:Offerings ;
803.   .
804.   bm:revenueStreams_pricedBy_PricingMechanisms
805.   rdf:type owl:ObjectProperty ;
806.   rdfs:domain bm:RevenueStreams ;
807.   rdfs:label "RevenueStreams priced by PricingMechanisms"@en ;
808.   rdfs:range bm:PricingMechanisms ;
809.   .
```

Source Code of the Business Capability Ontology

This appendix section shows the code for the business capability ontology stored within the file
BusinessCapabilities.ttl.

```
1.    # baseURI: http://ikm-group.ch/bc
2.    # prefix: bc
3.
4.    @prefix bc: <http://ikm-group.ch/bc#> .
5.    @prefix owl: <http://www.w3.org/2002/07/owl#> .
6.    @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
7.    @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
8.    @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
9.
10.   <http://ikm-group.ch/bc>
11.   rdf:type owl:Ontology ;
12.   owl:versionInfo "Created with TopBraid Composer"@en ;
13.   .
14.   bc:Adaptive
15.   rdf:type bc:Competencies ;
16.   bc:competencies_hasAcquisitionType_MotivationAttitude bc:EmotionsAttitude ;
17.   bc:competencies_hasAcquisitionType_MotivationAttitude bc:PersonalAttributes ;
18.   rdfs:label "Adaptive"@en ;
19.   .
20.   bc:Analytical
21.   rdf:type bc:Skills ;
22.   bc:skills_hasAcquisitionType_educationTraining bc:ContinuativeTraining ;
23.   bc:skills_hasAcquisitionType_personalProfessionalPractice bc:FunctionalCapabilit
      ies ;
24.   bc:skills_hasAcquisitionType_personalProfessionalPractice bc:TechniquesMethods ;
25.   rdfs:label "Analytical"@en ;
26.   .
27.   bc:Communication
28.   rdf:type bc:Skills ;
29.   bc:skills_hasAcquisitionType_educationTraining bc:FundamentalEducation ;
30.   rdfs:comment "oral, speaking capability, written, presenting, listening"@en ;
31.   rdfs:label "Communication"@en ;
32.   .
33.   bc:Competencies
34.   rdf:type owl:Class ;
35.   rdfs:subClassOf bc:HumanBasedCapabilities ;
36.   rdfs:label "Competencies"@en ;
37.   .
38.   bc:ContinuativeTraining
39.   rdf:type bc:EducationTraining ;
40.   rdfs:label "Continuative Training"@en ;
41.   .
42.   bc:CoreCapabilities
43.   rdf:type owl:Class ;
44.   rdfs:subClassOf bc:ResourceBasedCapabilities ;
45.   .
46.   bc:Courtesy
47.   rdf:type bc:Competencies ;
48.   bc:competencies_hasAcquisitionType_MotivationAttitude bc:EmotionsAttitude ;
49.   rdfs:comment "manners, etiquette, business etiquette, gracious, says please and
      thank you, respectful"@en ;
50.   rdfs:label "Courtesy"@en ;
51.   .
52.   bc:DynamicCapabilities
53.   rdf:type owl:Class ;
54.   rdfs:subClassOf bc:ResourceBasedCapabilities ;
55.   .
56.   bc:EducationTraining
57.   rdf:type owl:Class ;
58.   rdfs:subClassOf bc:HumanBasedCapabilityAcquisitionTypes ;
59.   .
```

```
60.  bc:EmotionsAttitude
61.  rdf:type bc:MotivationAttitude ;
62.  rdfs:label "Emotions Attitude"@en ;
63.  .
64.  bc:Flexibility
65.  rdf:type bc:Competencies ;
66.  bc:competencies_hasAcquisitionType_MotivationAttitude bc:EmotionsAttitude ;
67.  bc:competencies_hasAcquisitionType_MotivationAttitude bc:PersonalAttributes ;
68.  rdfs:comment "adaptability, willing to change, lifelong learner, accepts new thi
     ngs, adjusts, teachable"@en ;
69.  rdfs:label "Flexibility"@en ;
70.  .
71.  bc:FunctionalCapabilities
72.  rdf:type bc:PersonalProfessionalPractice ;
73.  rdfs:label "Functional Capabilities"@en ;
74.  .
75.  bc:FundamentalEducation
76.  rdf:type bc:EducationTraining ;
77.  rdfs:label "Fundamental Education"@en ;
78.  .
79.  bc:HumanBasedCapabilities
80.  rdf:type owl:Class ;
81.  rdfs:subClassOf bc:ResourceBasedCapabilities ;
82.  .
83.  bc:HumanBasedCapabilityAcquisitionTypes
84.  rdf:type owl:Class ;
85.  rdfs:subClassOf owl:Thing ;
86.  .
87.  bc:ICTSkill
88.  rdf:type bc:Skills ;
89.  bc:skills_hasAcquisitionType_educationTraining bc:FundamentalEducation ;
90.  rdfs:label "ICT Skill"@en ;
91.  .
92.  bc:Integrity
93.  rdf:type bc:Competencies ;
94.  bc:competencies_hasAcquisitionType_MotivationAttitude bc:EmotionsAttitude ;
95.  bc:competencies_hasAcquisitionType_PersonalProfessionalExperience bc:SelfDevelop
     ment ;
96.  rdfs:comment "honest, ethical, high morals, has personal values, does what's rig
     ht"@en ;
97.  rdfs:label "Integrity"@en ;
98.  .
99.  bc:Interpersonal
100. rdf:type bc:Competencies ;
101. bc:competencies_hasAcquisitionType_PersonalProfessionalExperience bc:SelfDevelop
     ment ;
102. rdfs:comment "nice, personable, sense of humor, friendly, nurturing, empathetic,
      has self-control, patient, sociability, warmth, social skills"@en ;
103. rdfs:label "Interpersonal"@en ;
104. .
105. bc:Leadership
106. rdf:type bc:Skills ;
107. bc:skills_hasAcquisitionType_educationTraining bc:ContinuativeTraining ;
108. rdfs:label "Leadership"@en ;
109. .
110. bc:MotivationAttitude
111. rdf:type owl:Class ;
112. rdfs:subClassOf bc:HumanBasedCapabilityAcquisitionTypes ;
113. .
114. bc:PersonalAttributes
115. rdf:type bc:MotivationAttitude ;
116. rdfs:label "Personal Attributes"@en ;
117. .
118. bc:PersonalProfessionalExperience
119. rdf:type owl:Class ;
```

```
120.    rdfs:subClassOf bc:HumanBasedCapabilityAcquisitionTypes ;
121.    .
122.    bc:PersonalProfessionalPractice
123.    rdf:type owl:Class ;
124.    rdfs:subClassOf bc:HumanBasedCapabilityAcquisitionTypes ;
125.    .
126.    bc:PositiveAttitude
127.    rdf:type bc:Competencies ;
128.    bc:competencies_hasAcquisitionType_MotivationAttitude bc:EmotionsAttitude ;
129.    rdfs:comment "optimistic, enthusiastic, encouraging, happy, confident"@en ;
130.    rdfs:label "Positive Attitude"@en ;
131.    .
132.    bc:ProblemSolving
133.    rdf:type bc:Skills ;
134.    rdfs:label "Problem-Solving"@en ;
135.    .
136.    bc:Professionalism
137.    rdf:type bc:Competencies ;
138.    bc:competencies_hasAcquisitionType_MotivationAttitude bc:EmotionsAttitude ;
139.    rdfs:comment "business-like, well-dressed, appearance, poised"@en ;
140.    rdfs:label "Professionalism"@en ;
141.    .
142.    bc:ProjectManagement
143.    rdf:type bc:Skills ;
144.    bc:skills_hasAcquisitionType_educationTraining bc:FundamentalEducation ;
145.    rdfs:label "Project Management"@en ;
146.    .
147.    bc:ResourceBasedCapabilities
148.    rdf:type owl:Class ;
149.    rdfs:subClassOf owl:Thing ;
150.    .
151.    bc:Responsibility
152.    rdf:type bc:Competencies ;
153.    bc:competencies_hasAcquisitionType_PersonalProfessionalExperience bc:SelfDevelop
        ment ;
154.    rdfs:comment "accountable, reliable, gets the job done, resourceful, self-
        disciplined, wants to do well, conscientious, common sense"@en ;
155.    rdfs:label "Responsibility"@en ;
156.    .
157.    bc:SelfDevelopment
158.    rdf:type bc:PersonalProfessionalExperience ;
159.    rdfs:label "Self Development"@en ;
160.    .
161.    bc:Skills
162.    rdf:type owl:Class ;
163.    rdfs:subClassOf bc:HumanBasedCapabilities ;
164.    rdfs:label "Skills"@en ;
165.    .
166.    bc:StrategiesRoutines
167.    rdf:type bc:PersonalProfessionalExperience ;
168.    rdfs:label "Strategies Routines"@en ;
169.    .
170.    bc:TeamPlayer
171.    rdf:type bc:Competencies ;
172.    bc:competencies_hasAcquisitionType_MotivationAttitude bc:EmotionsAttitude ;
173.    rdfs:comment "gets along with others, agreeable, supportive, helpful"@en ;
174.    rdfs:label "Team Player"@en ;
175.    .
176.    bc:Teamwork
177.    rdf:type bc:Skills ;
178.    bc:skills_hasAcquisitionType_personalProfessionalPractice bc:FunctionalCapabilit
        ies ;
179.    bc:skills_hasAcquisitionType_personalProfessionalPractice bc:TechniquesMethods ;
180.    rdfs:comment "cooperative, collaborative"@en ;
181.    rdfs:label "Teamwork"@en ;
```

```
182.    .
183.    bc:TechniquesMethods
184.    rdf:type bc:PersonalProfessionalPractice ;
185.    rdfs:label "Techniques Methods"@en ;
186.    .
187.    bc:WorkEthic
188.    rdf:type bc:Competencies ;
189.    bc:competencies_hasAcquisitionType_MotivationAttitude bc:EmotionsAttitude ;
190.    rdfs:comment "hard working, willing to work, loyal, initiative, self-
        motivated, on time, good attendance"@en ;
191.    rdfs:label "Work Ethic"@en ;
192.    .
193.    bc:competencies_hasAcquisitionType_MotivationAttitude
194.    rdf:type owl:ObjectProperty ;
195.    rdfs:domain bc:Competencies ;
196.    rdfs:range bc:MotivationAttitude ;
197.    .
198.    bc:competencies_hasAcquisitionType_PersonalProfessionalExperience
199.    rdf:type owl:ObjectProperty ;
200.    rdfs:domain bc:Competencies ;
201.    rdfs:range bc:PersonalProfessionalExperience ;
202.    .
203.    bc:coreCapabilities_aggregates_ResourceBasedCapabilities
204.    rdf:type owl:ObjectProperty ;
205.    rdfs:domain bc:CoreCapabilities ;
206.    rdfs:label "coreCapabilities aggregates ResourceBasedCapabilities"@en ;
207.    rdfs:range bc:ResourceBasedCapabilities ;
208.    .
209.    bc:coreCapabilities_specializes_ResourceBasedCapabilities
210.    rdf:type owl:ObjectProperty ;
211.    rdfs:domain bc:CoreCapabilities ;
212.    rdfs:label "CoreCapabilities specializes ResourceBasedCapabilities"@en ;
213.    rdfs:range bc:ResourceBasedCapabilities ;
214.    .
215.    bc:dynamicCapabilities_aggregates_ResourceBasedCapabilities
216.    rdf:type owl:ObjectProperty ;
217.    rdfs:domain bc:DynamicCapabilities ;
218.    rdfs:label "DynamicCapabilities aggregates ResourceBasedCapabilities"@en ;
219.    rdfs:range bc:ResourceBasedCapabilities ;
220.    .
221.    bc:dynamicCapabilities_specializes_ResourceBasedCapabilities
222.    rdf:type owl:ObjectProperty ;
223.    rdfs:domain bc:DynamicCapabilities ;
224.    rdfs:label "DynamicCapabilities specializes ResourceBasedCapabilities"@en ;
225.    rdfs:range bc:ResourceBasedCapabilities ;
226.    .
227.    bc:humanBasedCapabilities_specializes_ResourceBasedCapabilities
228.    rdf:type owl:ObjectProperty ;
229.    rdfs:domain bc:HumanBasedCapabilities ;
230.    rdfs:label "HumanBasedCapabilities specializes ResourceBasedCapabilities"@en ;
231.    rdfs:range bc:ResourceBasedCapabilities ;
232.    .
233.    bc:skills_hasAcquisitionType_educationTraining
234.    rdf:type owl:ObjectProperty ;
235.    rdfs:domain bc:Skills ;
236.    rdfs:range bc:EducationTraining ;
237.    .
238.    bc:skills_hasAcquisitionType_personalProfessionalPractice
239.    rdf:type owl:ObjectProperty ;
240.    rdfs:domain bc:Skills ;
241.    rdfs:range bc:PersonalProfessionalPractice ;
242.    .
```

Source Code of the Enterprise Architecture Ontology

This appendix section shows the enterprise architecture extension ontology code to integrate the ArchiMate version 3.1 elements. The code is stored within the file ArchiMate_V3.ttl.

```
1.    # baseURI: http://ikm-group.ch/archimateV3
2.    # imports: http://ikm-group.ch/archiMEO/archimate
3.    # prefix: archimateV3
4.
5.    @prefix archimateV3: <http://ikm-group.ch/archimateV3#> .
6.    @prefix owl: <http://www.w3.org/2002/07/owl#> .
7.    @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
8.    @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
9.    @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
10.
11.   <http://ikm-group.ch/archiMEO/archimate#ActiveStructureElement>
12.   rdfs:subClassOf archimateV3:StructureElement ;
13.   .
14.   <http://ikm-group.ch/archiMEO/archimate#ApplicationFunction>
15.   rdfs:subClassOf archimateV3:ApplicationBehaviourElement ;
16.   .
17.   <http://ikm-group.ch/archiMEO/archimate#ApplicationInteraction>
18.   rdfs:subClassOf archimateV3:ApplicationBehaviourElement ;
19.   .
20.   <http://ikm-group.ch/archiMEO/archimate#CommunicationPath>
21.   rdfs:subClassOf <http://ikm-group.ch/archiMEO/eo#InfrastructureElement> ;
22.   .
23.   <http://ikm-group.ch/archiMEO/archimate#InfrastructureFunction>
24.   rdfs:subClassOf archimateV3:TechnologyBehaviourElement ;
25.   .
26.   <http://ikm-group.ch/archiMEO/archimate#PassiveStructureElement>
27.   rdfs:subClassOf archimateV3:StructureElement ;
28.   .
29.   <http://ikm-group.ch/archimateV3>
30.   rdf:type owl:Ontology ;
31.   owl:imports <http://ikm-group.ch/archiMEO/archimate> ;
32.   owl:versionInfo "Created with TopBraid Composer" ;
33.   .
34.   archimateV3:ApplicationBehaviourElement
35.   rdf:type owl:Class ;
36.   rdfs:label "Application Behaviour Element" ;
37.   rdfs:subClassOf <http://ikm-group.ch/archiMEO/archimate#BehaviourElement> ;
38.   .
39.   archimateV3:ApplicationEvent
40.   rdf:type owl:Class ;
41.   rdfs:label "Application Event" ;
42.   rdfs:subClassOf archimateV3:ApplicationBehaviourElement ;
43.   .
44.   archimateV3:ApplicationProcess
45.   rdf:type owl:Class ;
46.   rdfs:label "Application Process" ;
47.   rdfs:subClassOf archimateV3:ApplicationBehaviourElement ;
48.   .
49.   archimateV3:Assessment
50.   rdf:type owl:Class ;
51.   rdfs:label "Assessment" ;
52.   rdfs:subClassOf archimateV3:MotivationElement ;
53.   .
54.   archimateV3:Capability
55.   rdf:type owl:Class ;
56.   rdfs:label "Capability" ;
57.   rdfs:subClassOf archimateV3:StrategyBehaviourElement ;
58.   .
59.   archimateV3:Constraint
60.   rdf:type owl:Class ;
61.   rdfs:label "Constraint" ;
```

```
62.     rdfs:subClassOf archimateV3:MotivationElement ;
63.     .
64.     archimateV3:CourseOfAction
65.     rdf:type owl:Class ;
66.     rdfs:label "Course of action" ;
67.     rdfs:subClassOf <http://ikm-group.ch/archiMEO/archimate#BehaviourElement> ;
68.     .
69.     archimateV3:Driver
70.     rdf:type owl:Class ;
71.     rdfs:label "Driver" ;
72.     rdfs:subClassOf archimateV3:MotivationElement ;
73.     .
74.     archimateV3:Goal
75.     rdf:type owl:Class ;
76.     rdfs:label "Goal" ;
77.     rdfs:subClassOf archimateV3:MotivationElement ;
78.     .
79.     archimateV3:Meaning
80.     rdf:type owl:Class ;
81.     rdfs:label "Meaning" ;
82.     rdfs:subClassOf archimateV3:MotivationElement ;
83.     .
84.     archimateV3:MotivationElement
85.     rdf:type owl:Class ;
86.     rdfs:label "Motivation Element" ;
87.     rdfs:subClassOf <http://ikm-group.ch/archiMEO/eo#EnterpriseObject> ;
88.     .
89.     archimateV3:Outcome
90.     rdf:type owl:Class ;
91.     rdfs:label "Outcome" ;
92.     rdfs:subClassOf archimateV3:MotivationElement ;
93.     .
94.     archimateV3:Principle
95.     rdf:type owl:Class ;
96.     rdfs:label "Principle" ;
97.     rdfs:subClassOf archimateV3:MotivationElement ;
98.     .
99.     archimateV3:Requirement
100.    rdf:type owl:Class ;
101.    rdfs:label "Requirement" ;
102.    rdfs:subClassOf archimateV3:MotivationElement ;
103.    .
104.    archimateV3:Resource
105.    rdf:type owl:Class ;
106.    rdfs:label "Resource" ;
107.    rdfs:subClassOf archimateV3:StructureElement ;
108.    .
109.    archimateV3:Stakeholder
110.    rdf:type owl:Class ;
111.    rdfs:label "Stakeholder" ;
112.    rdfs:subClassOf archimateV3:MotivationElement ;
113.    .
114.    archimateV3:StrategyBehaviourElement
115.    rdf:type owl:Class ;
116.    rdfs:label "Strategy Behaviour Element" ;
117.    rdfs:subClassOf <http://ikm-group.ch/archiMEO/archimate#BehaviourElement> ;
118.    .
119.    archimateV3:StructureElement
120.    rdf:type owl:Class ;
121.    rdfs:label "Structure Element" ;
122.    rdfs:subClassOf <http://ikm-group.ch/archiMEO/eo#EnterpriseObject> ;
123.    .
124.    archimateV3:TechnologyBehaviourElement
125.    rdf:type owl:Class ;
126.    rdfs:label "TechnologyBehaviourElement" ;
```

```
127.  rdfs:subClassOf <http://ikm-group.ch/archiMEO/archimate#BehaviourElement> ;
128.  .
129.  archimateV3:TechnologyCollaboration
130.  rdf:type owl:Class ;
131.  rdfs:label "Technology collaboration" ;
132.  rdfs:subClassOf <http://ikm-group.ch/archiMEO/eo#InfrastructureElement> ;
133.  .
134.  archimateV3:TechnologyEvent
135.  rdf:type owl:Class ;
136.  rdfs:label "Technology event" ;
137.  rdfs:subClassOf archimateV3:TechnologyBehaviourElement ;
138.  .
139.  archimateV3:TechnologyInteraction
140.  rdf:type owl:Class ;
141.  rdfs:label "Technology interaction" ;
142.  rdfs:subClassOf archimateV3:TechnologyBehaviourElement ;
143.  .
144.  archimateV3:TechnologyProcess
145.  rdf:type owl:Class ;
146.  rdfs:label "Technology process" ;
147.  rdfs:subClassOf archimateV3:TechnologyBehaviourElement ;
148.  .
149.  archimateV3:Value
150.  rdf:type owl:Class ;
151.  rdfs:label "Value" ;
152.  rdfs:subClassOf archimateV3:MotivationElement ;
153.  .
154.  archimateV3:ValueStream
155.  rdf:type owl:Class ;
156.  rdfs:label "Value stream" ;
157.  rdfs:subClassOf archimateV3:StrategyBehaviourElement ;
158.  .
159.  archimateV3:assessment_associatedWith_Assessment
160.  rdf:type owl:ObjectProperty ;
161.  rdfs:domain archimateV3:Assessment ;
162.  rdfs:label "Assessment is associated with Assessment" ;
163.  rdfs:range <http://ikm-group.ch/archiMEO/BMM#Assessment> ;
164.  .
165.  archimateV3:assessment_associatedWith_Goal
166.  rdf:type owl:ObjectProperty ;
167.  rdfs:domain archimateV3:Assessment ;
168.  rdfs:label "Assessment is associated with Goal" ;
169.  rdfs:range archimateV3:Goal ;
170.  .
171.  archimateV3:constraint_specializes_Requirement
172.  rdf:type owl:ObjectProperty ;
173.  rdfs:domain archimateV3:Constraint ;
174.  rdfs:label "Constraint specializes Requirement" ;
175.  rdfs:range archimateV3:Requirement ;
176.  .
177.  archimateV3:courseOfAction_associatedWith_CourseOfAction
178.  rdf:type owl:ObjectProperty ;
179.  rdfs:domain archimateV3:CourseOfAction ;
180.  rdfs:label "CourseOfAction is associated with CourseOfAction" ;
181.  rdfs:range <http://ikm-group.ch/archiMEO/BMM#CourseOfAction> ;
182.  .
183.  archimateV3:courseOfAction_flowsTo_CourseOfAction
184.  rdf:type owl:ObjectProperty ;
185.  rdfs:domain archimateV3:CourseOfAction ;
186.  rdfs:label "CourseOfAction flows to CourseOfAction" ;
187.  rdfs:range archimateV3:CourseOfAction ;
188.  .
189.  archimateV3:courseOfAction_serves_CourseOfAction
190.  rdf:type owl:ObjectProperty ;
191.  rdfs:domain archimateV3:CourseOfAction ;
```

```
192.   rdfs:label "CourseOfAction serves CourseOfAction" ;
193.   rdfs:range archimateV3:CourseOfAction ;
194.   .
195.   archimateV3:courseOfAction_triggers_CourseOfAction
196.   rdf:type owl:ObjectProperty ;
197.   rdfs:domain archimateV3:CourseOfAction ;
198.   rdfs:label "CourseOfAction triggers CourseOfAction" ;
199.   rdfs:range archimateV3:CourseOfAction ;
200.   .
201.   archimateV3:driver_associatedWith_Assessment
202.   rdf:type owl:ObjectProperty ;
203.   rdfs:domain archimateV3:Driver ;
204.   rdfs:label "Driver is associated with Assessment" ;
205.   rdfs:range archimateV3:Assessment ;
206.   .
207.   archimateV3:driver_associatedWith_Goal
208.   rdf:type owl:ObjectProperty ;
209.   rdfs:domain archimateV3:Driver ;
210.   rdfs:label "Driver is associated with Goal" ;
211.   rdfs:range archimateV3:Goal ;
212.   .
213.   archimateV3:goal_associatedWith_Goal
214.   rdf:type owl:ObjectProperty ;
215.   rdfs:domain archimateV3:Goal ;
216.   rdfs:label "Goal is associated with Goal" ;
217.   rdfs:range <http://ikm-group.ch/archiMEO/BMM#Goal> ;
218.   .
219.   archimateV3:meaning_specializedBy_Meaning
220.   rdf:type owl:ObjectProperty ;
221.   rdfs:domain archimateV3:Meaning ;
222.   rdfs:label "Meaning is specialized by Meaning" ;
223.   rdfs:range <http://ikm-group.ch/archiMEO/archimate#Meaning> ;
224.   .
225.   archimateV3:motivationElement_influences_MotivationElement
226.   rdf:type owl:ObjectProperty ;
227.   rdfs:domain archimateV3:MotivationElement ;
228.   rdfs:label "MotivationElement influences MotivationElement" ;
229.   rdfs:range archimateV3:MotivationElement ;
230.   .
231.   archimateV3:outcome_associatedWith_Objective
232.   rdf:type owl:ObjectProperty ;
233.   rdfs:domain archimateV3:Outcome ;
234.   rdfs:label "Outcome is associated with Objective" ;
235.   rdfs:range <http://ikm-group.ch/archiMEO/BMM#Objective> ;
236.   .
237.   archimateV3:outcome_realizes_Goal
238.   rdf:type owl:ObjectProperty ;
239.   rdfs:domain archimateV3:Outcome ;
240.   rdfs:label "Outcome realizes Goal" ;
241.   rdfs:range archimateV3:Goal ;
242.   .
243.   archimateV3:principle_associatedWith_Directive
244.   rdf:type owl:ObjectProperty ;
245.   rdfs:domain archimateV3:Principle ;
246.   rdfs:label "Principle is associated with Directive" ;
247.   rdfs:range <http://ikm-group.ch/archiMEO/BMM#Directive> ;
248.   .
249.   archimateV3:principle_realizes_Outcome
250.   rdf:type owl:ObjectProperty ;
251.   rdfs:domain archimateV3:Principle ;
252.   rdfs:label "Principle realizes Outcome" ;
253.   rdfs:range archimateV3:Outcome ;
254.   .
255.   archimateV3:requirement_realizes_Outcome
256.   rdf:type owl:ObjectProperty ;
```

```
257.    rdfs:domain archimateV3:Requirement ;
258.    rdfs:label "Requirement realizes Outcome" ;
259.    rdfs:range archimateV3:Outcome ;
260.    .
261.    archimateV3:requirement_realizes_Principle
262.    rdf:type owl:ObjectProperty ;
263.    rdfs:domain archimateV3:Requirement ;
264.    rdfs:label "Requirement realizes Principle" ;
265.    rdfs:range archimateV3:Principle ;
266.    .
267.    archimateV3:resource_assignedTo_StrategyBehaviourElement
268.    rdf:type owl:ObjectProperty ;
269.    rdfs:domain archimateV3:Resource ;
270.    rdfs:label "Resource is assigned to StrategyBehaviourElement" ;
271.    rdfs:range archimateV3:StrategyBehaviourElement ;
272.    .
273.    archimateV3:stakeholder_associatedWith_BusinessPartner
274.    rdf:type owl:ObjectProperty ;
275.    rdfs:domain archimateV3:Stakeholder ;
276.    rdfs:label "Stakeholder is associated with Business Partner" ;
277.    rdfs:range <http://ikm-group.ch/archiMEO/eo#BusinessPartner> ;
278.    .
279.    archimateV3:stakeholder_associatedWith_Driver
280.    rdf:type owl:ObjectProperty ;
281.    rdfs:domain archimateV3:Stakeholder ;
282.    rdfs:label "Stakeholder is associated with Driver" ;
283.    rdfs:range archimateV3:Driver ;
284.    .
285.    archimateV3:stakeholder_associatedWith_Meaning
286.    rdf:type owl:ObjectProperty ;
287.    rdfs:domain archimateV3:Stakeholder ;
288.    rdfs:label "Stakeholder is associated with Meaning" ;
289.    rdfs:range archimateV3:Meaning ;
290.    .
291.    archimateV3:stakeholder_associatedWith_Partner
292.    rdf:type owl:ObjectProperty ;
293.    rdfs:domain archimateV3:Stakeholder ;
294.    rdfs:label "Stakeholder is associated with Partner" ;
295.    rdfs:range <http://ikm-group.ch/archiMEO/eo#Partner> ;
296.    .
297.    archimateV3:stakeholder_associatedWith_Stakeholder
298.    rdf:type owl:ObjectProperty ;
299.    rdfs:domain archimateV3:Stakeholder ;
300.    rdfs:label "Stakeholder is associated with Stakeholder" ;
301.    rdfs:range <http://ikm-group.ch/archimeo/iso42010#Stakeholder> ;
302.    .
303.    archimateV3:stakeholder_associatedWith_Value
304.    rdf:type owl:ObjectProperty ;
305.    rdfs:domain archimateV3:Stakeholder ;
306.    rdfs:label "Stakeholder is associated with Value" ;
307.    rdfs:range archimateV3:Value ;
308.    .
309.    archimateV3:strategyBehaviourElement_flowsTo_StrategyBehaviourElement
310.    rdf:type owl:ObjectProperty ;
311.    rdfs:domain archimateV3:StrategyBehaviourElement ;
312.    rdfs:label "StrategyBehaviourElement flows to StrategyBehaviourElement" ;
313.    rdfs:range archimateV3:StrategyBehaviourElement ;
314.    .
315.    archimateV3:strategyBehaviourElement_realizes_CourseOfAction
316.    rdf:type owl:ObjectProperty ;
317.    rdfs:domain archimateV3:StrategyBehaviourElement ;
318.    rdfs:label "StrategyBehaviourElement realizes CourseOfAction" ;
319.    rdfs:range archimateV3:CourseOfAction ;
320.    .
321.    archimateV3:strategyBehaviourElement_serves_CourseOfAction
```

```
322.    rdf:type owl:ObjectProperty ;
323.    rdfs:domain archimateV3:StrategyBehaviourElement ;
324.    rdfs:label "StrategyBehaviourElement serves CourseOfAction" ;
325.    rdfs:range archimateV3:CourseOfAction ;
326.    .
327.    archimateV3:strategyBehaviourElement_serves_StrategyBehaviourElement
328.    rdf:type owl:ObjectProperty ;
329.    rdfs:domain archimateV3:StrategyBehaviourElement ;
330.    rdfs:label "StrategyBehaviourElement serves StrategyBehaviourElement" ;
331.    rdfs:range archimateV3:StrategyBehaviourElement ;
332.    .
333.    archimateV3:strategyBehaviourElement_triggers_StrategyBehaviourElement
334.    rdf:type owl:ObjectProperty ;
335.    rdfs:domain archimateV3:StrategyBehaviourElement ;
336.    rdfs:label "StrategyBehaviourElement triggers StrategyBehaviourElement" ;
337.    rdfs:range archimateV3:StrategyBehaviourElement ;
338.    .
339.    archimateV3:value_associatedWith_Outcome
340.    rdf:type owl:ObjectProperty ;
341.    rdfs:domain archimateV3:Value ;
342.    rdfs:label "Value is associated with Outcome" ;
343.    rdfs:range archimateV3:Outcome ;
344.    .
345.    archimateV3:value_specializedBy_Value
346.    rdf:type owl:ObjectProperty ;
347.    rdfs:domain archimateV3:Value ;
348.    rdfs:label "Value is specialized by Value" ;
349.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#Value> ;
350.    .
```

Source Code of the Business Innovation Case Ontology

This appendix section shows the business innovation case ontology code stored within the file BusinessInnovationCase.ttl.

```
1.     # baseURI: http://ikm-group.ch/bic
2.     # prefix: bic
3.
4.     @prefix bic: <http://ikm-group.ch/bic#> .
5.     @prefix owl: <http://www.w3.org/2002/07/owl#> .
6.     @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
7.     @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
8.     @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
9.
10.    <http://ikm-group.ch/bic>
11.    rdf:type owl:Ontology ;
12.    owl:versionInfo "Created with TopBraid Composer"@en ;
13.    .
14.    bic:Agriculture
15.    rdf:type bic:Industries ;
16.    rdfs:label "Agriculture"@en ;
17.    .
18.    bic:BarriersToOvercome
19.    rdf:type owl:Class ;
20.    rdfs:label "Barriers to overcome"@en ;
21.    rdfs:subClassOf bic:CaseCharacteristics ;
22.    .
23.    bic:BenefitsOfInnovation
24.    rdf:type owl:Class ;
```

```
25.    rdfs:label "Benefits of having done the innovation"@en ;
26.    rdfs:subClassOf bic:CaseCharacteristics ;
27.    .
28.    bic:BusinessProcess
29.    rdf:type bic:OperationalViews ;
30.    rdfs:label "BusinessProcess"@en ;
31.    .
32.    bic:BusinessStateCharacteristics
33.    rdf:type owl:Class ;
34.    rdfs:label "BusinessStateCharacteristics"@en ;
35.    rdfs:subClassOf bic:CaseCharacteristics ;
36.    .
37.    bic:CaseCharacteristics
38.    rdf:type owl:Class ;
39.    rdfs:label "Case characteristics"@en ;
40.    rdfs:subClassOf owl:Thing ;
41.    .
42.    bic:Cases
43.    rdf:type owl:Class ;
44.    rdfs:label "Case"@en ;
45.    rdfs:subClassOf owl:Thing ;
46.    .
47.    bic:ChemicalsAndResources
48.    rdf:type bic:Industries ;
49.    rdfs:label "Chemicals and resources"@en ;
50.    .
51.    bic:Construction
52.    rdf:type bic:Industries ;
53.    rdfs:label "Construction"@en ;
54.    .
55.    bic:ConsumerGoods
56.    rdf:type bic:Industries ;
57.    rdfs:label "Consumer goods"@en ;
58.    .
59.    bic:CrimeAndLawEnforcement
60.    rdf:type bic:Industries ;
61.    rdfs:label "Crime and law enforcement"@en ;
62.    .
63.    bic:Culture
64.    rdf:type bic:OrganisationalViews ;
65.    rdfs:label "Culture"@en ;
66.    .
67.    bic:CustomerBenefits
68.    rdf:type owl:Class ;
69.    rdfs:label "Customer benefits"@en ;
70.    rdfs:subClassOf bic:BenefitsOfInnovation ;
71.    .
72.    bic:Drivers
73.    rdf:type owl:Class ;
74.    rdfs:label "Reason for innovating/transforming the business"@en ;
75.    rdfs:subClassOf bic:CaseCharacteristics ;
76.    .
77.    bic:ECommerce
78.    rdf:type bic:Industries ;
79.    rdfs:label "E-Commerce"@en ;
80.    .
81.    bic:EducationAndScience
82.    rdf:type bic:Industries ;
83.    rdfs:label "Education and science"@en ;
84.    .
85.    bic:EnergyAndEnvironmentalServices
86.    rdf:type bic:Industries ;
87.    rdfs:label "Energy and environmental  services"@en ;
88.    .
89.    bic:Finance
```

```
90.    rdf:type bic:Industries ;
91.    rdfs:label "Finance"@en ;
92.    .
93.    bic:FinancialBarriers
94.    rdf:type owl:Class ;
95.    rdfs:label "Financial Barriers"@en ;
96.    rdfs:subClassOf bic:BarriersToOvercome ;
97.    .
98.    bic:FinancialRessources
99.    rdf:type owl:Class ;
100.   rdfs:label "Financial Ressources"@en ;
101.   rdfs:subClassOf bic:RequiredRessources ;
102.   .
103.   bic:HealthAndPharmaceuticals
104.   rdf:type bic:Industries ;
105.   rdfs:label "Health and pharmaceuticals"@en ;
106.   .
107.   bic:HumanRessources
108.   rdf:type owl:Class ;
109.   rdfs:label "Human Ressources"@en ;
110.   rdfs:subClassOf bic:RequiredRessources ;
111.   .
112.   bic:IT
113.   rdf:type bic:OperationalViews ;
114.   rdfs:label "IT"@en ;
115.   .
116.   bic:Industries
117.   rdf:type owl:Class ;
118.   rdfs:label "Industry"@en ;
119.   rdfs:subClassOf owl:Thing ;
120.   .
121.   bic:Insurance
122.   rdf:type bic:Industries ;
123.   rdfs:label "Insurance"@en ;
124.   .
125.   bic:IntellectualBarriers
126.   rdf:type owl:Class ;
127.   rdfs:label "Intellectual Barriers"@en ;
128.   rdfs:subClassOf bic:BarriersToOvercome ;
129.   .
130.   bic:IntellectualRessources
131.   rdf:type owl:Class ;
132.   rdfs:label "Intellectual Ressources"@en ;
133.   rdfs:subClassOf bic:RequiredRessources ;
134.   .
135.   bic:InvolvedParties
136.   rdf:type owl:Class ;
137.   rdfs:label "Involved Parties"@en ;
138.   rdfs:subClassOf bic:CaseCharacteristics ;
139.   .
140.   bic:InvolvedPartyBenefits
141.   rdf:type owl:Class ;
142.   rdfs:label "Involved Party Benefits"@en ;
143.   rdfs:subClassOf bic:BenefitsOfInnovation ;
144.   .
145.   bic:Leadership
146.   rdf:type bic:OrganisationalViews ;
147.   rdfs:label "Leadership"@en ;
148.   .
149.   bic:Manufacturing
150.   rdf:type bic:Industries ;
151.   rdfs:comment "contains Metals & Electronics "@en ;
152.   rdfs:label "Manufacturing"@en ;
153.   .
154.   bic:MediaAndAdvertising
```

```
155.    rdf:type bic:Industries ;
156.    rdfs:label "Media and advertising"@en ;
157.    .
158.    bic:OperationalViews
159.    rdf:type owl:Class ;
160.    rdfs:label "Operational Views"@en ;
161.    rdfs:subClassOf bic:ViewsOnBusiness ;
162.    .
163.    bic:OrganisationalBarriers
164.    rdf:type owl:Class ;
165.    rdfs:label "Organisational Barriers"@en ;
166.    rdfs:subClassOf bic:BarriersToOvercome ;
167.    .
168.    bic:OrganisationalViews
169.    rdf:type owl:Class ;
170.    rdfs:label "Organisational Views"@en ;
171.    rdfs:subClassOf bic:ViewsOnBusiness ;
172.    .
173.    bic:PhysicalBarriers
174.    rdf:type owl:Class ;
175.    rdfs:label "Physical Barriers"@en ;
176.    rdfs:subClassOf bic:BarriersToOvercome ;
177.    .
178.    bic:PhysicalRessources
179.    rdf:type owl:Class ;
180.    rdfs:label "Physical Ressources"@en ;
181.    rdfs:subClassOf bic:RequiredRessources ;
182.    .
183.    bic:PoliticsAndGovernment
184.    rdf:type bic:Industries ;
185.    rdfs:label "Politics and government"@en ;
186.    .
187.    bic:RealEstate
188.    rdf:type bic:Industries ;
189.    rdfs:label "Real estate"@en ;
190.    .
191.    bic:Religion
192.    rdf:type bic:Industries ;
193.    rdfs:label "Religion"@en ;
194.    .
195.    bic:RequiredRessources
196.    rdf:type owl:Class ;
197.    rdfs:label "Required Ressources"@en ;
198.    rdfs:subClassOf bic:CaseCharacteristics ;
199.    .
200.    bic:RetailAndTrade
201.    rdf:type bic:Industries ;
202.    rdfs:label "Retail and trade"@en ;
203.    .
204.    bic:RisksOfInnovation
205.    rdf:type owl:Class ;
206.    rdfs:label "Risks of innovation"@en ;
207.    rdfs:subClassOf bic:CaseCharacteristics ;
208.    .
209.    bic:Services
210.    rdf:type bic:Industries ;
211.    rdfs:label "Services"@en ;
212.    .
213.    bic:SportsAndRecreation
214.    rdf:type bic:Industries ;
215.    rdfs:label "Sports and recreation"@en ;
216.    .
217.    bic:StateAfterInnovating
218.    rdf:type owl:Class ;
219.    rdfs:label "State after innovating"@en ;
```

```
220.    rdfs:subClassOf bic:BusinessStateCharacteristics ;
221.    .
222.    bic:StateBeforeInnovating
223.    rdf:type owl:Class ;
224.    rdfs:label "State before innovating"@en ;
225.    rdfs:subClassOf bic:BusinessStateCharacteristics ;
226.    .
227.    bic:StrategicGoals
228.    rdf:type owl:Class ;
229.    rdfs:label "Strategic Goals"@en ;
230.    rdfs:subClassOf bic:CaseCharacteristics ;
231.    .
232.    bic:TechnologicalBarriers
233.    rdf:type owl:Class ;
234.    rdfs:label "Technological Barriers"@en ;
235.    rdfs:subClassOf bic:BarriersToOvercome ;
236.    .
237.    bic:TechnologyAndTelecommunications
238.    rdf:type bic:Industries ;
239.    rdfs:label "Technology and telecommunications"@en ;
240.    .
241.    bic:TransportationAndLogistics
242.    rdf:type bic:Industries ;
243.    rdfs:label "Transportation and logistics"@en ;
244.    .
245.    bic:TravelAndTourismAndHospitality
246.    rdf:type bic:Industries ;
247.    rdfs:label "Travel and tourism and hospitality"@en ;
248.    .
249.    bic:ViewsOnBusiness
250.    rdf:type owl:Class ;
251.    rdfs:label "Views on Business"@en ;
252.    rdfs:subClassOf owl:Thing ;
253.    .
254.    bic:businessStateCharacteristics_classifiesAs_ViewsOnBusiness
255.    rdf:type owl:ObjectProperty ;
256.    rdfs:domain bic:BusinessStateCharacteristics ;
257.    rdfs:label "BusinessStateCharacteristics classifies as ViewsOnBusiness"@en ;
258.    rdfs:range bic:ViewsOnBusiness ;
259.    .
260.    bic:cases_caseName
261.    rdf:type owl:AnnotationProperty ;
262.    rdfs:domain bic:Cases ;
263.    rdfs:label "case name of the case"@en ;
264.    rdfs:range xsd:string ;
265.    .
266.    bic:cases_consistsOf_CaseCharacteristics
267.    rdf:type owl:ObjectProperty ;
268.    rdfs:domain bic:Cases ;
269.    rdfs:label "Cases consists of CaseCharacteristics"@en ;
270.    rdfs:range bic:CaseCharacteristics ;
271.    .
272.    bic:cases_isSuccessfulInnovation
273.    rdf:type owl:DatatypeProperty ;
274.    rdfs:domain bic:Cases ;
275.    rdfs:label "Cases is a successful innovation"@en ;
276.    rdfs:range xsd:boolean ;
277.    .
278.    bic:cases_transformationDurationIs
279.    rdf:type owl:DatatypeProperty ;
280.    rdfs:domain bic:Cases ;
281.    rdfs:label "Transformation duration is [days]"@en ;
282.    rdfs:range xsd:integer ;
283.    .
284.    bic:involvedParties_belongsTo_Industry
```

```
285.   rdf:type owl:ObjectProperty ;
286.   rdfs:domain bic:InvolvedParties ;
287.   rdfs:label "InvolvedParties belongs to Industry"@en ;
288.   rdfs:range bic:Industries ;
289.   .
290.   bic:involvedParties_benefitsFrom_BenefitsOfInnovation
291.   rdf:type owl:ObjectProperty ;
292.   rdfs:domain bic:InvolvedParties ;
293.   rdfs:label "InvolvedParties benefits from BenefitsOfInnovation"@en ;
294.   rdfs:range bic:BenefitsOfInnovation ;
295.   .
296.   bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics
297.   rdf:type owl:ObjectProperty ;
298.   rdfs:domain bic:InvolvedParties ;
299.   rdfs:label "InvolvedParties has business state characteristics BusinessStateChar
       acteristics"@en ;
300.   rdfs:range bic:BusinessStateCharacteristics ;
301.   .
302.   bic:involvedParties_hasGoals_StrategicGoals
303.   rdf:type owl:ObjectProperty ;
304.   rdfs:domain bic:InvolvedParties ;
305.   rdfs:label "InvolvedParties has goals StrategicGoals"@en ;
306.   rdfs:range bic:StrategicGoals ;
307.   .
308.   bic:involvedParties_hasInnovationDrivers_Drivers
309.   rdf:type owl:ObjectProperty ;
310.   rdfs:domain bic:InvolvedParties ;
311.   rdfs:label "InvolvedParties has innovation drivers Drivers"@en ;
312.   rdfs:range bic:Drivers ;
313.   .
314.   bic:involvedParties_innovationBudgetIs
315.   rdf:type owl:DatatypeProperty ;
316.   rdfs:domain bic:InvolvedParties ;
317.   rdfs:label "the innovation budget for the involved parties"@en ;
318.   rdfs:range xsd:integer ;
319.   .
320.   bic:involvedParties_isCaseCompany
321.   rdf:type owl:DatatypeProperty ;
322.   rdfs:domain bic:InvolvedParties ;
323.   rdfs:label "Party involved is the main case company"@en ;
324.   rdfs:range xsd:boolean ;
325.   .
326.   bic:involvedParties_isPartnerCompany
327.   rdf:type owl:DatatypeProperty ;
328.   rdfs:domain bic:InvolvedParties ;
329.   rdfs:label "Involved party is a partner company of the main case company"@en ;
330.   rdfs:range xsd:boolean ;
331.   .
332.   bic:involvedParties_mustOvercome_BarriersToOvercome
333.   rdf:type owl:ObjectProperty ;
334.   rdfs:domain bic:InvolvedParties ;
335.   rdfs:label "InvolvedParties must overcome BarriersToOvercome"@en ;
336.   rdfs:range bic:BarriersToOvercome ;
337.   .
338.   bic:involvedParties_numberOfEmployeesIs
339.   rdf:type owl:DatatypeProperty ;
340.   rdfs:domain bic:InvolvedParties ;
341.   rdfs:label "the number of employees of the involved party"@en ;
342.   rdfs:range xsd:integer ;
343.   .
344.   bic:involvedParties_partOf_Cases
345.   rdf:type owl:ObjectProperty ;
346.   rdfs:domain bic:InvolvedParties ;
347.   rdfs:label "InvolvedParties is a part of Cases"@en ;
348.   rdfs:range bic:Cases ;
```

```
349.    .
350.    bic:involvedParties_requiresForInnovation_RequiredRessources
351.    rdf:type owl:ObjectProperty ;
352.    rdfs:domain bic:InvolvedParties ;
353.    rdfs:label "InvolvedParties requires for innovation RequiredRessources"@en ;
354.    rdfs:range bic:RequiredRessources ;
355.    .
356.    bic:involvedParties_risksOf_RisksOfInnovation
357.    rdf:type owl:ObjectProperty ;
358.    rdfs:domain bic:InvolvedParties ;
359.    rdfs:label "InvolvedParties risks of RisksOfInnovation"@en ;
360.    rdfs:range bic:RisksOfInnovation ;
361.    .
362.    bic:involvedParties_turnoverIs
363.    rdf:type owl:DatatypeProperty ;
364.    rdfs:domain bic:InvolvedParties ;
365.    rdfs:label "Turnover of the involved party"@en ;
366.    rdfs:range xsd:integer ;
367.    .
```

Source Code of the Construction Industry Specifics Ontology

This appendix section shows the code for the construction industry specifics ontology stored within the file ConstructionIndustry.ttl.

```
1.     # baseURI: http://ikm-group.ch/ci
2.     # prefix: ci
3.
4.     @prefix ci: <http://ikm-group.ch/ci#> .
5.     @prefix owl: <http://www.w3.org/2002/07/owl#> .
6.     @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
7.     @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
8.     @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
9.
10.    <http://ikm-group.ch/ci>
11.    rdf:type owl:Ontology ;
12.    owl:versionInfo "Created with TopBraid Composer"@en ;
13.    .
14.    ci:Architecture
15.    rdf:type ci:ConstructionStakeholderTypes ;
16.    rdfs:label "Architecture"@en ;
17.    .
18.    ci:BuildingOperator
19.    rdf:type ci:ConstructionStakeholderTypes ;
20.    rdfs:label "Building Operator"@en ;
21.    .
22.    ci:BuildingOwner
23.    rdf:type ci:ConstructionStakeholderTypes ;
24.    rdfs:label "Building Owner"@en ;
25.    .
26.    ci:BuildingUser
27.    rdf:type ci:ConstructionStakeholderTypes ;
28.    rdfs:label "Building User"@en ;
29.    .
30.    ci:CompanyExecutionAreas
31.    rdf:type owl:Class ;
32.    rdfs:label "Company Execution Area"@en ;
33.    rdfs:subClassOf owl:Thing ;
34.    .
```

```
35.  ci:ConstructionPlanningPhases
36.  rdf:type owl:Class ;
37.  rdfs:comment "SIA 112"@en ;
38.  rdfs:label "Construction Planning Phases"@en ;
39.  rdfs:subClassOf owl:Thing ;
40.  .
41.  ci:ConstructionRelatedCompanies
42.  rdf:type owl:Class ;
43.  rdfs:label "Construction related Companies"@en ;
44.  rdfs:subClassOf owl:Thing ;
45.  .
46.  ci:ConstructionStakeholderTypes
47.  rdf:type owl:Class ;
48.  rdfs:subClassOf owl:Thing ;
49.  .
50.  ci:Contractor
51.  rdf:type ci:ConstructionStakeholderTypes ;
52.  rdfs:label "Contractor"@en ;
53.  .
54.  ci:Engineering
55.  rdf:type ci:ConstructionStakeholderTypes ;
56.  rdfs:label "Engineering"@en ;
57.  .
58.  ci:ExecutionModels
59.  rdf:type owl:Class ;
60.  rdfs:label "Execution Model"@en ;
61.  rdfs:subClassOf owl:Thing ;
62.  .
63.  ci:FacilityManagement
64.  rdf:type ci:ConstructionPlanningPhases ;
65.  rdfs:label "6. Facility Management"@en ;
66.  .
67.  ci:GeneralContractor
68.  rdf:type ci:ExecutionModels ;
69.  rdfs:label "General Contractor"@en ;
70.  .
71.  ci:GeneralPlanner
72.  rdf:type ci:ExecutionModels ;
73.  rdfs:label "General Planner"@en ;
74.  .
75.  ci:IPD
76.  rdf:type ci:ExecutionModels ;
77.  rdfs:comment "Integrated-Project-Delivery"@en ;
78.  rdfs:label "IPD"@en ;
79.  .
80.  ci:LosingerMarazzi
81.  rdf:type ci:ConstructionRelatedCompanies ;
82.  ci:constructionRelatedCompanies_appliesModel_ExecutionModels ci:GeneralContracto
     r ;
83.  ci:constructionRelatedCompanies_appliesModel_ExecutionModels ci:GeneralPlanner ;
84.  ci:constructionRelatedCompanies_isOfType_ConstructionStakeholderTypes ci:Archite
     cture ;
85.  ci:constructionRelatedCompanies_isOfType_ConstructionStakeholderTypes ci:Contrac
     tor ;
86.  ci:constructionRelatedCompanies_isOfType_ConstructionStakeholderTypes ci:Enginee
     ring ;
87.  ci:constructionRelatedCompanies_operatesIn_CompanyExecutionAreas ci:Rural ;
88.  ci:constructionRelatedCompanies_operatesIn_CompanyExecutionAreas ci:Urban ;
89.  ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases ci:Pre
     liminaryStudy ;
90.  ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases ci:Pro
     jectPlanning ;
91.  ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases ci:Rea
     lization ;
```

```
92.    ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases ci:Str
       ategicPlanning ;
93.    ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases ci:Ten
       dering ;
94.    rdfs:label "Losinger Marazzi"@en ;
95.    .
96.    ci:PreliminaryStudy
97.    rdf:type ci:ConstructionPlanningPhases ;
98.    rdfs:label "2. Preliminary study"@en ;
99.    .
100.   ci:ProjectPlanning
101.   rdf:type ci:ConstructionPlanningPhases ;
102.   rdfs:label "3. Project Planning"@en ;
103.   .
104.   ci:PublicAuthority
105.   rdf:type ci:ConstructionStakeholderTypes ;
106.   rdfs:label "Public Authority"@en ;
107.   .
108.   ci:Realization
109.   rdf:type ci:ConstructionPlanningPhases ;
110.   rdfs:label "5. Realization"@en ;
111.   .
112.   ci:Rural
113.   rdf:type ci:CompanyExecutionAreas ;
114.   rdfs:label "Rural"@en ;
115.   .
116.   ci:StrategicPlanning
117.   rdf:type ci:ConstructionPlanningPhases ;
118.   rdfs:label "1. Strategic Planning"@en ;
119.   .
120.   ci:Tendering
121.   rdf:type ci:ConstructionPlanningPhases ;
122.   rdfs:label "4. Tendering"@en ;
123.   .
124.   ci:TotalContractor
125.   rdf:type ci:ExecutionModels ;
126.   rdfs:label "Total Contractor"@en ;
127.   .
128.   ci:Traditional
129.   rdf:type ci:ExecutionModels ;
130.   rdfs:label "Traditional"@en ;
131.   .
132.   ci:Urban
133.   rdf:type ci:CompanyExecutionAreas ;
134.   rdfs:label "Urban"@en ;
135.   .
136.   ci:constructionRelatedCompanies_appliesModel_ExecutionModels
137.   rdf:type owl:ObjectProperty ;
138.   rdfs:domain ci:ConstructionRelatedCompanies ;
139.   rdfs:label "ConstructionRelatedCompanies applies model ExecutionModels"@en ;
140.   rdfs:range ci:ExecutionModels ;
141.   .
142.   ci:constructionRelatedCompanies_isOfType_ConstructionStakeholderTypes
143.   rdf:type owl:ObjectProperty ;
144.   rdfs:domain ci:ConstructionRelatedCompanies ;
145.   rdfs:label "ConstructionRelatedCompanies is of type ConstructionStakeholderTypes
       "@en ;
146.   rdfs:range ci:ConstructionStakeholderTypes ;
147.   .
148.   ci:constructionRelatedCompanies_operatesIn_CompanyExecutionAreas
149.   rdf:type owl:ObjectProperty ;
150.   rdfs:domain ci:ConstructionRelatedCompanies ;
151.   rdfs:label "ConstructionRelatedCompanies operates in CompanyExecutionAreas"@en ;
152.   rdfs:range ci:CompanyExecutionAreas ;
153.   .
```

```
154.   ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases
155.   rdf:type owl:ObjectProperty ;
156.   rdfs:domain ci:ConstructionRelatedCompanies ;
157.   rdfs:label "ConstructionRelatedCompanies performs within Construction Planning P
       hases"@en ;
158.   rdfs:range ci:ConstructionPlanningPhases ;
159.   .
```

Source Code of the Business Model & Business Capability Ontology

This appendix section shows the code for the merged business model & business capability ontology stored within the file BusinessModelBusinessCapabilities.ttl.

```
1.    # baseURI: http://ikm-group.ch/bmbc
2.    # imports: http://ikm-group.ch/bc
3.    # imports: http://ikm-group.ch/bm
4.    # prefix: bmbc
5.
6.    @prefix bmbc: <http://ikm-group.ch/bmbc#> .
7.    @prefix owl: <http://www.w3.org/2002/07/owl#> .
8.    @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
9.    @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
10.   @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
11.
12.   <http://ikm-group.ch/bmbc>
13.   rdf:type owl:Ontology ;
14.   owl:imports <http://ikm-group.ch/bc> ;
15.   owl:imports <http://ikm-group.ch/bm> ;
16.   owl:versionInfo "Created with TopBraid Composer"@en ;
17.   .
18.   bmbc:coreCapabilities_composedOf_KeyActivities
19.   rdf:type owl:ObjectProperty ;
20.   rdfs:domain <http://ikm-group.ch/bc#CoreCapabilities> ;
21.   rdfs:label "CoreCapabilities is composed of KeyActivities"@en ;
22.   rdfs:range <http://ikm-group.ch/bm#KeyActivities> ;
23.   .
24.   bmbc:coreCapabilities_composedOf_KeyResources
25.   rdf:type owl:ObjectProperty ;
26.   rdfs:domain <http://ikm-group.ch/bc#CoreCapabilities> ;
27.   rdfs:label "CoreCapabilities is composed of KeyResources"@en ;
28.   rdfs:range <http://ikm-group.ch/bm#KeyResources> ;
29.   .
30.   bmbc:humanBasedCapabilities_yieldsValue_Human
31.   rdf:type owl:ObjectProperty ;
32.   rdfs:domain <http://ikm-group.ch/bc#HumanBasedCapabilities> ;
33.   rdfs:label "HumanBasedCapabilities yields value for Human"@en ;
34.   rdfs:range <http://ikm-group.ch/bm#Human> ;
35.   .
36.   bmbc:keyActivities_isACoreCapability
37.   rdf:type owl:DatatypeProperty ;
38.   rdfs:domain <http://ikm-group.ch/bm#KeyActivities> ;
39.   rdfs:label "KeyActivities is a Core Capability"@en ;
40.   rdfs:range xsd:boolean ;
41.   .
42.   bmbc:keyResources_isACoreCapability
43.   rdf:type owl:DatatypeProperty ;
44.   rdfs:domain <http://ikm-group.ch/bm#KeyResources> ;
45.   rdfs:label "KeyResources is a Core Capability"@en ;
46.   rdfs:range xsd:boolean ;
```

```
47.     .
48.     bmbc:resourceBasedCapabilities_composedOf_InfrastructureParts
49.     rdf:type owl:ObjectProperty ;
50.     rdfs:domain <http://ikm-group.ch/bc#ResourceBasedCapabilities> ;
51.     rdfs:label "ResourceBasedCapabilities is composed of InfrastructureParts"@en ;
52.     rdfs:range <http://ikm-group.ch/bm#InfrastructureParts> ;
53.     .
```

Source Code of the Business Model & Enterprise Architecture Ontology

This appendix section shows the code for the merged business model & enterprise architecture

ontology stored within the file BusinessModelEnterpriseArchitecture.ttl.

```
1.      # baseURI: http://ikm-group.ch/bmea
2.      # imports: http://ikm-group.ch/archimateV3
3.      # imports: http://ikm-group.ch/bmbc
4.      # prefix: bmea
5.
6.      @prefix bmea: <http://ikm-group.ch/bmea#> .
7.      @prefix owl: <http://www.w3.org/2002/07/owl#> .
8.      @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
9.      @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
10.     @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
11.
12.     <http://ikm-group.ch/bmea>
13.     rdf:type owl:Ontology ;
14.     owl:imports <http://ikm-group.ch/archimateV3> ;
15.     owl:imports <http://ikm-group.ch/bmbc> ;
16.     owl:versionInfo "Created with TopBraid Composer"@en ;
17.     .
18.     bmea:applicationComponent_servedBy_InfrastructureService
19.     rdf:type owl:ObjectProperty ;
20.     rdfs:domain <http://ikm-group.ch/archiMEO/archimate#ApplicationComponent> ;
21.     rdfs:label "ApplicationComponent is served by InfrastructureService"@en ;
22.     rdfs:range <http://ikm-group.ch/archiMEO/archimate#InfrastructureService> ;
23.     .
24.     bmea:applicationInterface_composedIn_ApplicationComponent
25.     rdf:type owl:ObjectProperty ;
26.     rdfs:domain <http://ikm-group.ch/archiMEO/archimate#ApplicationInterface> ;
27.     rdfs:label "ApplicationInterface is composed in ApplicationComponent"@en ;
28.     rdfs:range <http://ikm-group.ch/archiMEO/archimate#ApplicationComponent> ;
29.     .
30.     bmea:applicationService_realizedBy_ApplicationComponent
31.     rdf:type owl:ObjectProperty ;
32.     rdfs:domain <http://ikm-group.ch/archiMEO/archimate#ApplicationService> ;
33.     rdfs:label "ApplicationService is realized by ApplicationComponent"@en ;
34.     rdfs:range <http://ikm-group.ch/archiMEO/archimate#ApplicationComponent> ;
35.     .
36.     bmea:businessActor_servedBy_ApplicationInterface
37.     rdf:type owl:ObjectProperty ;
38.     rdfs:domain <http://ikm-group.ch/archiMEO/archimate#BusinessActor> ;
39.     rdfs:label "BusinessActor is served by ApplicationInterface"@en ;
40.     rdfs:range <http://ikm-group.ch/archiMEO/archimate#ApplicationInterface> ;
41.     .
42.     bmea:businessCollaboration_assignedTo_BusinessInteraction
43.     rdf:type owl:ObjectProperty ;
44.     rdfs:domain <http://ikm-group.ch/archiMEO/archimate#BusinessCollaboration> ;
45.     rdfs:label "BusinessCollaboration is assigned to BusinessInteraction"@en ;
46.     rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessInteraction> ;
```

```
47.    .
48.    bmea:businessObject_realizedBy_DataObject
49.    rdf:type owl:ObjectProperty ;
50.    rdfs:domain <http://ikm-group.ch/archiMEO/archimate#BusinessObject> ;
51.    rdfs:label "BusinessObject is realized by DataObject"@en ;
52.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#DataObject> ;
53.    .
54.    bmea:businessProcess_servedBy_ApplicationService
55.    rdf:type owl:ObjectProperty ;
56.    rdfs:domain <http://ikm-group.ch/archiMEO/archimate#BusinessProcess> ;
57.    rdfs:label "BusinessProcess is served by ApplicationService"@en ;
58.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#ApplicationService> ;
59.    .
60.    bmea:capability_servedBy_BusinessCollaboration
61.    rdf:type owl:ObjectProperty ;
62.    rdfs:domain <http://ikm-group.ch/archimateV3#Capability> ;
63.    rdfs:label "Capability is served by BusinessCollaboration"@en ;
64.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessCollaboration> ;
65.    .
66.    bmea:capability_servedBy_BusinessFunction
67.    rdf:type owl:ObjectProperty ;
68.    rdfs:domain <http://ikm-group.ch/archimateV3#Capability> ;
69.    rdfs:label "Capability is served by BusinessFunction"@en ;
70.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessFunction> ;
71.    .
72.    bmea:channels_associatedWith_Capability
73.    rdf:type owl:ObjectProperty ;
74.    rdfs:domain <http://ikm-group.ch/bm#Channels> ;
75.    rdfs:label "Channels is associated with Capability"@en ;
76.    rdfs:range <http://ikm-group.ch/archimateV3#Capability> ;
77.    .
78.    bmea:channels_composedOf_Resource
79.    rdf:type owl:ObjectProperty ;
80.    rdfs:domain <http://ikm-group.ch/bm#Channels> ;
81.    rdfs:label "Channels is composed of resource"@en ;
82.    rdfs:range <http://ikm-group.ch/archimateV3#Resource> ;
83.    .
84.    bmea:costStructureElements_associatedWith_Outcome
85.    rdf:type owl:ObjectProperty ;
86.    rdfs:domain <http://ikm-group.ch/bm#CostStructureElements> ;
87.    rdfs:label "CostStructureElements is associated with Outcome"@en ;
88.    rdfs:range <http://ikm-group.ch/archimateV3#Outcome> ;
89.    .
90.    bmea:customerRelationships_associatedWith_Capability
91.    rdf:type owl:ObjectProperty ;
92.    rdfs:domain <http://ikm-group.ch/bm#CustomerRelationships> ;
93.    rdfs:label "CustomerRelationships is associated with Capability"@en ;
94.    rdfs:range <http://ikm-group.ch/archimateV3#Capability> ;
95.    .
96.    bmea:customerSegments_composedOf_Stakeholder
97.    rdf:type owl:ObjectProperty ;
98.    rdfs:domain <http://ikm-group.ch/bm#CustomerSegments> ;
99.    rdfs:label "CustomerSegments is composed of Stakeholder"@en ;
100.   rdfs:range <http://ikm-group.ch/archimateV3#Stakeholder> ;
101.   .
102.   bmea:infrastructureService_realizedBy_SystemSoftware
103.   rdf:type owl:ObjectProperty ;
104.   rdfs:domain <http://ikm-group.ch/archiMEO/archimate#InfrastructureService> ;
105.   rdfs:label "InfrastructureService is realized by SystemSoftware"@en ;
106.   rdfs:range <http://ikm-group.ch/archiMEO/archimate#SystemSoftware> ;
107.   .
108.   bmea:keyActivities_associatedWith_ValueStream
109.   rdf:type owl:ObjectProperty ;
110.   rdfs:domain <http://ikm-group.ch/bm#KeyActivities> ;
111.   rdfs:label "KeyActivities is associated with ValueStream"@en ;
```

```
112.    rdfs:range <http://ikm-group.ch/archimateV3#ValueStream> ;
113.    .
114.    bmea:keyPartners_composedOf_Stakeholder
115.    rdf:type owl:ObjectProperty ;
116.    rdfs:domain <http://ikm-group.ch/bm#KeyPartners> ;
117.    rdfs:label "KeyPartners is composed of Stakeholder"@en ;
118.    rdfs:range <http://ikm-group.ch/archimateV3#Stakeholder> ;
119.    .
120.    bmea:keyResources_composedOf_Resource
121.    rdf:type owl:ObjectProperty ;
122.    rdfs:domain <http://ikm-group.ch/bm#KeyResources> ;
123.    rdfs:label "KeyResources is composed of Resource"@en ;
124.    rdfs:range <http://ikm-group.ch/archimateV3#Resource> ;
125.    .
126.    bmea:node_realizedBy_SystemSoftware
127.    rdf:type owl:ObjectProperty ;
128.    rdfs:domain <http://ikm-group.ch/archiMEO/archimate#Node> ;
129.    rdfs:label "Node is realized by SystemSoftware"@en ;
130.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#SystemSoftware> ;
131.    .
132.    bmea:offeringValues_composedOf_Value
133.    rdf:type owl:ObjectProperty ;
134.    rdfs:domain <http://ikm-group.ch/bm#OfferingValues> ;
135.    rdfs:label "OfferingValues is composed of Value"@en ;
136.    rdfs:range <http://ikm-group.ch/archimateV3#Value> ;
137.    .
138.    bmea:offerings_composedOf_Product
139.    rdf:type owl:ObjectProperty ;
140.    rdfs:domain <http://ikm-group.ch/bm#Offerings> ;
141.    rdfs:label "Offerings is composed of Product"@en ;
142.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#Product> ;
143.    .
144.    bmea:outcome_realizedBy_BusinessService
145.    rdf:type owl:ObjectProperty ;
146.    rdfs:domain <http://ikm-group.ch/archimateV3#Outcome> ;
147.    rdfs:label "Outcome is realized by BusinessService"@en ;
148.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessService> ;
149.    .
150.    bmea:product_aggregates_BusinessService
151.    rdf:type owl:ObjectProperty ;
152.    rdfs:domain <http://ikm-group.ch/archiMEO/archimate#Product> ;
153.    rdfs:label "Product aggregates BusinessService"@en ;
154.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessService> ;
155.    .
156.    bmea:resource_assignedTo_Capability
157.    rdf:type owl:ObjectProperty ;
158.    rdfs:domain <http://ikm-group.ch/archimateV3#Resource> ;
159.    rdfs:label "Resource is assigned to Capability"@en ;
160.    rdfs:range <http://ikm-group.ch/archimateV3#Capability> ;
161.    .
162.    bmea:resource_composedOf_BusinessActor
163.    rdf:type owl:ObjectProperty ;
164.    rdfs:domain <http://ikm-group.ch/archimateV3#Resource> ;
165.    rdfs:label "Resource is composed of BusinessActor"@en ;
166.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessActor> ;
167.    .
168.    bmea:resource_composedOf_BusinessObject
169.    rdf:type owl:ObjectProperty ;
170.    rdfs:domain <http://ikm-group.ch/archimateV3#Resource> ;
171.    rdfs:label "Resource is composed of BusinessObject"@en ;
172.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessObject> ;
173.    .
174.    bmea:resource_hasAssigned_BusinessInterface
175.    rdf:type owl:ObjectProperty ;
176.    rdfs:domain <http://ikm-group.ch/archimateV3#Resource> ;
```

```
177.    rdfs:label "Resource has assigned BusinessInterface"@en ;
178.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessInterface> ;
179.    .
180.    bmea:revenueStreams_associatedWith_Outcome
181.    rdf:type owl:ObjectProperty ;
182.    rdfs:domain <http://ikm-group.ch/bm#RevenueStreams> ;
183.    rdfs:label "RevenueStreams is associated with Outcome"@en ;
184.    rdfs:range <http://ikm-group.ch/archimateV3#Outcome> ;
185.    .
186.    bmea:stakeholder_associatedWith_BusinessActor
187.    rdf:type owl:ObjectProperty ;
188.    rdfs:domain <http://ikm-group.ch/archimateV3#Stakeholder> ;
189.    rdfs:label "Stakeholder is associated with BusinessActor"@en ;
190.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessActor> ;
191.    .
192.    bmea:valueStream_realizedBy_BusinessProcess
193.    rdf:type owl:ObjectProperty ;
194.    rdfs:domain <http://ikm-group.ch/archimateV3#ValueStream> ;
195.    rdfs:label "ValueStream is realized by BusinessProcess"@en ;
196.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessProcess> ;
197.    .
198.    bmea:value_realizedBy_BusinessObject
199.    rdf:type owl:ObjectProperty ;
200.    rdfs:domain <http://ikm-group.ch/archimateV3#Value> ;
201.    rdfs:label "Value is realized by BusinessObject"@en ;
202.    rdfs:range <http://ikm-group.ch/archiMEO/archimate#BusinessObject> ;
203.    .
204.    bmea:value_realizes_Outcome
205.    rdf:type owl:ObjectProperty ;
206.    rdfs:domain <http://ikm-group.ch/archimateV3#Value> ;
207.    rdfs:label "Value realizes Outcome"@en ;
208.    rdfs:range <http://ikm-group.ch/archimateV3#Outcome> ;
209.    .
```

Source Code of the Business Model Innovation Case Ontology

This appendix section shows the code for the business model innovation case ontology stored within the file BusinessModelInnovationCase.ttl.

```
1.      # baseURI: http://ikm-group.ch/bmic
2.      # imports: http://ikm-group.ch/bic
3.      # imports: http://ikm-group.ch/bmea
4.      # prefix: bmic
5.
6.      @prefix bic: <http://ikm-group.ch/bic#> .
7.      @prefix bmic: <http://ikm-group.ch/bmic#> .
8.      @prefix owl: <http://www.w3.org/2002/07/owl#> .
9.      @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
10.     @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
11.     @prefix top: <http://ikm-group.ch/archiMEO/top#> .
12.     @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
13.
14.     <http://ikm-group.ch/bm#CostStructureModels>
15.     rdfs:subClassOf bmic:BusinessModelElements ;
16.     .
17.     <http://ikm-group.ch/bm#CustomerInterfaceParts>
18.     rdfs:subClassOf bmic:BusinessModelElements ;
19.     .
20.     <http://ikm-group.ch/bm#EconomicAdvantages>
```

```
21.    rdfs:subClassOf bmic:BusinessModelElements ;
22.    .
23.    <http://ikm-group.ch/bm#FinancialAspectParts>
24.    rdfs:subClassOf bmic:BusinessModelElements ;
25.    .
26.    <http://ikm-group.ch/bm#InfrastructureParts>
27.    rdfs:subClassOf bmic:BusinessModelElements ;
28.    .
29.    <http://ikm-group.ch/bm#KeyPartnershipGoals>
30.    rdfs:subClassOf bmic:BusinessModelElements ;
31.    .
32.    <http://ikm-group.ch/bm#OfferingValues>
33.    rdfs:subClassOf bmic:BusinessModelElements ;
34.    .
35.    <http://ikm-group.ch/bm#Offerings>
36.    rdfs:subClassOf bmic:BusinessModelElements ;
37.    .
38.    <http://ikm-group.ch/bm#PricingMechanisms>
39.    rdfs:subClassOf bmic:BusinessModelElements ;
40.    .
41.    <http://ikm-group.ch/bm#ValueTypes>
42.    rdfs:subClassOf bmic:BusinessModelElements ;
43.    .
44.    <http://ikm-group.ch/bmic>
45.    rdf:type owl:Ontology ;
46.    owl:imports <http://ikm-group.ch/bic> ;
47.    owl:imports <http://ikm-group.ch/bmea> ;
48.    owl:versionInfo "Created with TopBraid Composer"@en ;
49.    .
50.    bmic:BusinessModel
51.    rdf:type bic:ViewsOnBusiness ;
52.    rdfs:label "Business Model"@en ;
53.    .
54.    bmic:BusinessModelElements
55.    rdf:type owl:Class ;
56.    rdfs:label "Elements to describe a Business Model"@en ;
57.    rdfs:subClassOf owl:Thing ;
58.    .
59.    bmic:BusinessModelInnovationCases
60.    rdf:type owl:Class ;
61.    rdfs:label "Cases of the type business model innovation"@en ;
62.    rdfs:subClassOf bic:Cases ;
63.    .
64.    bmic:barriersToOvercome_represents_Constraint
65.    rdf:type owl:ObjectProperty ;
66.    rdfs:domain bic:BarriersToOvercome ;
67.    rdfs:label "BarriersToOvercome represents Constraint"@en ;
68.    rdfs:range <http://ikm-group.ch/archimateV3#Constraint> ;
69.    .
70.    bmic:benefitsOfInnovation_represents_Value
71.    rdf:type owl:ObjectProperty ;
72.    rdfs:domain bic:BenefitsOfInnovation ;
73.    rdfs:label "BenefitsOfInnovation represents Value"@en ;
74.    rdfs:range <http://ikm-group.ch/archimateV3#Value> ;
75.    .
76.    bmic:businessModelInnovationCases_composedOf_InvolvedParties
77.    rdf:type owl:ObjectProperty ;
78.    rdfs:domain bmic:BusinessModelInnovationCases ;
79.    rdfs:label "BusinessModelInnovationCases composed of InvolvedParties"@en ;
80.    rdfs:range bic:InvolvedParties ;
81.    .
82.    bmic:businessStateCharacteristics_aggregates_Channels
83.    rdf:type owl:ObjectProperty ;
84.    rdfs:domain bic:BusinessStateCharacteristics ;
85.    rdfs:label "BusinessStateCharacteristics aggregates Channels"@en ;
```

```
86.     rdfs:range <http://ikm-group.ch/bm#Channels> ;
87.     .
88.     bmic:businessStateCharacteristics_aggregates_CostStructureElements
89.     rdf:type owl:ObjectProperty ;
90.     rdfs:domain bic:BusinessStateCharacteristics ;
91.     rdfs:label "BusinessStateCharacteristics aggregates CostStructureElements"@en ;
92.     rdfs:range <http://ikm-group.ch/bm#CostStructureElements> ;
93.     .
94.     bmic:businessStateCharacteristics_aggregates_CustomerRelationships
95.     rdf:type owl:ObjectProperty ;
96.     rdfs:domain bic:BusinessStateCharacteristics ;
97.     rdfs:label "BusinessStateCharacteristics aggregates CustomerRelationships"@en ;
98.     rdfs:range <http://ikm-group.ch/bm#CustomerRelationships> ;
99.     .
100.    bmic:businessStateCharacteristics_aggregates_CustomerSegments
101.    rdf:type owl:ObjectProperty ;
102.    rdfs:domain bic:BusinessStateCharacteristics ;
103.    rdfs:label "BusinessStateCharacteristics aggregates CustomerSegments"@en ;
104.    rdfs:range <http://ikm-group.ch/bm#CustomerSegments> ;
105.    .
106.    bmic:businessStateCharacteristics_aggregates_KeyActivities
107.    rdf:type owl:ObjectProperty ;
108.    rdfs:domain bic:BusinessStateCharacteristics ;
109.    rdfs:label "BusinessStateCharacteristics aggregates KeyActivities"@en ;
110.    rdfs:range <http://ikm-group.ch/bm#KeyActivities> ;
111.    .
112.    bmic:businessStateCharacteristics_aggregates_KeyPartners
113.    rdf:type owl:ObjectProperty ;
114.    rdfs:domain bic:BusinessStateCharacteristics ;
115.    rdfs:label "BusinessStateCharacteristics aggregates KeyPartners"@en ;
116.    rdfs:range <http://ikm-group.ch/bm#KeyPartners> ;
117.    .
118.    bmic:businessStateCharacteristics_aggregates_KeyResources
119.    rdf:type owl:ObjectProperty ;
120.    rdfs:domain bic:BusinessStateCharacteristics ;
121.    rdfs:label "BusinessStateCharacteristics aggregates KeyResources"@en ;
122.    rdfs:range <http://ikm-group.ch/bm#KeyResources> ;
123.    .
124.    bmic:businessStateCharacteristics_aggregates_OfferingValues
125.    rdf:type owl:ObjectProperty ;
126.    rdfs:domain bic:BusinessStateCharacteristics ;
127.    rdfs:label "BusinessStateCharacteristics aggregates OfferingValues"@en ;
128.    rdfs:range <http://ikm-group.ch/bm#OfferingValues> ;
129.    .
130.    bmic:businessStateCharacteristics_aggregates_Offerings
131.    rdf:type owl:ObjectProperty ;
132.    rdfs:domain bic:BusinessStateCharacteristics ;
133.    rdfs:label "BusinessStateCharacteristics aggregates Offerings"@en ;
134.    rdfs:range <http://ikm-group.ch/bm#Offerings> ;
135.    .
136.    bmic:businessStateCharacteristics_aggregates_RevenueStreams
137.    rdf:type owl:ObjectProperty ;
138.    rdfs:domain bic:BusinessStateCharacteristics ;
139.    rdfs:label "BusinessStateCharacteristics aggregates RevenueStreams"@en ;
140.    rdfs:range <http://ikm-group.ch/bm#RevenueStreams> ;
141.    .
142.    bmic:businessStateCharacteristics_represents_Capability
143.    rdf:type owl:ObjectProperty ;
144.    rdfs:domain bic:BusinessStateCharacteristics ;
145.    rdfs:label "BusinessStateCharacteristics represents Capability"@en ;
146.    rdfs:range <http://ikm-group.ch/archimateV3#Capability> ;
147.    .
148.    bmic:customerBenefits_extends_OfferingValues
149.    rdf:type owl:ObjectProperty ;
150.    rdfs:domain bic:CustomerBenefits ;
```

```
151.    rdfs:label "CustomerBenefits extends OfferingValues"@en ;
152.    rdfs:range <http://ikm-group.ch/bm#OfferingValues> ;
153.    .
154.    bmic:drivers_represent_Driver
155.    rdf:type owl:ObjectProperty ;
156.    rdfs:domain bic:Drivers ;
157.    rdfs:label "Drivers represent Driver"@en ;
158.    rdfs:range <http://ikm-group.ch/archimateV3#Driver> ;
159.    .
160.    bmic:involvedParties_aggregates_KeyPartners
161.    rdf:type owl:ObjectProperty ;
162.    rdfs:domain bic:InvolvedParties ;
163.    rdfs:label "InvolvedParties aggregates KeyPartners"@en ;
164.    rdfs:range <http://ikm-group.ch/bm#KeyPartners> ;
165.    .
166.    bmic:involvedParties_represents_Stakeholder
167.    rdf:type owl:ObjectProperty ;
168.    rdfs:domain bic:InvolvedParties ;
169.    rdfs:label "InvolvedParties represents Stakeholder"@en ;
170.    rdfs:range <http://ikm-group.ch/archimateV3#Stakeholder> ;
171.    .
172.    bmic:requiredResources_aggregates_KeyResources
173.    rdf:type owl:ObjectProperty ;
174.    rdfs:domain bic:RequiredRessources ;
175.    rdfs:label "RequiredResources aggregates KeyResources"@en ;
176.    rdfs:range <http://ikm-group.ch/bm#KeyResources> ;
177.    .
178.    bmic:requiredResources_represents_Requirement
179.    rdf:type owl:ObjectProperty ;
180.    rdfs:domain bic:RequiredRessources ;
181.    rdfs:label "RequiredResources represents Requirement"@en ;
182.    rdfs:range <http://ikm-group.ch/archimateV3#Requirement> ;
183.    .
184.    bmic:requiredResources_represents_Resource
185.    rdf:type owl:ObjectProperty ;
186.    rdfs:domain bic:RequiredRessources ;
187.    rdfs:label "RequiredResources represents Resource"@en ;
188.    rdfs:range <http://ikm-group.ch/archimateV3#Resource> ;
189.    .
190.    bmic:risksOfInnovation_represents_Constraint
191.    rdf:type owl:ObjectProperty ;
192.    rdfs:domain bic:RisksOfInnovation ;
193.    rdfs:label "RisksOfInnovation represents Constraint"@en ;
194.    rdfs:range <http://ikm-group.ch/archimateV3#Constraint> ;
195.    .
196.    bmic:stateAfterInnovating_represents_Outcome
197.    rdf:type owl:ObjectProperty ;
198.    rdfs:domain bic:StateAfterInnovating ;
199.    rdfs:label "StateAfterInnovating represents Outcome"@en ;
200.    rdfs:range <http://ikm-group.ch/archimateV3#Outcome> ;
201.    .
202.    bmic:strategicGoals_represents_Goal
203.    rdf:type owl:ObjectProperty ;
204.    rdfs:domain bic:StrategicGoals ;
205.    rdfs:label "StrategicGoals represents Goal"@en ;
206.    rdfs:range <http://ikm-group.ch/archimateV3#Goal> ;
207.    .
208.    bmic:strategicGoals_represents_KeyPartnershipGoals
209.    rdf:type owl:ObjectProperty ;
210.    rdfs:domain bic:StrategicGoals ;
211.    rdfs:label "StrategicGoals represents KeyPartnershipGoals"@en ;
212.    rdfs:range <http://ikm-group.ch/bm#KeyPartnershipGoals> ;
213.    .
```

Source Code of the Business Model Innovation Case with Industry Specifics Ontology

This appendix section shows the code for the business model innovation case with industry specifics ontology stored within the file BusinessModelInnovationCaseIndustrySpecifics.ttl.

```
1.    # baseURI: http://ikm-group.ch/bmicis
2.    # imports: http://ikm-group.ch/bmic
3.    # imports: http://ikm-group.ch/ci
4.    # prefix: bmicis
5.
6.    @prefix bmicis: <http://ikm-group.ch/bmicis#> .
7.    @prefix owl: <http://www.w3.org/2002/07/owl#> .
8.    @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
9.    @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
10.   @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
11.
12.   <http://ikm-group.ch/bmicis>
13.   rdf:type owl:Ontology ;
14.   owl:imports <http://ikm-group.ch/bmic> ;
15.   owl:imports <http://ikm-group.ch/ci> ;
16.   owl:versionInfo "Created with TopBraid Composer"@en ;
17.   .
18.   bmicis:companyExecutionAreas_associatedWith_Capability
19.   rdf:type owl:ObjectProperty ;
20.   rdfs:domain <http://ikm-group.ch/ci#CompanyExecutionAreas> ;
21.   rdfs:label "CompanyExecutionAreas associated with Capability"@en ;
22.   rdfs:range <http://ikm-group.ch/archimateV3#Capability> ;
23.   .
24.   bmicis:constructionPlanningPhases_associatedWith_Capability
25.   rdf:type owl:ObjectProperty ;
26.   rdfs:domain <http://ikm-group.ch/ci#ConstructionPlanningPhases> ;
27.   rdfs:label "ConstructionPlanningPhases associated with Capability"@en ;
28.   rdfs:range <http://ikm-group.ch/archimateV3#Capability> ;
29.   .
30.   bmicis:constructionRelatedCompanies_associatedWith_Stakeholder
31.   rdf:type owl:ObjectProperty ;
32.   rdfs:domain <http://ikm-group.ch/ci#ConstructionRelatedCompanies> ;
33.   rdfs:label "ConstructionRelatedCompanies associated with Stakeholder"@en ;
34.   rdfs:range <http://ikm-group.ch/archimateV3#Stakeholder> ;
35.   .
36.   bmicis:customerSegments_aggregates_ConstructionRelatedCompanies
37.   rdf:type owl:ObjectProperty ;
38.   rdfs:domain <http://ikm-group.ch/bm#CustomerSegments> ;
39.   rdfs:label "CustomerSegments aggregates ConstructionRelatedCompanies"@en ;
40.   rdfs:range <http://ikm-group.ch/ci#ConstructionRelatedCompanies> ;
41.   .
42.   bmicis:customerSegments_isOfType_ConstructionStakeholderTypes
43.   rdf:type owl:ObjectProperty ;
44.   rdfs:domain <http://ikm-group.ch/bm#CustomerSegments> ;
45.   rdfs:label "CustomerSegments is of type ConstructionStakeholderTypes"@en ;
46.   rdfs:range <http://ikm-group.ch/ci#ConstructionStakeholderTypes> ;
47.   .
48.   bmicis:executionModels_associatedWith_Capability
49.   rdf:type owl:ObjectProperty ;
50.   rdfs:domain <http://ikm-group.ch/ci#ExecutionModels> ;
51.   rdfs:label "ExecutionModels associated with Capability"@en ;
52.   rdfs:range <http://ikm-group.ch/archimateV3#Capability> ;
53.   .
54.   bmicis:industries_specializedBy_ConstructionStakeholderTypes
55.   rdf:type owl:ObjectProperty ;
56.   rdfs:domain <http://ikm-group.ch/bic#Industries> ;
57.   rdfs:label "Industries specialized by ConstructionStakeholderTypes"@en ;
```

```
58.      rdfs:range <http://ikm-group.ch/ci#ConstructionStakeholderTypes> ;
59.      .
60.   bmicis:involvedParties_aggregates_ConstructionRelatedCompanies
61.      rdf:type owl:ObjectProperty ;
62.      rdfs:domain <http://ikm-group.ch/bic#InvolvedParties> ;
63.      rdfs:label "InvolvedParties aggregates ConstructionRelatedCompanies"@en ;
64.      rdfs:range <http://ikm-group.ch/ci#ConstructionRelatedCompanies> ;
65.      .
66.   bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases
67.      rdf:type owl:ObjectProperty ;
68.      rdfs:domain <http://ikm-group.ch/bm#KeyActivities> ;
69.      rdfs:label "KeyActivities aggregated in ConstructionPlanningPhases"@en ;
70.      rdfs:range <http://ikm-group.ch/ci#ConstructionPlanningPhases> ;
71.      .
72.   bmicis:keyPartners_represents_ConstructionRelatedCompanies
73.      rdf:type owl:ObjectProperty ;
74.      rdfs:domain <http://ikm-group.ch/bm#KeyPartners> ;
75.      rdfs:label "KeyPartners represents ConstructionRelatedCompanies"@en ;
76.      rdfs:range <http://ikm-group.ch/ci#ConstructionRelatedCompanies> ;
77.      .
```

Appendix-C: Source Code of the Developed Similarity-Retrieval Service

This appendix shows the code developed as part of this research to run the similarity-retrieval service.

Source Code of the Business Model Innovation Case Model Ontology

This appendix section shows the code for the business model innovation case model stored within the file BusinessModelInnovationCaseModel.ttl.

```
1.     # baseURI: http://ikm-group.ch/bmicm
2.     # imports: http://ikm-group.ch/bmicis
3.     # imports: http://ikm-group.ch/cbr
4.     # prefix: bmicm
5.
6.     @prefix archi: <http://ikm-group.ch/archiMEO/archimate#> .
7.     @prefix archimateV3: <http://ikm-group.ch/archimateV3#> .
8.     @prefix bic: <http://ikm-group.ch/bic#> .
9.     @prefix bc: <http://ikm-group.ch/bc#> .
10.    @prefix ci: <http://ikm-group.ch/ci#> .
11.    @prefix bmic: <http://ikm-group.ch/bmic#> .
12.    @prefix bmicm: <http://ikm-group.ch/bmicm#> .
13.    @prefix bm: <http://ikm-group.ch/bm#> .
14.    @prefix cbr: <http://ikm-group.ch/cbr#> .
15.    @prefix owl: <http://www.w3.org/2002/07/owl#> .
16.    @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
17.    @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
18.    @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
19.
20.    <http://ikm-group.ch/bmicm>
21.    rdf:type owl:Ontology ;
22.    owl:imports <http://ikm-group.ch/bmicis> ;
23.    owl:imports <http://ikm-group.ch/cbr> ;
24.    owl:versionInfo "Created with TopBraid Composer" ;
25.    .
26.    bmicm:ApplicationLayerElements
27.    rdf:type owl:Class ;
28.    rdfs:label "Application Layer Elements" ;
29.    rdfs:subClassOf bmicm:EnterpriseArchitecture ;
30.    .
31.    bmicm:BMICaseElements
32.    rdf:type owl:Class ;
33.    rdfs:label "Business Model Innovation Case Elements" ;
34.    rdfs:subClassOf owl:Thing ;
35.    .
36.    bmicm:BusinessLayerElements
37.    rdf:type owl:Class ;
38.    rdfs:label "Business Layer Elements" ;
39.    rdfs:subClassOf bmicm:EnterpriseArchitecture ;
40.    .
41.    bmicm:CLevelManager
42.    rdf:type archi:BusinessRole ;
43.    rdf:type cbr:Role ;
44.    rdfs:label "C-level Manager"@en ;
45.    .
46.    bmicm:EnterpriseArchitect
47.    rdf:type archi:BusinessRole ;
48.    rdf:type cbr:Role ;
49.    rdfs:label "Enterprise Architect"@en ;
50.    .
```

```
51.   bmicm:EnterpriseArchitecture
52.   rdf:type owl:Class ;
53.   rdfs:label "Enterprise Architecture" ;
54.   rdfs:subClassOf owl:Thing ;
55.   .
56.   bmicm:MotivationAspectElements
57.   rdf:type owl:Class ;
58.   rdfs:label "Motivation Aspect Elements" ;
59.   rdfs:subClassOf bmicm:EnterpriseArchitecture ;
60.   .
61.   bmicm:RequiredResources
62.   rdf:type owl:Class ;
63.   rdfs:label "Required Resources" ;
64.   rdfs:subClassOf bmicm:BMICaseElements ;
65.   .
66.   bmicm:BusinessStateCharacteristics
67.   rdf:type owl:Class ;
68.   rdfs:label "Business State Characteristics" ;
69.   rdfs:subClassOf bmicm:BMICaseElements ;
70.   .
71.   bmicm:BenefitsOfInnovation
72.   rdf:type owl:Class ;
73.   rdfs:label "Benefits of Innovation" ;
74.   rdfs:subClassOf bmicm:BMICaseElements ;
75.   .
76.   bmicm:BarriersToOvercome
77.   rdf:type owl:Class ;
78.   rdfs:label "Barriers to Overcome" ;
79.   rdfs:subClassOf bmicm:BMICaseElements ;
80.   .
81.   bmicm:StrategyLayerElements
82.   rdf:type owl:Class ;
83.   rdfs:label "Strategy Layer Elements" ;
84.   rdfs:subClassOf bmicm:EnterpriseArchitecture ;
85.   .
86.   bmicm:TechnologyLayerElements
87.   rdf:type owl:Class ;
88.   rdfs:label "Technology Layer Elements" ;
89.   rdfs:subClassOf bmicm:EnterpriseArchitecture ;
90.   .
91.   bmicm:TransformationManager
92.   rdf:type archi:BusinessRole ;
93.   rdf:type cbr:Role ;
94.   rdfs:label "Transformation Manager"@en ;
95.   .
96.   bmicm:applicationLayerElements_specializedBy_ApplicationCollaboration
97.   rdf:type owl:ObjectProperty ;
98.   rdfs:domain bmicm:ApplicationLayerElements ;
99.   rdfs:label "Application Collaboration" ;
100.  rdfs:range archi:ApplicationCollaboration ;
101.  .
102.  bmicm:applicationLayerElements_specializedBy_ApplicationComponent
103.  rdf:type owl:ObjectProperty ;
104.  rdfs:domain bmicm:ApplicationLayerElements ;
105.  rdfs:label "Application Component" ;
106.  rdfs:range archi:ApplicationComponent ;
107.  .
108.  bmicm:applicationLayerElements_specializedBy_ApplicationEvent
109.  rdf:type owl:ObjectProperty ;
110.  rdfs:domain bmicm:ApplicationLayerElements ;
111.  rdfs:label "Application Event" ;
112.  rdfs:range archimateV3:ApplicationEvent ;
113.  .
114.  bmicm:applicationLayerElements_specializedBy_ApplicationFunction
115.  rdf:type owl:ObjectProperty ;
```

```
116.    rdfs:domain bmicm:ApplicationLayerElements ;
117.    rdfs:label "Application Function" ;
118.    rdfs:range archi:ApplicationFunction ;
119.    .
120.    bmicm:applicationLayerElements_specializedBy_ApplicationInteraction
121.    rdf:type owl:ObjectProperty ;
122.    rdfs:domain bmicm:ApplicationLayerElements ;
123.    rdfs:label "Application Interaction" ;
124.    rdfs:range archi:ApplicationInteraction ;
125.    .
126.    bmicm:applicationLayerElements_specializedBy_ApplicationInterface
127.    rdf:type owl:ObjectProperty ;
128.    rdfs:domain bmicm:ApplicationLayerElements ;
129.    rdfs:label "Application Interface" ;
130.    rdfs:range archi:ApplicationInterface ;
131.    .
132.    bmicm:applicationLayerElements_specializedBy_ApplicationProcess
133.    rdf:type owl:ObjectProperty ;
134.    rdfs:domain bmicm:ApplicationLayerElements ;
135.    rdfs:label "Application Process" ;
136.    rdfs:range archimateV3:ApplicationProcess ;
137.    .
138.    bmicm:applicationLayerElements_specializedBy_ApplicationService
139.    rdf:type owl:ObjectProperty ;
140.    rdfs:domain bmicm:ApplicationLayerElements ;
141.    rdfs:label "Application Service" ;
142.    rdfs:range archi:ApplicationService ;
143.    .
144.    bmicm:applicationLayerElements_specializedBy_DataObject
145.    rdf:type owl:ObjectProperty ;
146.    rdfs:domain bmicm:ApplicationLayerElements ;
147.    rdfs:label "Data Object" ;
148.    rdfs:range archi:DataObject ;
149.    .
150.    bmicm:businessLayerElements_specializedBy_BusinessActor
151.    rdf:type owl:ObjectProperty ;
152.    rdfs:domain bmicm:BusinessLayerElements ;
153.    rdfs:label "Business Actor" ;
154.    rdfs:range archi:BusinessActor ;
155.    .
156.    bmicm:businessLayerElements_specializedBy_BusinessCollaboration
157.    rdf:type owl:ObjectProperty ;
158.    rdfs:domain bmicm:BusinessLayerElements ;
159.    rdfs:label "Business Collaboration" ;
160.    rdfs:range archi:BusinessCollaboration ;
161.    .
162.    bmicm:businessLayerElements_specializedBy_BusinessEvent
163.    rdf:type owl:ObjectProperty ;
164.    rdfs:domain bmicm:BusinessLayerElements ;
165.    rdfs:label "Business Event" ;
166.    rdfs:range archi:BusinessEvent ;
167.    .
168.    bmicm:businessLayerElements_specializedBy_BusinessFunction
169.    rdf:type owl:ObjectProperty ;
170.    rdfs:domain bmicm:BusinessLayerElements ;
171.    rdfs:label "Business Function" ;
172.    rdfs:range archi:BusinessFunction ;
173.    .
174.    bmicm:businessLayerElements_specializedBy_BusinessInteraction
175.    rdf:type owl:ObjectProperty ;
176.    rdfs:domain bmicm:BusinessLayerElements ;
177.    rdfs:label "Business Interaction" ;
178.    rdfs:range archi:BusinessInteraction ;
179.    .
180.    bmicm:businessLayerElements_specializedBy_BusinessInterface
```

```
181.    rdf:type owl:ObjectProperty ;
182.    rdfs:domain bmicm:BusinessLayerElements ;
183.    rdfs:label "Business Interface" ;
184.    rdfs:range archi:BusinessInterface ;
185.    .
186.    bmicm:businessLayerElements_specializedBy_BusinessObject
187.    rdf:type owl:ObjectProperty ;
188.    rdfs:domain bmicm:BusinessLayerElements ;
189.    rdfs:label "Business Object" ;
190.    rdfs:range archi:BusinessObject ;
191.    .
192.    bmicm:businessLayerElements_specializedBy_BusinessProcess
193.    rdf:type owl:ObjectProperty ;
194.    rdfs:domain bmicm:BusinessLayerElements ;
195.    rdfs:label "Business Process" ;
196.    rdfs:range archi:BusinessProcess ;
197.    .
198.    bmicm:businessLayerElements_specializedBy_BusinessRole
199.    rdf:type owl:ObjectProperty ;
200.    rdfs:domain bmicm:BusinessLayerElements ;
201.    rdfs:label "Business Role" ;
202.    rdfs:range archi:BusinessRole ;
203.    .
204.    bmicm:businessLayerElements_specializedBy_BusinessService
205.    rdf:type owl:ObjectProperty ;
206.    rdfs:domain bmicm:BusinessLayerElements ;
207.    rdfs:label "Business Service" ;
208.    rdfs:range archi:BusinessService ;
209.    .
210.    bmicm:businessLayerElements_specializedBy_Contract
211.    rdf:type owl:ObjectProperty ;
212.    rdfs:domain bmicm:BusinessLayerElements ;
213.    rdfs:label "Contract" ;
214.    rdfs:range archi:Contract ;
215.    .
216.    bmicm:businessLayerElements_specializedBy_Product
217.    rdf:type owl:ObjectProperty ;
218.    rdfs:domain bmicm:BusinessLayerElements ;
219.    rdfs:label "Product" ;
220.    rdfs:range archi:Product ;
221.    .
222.    bmicm:businessLayerElements_specializedBy_Representation
223.    rdf:type owl:ObjectProperty ;
224.    rdfs:domain bmicm:BusinessLayerElements ;
225.    rdfs:label "Representation" ;
226.    rdfs:range archi:Representation ;
227.    .
228.    bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements
229.    rdf:type owl:ObjectProperty ;
230.    rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
231.    rdfs:label "Business Capability Elements" ;
232.    rdfs:range bmicm:BusinessCapabilityElements ;
233.    .
234.    bmicm:businessModelInnovationCases_composedOf_InfrastructureElements
235.    rdf:type owl:ObjectProperty ;
236.    rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
237.    rdfs:label "Infrastructure Elements" ;
238.    rdfs:range bmicm:InfrastructureElements ;
239.    .
240.    bmicm:businessModelInnovationCases_composedOf_CustomerInterfaceElements
241.    rdf:type owl:ObjectProperty ;
242.    rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
243.    rdfs:label "Customer Interface Elements" ;
244.    rdfs:range bmicm:CustomerInterfaceElements ;
245.    .
```

```
246.  bmicm:businessModelInnovationCases_composedOf_ValuePropositionElements
247.  rdf:type owl:ObjectProperty ;
248.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
249.  rdfs:label "Value Proposition Elements" ;
250.  rdfs:range bmicm:ValuePropositionElements ;
251.  .
252.  bmicm:businessModelInnovationCases_composedOf_FinancialAspectElements
253.  rdf:type owl:ObjectProperty ;
254.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
255.  rdfs:label "Financial Aspect Elements" ;
256.  rdfs:range bmicm:FinancialAspectElements ;
257.  .
258.  bmicm:businessModelInnovationCases_aggregates_ApplicationLayerElements
259.  rdf:type owl:ObjectProperty ;
260.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
261.  rdfs:label "Enterprise Architecture Application Layer Elements" ;
262.  rdfs:range bmicm:ApplicationLayerElements ;
263.  .
264.  bmicm:businessModelInnovationCases_aggregates_BusinessLayerElements
265.  rdf:type owl:ObjectProperty ;
266.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
267.  rdfs:label "Enterprise Architecture Business Layer Elements" ;
268.  rdfs:range bmicm:BusinessLayerElements ;
269.  .
270.  bmicm:businessModelInnovationCases_composedOf_RequiredResources
271.  rdf:type owl:ObjectProperty ;
272.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
273.  rdfs:label "BMI-Case characteristic: Required Resources" ;
274.  rdfs:range bmicm:RequiredResources ;
275.  .
276.  bmicm:businessModelInnovationCases_composedOf_BusinessStateCharacteristics
277.  rdf:type owl:ObjectProperty ;
278.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
279.  rdfs:label "BMI-Case characteristic: Business State Characteristics" ;
280.  rdfs:range bmicm:BusinessStateCharacteristics ;
281.  .
282.  bmicm:businessModelInnovationCases_composedOf_BenefitsOfInnovation
283.  rdf:type owl:ObjectProperty ;
284.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
285.  rdfs:label "BMI-Case characteristic: Benefits of Innovation" ;
286.  rdfs:range bmicm:BenefitsOfInnovation ;
287.  .
288.  bmicm:businessModelInnovationCases_composedOf_BarriersToOvercome
289.  rdf:type owl:ObjectProperty ;
290.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
291.  rdfs:label "BMI-Case characteristic: Barriers to Overcome" ;
292.  rdfs:range bmicm:BarriersToOvercome ;
293.  .
294.  bmicm:businessModelInnovationCases_composedOf_InvolvedParties
295.  rdf:type owl:ObjectProperty ;
296.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
297.  rdfs:label "BMI-Case characteristic: Involved Parties" ;
298.  rdfs:range bic:InvolvedParties ;
299.  .
300.  bmicm:businessModelInnovationCases_composedOf_Drivers
301.  rdf:type owl:ObjectProperty ;
302.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
303.  rdfs:label "BMI-Case characteristic: Drivers" ;
304.  rdfs:range bic:Drivers ;
305.  .
306.  bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation
307.  rdf:type owl:ObjectProperty ;
308.  rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
309.  rdfs:label "BMI-Case characteristic: Risks of Innovation" ;
310.  rdfs:range bic:RisksOfInnovation ;
```

```
311.    .
312.    bmicm:businessModelInnovationCases_composedOf_StrategicGoals
313.    rdf:type owl:ObjectProperty ;
314.    rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
315.    rdfs:label "BMI-Case characteristic: Strategic Goals" ;
316.    rdfs:range bic:StrategicGoals ;
317.    .
318.    bmicm:businessModelInnovationCases_composedOf_Industries
319.    rdf:type owl:ObjectProperty ;
320.    rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
321.    rdfs:label "BMI-Case characteristic: Industries" ;
322.    rdfs:range bic:Industries ;
323.    .
324.    bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics
325.    rdf:type owl:ObjectProperty ;
326.    rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
327.    rdfs:label "BMI-Case characteristic: Construction-Industry-Specifics" ;
328.    rdfs:range bmicm:ConstructionIndustrySpecifics ;
329.    .
330.    bmicm:ConstructionIndustrySpecifics
331.    rdf:type owl:Class ;
332.    rdfs:label "Construction-Industry-Specifics" ;
333.    rdfs:subClassOf bmicm:BMICaseElements ;
334.    .
335.    bmicm:constructionIndustrySpecifics_specializedBy_CompanyExecutionAreas
336.    rdf:type owl:ObjectProperty ;
337.    rdfs:domain bmicm:ConstructionIndustrySpecifics ;
338.    rdfs:label "Company Execution Areas" ;
339.    rdfs:range ci:CompanyExecutionAreas ;
340.    .
341.    bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases
342.    rdf:type owl:ObjectProperty ;
343.    rdfs:domain bmicm:ConstructionIndustrySpecifics ;
344.    rdfs:label "Construction Planning Phases" ;
345.    rdfs:range ci:ConstructionPlanningPhases ;
346.    .
347.    bmicm:constructionIndustrySpecifics_specializedBy_ConstructionRelatedCompanies
348.    rdf:type owl:ObjectProperty ;
349.    rdfs:domain bmicm:ConstructionIndustrySpecifics ;
350.    rdfs:label "Construction-Related Companies" ;
351.    rdfs:range ci:ConstructionRelatedCompanies ;
352.    .
353.    bmicm:constructionIndustrySpecifics_specializedBy_ConstructionStakeholderTypes
354.    rdf:type owl:ObjectProperty ;
355.    rdfs:domain bmicm:ConstructionIndustrySpecifics ;
356.    rdfs:label "Construction Stakeholder Types" ;
357.    rdfs:range ci:ConstructionStakeholderTypes ;
358.    .
359.    bmicm:constructionIndustrySpecifics_specializedBy_ExecutionModels
360.    rdf:type owl:ObjectProperty ;
361.    rdfs:domain bmicm:ConstructionIndustrySpecifics ;
362.    rdfs:label "Execution Models" ;
363.    rdfs:range ci:ExecutionModels ;
364.    .
365.
366.
367.
368.    bmicm:businessModelInnovationCases_aggregates_MotivationAspectElements
369.    rdf:type owl:ObjectProperty ;
370.    rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
371.    rdfs:label "Enterprise Architecture Motivation Aspect Elements" ;
372.    rdfs:range bmicm:MotivationAspectElements ;
373.    .
374.    bmicm:businessModelInnovationCases_aggregates_StrategyLayerElements
375.    rdf:type owl:ObjectProperty ;
```

```
376.    rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
377.    rdfs:label "Enterprise Architecture Strategy Layer Elements" ;
378.    rdfs:range bmicm:StrategyLayerElements ;
379.    .
380.    bmicm:businessModelInnovationCases_aggregates_TechnologyLayerElements
381.    rdf:type owl:ObjectProperty ;
382.    rdfs:domain <http://ikm-group.ch/bmic#BusinessModelInnovationCases> ;
383.    rdfs:label "Enterprise Architecture Technology Layer Elements" ;
384.    rdfs:range bmicm:TechnologyLayerElements ;
385.    .
386.    bmicm:motivationAspectElements_specializedBy_Assessment
387.    rdf:type owl:ObjectProperty ;
388.    rdfs:domain bmicm:MotivationAspectElements ;
389.    rdfs:label "Assessment" ;
390.    rdfs:range archimateV3:Assessment ;
391.    .
392.    bmicm:motivationAspectElements_specializedBy_Constraint
393.    rdf:type owl:ObjectProperty ;
394.    rdfs:domain bmicm:MotivationAspectElements ;
395.    rdfs:label "Constraint" ;
396.    rdfs:range archimateV3:Constraint ;
397.    .
398.    bmicm:motivationAspectElements_specializedBy_Driver
399.    rdf:type owl:ObjectProperty ;
400.    rdfs:domain bmicm:MotivationAspectElements ;
401.    rdfs:label "Driver" ;
402.    rdfs:range archimateV3:Driver ;
403.    .
404.    bmicm:motivationAspectElements_specializedBy_Goal
405.    rdf:type owl:ObjectProperty ;
406.    rdfs:domain bmicm:MotivationAspectElements ;
407.    rdfs:label "Goal" ;
408.    rdfs:range archimateV3:Goal ;
409.    .
410.    bmicm:motivationAspectElements_specializedBy_Meaning
411.    rdf:type owl:ObjectProperty ;
412.    rdfs:domain bmicm:MotivationAspectElements ;
413.    rdfs:label "Meaning" ;
414.    rdfs:range archimateV3:Meaning ;
415.    .
416.    bmicm:motivationAspectElements_specializedBy_Outcome
417.    rdf:type owl:ObjectProperty ;
418.    rdfs:domain bmicm:MotivationAspectElements ;
419.    rdfs:label "Outcome" ;
420.    rdfs:range archimateV3:Outcome ;
421.    .
422.    bmicm:motivationAspectElements_specializedBy_Principle
423.    rdf:type owl:ObjectProperty ;
424.    rdfs:domain bmicm:MotivationAspectElements ;
425.    rdfs:label "Principle" ;
426.    rdfs:range archimateV3:Principle ;
427.    .
428.    bmicm:motivationAspectElements_specializedBy_Requirement
429.    rdf:type owl:ObjectProperty ;
430.    rdfs:domain bmicm:MotivationAspectElements ;
431.    rdfs:label "Requirement" ;
432.    rdfs:range archimateV3:Requirement ;
433.    .
434.    bmicm:motivationAspectElements_specializedBy_Stakeholder
435.    rdf:type owl:ObjectProperty ;
436.    rdfs:domain bmicm:MotivationAspectElements ;
437.    rdfs:label "Stakeholder" ;
438.    rdfs:range archimateV3:Stakeholder ;
439.    .
440.    bmicm:motivationAspectElements_specializedBy_Value
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441.   rdf:type owl:ObjectProperty ;
442.   rdfs:domain bmicm:MotivationAspectElements ;
443.   rdfs:label "Value" ;
444.   rdfs:range archimateV3:Value ;
445.   .
446.   bmicm:requiredResources_specializedBy_FinancialRessources
447.   rdf:type owl:ObjectProperty ;
448.   rdfs:domain bmicm:RequiredResources ;
449.   rdfs:label "Financial Resources" ;
450.   rdfs:range bic:FinancialRessources ;
451.   .
452.   bmicm:requiredResources_specializedBy_HumanRessources
453.   rdf:type owl:ObjectProperty ;
454.   rdfs:domain bmicm:RequiredResources ;
455.   rdfs:label "Human Resources" ;
456.   rdfs:range bic:HumanRessources ;
457.   .
458.   bmicm:requiredResources_specializedBy_IntellectualRessources
459.   rdf:type owl:ObjectProperty ;
460.   rdfs:domain bmicm:RequiredResources ;
461.   rdfs:label "Intellectual Resources" ;
462.   rdfs:range bic:IntellectualRessources ;
463.   .
464.   bmicm:requiredResources_specializedBy_PhysicalRessources
465.   rdf:type owl:ObjectProperty ;
466.   rdfs:domain bmicm:RequiredResources ;
467.   rdfs:label "Physical Resources" ;
468.   rdfs:range bic:PhysicalRessources ;
469.   .
470.   bmicm:businessStateCharacteristics_specializedBy_StateAfterInnovating
471.   rdf:type owl:ObjectProperty ;
472.   rdfs:domain bmicm:BusinessStateCharacteristics ;
473.   rdfs:label "State after Innovating" ;
474.   rdfs:range bic:StateAfterInnovating ;
475.   .
476.   bmicm:businessStateCharacteristics_specializedBy_StateBeforeInnovating
477.   rdf:type owl:ObjectProperty ;
478.   rdfs:domain bmicm:BusinessStateCharacteristics ;
479.   rdfs:label "State before Innovating" ;
480.   rdfs:range bic:StateBeforeInnovating ;
481.   .
482.   bmicm:barriersToOvercome_specializedBy_FinancialBarriers
483.   rdf:type owl:ObjectProperty ;
484.   rdfs:domain bmicm:BarriersToOvercome ;
485.   rdfs:label "Financial Barriers" ;
486.   rdfs:range bic:FinancialBarriers ;
487.   .
488.   bmicm:barriersToOvercome_specializedBy_IntellectualBarriers
489.   rdf:type owl:ObjectProperty ;
490.   rdfs:domain bmicm:BarriersToOvercome ;
491.   rdfs:label "Intellectual Barriers" ;
492.   rdfs:range bic:IntellectualBarriers ;
493.   .
494.   bmicm:barriersToOvercome_specializedBy_OrganisationalBarriers
495.   rdf:type owl:ObjectProperty ;
496.   rdfs:domain bmicm:BarriersToOvercome ;
497.   rdfs:label "Organisational Barriers" ;
498.   rdfs:range bic:OrganisationalBarriers ;
499.   .
500.   bmicm:barriersToOvercome_specializedBy_PhysicalBarriers
501.   rdf:type owl:ObjectProperty ;
502.   rdfs:domain bmicm:BarriersToOvercome ;
503.   rdfs:label "Physical Barriers" ;
504.   rdfs:range bic:PhysicalBarriers ;
505.   .
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506.  bmicm:barriersToOvercome_specializedBy_TechnologicalBarriers
507.  rdf:type owl:ObjectProperty ;
508.  rdfs:domain bmicm:BarriersToOvercome ;
509.  rdfs:label "Technological Barriers" ;
510.  rdfs:range bic:TechnologicalBarriers ;
511.  .
512.  bmicm:benefitsOfInnovation_specializedBy_CustomerBenefits
513.  rdf:type owl:ObjectProperty ;
514.  rdfs:domain bmicm:BenefitsOfInnovation ;
515.  rdfs:label "Customer Benefits" ;
516.  rdfs:range bic:CustomerBenefits ;
517.  .
518.  bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits
519.  rdf:type owl:ObjectProperty ;
520.  rdfs:domain bmicm:BenefitsOfInnovation ;
521.  rdfs:label "Involved Party Benefits" ;
522.  rdfs:range bic:InvolvedPartyBenefits ;
523.  .
524.  bmicm:strategyLayerElements_specializedBy_Capability
525.  rdf:type owl:ObjectProperty ;
526.  rdfs:domain bmicm:StrategyLayerElements ;
527.  rdfs:label "Capability" ;
528.  rdfs:range archimateV3:Capability ;
529.  .
530.  bmicm:strategyLayerElements_specializedBy_CourseOfAction
531.  rdf:type owl:ObjectProperty ;
532.  rdfs:domain bmicm:StrategyLayerElements ;
533.  rdfs:label "Course of Action" ;
534.  rdfs:range archimateV3:CourseOfAction ;
535.  .
536.  bmicm:strategyLayerElements_specializedBy_Resource
537.  rdf:type owl:ObjectProperty ;
538.  rdfs:domain bmicm:StrategyLayerElements ;
539.  rdfs:label "Resource" ;
540.  rdfs:range archimateV3:Resource ;
541.  .
542.  bmicm:strategyLayerElements_specializedBy_ValueStream
543.  rdf:type owl:ObjectProperty ;
544.  rdfs:domain bmicm:StrategyLayerElements ;
545.  rdfs:label "ValueStream" ;
546.  rdfs:range archimateV3:ValueStream ;
547.  .
548.  bmicm:technologyLayerElements_specializedBy_Artifact
549.  rdf:type owl:ObjectProperty ;
550.  rdfs:domain bmicm:TechnologyLayerElements ;
551.  rdfs:label "Artifact" ;
552.  rdfs:range archi:Artifact ;
553.  .
554.  bmicm:technologyLayerElements_specializedBy_CommunicationPath
555.  rdf:type owl:ObjectProperty ;
556.  rdfs:domain bmicm:TechnologyLayerElements ;
557.  rdfs:label "Path" ;
558.  rdfs:range archi:CommunicationPath ;
559.  .
560.  bmicm:technologyLayerElements_specializedBy_Device
561.  rdf:type owl:ObjectProperty ;
562.  rdfs:domain bmicm:TechnologyLayerElements ;
563.  rdfs:label "Device" ;
564.  rdfs:range archi:Device ;
565.  .
566.  bmicm:technologyLayerElements_specializedBy_InfrastructureFunction
567.  rdf:type owl:ObjectProperty ;
568.  rdfs:domain bmicm:TechnologyLayerElements ;
569.  rdfs:label "Technology Function" ;
570.  rdfs:range archi:InfrastructureFunction ;
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571.     .
572.     bmicm:technologyLayerElements_specializedBy_InfrastructureInterface
573.     rdf:type owl:ObjectProperty ;
574.     rdfs:domain bmicm:TechnologyLayerElements ;
575.     rdfs:label "Technology Interface" ;
576.     rdfs:range archi:InfrastructureInterface ;
577.     .
578.     bmicm:technologyLayerElements_specializedBy_InfrastructureService
579.     rdf:type owl:ObjectProperty ;
580.     rdfs:domain bmicm:TechnologyLayerElements ;
581.     rdfs:label "Technology Service" ;
582.     rdfs:range archi:InfrastructureService ;
583.     .
584.     bmicm:technologyLayerElements_specializedBy_Network
585.     rdf:type owl:ObjectProperty ;
586.     rdfs:domain bmicm:TechnologyLayerElements ;
587.     rdfs:label "Communication Network" ;
588.     rdfs:range archi:Network ;
589.     .
590.     bmicm:technologyLayerElements_specializedBy_Node
591.     rdf:type owl:ObjectProperty ;
592.     rdfs:domain bmicm:TechnologyLayerElements ;
593.     rdfs:label "Node" ;
594.     rdfs:range archi:Node ;
595.     .
596.     bmicm:technologyLayerElements_specializedBy_SystemSoftware
597.     rdf:type owl:ObjectProperty ;
598.     rdfs:domain bmicm:TechnologyLayerElements ;
599.     rdfs:label "System Software" ;
600.     rdfs:range archi:SystemSoftware ;
601.     .
602.     bmicm:technologyLayerElements_specializedBy_TechnologyCollaboration
603.     rdf:type owl:ObjectProperty ;
604.     rdfs:domain bmicm:TechnologyLayerElements ;
605.     rdfs:label "Technology Collaboration" ;
606.     rdfs:range archimateV3:TechnologyCollaboration ;
607.     .
608.     bmicm:technologyLayerElements_specializedBy_TechnologyEvent
609.     rdf:type owl:ObjectProperty ;
610.     rdfs:domain bmicm:TechnologyLayerElements ;
611.     rdfs:label "Technology Event" ;
612.     rdfs:range archimateV3:TechnologyEvent ;
613.     .
614.     bmicm:technologyLayerElements_specializedBy_TechnologyInteraction
615.     rdf:type owl:ObjectProperty ;
616.     rdfs:domain bmicm:TechnologyLayerElements ;
617.     rdfs:label "Technology Interaction" ;
618.     rdfs:range archimateV3:TechnologyInteraction ;
619.     .
620.     bmicm:technologyLayerElements_specializedBy_TechnologyProcess
621.     rdf:type owl:ObjectProperty ;
622.     rdfs:domain bmicm:TechnologyLayerElements ;
623.     rdfs:label "Technology Process" ;
624.     rdfs:range archimateV3:TechnologyProcess ;
625.     .
626.     bmicm:BusinessModelElements
627.     rdf:type owl:Class ;
628.     rdfs:label "Business Model Elements" ;
629.     rdfs:subClassOf owl:Thing ;
630.     .
631.     bmicm:InfrastructureElements
632.     rdf:type owl:Class ;
633.     rdfs:label "Infrastructure Elements" ;
634.     rdfs:subClassOf bmicm:BusinessModelElements ;
635.     .
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636.    bmicm:CustomerInterfaceElements
637.    rdf:type owl:Class ;
638.    rdfs:label "Customer Interface Elements" ;
639.    rdfs:subClassOf bmicm:BusinessModelElements ;
640.    .
641.    bmicm:FinancialAspectElements
642.    rdf:type owl:Class ;
643.    rdfs:label "Financial Aspect Elements" ;
644.    rdfs:subClassOf bmicm:BusinessModelElements ;
645.    .
646.    bmicm:KeyActivityElements
647.    rdf:type owl:Class ;
648.    rdfs:label "Key Activity Elements" ;
649.    rdfs:subClassOf bmicm:BusinessModelElements ;
650.    .
651.    bmicm:KeyPartnerElements
652.    rdf:type owl:Class ;
653.    rdfs:label "Key Partner Elements" ;
654.    rdfs:subClassOf bmicm:BusinessModelElements ;
655.    .
656.    bmicm:KeyResourceElements
657.    rdf:type owl:Class ;
658.    rdfs:label "Key Resource Elements" ;
659.    rdfs:subClassOf bmicm:BusinessModelElements ;
660.    .
661.    bmicm:infrastructureElements_specializedBy_KeyActivityElements
662.    rdf:type owl:ObjectProperty ;
663.    rdfs:domain bmicm:InfrastructureElements ;
664.    rdfs:label "Key Activities" ;
665.    rdfs:range bmicm:KeyActivityElements ;
666.    .
667.    bmicm:keyActivityElements_specializedBy_CoreProcess
668.    rdf:type owl:ObjectProperty ;
669.    rdfs:domain bmicm:KeyActivityElements ;
670.    rdfs:label "Core Process" ;
671.    rdfs:range bm:CoreProcess ;
672.    .
673.    bmicm:keyActivityElements_specializedBy_SupportProcess
674.    rdf:type owl:ObjectProperty ;
675.    rdfs:domain bmicm:KeyActivityElements ;
676.    rdfs:label "Support Process" ;
677.    rdfs:range bm:SupportProcess ;
678.    .
679.    bmicm:infrastructureElements_specializedBy_KeyPartnerElements
680.    rdf:type owl:ObjectProperty ;
681.    rdfs:domain bmicm:InfrastructureElements ;
682.    rdfs:label "Key Partners" ;
683.    rdfs:range bmicm:KeyPartnerElements ;
684.    .
685.    bmicm:keyPartnerElements_specializedBy_AcademicInstitute
686.    rdf:type owl:ObjectProperty ;
687.    rdfs:domain bmicm:KeyPartnerElements ;
688.    rdfs:label "Academic Institute" ;
689.    rdfs:range bm:AcademicInstitute ;
690.    .
691.    bmicm:keyPartnerElements_specializedBy_Business
692.    rdf:type owl:ObjectProperty ;
693.    rdfs:domain bmicm:KeyPartnerElements ;
694.    rdfs:label "Business" ;
695.    rdfs:range bm:Business ;
696.    .
697.    bmicm:keyPartnerElements_specializedBy_Government
698.    rdf:type owl:ObjectProperty ;
699.    rdfs:domain bmicm:KeyPartnerElements ;
700.    rdfs:label "Government" ;
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701.    rdfs:range bm:Government ;
702.    .
703.    bmicm:keyPartnerElements_specializedBy_Individual
704.    rdf:type owl:ObjectProperty ;
705.    rdfs:domain bmicm:KeyPartnerElements ;
706.    rdfs:label "Individual" ;
707.    rdfs:range bm:Individual ;
708.    .
709.    bmicm:infrastructureElements_specializedBy_KeyResourceElements
710.    rdf:type owl:ObjectProperty ;
711.    rdfs:domain bmicm:InfrastructureElements ;
712.    rdfs:label "Key Resources" ;
713.    rdfs:range bmicm:KeyResourceElements ;
714.    .
715.    bmicm:keyResourceElements_specializedBy_Human
716.    rdf:type owl:ObjectProperty ;
717.    rdfs:domain bmicm:KeyResourceElements ;
718.    rdfs:label "Human" ;
719.    rdfs:range bm:Human ;
720.    .
721.    bmicm:FinancialElements
722.    rdf:type owl:Class ;
723.    rdfs:label "Financial Elements" ;
724.    rdfs:subClassOf bmicm:BusinessModelElements ;
725.    .
726.    bmicm:keyResourceElements_specializedBy_FinancialElements
727.    rdf:type owl:ObjectProperty ;
728.    rdfs:domain bmicm:KeyResourceElements ;
729.    rdfs:label "Financial" ;
730.    rdfs:range bmicm:FinancialElements ;
731.    .
732.    bmicm:financialElements_specializedBy_Cash
733.    rdf:type owl:ObjectProperty ;
734.    rdfs:domain bmicm:FinancialElements ;
735.    rdfs:label "Cash" ;
736.    rdfs:range bm:Cash ;
737.    .
738.    bmicm:financialElements_specializedBy_Credit
739.    rdf:type owl:ObjectProperty ;
740.    rdfs:domain bmicm:FinancialElements ;
741.    rdfs:label "Credit" ;
742.    rdfs:range bm:Credit ;
743.    .
744.    bmicm:IntellectualElements
745.    rdf:type owl:Class ;
746.    rdfs:label "Intellectual Elements" ;
747.    rdfs:subClassOf bmicm:BusinessModelElements ;
748.    .
749.    bmicm:keyResourceElements_specializedBy_IntellectualElements
750.    rdf:type owl:ObjectProperty ;
751.    rdfs:domain bmicm:KeyResourceElements ;
752.    rdfs:label "Intellectual" ;
753.    rdfs:range bmicm:IntellectualElements ;
754.    .
755.    bmicm:intellectualElements_specializedBy_Brand
756.    rdf:type owl:ObjectProperty ;
757.    rdfs:domain bmicm:IntellectualElements ;
758.    rdfs:label "Brand" ;
759.    rdfs:range bm:Brand ;
760.    .
761.    bmicm:intellectualElements_specializedBy_Culture
762.    rdf:type owl:ObjectProperty ;
763.    rdfs:domain bmicm:IntellectualElements ;
764.    rdfs:label "Culture" ;
765.    rdfs:range bm:Culture ;
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766.    .
767.    bmicm:intellectualElements_specializedBy_CustomerData
768.    rdf:type owl:ObjectProperty ;
769.    rdfs:domain bmicm:IntellectualElements ;
770.    rdfs:label "Customer Data" ;
771.    rdfs:range bm:CustomerData ;
772.    .
773.    bmicm:intellectualElements_specializedBy_Partnership
774.    rdf:type owl:ObjectProperty ;
775.    rdfs:domain bmicm:IntellectualElements ;
776.    rdfs:label "Partnership" ;
777.    rdfs:range bm:Partnership ;
778.    .
779.    bmicm:intellectualElements_specializedBy_PatentCopyright
780.    rdf:type owl:ObjectProperty ;
781.    rdfs:domain bmicm:IntellectualElements ;
782.    rdfs:label "Patent/Copyright" ;
783.    rdfs:range bm:PatentCopyright ;
784.    .
785.    bmicm:intellectualElements_specializedBy_ProprietaryKnowledge
786.    rdf:type owl:ObjectProperty ;
787.    rdfs:domain bmicm:IntellectualElements ;
788.    rdfs:label "ProprietaryKnowledge" ;
789.    rdfs:range bm:ProprietaryKnowledge ;
790.    .
791.    bmicm:PhysicalElements
792.    rdf:type owl:Class ;
793.    rdfs:label "Physical Elements" ;
794.    rdfs:subClassOf bmicm:BusinessModelElements ;
795.    .
796.    bmicm:keyResourceElements_specializedBy_PhysicalElements
797.    rdf:type owl:ObjectProperty ;
798.    rdfs:domain bmicm:KeyResourceElements ;
799.    rdfs:label "Physical" ;
800.    rdfs:range bmicm:PhysicalElements ;
801.    .
802.    bmicm:physicalElements_specializedBy_Building
803.    rdf:type owl:ObjectProperty ;
804.    rdfs:domain bmicm:PhysicalElements ;
805.    rdfs:label "Building" ;
806.    rdfs:range bm:Building ;
807.    .
808.    bmicm:physicalElements_specializedBy_DistributionNetwork
809.    rdf:type owl:ObjectProperty ;
810.    rdfs:domain bmicm:PhysicalElements ;
811.    rdfs:label "Distribution Network" ;
812.    rdfs:range bm:DistributionNetwork ;
813.    .
814.    bmicm:physicalElements_specializedBy_ITSystems
815.    rdf:type owl:ObjectProperty ;
816.    rdfs:domain bmicm:PhysicalElements ;
817.    rdfs:label "IT-Systems" ;
818.    rdfs:range bm:ITSystems ;
819.    .
820.    bmicm:physicalElements_specializedBy_Machines
821.    rdf:type owl:ObjectProperty ;
822.    rdfs:domain bmicm:PhysicalElements ;
823.    rdfs:label "Machines" ;
824.    rdfs:range bm:Machines ;
825.    .
826.    bmicm:physicalElements_specializedBy_Technology
827.    rdf:type owl:ObjectProperty ;
828.    rdfs:domain bmicm:PhysicalElements ;
829.    rdfs:label "Technology" ;
830.    rdfs:range bm:Technology ;
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831.    .
832.    bmicm:physicalElements_specializedBy_Vehicles
833.    rdf:type owl:ObjectProperty ;
834.    rdfs:domain bmicm:PhysicalElements ;
835.    rdfs:label "Vehicles" ;
836.    rdfs:range bm:Vehicles ;
837.    .
838.    bmicm:CostStructureElements
839.    rdf:type owl:Class ;
840.    rdfs:label "Cost Structure Elements" ;
841.    rdfs:subClassOf bmicm:BusinessModelElements ;
842.    .
843.    bmicm:financialAspectElements_specializedBy_CostStructureElements
844.    rdf:type owl:ObjectProperty ;
845.    rdfs:domain bmicm:FinancialAspectElements ;
846.    rdfs:label "Cost Structure Elements" ;
847.    rdfs:range bmicm:CostStructureElements ;
848.    .
849.    bmicm:costStructureElements_specializedBy_FixedCost
850.    rdf:type owl:ObjectProperty ;
851.    rdfs:domain bmicm:CostStructureElements ;
852.    rdfs:label "Fixed Cost" ;
853.    rdfs:range bm:FixedCost ;
854.    .
855.    bmicm:costStructureElements_specializedBy_VariableCost
856.    rdf:type owl:ObjectProperty ;
857.    rdfs:domain bmicm:CostStructureElements ;
858.    rdfs:label "Variable Cost" ;
859.    rdfs:range bm:VariableCost ;
860.    .
861.    bmicm:RevenueStreamElements
862.    rdf:type owl:Class ;
863.    rdfs:label "Revenue Stream Elements" ;
864.    rdfs:subClassOf bmicm:BusinessModelElements ;
865.    .
866.    bmicm:financialAspectElements_specializedBy_RevenueStreamElements
867.    rdf:type owl:ObjectProperty ;
868.    rdfs:domain bmicm:FinancialAspectElements ;
869.    rdfs:label "Revenue Streams" ;
870.    rdfs:range bmicm:RevenueStreamElements ;
871.    .
872.    bmicm:revenueStreamElements_specializedBy_AssetSale
873.    rdf:type owl:ObjectProperty ;
874.    rdfs:domain bmicm:RevenueStreamElements ;
875.    rdfs:label "Asset Sale" ;
876.    rdfs:range bm:AssetSale ;
877.    .
878.    bmicm:FeeBasedRevenueElements
879.    rdf:type owl:Class ;
880.    rdfs:label "Fee-based Revenue Elements" ;
881.    rdfs:subClassOf bmicm:BusinessModelElements ;
882.    .
883.    bmicm:revenueStreamElements_specializedBy_FeeBasedRevenueElements
884.    rdf:type owl:ObjectProperty ;
885.    rdfs:domain bmicm:RevenueStreamElements ;
886.    rdfs:label "Fee-based Revenue" ;
887.    rdfs:range bmicm:FeeBasedRevenueElements ;
888.    .
889.    bmicm:feeBasedRevenueElements_specializedBy_Advertising
890.    rdf:type owl:ObjectProperty ;
891.    rdfs:domain bmicm:FeeBasedRevenueElements ;
892.    rdfs:label "Advertising" ;
893.    rdfs:range bm:Advertising ;
894.    .
895.    bmicm:feeBasedRevenueElements_specializedBy_BrokerageFees
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896.    rdf:type owl:ObjectProperty ;
897.    rdfs:domain bmicm:FeeBasedRevenueElements ;
898.    rdfs:label "Brokerage-Fees" ;
899.    rdfs:range bm:BrokerageFees ;
900.    .
901.    bmicm:feeBasedRevenueElements_specializedBy_LendingRentingLeasing
902.    rdf:type owl:ObjectProperty ;
903.    rdfs:domain bmicm:FeeBasedRevenueElements ;
904.    rdfs:label "Lending/Renting/Leasing" ;
905.    rdfs:range bm:LendingRentingLeasing ;
906.    .
907.    bmicm:feeBasedRevenueElements_specializedBy_Licensing
908.    rdf:type owl:ObjectProperty ;
909.    rdfs:domain bmicm:FeeBasedRevenueElements ;
910.    rdfs:label "Licensing" ;
911.    rdfs:range bm:Licensing ;
912.    .
913.    bmicm:feeBasedRevenueElements_specializedBy_SubscriptionFee
914.    rdf:type owl:ObjectProperty ;
915.    rdfs:domain bmicm:FeeBasedRevenueElements ;
916.    rdfs:label "Subscription-Fee" ;
917.    rdfs:range bm:SubscriptionFee ;
918.    .
919.    bmicm:feeBasedRevenueElements_specializedBy_UsageFee
920.    rdf:type owl:ObjectProperty ;
921.    rdfs:domain bmicm:FeeBasedRevenueElements ;
922.    rdfs:label "Usage-Fee" ;
923.    rdfs:range bm:UsageFee ;
924.    .
925.    bmicm:ValuePropositionElements
926.    rdf:type owl:Class ;
927.    rdfs:label "Value Proposition Elements" ;
928.    rdfs:subClassOf bmicm:BusinessModelElements ;
929.    .
930.    bmicm:OfferingElements
931.    rdf:type owl:Class ;
932.    rdfs:label "Offerings" ;
933.    rdfs:subClassOf bmicm:BusinessModelElements ;
934.    .
935.    bmicm:valuePropositionElements_specializedBy_OfferingElements
936.    rdf:type owl:ObjectProperty ;
937.    rdfs:domain bmicm:ValuePropositionElements ;
938.    rdfs:label "Offerings" ;
939.    rdfs:range bmicm:OfferingElements ;
940.    .
941.    bmicm:offeringElements_specializedBy_Product
942.    rdf:type owl:ObjectProperty ;
943.    rdfs:domain bmicm:OfferingElements ;
944.    rdfs:label "Product" ;
945.    rdfs:range bm:Product ;
946.    .
947.    bmicm:offeringElements_specializedBy_Service
948.    rdf:type owl:ObjectProperty ;
949.    rdfs:domain bmicm:OfferingElements ;
950.    rdfs:label "Service" ;
951.    rdfs:range bm:Service ;
952.    .
953.    bmicm:OfferingValueElements
954.    rdf:type owl:Class ;
955.    rdfs:label "Offering Value Elements" ;
956.    rdfs:subClassOf bmicm:BusinessModelElements ;
957.    .
958.    bmicm:valuePropositionElements_specializedBy_OfferingValueElements
959.    rdf:type owl:ObjectProperty ;
960.    rdfs:domain bmicm:ValuePropositionElements ;
```

```
961.   rdfs:label "Offering Values" ;
962.   rdfs:range bmicm:OfferingValueElements ;
963.   .
964.   bmicm:QualitativeValueElements
965.   rdf:type owl:Class ;
966.   rdfs:label "Qualitative Value Elements" ;
967.   rdfs:subClassOf bmicm:BusinessModelElements ;
968.   .
969.   bmicm:offeringValueElements_specializedBy_QualitativeValueElements
970.   rdf:type owl:ObjectProperty ;
971.   rdfs:domain bmicm:OfferingValueElements ;
972.   rdfs:label "Qualitative Values" ;
973.   rdfs:range bmicm:QualitativeValueElements ;
974.   .
975.   bmicm:qualitativeValueElements_specializedBy_Accessibility
976.   rdf:type owl:ObjectProperty ;
977.   rdfs:domain bmicm:QualitativeValueElements ;
978.   rdfs:label "Accessibility" ;
979.   rdfs:range bm:Accessibility ;
980.   .
981.   bmicm:qualitativeValueElements_specializedBy_Convenience
982.   rdf:type owl:ObjectProperty ;
983.   rdfs:domain bmicm:QualitativeValueElements ;
984.   rdfs:label "Convenience" ;
985.   rdfs:range bm:Convenience ;
986.   .
987.   bmicm:qualitativeValueElements_specializedBy_CustomerCoCreation
988.   rdf:type owl:ObjectProperty ;
989.   rdfs:domain bmicm:QualitativeValueElements ;
990.   rdfs:label "Customer Co-Creation" ;
991.   rdfs:range bm:CustomerCoCreation ;
992.   .
993.   bmicm:qualitativeValueElements_specializedBy_Design
994.   rdf:type owl:ObjectProperty ;
995.   rdfs:domain bmicm:QualitativeValueElements ;
996.   rdfs:label "Design" ;
997.   rdfs:range bm:Design ;
998.   .
999.   bmicm:qualitativeValueElements_specializedBy_MassCustomization
1000.  rdf:type owl:ObjectProperty ;
1001.  rdfs:domain bmicm:QualitativeValueElements ;
1002.  rdfs:label "Mass-Customization" ;
1003.  rdfs:range bm:MassCustomization ;
1004.  .
1005.  bmicm:qualitativeValueElements_specializedBy_Newness
1006.  rdf:type owl:ObjectProperty ;
1007.  rdfs:domain bmicm:QualitativeValueElements ;
1008.  rdfs:label "Newness" ;
1009.  rdfs:range bm:Newness ;
1010.  .
1011.  bmicm:qualitativeValueElements_specializedBy_Status
1012.  rdf:type owl:ObjectProperty ;
1013.  rdfs:domain bmicm:QualitativeValueElements ;
1014.  rdfs:label "Status" ;
1015.  rdfs:range bm:Status ;
1016.  .
1017.  bmicm:QuantitativeValueElements
1018.  rdf:type owl:Class ;
1019.  rdfs:label "Quantitative Value Elements" ;
1020.  rdfs:subClassOf bmicm:BusinessModelElements ;
1021.  .
1022.  bmicm:offeringValueElements_specializedBy_QuantitativeValueElements
1023.  rdf:type owl:ObjectProperty ;
1024.  rdfs:domain bmicm:OfferingValueElements ;
1025.  rdfs:label "Quantitative Values" ;
```

```
1026. rdfs:range bmicm:QuantitativeValueElements ;
1027. .
1028. bmicm:quantitativeValueElements_specializedBy_CostReduction
1029. rdf:type owl:ObjectProperty ;
1030. rdfs:domain bmicm:QuantitativeValueElements ;
1031. rdfs:label "Cost-Reduction" ;
1032. rdfs:range bm:CostReduction ;
1033. .
1034. bmicm:quantitativeValueElements_specializedBy_GettingTheJobDone
1035. rdf:type owl:ObjectProperty ;
1036. rdfs:domain bmicm:QuantitativeValueElements ;
1037. rdfs:label "Getting the Job Done" ;
1038. rdfs:range bm:GettingTheJobDone ;
1039. .
1040. bmicm:quantitativeValueElements_specializedBy_Performance
1041. rdf:type owl:ObjectProperty ;
1042. rdfs:domain bmicm:QuantitativeValueElements ;
1043. rdfs:label "Performance" ;
1044. rdfs:range bm:Performance ;
1045. .
1046. bmicm:quantitativeValueElements_specializedBy_Price
1047. rdf:type owl:ObjectProperty ;
1048. rdfs:domain bmicm:QuantitativeValueElements ;
1049. rdfs:label "Price" ;
1050. rdfs:range bm:Price ;
1051. .
1052. bmicm:quantitativeValueElements_specializedBy_RiskReduction
1053. rdf:type owl:ObjectProperty ;
1054. rdfs:domain bmicm:QuantitativeValueElements ;
1055. rdfs:label "Risk-Reduction" ;
1056. rdfs:range bm:RiskReduction ;
1057. .
1058. bmicm:quantitativeValueElements_specializedBy_SpeedOfService
1059. rdf:type owl:ObjectProperty ;
1060. rdfs:domain bmicm:QuantitativeValueElements ;
1061. rdfs:label "Speed-of-Service" ;
1062. rdfs:range bm:SpeedOfService ;
1063. .
1064. bmicm:ChannelElements
1065. rdf:type owl:Class ;
1066. rdfs:label "Channel Elements" ;
1067. rdfs:subClassOf bmicm:BusinessModelElements ;
1068. .
1069. bmicm:customerInterfaceElements_specializedBy_ChannelElements
1070. rdf:type owl:ObjectProperty ;
1071. rdfs:domain bmicm:CustomerInterfaceElements ;
1072. rdfs:label "Channels" ;
1073. rdfs:range bmicm:ChannelElements ;
1074. .
1075. bmicm:DirectChannelElements
1076. rdf:type owl:Class ;
1077. rdfs:label "Direct Channel Elements" ;
1078. rdfs:subClassOf bmicm:BusinessModelElements ;
1079. .
1080. bmicm:channelElements_specializedBy_DirectChannelElements
1081. rdf:type owl:ObjectProperty ;
1082. rdfs:domain bmicm:ChannelElements ;
1083. rdfs:label "Direct Channels" ;
1084. rdfs:range bmicm:DirectChannelElements ;
1085. .
1086. bmicm:directChannelElements_specializedBy_SalesForce
1087. rdf:type owl:ObjectProperty ;
1088. rdfs:domain bmicm:DirectChannelElements ;
1089. rdfs:label "Sales Force" ;
1090. rdfs:range bm:SalesForce ;
```

```
1091. .
1092. bmicm:directChannelElements_specializedBy_WebSale
1093. rdf:type owl:ObjectProperty ;
1094. rdfs:domain bmicm:DirectChannelElements ;
1095. rdfs:label "Web-Sale" ;
1096. rdfs:range bm:WebSale ;
1097. .
1098. bmicm:IndirectChannelElements
1099. rdf:type owl:Class ;
1100. rdfs:label "Indirect Channel Elements" ;
1101. rdfs:subClassOf bmicm:BusinessModelElements ;
1102. .
1103. bmicm:channelElements_specializedBy_IndirectChannelElements
1104. rdf:type owl:ObjectProperty ;
1105. rdfs:domain bmicm:ChannelElements ;
1106. rdfs:label "Indirect Channels" ;
1107. rdfs:range bmicm:IndirectChannelElements ;
1108. .
1109. bmicm:indirectChannelElements_specializedBy_OwnStore
1110. rdf:type owl:ObjectProperty ;
1111. rdfs:domain bmicm:IndirectChannelElements ;
1112. rdfs:label "Own Store" ;
1113. rdfs:range bm:OwnStore ;
1114. .
1115. bmicm:indirectChannelElements_specializedBy_PartnerStore
1116. rdf:type owl:ObjectProperty ;
1117. rdfs:domain bmicm:IndirectChannelElements ;
1118. rdfs:label "Partner Store" ;
1119. rdfs:range bm:PartnerStore ;
1120. .
1121. bmicm:indirectChannelElements_specializedBy_Wholesaler
1122. rdf:type owl:ObjectProperty ;
1123. rdfs:domain bmicm:IndirectChannelElements ;
1124. rdfs:label "Wholesaler" ;
1125. rdfs:range bm:Wholesaler ;
1126. .
1127. bmicm:CustomerRelationshipElements
1128. rdf:type owl:Class ;
1129. rdfs:label "Customer Relationship Elements" ;
1130. rdfs:subClassOf bmicm:BusinessModelElements ;
1131. .
1132. bmicm:customerInterfaceElements_specializedBy_CustomerRelationshipElements
1133. rdf:type owl:ObjectProperty ;
1134. rdfs:domain bmicm:CustomerInterfaceElements ;
1135. rdfs:label "Customer Relationships" ;
1136. rdfs:range bmicm:CustomerRelationshipElements ;
1137. .
1138. bmicm:HumanInteractionElements
1139. rdf:type owl:Class ;
1140. rdfs:label "Human Interaction Elements" ;
1141. rdfs:subClassOf bmicm:BusinessModelElements ;
1142. .
1143. bmicm:customerRelationshipElements_specializedBy_HumanInteractionElements
1144. rdf:type owl:ObjectProperty ;
1145. rdfs:domain bmicm:CustomerRelationshipElements ;
1146. rdfs:label "Human Interactions" ;
1147. rdfs:range bmicm:HumanInteractionElements ;
1148. .
1149. bmicm:humanInteractionElements_specializedBy_CoCreationWithPeople
1150. rdf:type owl:ObjectProperty ;
1151. rdfs:domain bmicm:HumanInteractionElements ;
1152. rdfs:label "Co-Creation with People" ;
1153. rdfs:range bm:CoCreationWithPeople ;
1154. .
1155. bmicm:humanInteractionElements_specializedBy_Communities
```

```
1156.    rdf:type owl:ObjectProperty ;
1157.    rdfs:domain bmicm:HumanInteractionElements ;
1158.    rdfs:label "Communities" ;
1159.    rdfs:range bm:Communities ;
1160.    .
1161.    bmicm:humanInteractionElements_specializedBy_DedicatedPersonalAssistance
1162.    rdf:type owl:ObjectProperty ;
1163.    rdfs:domain bmicm:HumanInteractionElements ;
1164.    rdfs:label "Dedicated Personal Assistance" ;
1165.    rdfs:range bm:DedicatedPersonalAssistance ;
1166.    .
1167.    bmicm:humanInteractionElements_specializedBy_PersonalAssistance
1168.    rdf:type owl:ObjectProperty ;
1169.    rdfs:domain bmicm:HumanInteractionElements ;
1170.    rdfs:label "Personal Assistance" ;
1171.    rdfs:range bm:PersonalAssistance ;
1172.    .
1173.    bmicm:NonHumanInteractionElements
1174.    rdf:type owl:Class ;
1175.    rdfs:label "Non-Human Interaction Elements" ;
1176.    rdfs:subClassOf bmicm:BusinessModelElements ;
1177.    .
1178.    bmicm:customerRelationshipElements_specializedBy_NonHumanInteractionElements
1179.    rdf:type owl:ObjectProperty ;
1180.    rdfs:domain bmicm:CustomerRelationshipElements ;
1181.    rdfs:label "Non-Human Interactions" ;
1182.    rdfs:range bmicm:NonHumanInteractionElements ;
1183.    .
1184.    bmicm:nonHumanInteractionElements_specializedBy_AutomatedService
1185.    rdf:type owl:ObjectProperty ;
1186.    rdfs:domain bmicm:NonHumanInteractionElements ;
1187.    rdfs:label "Automated Service" ;
1188.    rdfs:range bm:AutomatedService ;
1189.    .
1190.    bmicm:nonHumanInteractionElements_specializedBy_CoCreationWithBot
1191.    rdf:type owl:ObjectProperty ;
1192.    rdfs:domain bmicm:NonHumanInteractionElements ;
1193.    rdfs:label "Co-Creation with Bot" ;
1194.    rdfs:range bm:CoCreationWithBot ;
1195.    .
1196.    bmicm:nonHumanInteractionElements_specializedBy_SelfService
1197.    rdf:type owl:ObjectProperty ;
1198.    rdfs:domain bmicm:NonHumanInteractionElements ;
1199.    rdfs:label "Self-Service" ;
1200.    rdfs:range bm:SelfService ;
1201.    .
1202.    bmicm:CustomerSegmentElements
1203.    rdf:type owl:Class ;
1204.    rdfs:label "Customer Segment Elements" ;
1205.    rdfs:subClassOf bmicm:BusinessModelElements ;
1206.    .
1207.    bmicm:customerInterfaceElements_specializedBy_CustomerSegmentElements
1208.    rdf:type owl:ObjectProperty ;
1209.    rdfs:domain bmicm:CustomerInterfaceElements ;
1210.    rdfs:label "Customer Segments" ;
1211.    rdfs:range bmicm:CustomerSegmentElements ;
1212.    .
1213.    bmicm:customerSegmentElements_specializedBy_MassMarket
1214.    rdf:type owl:ObjectProperty ;
1215.    rdfs:domain bmicm:CustomerSegmentElements ;
1216.    rdfs:label "Mass-Market" ;
1217.    rdfs:range bm:MassMarket ;
1218.    .
1219.    bmicm:customerSegmentElements_specializedBy_MicroMarket
1220.    rdf:type owl:ObjectProperty ;
```

```
1221. rdfs:domain bmicm:CustomerSegmentElements ;
1222. rdfs:label "Micro-Market" ;
1223. rdfs:range bm:MicroMarket ;
1224. .
1225. bmicm:customerSegmentElements_specializedBy_NicheMarket
1226. rdf:type owl:ObjectProperty ;
1227. rdfs:domain bmicm:CustomerSegmentElements ;
1228. rdfs:label "Niche-Market" ;
1229. rdfs:range bm:NicheMarket ;
1230. .
1231. bmicm:customerSegmentElements_specializedBy_SegmentedMarket
1232. rdf:type owl:ObjectProperty ;
1233. rdfs:domain bmicm:CustomerSegmentElements ;
1234. rdfs:label "Segmented-Market" ;
1235. rdfs:range bm:SegmentedMarket ;
1236. .
1237. bmicm:BusinessCapabilityElements
1238. rdf:type owl:Class ;
1239. rdfs:label "Business Capabilities" ;
1240. rdfs:subClassOf bmicm:BusinessModelElements ;
1241. .
1242. bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities
1243. rdf:type owl:ObjectProperty ;
1244. rdfs:domain bmicm:BusinessCapabilityElements ;
1245. rdfs:label "Resource-based Capabilities" ;
1246. rdfs:range bc:ResourceBasedCapabilities ;
1247. .
1248. bmicm:businessCapabilityElements_specializedBy_CoreCapabilities
1249. rdf:type owl:ObjectProperty ;
1250. rdfs:domain bmicm:BusinessCapabilityElements ;
1251. rdfs:label "Core Capabilities" ;
1252. rdfs:range bc:CoreCapabilities ;
1253. .
1254. bmicm:businessCapabilityElements_specializedBy_DynamicCapabilities
1255. rdf:type owl:ObjectProperty ;
1256. rdfs:domain bmicm:BusinessCapabilityElements ;
1257. rdfs:label "Dynamic Capabilities" ;
1258. rdfs:range bc:DynamicCapabilities ;
1259. .
1260. bmicm:HumanBasedCapabilityElements
1261. rdf:type owl:Class ;
1262. rdfs:label "Human-based Capabilities" ;
1263. rdfs:subClassOf bmicm:BusinessModelElements ;
1264. .
1265. bmicm:businessCapabilityElements_specializedBy_HumanBasedCapabilityElements
1266. rdf:type owl:ObjectProperty ;
1267. rdfs:domain bmicm:BusinessCapabilityElements ;
1268. rdfs:label "Human-based Capabilities" ;
1269. rdfs:range bmicm:HumanBasedCapabilityElements ;
1270. .
1271. bmicm:humanBasedCapabilityElements_specializedBy_Competencies
1272. rdf:type owl:ObjectProperty ;
1273. rdfs:domain bmicm:HumanBasedCapabilityElements ;
1274. rdfs:label "Competencies" ;
1275. rdfs:range bc:Competencies ;
1276. .
1277. bmicm:humanBasedCapabilityElements_specializedBy_Skills
1278. rdf:type owl:ObjectProperty ;
1279. rdfs:domain bmicm:HumanBasedCapabilityElements ;
1280. rdfs:label "Skills" ;
1281. rdfs:range bc:Skills ;
1282. .
1283.
1284.
1285. cbr:BMIPossibilitiesConcern
```

```
1286.  rdf:type cbr:Concern ;
1287.  cbr:concernsBelongToRole bmicm:CLevelManager ;
1288.  cbr:concernsBelongToRole bmicm:TransformationManager ;
1289.  rdfs:label "BMI Possibilities Concern"@en ;
1290.  .
1291.  cbr:BMITransformationConcern
1292.  rdf:type cbr:Concern ;
1293.  cbr:concernsBelongToRole bmicm:CLevelManager ;
1294.  cbr:concernsBelongToRole bmicm:TransformationManager ;
1295.  rdfs:label "BMI Transformation Concern"@en ;
1296.  .
1297.  cbr:EAInnovationConcern
1298.  rdf:type cbr:Concern ;
1299.  cbr:concernsBelongToRole bmicm:EnterpriseArchitect ;
1300.  cbr:concernsBelongToRole bmicm:TransformationManager ;
1301.  rdfs:label "EA Innovation Concern"@en ;
1302.  .
```

Source Code of the Business Model Innovation Case Similarity Ontology

This appendix section shows the code for the business model innovation case similarity model
for the business model innovation case industry specifics ontology stored within the file
BusinessModelInnovationCaseIndustrySpecificsCaseSimilarityModel.ttl.

```
1.    # baseURI: http://ikm-group.ch/bmiciscsm
2.    # imports: http://ikm-group.ch/bmicis
3.    # imports: http://ikm-group.ch/cbr
4.    # prefix: bmiciscsm
5.
6.    @prefix bmiciscsm: <http://ikm-group.ch/bmiciscsm#> .
7.    @prefix archi: <http://ikm-group.ch/archiMEO/archimate#> .
8.    @prefix archimateV3: <http://ikm-group.ch/archimateV3#> .
9.    @prefix bc: <http://ikm-group.ch/bc#> .
10.   @prefix bic: <http://ikm-group.ch/bic#> .
11.   @prefix bm: <http://ikm-group.ch/bm#> .
12.   @prefix bmbc: <http://ikm-group.ch/bmbc#> .
13.   @prefix bmea: <http://ikm-group.ch/bmea#> .
14.   @prefix bmic: <http://ikm-group.ch/bmic#> .
15.   @prefix bmicm: <http://ikm-group.ch/bmicm#> .
16.   @prefix bmicis: <http://ikm-group.ch/bmicis#> .
17.   @prefix cbr: <http://ikm-group.ch/cbr#> .
18.   @prefix ci: <http://ikm-group.ch/ci#> .
19.   @prefix eo: <http://ikm-group.ch/archiMEO/eo#> .
20.   @prefix owl: <http://www.w3.org/2002/07/owl#> .
21.   @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
22.   @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
23.   @prefix sim: <http://ikm-group.ch/similarity#> .
24.   @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
25.
26.   <http://ikm-group.ch/bmiciscsm>
27.   rdf:type owl:Ontology ;
28.   owl:imports <http://ikm-group.ch/bmicm> ;
29.   owl:imports <http://ikm-group.ch/cbr> ;
30.   owl:versionInfo "Created with TopBraid Composer"@en ;
31.   .
32.
33.   bmiciscsm:EAInnovationView
34.   rdf:type cbr:CaseView ;
35.   cbr:caseViewAddressesConcerns cbr:EAInnovationConcern ;
```

```
36.   rdfs:label "EA Innovation View"@en ;
37.   .
38.   bmiciscsm:BMITransformationView
39.   rdf:type cbr:CaseView ;
40.   cbr:caseViewAddressesConcerns cbr:BMITransformationConcern ;
41.   rdfs:label "BMI Transformation View"@en ;
42.   .
43.   bmiciscsm:BMIPossibilitiesView
44.   rdf:type cbr:CaseView ;
45.   cbr:caseViewAddressesConcerns cbr:BMIPossibilitiesConcern ;
46.   rdfs:label "BMI Possibilities View"@en ;
47.   .
48.   bic:Cases
49.   rdfs:subClassOf cbr:Case ;
50.   .
51.

52.   bmic:BusinessModelInnovationCases
53.   sim:similarity bmiciscsm:simCS_Cases_EAInnovationView ;
54.   .
55.   bmiciscsm:simCS_Cases_EAInnovationView
56.   rdf:type sim:RootCaseClassSimilarity ;
57.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
58.   sim:globalSimilarityFunction sim:average ;
59.   rdfs:label "RootCaseClassSimiliarity Cases for EAInnovationView"@en ;
60.   .
61.   bmicm:businessModelInnovationCases_aggregates_StrategyLayerElements
62.   sim:similarity bmiciscsm:simOP_businessModelInnovationCases_aggregates_StrategyL
      ayerElements_EAInnovationView ;
63.   .
64.   bmiciscsm:simOP_businessModelInnovationCases_aggregates_StrategyLayerElements_EA
      InnovationView
65.   rdf:type sim:ObjectPropertySimilarity ;
66.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
67.   sim:globalSimilarityFunction sim:average ;
68.   sim:weight "1"^^xsd:float ;
69.   rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_aggregates_Str
      ategyLayerElements for EAInnovationView"@en ;
70.   .
71.   bmiciscsm:simAP_MotivationAspectElements_EAInnovationView
72.   rdf:type sim:AnnotationPropertySimilarity ;
73.   sim:annotationProperty rdfs:label ;
74.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
75.   sim:localSimilarityFunction sim:levenshtein ;
76.   sim:weight "1"^^xsd:float ;
77.   rdfs:label "AnnotationPropertySimilarity MotivationAspectElements for EAInnovati
      onView"@en ;
78.   .
79.   bmicm:businessModelInnovationCases_aggregates_MotivationAspectElements
80.   sim:similarity bmiciscsm:simOP_businessModelInnovationCases_aggregates_Motivatio
      nAspectElements_EAInnovationView ;
81.   .
82.   bmiciscsm:simOP_businessModelInnovationCases_aggregates_MotivationAspectElements
      _EAInnovationView
83.   rdf:type sim:ObjectPropertySimilarity ;
84.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
85.   sim:globalSimilarityFunction sim:average ;
86.   sim:weight "1"^^xsd:float ;
87.   rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_aggregates_Mot
      ivationAspectElements for EAInnovationView"@en ;
88.   .
89.   archimateV3:Assessment
90.   sim:similarity bmiciscsm:simAP_Assessment_EAInnovationView ;
91.   .
92.   bmiciscsm:simAP_Assessment_EAInnovationView
```

```
93.     rdf:type sim:AnnotationPropertySimilarity ;
94.     sim:annotationProperty rdfs:label ;
95.     sim:belongsToCaseView bmiciscsm:EAInnovationView ;
96.     sim:localSimilarityFunction sim:levenshtein ;
97.     sim:weight "1"^^xsd:float ;
98.     rdfs:label "AnnotationPropertySimilarity Assessment for EAInnovationView"@en ;
99.     .
100.    bmicm:motivationAspectElements_specializedBy_Assessment
101.    sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Assessment
        _EAInnovationView ;
102.    .
103.    bmiciscsm:simOP_motivationAspectElements_specializedBy_Assessment_EAInnovationVi
        ew
104.    rdf:type sim:ObjectPropertySimilarity ;
105.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
106.    sim:globalSimilarityFunction sim:average ;
107.    sim:weight "1"^^xsd:float ;
108.    rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Asse
        ssment for EAInnovationView"@en ;
109.    .
110.    archimateV3:Constraint
111.    sim:similarity bmiciscsm:simAP_Constraint_EAInnovationView ;
112.    .
113.    bmiciscsm:simAP_Constraint_EAInnovationView
114.    rdf:type sim:AnnotationPropertySimilarity ;
115.    sim:annotationProperty rdfs:label ;
116.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
117.    sim:localSimilarityFunction sim:levenshtein ;
118.    sim:weight "1"^^xsd:float ;
119.    rdfs:label "AnnotationPropertySimilarity Constraint for EAInnovationView"@en ;
120.    .
121.    bmicm:motivationAspectElements_specializedBy_Constraint
122.    sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Constraint
        _EAInnovationView ;
123.    .
124.    bmiciscsm:simOP_motivationAspectElements_specializedBy_Constraint_EAInnovationVi
        ew
125.    rdf:type sim:ObjectPropertySimilarity ;
126.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
127.    sim:globalSimilarityFunction sim:average ;
128.    sim:weight "1"^^xsd:float ;
129.    rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Cons
        traint for EAInnovationView"@en ;
130.    .
131.    archimateV3:Stakeholder
132.    sim:similarity bmiciscsm:simAP_Stakeholder_EAInnovationView ;
133.    .
134.    bmiciscsm:simAP_Stakeholder_EAInnovationView
135.    rdf:type sim:AnnotationPropertySimilarity ;
136.    sim:annotationProperty rdfs:label ;
137.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
138.    sim:localSimilarityFunction sim:levenshtein ;
139.    sim:weight "1"^^xsd:float ;
140.    rdfs:label "AnnotationPropertySimilarity Stakeholder for EAInnovationView"@en ;
141.    .
142.    bmicm:motivationAspectElements_specializedBy_Stakeholder
143.    sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Stakeholde
        r_EAInnovationView ;
144.    .
145.    bmiciscsm:simOP_motivationAspectElements_specializedBy_Stakeholder_EAInnovationV
        iew
146.    rdf:type sim:ObjectPropertySimilarity ;
147.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
148.    sim:globalSimilarityFunction sim:average ;
149.    sim:weight "1"^^xsd:float ;
```

```
150.  rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Stak
      eholder for EAInnovationView"@en ;
151.  .
152.  archimateV3:Driver
153.  sim:similarity bmiciscsm:simAP_Driver_EAInnovationView ;
154.  .
155.  bmiciscsm:simAP_Driver_EAInnovationView
156.  rdf:type sim:AnnotationPropertySimilarity ;
157.  sim:annotationProperty rdfs:label ;
158.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
159.  sim:localSimilarityFunction sim:levenshtein ;
160.  sim:weight "1"^^xsd:float ;
161.  rdfs:label "AnnotationPropertySimilarity Driver for EAInnovationView"@en ;
162.  .
163.  bmicm:motivationAspectElements_specializedBy_Driver
164.  sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Driver_EAI
      nnovationView ;
165.  .
166.  bmiciscsm:simOP_motivationAspectElements_specializedBy_Driver_EAInnovationView
167.  rdf:type sim:ObjectPropertySimilarity ;
168.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
169.  sim:globalSimilarityFunction sim:average ;
170.  sim:weight "1"^^xsd:float ;
171.  rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Driv
      er for EAInnovationView"@en ;
172.  .
173.  archimateV3:Goal
174.  sim:similarity bmiciscsm:simAP_Goal_EAInnovationView ;
175.  .
176.  bmiciscsm:simAP_Goal_EAInnovationView
177.  rdf:type sim:AnnotationPropertySimilarity ;
178.  sim:annotationProperty rdfs:label ;
179.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
180.  sim:localSimilarityFunction sim:levenshtein ;
181.  sim:weight "1"^^xsd:float ;
182.  rdfs:label "AnnotationPropertySimilarity Goal for EAInnovationView"@en ;
183.  .
184.  bmicm:motivationAspectElements_specializedBy_Goal
185.  sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Goal_EAInn
      ovationView ;
186.  .
187.  bmiciscsm:simOP_motivationAspectElements_specializedBy_Goal_EAInnovationView
188.  rdf:type sim:ObjectPropertySimilarity ;
189.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
190.  sim:globalSimilarityFunction sim:average ;
191.  sim:weight "1"^^xsd:float ;
192.  rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Goal
       for EAInnovationView"@en ;
193.  .
194.  archimateV3:Meaning
195.  sim:similarity bmiciscsm:simAP_Meaning_EAInnovationView ;
196.  .
197.  bmiciscsm:simAP_Meaning_EAInnovationView
198.  rdf:type sim:AnnotationPropertySimilarity ;
199.  sim:annotationProperty rdfs:label ;
200.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
201.  sim:localSimilarityFunction sim:levenshtein ;
202.  sim:weight "1"^^xsd:float ;
203.  rdfs:label "AnnotationPropertySimilarity Meaning for EAInnovationView"@en ;
204.  .
205.  bmicm:motivationAspectElements_specializedBy_Meaning
206.  sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Meaning_EA
      InnovationView ;
207.  .
208.  bmiciscsm:simOP_motivationAspectElements_specializedBy_Meaning_EAInnovationView
```

```
209.    rdf:type sim:ObjectPropertySimilarity ;
210.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
211.    sim:globalSimilarityFunction sim:average ;
212.    sim:weight "1"^^xsd:float ;
213.    rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Mean
        ing for EAInnovationView"@en ;
214.    .
215.    archimateV3:Outcome
216.    sim:similarity bmiciscsm:simAP_Outcome_EAInnovationView ;
217.    .
218.    bmiciscsm:simAP_Outcome_EAInnovationView
219.    rdf:type sim:AnnotationPropertySimilarity ;
220.    sim:annotationProperty rdfs:label ;
221.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
222.    sim:localSimilarityFunction sim:levenshtein ;
223.    sim:weight "1"^^xsd:float ;
224.    rdfs:label "AnnotationPropertySimilarity Outcome for EAInnovationView"@en ;
225.    .
226.    bmicm:motivationAspectElements_specializedBy_Outcome
227.    sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Outcome_EA
        InnovationView ;
228.    .
229.    bmiciscsm:simOP_motivationAspectElements_specializedBy_Outcome_EAInnovationView
230.    rdf:type sim:ObjectPropertySimilarity ;
231.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
232.    sim:globalSimilarityFunction sim:average ;
233.    sim:weight "1"^^xsd:float ;
234.    rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Outc
        ome for EAInnovationView"@en ;
235.    .
236.    archimateV3:Principle
237.    sim:similarity bmiciscsm:simAP_Principle_EAInnovationView ;
238.    .
239.    bmiciscsm:simAP_Principle_EAInnovationView
240.    rdf:type sim:AnnotationPropertySimilarity ;
241.    sim:annotationProperty rdfs:label ;
242.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
243.    sim:localSimilarityFunction sim:levenshtein ;
244.    sim:weight "1"^^xsd:float ;
245.    rdfs:label "AnnotationPropertySimilarity Principle for EAInnovationView"@en ;
246.    .
247.    bmicm:motivationAspectElements_specializedBy_Principle
248.    sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Principle_
        EAInnovationView ;
249.    .
250.    bmiciscsm:simOP_motivationAspectElements_specializedBy_Principle_EAInnovationVie
        w
251.    rdf:type sim:ObjectPropertySimilarity ;
252.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
253.    sim:globalSimilarityFunction sim:average ;
254.    sim:weight "1"^^xsd:float ;
255.    rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Prin
        ciple for EAInnovationView"@en ;
256.    .
257.    archimateV3:Requirement
258.    sim:similarity bmiciscsm:simAP_Requirement_EAInnovationView ;
259.    .
260.    bmiciscsm:simAP_Requirement_EAInnovationView
261.    rdf:type sim:AnnotationPropertySimilarity ;
262.    sim:annotationProperty rdfs:label ;
263.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
264.    sim:localSimilarityFunction sim:levenshtein ;
265.    sim:weight "1"^^xsd:float ;
266.    rdfs:label "AnnotationPropertySimilarity Requirement for EAInnovationView"@en ;
267.    .
```

```
268.   bmicm:motivationAspectElements_specializedBy_Requirement
269.   sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Requiremen
       t_EAInnovationView ;
270.   .
271.   bmiciscsm:simOP_motivationAspectElements_specializedBy_Requirement_EAInnovationV
       iew
272.   rdf:type sim:ObjectPropertySimilarity ;
273.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
274.   sim:globalSimilarityFunction sim:average ;
275.   sim:weight "1"^^xsd:float ;
276.   rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Requ
       irement for EAInnovationView"@en ;
277.   .
278.   archimateV3:Value
279.   sim:similarity bmiciscsm:simAP_Value_EAInnovationView ;
280.   .
281.   bmiciscsm:simAP_Value_EAInnovationView
282.   rdf:type sim:AnnotationPropertySimilarity ;
283.   sim:annotationProperty rdfs:label ;
284.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
285.   sim:localSimilarityFunction sim:levenshtein ;
286.   sim:weight "1"^^xsd:float ;
287.   rdfs:label "AnnotationPropertySimilarity Value for EAInnovationView"@en ;
288.   .
289.   bmicm:motivationAspectElements_specializedBy_Value
290.   sim:similarity bmiciscsm:simOP_motivationAspectElements_specializedBy_Value_EAIn
       novationView ;
291.   .
292.   bmiciscsm:simOP_motivationAspectElements_specializedBy_Value_EAInnovationView
293.   rdf:type sim:ObjectPropertySimilarity ;
294.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
295.   sim:globalSimilarityFunction sim:average ;
296.   sim:weight "1"^^xsd:float ;
297.   rdfs:label "ObjectPropertySimilarity motivationAspectElements_specializedBy_Valu
       e for EAInnovationView"@en ;
298.   .
299.
300.   archimateV3:Capability
301.   sim:similarity bmiciscsm:simAP_Capability_EAInnovationView ;
302.   .
303.   bmiciscsm:simAP_Capability_EAInnovationView
304.   rdf:type sim:AnnotationPropertySimilarity ;
305.   sim:annotationProperty rdfs:label ;
306.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
307.   sim:localSimilarityFunction sim:levenshtein ;
308.   sim:weight "1"^^xsd:float ;
309.   rdfs:label "AnnotationPropertySimilarity Capability for EAInnovationView"@en ;
310.   .
311.   bmicm:strategyLayerElements_specializedBy_Capability
312.   sim:similarity bmiciscsm:simOP_strategyLayerElements_specializedBy_Capability_EA
       InnovationView ;
313.   .
314.   bmiciscsm:simOP_strategyLayerElements_specializedBy_Capability_EAInnovationView
315.   rdf:type sim:ObjectPropertySimilarity ;
316.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
317.   sim:globalSimilarityFunction sim:average ;
318.   sim:weight "1"^^xsd:float ;
319.   rdfs:label "ObjectPropertySimilarity strategyLayerElements_specializedBy_Capabil
       ity for EAInnovationView"@en ;
320.   .
321.   archimateV3:CourseOfAction
322.   sim:similarity bmiciscsm:simAP_CourseOfAction_EAInnovationView ;
323.   .
324.   bmiciscsm:simAP_CourseOfAction_EAInnovationView
325.   rdf:type sim:AnnotationPropertySimilarity ;
```

```
326.  sim:annotationProperty rdfs:label ;
327.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
328.  sim:localSimilarityFunction sim:levenshtein ;
329.  sim:weight "1"^^xsd:float ;
330.  rdfs:label "AnnotationPropertySimilarity CourseOfAction for EAInnovationView"@en
       ;
331.  .
332.  bmicm:strategyLayerElements_specializedBy_CourseOfAction
333.  sim:similarity bmiciscsm:simOP_strategyLayerElements_specializedBy_CourseOfActio
      n_EAInnovationView ;
334.  .
335.  bmiciscsm:simOP_strategyLayerElements_specializedBy_CourseOfAction_EAInnovationV
      iew
336.  rdf:type sim:ObjectPropertySimilarity ;
337.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
338.  sim:globalSimilarityFunction sim:average ;
339.  sim:weight "1"^^xsd:float ;
340.  rdfs:label "ObjectPropertySimilarity strategyLayerElements_specializedBy_CourseO
      fAction for EAInnovationView"@en ;
341.  .
342.  archimateV3:Resource
343.  sim:similarity bmiciscsm:simAP_Resource_EAInnovationView ;
344.  .
345.  bmiciscsm:simAP_Resource_EAInnovationView
346.  rdf:type sim:AnnotationPropertySimilarity ;
347.  sim:annotationProperty rdfs:label ;
348.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
349.  sim:localSimilarityFunction sim:levenshtein ;
350.  sim:weight "1"^^xsd:float ;
351.  rdfs:label "AnnotationPropertySimilarity Resource for EAInnovationView"@en ;
352.  .
353.  bmicm:strategyLayerElements_specializedBy_Resource
354.  sim:similarity bmiciscsm:simOP_strategyLayerElements_specializedBy_Resource_EAIn
      novationView ;
355.  .
356.  bmiciscsm:simOP_strategyLayerElements_specializedBy_Resource_EAInnovationView
357.  rdf:type sim:ObjectPropertySimilarity ;
358.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
359.  sim:globalSimilarityFunction sim:average ;
360.  sim:weight "1"^^xsd:float ;
361.  rdfs:label "ObjectPropertySimilarity strategyLayerElements_specializedBy_Resourc
      e for EAInnovationView"@en ;
362.  .
363.  archimateV3:ValueStream
364.  sim:similarity bmiciscsm:simAP_ValueStream_EAInnovationView ;
365.  .
366.  bmiciscsm:simAP_ValueStream_EAInnovationView
367.  rdf:type sim:AnnotationPropertySimilarity ;
368.  sim:annotationProperty rdfs:label ;
369.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
370.  sim:localSimilarityFunction sim:levenshtein ;
371.  sim:weight "1"^^xsd:float ;
372.  rdfs:label "AnnotationPropertySimilarity ValueStream for EAInnovationView"@en ;
373.  .
374.  bmicm:strategyLayerElements_specializedBy_ValueStream
375.  sim:similarity bmiciscsm:simOP_strategyLayerElements_specializedBy_ValueStream_E
      AInnovationView ;
376.  .
377.  bmiciscsm:simOP_strategyLayerElements_specializedBy_ValueStream_EAInnovationView
378.  rdf:type sim:ObjectPropertySimilarity ;
379.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
380.  sim:globalSimilarityFunction sim:average ;
381.  sim:weight "1"^^xsd:float ;
382.  rdfs:label "ObjectPropertySimilarity strategyLayerElements_specializedBy_ValueSt
      ream for EAInnovationView"@en ;
```

383. .

384. `bmicm:businessModelInnovationCases_aggregates_BusinessLayerElements`
385. `sim:similarity bmiciscsm:simOP_businessModelInnovationCases_aggregates_BusinessLayerElements_EAInnovationView ;`
386. .
387. `bmiciscsm:simOP_businessModelInnovationCases_aggregates_BusinessLayerElements_EAInnovationView`
388. `rdf:type sim:ObjectPropertySimilarity ;`
389. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
390. `sim:globalSimilarityFunction sim:average ;`
391. `sim:weight "1"^^xsd:float ;`
392. `rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_aggregates_BusinessLayerElements for EAInnovationView"@en ;`
393. .
394. `archi:Product`
395. `sim:similarity bmiciscsm:simAP_Product_EAInnovationView ;`
396. .
397. `bmiciscsm:simAP_Product_EAInnovationView`
398. `rdf:type sim:AnnotationPropertySimilarity ;`
399. `sim:annotationProperty rdfs:label ;`
400. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
401. `sim:localSimilarityFunction sim:levenshtein ;`
402. `sim:weight "1"^^xsd:float ;`
403. `rdfs:label "AnnotationPropertySimilarity Product for EAInnovationView"@en ;`
404. .
405. `bmicm:businessLayerElements_specializedBy_Product`
406. `sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_Product_EAInnovationView ;`
407. .
408. `bmiciscsm:simOP_businessLayerElements_specializedBy_Product_EAInnovationView`
409. `rdf:type sim:ObjectPropertySimilarity ;`
410. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
411. `sim:globalSimilarityFunction sim:average ;`
412. `sim:weight "1"^^xsd:float ;`
413. `rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_Product for EAInnovationView"@en ;`
414. .
415. `archi:BusinessActor`
416. `sim:similarity bmiciscsm:simAP_BusinessActor_EAInnovationView ;`
417. .
418. `bmiciscsm:simAP_BusinessActor_EAInnovationView`
419. `rdf:type sim:AnnotationPropertySimilarity ;`
420. `sim:annotationProperty rdfs:label ;`
421. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
422. `sim:localSimilarityFunction sim:levenshtein ;`
423. `sim:weight "1"^^xsd:float ;`
424. `rdfs:label "AnnotationPropertySimilarity BusinessActor for EAInnovationView"@en ;`
425. .
426. `bmicm:businessLayerElements_specializedBy_BusinessActor`
427. `sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessActor_EAInnovationView ;`
428. .
429. `bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessActor_EAInnovationView`
430. `rdf:type sim:ObjectPropertySimilarity ;`
431. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
432. `sim:globalSimilarityFunction sim:average ;`
433. `sim:weight "1"^^xsd:float ;`
434. `rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_BusinessActor for EAInnovationView"@en ;`
435. .
436. `archi:BusinessService`
437. `sim:similarity bmiciscsm:simAP_BusinessService_EAInnovationView ;`

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438.    .
439.    bmiciscsm:simAP_BusinessService_EAInnovationView
440.    rdf:type sim:AnnotationPropertySimilarity ;
441.    sim:annotationProperty rdfs:label ;
442.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
443.    sim:localSimilarityFunction sim:levenshtein ;
444.    sim:weight "1"^^xsd:float ;
445.    rdfs:label "AnnotationPropertySimilarity BusinessService for EAInnovationView"@e
        n ;
446.    .
447.    bmicm:businessLayerElements_specializedBy_BusinessService
448.    sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessServi
        ce_EAInnovationView ;
449.    .
450.    bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessService_EAInnovation
        View
451.    rdf:type sim:ObjectPropertySimilarity ;
452.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
453.    sim:globalSimilarityFunction sim:average ;
454.    sim:weight "1"^^xsd:float ;
455.    rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_Busines
        sService for EAInnovationView"@en ;
456.    .
457.    archi:BusinessObject
458.    sim:similarity bmiciscsm:simAP_BusinessObject_EAInnovationView ;
459.    .
460.    bmiciscsm:simAP_BusinessObject_EAInnovationView
461.    rdf:type sim:AnnotationPropertySimilarity ;
462.    sim:annotationProperty rdfs:label ;
463.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
464.    sim:localSimilarityFunction sim:levenshtein ;
465.    sim:weight "1"^^xsd:float ;
466.    rdfs:label "AnnotationPropertySimilarity BusinessObject for EAInnovationView"@en
         ;
467.    .
468.    bmicm:businessLayerElements_specializedBy_BusinessObject
469.    sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessObjec
        t_EAInnovationView ;
470.    .
471.    bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessObject_EAInnovationV
        iew
472.    rdf:type sim:ObjectPropertySimilarity ;
473.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
474.    sim:globalSimilarityFunction sim:average ;
475.    sim:weight "1"^^xsd:float ;
476.    rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_Busines
        sObject for EAInnovationView"@en ;
477.    .
478.    bmiciscsm:simAP_BusinessCollaboration_EAInnovationView
479.    rdf:type sim:AnnotationPropertySimilarity ;
480.    sim:annotationProperty rdfs:label ;
481.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
482.    sim:localSimilarityFunction sim:levenshtein ;
483.    sim:weight "1"^^xsd:float ;
484.    rdfs:label "AnnotationPropertySimilarity BusinessCollaboration for EAInnovationV
        iew"@en ;
485.    .
486.    bmicm:businessLayerElements_specializedBy_BusinessCollaboration
487.    sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessColla
        boration_EAInnovationView ;
488.    .
489.    bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessCollaboration_EAInno
        vationView
490.    rdf:type sim:ObjectPropertySimilarity ;
491.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
```

```
492.   sim:globalSimilarityFunction sim:average ;
493.   sim:weight "1"^^xsd:float ;
494.   rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_Busines
       sCollaboration for EAInnovationView"@en ;
495.   .
496.   archi:BusinessFunction
497.   sim:similarity bmiciscsm:simAP_BusinessFunction_EAInnovationView ;
498.   .
499.   bmiciscsm:simAP_BusinessFunction_EAInnovationView
500.   rdf:type sim:AnnotationPropertySimilarity ;
501.   sim:annotationProperty rdfs:label ;
502.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
503.   sim:localSimilarityFunction sim:levenshtein ;
504.   sim:weight "1"^^xsd:float ;
505.   rdfs:label "AnnotationPropertySimilarity BusinessFunction for EAInnovationView"@
       en ;
506.   .
507.   bmicm:businessLayerElements_specializedBy_BusinessFunction
508.   sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessFunct
       ion_EAInnovationView ;
509.   .
510.   bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessFunction_EAInnovatio
       nView
511.   rdf:type sim:ObjectPropertySimilarity ;
512.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
513.   sim:globalSimilarityFunction sim:average ;
514.   sim:weight "1"^^xsd:float ;
515.   rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_Busines
       sFunction for EAInnovationView"@en ;
516.   .
517.   archi:BusinessProcess
518.   sim:similarity bmiciscsm:simAP_BusinessProcess_EAInnovationView ;
519.   .
520.   bmiciscsm:simAP_BusinessProcess_EAInnovationView
521.   rdf:type sim:AnnotationPropertySimilarity ;
522.   sim:annotationProperty rdfs:label ;
523.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
524.   sim:localSimilarityFunction sim:levenshtein ;
525.   sim:weight "1"^^xsd:float ;
526.   rdfs:label "AnnotationPropertySimilarity BusinessProcess for EAInnovationView"@e
       n ;
527.   .
528.   bmicm:businessLayerElements_specializedBy_BusinessProcess
529.   sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessProce
       ss_EAInnovationView ;
530.   .
531.   bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessProcess_EAInnovation
       View
532.   rdf:type sim:ObjectPropertySimilarity ;
533.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
534.   sim:globalSimilarityFunction sim:average ;
535.   sim:weight "1"^^xsd:float ;
536.   rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_Busines
       sProcess for EAInnovationView"@en ;
537.   .
538.   archi:BusinessInterface
539.   sim:similarity bmiciscsm:simAP_BusinessInterface_EAInnovationView ;
540.   .
541.   bmiciscsm:simAP_BusinessInterface_EAInnovationView
542.   rdf:type sim:AnnotationPropertySimilarity ;
543.   sim:annotationProperty rdfs:label ;
544.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
545.   sim:localSimilarityFunction sim:levenshtein ;
546.   sim:weight "1"^^xsd:float ;
```

547. `rdfs:label "AnnotationPropertySimilarity BusinessInterface for EAInnovationView" @en ;`
548. `.`
549. `bmicm:businessLayerElements_specializedBy_BusinessInterface`
550. `sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessInterface_EAInnovationView ;`
551. `.`
552. `bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessInterface_EAInnovationView`
553. `rdf:type sim:ObjectPropertySimilarity ;`
554. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
555. `sim:globalSimilarityFunction sim:average ;`
556. `sim:weight "1"^^xsd:float ;`
557. `rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_BusinessInterface for EAInnovationView"@en ;`
558. `.`
559. `archi:BusinessRole`
560. `sim:similarity bmiciscsm:simAP_BusinessRole_EAInnovationView ;`
561. `.`
562. `bmiciscsm:simAP_BusinessRole_EAInnovationView`
563. `rdf:type sim:AnnotationPropertySimilarity ;`
564. `sim:annotationProperty rdfs:label ;`
565. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
566. `sim:localSimilarityFunction sim:levenshtein ;`
567. `sim:weight "1"^^xsd:float ;`
568. `rdfs:label "AnnotationPropertySimilarity BusinessRole for EAInnovationView"@en ;`
569. `.`
570. `bmicm:businessLayerElements_specializedBy_BusinessRole`
571. `sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessRole_EAInnovationView ;`
572. `.`
573. `bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessRole_EAInnovationView`
574. `rdf:type sim:ObjectPropertySimilarity ;`
575. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
576. `sim:globalSimilarityFunction sim:average ;`
577. `sim:weight "1"^^xsd:float ;`
578. `rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_BusinessRole for EAInnovationView"@en ;`
579. `.`
580. `archi:BusinessInteraction`
581. `sim:similarity bmiciscsm:simAP_BusinessInteraction_EAInnovationView ;`
582. `.`
583. `bmiciscsm:simAP_BusinessInteraction_EAInnovationView`
584. `rdf:type sim:AnnotationPropertySimilarity ;`
585. `sim:annotationProperty rdfs:label ;`
586. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
587. `sim:localSimilarityFunction sim:levenshtein ;`
588. `sim:weight "1"^^xsd:float ;`
589. `rdfs:label "AnnotationPropertySimilarity BusinessInteraction for EAInnovationView"@en ;`
590. `.`
591. `bmicm:businessLayerElements_specializedBy_BusinessInteraction`
592. `sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessInteraction_EAInnovationView ;`
593. `.`
594. `bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessInteraction_EAInnovationView`
595. `rdf:type sim:ObjectPropertySimilarity ;`
596. `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
597. `sim:globalSimilarityFunction sim:average ;`
598. `sim:weight "1"^^xsd:float ;`
599. `rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_BusinessInteraction for EAInnovationView"@en ;`
600. `.`

601. archi:BusinessEvent
602. sim:similarity bmiciscsm:simAP_BusinessEvent_EAInnovationView ;
603. .
604. bmiciscsm:simAP_BusinessEvent_EAInnovationView
605. rdf:type sim:AnnotationPropertySimilarity ;
606. sim:annotationProperty rdfs:label ;
607. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
608. sim:localSimilarityFunction sim:levenshtein ;
609. sim:weight "1"^^xsd:float ;
610. rdfs:label "AnnotationPropertySimilarity BusinessEvent for EAInnovationView"@en
    ;
611. .
612. bmicm:businessLayerElements_specializedBy_BusinessEvent
613. sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessEvent
    _EAInnovationView ;
614. .
615. bmiciscsm:simOP_businessLayerElements_specializedBy_BusinessEvent_EAInnovationVi
    ew
616. rdf:type sim:ObjectPropertySimilarity ;
617. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
618. sim:globalSimilarityFunction sim:average ;
619. sim:weight "1"^^xsd:float ;
620. rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_Busines
    sEvent for EAInnovationView"@en ;
621. .
622. bmiciscsm:simAP_Contract_EAInnovationView
623. rdf:type sim:AnnotationPropertySimilarity ;
624. sim:annotationProperty rdfs:label ;
625. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
626. sim:localSimilarityFunction sim:levenshtein ;
627. sim:weight "1"^^xsd:float ;
628. rdfs:label "AnnotationPropertySimilarity Contract for EAInnovationView"@en ;
629. .
630. bmicm:businessLayerElements_specializedBy_Contract
631. sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_Contract_EAIn
    novationView ;
632. .
633. bmiciscsm:simOP_businessLayerElements_specializedBy_Contract_EAInnovationView
634. rdf:type sim:ObjectPropertySimilarity ;
635. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
636. sim:globalSimilarityFunction sim:average ;
637. sim:weight "1"^^xsd:float ;
638. rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_Contrac
    t for EAInnovationView"@en ;
639. .
640. archi:Representation
641. sim:similarity bmiciscsm:simAP_Representation_EAInnovationView ;
642. .
643. bmiciscsm:simAP_Representation_EAInnovationView
644. rdf:type sim:AnnotationPropertySimilarity ;
645. sim:annotationProperty rdfs:label ;
646. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
647. sim:localSimilarityFunction sim:levenshtein ;
648. sim:weight "1"^^xsd:float ;
649. rdfs:label "AnnotationPropertySimilarity Representation for EAInnovationView"@en
     ;
650. .
651. bmicm:businessLayerElements_specializedBy_Representation
652. sim:similarity bmiciscsm:simOP_businessLayerElements_specializedBy_Representatio
    n_EAInnovationView ;
653. .
654. bmiciscsm:simOP_businessLayerElements_specializedBy_Representation_EAInnovationV
    iew
655. rdf:type sim:ObjectPropertySimilarity ;
656. sim:belongsToCaseView bmiciscsm:EAInnovationView ;

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657.  sim:globalSimilarityFunction sim:average ;
658.  sim:weight "1"^^xsd:float ;
659.  rdfs:label "ObjectPropertySimilarity businessLayerElements_specializedBy_Represe
      ntation for EAInnovationView"@en ;
660.  .
661.

662.  bmicm:businessModelInnovationCases_aggregates_ApplicationLayerElements
663.  sim:similarity bmiciscsm:simOP_businessModelInnovationCases_aggregates_Applicati
      onLayerElements_EAInnovationView ;
664.  .
665.  bmiciscsm:simOP_businessModelInnovationCases_aggregates_ApplicationLayerElements
      _EAInnovationView
666.  rdf:type sim:ObjectPropertySimilarity ;
667.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
668.  sim:globalSimilarityFunction sim:average ;
669.  sim:weight "1"^^xsd:float ;
670.  rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_aggregates_App
      licationLayerElements for EAInnovationView"@en ;
671.  .
672.  archi:DataObject
673.  sim:similarity bmiciscsm:simAP_DataObject_EAInnovationView ;
674.  .
675.  bmiciscsm:simAP_DataObject_EAInnovationView
676.  rdf:type sim:AnnotationPropertySimilarity ;
677.  sim:annotationProperty rdfs:label ;
678.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
679.  sim:localSimilarityFunction sim:levenshtein ;
680.  sim:weight "1"^^xsd:float ;
681.  rdfs:label "AnnotationPropertySimilarity DataObject for EAInnovationView"@en ;
682.  .
683.  bmicm:applicationLayerElements_specializedBy_DataObject
684.  sim:similarity bmiciscsm:simOP_applicationLayerElements_specializedBy_DataObject
      _EAInnovationView ;
685.  .
686.  bmiciscsm:simOP_applicationLayerElements_specializedBy_DataObject_EAInnovationVi
      ew
687.  rdf:type sim:ObjectPropertySimilarity ;
688.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
689.  sim:globalSimilarityFunction sim:average ;
690.  sim:weight "1"^^xsd:float ;
691.  rdfs:label "ObjectPropertySimilarity applicationLayerElements_specializedBy_Data
      Object for EAInnovationView"@en ;
692.  .
693.  archi:ApplicationService
694.  sim:similarity bmiciscsm:simAP_ApplicationService_EAInnovationView ;
695.  .
696.  bmiciscsm:simAP_ApplicationService_EAInnovationView
697.  rdf:type sim:AnnotationPropertySimilarity ;
698.  sim:annotationProperty rdfs:label ;
699.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
700.  sim:localSimilarityFunction sim:levenshtein ;
701.  sim:weight "1"^^xsd:float ;
702.  rdfs:label "AnnotationPropertySimilarity ApplicationService for EAInnovationView
      "@en ;
703.  .
704.  bmicm:applicationLayerElements_specializedBy_ApplicationService
705.  sim:similarity bmiciscsm:simOP_applicationLayerElements_specializedBy_Applicatio
      nService_EAInnovationView ;
706.  .
707.  bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationService_EAInno
      vationView
708.  rdf:type sim:ObjectPropertySimilarity ;
709.  sim:belongsToCaseView bmiciscsm:EAInnovationView ;
710.  sim:globalSimilarityFunction sim:average ;
```

```
711.   sim:weight "1"^^xsd:float ;
712.   rdfs:label "ObjectPropertySimilarity applicationLayerElements_specializedBy_Appl
       icationService for EAInnovationView"@en ;
713.   .
714.   archi:ApplicationInterface
715.   sim:similarity bmiciscsm:simAP_ApplicationInterface_EAInnovationView ;
716.   .
717.   bmiciscsm:simAP_ApplicationInterface_EAInnovationView
718.   rdf:type sim:AnnotationPropertySimilarity ;
719.   sim:annotationProperty rdfs:label ;
720.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
721.   sim:localSimilarityFunction sim:levenshtein ;
722.   sim:weight "1"^^xsd:float ;
723.   rdfs:label "AnnotationPropertySimilarity ApplicationInterface for EAInnovationVi
       ew"@en ;
724.   .
725.   bmicm:applicationLayerElements_specializedBy_ApplicationInterface
726.   sim:similarity bmiciscsm:simOP_applicationLayerElements_specializedBy_Applicatio
       nInterface_EAInnovationView ;
727.   .
728.   bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationInterface_EAIn
       novationView
729.   rdf:type sim:ObjectPropertySimilarity ;
730.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
731.   sim:globalSimilarityFunction sim:average ;
732.   sim:weight "1"^^xsd:float ;
733.   rdfs:label "ObjectPropertySimilarity applicationLayerElements_specializedBy_Appl
       icationInterface for EAInnovationView"@en ;
734.   .
735.   archi:ApplicationComponent
736.   sim:similarity bmiciscsm:simAP_ApplicationComponent_EAInnovationView ;
737.   .
738.   bmiciscsm:simAP_ApplicationComponent_EAInnovationView
739.   rdf:type sim:AnnotationPropertySimilarity ;
740.   sim:annotationProperty rdfs:label ;
741.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
742.   sim:localSimilarityFunction sim:levenshtein ;
743.   sim:weight "1"^^xsd:float ;
744.   rdfs:label "AnnotationPropertySimilarity ApplicationComponent for EAInnovationVi
       ew"@en ;
745.   .
746.   bmicm:applicationLayerElements_specializedBy_ApplicationComponent
747.   sim:similarity bmiciscsm:simOP_applicationLayerElements_specializedBy_Applicatio
       nComponent_EAInnovationView ;
748.   .
749.   bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationComponent_EAIn
       novationView
750.   rdf:type sim:ObjectPropertySimilarity ;
751.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
752.   sim:globalSimilarityFunction sim:average ;
753.   sim:weight "1"^^xsd:float ;
754.   rdfs:label "ObjectPropertySimilarity applicationLayerElements_specializedBy_Appl
       icationComponent for EAInnovationView"@en ;
755.   .
756.   bmiciscsm:simAP_ApplicationCollaboration_EAInnovationView
757.   rdf:type sim:AnnotationPropertySimilarity ;
758.   sim:annotationProperty rdfs:label ;
759.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
760.   sim:localSimilarityFunction sim:levenshtein ;
761.   sim:weight "1"^^xsd:float ;
762.   rdfs:label "AnnotationPropertySimilarity ApplicationCollaboration for EAInnovati
       onView"@en ;
763.   .
764.   bmicm:applicationLayerElements_specializedBy_ApplicationCollaboration
```

765.   `sim:similarity bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationCollaboration_EAInnovationView ;`
766.   `.`
767.   `bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationCollaboration_EAInnovationView`
768.   `rdf:type sim:ObjectPropertySimilarity ;`
769.   `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
770.   `sim:globalSimilarityFunction sim:average ;`
771.   `sim:weight "1"^^xsd:float ;`
772.   `rdfs:label "ObjectPropertySimilarity applicationLayerElements_specializedBy_ApplicationCollaboration for EAInnovationView"@en ;`
773.   `.`
774.   `archi:ApplicationFunction`
775.   `sim:similarity bmiciscsm:simAP_ApplicationFunction_EAInnovationView ;`
776.   `.`
777.   `bmiciscsm:simAP_ApplicationFunction_EAInnovationView`
778.   `rdf:type sim:AnnotationPropertySimilarity ;`
779.   `sim:annotationProperty rdfs:label ;`
780.   `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
781.   `sim:localSimilarityFunction sim:levenshtein ;`
782.   `sim:weight "1"^^xsd:float ;`
783.   `rdfs:label "AnnotationPropertySimilarity ApplicationFunction for EAInnovationView"@en ;`
784.   `.`
785.   `bmicm:applicationLayerElements_specializedBy_ApplicationFunction`
786.   `sim:similarity bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationFunction_EAInnovationView ;`
787.   `.`
788.   `bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationFunction_EAInnovationView`
789.   `rdf:type sim:ObjectPropertySimilarity ;`
790.   `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
791.   `sim:globalSimilarityFunction sim:average ;`
792.   `sim:weight "1"^^xsd:float ;`
793.   `rdfs:label "ObjectPropertySimilarity applicationLayerElements_specializedBy_ApplicationFunction for EAInnovationView"@en ;`
794.   `.`
795.   `archi:ApplicationInteraction`
796.   `sim:similarity bmiciscsm:simAP_ApplicationInteraction_EAInnovationView ;`
797.   `.`
798.   `bmiciscsm:simAP_ApplicationInteraction_EAInnovationView`
799.   `rdf:type sim:AnnotationPropertySimilarity ;`
800.   `sim:annotationProperty rdfs:label ;`
801.   `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
802.   `sim:localSimilarityFunction sim:levenshtein ;`
803.   `sim:weight "1"^^xsd:float ;`
804.   `rdfs:label "AnnotationPropertySimilarity ApplicationInteraction for EAInnovationView"@en ;`
805.   `.`
806.   `bmicm:applicationLayerElements_specializedBy_ApplicationInteraction`
807.   `sim:similarity bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationInteraction_EAInnovationView ;`
808.   `.`
809.   `bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationInteraction_EAInnovationView`
810.   `rdf:type sim:ObjectPropertySimilarity ;`
811.   `sim:belongsToCaseView bmiciscsm:EAInnovationView ;`
812.   `sim:globalSimilarityFunction sim:average ;`
813.   `sim:weight "1"^^xsd:float ;`
814.   `rdfs:label "ObjectPropertySimilarity applicationLayerElements_specializedBy_ApplicationInteraction for EAInnovationView"@en ;`
815.   `.`
816.   `archimateV3:ApplicationProcess`
817.   `sim:similarity bmiciscsm:simAP_ApplicationProcess_EAInnovationView ;`
818.   `.`

```
819.   bmiciscsm:simAP_ApplicationProcess_EAInnovationView
820.   rdf:type sim:AnnotationPropertySimilarity ;
821.   sim:annotationProperty rdfs:label ;
822.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
823.   sim:localSimilarityFunction sim:levenshtein ;
824.   sim:weight "1"^^xsd:float ;
825.   rdfs:label "AnnotationPropertySimilarity ApplicationProcess for EAInnovationView
       "@en ;
826.   .
827.   bmicm:applicationLayerElements_specializedBy_ApplicationProcess
828.   sim:similarity bmiciscsm:simOP_applicationLayerElements_specializedBy_Applicatio
       nProcess_EAInnovationView ;
829.   .
830.   bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationProcess_EAInno
       vationView
831.   rdf:type sim:ObjectPropertySimilarity ;
832.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
833.   sim:globalSimilarityFunction sim:average ;
834.   sim:weight "1"^^xsd:float ;
835.   rdfs:label "ObjectPropertySimilarity applicationLayerElements_specializedBy_Appl
       icationProcess for EAInnovationView"@en ;
836.   .
837.   archimateV3:ApplicationEvent
838.   sim:similarity bmiciscsm:simAP_ApplicationEvent_EAInnovationView ;
839.   .
840.   bmiciscsm:simAP_ApplicationEvent_EAInnovationView
841.   rdf:type sim:AnnotationPropertySimilarity ;
842.   sim:annotationProperty rdfs:label ;
843.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
844.   sim:localSimilarityFunction sim:levenshtein ;
845.   sim:weight "1"^^xsd:float ;
846.   rdfs:label "AnnotationPropertySimilarity ApplicationEvent for EAInnovationView"@
       en ;
847.   .
848.   bmicm:applicationLayerElements_specializedBy_ApplicationEvent
849.   sim:similarity bmiciscsm:simOP_applicationLayerElements_specializedBy_Applicatio
       nEvent_EAInnovationView ;
850.   .
851.   bmiciscsm:simOP_applicationLayerElements_specializedBy_ApplicationEvent_EAInnova
       tionView
852.   rdf:type sim:ObjectPropertySimilarity ;
853.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
854.   sim:globalSimilarityFunction sim:average ;
855.   sim:weight "1"^^xsd:float ;
856.   rdfs:label "ObjectPropertySimilarity applicationLayerElements_specializedBy_Appl
       icationEvent for EAInnovationView"@en ;
857.   .
858.
859.
860.   bmicm:businessModelInnovationCases_aggregates_TechnologyLayerElements
861.   sim:similarity bmiciscsm:simOP_businessModelInnovationCases_aggregates_Technolog
       yLayerElements_EAInnovationView ;
862.   .
863.   bmiciscsm:simOP_businessModelInnovationCases_aggregates_TechnologyLayerElements_
       EAInnovationView
864.   rdf:type sim:ObjectPropertySimilarity ;
865.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
866.   sim:globalSimilarityFunction sim:average ;
867.   sim:weight "1"^^xsd:float ;
868.   rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_aggregates_Tec
       hnologyLayerElements for EAInnovationView"@en ;
869.   .
870.   archi:InfrastructureService
871.   sim:similarity bmiciscsm:simAP_InfrastructureService_EAInnovationView ;
872.   .
```

```
873.   bmiciscsm:simAP_InfrastructureService_EAInnovationView
874.   rdf:type sim:AnnotationPropertySimilarity ;
875.   sim:annotationProperty rdfs:label ;
876.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
877.   sim:localSimilarityFunction sim:levenshtein ;
878.   sim:weight "1"^^xsd:float ;
879.   rdfs:label "AnnotationPropertySimilarity InfrastructureService for EAInnovationV
       iew"@en ;
880.   .
881.   bmicm:technologyLayerElements_specializedBy_InfrastructureService
882.   sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_Infrastruct
       ureService_EAInnovationView ;
883.   .
884.   bmiciscsm:simOP_technologyLayerElements_specializedBy_InfrastructureService_EAIn
       novationView
885.   rdf:type sim:ObjectPropertySimilarity ;
886.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
887.   sim:globalSimilarityFunction sim:average ;
888.   sim:weight "1"^^xsd:float ;
889.   rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Infra
       structureService for EAInnovationView"@en ;
890.   .
891.   bmiciscsm:simAP_SystemSoftware_EAInnovationView
892.   rdf:type sim:AnnotationPropertySimilarity ;
893.   sim:annotationProperty rdfs:label ;
894.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
895.   sim:localSimilarityFunction sim:levenshtein ;
896.   sim:weight "1"^^xsd:float ;
897.   rdfs:label "AnnotationPropertySimilarity SystemSoftware for EAInnovationView"@en
        ;
898.   .
899.   bmicm:technologyLayerElements_specializedBy_SystemSoftware
900.   sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_SystemSoftw
       are_EAInnovationView ;
901.   .
902.   bmiciscsm:simOP_technologyLayerElements_specializedBy_SystemSoftware_EAInnovatio
       nView
903.   rdf:type sim:ObjectPropertySimilarity ;
904.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
905.   sim:globalSimilarityFunction sim:average ;
906.   sim:weight "1"^^xsd:float ;
907.   rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Syste
       mSoftware for EAInnovationView"@en ;
908.   .
909.   archi:Node
910.   sim:similarity bmiciscsm:simAP_Node_EAInnovationView ;
911.   .
912.   bmiciscsm:simAP_Node_EAInnovationView
913.   rdf:type sim:AnnotationPropertySimilarity ;
914.   sim:annotationProperty rdfs:label ;
915.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
916.   sim:localSimilarityFunction sim:levenshtein ;
917.   sim:weight "1"^^xsd:float ;
918.   rdfs:label "AnnotationPropertySimilarity Node for EAInnovationView"@en ;
919.   .
920.   bmicm:technologyLayerElements_specializedBy_Node
921.   sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_Node_EAInno
       vationView ;
922.   .
923.   bmiciscsm:simOP_technologyLayerElements_specializedBy_Node_EAInnovationView
924.   rdf:type sim:ObjectPropertySimilarity ;
925.   sim:belongsToCaseView bmiciscsm:EAInnovationView ;
926.   sim:globalSimilarityFunction sim:average ;
927.   sim:weight "1"^^xsd:float ;
```

```
928.    rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Node
        for EAInnovationView"@en ;
929.    .
930.    bmiciscsm:simAP_Device_EAInnovationView
931.    rdf:type sim:AnnotationPropertySimilarity ;
932.    sim:annotationProperty rdfs:label ;
933.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
934.    sim:localSimilarityFunction sim:levenshtein ;
935.    sim:weight "1"^^xsd:float ;
936.    rdfs:label "AnnotationPropertySimilarity Device for EAInnovationView"@en ;
937.    .
938.    bmicm:technologyLayerElements_specializedBy_Device
939.    sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_Device_EAIn
        novationView ;
940.    .
941.    bmiciscsm:simOP_technologyLayerElements_specializedBy_Device_EAInnovationView
942.    rdf:type sim:ObjectPropertySimilarity ;
943.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
944.    sim:globalSimilarityFunction sim:average ;
945.    sim:weight "1"^^xsd:float ;
946.    rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Devic
        e for EAInnovationView"@en ;
947.    .
948.    archimateV3:TechnologyCollaboration
949.    sim:similarity bmiciscsm:simAP_TechnologyCollaboration_EAInnovationView ;
950.    .
951.    bmiciscsm:simAP_TechnologyCollaboration_EAInnovationView
952.    rdf:type sim:AnnotationPropertySimilarity ;
953.    sim:annotationProperty rdfs:label ;
954.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
955.    sim:localSimilarityFunction sim:levenshtein ;
956.    sim:weight "1"^^xsd:float ;
957.    rdfs:label "AnnotationPropertySimilarity TechnologyCollaboration for EAInnovatio
        nView"@en ;
958.    .
959.    bmicm:technologyLayerElements_specializedBy_TechnologyCollaboration
960.    sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_TechnologyC
        ollaboration_EAInnovationView ;
961.    .
962.    bmiciscsm:simOP_technologyLayerElements_specializedBy_TechnologyCollaboration_EA
        InnovationView
963.    rdf:type sim:ObjectPropertySimilarity ;
964.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
965.    sim:globalSimilarityFunction sim:average ;
966.    sim:weight "1"^^xsd:float ;
967.    rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Techn
        ologyCollaboration for EAInnovationView"@en ;
968.    .
969.    archi:InfrastructureInterface
970.    sim:similarity bmiciscsm:simAP_InfrastructureInterface_EAInnovationView ;
971.    .
972.    bmiciscsm:simAP_InfrastructureInterface_EAInnovationView
973.    rdf:type sim:AnnotationPropertySimilarity ;
974.    sim:annotationProperty rdfs:label ;
975.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
976.    sim:localSimilarityFunction sim:levenshtein ;
977.    sim:weight "1"^^xsd:float ;
978.    rdfs:label "AnnotationPropertySimilarity InfrastructureInterface for EAInnovatio
        nView"@en ;
979.    .
980.    bmicm:technologyLayerElements_specializedBy_InfrastructureInterface
981.    sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_Infrastruct
        ureInterface_EAInnovationView ;
982.    .
```

983. bmiciscsm:simOP_technologyLayerElements_specializedBy_InfrastructureInterface_EA
     InnovationView
984. rdf:type sim:ObjectPropertySimilarity ;
985. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
986. sim:globalSimilarityFunction sim:average ;
987. sim:weight "1"^^xsd:float ;
988. rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Infra
     structureInterface for EAInnovationView"@en ;
989. .
990. archi:CommunicationPath
991. sim:similarity bmiciscsm:simAP_CommunicationPath_EAInnovationView ;
992. .
993. bmiciscsm:simAP_CommunicationPath_EAInnovationView
994. rdf:type sim:AnnotationPropertySimilarity ;
995. sim:annotationProperty rdfs:label ;
996. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
997. sim:localSimilarityFunction sim:levenshtein ;
998. sim:weight "1"^^xsd:float ;
999. rdfs:label "AnnotationPropertySimilarity CommunicationPath for EAInnovationView"
     @en ;
1000. .
1001. bmicm:technologyLayerElements_specializedBy_CommunicationPath
1002. sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_Communicati
      onPath_EAInnovationView ;
1003. .
1004. bmiciscsm:simOP_technologyLayerElements_specializedBy_CommunicationPath_EAInnova
      tionView
1005. rdf:type sim:ObjectPropertySimilarity ;
1006. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1007. sim:globalSimilarityFunction sim:average ;
1008. sim:weight "1"^^xsd:float ;
1009. rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Commu
      nicationPath for EAInnovationView"@en ;
1010. .
1011. archi:Network
1012. sim:similarity bmiciscsm:simAP_Network_EAInnovationView ;
1013. .
1014. bmiciscsm:simAP_Network_EAInnovationView
1015. rdf:type sim:AnnotationPropertySimilarity ;
1016. sim:annotationProperty rdfs:label ;
1017. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1018. sim:localSimilarityFunction sim:levenshtein ;
1019. sim:weight "1"^^xsd:float ;
1020. rdfs:label "AnnotationPropertySimilarity Network for EAInnovationView"@en ;
1021. .
1022. bmicm:technologyLayerElements_specializedBy_Network
1023. sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_Network_EAI
      nnovationView ;
1024. .
1025. bmiciscsm:simOP_technologyLayerElements_specializedBy_Network_EAInnovationView
1026. rdf:type sim:ObjectPropertySimilarity ;
1027. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1028. sim:globalSimilarityFunction sim:average ;
1029. sim:weight "1"^^xsd:float ;
1030. rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Netwo
      rk for EAInnovationView"@en ;
1031. .
1032. archi:InfrastructureFunction
1033. sim:similarity bmiciscsm:simAP_InfrastructureFunction_EAInnovationView ;
1034. .
1035. bmiciscsm:simAP_InfrastructureFunction_EAInnovationView
1036. rdf:type sim:AnnotationPropertySimilarity ;
1037. sim:annotationProperty rdfs:label ;
1038. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1039. sim:localSimilarityFunction sim:levenshtein ;

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1040.    sim:weight "1"^^xsd:float ;
1041.    rdfs:label "AnnotationPropertySimilarity InfrastructureFunction for EAInnovation
         View"@en ;
1042.    .
1043.    bmicm:technologyLayerElements_specializedBy_InfrastructureFunction
1044.    sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_Infrastruct
         ureFunction_EAInnovationView ;
1045.    .
1046.    bmiciscsm:simOP_technologyLayerElements_specializedBy_InfrastructureFunction_EAI
         nnovationView
1047.    rdf:type sim:ObjectPropertySimilarity ;
1048.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1049.    sim:globalSimilarityFunction sim:average ;
1050.    sim:weight "1"^^xsd:float ;
1051.    rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Infra
         structureFunction for EAInnovationView"@en ;
1052.    .
1053.    archimateV3:TechnologyProcess
1054.    sim:similarity bmiciscsm:simAP_TechnologyProcess_EAInnovationView ;
1055.    .
1056.    bmiciscsm:simAP_TechnologyProcess_EAInnovationView
1057.    rdf:type sim:AnnotationPropertySimilarity ;
1058.    sim:annotationProperty rdfs:label ;
1059.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1060.    sim:localSimilarityFunction sim:levenshtein ;
1061.    sim:weight "1"^^xsd:float ;
1062.    rdfs:label "AnnotationPropertySimilarity TechnologyProcess for EAInnovationView"
         @en ;
1063.    .
1064.    bmicm:technologyLayerElements_specializedBy_TechnologyProcess
1065.    sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_TechnologyP
         rocess_EAInnovationView ;
1066.    .
1067.    bmiciscsm:simOP_technologyLayerElements_specializedBy_TechnologyProcess_EAInnova
         tionView
1068.    rdf:type sim:ObjectPropertySimilarity ;
1069.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1070.    sim:globalSimilarityFunction sim:average ;
1071.    sim:weight "1"^^xsd:float ;
1072.    rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Techn
         ologyProcess for EAInnovationView"@en ;
1073.    .
1074.    archimateV3:TechnologyInteraction
1075.    sim:similarity bmiciscsm:simAP_TechnologyInteraction_EAInnovationView ;
1076.    .
1077.    bmiciscsm:simAP_TechnologyInteraction_EAInnovationView
1078.    rdf:type sim:AnnotationPropertySimilarity ;
1079.    sim:annotationProperty rdfs:label ;
1080.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1081.    sim:localSimilarityFunction sim:levenshtein ;
1082.    sim:weight "1"^^xsd:float ;
1083.    rdfs:label "AnnotationPropertySimilarity TechnologyInteraction for EAInnovationV
         iew"@en ;
1084.    .
1085.    bmicm:technologyLayerElements_specializedBy_TechnologyInteraction
1086.    sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_TechnologyI
         nteraction_EAInnovationView ;
1087.    .
1088.    bmiciscsm:simOP_technologyLayerElements_specializedBy_TechnologyInteraction_EAIn
         novationView
1089.    rdf:type sim:ObjectPropertySimilarity ;
1090.    sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1091.    sim:globalSimilarityFunction sim:average ;
1092.    sim:weight "1"^^xsd:float ;
```

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1093. rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Techn
      ologyInteraction for EAInnovationView"@en ;
1094. .
1095. archimateV3:TechnologyEvent
1096. sim:similarity bmiciscsm:simAP_TechnologyEvent_EAInnovationView ;
1097. .
1098. bmiciscsm:simAP_TechnologyEvent_EAInnovationView
1099. rdf:type sim:AnnotationPropertySimilarity ;
1100. sim:annotationProperty rdfs:label ;
1101. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1102. sim:localSimilarityFunction sim:levenshtein ;
1103. sim:weight "1"^^xsd:float ;
1104. rdfs:label "AnnotationPropertySimilarity TechnologyEvent for EAInnovationView"@e
      n ;
1105. .
1106. bmicm:technologyLayerElements_specializedBy_TechnologyEvent
1107. sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_TechnologyE
      vent_EAInnovationView ;
1108. .
1109. bmiciscsm:simOP_technologyLayerElements_specializedBy_TechnologyEvent_EAInnovati
      onView
1110. rdf:type sim:ObjectPropertySimilarity ;
1111. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1112. sim:globalSimilarityFunction sim:average ;
1113. sim:weight "1"^^xsd:float ;
1114. rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Techn
      ologyEvent for EAInnovationView"@en ;
1115. .
1116. archi:Artifact
1117. sim:similarity bmiciscsm:simAP_Artifact_EAInnovationView ;
1118. .
1119. bmiciscsm:simAP_Artifact_EAInnovationView
1120. rdf:type sim:AnnotationPropertySimilarity ;
1121. sim:annotationProperty rdfs:label ;
1122. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1123. sim:localSimilarityFunction sim:levenshtein ;
1124. sim:weight "1"^^xsd:float ;
1125. rdfs:label "AnnotationPropertySimilarity Artifact for EAInnovationView"@en ;
1126. .
1127. bmicm:technologyLayerElements_specializedBy_Artifact
1128. sim:similarity bmiciscsm:simOP_technologyLayerElements_specializedBy_Artifact_EA
      InnovationView ;
1129. .
1130. bmiciscsm:simOP_technologyLayerElements_specializedBy_Artifact_EAInnovationView
1131. rdf:type sim:ObjectPropertySimilarity ;
1132. sim:belongsToCaseView bmiciscsm:EAInnovationView ;
1133. sim:globalSimilarityFunction sim:average ;
1134. sim:weight "1"^^xsd:float ;
1135. rdfs:label "ObjectPropertySimilarity technologyLayerElements_specializedBy_Artif
      act for EAInnovationView"@en ;
1136. .
1137. bic:BarriersToOvercome
1138. sim:similarity bmiciscsm:simAP_BarriersToOvercome_BMITransformationView ;
1139. .
1140. bmiciscsm:simAP_BarriersToOvercome_BMITransformationView
1141. rdf:type sim:AnnotationPropertySimilarity ;
1142. sim:annotationProperty rdfs:label ;
1143. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1144. sim:localSimilarityFunction sim:levenshtein ;
1145. sim:weight "1"^^xsd:float ;
1146. rdfs:label "AnnotationPropertySimilarity BarriersToOvercome for BMITransformatio
      nView"@en ;
1147. .
1148. bic:BenefitsOfInnovation
1149. sim:similarity bmiciscsm:simAP_BenefitsOfInnovation_BMITransformationView ;
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1150. .
1151. bmiciscsm:simAP_BenefitsOfInnovation_BMITransformationView
1152. rdf:type sim:AnnotationPropertySimilarity ;
1153. sim:annotationProperty rdfs:label ;
1154. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1155. sim:localSimilarityFunction sim:levenshtein ;
1156. sim:weight "1"^^xsd:float ;
1157. rdfs:label "AnnotationPropertySimilarity BenefitsOfInnovation for BMITransformationView"@en ;
1158. .
1159. bic:BusinessStateCharacteristics
1160. sim:similarity bmiciscsm:simAP_BusinessStateCharacteristics_BMITransformationView ;
1161. .
1162. bmiciscsm:simAP_BusinessStateCharacteristics_BMITransformationView
1163. rdf:type sim:AnnotationPropertySimilarity ;
1164. sim:annotationProperty rdfs:label ;
1165. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1166. sim:localSimilarityFunction sim:levenshtein ;
1167. sim:weight "1"^^xsd:float ;
1168. rdfs:label "AnnotationPropertySimilarity BusinessStateCharacteristics for BMITransformationView"@en ;
1169. .
1170. bic:Cases
1171. rdfs:subClassOf cbr:Case ;
1172. .
1173. bmiciscsm:simAP_CustomerBenefits_BMITransformationView
1174. rdf:type sim:AnnotationPropertySimilarity ;
1175. sim:annotationProperty rdfs:label ;
1176. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1177. sim:localSimilarityFunction sim:levenshtein ;
1178. sim:weight "1"^^xsd:float ;
1179. rdfs:label "AnnotationPropertySimilarity CustomerBenefits for BMITransformationView"@en ;
1180. .
1181. bic:Drivers
1182. sim:similarity bmiciscsm:simAP_Drivers_BMITransformationView ;
1183. .
1184. bmiciscsm:simAP_Drivers_BMITransformationView
1185. rdf:type sim:AnnotationPropertySimilarity ;
1186. sim:annotationProperty rdfs:label ;
1187. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1188. sim:localSimilarityFunction sim:levenshtein ;
1189. sim:weight "1"^^xsd:float ;
1190. rdfs:label "AnnotationPropertySimilarity Drivers for BMITransformationView"@en ;
1191. .
1192. bmiciscsm:simAP_FinancialBarriers_BMITransformationView
1193. rdf:type sim:AnnotationPropertySimilarity ;
1194. sim:annotationProperty rdfs:label ;
1195. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1196. sim:localSimilarityFunction sim:levenshtein ;
1197. sim:weight "1"^^xsd:float ;
1198. rdfs:label "AnnotationPropertySimilarity FinancialBarriers for BMITransformationView"@en ;
1199. .
1200. bmiciscsm:simAP_FinancialRessources_BMITransformationView
1201. rdf:type sim:AnnotationPropertySimilarity ;
1202. sim:annotationProperty rdfs:label ;
1203. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1204. sim:localSimilarityFunction sim:levenshtein ;
1205. sim:weight "1"^^xsd:float ;
1206. rdfs:label "AnnotationPropertySimilarity FinancialRessources for BMITransformationView"@en ;
1207. .
1208. bmiciscsm:simAP_HumanRessources_BMITransformationView

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1209. rdf:type sim:AnnotationPropertySimilarity ;
1210. sim:annotationProperty rdfs:label ;
1211. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1212. sim:localSimilarityFunction sim:levenshtein ;
1213. sim:weight "1"^^xsd:float ;
1214. rdfs:label "AnnotationPropertySimilarity HumanRessources for BMITransformationVi
      ew"@en ;
1215. .
1216. bic:Industries
1217. sim:similarity bmiciscsm:simAP_Industries_BMITransformationView ;
1218. .
1219. bmiciscsm:simAP_Industries_BMITransformationView
1220. rdf:type sim:AnnotationPropertySimilarity ;
1221. sim:annotationProperty rdfs:label ;
1222. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1223. sim:localSimilarityFunction sim:levenshtein ;
1224. sim:weight "1"^^xsd:float ;
1225. rdfs:label "AnnotationPropertySimilarity Industries for BMITransformationView"@e
      n ;
1226. .
1227. bmiciscsm:simAP_IntellectualBarriers_BMITransformationView
1228. rdf:type sim:AnnotationPropertySimilarity ;
1229. sim:annotationProperty rdfs:label ;
1230. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1231. sim:localSimilarityFunction sim:levenshtein ;
1232. sim:weight "1"^^xsd:float ;
1233. rdfs:label "AnnotationPropertySimilarity IntellectualBarriers for BMITransformat
      ionView"@en ;
1234. .
1235. bmiciscsm:simAP_IntellectualRessources_BMITransformationView
1236. rdf:type sim:AnnotationPropertySimilarity ;
1237. sim:annotationProperty rdfs:label ;
1238. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1239. sim:localSimilarityFunction sim:levenshtein ;
1240. sim:weight "1"^^xsd:float ;
1241. rdfs:label "AnnotationPropertySimilarity IntellectualRessources for BMITransform
      ationView"@en ;
1242. .
1243. bic:InvolvedParties
1244. sim:similarity bmiciscsm:simAP_InvolvedParties_BMITransformationView ;
1245. .
1246. bmiciscsm:simAP_InvolvedParties_BMITransformationView
1247. rdf:type sim:AnnotationPropertySimilarity ;
1248. sim:annotationProperty rdfs:label ;
1249. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1250. sim:localSimilarityFunction sim:levenshtein ;
1251. sim:weight "1"^^xsd:float ;
1252. rdfs:label "AnnotationPropertySimilarity InvolvedParties for BMITransformationVi
      ew"@en ;
1253. .
1254. bmiciscsm:simAP_InvolvedPartyBenefits_BMITransformationView
1255. rdf:type sim:AnnotationPropertySimilarity ;
1256. sim:annotationProperty rdfs:label ;
1257. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1258. sim:localSimilarityFunction sim:levenshtein ;
1259. sim:weight "1"^^xsd:float ;
1260. rdfs:label "AnnotationPropertySimilarity InvolvedPartyBenefits for BMITransforma
      tionView"@en ;
1261. .
1262. bic:OperationalViews
1263. sim:similarity bmiciscsm:simAP_OperationalViews_BMITransformationView ;
1264. .
1265. bmiciscsm:simAP_OperationalViews_BMITransformationView
1266. rdf:type sim:AnnotationPropertySimilarity ;
1267. sim:annotationProperty rdfs:label ;
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1268. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1269. sim:localSimilarityFunction sim:levenshtein ;
1270. sim:weight "1"^^xsd:float ;
1271. rdfs:label "AnnotationPropertySimilarity OperationalViews for BMITransformationV
      iew"@en ;
1272. .
1273. bmiciscsm:simAP_OrganisationalBarriers_BMITransformationView
1274. rdf:type sim:AnnotationPropertySimilarity ;
1275. sim:annotationProperty rdfs:label ;
1276. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1277. sim:localSimilarityFunction sim:levenshtein ;
1278. sim:weight "1"^^xsd:float ;
1279. rdfs:label "AnnotationPropertySimilarity OrganisationalBarriers for BMITransform
      ationView"@en ;
1280. .
1281. bic:OrganisationalViews
1282. sim:similarity bmiciscsm:simAP_OrganisationalViews_BMITransformationView ;
1283. .
1284. bmiciscsm:simAP_OrganisationalViews_BMITransformationView
1285. rdf:type sim:AnnotationPropertySimilarity ;
1286. sim:annotationProperty rdfs:label ;
1287. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1288. sim:localSimilarityFunction sim:levenshtein ;
1289. sim:weight "1"^^xsd:float ;
1290. rdfs:label "AnnotationPropertySimilarity OrganisationalViews for BMITransformati
      onView"@en ;
1291. .
1292. bmiciscsm:simAP_PhysicalBarriers_BMITransformationView
1293. rdf:type sim:AnnotationPropertySimilarity ;
1294. sim:annotationProperty rdfs:label ;
1295. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1296. sim:localSimilarityFunction sim:levenshtein ;
1297. sim:weight "1"^^xsd:float ;
1298. rdfs:label "AnnotationPropertySimilarity PhysicalBarriers for BMITransformationV
      iew"@en ;
1299. .
1300. bmiciscsm:simAP_PhysicalRessources_BMITransformationView
1301. rdf:type sim:AnnotationPropertySimilarity ;
1302. sim:annotationProperty rdfs:label ;
1303. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1304. sim:localSimilarityFunction sim:levenshtein ;
1305. sim:weight "1"^^xsd:float ;
1306. rdfs:label "AnnotationPropertySimilarity PhysicalRessources for BMITransformatio
      nView"@en ;
1307. .
1308. bic:RequiredRessources
1309. sim:similarity bmiciscsm:simAP_RequiredRessources_BMITransformationView ;
1310. .
1311. bmiciscsm:simAP_RequiredRessources_BMITransformationView
1312. rdf:type sim:AnnotationPropertySimilarity ;
1313. sim:annotationProperty rdfs:label ;
1314. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1315. sim:localSimilarityFunction sim:levenshtein ;
1316. sim:weight "1"^^xsd:float ;
1317. rdfs:label "AnnotationPropertySimilarity RequiredRessources for BMITransformatio
      nView"@en ;
1318. .
1319. bic:RisksOfInnovation
1320. sim:similarity bmiciscsm:simAP_RisksOfInnovation_BMITransformationView ;
1321. .
1322. bmiciscsm:simAP_RisksOfInnovation_BMITransformationView
1323. rdf:type sim:AnnotationPropertySimilarity ;
1324. sim:annotationProperty rdfs:label ;
1325. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1326. sim:localSimilarityFunction sim:levenshtein ;
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1327.     sim:weight "1"^^xsd:float ;
1328.     rdfs:label "AnnotationPropertySimilarity RisksOfInnovation for BMITransformation
          View"@en ;
1329.     .
1330.     bmiciscsm:simAP_StateAfterInnovating_BMITransformationView
1331.     rdf:type sim:AnnotationPropertySimilarity ;
1332.     sim:annotationProperty rdfs:label ;
1333.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1334.     sim:localSimilarityFunction sim:levenshtein ;
1335.     sim:weight "1"^^xsd:float ;
1336.     rdfs:label "AnnotationPropertySimilarity StateAfterInnovating for BMITransformat
          ionView"@en ;
1337.     .
1338.     bmiciscsm:simAP_StateBeforeInnovating_BMITransformationView
1339.     rdf:type sim:AnnotationPropertySimilarity ;
1340.     sim:annotationProperty rdfs:label ;
1341.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1342.     sim:localSimilarityFunction sim:levenshtein ;
1343.     sim:weight "1"^^xsd:float ;
1344.     rdfs:label "AnnotationPropertySimilarity StateBeforeInnovating for BMITransforma
          tionView"@en ;
1345.     .
1346.     bic:StrategicGoals
1347.     sim:similarity bmiciscsm:simAP_StrategicGoals_BMITransformationView ;
1348.     .
1349.     bmiciscsm:simAP_StrategicGoals_BMITransformationView
1350.     rdf:type sim:AnnotationPropertySimilarity ;
1351.     sim:annotationProperty rdfs:label ;
1352.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1353.     sim:localSimilarityFunction sim:levenshtein ;
1354.     sim:weight "1"^^xsd:float ;
1355.     rdfs:label "AnnotationPropertySimilarity StrategicGoals for BMITransformationVie
          w"@en ;
1356.     .
1357.     bmiciscsm:simAP_TechnologicalBarriers_BMITransformationView
1358.     rdf:type sim:AnnotationPropertySimilarity ;
1359.     sim:annotationProperty rdfs:label ;
1360.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1361.     sim:localSimilarityFunction sim:levenshtein ;
1362.     sim:weight "1"^^xsd:float ;
1363.     rdfs:label "AnnotationPropertySimilarity TechnologicalBarriers for BMITransforma
          tionView"@en ;
1364.     .
1365.     bic:ViewsOnBusiness
1366.     sim:similarity bmiciscsm:simAP_ViewsOnBusiness_BMITransformationView ;
1367.     .
1368.     bmiciscsm:simAP_ViewsOnBusiness_BMITransformationView
1369.     rdf:type sim:AnnotationPropertySimilarity ;
1370.     sim:annotationProperty rdfs:label ;
1371.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1372.     sim:localSimilarityFunction sim:levenshtein ;
1373.     sim:weight "1"^^xsd:float ;
1374.     rdfs:label "AnnotationPropertySimilarity ViewsOnBusiness for BMITransformationVi
          ew"@en ;
1375.     .
1376.     bic:businessStateCharacteristics_classifiesAs_ViewsOnBusiness
1377.     sim:similarity bmiciscsm:simOP_businessStateCharacteristics_classifiesAs_ViewsOn
          Business_BMITransformationView ;
1378.     .
1379.     bmiciscsm:simOP_businessStateCharacteristics_classifiesAs_ViewsOnBusiness_BMITra
          nsformationView
1380.     rdf:type sim:ObjectPropertySimilarity ;
1381.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1382.     sim:globalSimilarityFunction sim:average ;
1383.     sim:weight "1"^^xsd:float ;
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1384.   rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_classifiesAs_V
        iewsOnBusiness for BMITransformationView"@en ;
1385.   .
1386.   bic:cases_isSuccessfulInnovation
1387.   sim:similarity bmiciscsm:simDP_cases_isSuccessfullInnovation_BMITransformationVi
        ew ;
1388.   .
1389.   bmiciscsm:simDP_cases_isSuccessfullInnovation_BMITransformationView
1390.   rdf:type sim:DatatypePropertySimilarity ;
1391.   sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1392.   sim:localSimilarityFunction sim:equals ;
1393.   sim:weight "1"^^xsd:float ;
1394.   rdfs:label "DatatypePropertySimilarity cases_isSuccessfullInnovation for BMITran
        sformationView"@en ;
1395.   .
1396.   bic:cases_transformationDurationIs
1397.   sim:similarity bmiciscsm:simDP_cases_transformationDurationIs_BMITransformationV
        iew ;
1398.   .
1399.   bmiciscsm:simDP_cases_transformationDurationIs_BMITransformationView
1400.   rdf:type sim:DatatypePropertySimilarity ;
1401.   sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1402.   sim:localSimilarityFunction sim:softTFIDFJaroWinkler ;
1403.   sim:weight "1"^^xsd:float ;
1404.   rdfs:label "DatatypePropertySimilarity cases_transformationDurationIs for BMITra
        nsformationView"@en ;
1405.   .
1406.   bic:involvedParties_innovationBudgetIs
1407.   sim:similarity bmiciscsm:simDP_involvedParties_innovationBudgetIs_BMITransformat
        ionView ;
1408.   .
1409.   bmiciscsm:simDP_involvedParties_innovationBudgetIs_BMITransformationView
1410.   rdf:type sim:DatatypePropertySimilarity ;
1411.   sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1412.   sim:localSimilarityFunction sim:softTFIDFJaroWinkler ;
1413.   sim:weight "1"^^xsd:float ;
1414.   rdfs:label "DatatypePropertySimilarity involvedParties_innovationBudgetIs for BM
        ITransformationView"@en ;
1415.   .
1416.   bic:involvedParties_numberOfEmployeesIs
1417.   sim:similarity bmiciscsm:simDP_involvedParties_numberOfEmployeesIs_BMITransforma
        tionView ;
1418.   .
1419.   bmiciscsm:simDP_involvedParties_numberOfEmployeesIs_BMITransformationView
1420.   rdf:type sim:DatatypePropertySimilarity ;
1421.   sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1422.   sim:localSimilarityFunction sim:softTFIDFJaroWinkler ;
1423.   sim:weight "1"^^xsd:float ;
1424.   rdfs:label "DatatypePropertySimilarity involvedParties_numberOfEmployeesIs for B
        MITransformationView"@en ;
1425.   .
1426.   bic:involvedParties_turnoverIs
1427.   sim:similarity bmiciscsm:simDP_involvedParties_turnoverIs_BMITransformationView
        ;
1428.   .
1429.   bmiciscsm:simDP_involvedParties_turnoverIs_BMITransformationView
1430.   rdf:type sim:DatatypePropertySimilarity ;
1431.   sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1432.   sim:localSimilarityFunction sim:softTFIDFJaroWinkler ;
1433.   sim:weight "1"^^xsd:float ;
1434.   rdfs:label "DatatypePropertySimilarity involvedParties_turnoverIs for BMITransfo
        rmationView"@en ;
1435.   .
1436.   bic:involvedParties_isCaseCompany
```

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1437.  sim:similarity bmiciscsm:simDP_involvedParties_isCaseCompany_BMITransformationVi
       ew ;
1438.  .
1439.  bmiciscsm:simDP_involvedParties_isCaseCompany_BMITransformationView
1440.  rdf:type sim:DatatypePropertySimilarity ;
1441.  sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1442.  sim:localSimilarityFunction sim:equals ;
1443.  sim:weight "1"^^xsd:float ;
1444.  rdfs:label "DatatypePropertySimilarity involvedParties_isCaseCompany for BMITran
       sformationView"@en ;
1445.  .
1446.  bic:involvedParties_isPartnerCompany
1447.  sim:similarity bmiciscsm:simDP_involvedParties_isPartnerCompany_BMITransformatio
       nView ;
1448.  .
1449.  bmiciscsm:simDP_involvedParties_isPartnerCompany_BMITransformationView
1450.  rdf:type sim:DatatypePropertySimilarity ;
1451.  sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1452.  sim:localSimilarityFunction sim:equals ;
1453.  sim:weight "1"^^xsd:float ;
1454.  rdfs:label "DatatypePropertySimilarity involvedParties_isPartnerCompany for BMIT
       ransformationView"@en ;
1455.  .
1456.  bmicm:businessModelInnovationCases_composedOf_RequiredResources
1457.  sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_RequiredR
       esources_BMITransformationView ;
1458.  .
1459.  bmiciscsm:simOP_businessModelInnovationCases_composedOf_RequiredResources_BMITra
       nsformationView
1460.  rdf:type sim:ObjectPropertySimilarity ;
1461.  sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1462.  sim:globalSimilarityFunction sim:average ;
1463.  sim:weight "1"^^xsd:float ;
1464.  rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Req
       uiredResources for BMITransformationView"@en ;
1465.  .
1466.  bmicm:requiredResources_specializedBy_HumanRessources
1467.  sim:similarity bmiciscsm:simOP_requiredResources_specializedBy_HumanRessources_B
       MITransformationView ;
1468.  .
1469.  bmiciscsm:simOP_requiredResources_specializedBy_HumanRessources_BMITransformatio
       nView
1470.  rdf:type sim:ObjectPropertySimilarity ;
1471.  sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1472.  sim:globalSimilarityFunction sim:average ;
1473.  sim:weight "1"^^xsd:float ;
1474.  rdfs:label "ObjectPropertySimilarity requiredResources_specializedBy_HumanRessou
       rces for BMITransformationView"@en ;
1475.  .
1476.  bmicm:requiredResources_specializedBy_FinancialRessources
1477.  sim:similarity bmiciscsm:simOP_requiredResources_specializedBy_FinancialRessourc
       es_BMITransformationView ;
1478.  .
1479.  bmiciscsm:simOP_requiredResources_specializedBy_FinancialRessources_BMITransform
       ationView
1480.  rdf:type sim:ObjectPropertySimilarity ;
1481.  sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1482.  sim:globalSimilarityFunction sim:average ;
1483.  sim:weight "1"^^xsd:float ;
1484.  rdfs:label "ObjectPropertySimilarity requiredResources_specializedBy_FinancialRe
       ssources for BMITransformationView"@en ;
1485.  .
1486.  bmicm:requiredResources_specializedBy_IntellectualRessources
1487.  sim:similarity bmiciscsm:simOP_requiredResources_specializedBy_IntellectualResso
       urces_BMITransformationView ;
```

1488. .
1489. bmiciscsm:simOP_requiredResources_specializedBy_IntellectualRessources_BMITransf
      ormationView
1490. rdf:type sim:ObjectPropertySimilarity ;
1491. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1492. sim:globalSimilarityFunction sim:average ;
1493. sim:weight "1"^^xsd:float ;
1494. rdfs:label "ObjectPropertySimilarity requiredResources_specializedBy_Intellectua
      lRessources for BMITransformationView"@en ;
1495. .
1496. bmicm:requiredResources_specializedBy_PhysicalRessources
1497. sim:similarity bmiciscsm:simOP_requiredResources_specializedBy_PhysicalRessource
      s_BMITransformationView ;
1498. .
1499. bmiciscsm:simOP_requiredResources_specializedBy_PhysicalRessources_BMITransforma
      tionView
1500. rdf:type sim:ObjectPropertySimilarity ;
1501. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1502. sim:globalSimilarityFunction sim:average ;
1503. sim:weight "1"^^xsd:float ;
1504. rdfs:label "ObjectPropertySimilarity requiredResources_specializedBy_PhysicalRes
      sources for BMITransformationView"@en ;
1505. .
1506. bmicm:businessModelInnovationCases_composedOf_InvolvedParties
1507. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_InvolvedP
      arties_BMITransformationView ;
1508. .
1509. bmiciscsm:simOP_businessModelInnovationCases_composedOf_InvolvedParties_BMITrans
      formationView
1510. rdf:type sim:ObjectPropertySimilarity ;
1511. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1512. sim:globalSimilarityFunction sim:average ;
1513. sim:weight "1"^^xsd:float ;
1514. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Inv
      olvedParties for BMITransformationView"@en ;
1515. .
1516. bmicm:businessModelInnovationCases_composedOf_Drivers
1517. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_Drivers_B
      MITransformationView ;
1518. .
1519. bmiciscsm:simOP_businessModelInnovationCases_composedOf_Drivers_BMITransformatio
      nView
1520. rdf:type sim:ObjectPropertySimilarity ;
1521. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1522. sim:globalSimilarityFunction sim:average ;
1523. sim:weight "1"^^xsd:float ;
1524. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Dri
      vers for BMITransformationView"@en ;
1525. .
1526. bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation
1527. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_RisksOfIn
      novation_BMITransformationView ;
1528. .
1529. bmiciscsm:simOP_businessModelInnovationCases_composedOf_RisksOfInnovation_BMITra
      nsformationView
1530. rdf:type sim:ObjectPropertySimilarity ;
1531. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1532. sim:globalSimilarityFunction sim:average ;
1533. sim:weight "1"^^xsd:float ;
1534. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Ris
      ksOfInnovation for BMITransformationView"@en ;
1535. .
1536. bmicm:businessModelInnovationCases_composedOf_StrategicGoals
1537. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_Strategic
      Goals_BMITransformationView ;

1538. .
1539. bmiciscsm:simOP_businessModelInnovationCases_composedOf_StrategicGoals_BMITransf
     ormationView
1540. rdf:type sim:ObjectPropertySimilarity ;
1541. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1542. sim:globalSimilarityFunction sim:average ;
1543. sim:weight "1"^^xsd:float ;
1544. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Str
     ategicGoals for BMITransformationView"@en ;
1545. .
1546. bmicm:businessModelInnovationCases_composedOf_BusinessStateCharacteristics
1547. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_BusinessS
     tateCharacteristics_BMITransformationView ;
1548. .
1549. bmiciscsm:simOP_businessModelInnovationCases_composedOf_BusinessStateCharacteris
     tics_BMITransformationView
1550. rdf:type sim:ObjectPropertySimilarity ;
1551. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1552. sim:globalSimilarityFunction sim:average ;
1553. sim:weight "1"^^xsd:float ;
1554. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Bus
     inessStateCharacteristics for BMITransformationView"@en ;
1555. .
1556. bmicm:businessStateCharacteristics_specializedBy_StateAfterInnovating
1557. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_specializedBy_StateA
     fterInnovating_BMITransformationView ;
1558. .
1559. bmiciscsm:simOP_businessStateCharacteristics_specializedBy_StateAfterInnovating_
     BMITransformationView
1560. rdf:type sim:ObjectPropertySimilarity ;
1561. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1562. sim:globalSimilarityFunction sim:average ;
1563. sim:weight "1"^^xsd:float ;
1564. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_specializedBy_
     StateAfterInnovating for BMITransformationView"@en ;
1565. .
1566. bmicm:businessStateCharacteristics_specializedBy_StateBeforeInnovating
1567. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_specializedBy_StateB
     eforeInnovating_BMITransformationView ;
1568. .
1569. bmiciscsm:simOP_businessStateCharacteristics_specializedBy_StateBeforeInnovating
     _BMITransformationView
1570. rdf:type sim:ObjectPropertySimilarity ;
1571. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1572. sim:globalSimilarityFunction sim:average ;
1573. sim:weight "1"^^xsd:float ;
1574. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_specializedBy_
     StateBeforeInnovating for BMITransformationView"@en ;
1575. .
1576. bmicm:businessModelInnovationCases_composedOf_BenefitsOfInnovation
1577. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_BenefitsO
     fInnovation_BMITransformationView ;
1578. .
1579. bmiciscsm:simOP_businessModelInnovationCases_composedOf_BenefitsOfInnovation_BMI
     TransformationView
1580. rdf:type sim:ObjectPropertySimilarity ;
1581. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1582. sim:globalSimilarityFunction sim:average ;
1583. sim:weight "1"^^xsd:float ;
1584. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Ben
     efitsOfInnovation for BMITransformationView"@en ;
1585. .
1586. bmicm:benefitsOfInnovation_specializedBy_CustomerBenefits
1587. sim:similarity bmiciscsm:simOP_benefitsOfInnovation_specializedBy_CustomerBenefi
     ts_BMITransformationView ;

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1588. .
1589. bmiciscsm:simOP_benefitsOfInnovation_specializedBy_CustomerBenefits_BMITransform
      ationView
1590. rdf:type sim:ObjectPropertySimilarity ;
1591. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1592. sim:globalSimilarityFunction sim:average ;
1593. sim:weight "1"^^xsd:float ;
1594. rdfs:label "ObjectPropertySimilarity benefitsOfInnovation_specializedBy_Customer
      Benefits for BMITransformationView"@en ;
1595. .
1596. bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits
1597. sim:similarity bmiciscsm:simOP_benefitsOfInnovation_specializedBy_InvolvedPartyB
      enefits_BMITransformationView ;
1598. .
1599. bmiciscsm:simOP_benefitsOfInnovation_specializedBy_InvolvedPartyBenefits_BMITran
      sformationView
1600. rdf:type sim:ObjectPropertySimilarity ;
1601. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1602. sim:globalSimilarityFunction sim:average ;
1603. sim:weight "1"^^xsd:float ;
1604. rdfs:label "ObjectPropertySimilarity benefitsOfInnovation_specializedBy_Involved
      PartyBenefits for BMITransformationView"@en ;
1605. .
1606. bmicm:businessModelInnovationCases_composedOf_BarriersToOvercome
1607. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_BarriersT
      oOvercome_BMITransformationView ;
1608. .
1609. bmiciscsm:simOP_businessModelInnovationCases_composedOf_BarriersToOvercome_BMITr
      ansformationView
1610. rdf:type sim:ObjectPropertySimilarity ;
1611. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1612. sim:globalSimilarityFunction sim:average ;
1613. sim:weight "1"^^xsd:float ;
1614. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Bar
      riersToOvercome for BMITransformationView"@en ;
1615. .
1616. bmicm:barriersToOvercome_specializedBy_FinancialBarriers
1617. sim:similarity bmiciscsm:simOP_barriersToOvercome_specializedBy_FinancialBarrier
      s_BMITransformationView ;
1618. .
1619. bmiciscsm:simOP_barriersToOvercome_specializedBy_FinancialBarriers_BMITransforma
      tionView
1620. rdf:type sim:ObjectPropertySimilarity ;
1621. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1622. sim:globalSimilarityFunction sim:average ;
1623. sim:weight "1"^^xsd:float ;
1624. rdfs:label "ObjectPropertySimilarity barriersToOvercome_specializedBy_FinancialB
      arriers for BMITransformationView"@en ;
1625. .
1626. bmicm:barriersToOvercome_specializedBy_IntellectualBarriers
1627. sim:similarity bmiciscsm:simOP_barriersToOvercome_specializedBy_IntellectualBarr
      iers_BMITransformationView ;
1628. .
1629. bmiciscsm:simOP_barriersToOvercome_specializedBy_IntellectualBarriers_BMITransfo
      rmationView
1630. rdf:type sim:ObjectPropertySimilarity ;
1631. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1632. sim:globalSimilarityFunction sim:average ;
1633. sim:weight "1"^^xsd:float ;
1634. rdfs:label "ObjectPropertySimilarity barriersToOvercome_specializedBy_Intellectu
      alBarriers for BMITransformationView"@en ;
1635. .
1636. bmicm:barriersToOvercome_specializedBy_OrganisationalBarriers
1637. sim:similarity bmiciscsm:simOP_barriersToOvercome_specializedBy_OrganisationalBa
      rriers_BMITransformationView ;
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1638. .
1639. bmiciscsm:simOP_barriersToOvercome_specializedBy_OrganisationalBarriers_BMITransformationView
1640. rdf:type sim:ObjectPropertySimilarity ;
1641. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1642. sim:globalSimilarityFunction sim:average ;
1643. sim:weight "1"^^xsd:float ;
1644. rdfs:label "ObjectPropertySimilarity barriersToOvercome_specializedBy_OrganisationalBarriers for BMITransformationView"@en ;
1645. .
1646. bmicm:barriersToOvercome_specializedBy_PhysicalBarriers
1647. sim:similarity bmiciscsm:simOP_barriersToOvercome_specializedBy_PhysicalBarriers_BMITransformationView ;
1648. .
1649. bmiciscsm:simOP_barriersToOvercome_specializedBy_PhysicalBarriers_BMITransformationView
1650. rdf:type sim:ObjectPropertySimilarity ;
1651. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1652. sim:globalSimilarityFunction sim:average ;
1653. sim:weight "1"^^xsd:float ;
1654. rdfs:label "ObjectPropertySimilarity barriersToOvercome_specializedBy_PhysicalBarriers for BMITransformationView"@en ;
1655. .
1656. bmicm:barriersToOvercome_specializedBy_TechnologicalBarriers
1657. sim:similarity bmiciscsm:simOP_barriersToOvercome_specializedBy_TechnologicalBarriers_BMITransformationView ;
1658. .
1659. bmiciscsm:simOP_barriersToOvercome_specializedBy_TechnologicalBarriers_BMITransformationView
1660. rdf:type sim:ObjectPropertySimilarity ;
1661. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1662. sim:globalSimilarityFunction sim:average ;
1663. sim:weight "1"^^xsd:float ;
1664. rdfs:label "ObjectPropertySimilarity barriersToOvercome_specializedBy_TechnologicalBarriers for BMITransformationView"@en ;
1665. .
1666. bmicm:businessModelInnovationCases_composedOf_Industries
1667. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_Industries_BMITransformationView ;
1668. .
1669. bmiciscsm:simOP_businessModelInnovationCases_composedOf_Industries_BMITransformationView
1670. rdf:type sim:ObjectPropertySimilarity ;
1671. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1672. sim:globalSimilarityFunction sim:average ;
1673. sim:weight "1"^^xsd:float ;
1674. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Industries for BMITransformationView"@en ;
1675. .
1676. bmic:businessStateCharacteristics_aggregates_Channels
1677. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_Channels_BMITransformationView ;
1678. .
1679. bmiciscsm:simOP_businessStateCharacteristics_aggregates_Channels_BMITransformationView
1680. rdf:type sim:ObjectPropertySimilarity ;
1681. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1682. sim:globalSimilarityFunction sim:average ;
1683. sim:weight "1"^^xsd:float ;
1684. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Channels for BMITransformationView"@en ;
1685. .
1686. bmic:businessStateCharacteristics_aggregates_CostStructureElements
1687. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_CostStructureElements_BMITransformationView ;

1688. .
1689. bmiciscsm:simOP_businessStateCharacteristics_aggregates_CostStructureElements_BM
ITransformationView
1690. rdf:type sim:ObjectPropertySimilarity ;
1691. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1692. sim:globalSimilarityFunction sim:average ;
1693. sim:weight "1"^^xsd:float ;
1694. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Cos
tStructureElements for BMITransformationView"@en ;
1695. .
1696. bmic:businessStateCharacteristics_aggregates_CustomerRelationships
1697. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_CustomerR
elationships_BMITransformationView ;
1698. .
1699. bmiciscsm:simOP_businessStateCharacteristics_aggregates_CustomerRelationships_BM
ITransformationView
1700. rdf:type sim:ObjectPropertySimilarity ;
1701. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1702. sim:globalSimilarityFunction sim:average ;
1703. sim:weight "1"^^xsd:float ;
1704. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Cus
tomerRelationships for BMITransformationView"@en ;
1705. .
1706. bmic:businessStateCharacteristics_aggregates_CustomerSegments
1707. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_CustomerS
egments_BMITransformationView ;
1708. .
1709. bmiciscsm:simOP_businessStateCharacteristics_aggregates_CustomerSegments_BMITran
sformationView
1710. rdf:type sim:ObjectPropertySimilarity ;
1711. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1712. sim:globalSimilarityFunction sim:average ;
1713. sim:weight "1"^^xsd:float ;
1714. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Cus
tomerSegments for BMITransformationView"@en ;
1715. .
1716. bmic:businessStateCharacteristics_aggregates_KeyActivities
1717. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_KeyActivi
ties_BMITransformationView ;
1718. .
1719. bmiciscsm:simOP_businessStateCharacteristics_aggregates_KeyActivities_BMITransfo
rmationView
1720. rdf:type sim:ObjectPropertySimilarity ;
1721. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1722. sim:globalSimilarityFunction sim:average ;
1723. sim:weight "1"^^xsd:float ;
1724. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Key
Activities for BMITransformationView"@en ;
1725. .
1726. bmic:businessStateCharacteristics_aggregates_KeyPartners
1727. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_KeyPartne
rs_BMITransformationView ;
1728. .
1729. bmiciscsm:simOP_businessStateCharacteristics_aggregates_KeyPartners_BMITransform
ationView
1730. rdf:type sim:ObjectPropertySimilarity ;
1731. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1732. sim:globalSimilarityFunction sim:average ;
1733. sim:weight "1"^^xsd:float ;
1734. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Key
Partners for BMITransformationView"@en ;
1735. .
1736. bmic:businessStateCharacteristics_aggregates_KeyResources
1737. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_KeyResour
ces_BMITransformationView ;

1738. .
1739. bmiciscsm:simOP_businessStateCharacteristics_aggregates_KeyResources_BMITransfor
      mationView
1740. rdf:type sim:ObjectPropertySimilarity ;
1741. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1742. sim:globalSimilarityFunction sim:average ;
1743. sim:weight "1"^^xsd:float ;
1744. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Key
      Resources for BMITransformationView"@en ;
1745. .
1746. bmic:businessStateCharacteristics_aggregates_OfferingValues
1747. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_OfferingV
      alues_BMITransformationView ;
1748. .
1749. bmiciscsm:simOP_businessStateCharacteristics_aggregates_OfferingValues_BMITransf
      ormationView
1750. rdf:type sim:ObjectPropertySimilarity ;
1751. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1752. sim:globalSimilarityFunction sim:average ;
1753. sim:weight "1"^^xsd:float ;
1754. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Off
      eringValues for BMITransformationView"@en ;
1755. .
1756. bmic:businessStateCharacteristics_aggregates_Offerings
1757. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_Offerings
      _BMITransformationView ;
1758. .
1759. bmiciscsm:simOP_businessStateCharacteristics_aggregates_Offerings_BMITransformat
      ionView
1760. rdf:type sim:ObjectPropertySimilarity ;
1761. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1762. sim:globalSimilarityFunction sim:average ;
1763. sim:weight "1"^^xsd:float ;
1764. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Off
      erings for BMITransformationView"@en ;
1765. .
1766. bmic:businessStateCharacteristics_aggregates_RevenueStreams
1767. sim:similarity bmiciscsm:simOP_businessStateCharacteristics_aggregates_RevenueSt
      reams_BMITransformationView ;
1768. .
1769. bmiciscsm:simOP_businessStateCharacteristics_aggregates_RevenueStreams_BMITransf
      ormationView
1770. rdf:type sim:ObjectPropertySimilarity ;
1771. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1772. sim:globalSimilarityFunction sim:average ;
1773. sim:weight "1"^^xsd:float ;
1774. rdfs:label "ObjectPropertySimilarity businessStateCharacteristics_aggregates_Rev
      enueStreams for BMITransformationView"@en ;
1775. .
1776. bmic:BusinessModelElements
1777. sim:similarity bmiciscsm:simAP_BusinessModelElements_BMITransformationView ;
1778. .
1779. bmiciscsm:simAP_BusinessModelElements_BMITransformationView
1780. rdf:type sim:AnnotationPropertySimilarity ;
1781. sim:annotationProperty rdfs:label ;
1782. sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1783. sim:localSimilarityFunction sim:levenshtein ;
1784. sim:weight "1"^^xsd:float ;
1785. rdfs:label "AnnotationPropertySimilarity BusinessModelElements for BMITransforma
      tionView"@en ;
1786. .
1787. bmic:BusinessModelInnovationCases
1788. sim:similarity bmiciscsm:simCS_Cases_BMITransformationView ;
1789. .
1790. bmiciscsm:simCS_Cases_BMITransformationView

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1791.    rdf:type sim:RootCaseClassSimilarity ;
1792.    sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1793.    sim:globalSimilarityFunction sim:average ;
1794.    rdfs:label "RootCaseClassSimiliarity Cases for BMITransformationView"@en ;
1795.    .
1796.
1797.    bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics
1798.    sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_Construct
         ionIndustrySpecifics_BMITransformationView ;
1799.    .
1800.    bmiciscsm:simOP_businessModelInnovationCases_composedOf_ConstructionIndustrySpec
         ifics_BMITransformationView
1801.    rdf:type sim:ObjectPropertySimilarity ;
1802.    sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1803.    sim:globalSimilarityFunction sim:average ;
1804.    sim:weight "1"^^xsd:float ;
1805.    rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Con
         structionIndustrySpecifics for BMITransformationView"@en ;
1806.    .
1807.    ci:CompanyExecutionAreas
1808.    sim:similarity bmiciscsm:simAP_CompanyExecutionAreas_BMITransformationView ;
1809.    .
1810.    bmiciscsm:simAP_CompanyExecutionAreas_BMITransformationView
1811.    rdf:type sim:AnnotationPropertySimilarity ;
1812.    sim:annotationProperty rdfs:label ;
1813.    sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1814.    sim:localSimilarityFunction sim:levenshtein ;
1815.    sim:weight "1"^^xsd:float ;
1816.    rdfs:label "AnnotationPropertySimilarity CompanyExecutionAreas for BMITransforma
         tionView"@en ;
1817.    .
1818.    bmicm:constructionIndustrySpecifics_specializedBy_CompanyExecutionAreas
1819.    sim:similarity bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_Compa
         nyExecutionAreas_BMITransformationView ;
1820.    .
1821.    bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_CompanyExecutionArea
         s_BMITransformationView
1822.    rdf:type sim:ObjectPropertySimilarity ;
1823.    sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1824.    sim:globalSimilarityFunction sim:average ;
1825.    sim:weight "1"^^xsd:float ;
1826.    rdfs:label "ObjectPropertySimilarity constructionIndustrySpecifics_specializedBy
         _CompanyExecutionAreas for BMITransformationView"@en ;
1827.    .
1828.    ci:ConstructionPlanningPhases
1829.    sim:similarity bmiciscsm:simAP_ConstructionPlanningPhases_BMITransformationView
         ;
1830.    .
1831.    bmiciscsm:simAP_ConstructionPlanningPhases_BMITransformationView
1832.    rdf:type sim:AnnotationPropertySimilarity ;
1833.    sim:annotationProperty rdfs:label ;
1834.    sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1835.    sim:localSimilarityFunction sim:levenshtein ;
1836.    sim:weight "1"^^xsd:float ;
1837.    rdfs:label "AnnotationPropertySimilarity ConstructionPlanningPhases for BMITrans
         formationView"@en ;
1838.    .
1839.    bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases
1840.    sim:similarity bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_Const
         ructionPlanningPhases_BMITransformationView ;
1841.    .
1842.    bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_ConstructionPlanning
         Phases_BMITransformationView
1843.    rdf:type sim:ObjectPropertySimilarity ;
1844.    sim:belongsToCaseView bmiciscsm:BMITransformationView ;
```

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1845.     sim:globalSimilarityFunction sim:average ;
1846.     sim:weight "1"^^xsd:float ;
1847.     rdfs:label "ObjectPropertySimilarity constructionIndustrySpecifics_specializedBy
          _ConstructionPlanningPhases for BMITransformationView"@en ;
1848. .
1849. ci:ConstructionRelatedCompanies
1850.     sim:similarity bmiciscsm:simAP_ConstructionRelatedCompanies_BMITransformationVie
          w ;
1851. .
1852. bmiciscsm:simAP_ConstructionRelatedCompanies_BMITransformationView
1853.     rdf:type sim:AnnotationPropertySimilarity ;
1854.     sim:annotationProperty rdfs:label ;
1855.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1856.     sim:localSimilarityFunction sim:levenshtein ;
1857.     sim:weight "1"^^xsd:float ;
1858.     rdfs:label "AnnotationPropertySimilarity ConstructionRelatedCompanies for BMITra
          nsformationView"@en ;
1859. .
1860. bmicm:constructionIndustrySpecifics_specializedBy_ConstructionRelatedCompanies
1861.     sim:similarity bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_Const
          ructionRelatedCompanies_BMITransformationView ;
1862. .
1863. bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_ConstructionRelatedC
          ompanies_BMITransformationView
1864.     rdf:type sim:ObjectPropertySimilarity ;
1865.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1866.     sim:globalSimilarityFunction sim:average ;
1867.     sim:weight "1"^^xsd:float ;
1868.     rdfs:label "ObjectPropertySimilarity constructionIndustrySpecifics_specializedBy
          _ConstructionRelatedCompanies for BMITransformationView"@en ;
1869. .
1870. ci:ConstructionStakeholderTypes
1871.     sim:similarity bmiciscsm:simAP_ConstructionStakeholderTypes_BMITransformationVie
          w ;
1872. .
1873. bmiciscsm:simAP_ConstructionStakeholderTypes_BMITransformationView
1874.     rdf:type sim:AnnotationPropertySimilarity ;
1875.     sim:annotationProperty rdfs:label ;
1876.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1877.     sim:localSimilarityFunction sim:levenshtein ;
1878.     sim:weight "1"^^xsd:float ;
1879.     rdfs:label "AnnotationPropertySimilarity ConstructionStakeholderTypes for BMITra
          nsformationView"@en ;
1880. .
1881. bmicm:constructionIndustrySpecifics_specializedBy_ConstructionStakeholderTypes
1882.     sim:similarity bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_Const
          ructionStakeholderTypes_BMITransformationView ;
1883. .
1884. bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_ConstructionStakehol
          derTypes_BMITransformationView
1885.     rdf:type sim:ObjectPropertySimilarity ;
1886.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1887.     sim:globalSimilarityFunction sim:average ;
1888.     sim:weight "1"^^xsd:float ;
1889.     rdfs:label "ObjectPropertySimilarity constructionIndustrySpecifics_specializedBy
          _ConstructionStakeholderTypes for BMITransformationView"@en ;
1890. .
1891. ci:ExecutionModels
1892.     sim:similarity bmiciscsm:simAP_ExecutionModels_BMITransformationView ;
1893. .
1894. bmiciscsm:simAP_ExecutionModels_BMITransformationView
1895.     rdf:type sim:AnnotationPropertySimilarity ;
1896.     sim:annotationProperty rdfs:label ;
1897.     sim:belongsToCaseView bmiciscsm:BMITransformationView ;
1898.     sim:localSimilarityFunction sim:levenshtein ;
```

1899. `sim:weight "1"^^xsd:float ;`
1900. `rdfs:label "AnnotationPropertySimilarity ExecutionModels for BMITransformationVi`
     `ew"@en ;`
1901. `.`
1902. `bmicm:constructionIndustrySpecifics_specializedBy_ExecutionModels`
1903. `sim:similarity bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_Execu`
     `tionModels_BMITransformationView ;`
1904. `.`
1905. `bmiciscsm:simOP_constructionIndustrySpecifics_specializedBy_ExecutionModels_BMIT`
     `ransformationView`
1906. `rdf:type sim:ObjectPropertySimilarity ;`
1907. `sim:belongsToCaseView bmiciscsm:BMITransformationView ;`
1908. `sim:globalSimilarityFunction sim:average ;`
1909. `sim:weight "1"^^xsd:float ;`
1910. `rdfs:label "ObjectPropertySimilarity constructionIndustrySpecifics_specializedBy`
     `_ExecutionModels for BMITransformationView"@en ;`
1911. `.`
1912. `bmic:BusinessModelInnovationCases`
1913. `sim:similarity bmiciscsm:simCS_Cases_BMIPossibilitiesView ;`
1914. `.`
1915. `bmiciscsm:simCS_Cases_BMIPossibilitiesView`
1916. `rdf:type sim:RootCaseClassSimilarity ;`
1917. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
1918. `sim:globalSimilarityFunction sim:average ;`
1919. `rdfs:label "RootCaseClassSimiliarity Cases for BMIPossibilitiesView"@en ;`
1920. `.`
1921. `bmicm:businessModelInnovationCases_composedOf_InfrastructureElements`
1922. `sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_Infrastru`
     `ctureElements_BMIPossibilitiesView ;`
1923. `.`
1924. `bmiciscsm:simOP_businessModelInnovationCases_composedOf_InfrastructureElements_B`
     `MIPossibilitiesView`
1925. `rdf:type sim:ObjectPropertySimilarity ;`
1926. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
1927. `sim:globalSimilarityFunction sim:average ;`
1928. `sim:weight "1"^^xsd:float ;`
1929. `rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Inf`
     `rastructureElements for BMIPossibilitiesView"@en ;`
1930. `.`
1931. `bmicm:infrastructureElements_specializedBy_KeyActivityElements`
1932. `sim:similarity bmiciscsm:simOP_infrastructureElements_specializedBy_KeyActivityE`
     `lements_BMIPossibilitiesView ;`
1933. `.`
1934. `bmiciscsm:simOP_infrastructureElements_specializedBy_KeyActivityElements_BMIPoss`
     `ibilitiesView`
1935. `rdf:type sim:ObjectPropertySimilarity ;`
1936. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
1937. `sim:globalSimilarityFunction sim:average ;`
1938. `sim:weight "1"^^xsd:float ;`
1939. `rdfs:label "ObjectPropertySimilarity infrastructureElements_specializedBy_KeyAct`
     `ivityElements for BMIPossibilitiesView"@en ;`
1940. `.`
1941. `bm:CoreProcess`
1942. `sim:similarity bmiciscsm:simAP_CoreProcess_BMIPossibilitiesView ;`
1943. `.`
1944. `bmiciscsm:simAP_CoreProcess_BMIPossibilitiesView`
1945. `rdf:type sim:AnnotationPropertySimilarity ;`
1946. `sim:annotationProperty rdfs:label ;`
1947. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
1948. `sim:localSimilarityFunction sim:levenshtein ;`
1949. `sim:weight "1"^^xsd:float ;`
1950. `rdfs:label "AnnotationPropertySimilarity CoreProcess for BMIPossibilitiesView"@e`
     `n ;`
1951. `.`
1952. `bmicm:keyActivityElements_specializedBy_CoreProcess`

1953. `sim:similarity bmiciscsm:simOP_keyActivityElements_specializedBy_CoreProcess_BMI`
`PossibilitiesView ;`
1954. `.`
1955. `bmiciscsm:simOP_keyActivityElements_specializedBy_CoreProcess_BMIPossibilitiesVi`
`ew`
1956. `rdf:type sim:ObjectPropertySimilarity ;`
1957. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
1958. `sim:globalSimilarityFunction sim:average ;`
1959. `sim:weight "1"^^xsd:float ;`
1960. `rdfs:label "ObjectPropertySimilarity keyActivityElements_specializedBy_CoreProce`
`ss for BMIPossibilitiesView"@en ;`
1961. `.`
1962. `bm:SupportProcess`
1963. `sim:similarity bmiciscsm:simAP_SupportProcess_BMIPossibilitiesView ;`
1964. `.`
1965. `bmiciscsm:simAP_SupportProcess_BMIPossibilitiesView`
1966. `rdf:type sim:AnnotationPropertySimilarity ;`
1967. `sim:annotationProperty rdfs:label ;`
1968. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
1969. `sim:localSimilarityFunction sim:levenshtein ;`
1970. `sim:weight "1"^^xsd:float ;`
1971. `rdfs:label "AnnotationPropertySimilarity SupportProcess for BMIPossibilitiesView`
`"@en ;`
1972. `.`
1973. `bmicm:keyActivityElements_specializedBy_SupportProcess`
1974. `sim:similarity bmiciscsm:simOP_keyActivityElements_specializedBy_SupportProcess_`
`BMIPossibilitiesView ;`
1975. `.`
1976. `bmiciscsm:simOP_keyActivityElements_specializedBy_SupportProcess_BMIPossibilitie`
`sView`
1977. `rdf:type sim:ObjectPropertySimilarity ;`
1978. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
1979. `sim:globalSimilarityFunction sim:average ;`
1980. `sim:weight "1"^^xsd:float ;`
1981. `rdfs:label "ObjectPropertySimilarity keyActivityElements_specializedBy_SupportPr`
`ocess for BMIPossibilitiesView"@en ;`
1982. `.`
1983. `bmicm:infrastructureElements_specializedBy_KeyPartnerElements`
1984. `sim:similarity bmiciscsm:simOP_infrastructureElements_specializedBy_KeyPartnerEl`
`ements_BMIPossibilitiesView ;`
1985. `.`
1986. `bmiciscsm:simOP_infrastructureElements_specializedBy_KeyPartnerElements_BMIPossi`
`bilitiesView`
1987. `rdf:type sim:ObjectPropertySimilarity ;`
1988. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
1989. `sim:globalSimilarityFunction sim:average ;`
1990. `sim:weight "1"^^xsd:float ;`
1991. `rdfs:label "ObjectPropertySimilarity infrastructureElements_specializedBy_KeyPar`
`tnerElements for BMIPossibilitiesView"@en ;`
1992. `.`
1993. `bm:AcademicInstitute`
1994. `sim:similarity bmiciscsm:simAP_AcademicInstitute_BMIPossibilitiesView ;`
1995. `.`
1996. `bmiciscsm:simAP_AcademicInstitute_BMIPossibilitiesView`
1997. `rdf:type sim:AnnotationPropertySimilarity ;`
1998. `sim:annotationProperty rdfs:label ;`
1999. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2000. `sim:localSimilarityFunction sim:levenshtein ;`
2001. `sim:weight "1"^^xsd:float ;`
2002. `rdfs:label "AnnotationPropertySimilarity AcademicInstitute for BMIPossibilitiesV`
`iew"@en ;`
2003. `.`
2004. `bmicm:keyPartnerElements_specializedBy_AcademicInstitute`
2005. `sim:similarity bmiciscsm:simOP_keyPartnerElements_specializedBy_AcademicInstitut`
`e_BMIPossibilitiesView ;`

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2006. .
2007. bmiciscsm:simOP_keyPartnerElements_specializedBy_AcademicInstitute_BMIPossibilit
      iesView
2008. rdf:type sim:ObjectPropertySimilarity ;
2009. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2010. sim:globalSimilarityFunction sim:average ;
2011. sim:weight "1"^^xsd:float ;
2012. rdfs:label "ObjectPropertySimilarity keyPartnerElements_specializedBy_AcademicIn
      stitute for BMIPossibilitiesView"@en ;
2013. .
2014. bm:Business
2015. sim:similarity bmiciscsm:simAP_Business_BMIPossibilitiesView ;
2016. .
2017. bmiciscsm:simAP_Business_BMIPossibilitiesView
2018. rdf:type sim:AnnotationPropertySimilarity ;
2019. sim:annotationProperty rdfs:label ;
2020. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2021. sim:localSimilarityFunction sim:levenshtein ;
2022. sim:weight "1"^^xsd:float ;
2023. rdfs:label "AnnotationPropertySimilarity Business for BMIPossibilitiesView"@en ;
2024. .
2025. bmicm:keyPartnerElements_specializedBy_Business
2026. sim:similarity bmiciscsm:simOP_keyPartnerElements_specializedBy_Business_BMIPoss
      ibilitiesView ;
2027. .
2028. bmiciscsm:simOP_keyPartnerElements_specializedBy_Business_BMIPossibilitiesView
2029. rdf:type sim:ObjectPropertySimilarity ;
2030. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2031. sim:globalSimilarityFunction sim:average ;
2032. sim:weight "1"^^xsd:float ;
2033. rdfs:label "ObjectPropertySimilarity keyPartnerElements_specializedBy_Business f
      or BMIPossibilitiesView"@en ;
2034. .
2035. bm:Government
2036. sim:similarity bmiciscsm:simAP_Government_BMIPossibilitiesView ;
2037. .
2038. bmiciscsm:simAP_Government_BMIPossibilitiesView
2039. rdf:type sim:AnnotationPropertySimilarity ;
2040. sim:annotationProperty rdfs:label ;
2041. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2042. sim:localSimilarityFunction sim:levenshtein ;
2043. sim:weight "1"^^xsd:float ;
2044. rdfs:label "AnnotationPropertySimilarity Government for BMIPossibilitiesView"@en
       ;
2045. .
2046. bmicm:keyPartnerElements_specializedBy_Government
2047. sim:similarity bmiciscsm:simOP_keyPartnerElements_specializedBy_Government_BMIPo
      ssibilitiesView ;
2048. .
2049. bmiciscsm:simOP_keyPartnerElements_specializedBy_Government_BMIPossibilitiesView
2050. rdf:type sim:ObjectPropertySimilarity ;
2051. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2052. sim:globalSimilarityFunction sim:average ;
2053. sim:weight "1"^^xsd:float ;
2054. rdfs:label "ObjectPropertySimilarity keyPartnerElements_specializedBy_Government
       for BMIPossibilitiesView"@en ;
2055. .
2056. bm:Individual
2057. sim:similarity bmiciscsm:simAP_Individual_BMIPossibilitiesView ;
2058. .
2059. bmiciscsm:simAP_Individual_BMIPossibilitiesView
2060. rdf:type sim:AnnotationPropertySimilarity ;
2061. sim:annotationProperty rdfs:label ;
2062. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2063. sim:localSimilarityFunction sim:levenshtein ;
```

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2064.   sim:weight "1"^^xsd:float ;
2065.   rdfs:label "AnnotationPropertySimilarity Individual for BMIPossibilitiesView"@en
          ;
2066.   .
2067.   bmicm:keyPartnerElements_specializedBy_Individual
2068.   sim:similarity bmiciscsm:simOP_keyPartnerElements_specializedBy_Individual_BMIPo
          ssibilitiesView ;
2069.   .
2070.   bmiciscsm:simOP_keyPartnerElements_specializedBy_Individual_BMIPossibilitiesView
2071.   rdf:type sim:ObjectPropertySimilarity ;
2072.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2073.   sim:globalSimilarityFunction sim:average ;
2074.   sim:weight "1"^^xsd:float ;
2075.   rdfs:label "ObjectPropertySimilarity keyPartnerElements_specializedBy_Individual
          for BMIPossibilitiesView"@en ;
2076.   .

2077.   bmicm:infrastructureElements_specializedBy_KeyResourceElements
2078.   sim:similarity bmiciscsm:simOP_infrastructureElements_specializedBy_KeyResourceE
          lements_BMIPossibilitiesView ;
2079.   .
2080.   bmiciscsm:simOP_infrastructureElements_specializedBy_KeyResourceElements_BMIPoss
          ibilitiesView
2081.   rdf:type sim:ObjectPropertySimilarity ;
2082.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2083.   sim:globalSimilarityFunction sim:average ;
2084.   sim:weight "1"^^xsd:float ;
2085.   rdfs:label "ObjectPropertySimilarity infrastructureElements_specializedBy_KeyRes
          ourceElements for BMIPossibilitiesView"@en ;
2086.   .
2087.   bm:Human
2088.   sim:similarity bmiciscsm:simAP_Human_BMIPossibilitiesView ;
2089.   .
2090.   bmiciscsm:simAP_Human_BMIPossibilitiesView
2091.   rdf:type sim:AnnotationPropertySimilarity ;
2092.   sim:annotationProperty rdfs:label ;
2093.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2094.   sim:localSimilarityFunction sim:levenshtein ;
2095.   sim:weight "1"^^xsd:float ;
2096.   rdfs:label "AnnotationPropertySimilarity Human for BMIPossibilitiesView"@en ;
2097.   .
2098.   bmicm:keyResourceElements_specializedBy_Human
2099.   sim:similarity bmiciscsm:simOP_keyResourceElements_specializedBy_Human_BMIPossib
          ilitiesView ;
2100.   .
2101.   bmiciscsm:simOP_keyResourceElements_specializedBy_Human_BMIPossibilitiesView
2102.   rdf:type sim:ObjectPropertySimilarity ;
2103.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2104.   sim:globalSimilarityFunction sim:average ;
2105.   sim:weight "1"^^xsd:float ;
2106.   rdfs:label "ObjectPropertySimilarity keyResourceElements_specializedBy_Human for
          BMIPossibilitiesView"@en ;
2107.   .
2108.   bmicm:keyResourceElements_specializedBy_FinancialElements
2109.   sim:similarity bmiciscsm:simOP_keyResourceElements_specializedBy_FinancialElemen
          ts_BMIPossibilitiesView ;
2110.   .
2111.   bmiciscsm:simOP_keyResourceElements_specializedBy_FinancialElements_BMIPossibili
          tiesView
2112.   rdf:type sim:ObjectPropertySimilarity ;
2113.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2114.   sim:globalSimilarityFunction sim:average ;
2115.   sim:weight "1"^^xsd:float ;
2116.   rdfs:label "ObjectPropertySimilarity keyResourceElements_specializedBy_Financial
          Elements for BMIPossibilitiesView"@en ;
```

```
2117. .
2118. bm:Cash
2119. sim:similarity bmiciscsm:simAP_Cash_BMIPossibilitiesView ;
2120. .
2121. bmiciscsm:simAP_Cash_BMIPossibilitiesView
2122. rdf:type sim:AnnotationPropertySimilarity ;
2123. sim:annotationProperty rdfs:label ;
2124. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2125. sim:localSimilarityFunction sim:levenshtein ;
2126. sim:weight "1"^^xsd:float ;
2127. rdfs:label "AnnotationPropertySimilarity Cash for BMIPossibilitiesView"@en ;
2128. .
2129. bmicm:financialElements_specializedBy_Cash
2130. sim:similarity bmiciscsm:simOP_financialElements_specializedBy_Cash_BMIPossibili
       tiesView ;
2131. .
2132. bmiciscsm:simOP_financialElements_specializedBy_Cash_BMIPossibilitiesView
2133. rdf:type sim:ObjectPropertySimilarity ;
2134. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2135. sim:globalSimilarityFunction sim:average ;
2136. sim:weight "1"^^xsd:float ;
2137. rdfs:label "ObjectPropertySimilarity financialElements_specializedBy_Cash for BM
       IPossibilitiesView"@en ;
2138. .
2139. bm:Credit
2140. sim:similarity bmiciscsm:simAP_Credit_BMIPossibilitiesView ;
2141. .
2142. bmiciscsm:simAP_Credit_BMIPossibilitiesView
2143. rdf:type sim:AnnotationPropertySimilarity ;
2144. sim:annotationProperty rdfs:label ;
2145. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2146. sim:localSimilarityFunction sim:levenshtein ;
2147. sim:weight "1"^^xsd:float ;
2148. rdfs:label "AnnotationPropertySimilarity Credit for BMIPossibilitiesView"@en ;
2149. .
2150. bmicm:financialElements_specializedBy_Credit
2151. sim:similarity bmiciscsm:simOP_financialElements_specializedBy_Credit_BMIPossibi
       litiesView ;
2152. .
2153. bmiciscsm:simOP_financialElements_specializedBy_Credit_BMIPossibilitiesView
2154. rdf:type sim:ObjectPropertySimilarity ;
2155. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2156. sim:globalSimilarityFunction sim:average ;
2157. sim:weight "1"^^xsd:float ;
2158. rdfs:label "ObjectPropertySimilarity financialElements_specializedBy_Credit for
       BMIPossibilitiesView"@en ;
2159. .
2160. bmicm:keyResourceElements_specializedBy_IntellectualElements
2161. sim:similarity bmiciscsm:simOP_keyResourceElements_specializedBy_IntellectualEle
       ments_BMIPossibilitiesView ;
2162. .
2163. bmiciscsm:simOP_keyResourceElements_specializedBy_IntellectualElements_BMIPossib
       ilitiesView
2164. rdf:type sim:ObjectPropertySimilarity ;
2165. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2166. sim:globalSimilarityFunction sim:average ;
2167. sim:weight "1"^^xsd:float ;
2168. rdfs:label "ObjectPropertySimilarity keyResourceElements_specializedBy_Intellect
       ualElements for BMIPossibilitiesView"@en ;
2169. .
2170. bm:Brand
2171. sim:similarity bmiciscsm:simAP_Brand_BMIPossibilitiesView ;
2172. .
2173. bmiciscsm:simAP_Brand_BMIPossibilitiesView
2174. rdf:type sim:AnnotationPropertySimilarity ;
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```
2175.    sim:annotationProperty rdfs:label ;
2176.    sim:belongsToCaseView bmicicscsm:BMIPossibilitiesView ;
2177.    sim:localSimilarityFunction sim:levenshtein ;
2178.    sim:weight "1"^^xsd:float ;
2179.    rdfs:label "AnnotationPropertySimilarity Brand for BMIPossibilitiesView"@en ;
2180.    .
2181.    bmicm:intellectualElements_specializedBy_Brand
2182.    sim:similarity bmicicscsm:simOP_intellectualElements_specializedBy_Brand_BMIPossi
         bilitiesView ;
2183.    .
2184.    bmicicscsm:simOP_intellectualElements_specializedBy_Brand_BMIPossibilitiesView
2185.    rdf:type sim:ObjectPropertySimilarity ;
2186.    sim:belongsToCaseView bmicicscsm:BMIPossibilitiesView ;
2187.    sim:globalSimilarityFunction sim:average ;
2188.    sim:weight "1"^^xsd:float ;
2189.    rdfs:label "ObjectPropertySimilarity intellectualElements_specializedBy_Brand fo
         r BMIPossibilitiesView"@en ;
2190.    .
2191.    bm:Culture
2192.    sim:similarity bmicicscsm:simAP_Culture_BMIPossibilitiesView ;
2193.    .
2194.    bmicicscsm:simAP_Culture_BMIPossibilitiesView
2195.    rdf:type sim:AnnotationPropertySimilarity ;
2196.    sim:annotationProperty rdfs:label ;
2197.    sim:belongsToCaseView bmicicscsm:BMIPossibilitiesView ;
2198.    sim:localSimilarityFunction sim:levenshtein ;
2199.    sim:weight "1"^^xsd:float ;
2200.    rdfs:label "AnnotationPropertySimilarity Culture for BMIPossibilitiesView"@en ;
2201.    .
2202.    bmicm:intellectualElements_specializedBy_Culture
2203.    sim:similarity bmicicscsm:simOP_intellectualElements_specializedBy_Culture_BMIPos
         sibilitiesView ;
2204.    .
2205.    bmicicscsm:simOP_intellectualElements_specializedBy_Culture_BMIPossibilitiesView
2206.    rdf:type sim:ObjectPropertySimilarity ;
2207.    sim:belongsToCaseView bmicicscsm:BMIPossibilitiesView ;
2208.    sim:globalSimilarityFunction sim:average ;
2209.    sim:weight "1"^^xsd:float ;
2210.    rdfs:label "ObjectPropertySimilarity intellectualElements_specializedBy_Culture
         for BMIPossibilitiesView"@en ;
2211.    .
2212.    bm:CustomerData
2213.    sim:similarity bmicicscsm:simAP_CustomerData_BMIPossibilitiesView ;
2214.    .
2215.    bmicicscsm:simAP_CustomerData_BMIPossibilitiesView
2216.    rdf:type sim:AnnotationPropertySimilarity ;
2217.    sim:annotationProperty rdfs:label ;
2218.    sim:belongsToCaseView bmicicscsm:BMIPossibilitiesView ;
2219.    sim:localSimilarityFunction sim:levenshtein ;
2220.    sim:weight "1"^^xsd:float ;
2221.    rdfs:label "AnnotationPropertySimilarity CustomerData for BMIPossibilitiesView"@
         en ;
2222.    .
2223.    bmicm:intellectualElements_specializedBy_CustomerData
2224.    sim:similarity bmicicscsm:simOP_intellectualElements_specializedBy_CustomerData_B
         MIPossibilitiesView ;
2225.    .
2226.    bmicicscsm:simOP_intellectualElements_specializedBy_CustomerData_BMIPossibilities
         View
2227.    rdf:type sim:ObjectPropertySimilarity ;
2228.    sim:belongsToCaseView bmicicscsm:BMIPossibilitiesView ;
2229.    sim:globalSimilarityFunction sim:average ;
2230.    sim:weight "1"^^xsd:float ;
2231.    rdfs:label "ObjectPropertySimilarity intellectualElements_specializedBy_Customer
         Data for BMIPossibilitiesView"@en ;
```

2232. .
2233. bm:Partnership
2234. sim:similarity bmiciscsm:simAP_Partnership_BMIPossibilitiesView ;
2235. .
2236. bmiciscsm:simAP_Partnership_BMIPossibilitiesView
2237. rdf:type sim:AnnotationPropertySimilarity ;
2238. sim:annotationProperty rdfs:label ;
2239. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2240. sim:localSimilarityFunction sim:levenshtein ;
2241. sim:weight "1"^^xsd:float ;
2242. rdfs:label "AnnotationPropertySimilarity Partnership for BMIPossibilitiesView"@en ;
2243. .
2244. bmicm:intellectualElements_specializedBy_Partnership
2245. sim:similarity bmiciscsm:simOP_intellectualElements_specializedBy_Partnership_BMIPossibilitiesView ;
2246. .
2247. bmiciscsm:simOP_intellectualElements_specializedBy_Partnership_BMIPossibilitiesView
2248. rdf:type sim:ObjectPropertySimilarity ;
2249. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2250. sim:globalSimilarityFunction sim:average ;
2251. sim:weight "1"^^xsd:float ;
2252. rdfs:label "ObjectPropertySimilarity intellectualElements_specializedBy_Partnership for BMIPossibilitiesView"@en ;
2253. .
2254. bm:PatentCopyright
2255. sim:similarity bmiciscsm:simAP_PatentCopyright_BMIPossibilitiesView ;
2256. .
2257. bmiciscsm:simAP_PatentCopyright_BMIPossibilitiesView
2258. rdf:type sim:AnnotationPropertySimilarity ;
2259. sim:annotationProperty rdfs:label ;
2260. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2261. sim:localSimilarityFunction sim:levenshtein ;
2262. sim:weight "1"^^xsd:float ;
2263. rdfs:label "AnnotationPropertySimilarity PatentCopyright for BMIPossibilitiesView"@en ;
2264. .
2265. bmicm:intellectualElements_specializedBy_PatentCopyright
2266. sim:similarity bmiciscsm:simOP_intellectualElements_specializedBy_PatentCopyright_BMIPossibilitiesView ;
2267. .
2268. bmiciscsm:simOP_intellectualElements_specializedBy_PatentCopyright_BMIPossibilitiesView
2269. rdf:type sim:ObjectPropertySimilarity ;
2270. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2271. sim:globalSimilarityFunction sim:average ;
2272. sim:weight "1"^^xsd:float ;
2273. rdfs:label "ObjectPropertySimilarity intellectualElements_specializedBy_PatentCopyright for BMIPossibilitiesView"@en ;
2274. .
2275. bm:ProprietaryKnowledge
2276. sim:similarity bmiciscsm:simAP_ProprietaryKnowledge_BMIPossibilitiesView ;
2277. .
2278. bmiciscsm:simAP_ProprietaryKnowledge_BMIPossibilitiesView
2279. rdf:type sim:AnnotationPropertySimilarity ;
2280. sim:annotationProperty rdfs:label ;
2281. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2282. sim:localSimilarityFunction sim:levenshtein ;
2283. sim:weight "1"^^xsd:float ;
2284. rdfs:label "AnnotationPropertySimilarity ProprietaryKnowledge for BMIPossibilitiesView"@en ;
2285. .
2286. bmicm:intellectualElements_specializedBy_ProprietaryKnowledge

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2287.    sim:similarity bmiciscsm:simOP_intellectualElements_specializedBy_ProprietaryKno
         wledge_BMIPossibilitiesView ;
2288.    .
2289.    bmiciscsm:simOP_intellectualElements_specializedBy_ProprietaryKnowledge_BMIPossi
         bilitiesView
2290.    rdf:type sim:ObjectPropertySimilarity ;
2291.    sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2292.    sim:globalSimilarityFunction sim:average ;
2293.    sim:weight "1"^^xsd:float ;
2294.    rdfs:label "ObjectPropertySimilarity intellectualElements_specializedBy_Propriet
         aryKnowledge for BMIPossibilitiesView"@en ;
2295.    .
2296.    bmicm:keyResourceElements_specializedBy_PhysicalElements
2297.    sim:similarity bmiciscsm:simOP_keyResourceElements_specializedBy_PhysicalElement
         s_BMIPossibilitiesView ;
2298.    .
2299.    bmiciscsm:simOP_keyResourceElements_specializedBy_PhysicalElements_BMIPossibilit
         iesView
2300.    rdf:type sim:ObjectPropertySimilarity ;
2301.    sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2302.    sim:globalSimilarityFunction sim:average ;
2303.    sim:weight "1"^^xsd:float ;
2304.    rdfs:label "ObjectPropertySimilarity keyResourceElements_specializedBy_PhysicalE
         lements for BMIPossibilitiesView"@en ;
2305.    .
2306.    bm:Building
2307.    sim:similarity bmiciscsm:simAP_Building_BMIPossibilitiesView ;
2308.    .
2309.    bmiciscsm:simAP_Building_BMIPossibilitiesView
2310.    rdf:type sim:AnnotationPropertySimilarity ;
2311.    sim:annotationProperty rdfs:label ;
2312.    sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2313.    sim:localSimilarityFunction sim:levenshtein ;
2314.    sim:weight "1"^^xsd:float ;
2315.    rdfs:label "AnnotationPropertySimilarity Building for BMIPossibilitiesView"@en ;
2316.    .
2317.    bmicm:physicalElements_specializedBy_Building
2318.    sim:similarity bmiciscsm:simOP_physicalElements_specializedBy_Building_BMIPossib
         ilitiesView ;
2319.    .
2320.    bmiciscsm:simOP_physicalElements_specializedBy_Building_BMIPossibilitiesView
2321.    rdf:type sim:ObjectPropertySimilarity ;
2322.    sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2323.    sim:globalSimilarityFunction sim:average ;
2324.    sim:weight "1"^^xsd:float ;
2325.    rdfs:label "ObjectPropertySimilarity physicalElements_specializedBy_Building for
          BMIPossibilitiesView"@en ;
2326.    .
2327.    bm:DistributionNetwork
2328.    sim:similarity bmiciscsm:simAP_DistributionNetwork_BMIPossibilitiesView ;
2329.    .
2330.    bmiciscsm:simAP_DistributionNetwork_BMIPossibilitiesView
2331.    rdf:type sim:AnnotationPropertySimilarity ;
2332.    sim:annotationProperty rdfs:label ;
2333.    sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2334.    sim:localSimilarityFunction sim:levenshtein ;
2335.    sim:weight "1"^^xsd:float ;
2336.    rdfs:label "AnnotationPropertySimilarity DistributionNetwork for BMIPossibilitie
         sView"@en ;
2337.    .
2338.    bmicm:physicalElements_specializedBy_DistributionNetwork
2339.    sim:similarity bmiciscsm:simOP_physicalElements_specializedBy_DistributionNetwor
         k_BMIPossibilitiesView ;
2340.    .
```

2341. `bmiciscsm:`simOP_physicalElements_specializedBy_DistributionNetwork_BMIPossibilit
iesView
2342. `rdf:`type `sim:`ObjectPropertySimilarity ;
2343. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2344. `sim:`globalSimilarityFunction `sim:`average ;
2345. `sim:`weight "1"^^`xsd:`float ;
2346. `rdfs:`label "ObjectPropertySimilarity physicalElements_specializedBy_Distribution
Network for BMIPossibilitiesView"@en ;
2347. .
2348. `bm:`ITSystems
2349. `sim:`similarity `bmiciscsm:`simAP_ITSystems_BMIPossibilitiesView ;
2350. .
2351. `bmiciscsm:`simAP_ITSystems_BMIPossibilitiesView
2352. `rdf:`type `sim:`AnnotationPropertySimilarity ;
2353. `sim:`annotationProperty `rdfs:`label ;
2354. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2355. `sim:`localSimilarityFunction `sim:`levenshtein ;
2356. `sim:`weight "1"^^`xsd:`float ;
2357. `rdfs:`label "AnnotationPropertySimilarity ITSystems for BMIPossibilitiesView"@en
;
2358. .
2359. `bmicm:`physicalElements_specializedBy_ITSystems
2360. `sim:`similarity `bmiciscsm:`simOP_physicalElements_specializedBy_ITSystems_BMIPossi
bilitiesView ;
2361. .
2362. `bmiciscsm:`simOP_physicalElements_specializedBy_ITSystems_BMIPossibilitiesView
2363. `rdf:`type `sim:`ObjectPropertySimilarity ;
2364. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2365. `sim:`globalSimilarityFunction `sim:`average ;
2366. `sim:`weight "1"^^`xsd:`float ;
2367. `rdfs:`label "ObjectPropertySimilarity physicalElements_specializedBy_ITSystems fo
r BMIPossibilitiesView"@en ;
2368. .
2369. `bm:`Machines
2370. `sim:`similarity `bmiciscsm:`simAP_Machines_BMIPossibilitiesView ;
2371. .
2372. `bmiciscsm:`simAP_Machines_BMIPossibilitiesView
2373. `rdf:`type `sim:`AnnotationPropertySimilarity ;
2374. `sim:`annotationProperty `rdfs:`label ;
2375. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2376. `sim:`localSimilarityFunction `sim:`levenshtein ;
2377. `sim:`weight "1"^^`xsd:`float ;
2378. `rdfs:`label "AnnotationPropertySimilarity Machines for BMIPossibilitiesView"@en ;
2379. .
2380. `bmicm:`physicalElements_specializedBy_Machines
2381. `sim:`similarity `bmiciscsm:`simOP_physicalElements_specializedBy_Machines_BMIPossib
ilitiesView ;
2382. .
2383. `bmiciscsm:`simOP_physicalElements_specializedBy_Machines_BMIPossibilitiesView
2384. `rdf:`type `sim:`ObjectPropertySimilarity ;
2385. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2386. `sim:`globalSimilarityFunction `sim:`average ;
2387. `sim:`weight "1"^^`xsd:`float ;
2388. `rdfs:`label "ObjectPropertySimilarity physicalElements_specializedBy_Machines for
BMIPossibilitiesView"@en ;
2389. .
2390. `bm:`Technology
2391. `sim:`similarity `bmiciscsm:`simAP_Technology_BMIPossibilitiesView ;
2392. .
2393. `bmiciscsm:`simAP_Technology_BMIPossibilitiesView
2394. `rdf:`type `sim:`AnnotationPropertySimilarity ;
2395. `sim:`annotationProperty `rdfs:`label ;
2396. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2397. `sim:`localSimilarityFunction `sim:`levenshtein ;
2398. `sim:`weight "1"^^`xsd:`float ;

```
2399. rdfs:label "AnnotationPropertySimilarity Technology for BMIPossibilitiesView"@en
      ;
2400. .
2401. bmicm:physicalElements_specializedBy_Technology
2402. sim:similarity bmiciscsm:simOP_physicalElements_specializedBy_Technology_BMIPoss
      ibilitiesView ;
2403. .
2404. bmiciscsm:simOP_physicalElements_specializedBy_Technology_BMIPossibilitiesView
2405. rdf:type sim:ObjectPropertySimilarity ;
2406. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2407. sim:globalSimilarityFunction sim:average ;
2408. sim:weight "1"^^xsd:float ;
2409. rdfs:label "ObjectPropertySimilarity physicalElements_specializedBy_Technology f
      or BMIPossibilitiesView"@en ;
2410. .
2411. bm:Vehicles
2412. sim:similarity bmiciscsm:simAP_Vehicles_BMIPossibilitiesView ;
2413. .
2414. bmiciscsm:simAP_Vehicles_BMIPossibilitiesView
2415. rdf:type sim:AnnotationPropertySimilarity ;
2416. sim:annotationProperty rdfs:label ;
2417. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2418. sim:localSimilarityFunction sim:levenshtein ;
2419. sim:weight "1"^^xsd:float ;
2420. rdfs:label "AnnotationPropertySimilarity Vehicles for BMIPossibilitiesView"@en ;
2421. .
2422. bmicm:physicalElements_specializedBy_Vehicles
2423. sim:similarity bmiciscsm:simOP_physicalElements_specializedBy_Vehicles_BMIPossib
      ilitiesView ;
2424. .
2425. bmiciscsm:simOP_physicalElements_specializedBy_Vehicles_BMIPossibilitiesView
2426. rdf:type sim:ObjectPropertySimilarity ;
2427. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2428. sim:globalSimilarityFunction sim:average ;
2429. sim:weight "1"^^xsd:float ;
2430. rdfs:label "ObjectPropertySimilarity physicalElements_specializedBy_Vehicles for
       BMIPossibilitiesView"@en ;
2431. .
2432. bmicm:businessModelInnovationCases_composedOf_FinancialAspectElements
2433. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_Financial
      AspectElements_BMIPossibilitiesView ;
2434. .
2435. bmiciscsm:simOP_businessModelInnovationCases_composedOf_FinancialAspectElements_
      BMIPossibilitiesView
2436. rdf:type sim:ObjectPropertySimilarity ;
2437. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2438. sim:globalSimilarityFunction sim:average ;
2439. sim:weight "1"^^xsd:float ;
2440. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Fin
      ancialAspectElements for BMIPossibilitiesView"@en ;
2441. .
2442. bmicm:financialAspectElements_specializedBy_CostStructureElements
2443. sim:similarity bmiciscsm:simOP_financialAspectElements_specializedBy_CostStructu
      reElements_BMIPossibilitiesView ;
2444. .
2445. bmiciscsm:simOP_financialAspectElements_specializedBy_CostStructureElements_BMIP
      ossibilitiesView
2446. rdf:type sim:ObjectPropertySimilarity ;
2447. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2448. sim:globalSimilarityFunction sim:average ;
2449. sim:weight "1"^^xsd:float ;
2450. rdfs:label "ObjectPropertySimilarity financialAspectElements_specializedBy_CostS
      tructureElements for BMIPossibilitiesView"@en ;
2451. .
2452. bm:FixedCost
```

```
2453.   sim:similarity bmiciscsm:simAP_FixedCost_BMIPossibilitiesView ;
2454.   .
2455.   bmiciscsm:simAP_FixedCost_BMIPossibilitiesView
2456.   rdf:type sim:AnnotationPropertySimilarity ;
2457.   sim:annotationProperty rdfs:label ;
2458.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2459.   sim:localSimilarityFunction sim:levenshtein ;
2460.   sim:weight "1"^^xsd:float ;
2461.   rdfs:label "AnnotationPropertySimilarity FixedCost for BMIPossibilitiesView"@en
        ;
2462.   .
2463.   bmicm:costStructureElements_specializedBy_FixedCost
2464.   sim:similarity bmiciscsm:simOP_costStructureElements_specializedBy_FixedCost_BMI
        PossibilitiesView ;
2465.   .
2466.   bmiciscsm:simOP_costStructureElements_specializedBy_FixedCost_BMIPossibilitiesVi
        ew
2467.   rdf:type sim:ObjectPropertySimilarity ;
2468.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2469.   sim:globalSimilarityFunction sim:average ;
2470.   sim:weight "1"^^xsd:float ;
2471.   rdfs:label "ObjectPropertySimilarity costStructureElements_specializedBy_FixedCo
        st for BMIPossibilitiesView"@en ;
2472.   .
2473.   bm:VariableCost
2474.   sim:similarity bmiciscsm:simAP_VariableCost_BMIPossibilitiesView ;
2475.   .
2476.   bmiciscsm:simAP_VariableCost_BMIPossibilitiesView
2477.   rdf:type sim:AnnotationPropertySimilarity ;
2478.   sim:annotationProperty rdfs:label ;
2479.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2480.   sim:localSimilarityFunction sim:levenshtein ;
2481.   sim:weight "1"^^xsd:float ;
2482.   rdfs:label "AnnotationPropertySimilarity VariableCost for BMIPossibilitiesView"@
        en ;
2483.   .
2484.   bmicm:costStructureElements_specializedBy_VariableCost
2485.   sim:similarity bmiciscsm:simOP_costStructureElements_specializedBy_VariableCost_
        BMIPossibilitiesView ;
2486.   .
2487.   bmiciscsm:simOP_costStructureElements_specializedBy_VariableCost_BMIPossibilitie
        sView
2488.   rdf:type sim:ObjectPropertySimilarity ;
2489.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2490.   sim:globalSimilarityFunction sim:average ;
2491.   sim:weight "1"^^xsd:float ;
2492.   rdfs:label "ObjectPropertySimilarity costStructureElements_specializedBy_Variabl
        eCost for BMIPossibilitiesView"@en ;
2493.   .
2494.   bmicm:financialAspectElements_specializedBy_RevenueStreamElements
2495.   sim:similarity bmiciscsm:simOP_financialAspectElements_specializedBy_RevenueStre
        amElements_BMIPossibilitiesView ;
2496.   .
2497.   bmiciscsm:simOP_financialAspectElements_specializedBy_RevenueStreamElements_BMIP
        ossibilitiesView
2498.   rdf:type sim:ObjectPropertySimilarity ;
2499.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2500.   sim:globalSimilarityFunction sim:average ;
2501.   sim:weight "1"^^xsd:float ;
2502.   rdfs:label "ObjectPropertySimilarity financialAspectElements_specializedBy_Reven
        ueStreamElements for BMIPossibilitiesView"@en ;
2503.   .
2504.   bm:AssetSale
2505.   sim:similarity bmiciscsm:simAP_AssetSale_BMIPossibilitiesView ;
2506.   .
```

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2507. bmiciscsm:simAP_AssetSale_BMIPossibilitiesView
2508. rdf:type sim:AnnotationPropertySimilarity ;
2509. sim:annotationProperty rdfs:label ;
2510. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2511. sim:localSimilarityFunction sim:levenshtein ;
2512. sim:weight "1"^^xsd:float ;
2513. rdfs:label "AnnotationPropertySimilarity AssetSale for BMIPossibilitiesView"@en
      ;
2514. .
2515. bmicm:revenueStreamElements_specializedBy_AssetSale
2516. sim:similarity bmiciscsm:simOP_revenueStreamElements_specializedBy_AssetSale_BMI
      PossibilitiesView ;
2517. .
2518. bmiciscsm:simOP_revenueStreamElements_specializedBy_AssetSale_BMIPossibilitiesVi
      ew
2519. rdf:type sim:ObjectPropertySimilarity ;
2520. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2521. sim:globalSimilarityFunction sim:average ;
2522. sim:weight "1"^^xsd:float ;
2523. rdfs:label "ObjectPropertySimilarity revenueStreamElements_specializedBy_AssetSa
      le for BMIPossibilitiesView"@en ;
2524. .
2525. bmicm:revenueStreamElements_specializedBy_FeeBasedRevenueElements
2526. sim:similarity bmiciscsm:simOP_revenueStreamElements_specializedBy_FeeBasedReven
      ueElements_BMIPossibilitiesView ;
2527. .
2528. bmiciscsm:simOP_revenueStreamElements_specializedBy_FeeBasedRevenueElements_BMIP
      ossibilitiesView
2529. rdf:type sim:ObjectPropertySimilarity ;
2530. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2531. sim:globalSimilarityFunction sim:average ;
2532. sim:weight "1"^^xsd:float ;
2533. rdfs:label "ObjectPropertySimilarity revenueStreamElements_specializedBy_FeeBase
      dRevenueElements for BMIPossibilitiesView"@en ;
2534. .
2535. bm:Advertising
2536. sim:similarity bmiciscsm:simAP_Advertising_BMIPossibilitiesView ;
2537. .
2538. bmiciscsm:simAP_Advertising_BMIPossibilitiesView
2539. rdf:type sim:AnnotationPropertySimilarity ;
2540. sim:annotationProperty rdfs:label ;
2541. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2542. sim:localSimilarityFunction sim:levenshtein ;
2543. sim:weight "1"^^xsd:float ;
2544. rdfs:label "AnnotationPropertySimilarity Advertising for BMIPossibilitiesView"@e
      n ;
2545. .
2546. bmicm:feeBasedRevenueElements_specializedBy_Advertising
2547. sim:similarity bmiciscsm:simOP_feeBasedRevenueElements_specializedBy_Advertising
      _BMIPossibilitiesView ;
2548. .
2549. bmiciscsm:simOP_feeBasedRevenueElements_specializedBy_Advertising_BMIPossibiliti
      esView
2550. rdf:type sim:ObjectPropertySimilarity ;
2551. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2552. sim:globalSimilarityFunction sim:average ;
2553. sim:weight "1"^^xsd:float ;
2554. rdfs:label "ObjectPropertySimilarity feeBasedRevenueElements_specializedBy_Adver
      tising for BMIPossibilitiesView"@en ;
2555. .
2556. bm:BrokerageFees
2557. sim:similarity bmiciscsm:simAP_BrokerageFees_BMIPossibilitiesView ;
2558. .
2559. bmiciscsm:simAP_BrokerageFees_BMIPossibilitiesView
2560. rdf:type sim:AnnotationPropertySimilarity ;
```

2561. `sim:annotationProperty rdfs:label ;`
2562. `sim:belongsToCaseView bmicscsm:BMIPossibilitiesView ;`
2563. `sim:localSimilarityFunction sim:levenshtein ;`
2564. `sim:weight "1"^^xsd:float ;`
2565. `rdfs:label "AnnotationPropertySimilarity BrokerageFees for BMIPossibilitiesView" @en ;`
2566. `.`
2567. `bmicm:feeBasedRevenueElements_specializedBy_BrokerageFees`
2568. `sim:similarity bmicscsm:simOP_feeBasedRevenueElements_specializedBy_BrokerageFees_BMIPossibilitiesView ;`
2569. `.`
2570. `bmicscsm:simOP_feeBasedRevenueElements_specializedBy_BrokerageFees_BMIPossibilitiesView`
2571. `rdf:type sim:ObjectPropertySimilarity ;`
2572. `sim:belongsToCaseView bmicscsm:BMIPossibilitiesView ;`
2573. `sim:globalSimilarityFunction sim:average ;`
2574. `sim:weight "1"^^xsd:float ;`
2575. `rdfs:label "ObjectPropertySimilarity feeBasedRevenueElements_specializedBy_BrokerageFees for BMIPossibilitiesView"@en ;`
2576. `.`
2577. `bm:LendingRentingLeasing`
2578. `sim:similarity bmicscsm:simAP_LendingRentingLeasing_BMIPossibilitiesView ;`
2579. `.`
2580. `bmicscsm:simAP_LendingRentingLeasing_BMIPossibilitiesView`
2581. `rdf:type sim:AnnotationPropertySimilarity ;`
2582. `sim:annotationProperty rdfs:label ;`
2583. `sim:belongsToCaseView bmicscsm:BMIPossibilitiesView ;`
2584. `sim:localSimilarityFunction sim:levenshtein ;`
2585. `sim:weight "1"^^xsd:float ;`
2586. `rdfs:label "AnnotationPropertySimilarity LendingRentingLeasing for BMIPossibilitiesView"@en ;`
2587. `.`
2588. `bmicm:feeBasedRevenueElements_specializedBy_LendingRentingLeasing`
2589. `sim:similarity bmicscsm:simOP_feeBasedRevenueElements_specializedBy_LendingRentingLeasing_BMIPossibilitiesView ;`
2590. `.`
2591. `bmicscsm:simOP_feeBasedRevenueElements_specializedBy_LendingRentingLeasing_BMIPossibilitiesView`
2592. `rdf:type sim:ObjectPropertySimilarity ;`
2593. `sim:belongsToCaseView bmicscsm:BMIPossibilitiesView ;`
2594. `sim:globalSimilarityFunction sim:average ;`
2595. `sim:weight "1"^^xsd:float ;`
2596. `rdfs:label "ObjectPropertySimilarity feeBasedRevenueElements_specializedBy_LendingRentingLeasing for BMIPossibilitiesView"@en ;`
2597. `.`
2598. `bm:Licensing`
2599. `sim:similarity bmicscsm:simAP_Licensing_BMIPossibilitiesView ;`
2600. `.`
2601. `bmicscsm:simAP_Licensing_BMIPossibilitiesView`
2602. `rdf:type sim:AnnotationPropertySimilarity ;`
2603. `sim:annotationProperty rdfs:label ;`
2604. `sim:belongsToCaseView bmicscsm:BMIPossibilitiesView ;`
2605. `sim:localSimilarityFunction sim:levenshtein ;`
2606. `sim:weight "1"^^xsd:float ;`
2607. `rdfs:label "AnnotationPropertySimilarity Licensing for BMIPossibilitiesView"@en ;`
2608. `.`
2609. `bmicm:feeBasedRevenueElements_specializedBy_Licensing`
2610. `sim:similarity bmicscsm:simOP_feeBasedRevenueElements_specializedBy_Licensing_BMIPossibilitiesView ;`
2611. `.`
2612. `bmicscsm:simOP_feeBasedRevenueElements_specializedBy_Licensing_BMIPossibilitiesView`
2613. `rdf:type sim:ObjectPropertySimilarity ;`
2614. `sim:belongsToCaseView bmicscsm:BMIPossibilitiesView ;`

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2615. sim:globalSimilarityFunction sim:average ;
2616. sim:weight "1"^^xsd:float ;
2617. rdfs:label "ObjectPropertySimilarity feeBasedRevenueElements_specializedBy_Licen
      sing for BMIPossibilitiesView"@en ;
2618. .
2619. bm:SubscriptionFee
2620. sim:similarity bmiciscsm:simAP_SubscriptionFee_BMIPossibilitiesView ;
2621. .
2622. bmiciscsm:simAP_SubscriptionFee_BMIPossibilitiesView
2623. rdf:type sim:AnnotationPropertySimilarity ;
2624. sim:annotationProperty rdfs:label ;
2625. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2626. sim:localSimilarityFunction sim:levenshtein ;
2627. sim:weight "1"^^xsd:float ;
2628. rdfs:label "AnnotationPropertySimilarity SubscriptionFee for BMIPossibilitiesVie
      w"@en ;
2629. .
2630. bmicm:feeBasedRevenueElements_specializedBy_SubscriptionFee
2631. sim:similarity bmiciscsm:simOP_feeBasedRevenueElements_specializedBy_Subscriptio
      nFee_BMIPossibilitiesView ;
2632. .
2633. bmiciscsm:simOP_feeBasedRevenueElements_specializedBy_SubscriptionFee_BMIPossibi
      litiesView
2634. rdf:type sim:ObjectPropertySimilarity ;
2635. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2636. sim:globalSimilarityFunction sim:average ;
2637. sim:weight "1"^^xsd:float ;
2638. rdfs:label "ObjectPropertySimilarity feeBasedRevenueElements_specializedBy_Subsc
      riptionFee for BMIPossibilitiesView"@en ;
2639. .
2640. bm:UsageFee
2641. sim:similarity bmiciscsm:simAP_UsageFee_BMIPossibilitiesView ;
2642. .
2643. bmiciscsm:simAP_UsageFee_BMIPossibilitiesView
2644. rdf:type sim:AnnotationPropertySimilarity ;
2645. sim:annotationProperty rdfs:label ;
2646. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2647. sim:localSimilarityFunction sim:levenshtein ;
2648. sim:weight "1"^^xsd:float ;
2649. rdfs:label "AnnotationPropertySimilarity UsageFee for BMIPossibilitiesView"@en ;
2650. .
2651. bmicm:feeBasedRevenueElements_specializedBy_UsageFee
2652. sim:similarity bmiciscsm:simOP_feeBasedRevenueElements_specializedBy_UsageFee_BM
      IPossibilitiesView ;
2653. .
2654. bmiciscsm:simOP_feeBasedRevenueElements_specializedBy_UsageFee_BMIPossibilitiesV
      iew
2655. rdf:type sim:ObjectPropertySimilarity ;
2656. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2657. sim:globalSimilarityFunction sim:average ;
2658. sim:weight "1"^^xsd:float ;
2659. rdfs:label "ObjectPropertySimilarity feeBasedRevenueElements_specializedBy_Usage
      Fee for BMIPossibilitiesView"@en ;
2660. .
2661. bmicm:businessModelInnovationCases_composedOf_ValuePropositionElements
2662. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_ValueProp
      ositionElements_BMIPossibilitiesView ;
2663. .
2664. bmiciscsm:simOP_businessModelInnovationCases_composedOf_ValuePropositionElements
      _BMIPossibilitiesView
2665. rdf:type sim:ObjectPropertySimilarity ;
2666. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2667. sim:globalSimilarityFunction sim:average ;
2668. sim:weight "1"^^xsd:float ;
```

2669. `rdfs:`label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_ValuePropositionElements for BMIPossibilitiesView"@en ;
2670. .
2671. `bmicm:`valuePropositionElements_specializedBy_OfferingElements
2672. `sim:`similarity `bmiciscsm:`simOP_valuePropositionElements_specializedBy_OfferingElements_BMIPossibilitiesView ;
2673. .
2674. `bmiciscsm:`simOP_valuePropositionElements_specializedBy_OfferingElements_BMIPossibilitiesView
2675. `rdf:`type `sim:`ObjectPropertySimilarity ;
2676. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2677. `sim:`globalSimilarityFunction `sim:`average ;
2678. `sim:`weight "1"^^`xsd:`float ;
2679. `rdfs:`label "ObjectPropertySimilarity valuePropositionElements_specializedBy_OfferingElements for BMIPossibilitiesView"@en ;
2680. .
2681. `bm:`Product
2682. `sim:`similarity `bmiciscsm:`simAP_Product_BMIPossibilitiesView ;
2683. .
2684. `bmiciscsm:`simAP_Product_BMIPossibilitiesView
2685. `rdf:`type `sim:`AnnotationPropertySimilarity ;
2686. `sim:`annotationProperty `rdfs:`label ;
2687. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2688. `sim:`localSimilarityFunction `sim:`levenshtein ;
2689. `sim:`weight "1"^^`xsd:`float ;
2690. `rdfs:`label "AnnotationPropertySimilarity Product for BMIPossibilitiesView"@en ;
2691. .
2692. `bmicm:`offeringElements_specializedBy_Product
2693. `sim:`similarity `bmiciscsm:`simOP_offeringElements_specializedBy_Product_BMIPossibilitiesView ;
2694. .
2695. `bmiciscsm:`simOP_offeringElements_specializedBy_Product_BMIPossibilitiesView
2696. `rdf:`type `sim:`ObjectPropertySimilarity ;
2697. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2698. `sim:`globalSimilarityFunction `sim:`average ;
2699. `sim:`weight "1"^^`xsd:`float ;
2700. `rdfs:`label "ObjectPropertySimilarity offeringElements_specializedBy_Product for BMIPossibilitiesView"@en ;
2701. .
2702. `bm:`Service
2703. `sim:`similarity `bmiciscsm:`simAP_Service_BMIPossibilitiesView ;
2704. .
2705. `bmiciscsm:`simAP_Service_BMIPossibilitiesView
2706. `rdf:`type `sim:`AnnotationPropertySimilarity ;
2707. `sim:`annotationProperty `rdfs:`label ;
2708. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2709. `sim:`localSimilarityFunction `sim:`levenshtein ;
2710. `sim:`weight "1"^^`xsd:`float ;
2711. `rdfs:`label "AnnotationPropertySimilarity Service for BMIPossibilitiesView"@en ;
2712. .
2713. `bmicm:`offeringElements_specializedBy_Service
2714. `sim:`similarity `bmiciscsm:`simOP_offeringElements_specializedBy_Service_BMIPossibilitiesView ;
2715. .
2716. `bmiciscsm:`simOP_offeringElements_specializedBy_Service_BMIPossibilitiesView
2717. `rdf:`type `sim:`ObjectPropertySimilarity ;
2718. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
2719. `sim:`globalSimilarityFunction `sim:`average ;
2720. `sim:`weight "1"^^`xsd:`float ;
2721. `rdfs:`label "ObjectPropertySimilarity offeringElements_specializedBy_Service for BMIPossibilitiesView"@en ;
2722. .
2723. `bmicm:`valuePropositionElements_specializedBy_OfferingValueElements
2724. `sim:`similarity `bmiciscsm:`simOP_valuePropositionElements_specializedBy_OfferingValueElements_BMIPossibilitiesView ;

2725. .
2726. bmiciscsm:simOP_valuePropositionElements_specializedBy_OfferingValueElements_BMI
PossibilitiesView
2727. rdf:type sim:ObjectPropertySimilarity ;
2728. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2729. sim:globalSimilarityFunction sim:average ;
2730. sim:weight "1"^^xsd:float ;
2731. rdfs:label "ObjectPropertySimilarity valuePropositionElements_specializedBy_Offe
ringValueElements for BMIPossibilitiesView"@en ;
2732. .
2733. bmicm:offeringValueElements_specializedBy_QualitativeValueElements
2734. sim:similarity bmiciscsm:simOP_offeringValueElements_specializedBy_QualitativeVa
lueElements_BMIPossibilitiesView ;
2735. .
2736. bmiciscsm:simOP_offeringValueElements_specializedBy_QualitativeValueElements_BMI
PossibilitiesView
2737. rdf:type sim:ObjectPropertySimilarity ;
2738. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2739. sim:globalSimilarityFunction sim:average ;
2740. sim:weight "1"^^xsd:float ;
2741. rdfs:label "ObjectPropertySimilarity offeringValueElements_specializedBy_Qualita
tiveValueElements for BMIPossibilitiesView"@en ;
2742. .
2743. bmicm:offeringValueElements_specializedBy_QuantitativeValueElements
2744. sim:similarity bmiciscsm:simOP_offeringValueElements_specializedBy_QuantitativeV
alueElements_BMIPossibilitiesView ;
2745. .
2746. bmiciscsm:simOP_offeringValueElements_specializedBy_QuantitativeValueElements_BM
IPossibilitiesView
2747. rdf:type sim:ObjectPropertySimilarity ;
2748. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2749. sim:globalSimilarityFunction sim:average ;
2750. sim:weight "1"^^xsd:float ;
2751. rdfs:label "ObjectPropertySimilarity offeringValueElements_specializedBy_Quantit
ativeValueElements for BMIPossibilitiesView"@en ;
2752. .
2753. bm:Accessibility
2754. sim:similarity bmiciscsm:simAP_Accessibility_BMIPossibilitiesView ;
2755. .
2756. bmiciscsm:simAP_Accessibility_BMIPossibilitiesView
2757. rdf:type sim:AnnotationPropertySimilarity ;
2758. sim:annotationProperty rdfs:label ;
2759. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2760. sim:localSimilarityFunction sim:levenshtein ;
2761. sim:weight "1"^^xsd:float ;
2762. rdfs:label "AnnotationPropertySimilarity Accessibility for BMIPossibilitiesView"
@en ;
2763. .
2764. bmicm:qualitativeValueElements_specializedBy_Accessibility
2765. sim:similarity bmiciscsm:simOP_qualitativeValueElements_specializedBy_Accessibil
ity_BMIPossibilitiesView ;
2766. .
2767. bmiciscsm:simOP_qualitativeValueElements_specializedBy_Accessibility_BMIPossibil
itiesView
2768. rdf:type sim:ObjectPropertySimilarity ;
2769. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2770. sim:globalSimilarityFunction sim:average ;
2771. sim:weight "1"^^xsd:float ;
2772. rdfs:label "ObjectPropertySimilarity qualitativeValueElements_specializedBy_Acce
ssibility for BMIPossibilitiesView"@en ;
2773. .
2774. bm:Convenience
2775. sim:similarity bmiciscsm:simAP_Convenience_BMIPossibilitiesView ;
2776. .
2777. bmiciscsm:simAP_Convenience_BMIPossibilitiesView

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2778.  rdf:type sim:AnnotationPropertySimilarity ;
2779.  sim:annotationProperty rdfs:label ;
2780.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2781.  sim:localSimilarityFunction sim:levenshtein ;
2782.  sim:weight "1"^^xsd:float ;
2783.  rdfs:label "AnnotationPropertySimilarity Convenience for BMIPossibilitiesView"@e
       n ;
2784.  .
2785.  bmicm:qualitativeValueElements_specializedBy_Convenience
2786.  sim:similarity bmiciscsm:simOP_qualitativeValueElements_specializedBy_Convenienc
       e_BMIPossibilitiesView ;
2787.  .
2788.  bmiciscsm:simOP_qualitativeValueElements_specializedBy_Convenience_BMIPossibilit
       iesView
2789.  rdf:type sim:ObjectPropertySimilarity ;
2790.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2791.  sim:globalSimilarityFunction sim:average ;
2792.  sim:weight "1"^^xsd:float ;
2793.  rdfs:label "ObjectPropertySimilarity qualitativeValueElements_specializedBy_Conv
       enience for BMIPossibilitiesView"@en ;
2794.  .
2795.  bm:CustomerCoCreation
2796.  sim:similarity bmiciscsm:simAP_CustomerCoCreation_BMIPossibilitiesView ;
2797.  .
2798.  bmiciscsm:simAP_CustomerCoCreation_BMIPossibilitiesView
2799.  rdf:type sim:AnnotationPropertySimilarity ;
2800.  sim:annotationProperty rdfs:label ;
2801.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2802.  sim:localSimilarityFunction sim:levenshtein ;
2803.  sim:weight "1"^^xsd:float ;
2804.  rdfs:label "AnnotationPropertySimilarity CustomerCoCreation for BMIPossibilities
       View"@en ;
2805.  .
2806.  bmicm:qualitativeValueElements_specializedBy_CustomerCoCreation
2807.  sim:similarity bmiciscsm:simOP_qualitativeValueElements_specializedBy_CustomerCo
       Creation_BMIPossibilitiesView ;
2808.  .
2809.  bmiciscsm:simOP_qualitativeValueElements_specializedBy_CustomerCoCreation_BMIPos
       sibilitiesView
2810.  rdf:type sim:ObjectPropertySimilarity ;
2811.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2812.  sim:globalSimilarityFunction sim:average ;
2813.  sim:weight "1"^^xsd:float ;
2814.  rdfs:label "ObjectPropertySimilarity qualitativeValueElements_specializedBy_Cust
       omerCoCreation for BMIPossibilitiesView"@en ;
2815.  .
2816.  bm:Design
2817.  sim:similarity bmiciscsm:simAP_Design_BMIPossibilitiesView ;
2818.  .
2819.  bmiciscsm:simAP_Design_BMIPossibilitiesView
2820.  rdf:type sim:AnnotationPropertySimilarity ;
2821.  sim:annotationProperty rdfs:label ;
2822.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2823.  sim:localSimilarityFunction sim:levenshtein ;
2824.  sim:weight "1"^^xsd:float ;
2825.  rdfs:label "AnnotationPropertySimilarity Design for BMIPossibilitiesView"@en ;
2826.  .
2827.  bmicm:qualitativeValueElements_specializedBy_Design
2828.  sim:similarity bmiciscsm:simOP_qualitativeValueElements_specializedBy_Design_BMI
       PossibilitiesView ;
2829.  .
2830.  bmiciscsm:simOP_qualitativeValueElements_specializedBy_Design_BMIPossibilitiesVi
       ew
2831.  rdf:type sim:ObjectPropertySimilarity ;
2832.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
```

2833. `sim:globalSimilarityFunction sim:average ;`
2834. `sim:weight "1"^^xsd:float ;`
2835. `rdfs:label "ObjectPropertySimilarity qualitativeValueElements_specializedBy_Desi`
      `gn for BMIPossibilitiesView"@en ;`
2836. `.`
2837. `bm:MassCustomization`
2838. `sim:similarity bmiciscsm:simAP_MassCustomization_BMIPossibilitiesView ;`
2839. `.`
2840. `bmiciscsm:simAP_MassCustomization_BMIPossibilitiesView`
2841. `rdf:type sim:AnnotationPropertySimilarity ;`
2842. `sim:annotationProperty rdfs:label ;`
2843. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2844. `sim:localSimilarityFunction sim:levenshtein ;`
2845. `sim:weight "1"^^xsd:float ;`
2846. `rdfs:label "AnnotationPropertySimilarity MassCustomization for BMIPossibilitiesV`
      `iew"@en ;`
2847. `.`
2848. `bmicm:qualitativeValueElements_specializedBy_MassCustomization`
2849. `sim:similarity bmiciscsm:simOP_qualitativeValueElements_specializedBy_MassCustom`
      `ization_BMIPossibilitiesView ;`
2850. `.`
2851. `bmiciscsm:simOP_qualitativeValueElements_specializedBy_MassCustomization_BMIPoss`
      `ibilitiesView`
2852. `rdf:type sim:ObjectPropertySimilarity ;`
2853. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2854. `sim:globalSimilarityFunction sim:average ;`
2855. `sim:weight "1"^^xsd:float ;`
2856. `rdfs:label "ObjectPropertySimilarity qualitativeValueElements_specializedBy_Mass`
      `Customization for BMIPossibilitiesView"@en ;`
2857. `.`
2858. `bm:Newness`
2859. `sim:similarity bmiciscsm:simAP_Newness_BMIPossibilitiesView ;`
2860. `.`
2861. `bmiciscsm:simAP_Newness_BMIPossibilitiesView`
2862. `rdf:type sim:AnnotationPropertySimilarity ;`
2863. `sim:annotationProperty rdfs:label ;`
2864. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2865. `sim:localSimilarityFunction sim:levenshtein ;`
2866. `sim:weight "1"^^xsd:float ;`
2867. `rdfs:label "AnnotationPropertySimilarity Newness for BMIPossibilitiesView"@en ;`
2868. `.`
2869. `bmicm:qualitativeValueElements_specializedBy_Newness`
2870. `sim:similarity bmiciscsm:simOP_qualitativeValueElements_specializedBy_Newness_BM`
      `IPossibilitiesView ;`
2871. `.`
2872. `bmiciscsm:simOP_qualitativeValueElements_specializedBy_Newness_BMIPossibilitiesV`
      `iew`
2873. `rdf:type sim:ObjectPropertySimilarity ;`
2874. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2875. `sim:globalSimilarityFunction sim:average ;`
2876. `sim:weight "1"^^xsd:float ;`
2877. `rdfs:label "ObjectPropertySimilarity qualitativeValueElements_specializedBy_Newn`
      `ess for BMIPossibilitiesView"@en ;`
2878. `.`
2879. `bm:Status`
2880. `sim:similarity bmiciscsm:simAP_Status_BMIPossibilitiesView ;`
2881. `.`
2882. `bmiciscsm:simAP_Status_BMIPossibilitiesView`
2883. `rdf:type sim:AnnotationPropertySimilarity ;`
2884. `sim:annotationProperty rdfs:label ;`
2885. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2886. `sim:localSimilarityFunction sim:levenshtein ;`
2887. `sim:weight "1"^^xsd:float ;`
2888. `rdfs:label "AnnotationPropertySimilarity Status for BMIPossibilitiesView"@en ;`
2889. `.`

2890. `bmicm:qualitativeValueElements_specializedBy_Status`
2891. `sim:similarity bmiciscsm:simOP_qualitativeValueElements_specializedBy_Status_BMI PossibilitiesView ;`
2892. `.`
2893. `bmiciscsm:simOP_qualitativeValueElements_specializedBy_Status_BMIPossibilitiesVi ew`
2894. `rdf:type sim:ObjectPropertySimilarity ;`
2895. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2896. `sim:globalSimilarityFunction sim:average ;`
2897. `sim:weight "1"^^xsd:float ;`
2898. `rdfs:label "ObjectPropertySimilarity qualitativeValueElements_specializedBy_Stat us for BMIPossibilitiesView"@en ;`
2899. `.`
2900. `bm:CostReduction`
2901. `sim:similarity bmiciscsm:simAP_CostReduction_BMIPossibilitiesView ;`
2902. `.`
2903. `bmiciscsm:simAP_CostReduction_BMIPossibilitiesView`
2904. `rdf:type sim:AnnotationPropertySimilarity ;`
2905. `sim:annotationProperty rdfs:label ;`
2906. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2907. `sim:localSimilarityFunction sim:levenshtein ;`
2908. `sim:weight "1"^^xsd:float ;`
2909. `rdfs:label "AnnotationPropertySimilarity CostReduction for BMIPossibilitiesView" @en ;`
2910. `.`
2911. `bmicm:quantitativeValueElements_specializedBy_CostReduction`
2912. `sim:similarity bmiciscsm:simOP_quantitativeValueElements_specializedBy_CostReduc tion_BMIPossibilitiesView ;`
2913. `.`
2914. `bmiciscsm:simOP_quantitativeValueElements_specializedBy_CostReduction_BMIPossibi litiesView`
2915. `rdf:type sim:ObjectPropertySimilarity ;`
2916. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2917. `sim:globalSimilarityFunction sim:average ;`
2918. `sim:weight "1"^^xsd:float ;`
2919. `rdfs:label "ObjectPropertySimilarity quantitativeValueElements_specializedBy_Cos tReduction for BMIPossibilitiesView"@en ;`
2920. `.`
2921. `bm:GettingTheJobDone`
2922. `sim:similarity bmiciscsm:simAP_GettingTheJobDone_BMIPossibilitiesView ;`
2923. `.`
2924. `bmiciscsm:simAP_GettingTheJobDone_BMIPossibilitiesView`
2925. `rdf:type sim:AnnotationPropertySimilarity ;`
2926. `sim:annotationProperty rdfs:label ;`
2927. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2928. `sim:localSimilarityFunction sim:levenshtein ;`
2929. `sim:weight "1"^^xsd:float ;`
2930. `rdfs:label "AnnotationPropertySimilarity GettingTheJobDone for BMIPossibilitiesV iew"@en ;`
2931. `.`
2932. `bmicm:quantitativeValueElements_specializedBy_GettingTheJobDone`
2933. `sim:similarity bmiciscsm:simOP_quantitativeValueElements_specializedBy_GettingTh eJobDone_BMIPossibilitiesView ;`
2934. `.`
2935. `bmiciscsm:simOP_quantitativeValueElements_specializedBy_GettingTheJobDone_BMIPos sibilitiesView`
2936. `rdf:type sim:ObjectPropertySimilarity ;`
2937. `sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;`
2938. `sim:globalSimilarityFunction sim:average ;`
2939. `sim:weight "1"^^xsd:float ;`
2940. `rdfs:label "ObjectPropertySimilarity quantitativeValueElements_specializedBy_Get tingTheJobDone for BMIPossibilitiesView"@en ;`
2941. `.`
2942. `bm:Performance`
2943. `sim:similarity bmiciscsm:simAP_Performance_BMIPossibilitiesView ;`

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2944. .
2945. bmiciscsm:simAP_Performance_BMIPossibilitiesView
2946. rdf:type sim:AnnotationPropertySimilarity ;
2947. sim:annotationProperty rdfs:label ;
2948. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2949. sim:localSimilarityFunction sim:levenshtein ;
2950. sim:weight "1"^^xsd:float ;
2951. rdfs:label "AnnotationPropertySimilarity Performance for BMIPossibilitiesView"@e
       n ;
2952. .
2953. bmicm:quantitativeValueElements_specializedBy_Performance
2954. sim:similarity bmiciscsm:simOP_quantitativeValueElements_specializedBy_Performan
       ce_BMIPossibilitiesView ;
2955. .
2956. bmiciscsm:simOP_quantitativeValueElements_specializedBy_Performance_BMIPossibili
       tiesView
2957. rdf:type sim:ObjectPropertySimilarity ;
2958. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2959. sim:globalSimilarityFunction sim:average ;
2960. sim:weight "1"^^xsd:float ;
2961. rdfs:label "ObjectPropertySimilarity quantitativeValueElements_specializedBy_Per
       formance for BMIPossibilitiesView"@en ;
2962. .
2963. bm:Price
2964. sim:similarity bmiciscsm:simAP_Price_BMIPossibilitiesView ;
2965. .
2966. bmiciscsm:simAP_Price_BMIPossibilitiesView
2967. rdf:type sim:AnnotationPropertySimilarity ;
2968. sim:annotationProperty rdfs:label ;
2969. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2970. sim:localSimilarityFunction sim:levenshtein ;
2971. sim:weight "1"^^xsd:float ;
2972. rdfs:label "AnnotationPropertySimilarity Price for BMIPossibilitiesView"@en ;
2973. .
2974. bmicm:quantitativeValueElements_specializedBy_Price
2975. sim:similarity bmiciscsm:simOP_quantitativeValueElements_specializedBy_Price_BMI
       PossibilitiesView ;
2976. .
2977. bmiciscsm:simOP_quantitativeValueElements_specializedBy_Price_BMIPossibilitiesVi
       ew
2978. rdf:type sim:ObjectPropertySimilarity ;
2979. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2980. sim:globalSimilarityFunction sim:average ;
2981. sim:weight "1"^^xsd:float ;
2982. rdfs:label "ObjectPropertySimilarity quantitativeValueElements_specializedBy_Pri
       ce for BMIPossibilitiesView"@en ;
2983. .
2984. bm:RiskReduction
2985. sim:similarity bmiciscsm:simAP_RiskReduction_BMIPossibilitiesView ;
2986. .
2987. bmiciscsm:simAP_RiskReduction_BMIPossibilitiesView
2988. rdf:type sim:AnnotationPropertySimilarity ;
2989. sim:annotationProperty rdfs:label ;
2990. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
2991. sim:localSimilarityFunction sim:levenshtein ;
2992. sim:weight "1"^^xsd:float ;
2993. rdfs:label "AnnotationPropertySimilarity RiskReduction for BMIPossibilitiesView"
       @en ;
2994. .
2995. bmicm:quantitativeValueElements_specializedBy_RiskReduction
2996. sim:similarity bmiciscsm:simOP_quantitativeValueElements_specializedBy_RiskReduc
       tion_BMIPossibilitiesView ;
2997. .
2998. bmiciscsm:simOP_quantitativeValueElements_specializedBy_RiskReduction_BMIPossibi
       litiesView
```

```
2999. rdf:type sim:ObjectPropertySimilarity ;
3000. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3001. sim:globalSimilarityFunction sim:average ;
3002. sim:weight "1"^^xsd:float ;
3003. rdfs:label "ObjectPropertySimilarity quantitativeValueElements_specializedBy_Ris
      kReduction for BMIPossibilitiesView"@en ;
3004. .
3005. bm:SpeedOfService
3006. sim:similarity bmiciscsm:simAP_SpeedOfService_BMIPossibilitiesView ;
3007. .
3008. bmiciscsm:simAP_SpeedOfService_BMIPossibilitiesView
3009. rdf:type sim:AnnotationPropertySimilarity ;
3010. sim:annotationProperty rdfs:label ;
3011. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3012. sim:localSimilarityFunction sim:levenshtein ;
3013. sim:weight "1"^^xsd:float ;
3014. rdfs:label "AnnotationPropertySimilarity SpeedOfService for BMIPossibilitiesView
      "@en ;
3015. .
3016. bmicm:quantitativeValueElements_specializedBy_SpeedOfService
3017. sim:similarity bmiciscsm:simOP_quantitativeValueElements_specializedBy_SpeedOfSe
      rvice_BMIPossibilitiesView ;
3018. .
3019. bmiciscsm:simOP_quantitativeValueElements_specializedBy_SpeedOfService_BMIPossib
      ilitiesView
3020. rdf:type sim:ObjectPropertySimilarity ;
3021. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3022. sim:globalSimilarityFunction sim:average ;
3023. sim:weight "1"^^xsd:float ;
3024. rdfs:label "ObjectPropertySimilarity quantitativeValueElements_specializedBy_Spe
      edOfService for BMIPossibilitiesView"@en ;
3025. .
3026. bmicm:businessModelInnovationCases_composedOf_CustomerInterfaceElements
3027. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_CustomerI
      nterfaceElements_BMIPossibilitiesView ;
3028. .
3029. bmiciscsm:simOP_businessModelInnovationCases_composedOf_CustomerInterfaceElement
      s_BMIPossibilitiesView
3030. rdf:type sim:ObjectPropertySimilarity ;
3031. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3032. sim:globalSimilarityFunction sim:average ;
3033. sim:weight "1"^^xsd:float ;
3034. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Cus
      tomerInterfaceElements for BMIPossibilitiesView"@en ;
3035. .
3036. bmicm:customerInterfaceElements_specializedBy_ChannelElements
3037. sim:similarity bmiciscsm:simOP_customerInterfaceElements_specializedBy_ChannelEl
      ements_BMIPossibilitiesView ;
3038. .
3039. bmiciscsm:simOP_customerInterfaceElements_specializedBy_ChannelElements_BMIPossi
      bilitiesView
3040. rdf:type sim:ObjectPropertySimilarity ;
3041. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3042. sim:globalSimilarityFunction sim:average ;
3043. sim:weight "1"^^xsd:float ;
3044. rdfs:label "ObjectPropertySimilarity customerInterfaceElements_specializedBy_Cha
      nnelElements for BMIPossibilitiesView"@en ;
3045. .
3046. bmicm:channelElements_specializedBy_DirectChannelElements
3047. sim:similarity bmiciscsm:simOP_channelElements_specializedBy_DirectChannelElemen
      ts_BMIPossibilitiesView ;
3048. .
3049. bmiciscsm:simOP_channelElements_specializedBy_DirectChannelElements_BMIPossibili
      tiesView
3050. rdf:type sim:ObjectPropertySimilarity ;
```

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3051.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3052.   sim:globalSimilarityFunction sim:average ;
3053.   sim:weight "1"^^xsd:float ;
3054.   rdfs:label "ObjectPropertySimilarity channelElements_specializedBy_DirectChannel
        Elements for BMIPossibilitiesView"@en ;
3055.   .
3056.   bmicm:channelElements_specializedBy_IndirectChannelElements
3057.   sim:similarity bmiciscsm:simOP_channelElements_specializedBy_IndirectChannelElem
        ents_BMIPossibilitiesView ;
3058.   .
3059.   bmiciscsm:simOP_channelElements_specializedBy_IndirectChannelElements_BMIPossibi
        litiesView
3060.   rdf:type sim:ObjectPropertySimilarity ;
3061.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3062.   sim:globalSimilarityFunction sim:average ;
3063.   sim:weight "1"^^xsd:float ;
3064.   rdfs:label "ObjectPropertySimilarity channelElements_specializedBy_IndirectChann
        elElements for BMIPossibilitiesView"@en ;
3065.   .
3066.   bm:SalesForce
3067.   sim:similarity bmiciscsm:simAP_SalesForce_BMIPossibilitiesView ;
3068.   .
3069.   bmiciscsm:simAP_SalesForce_BMIPossibilitiesView
3070.   rdf:type sim:AnnotationPropertySimilarity ;
3071.   sim:annotationProperty rdfs:label ;
3072.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3073.   sim:localSimilarityFunction sim:levenshtein ;
3074.   sim:weight "1"^^xsd:float ;
3075.   rdfs:label "AnnotationPropertySimilarity SalesForce for BMIPossibilitiesView"@en
         ;
3076.   .
3077.   bmicm:directChannelElements_specializedBy_SalesForce
3078.   sim:similarity bmiciscsm:simOP_directChannelElements_specializedBy_SalesForce_BM
        IPossibilitiesView ;
3079.   .
3080.   bmiciscsm:simOP_directChannelElements_specializedBy_SalesForce_BMIPossibilitiesV
        iew
3081.   rdf:type sim:ObjectPropertySimilarity ;
3082.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3083.   sim:globalSimilarityFunction sim:average ;
3084.   sim:weight "1"^^xsd:float ;
3085.   rdfs:label "ObjectPropertySimilarity directChannelElements_specializedBy_SalesFo
        rce for BMIPossibilitiesView"@en ;
3086.   .
3087.   bm:WebSale
3088.   sim:similarity bmiciscsm:simAP_WebSale_BMIPossibilitiesView ;
3089.   .
3090.   bmiciscsm:simAP_WebSale_BMIPossibilitiesView
3091.   rdf:type sim:AnnotationPropertySimilarity ;
3092.   sim:annotationProperty rdfs:label ;
3093.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3094.   sim:localSimilarityFunction sim:levenshtein ;
3095.   sim:weight "1"^^xsd:float ;
3096.   rdfs:label "AnnotationPropertySimilarity WebSale for BMIPossibilitiesView"@en ;
3097.   .
3098.   bmicm:directChannelElements_specializedBy_WebSale
3099.   sim:similarity bmiciscsm:simOP_directChannelElements_specializedBy_WebSale_BMIPo
        ssibilitiesView ;
3100.   .
3101.   bmiciscsm:simOP_directChannelElements_specializedBy_WebSale_BMIPossibilitiesView
3102.   rdf:type sim:ObjectPropertySimilarity ;
3103.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3104.   sim:globalSimilarityFunction sim:average ;
3105.   sim:weight "1"^^xsd:float ;
```

```
3106.   rdfs:label "ObjectPropertySimilarity directChannelElements_specializedBy_WebSale
          for BMIPossibilitiesView"@en ;
3107.   .
3108.   bm:OwnStore
3109.   sim:similarity bmiciscsm:simAP_OwnStore_BMIPossibilitiesView ;
3110.   .
3111.   bmiciscsm:simAP_OwnStore_BMIPossibilitiesView
3112.   rdf:type sim:AnnotationPropertySimilarity ;
3113.   sim:annotationProperty rdfs:label ;
3114.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3115.   sim:localSimilarityFunction sim:levenshtein ;
3116.   sim:weight "1"^^xsd:float ;
3117.   rdfs:label "AnnotationPropertySimilarity OwnStore for BMIPossibilitiesView"@en ;
3118.   .
3119.   bmicm:indirectChannelElements_specializedBy_OwnStore
3120.   sim:similarity bmiciscsm:simOP_indirectChannelElements_specializedBy_OwnStore_BM
          IPossibilitiesView ;
3121.   .
3122.   bmiciscsm:simOP_indirectChannelElements_specializedBy_OwnStore_BMIPossibilitiesV
          iew
3123.   rdf:type sim:ObjectPropertySimilarity ;
3124.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3125.   sim:globalSimilarityFunction sim:average ;
3126.   sim:weight "1"^^xsd:float ;
3127.   rdfs:label "ObjectPropertySimilarity indirectChannelElements_specializedBy_OwnSt
          ore for BMIPossibilitiesView"@en ;
3128.   .
3129.   bm:PartnerStore
3130.   sim:similarity bmiciscsm:simAP_PartnerStore_BMIPossibilitiesView ;
3131.   .
3132.   bmiciscsm:simAP_PartnerStore_BMIPossibilitiesView
3133.   rdf:type sim:AnnotationPropertySimilarity ;
3134.   sim:annotationProperty rdfs:label ;
3135.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3136.   sim:localSimilarityFunction sim:levenshtein ;
3137.   sim:weight "1"^^xsd:float ;
3138.   rdfs:label "AnnotationPropertySimilarity PartnerStore for BMIPossibilitiesView"@
          en ;
3139.   .
3140.   bmicm:indirectChannelElements_specializedBy_PartnerStore
3141.   sim:similarity bmiciscsm:simOP_indirectChannelElements_specializedBy_PartnerStor
          e_BMIPossibilitiesView ;
3142.   .
3143.   bmiciscsm:simOP_indirectChannelElements_specializedBy_PartnerStore_BMIPossibilit
          iesView
3144.   rdf:type sim:ObjectPropertySimilarity ;
3145.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3146.   sim:globalSimilarityFunction sim:average ;
3147.   sim:weight "1"^^xsd:float ;
3148.   rdfs:label "ObjectPropertySimilarity indirectChannelElements_specializedBy_Partn
          erStore for BMIPossibilitiesView"@en ;
3149.   .
3150.   bm:Wholesaler
3151.   sim:similarity bmiciscsm:simAP_Wholesaler_BMIPossibilitiesView ;
3152.   .
3153.   bmiciscsm:simAP_Wholesaler_BMIPossibilitiesView
3154.   rdf:type sim:AnnotationPropertySimilarity ;
3155.   sim:annotationProperty rdfs:label ;
3156.   sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3157.   sim:localSimilarityFunction sim:levenshtein ;
3158.   sim:weight "1"^^xsd:float ;
3159.   rdfs:label "AnnotationPropertySimilarity Wholesaler for BMIPossibilitiesView"@en
          ;
3160.   .
3161.   bmicm:indirectChannelElements_specializedBy_Wholesaler
```

3162. sim:similarity bmiciscsm:simOP_indirectChannelElements_specializedBy_Wholesaler_
      BMIPossibilitiesView ;
3163. .
3164. bmiciscsm:simOP_indirectChannelElements_specializedBy_Wholesaler_BMIPossibilitie
      sView
3165. rdf:type sim:ObjectPropertySimilarity ;
3166. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3167. sim:globalSimilarityFunction sim:average ;
3168. sim:weight "1"^^xsd:float ;
3169. rdfs:label "ObjectPropertySimilarity indirectChannelElements_specializedBy_Whole
      saler for BMIPossibilitiesView"@en ;
3170. .
3171. bmicm:customerInterfaceElements_specializedBy_CustomerRelationshipElements
3172. sim:similarity bmiciscsm:simOP_customerInterfaceElements_specializedBy_CustomerR
      elationshipElements_BMIPossibilitiesView ;
3173. .
3174. bmiciscsm:simOP_customerInterfaceElements_specializedBy_CustomerRelationshipElem
      ents_BMIPossibilitiesView
3175. rdf:type sim:ObjectPropertySimilarity ;
3176. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3177. sim:globalSimilarityFunction sim:average ;
3178. sim:weight "1"^^xsd:float ;
3179. rdfs:label "ObjectPropertySimilarity customerInterfaceElements_specializedBy_Cus
      tomerRelationshipElements for BMIPossibilitiesView"@en ;
3180. .
3181. bmicm:customerRelationshipElements_specializedBy_HumanInteractionElements
3182. sim:similarity bmiciscsm:simOP_customerRelationshipElements_specializedBy_HumanI
      nteractionElements_BMIPossibilitiesView ;
3183. .
3184. bmiciscsm:simOP_customerRelationshipElements_specializedBy_HumanInteractionEleme
      nts_BMIPossibilitiesView
3185. rdf:type sim:ObjectPropertySimilarity ;
3186. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3187. sim:globalSimilarityFunction sim:average ;
3188. sim:weight "1"^^xsd:float ;
3189. rdfs:label "ObjectPropertySimilarity customerRelationshipElements_specializedBy_
      HumanInteractionElements for BMIPossibilitiesView"@en ;
3190. .
3191. bmicm:customerRelationshipElements_specializedBy_NonHumanInteractionElements
3192. sim:similarity bmiciscsm:simOP_customerRelationshipElements_specializedBy_NonHum
      anInteractionElements_BMIPossibilitiesView ;
3193. .
3194. bmiciscsm:simOP_customerRelationshipElements_specializedBy_NonHumanInteractionEl
      ements_BMIPossibilitiesView
3195. rdf:type sim:ObjectPropertySimilarity ;
3196. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3197. sim:globalSimilarityFunction sim:average ;
3198. sim:weight "1"^^xsd:float ;
3199. rdfs:label "ObjectPropertySimilarity customerRelationshipElements_specializedBy_
      NonHumanInteractionElements for BMIPossibilitiesView"@en ;
3200. .
3201. bm:CoCreationWithPeople
3202. sim:similarity bmiciscsm:simAP_CoCreationWithPeople_BMIPossibilitiesView ;
3203. .
3204. bmiciscsm:simAP_CoCreationWithPeople_BMIPossibilitiesView
3205. rdf:type sim:AnnotationPropertySimilarity ;
3206. sim:annotationProperty rdfs:label ;
3207. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3208. sim:localSimilarityFunction sim:levenshtein ;
3209. sim:weight "1"^^xsd:float ;
3210. rdfs:label "AnnotationPropertySimilarity CoCreationWithPeople for BMIPossibiliti
      esView"@en ;
3211. .
3212. bmicm:humanInteractionElements_specializedBy_CoCreationWithPeople

3213. `sim:`similarity `bmiciscsm:`simOP_humanInteractionElements_specializedBy_CoCreation
WithPeople_BMIPossibilitiesView ;
3214. .
3215. `bmiciscsm:`simOP_humanInteractionElements_specializedBy_CoCreationWithPeople_BMIP
ossibilitiesView
3216. `rdf:`type `sim:`ObjectPropertySimilarity ;
3217. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3218. `sim:`globalSimilarityFunction `sim:`average ;
3219. `sim:`weight "1"^^`xsd:`float ;
3220. `rdfs:`label "ObjectPropertySimilarity humanInteractionElements_specializedBy_CoCr
eationWithPeople for BMIPossibilitiesView"@en ;
3221. .
3222. `bm:`Communities
3223. `sim:`similarity `bmiciscsm:`simAP_Communities_BMIPossibilitiesView ;
3224. .
3225. `bmiciscsm:`simAP_Communities_BMIPossibilitiesView
3226. `rdf:`type `sim:`AnnotationPropertySimilarity ;
3227. `sim:`annotationProperty `rdfs:`label ;
3228. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3229. `sim:`localSimilarityFunction `sim:`levenshtein ;
3230. `sim:`weight "1"^^`xsd:`float ;
3231. `rdfs:`label "AnnotationPropertySimilarity Communities for BMIPossibilitiesView"@e
n ;
3232. .
3233. `bmicm:`humanInteractionElements_specializedBy_Communities
3234. `sim:`similarity `bmiciscsm:`simOP_humanInteractionElements_specializedBy_Communitie
s_BMIPossibilitiesView ;
3235. .
3236. `bmiciscsm:`simOP_humanInteractionElements_specializedBy_Communities_BMIPossibilit
iesView
3237. `rdf:`type `sim:`ObjectPropertySimilarity ;
3238. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3239. `sim:`globalSimilarityFunction `sim:`average ;
3240. `sim:`weight "1"^^`xsd:`float ;
3241. `rdfs:`label "ObjectPropertySimilarity humanInteractionElements_specializedBy_Comm
unities for BMIPossibilitiesView"@en ;
3242. .
3243. `bm:`DedicatedPersonalAssistance
3244. `sim:`similarity `bmiciscsm:`simAP_DedicatedPersonalAssistance_BMIPossibilitiesView
;
3245. .
3246. `bmiciscsm:`simAP_DedicatedPersonalAssistance_BMIPossibilitiesView
3247. `rdf:`type `sim:`AnnotationPropertySimilarity ;
3248. `sim:`annotationProperty `rdfs:`label ;
3249. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3250. `sim:`localSimilarityFunction `sim:`levenshtein ;
3251. `sim:`weight "1"^^`xsd:`float ;
3252. `rdfs:`label "AnnotationPropertySimilarity DedicatedPersonalAssistance for BMIPoss
ibilitiesView"@en ;
3253. .
3254. `bmicm:`humanInteractionElements_specializedBy_DedicatedPersonalAssistance
3255. `sim:`similarity `bmiciscsm:`simOP_humanInteractionElements_specializedBy_DedicatedP
ersonalAssistance_BMIPossibilitiesView ;
3256. .
3257. `bmiciscsm:`simOP_humanInteractionElements_specializedBy_DedicatedPersonalAssistan
ce_BMIPossibilitiesView
3258. `rdf:`type `sim:`ObjectPropertySimilarity ;
3259. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3260. `sim:`globalSimilarityFunction `sim:`average ;
3261. `sim:`weight "1"^^`xsd:`float ;
3262. `rdfs:`label "ObjectPropertySimilarity humanInteractionElements_specializedBy_Dedi
catedPersonalAssistance for BMIPossibilitiesView"@en ;
3263. .
3264. `bm:`PersonalAssistance
3265. `sim:`similarity `bmiciscsm:`simAP_PersonalAssistance_BMIPossibilitiesView ;

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3266.  .
3267.  bmiciscsm:simAP_PersonalAssistance_BMIPossibilitiesView
3268.  rdf:type sim:AnnotationPropertySimilarity ;
3269.  sim:annotationProperty rdfs:label ;
3270.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3271.  sim:localSimilarityFunction sim:levenshtein ;
3272.  sim:weight "1"^^xsd:float ;
3273.  rdfs:label "AnnotationPropertySimilarity PersonalAssistance for BMIPossibilities
       View"@en ;
3274.  .
3275.  bmicm:humanInteractionElements_specializedBy_PersonalAssistance
3276.  sim:similarity bmiciscsm:simOP_humanInteractionElements_specializedBy_PersonalAs
       sistance_BMIPossibilitiesView ;
3277.  .
3278.  bmiciscsm:simOP_humanInteractionElements_specializedBy_PersonalAssistance_BMIPos
       sibilitiesView
3279.  rdf:type sim:ObjectPropertySimilarity ;
3280.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3281.  sim:globalSimilarityFunction sim:average ;
3282.  sim:weight "1"^^xsd:float ;
3283.  rdfs:label "ObjectPropertySimilarity humanInteractionElements_specializedBy_Pers
       onalAssistance for BMIPossibilitiesView"@en ;
3284.  .
3285.  bm:AutomatedService
3286.  sim:similarity bmiciscsm:simAP_AutomatedService_BMIPossibilitiesView ;
3287.  .
3288.  bmiciscsm:simAP_AutomatedService_BMIPossibilitiesView
3289.  rdf:type sim:AnnotationPropertySimilarity ;
3290.  sim:annotationProperty rdfs:label ;
3291.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3292.  sim:localSimilarityFunction sim:levenshtein ;
3293.  sim:weight "1"^^xsd:float ;
3294.  rdfs:label "AnnotationPropertySimilarity AutomatedService for BMIPossibilitiesVi
       ew"@en ;
3295.  .
3296.  bmicm:nonHumanInteractionElements_specializedBy_AutomatedService
3297.  sim:similarity bmiciscsm:simOP_nonHumanInteractionElements_specializedBy_Automat
       edService_BMIPossibilitiesView ;
3298.  .
3299.  bmiciscsm:simOP_nonHumanInteractionElements_specializedBy_AutomatedService_BMIPo
       ssibilitiesView
3300.  rdf:type sim:ObjectPropertySimilarity ;
3301.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3302.  sim:globalSimilarityFunction sim:average ;
3303.  sim:weight "1"^^xsd:float ;
3304.  rdfs:label "ObjectPropertySimilarity nonHumanInteractionElements_specializedBy_A
       utomatedService for BMIPossibilitiesView"@en ;
3305.  .
3306.  bm:CoCreationWithBot
3307.  sim:similarity bmiciscsm:simAP_CoCreationWithBot_BMIPossibilitiesView ;
3308.  .
3309.  bmiciscsm:simAP_CoCreationWithBot_BMIPossibilitiesView
3310.  rdf:type sim:AnnotationPropertySimilarity ;
3311.  sim:annotationProperty rdfs:label ;
3312.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3313.  sim:localSimilarityFunction sim:levenshtein ;
3314.  sim:weight "1"^^xsd:float ;
3315.  rdfs:label "AnnotationPropertySimilarity CoCreationWithBot for BMIPossibilitiesV
       iew"@en ;
3316.  .
3317.  bmicm:nonHumanInteractionElements_specializedBy_CoCreationWithBot
3318.  sim:similarity bmiciscsm:simOP_nonHumanInteractionElements_specializedBy_CoCreat
       ionWithBot_BMIPossibilitiesView ;
3319.  .
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3320. `bmiciscsm:`simOP_nonHumanInteractionElements_specializedBy_CoCreationWithBot_BMIP ossibilitiesView
3321. `rdf:`type `sim:`ObjectPropertySimilarity ;
3322. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3323. `sim:`globalSimilarityFunction `sim:`average ;
3324. `sim:`weight "1"^^`xsd:`float ;
3325. `rdfs:`label "ObjectPropertySimilarity nonHumanInteractionElements_specializedBy_C oCreationWithBot for BMIPossibilitiesView"@en ;
3326. .
3327. `bm:`SelfService
3328. `sim:`similarity `bmiciscsm:`simAP_SelfService_BMIPossibilitiesView ;
3329. .
3330. `bmiciscsm:`simAP_SelfService_BMIPossibilitiesView
3331. `rdf:`type `sim:`AnnotationPropertySimilarity ;
3332. `sim:`annotationProperty `rdfs:`label ;
3333. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3334. `sim:`localSimilarityFunction `sim:`levenshtein ;
3335. `sim:`weight "1"^^`xsd:`float ;
3336. `rdfs:`label "AnnotationPropertySimilarity SelfService for BMIPossibilitiesView"@e n ;
3337. .
3338. `bmicm:`nonHumanInteractionElements_specializedBy_SelfService
3339. `sim:`similarity `bmiciscsm:`simOP_nonHumanInteractionElements_specializedBy_SelfSer vice_BMIPossibilitiesView ;
3340. .
3341. `bmiciscsm:`simOP_nonHumanInteractionElements_specializedBy_SelfService_BMIPossibi litiesView
3342. `rdf:`type `sim:`ObjectPropertySimilarity ;
3343. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3344. `sim:`globalSimilarityFunction `sim:`average ;
3345. `sim:`weight "1"^^`xsd:`float ;
3346. `rdfs:`label "ObjectPropertySimilarity nonHumanInteractionElements_specializedBy_S elfService for BMIPossibilitiesView"@en ;
3347. .
3348. `bmicm:`customerInterfaceElements_specializedBy_CustomerSegmentElements
3349. `sim:`similarity `bmiciscsm:`simOP_customerInterfaceElements_specializedBy_CustomerS egmentElements_BMIPossibilitiesView ;
3350. .
3351. `bmiciscsm:`simOP_customerInterfaceElements_specializedBy_CustomerSegmentElements_ BMIPossibilitiesView
3352. `rdf:`type `sim:`ObjectPropertySimilarity ;
3353. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3354. `sim:`globalSimilarityFunction `sim:`average ;
3355. `sim:`weight "1"^^`xsd:`float ;
3356. `rdfs:`label "ObjectPropertySimilarity customerInterfaceElements_specializedBy_Cus tomerSegmentElements for BMIPossibilitiesView"@en ;
3357. .
3358. `bm:`MassMarket
3359. `sim:`similarity `bmiciscsm:`simAP_MassMarket_BMIPossibilitiesView ;
3360. .
3361. `bmiciscsm:`simAP_MassMarket_BMIPossibilitiesView
3362. `rdf:`type `sim:`AnnotationPropertySimilarity ;
3363. `sim:`annotationProperty `rdfs:`label ;
3364. `sim:`belongsToCaseView `bmiciscsm:`BMIPossibilitiesView ;
3365. `sim:`localSimilarityFunction `sim:`levenshtein ;
3366. `sim:`weight "1"^^`xsd:`float ;
3367. `rdfs:`label "AnnotationPropertySimilarity MassMarket for BMIPossibilitiesView"@en ;
3368. .
3369. `bmicm:`customerSegmentElements_specializedBy_MassMarket
3370. `sim:`similarity `bmiciscsm:`simOP_customerSegmentElements_specializedBy_MassMarket_ BMIPossibilitiesView ;
3371. .
3372. `bmiciscsm:`simOP_customerSegmentElements_specializedBy_MassMarket_BMIPossibilitie sView

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3373. rdf:type sim:ObjectPropertySimilarity ;
3374. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3375. sim:globalSimilarityFunction sim:average ;
3376. sim:weight "1"^^xsd:float ;
3377. rdfs:label "ObjectPropertySimilarity customerSegmentElements_specializedBy_MassM
      arket for BMIPossibilitiesView"@en ;
3378. .
3379. bm:MicroMarket
3380. sim:similarity bmiciscsm:simAP_MicroMarket_BMIPossibilitiesView ;
3381. .
3382. bmiciscsm:simAP_MicroMarket_BMIPossibilitiesView
3383. rdf:type sim:AnnotationPropertySimilarity ;
3384. sim:annotationProperty rdfs:label ;
3385. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3386. sim:localSimilarityFunction sim:levenshtein ;
3387. sim:weight "1"^^xsd:float ;
3388. rdfs:label "AnnotationPropertySimilarity MicroMarket for BMIPossibilitiesView"@e
      n ;
3389. .
3390. bmicm:customerSegmentElements_specializedBy_MicroMarket
3391. sim:similarity bmiciscsm:simOP_customerSegmentElements_specializedBy_MicroMarket
      _BMIPossibilitiesView ;
3392. .
3393. bmiciscsm:simOP_customerSegmentElements_specializedBy_MicroMarket_BMIPossibiliti
      esView
3394. rdf:type sim:ObjectPropertySimilarity ;
3395. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3396. sim:globalSimilarityFunction sim:average ;
3397. sim:weight "1"^^xsd:float ;
3398. rdfs:label "ObjectPropertySimilarity customerSegmentElements_specializedBy_Micro
      Market for BMIPossibilitiesView"@en ;
3399. .
3400. bm:NicheMarket
3401. sim:similarity bmiciscsm:simAP_NicheMarket_BMIPossibilitiesView ;
3402. .
3403. bmiciscsm:simAP_NicheMarket_BMIPossibilitiesView
3404. rdf:type sim:AnnotationPropertySimilarity ;
3405. sim:annotationProperty rdfs:label ;
3406. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3407. sim:localSimilarityFunction sim:levenshtein ;
3408. sim:weight "1"^^xsd:float ;
3409. rdfs:label "AnnotationPropertySimilarity NicheMarket for BMIPossibilitiesView"@e
      n ;
3410. .
3411. bmicm:customerSegmentElements_specializedBy_NicheMarket
3412. sim:similarity bmiciscsm:simOP_customerSegmentElements_specializedBy_NicheMarket
      _BMIPossibilitiesView ;
3413. .
3414. bmiciscsm:simOP_customerSegmentElements_specializedBy_NicheMarket_BMIPossibiliti
      esView
3415. rdf:type sim:ObjectPropertySimilarity ;
3416. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3417. sim:globalSimilarityFunction sim:average ;
3418. sim:weight "1"^^xsd:float ;
3419. rdfs:label "ObjectPropertySimilarity customerSegmentElements_specializedBy_Niche
      Market for BMIPossibilitiesView"@en ;
3420. .
3421. bm:SegmentedMarket
3422. sim:similarity bmiciscsm:simAP_SegmentedMarket_BMIPossibilitiesView ;
3423. .
3424. bmiciscsm:simAP_SegmentedMarket_BMIPossibilitiesView
3425. rdf:type sim:AnnotationPropertySimilarity ;
3426. sim:annotationProperty rdfs:label ;
3427. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3428. sim:localSimilarityFunction sim:levenshtein ;
```

```
3429.  sim:weight "1"^^xsd:float ;
3430.  rdfs:label "AnnotationPropertySimilarity SegmentedMarket for BMIPossibilitiesVie
       w"@en ;
3431.  .
3432.  bmicm:customerSegmentElements_specializedBy_SegmentedMarket
3433.  sim:similarity bmiciscsm:simOP_customerSegmentElements_specializedBy_SegmentedMa
       rket_BMIPossibilitiesView ;
3434.  .
3435.  bmiciscsm:simOP_customerSegmentElements_specializedBy_SegmentedMarket_BMIPossibi
       litiesView
3436.  rdf:type sim:ObjectPropertySimilarity ;
3437.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3438.  sim:globalSimilarityFunction sim:average ;
3439.  sim:weight "1"^^xsd:float ;
3440.  rdfs:label "ObjectPropertySimilarity customerSegmentElements_specializedBy_Segme
       ntedMarket for BMIPossibilitiesView"@en ;
3441.  .
3442.  bm:CostStructureModels
3443.  sim:similarity bmiciscsm:simAP_CostStructureModels_BMIPossibilitiesView ;
3444.  .
3445.  bmiciscsm:simAP_CostStructureModels_BMIPossibilitiesView
3446.  rdf:type sim:AnnotationPropertySimilarity ;
3447.  sim:annotationProperty rdfs:label ;
3448.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3449.  sim:localSimilarityFunction sim:levenshtein ;
3450.  sim:weight "1"^^xsd:float ;
3451.  rdfs:label "AnnotationPropertySimilarity CostStructureModels for BMIPossibilitie
       sView"@en ;
3452.  .
3453.  bm:costStructureElements_justifiedBy_CostStructureModels
3454.  sim:similarity bmiciscsm:simOP_costStructureElements_justifiedBy_CostStructureMo
       dels_BMIPossibilitiesView ;
3455.  .
3456.  bmiciscsm:simOP_costStructureElements_justifiedBy_CostStructureModels_BMIPossibi
       litiesView
3457.  rdf:type sim:ObjectPropertySimilarity ;
3458.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3459.  sim:globalSimilarityFunction sim:average ;
3460.  sim:weight "1"^^xsd:float ;
3461.  rdfs:label "ObjectPropertySimilarity costStructureElements_justifiedBy_CostStruc
       tureModels for BMIPossibilitiesView"@en ;
3462.  .
3463.  bm:KeyPartnershipGoals
3464.  sim:similarity bmiciscsm:simAP_KeyPartnershipGoals_BMIPossibilitiesView ;
3465.  .
3466.  bmiciscsm:simAP_KeyPartnershipGoals_BMIPossibilitiesView
3467.  rdf:type sim:AnnotationPropertySimilarity ;
3468.  sim:annotationProperty rdfs:label ;
3469.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3470.  sim:localSimilarityFunction sim:levenshtein ;
3471.  sim:weight "1"^^xsd:float ;
3472.  rdfs:label "AnnotationPropertySimilarity KeyPartnershipGoals for BMIPossibilitie
       sView"@en ;
3473.  .
3474.  bm:keyPartners_justifiedBy_KeyPartnershipGoals
3475.  sim:similarity bmiciscsm:simOP_keyPartners_justifiedBy_KeyPartnershipGoals_BMIPo
       ssibilitiesView ;
3476.  .
3477.  bmiciscsm:simOP_keyPartners_justifiedBy_KeyPartnershipGoals_BMIPossibilitiesView
3478.  rdf:type sim:ObjectPropertySimilarity ;
3479.  sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3480.  sim:globalSimilarityFunction sim:average ;
3481.  sim:weight "1"^^xsd:float ;
3482.  rdfs:label "ObjectPropertySimilarity keyPartners_justifiedBy_KeyPartnershipGoals
        for BMIPossibilitiesView"@en ;
```

```
3483. .
3484. bm:EconomicAdvantages
3485. sim:similarity bmiciscsm:simAP_EconomicAdvantages_BMIPossibilitiesView ;
3486. .
3487. bmiciscsm:simAP_EconomicAdvantages_BMIPossibilitiesView
3488. rdf:type sim:AnnotationPropertySimilarity ;
3489. sim:annotationProperty rdfs:label ;
3490. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3491. sim:localSimilarityFunction sim:levenshtein ;
3492. sim:weight "1"^^xsd:float ;
3493. rdfs:label "AnnotationPropertySimilarity EconomicAdvantages for BMIPossibilities
      View"@en ;
3494. .
3495. bm:infrastructureParts_influencedBy_EconomicAdvantages
3496. sim:similarity bmiciscsm:simOP_infrastructureParts_influencedBy_EconomicAdvantag
      es_BMIPossibilitiesView ;
3497. .
3498. bmiciscsm:simOP_infrastructureParts_influencedBy_EconomicAdvantages_BMIPossibili
      tiesView
3499. rdf:type sim:ObjectPropertySimilarity ;
3500. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3501. sim:globalSimilarityFunction sim:average ;
3502. sim:weight "1"^^xsd:float ;
3503. rdfs:label "ObjectPropertySimilarity infrastructureParts_influencedBy_EconomicAd
      vantages for BMIPossibilitiesView"@en ;
3504. .
3505. bm:PricingMechanisms
3506. sim:similarity bmiciscsm:simAP_PricingMechanisms_BMIPossibilitiesView ;
3507. .
3508. bmiciscsm:simAP_PricingMechanisms_BMIPossibilitiesView
3509. rdf:type sim:AnnotationPropertySimilarity ;
3510. sim:annotationProperty rdfs:label ;
3511. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3512. sim:localSimilarityFunction sim:levenshtein ;
3513. sim:weight "1"^^xsd:float ;
3514. rdfs:label "AnnotationPropertySimilarity PricingMechanisms for BMIPossibilitiesV
      iew"@en ;
3515. .
3516. bm:revenueStreams_pricedBy_PricingMechanisms
3517. sim:similarity bmiciscsm:simOP_revenueStreams_pricedBy_PricingMechanisms_BMIPoss
      ibilitiesView ;
3518. .
3519. bmiciscsm:simOP_revenueStreams_pricedBy_PricingMechanisms_BMIPossibilitiesView
3520. rdf:type sim:ObjectPropertySimilarity ;
3521. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3522. sim:globalSimilarityFunction sim:average ;
3523. sim:weight "1"^^xsd:float ;
3524. rdfs:label "ObjectPropertySimilarity revenueStreams_pricedBy_PricingMechanisms f
      or BMIPossibilitiesView"@en ;
3525. .

3526. bm:channel_hasChannelOwnerType
3527. sim:similarity bmiciscsm:simDP_channel_hasChannelOwnerType_BMIPossibilitiesView
      ;
3528. .
3529. bmiciscsm:simDP_channel_hasChannelOwnerType_BMIPossibilitiesView
3530. rdf:type sim:DatatypePropertySimilarity ;
3531. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3532. sim:localSimilarityFunction sim:equals ;
3533. sim:weight "1"^^xsd:float ;
3534. rdfs:label "DatatypePropertySimilarity channel_hasChannelOwnerType for BMIPossib
      ilitiesView"@en ;
3535. .
3536. bm:channel_hasChannelPhaseType
```

```
3537. sim:similarity bmiciscsm:simDP_channel_hasChannelPhaseType_BMIPossibilitiesView
       ;
3538. .
3539. bmiciscsm:simDP_channel_hasChannelPhaseType_BMIPossibilitiesView
3540. rdf:type sim:DatatypePropertySimilarity ;
3541. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3542. sim:localSimilarityFunction sim:equals ;
3543. sim:weight "1"^^xsd:float ;
3544. rdfs:label "DatatypePropertySimilarity channel_hasChannelPhaseType for BMIPossib
       ilitiesView"@en ;
3545. .
3546. bm:customerSegment_isAMultiSidedPlatform
3547. sim:similarity bmiciscsm:simDP_customerSegment_isAMultiSidedPlatform_BMIPossibil
       itiesView ;
3548. .
3549. bmiciscsm:simDP_customerSegment_isAMultiSidedPlatform_BMIPossibilitiesView
3550. rdf:type sim:DatatypePropertySimilarity ;
3551. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3552. sim:localSimilarityFunction sim:equals ;
3553. sim:weight "1"^^xsd:float ;
3554. rdfs:label "DatatypePropertySimilarity customerSegment_isAMultiSidedPlatform for
        BMIPossibilitiesView"@en ;
3555. .
3556. bm:customerSegment_isDiversified
3557. sim:similarity bmiciscsm:simDP_customerSegment_isDiversified_BMIPossibilitiesVie
       w ;
3558. .
3559. bmiciscsm:simDP_customerSegment_isDiversified_BMIPossibilitiesView
3560. rdf:type sim:DatatypePropertySimilarity ;
3561. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3562. sim:localSimilarityFunction sim:equals ;
3563. sim:weight "1"^^xsd:float ;
3564. rdfs:label "DatatypePropertySimilarity customerSegment_isDiversified for BMIPoss
       ibilitiesView"@en ;
3565. .
3566. bmbc:keyActivities_isACoreCapability
3567. sim:similarity bmiciscsm:simDP_keyActivities_isACoreCapability_BMIPossibilitiesV
       iew ;
3568. .
3569. bmiciscsm:simDP_keyActivities_isACoreCapability_BMIPossibilitiesView
3570. rdf:type sim:DatatypePropertySimilarity ;
3571. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3572. sim:localSimilarityFunction sim:equals ;
3573. sim:weight "1"^^xsd:float ;
3574. rdfs:label "DatatypePropertySimilarity keyActivities_isACoreCapability for BMIPo
       ssibilitiesView"@en ;
3575. .
3576. bmbc:keyResources_isACoreCapability
3577. sim:similarity bmiciscsm:simDP_keyResources_isACoreCapability_BMIPossibilitiesVi
       ew ;
3578. .
3579. bmiciscsm:simDP_keyResources_isACoreCapability_BMIPossibilitiesView
3580. rdf:type sim:DatatypePropertySimilarity ;
3581. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3582. sim:localSimilarityFunction sim:equals ;
3583. sim:weight "1"^^xsd:float ;
3584. rdfs:label "DatatypePropertySimilarity keyResources_isACoreCapability for BMIPos
       sibilitiesView"@en ;
3585. .
3586.
3587. bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements
3588. sim:similarity bmiciscsm:simOP_businessModelInnovationCases_composedOf_BusinessC
       apabilityElements_BMIPossibilitiesView ;
3589. .
```

```
3590. bmiciscsm:simOP_businessModelInnovationCases_composedOf_BusinessCapabilityElemen
      ts_BMIPossibilitiesView
3591. rdf:type sim:ObjectPropertySimilarity ;
3592. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3593. sim:globalSimilarityFunction sim:average ;
3594. sim:weight "1"^^xsd:float ;
3595. rdfs:label "ObjectPropertySimilarity businessModelInnovationCases_composedOf_Bus
      inessCapabilityElements for BMIPossibilitiesView"@en ;
3596. .
3597. bc:ResourceBasedCapabilities
3598. sim:similarity bmiciscsm:simAP_ResourceBasedCapabilities_BMIPossibilitiesView ;
3599. .
3600. bmiciscsm:simAP_ResourceBasedCapabilities_BMIPossibilitiesView
3601. rdf:type sim:AnnotationPropertySimilarity ;
3602. sim:annotationProperty rdfs:label ;
3603. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3604. sim:localSimilarityFunction sim:levenshtein ;
3605. sim:weight "1"^^xsd:float ;
3606. rdfs:label "AnnotationPropertySimilarity ResourceBasedCapabilities for BMIPossib
      ilitiesView"@en ;
3607. .
3608. bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities
3609. sim:similarity bmiciscsm:simOP_businessCapabilityElements_specializedBy_Resource
      BasedCapabilities_BMIPossibilitiesView ;
3610. .
3611. bmiciscsm:simOP_businessCapabilityElements_specializedBy_ResourceBasedCapabiliti
      es_BMIPossibilitiesView
3612. rdf:type sim:ObjectPropertySimilarity ;
3613. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3614. sim:globalSimilarityFunction sim:average ;
3615. sim:weight "1"^^xsd:float ;
3616. rdfs:label "ObjectPropertySimilarity businessCapabilityElements_specializedBy_Re
      sourceBasedCapabilities for BMIPossibilitiesView"@en ;
3617. .
3618. bmiciscsm:simAP_CoreCapabilities_BMIPossibilitiesView
3619. rdf:type sim:AnnotationPropertySimilarity ;
3620. sim:annotationProperty rdfs:label ;
3621. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3622. sim:localSimilarityFunction sim:levenshtein ;
3623. sim:weight "1"^^xsd:float ;
3624. rdfs:label "AnnotationPropertySimilarity CoreCapabilities for BMIPossibilitiesVi
      ew"@en ;
3625. .
3626. bmicm:businessCapabilityElements_specializedBy_CoreCapabilities
3627. sim:similarity bmiciscsm:simOP_businessCapabilityElements_specializedBy_CoreCapa
      bilities_BMIPossibilitiesView ;
3628. .
3629. bmiciscsm:simOP_businessCapabilityElements_specializedBy_CoreCapabilities_BMIPos
      sibilitiesView
3630. rdf:type sim:ObjectPropertySimilarity ;
3631. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3632. sim:globalSimilarityFunction sim:average ;
3633. sim:weight "1"^^xsd:float ;
3634. rdfs:label "ObjectPropertySimilarity businessCapabilityElements_specializedBy_Co
      reCapabilities for BMIPossibilitiesView"@en ;
3635. .
3636. bmiciscsm:simAP_DynamicCapabilities_BMIPossibilitiesView
3637. rdf:type sim:AnnotationPropertySimilarity ;
3638. sim:annotationProperty rdfs:label ;
3639. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3640. sim:localSimilarityFunction sim:levenshtein ;
3641. sim:weight "1"^^xsd:float ;
3642. rdfs:label "AnnotationPropertySimilarity DynamicCapabilities for BMIPossibilitie
      sView"@en ;
3643. .
```

3644. bmicm:businessCapabilityElements_specializedBy_DynamicCapabilities
3645. sim:similarity bmiciscsm:simOP_businessCapabilityElements_specializedBy_DynamicC
    apabilities_BMIPossibilitiesView ;
3646. .
3647. bmiciscsm:simOP_businessCapabilityElements_specializedBy_DynamicCapabilities_BMI
    PossibilitiesView
3648. rdf:type sim:ObjectPropertySimilarity ;
3649. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3650. sim:globalSimilarityFunction sim:average ;
3651. sim:weight "1"^^xsd:float ;
3652. rdfs:label "ObjectPropertySimilarity businessCapabilityElements_specializedBy_Dy
    namicCapabilities for BMIPossibilitiesView"@en ;
3653. .
3654. bmicm:businessCapabilityElements_specializedBy_HumanBasedCapabilityElements
3655. sim:similarity bmiciscsm:simOP_businessCapabilityElements_specializedBy_HumanBas
    edCapabilityElements_BMIPossibilitiesView ;
3656. .
3657. bmiciscsm:simOP_businessCapabilityElements_specializedBy_HumanBasedCapabilityEle
    ments_BMIPossibilitiesView
3658. rdf:type sim:ObjectPropertySimilarity ;
3659. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3660. sim:globalSimilarityFunction sim:average ;
3661. sim:weight "1"^^xsd:float ;
3662. rdfs:label "ObjectPropertySimilarity businessCapabilityElements_specializedBy_Hu
    manBasedCapabilityElements for BMIPossibilitiesView"@en ;
3663. .
3664. bmiciscsm:simAP_Competencies_BMIPossibilitiesView
3665. rdf:type sim:AnnotationPropertySimilarity ;
3666. sim:annotationProperty rdfs:label ;
3667. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3668. sim:localSimilarityFunction sim:levenshtein ;
3669. sim:weight "1"^^xsd:float ;
3670. rdfs:label "AnnotationPropertySimilarity Competencies for BMIPossibilitiesView"@
    en ;
3671. .
3672. bmicm:humanBasedCapabilityElements_specializedBy_Competencies
3673. sim:similarity bmiciscsm:simOP_humanBasedCapabilityElements_specializedBy_Compet
    encies_BMIPossibilitiesView ;
3674. .
3675. bmiciscsm:simOP_humanBasedCapabilityElements_specializedBy_Competencies_BMIPossi
    bilitiesView
3676. rdf:type sim:ObjectPropertySimilarity ;
3677. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3678. sim:globalSimilarityFunction sim:average ;
3679. sim:weight "1"^^xsd:float ;
3680. rdfs:label "ObjectPropertySimilarity humanBasedCapabilityElements_specializedBy_
    Competencies for BMIPossibilitiesView"@en ;
3681. .
3682. bmiciscsm:simAP_Skills_BMIPossibilitiesView
3683. rdf:type sim:AnnotationPropertySimilarity ;
3684. sim:annotationProperty rdfs:label ;
3685. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3686. sim:localSimilarityFunction sim:levenshtein ;
3687. sim:weight "1"^^xsd:float ;
3688. rdfs:label "AnnotationPropertySimilarity Skills for BMIPossibilitiesView"@en ;
3689. .
3690. bmicm:humanBasedCapabilityElements_specializedBy_Skills
3691. sim:similarity bmiciscsm:simOP_humanBasedCapabilityElements_specializedBy_Skills
    _BMIPossibilitiesView ;
3692. .
3693. bmiciscsm:simOP_humanBasedCapabilityElements_specializedBy_Skills_BMIPossibiliti
    esView
3694. rdf:type sim:ObjectPropertySimilarity ;
3695. sim:belongsToCaseView bmiciscsm:BMIPossibilitiesView ;
3696. sim:globalSimilarityFunction sim:average ;

```
3697.  sim:weight "1"^^xsd:float ;
3698.  rdfs:label "ObjectPropertySimilarity humanBasedCapabilityElements_specializedBy_
       Skills for BMIPossibilitiesView"@en ;
3699.  .
```

Appendix-D: Case Repository

This appendix shows the code developed as part of this research to represent the business model innovation cases represented within the case repository.

The Business Model Innovation Case: BIM-Manager-as-a-Service

This appendix section shows the code to represent the business model innovation case *BIM-Manager-as-a-Service* stored within the file BMICaseDataCaseA.ttl.

```
1.    # baseURI: http://ikm-group.ch/bmicdca
2.    # imports: http://ikm-group.ch/bmiciscsm
3.    # prefix: bmicdca
4.
5.    @prefix archi: <http://ikm-group.ch/archiMEO/archimate#> .
6.    @prefix archimateV3: <http://ikm-group.ch/archimateV3#> .
7.    @prefix bc: <http://ikm-group.ch/bc#> .
8.    @prefix bic: <http://ikm-group.ch/bic#> .
9.    @prefix bm: <http://ikm-group.ch/bm#> .
10.   @prefix bmbc: <http://ikm-group.ch/bmbc#> .
11.   @prefix bmea: <http://ikm-group.ch/bmea#> .
12.   @prefix bmic: <http://ikm-group.ch/bmic#> .
13.   @prefix bmicdca: <http://ikm-group.ch/bmicdca#> .
14.   @prefix bmicis: <http://ikm-group.ch/bmicis#> .
15.   @prefix bmicm: <http://ikm-group.ch/bmicm#> .
16.   @prefix cbr: <http://ikm-group.ch/cbr#> .
17.   @prefix ci: <http://ikm-group.ch/ci#> .
18.   @prefix eo: <http://ikm-group.ch/archiMEO/eo#> .
19.   @prefix owl: <http://www.w3.org/2002/07/owl#> .
20.   @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
21.   @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
22.   @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
23.
24.   bc:Adaptive
25.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
26.   .
27.   bc:Analytical
28.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
29.   .
30.   bc:Communication
31.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
32.   .
33.   bc:Flexibility
34.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
35.   .
36.   bc:Leadership
37.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
38.   .
39.   bc:Professionalism
40.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
41.   .
42.   bc:ProjectManagement
43.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
44.   .
45.   bc:Responsibility
46.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
47.   .
48.   bc:TeamPlayer
49.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
50.   .
```

```
51.   bc:Teamwork
52.   bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
53.   .
54.   <http://ikm-group.ch/bmicdca>
55.   rdf:type owl:Ontology ;
56.   owl:imports <http://ikm-group.ch/bmiciscsm> ;
57.   owl:versionInfo "Created with TopBraid Composer"@en ;
58.   .
59.   bmicdca:ApplicationComponent_ContractManagementService
60.   rdf:type archi:ApplicationComponent ;
61.   bmea:applicationComponent_servedBy_InfrastructureService bmicdca:InfrastructureS
      ervice_ContractManagementPlatformService ;
62.   rdfs:label "ApplicationComponent ContractManagementService"@en ;
63.   .
64.   bmicdca:ApplicationComponent_ProjectManagementApplication
65.   rdf:type archi:ApplicationComponent ;
66.   bmea:applicationComponent_servedBy_InfrastructureService bmicdca:InfrastructureS
      ervice_ProjectManagementPlatformService ;
67.   rdfs:label "ApplicationComponent ProjectManagementApplication"@en ;
68.   .
69.   bmicdca:ApplicationComponent_RecruitingApplication
70.   rdf:type archi:ApplicationComponent ;
71.   bmea:applicationComponent_servedBy_InfrastructureService bmicdca:InfrastructureS
      ervice_RecruitingPlatformService ;
72.   rdfs:label "ApplicationComponent RecruitingApplication"@en ;
73.   .
74.   bmicdca:ApplicationComponent_TrainingSystem
75.   rdf:type archi:ApplicationComponent ;
76.   bmea:applicationComponent_servedBy_InfrastructureService bmicdca:InfrastructureS
      ervice_TrainingPlatformService ;
77.   rdfs:label "ApplicationComponent TrainingSystem"@en ;
78.   .
79.   bmicdca:ApplicationInterface_TrainingSystemGUI
80.   rdf:type archi:ApplicationInterface ;
81.   bmea:applicationInterface_composedIn_ApplicationComponent bmicdca:ApplicationCom
      ponent_TrainingSystem ;
82.   rdfs:label "ApplicationInterface TrainingSystemGUI"@en ;
83.   .
84.   bmicdca:ApplicationLayerElementsAggregated
85.   rdf:type bmicm:ApplicationLayerElements ;
86.   bmicm:applicationLayerElements_specializedBy_ApplicationComponent bmicdca:Applic
      ationComponent_ContractManagementService ;
87.   bmicm:applicationLayerElements_specializedBy_ApplicationComponent bmicdca:Applic
      ationComponent_ProjectManagementApplication ;
88.   bmicm:applicationLayerElements_specializedBy_ApplicationComponent bmicdca:Applic
      ationComponent_RecruitingApplication ;
89.   bmicm:applicationLayerElements_specializedBy_ApplicationComponent bmicdca:Applic
      ationComponent_TrainingSystem ;
90.   bmicm:applicationLayerElements_specializedBy_ApplicationInterface bmicdca:Applic
      ationInterface_TrainingSystemGUI ;
91.   bmicm:applicationLayerElements_specializedBy_ApplicationService bmicdca:Applicat
      ionService_ContractService ;
92.   bmicm:applicationLayerElements_specializedBy_ApplicationService bmicdca:Applicat
      ionService_ProjectManagementService ;
93.   bmicm:applicationLayerElements_specializedBy_ApplicationService bmicdca:Applicat
      ionService_RecruitingService ;
94.   bmicm:applicationLayerElements_specializedBy_ApplicationService bmicdca:Applicat
      ionService_TrainingBIMManagerService ;
95.   bmicm:applicationLayerElements_specializedBy_DataObject bmicdca:DataObject_Quant
      ityOfSuccessfulBIMProjects ;
96.   bmicm:applicationLayerElements_specializedBy_DataObject bmicdca:DataObject_Reput
      ationScoreOfBIMManagers ;
97.   rdfs:label "Application Layer Elements Aggregated" ;
98.   .
99.   bmicdca:ApplicationService_ContractService
```

```
100.  rdf:type archi:ApplicationService ;
101.  bmea:applicationService_realizedBy_ApplicationComponent bmicdca:ApplicationCompo
      nent_ContractManagementService ;
102.  rdfs:label "ApplicationService ContractService"@en ;
103.  .
104.  bmicdca:ApplicationService_ProjectManagementService
105.  rdf:type archi:ApplicationService ;
106.  bmea:applicationService_realizedBy_ApplicationComponent bmicdca:ApplicationCompo
      nent_ProjectManagementApplication ;
107.  rdfs:label "ApplicationService ProjectManagementService"@en ;
108.  .
109.  bmicdca:ApplicationService_RecruitingService
110.  rdf:type archi:ApplicationService ;
111.  bmea:applicationService_realizedBy_ApplicationComponent bmicdca:ApplicationCompo
      nent_RecruitingApplication ;
112.  rdfs:label "ApplicationService RecruitingService"@en ;
113.  .
114.  bmicdca:ApplicationService_TrainingBIMManagerService
115.  rdf:type archi:ApplicationService ;
116.  bmea:applicationService_realizedBy_ApplicationComponent bmicdca:ApplicationCompo
      nent_TrainingSystem ;
117.  rdfs:label "ApplicationService TrainingBIMManagerService"@en ;
118.  .
119.  bmicdca:BIM
120.  rdf:type bc:Skills ;
121.  bc:skills_hasAcquisitionType_educationTraining bc:FundamentalEducation ;
122.  bmbc:humanBasedCapabilities_yieldsValue_Human bmicdca:BIMManager ;
123.  rdfs:label "Handling BIM"@en ;
124.  .
125.  bmicdca:BIMManager
126.  rdf:type bm:Human ;
127.  bm:infrastructureParts_affects_FinancialAspectParts bmicdca:BIMManagerSalaries ;
128.  bm:infrastructureParts_enables_Offerings bmicdca:BIMManagerAsAService ;
129.  bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
130.  bm:keyRessources_enables_KeyActivities bmicdca:ManageClientsBIMprojects ;
131.  bm:keyRessources_enables_KeyActivities bmicdca:SubcontractBIMManagersToThirdPart
      ies ;
132.  bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;
133.  bmea:keyResources_composedOf_Resource bmicdca:Resource_BIMManager ;
134.  rdfs:label "BIM-Managers"@en ;
135.  .
136.  bmicdca:BIMManagerAsAService
137.  rdf:type bm:Service ;
138.  bm:offerings_basedOn_KeyRessources bmicdca:BIMManager ;
139.  bm:offerings_basedOn_KeyRessources bmicdca:HowToPerformSuccessfulBIMProjects ;
140.  bm:offerings_basedOn_KeyRessources bmicdca:ReputationOfBIMManagers ;
141.  bm:offerings_basedOn_KeyRessources bmicdca:TrackRecordOfSuccessfulBIMProjects ;
142.  bm:offerings_provide_OfferingValues bmicdca:BIMMangersWithSeveralYearsOfExperien
      ceOnBIMProjects ;
143.  bm:offerings_provide_OfferingValues bmicdca:BuildBIMCompliantConstructions ;
144.  bm:offerings_provide_OfferingValues bmicdca:CateringToTheNeedsOfTheCustomersBusi
      ness ;
145.  bm:offerings_provide_OfferingValues bmicdca:GrowTheOfferForCustomersToBuildBIMCo
      mpliantConstructions ;
146.  bm:offerings_provide_OfferingValues bmicdca:HalfOfThePriceIsContingentOnTheSucce
      ssOfTheBIMManagersDelivery ;
147.  bm:offerings_provide_OfferingValues bmicdca:NoNeedOfHiringABIMManager ;
148.  bm:offerings_require_KeyActivities bmicdca:ManageClientsBIMprojects ;
149.  bm:offerings_require_KeyActivities bmicdca:RecruitBIMManagers ;
150.  bm:offerings_require_KeyActivities bmicdca:SubcontractBIMManagersToThirdParties
      ;
151.  bm:offerings_require_KeyActivities bmicdca:TrainingOfBIMManagersOffTheField ;
152.  bm:offerings_require_KeyActivities bmicdca:TrainingOfBIMManagersOnTheField ;
153.  bm:offerings_valueFor_CustomerSegments bmicdca:GeneralPlanerCompaniesInNeedOfBIM
      Managers ;
```

154. `bm:offerings_valueFor_CustomerSegments` `bmicdca:TotalContractorCompaniesInNeedOfB`
IMManagers ;
155. `bmea:offerings_composedOf_Product` `bmicdca:Product_BIMManagerAsAService` ;
156. `rdfs:label` "BIM Manager-as-a-Service (Renting BIM-Managers)"@en ;
157. .
158. `bmicdca:BIMManagerSalaries`
159. `rdf:type` `bm:FixedCost` ;
160. `bm:costStructureElements_affectedBy_Offerings` `bmicdca:BIMManagerAsAService` ;
161. `bm:costStructureElements_justifiedBy_CostStructureModels` `bm:ValueDriven` ;
162. `bmea:costStructureElements_associatedWith_Outcome` `bmicdca:Outcome_BIMManagerSala`
ries ;
163. `rdfs:label` "BIM-Manager salaries"@en ;
164. .
165. `bmicdca:BIMManagers`
166. `rdf:type` `bic:HumanRessources` ;
167. `bmic:requiredResources_aggregates_KeyResources` `bmicdca:BIMManager` ;
168. `bmic:requiredResources_represents_Resource` `bmicdca:Resource_BIMManager` ;
169. `rdfs:label` "BIM Managers"@en ;
170. .
171. `bmicdca:BIMMangersWithSeveralYearsOfExperienceOnBIMProjects`
172. `rdf:type` `bm:Accessibility` ;
173. `bm:offeringValues_influencedBy_CostStructureModels` `bm:ValueDriven` ;
174. `bmea:offeringValues_composedOf_Value` `bmicdca:Value_BIMMangersWithSeveralYearsOfE`
xperienceOnBIMProjects ;
175. `rdfs:label` "BIM-Mangers with several years of experience on BIM-projects"@en ;
176. .
177. `bmicdca:BMICase_A`
178. `rdf:type` `bmic:BusinessModelInnovationCases` ;
179. `bic:cases_caseName` "BIM-Manager-as-a-Service"@en ;
180. `bic:cases_consistsOf_BarriersToOvercome` `bmicdca:MaintainAHighLevelOfBIMCompetenc`
y ;
181. `bic:cases_consistsOf_BarriersToOvercome` `bmicdca:WillingnessOfBIMManagersToBeOuts`
ourced ;
182. `bic:cases_consistsOf_BenefitsOfInnovation` `bmicdca:BetterWorkloadUtilizationOfBIM`
Managers ;
183. `bic:cases_consistsOf_BenefitsOfInnovation` `bmicdca:NewValueStream` ;
184. `bic:cases_consistsOf_BusinessStateCharacteristics` `bmicdca:BusinessModelAfterInno`
vating ;
185. `bic:cases_consistsOf_CaseCharacteristics` `bmicdca:LosingerMarazzi` ;
186. `bic:cases_consistsOf_Drivers` `bmicdca:NotEnoughWorkloadForBIMManagers` ;
187. `bic:cases_consistsOf_RequiredRessources` `bmicdca:BIMManagers` ;
188. `bic:cases_consistsOf_RequiredRessources` `bmicdca:ReputationForBIM` ;
189. `bic:cases_consistsOf_RisksOfInnovation` `bmicdca:HiringTooManyBIMManagers` ;
190. `bic:cases_consistsOf_RisksOfInnovation` `bmicdca:NotHavingEnoughBIMManagersForCust`
omerDemands ;
191. `bic:cases_consistsOf_RisksOfInnovation` `bmicdca:NotHavingEnoughBIMManagersForOwnP`
rojects ;
192. `bic:cases_consistsOf_StrategicGoals` `bmicdca:CreateANewCustomerSegment` ;
193. `bic:cases_consistsOf_StrategicGoals` `bmicdca:ImprovedWorkloadOptimization` ;
194. `bic:cases_isSuccessfulInnovation` "true"^^`xsd:boolean` ;
195. `bic:cases_transformationDurationIs` 100 ;
196. `bmic:businessModelInnovationCases_composedOf_InvolvedParties` `bmicdca:LosingerMar`
azzi ;
197. `bmicm:businessModelInnovationCases_aggregates_ApplicationLayerElements` `bmicdca:A`
pplicationLayerElementsAggregated ;
198. `bmicm:businessModelInnovationCases_aggregates_BusinessLayerElements` `bmicdca:Busi`
nessLayerElementsAggregated ;
199. `bmicm:businessModelInnovationCases_aggregates_MotivationAspectElements` `bmicdca:M`
otivationAspectElementsAggregated ;
200. `bmicm:businessModelInnovationCases_aggregates_StrategyLayerElements` `bmicdca:Stra`
tegyLayerElementsAggregated ;
201. `bmicm:businessModelInnovationCases_aggregates_TechnologyLayerElements` `bmicdca:Te`
chnologyLayerElementsAggregated ;
202. `bmicm:businessModelInnovationCases_composedOf_BarriersToOvercome` `bmicdca:Barrier`
sToOvercomeAggregated ;

203. `bmicm:businessModelInnovationCases_composedOf_BenefitsOfInnovation bmicdca:BenefitsOfInnovationAggregated ;`
204. `bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements bmicdca:BusinessCapabilityElementsAggregated ;`
205. `bmicm:businessModelInnovationCases_composedOf_BusinessStateCharacteristics bmicdca:BusinessStateCharacteristicsAggregated ;`
206. `bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics bmicdca:ConstructionIndustrySpecificsAggregated ;`
207. `bmicm:businessModelInnovationCases_composedOf_CustomerInterfaceElements bmicdca:CustomerInterfaceElementsAggregated ;`
208. `bmicm:businessModelInnovationCases_composedOf_Drivers bmicdca:NotEnoughWorkloadForBIMManagers ;`
209. `bmicm:businessModelInnovationCases_composedOf_FinancialAspectElements bmicdca:FinancialAspectElementsAggregated ;`
210. `bmicm:businessModelInnovationCases_composedOf_Industries bic:Construction ;`
211. `bmicm:businessModelInnovationCases_composedOf_InfrastructureElements bmicdca:InfrastructureElementsAggregated ;`
212. `bmicm:businessModelInnovationCases_composedOf_InvolvedParties bmicdca:LosingerMarazzi ;`
213. `bmicm:businessModelInnovationCases_composedOf_RequiredResources bmicdca:RequiredResourcesAggregated ;`
214. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation bmicdca:HiringTooManyBIMManagers ;`
215. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation bmicdca:NotHavingEnoughBIMManagersForCustomerDemands ;`
216. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation bmicdca:NotHavingEnoughBIMManagersForOwnProjects ;`
217. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals bmicdca:CreateANewCustomerSegment ;`
218. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals bmicdca:ImprovedWorkloadOptimization ;`
219. `bmicm:businessModelInnovationCases_composedOf_ValuePropositionElements bmicdca:ValuePropositionElementsAggregated ;`
220. `rdfs:label "BMI Case: BIM-Manager-as-a-Service"@en ;`
221. `.`
222. `bmicdca:BarriersToOvercomeAggregated`
223. `rdf:type bmicm:BarriersToOvercome ;`
224. `bmicm:barriersToOvercome_specializedBy_IntellectualBarriers bmicdca:MaintainAHighLevelOfBIMCompetency ;`
225. `bmicm:barriersToOvercome_specializedBy_OrganisationalBarriers bmicdca:WillingnessOfBIMManagersToBeOutsourced ;`
226. `rdfs:label "BarriersToOvercomeAggregated" ;`
227. `.`
228. `bmicdca:BenefitsOfInnovationAggregated`
229. `rdf:type bmicm:BenefitsOfInnovation ;`
230. `bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits bmicdca:BetterWorkloadUtilizationOfBIMManagers ;`
231. `bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits bmicdca:NewValueStream ;`
232. `rdfs:label "BenefitsOfInnovationAggregated" ;`
233. `.`
234. `bmicdca:BetterWorkloadUtilizationOfBIMManagers`
235. `rdf:type bic:InvolvedPartyBenefits ;`
236. `rdfs:label "Better Workload Utilization Of BIM Managers"@en ;`
237. `.`
238. `bmicdca:BuildBIMCompliantConstructions`
239. `rdf:type bm:GettingTheJobDone ;`
240. `bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;`
241. `bmea:offeringValues_composedOf_Value bmicdca:Value_BuildBIMCompliantConstructions ;`
242. `rdfs:label "Build BIM-compliant constructions"@en ;`
243. `.`
244. `bmicdca:BusinessActor_AcademicInstitute`
245. `rdf:type eo:LegalEntity ;`

246. `eo:businessActorHasAssignedBusinessRole bmicdca:BusinessRole_TrainingFacilityFor`
     `TrainingBIMManagers ;`
247. `rdfs:label "BusinessActor AcademicInstitute"@en ;`
248. `.`
249. `bmicdca:BusinessActor_BIMManagerUnit`
250. `rdf:type eo:OrganisationalUnit ;`
251. `eo:businessActorHasAssignedBusinessRole bmicdca:BusinessRole_BIMManager ;`
252. `bmea:businessActor_servedBy_ApplicationInterface bmicdca:ApplicationInterface_Tr`
     `ainingSystemGUI ;`
253. `rdfs:label "BusinessActor BIMManagerUnit"@en ;`
254. `.`
255. `bmicdca:BusinessActor_NicheMarketCustomerSegmentA`
256. `rdf:type eo:LegalEntity ;`
257. `eo:businessActorHasAssignedBusinessRole bmicdca:BusinessRole_GeneralPlanerCompan`
     `iesInNeedOfBIMManagers ;`
258. `rdfs:label "BusinessActor NicheMarketCustomerSegmentA"@en ;`
259. `.`
260. `bmicdca:BusinessActor_NicheMarketCustomerSegmentB`
261. `rdf:type eo:LegalEntity ;`
262. `eo:businessActorHasAssignedBusinessRole bmicdca:BusinessRole_TotalContractorComp`
     `aniesInNeedOfBIMManagers ;`
263. `rdfs:label "BusinessActor NicheMarketCustomerSegmentB"@en ;`
264. `.`
265. `bmicdca:BusinessCapabilityElementsAggregated`
266. `rdf:type bmicm:BusinessCapabilityElements ;`
267. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdca:HandleBI`
     `MMProjects ;`
268. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdca:TeamOfBI`
     `MManagers ;`
269. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdca:Transfer`
     `BIMKnowledge ;`
270. `bmicm:businessCapabilityElements_specializedBy_HumanBasedCapabilityElements bmic`
     `dca:HumanBasedCapabilityElementsAggregated ;`
271. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Adap`
     `tive ;`
272. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Anal`
     `ytical ;`
273. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Comm`
     `unication ;`
274. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Flex`
     `ibility ;`
275. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Lead`
     `ership ;`
276. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Prof`
     `essionalism ;`
277. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Proj`
     `ectManagement ;`
278. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Resp`
     `onsibility ;`
279. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Team`
     `Player ;`
280. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bc:Team`
     `work ;`
281. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdca`
     `:BIM ;`
282. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdca`
     `:HandleBIMProjects ;`
283. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdca`
     `:TeamOfBIMManagers ;`
284. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdca`
     `:TransferBIMKnowledge ;`
285. `rdfs:label "Business Capability Elements Aggregated" ;`
286. `.`
287. `bmicdca:BusinessCollaboration_CoCreationWithPeople`
288. `rdf:type archi:BusinessCollaboration ;`

289. `bmea:businessCollaboration_assignedTo_BusinessInteraction bmicdca:BusinessIntera`
     `ction_ProjectBasedRelationThroughTheBIMManager ;`
290. `rdfs:label "BusinessCollaboration CoCreationWithPeople"@en ;`
291. `.`
292. `bmicdca:BusinessFunction_PersonalAssistanceThroughSalesTeam`
293. `rdf:type archi:BusinessFunction ;`
294. `rdfs:label "BusinessFunction PersonalAssistanceThroughSalesTeam"@en ;`
295. `.`
296. `bmicdca:BusinessInteraction_ProjectBasedRelationThroughTheBIMManager`
297. `rdf:type archi:BusinessInteraction ;`
298. `rdfs:label "BusinessInteraction ProjectBasedRelationThroughTheBIMManager"@en ;`
299. `.`
300. `bmicdca:BusinessInterface_SalesForceTeam`
301. `rdf:type archi:BusinessInterface ;`
302. `rdfs:label "BusinessInterface Website"@en ;`
303. `.`
304. `bmicdca:BusinessInterface_Website`
305. `rdf:type archi:BusinessInterface ;`
306. `rdfs:label "BusinessInterface Website"@en ;`
307. `.`
308. `bmicdca:BusinessLayerElementsAggregated`
309. `rdf:type bmicm:BusinessLayerElements ;`
310. `bmicm:businessLayerElements_specializedBy_BusinessActor bmicdca:BusinessActor_Ac`
     `ademicInstitute ;`
311. `bmicm:businessLayerElements_specializedBy_BusinessActor bmicdca:BusinessActor_BI`
     `MManagerUnit ;`
312. `bmicm:businessLayerElements_specializedBy_BusinessActor bmicdca:BusinessActor_Ni`
     `cheMarketCustomerSegmentA ;`
313. `bmicm:businessLayerElements_specializedBy_BusinessActor bmicdca:BusinessActor_Ni`
     `cheMarketCustomerSegmentB ;`
314. `bmicm:businessLayerElements_specializedBy_BusinessCollaboration bmicdca:Business`
     `Collaboration_CoCreationWithPeople ;`
315. `bmicm:businessLayerElements_specializedBy_BusinessFunction bmicdca:BusinessFunct`
     `ion_PersonalAssistanceThroughSalesTeam ;`
316. `bmicm:businessLayerElements_specializedBy_BusinessInteraction bmicdca:BusinessIn`
     `teraction_ProjectBasedRelationThroughTheBIMManager ;`
317. `bmicm:businessLayerElements_specializedBy_BusinessInterface bmicdca:BusinessInte`
     `rface_SalesForceTeam ;`
318. `bmicm:businessLayerElements_specializedBy_BusinessInterface bmicdca:BusinessInte`
     `rface_Website ;`
319. `bmicm:businessLayerElements_specializedBy_BusinessObject bmicdca:BusinessObject_`
     `HowToPerformSuccessfulBIMProjects ;`
320. `bmicm:businessLayerElements_specializedBy_BusinessObject bmicdca:BusinessObject_`
     `ReputationOfBIMManagers ;`
321. `bmicm:businessLayerElements_specializedBy_BusinessObject bmicdca:BusinessObject_`
     `TrackRecordOfSuccessfulBIMProjects ;`
322. `bmicm:businessLayerElements_specializedBy_BusinessProcess bmicdca:BusinessProces`
     `s_ManageClientsBIMprojects ;`
323. `bmicm:businessLayerElements_specializedBy_BusinessProcess bmicdca:BusinessProces`
     `s_RecruitBIMManagers ;`
324. `bmicm:businessLayerElements_specializedBy_BusinessProcess bmicdca:BusinessProces`
     `s_SubcontractBIMManagersToThirdParties ;`
325. `bmicm:businessLayerElements_specializedBy_BusinessProcess bmicdca:BusinessProces`
     `s_TrainingOfBIMManagersOffTheField ;`
326. `bmicm:businessLayerElements_specializedBy_BusinessProcess bmicdca:BusinessProces`
     `s_TrainingOfBIMManagersOnTheField ;`
327. `bmicm:businessLayerElements_specializedBy_BusinessRole bmicdca:BusinessCollabora`
     `tion_CoCreationWithPeople ;`
328. `bmicm:businessLayerElements_specializedBy_BusinessRole bmicdca:BusinessRole_BIMM`
     `anager ;`
329. `bmicm:businessLayerElements_specializedBy_BusinessRole bmicdca:BusinessRole_Gene`
     `ralPlanerCompaniesInNeedOfBIMManagers ;`
330. `bmicm:businessLayerElements_specializedBy_BusinessRole bmicdca:BusinessRole_Tota`
     `lContractorCompaniesInNeedOfBIMManagers ;`

331. `bmicm:businessLayerElements_specializedBy_BusinessRole bmicdca:BusinessRole_TrainingFacilityForTrainingBIMManagers ;`
332. `bmicm:businessLayerElements_specializedBy_BusinessService bmicdca:BusinessService_BIMManagerRecruiting ;`
333. `bmicm:businessLayerElements_specializedBy_BusinessService bmicdca:BusinessService_SalesMarketing ;`
334. `bmicm:businessLayerElements_specializedBy_Product bmicdca:Product_BIMManagerAsAService ;`
335. `rdfs:label "BusinessLayerElementsAggregated" ;`
336. `.`
337. `bmicdca:BusinessModelAfterInnovating`
338. `rdf:type bic:StateAfterInnovating ;`
339. `bic:businessStateCharacteristics_classifiesAs_ViewsOnBusiness bmic:BusinessModel ;`
340. `bmic:businessStateCharacteristics_aggregates_Channels bmicdca:SalesForceTeam ;`
341. `bmic:businessStateCharacteristics_aggregates_Channels bmicdca:Website ;`
342. `bmic:businessStateCharacteristics_aggregates_CostStructureElements bmicdca:BIMManagerSalaries ;`
343. `bmic:businessStateCharacteristics_aggregates_CostStructureElements bmicdca:SalesMarketing ;`
344. `bmic:businessStateCharacteristics_aggregates_CostStructureElements bmicdca:TrainingCostsForTrainingBIMManagers ;`
345. `bmic:businessStateCharacteristics_aggregates_CustomerRelationships bmicdca:ProjectBasedRelationThroughTheBIMManager ;`
346. `bmic:businessStateCharacteristics_aggregates_CustomerRelationships bmicdca:SalesTeam ;`
347. `bmic:businessStateCharacteristics_aggregates_CustomerSegments bmicdca:GeneralPlanerCompaniesInNeedOfBIMManagers ;`
348. `bmic:businessStateCharacteristics_aggregates_CustomerSegments bmicdca:TotalContractorCompaniesInNeedOfBIMManagers ;`
349. `bmic:businessStateCharacteristics_aggregates_KeyActivities bmicdca:ManageClientsBIMprojects ;`
350. `bmic:businessStateCharacteristics_aggregates_KeyActivities bmicdca:RecruitBIMManagers ;`
351. `bmic:businessStateCharacteristics_aggregates_KeyActivities bmicdca:SubcontractBIMManagersToThirdParties ;`
352. `bmic:businessStateCharacteristics_aggregates_KeyActivities bmicdca:TrainingOfBIMManagersOffTheField ;`
353. `bmic:businessStateCharacteristics_aggregates_KeyActivities bmicdca:TrainingOfBIMManagersOnTheField ;`
354. `bmic:businessStateCharacteristics_aggregates_KeyPartners bmicdca:TrainingFacilityForTrainingBIMManagers ;`
355. `bmic:businessStateCharacteristics_aggregates_KeyResources bmicdca:BIMManager ;`
356. `bmic:businessStateCharacteristics_aggregates_KeyResources bmicdca:HowToPerformSuccessfulBIMProjects ;`
357. `bmic:businessStateCharacteristics_aggregates_KeyResources bmicdca:ReputationOfBIMManagers ;`
358. `bmic:businessStateCharacteristics_aggregates_KeyResources bmicdca:TrackRecordOfSuccessfulBIMProjects ;`
359. `bmic:businessStateCharacteristics_aggregates_OfferingValues bmicdca:BIMMangersWithSeveralYearsOfExperienceOnBIMProjects ;`
360. `bmic:businessStateCharacteristics_aggregates_OfferingValues bmicdca:BuildBIMCompliantConstructions ;`
361. `bmic:businessStateCharacteristics_aggregates_OfferingValues bmicdca:CateringToTheNeedsOfTheCustomersBusiness ;`
362. `bmic:businessStateCharacteristics_aggregates_OfferingValues bmicdca:GrowTheOfferForCustomersToBuildBIMCompliantConstructions ;`
363. `bmic:businessStateCharacteristics_aggregates_OfferingValues bmicdca:HalfOfThePriceIsContingentOnTheSuccessOfTheBIMManagersDelivery ;`
364. `bmic:businessStateCharacteristics_aggregates_OfferingValues bmicdca:NoNeedOfHiringABIMManager ;`
365. `bmic:businessStateCharacteristics_aggregates_Offerings bmicdca:BIMManagerAsAService ;`
366. `bmic:businessStateCharacteristics_aggregates_RevenueStreams bmicdca:FixedFee ;`

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367.    bmic:businessStateCharacteristics_aggregates_RevenueStreams bmicdca:PerformanceB
        asedFee ;
368.    rdfs:label "Business Model after innovating"@en ;
369.    .
370.    bmicdca:BusinessObject_HowToPerformSuccessfulBIMProjects
371.    rdf:type archi:BusinessObject ;
372.    rdfs:label "BusinessObject HowToPerformSuccessfulBIMProjects"@en ;
373.    .
374.    bmicdca:BusinessObject_ReputationOfBIMManagers
375.    rdf:type archi:BusinessObject ;
376.    bmea:businessObject_realizedBy_DataObject bmicdca:DataObject_ReputationScoreOfBI
        MManagers ;
377.    rdfs:label "BusinessObject ReputationOfBIMManagers"@en ;
378.    .
379.    bmicdca:BusinessObject_TrackRecordOfSuccessfulBIMProjects
380.    rdf:type archi:BusinessObject ;
381.    bmea:businessObject_realizedBy_DataObject bmicdca:DataObject_QuantityOfSuccessfu
        lBIMProjects ;
382.    rdfs:label "BusinessObject TrackRecordOfSuccessfulBIMProjects"@en ;
383.    .
384.    bmicdca:BusinessProcess_ManageClientsBIMprojects
385.    rdf:type archi:BusinessProcess ;
386.    bmea:businessProcess_servedBy_ApplicationService bmicdca:ApplicationService_Proj
        ectManagementService ;
387.    rdfs:label "BusinessProcess ManageClientsBIMprojects"@en ;
388.    .
389.    bmicdca:BusinessProcess_RecruitBIMManagers
390.    rdf:type archi:BusinessProcess ;
391.    bmea:businessProcess_servedBy_ApplicationService bmicdca:ApplicationService_Recr
        uitingService ;
392.    rdfs:label "BusinessProcess RecruitBIMManagers"@en ;
393.    .
394.    bmicdca:BusinessProcess_SubcontractBIMManagersToThirdParties
395.    rdf:type archi:BusinessProcess ;
396.    bmea:businessProcess_servedBy_ApplicationService bmicdca:ApplicationService_Cont
        ractService ;
397.    rdfs:label "BusinessProcess SubcontractBIMManagersToThirdParties"@en ;
398.    .
399.    bmicdca:BusinessProcess_TrainingOfBIMManagersOffTheField
400.    rdf:type archi:BusinessProcess ;
401.    bmea:businessProcess_servedBy_ApplicationService bmicdca:ApplicationService_Trai
        ningBIMManagerService ;
402.    rdfs:label "BusinessProcess TrainingOfBIMManagersOffTheField"@en ;
403.    .
404.    bmicdca:BusinessProcess_TrainingOfBIMManagersOnTheField
405.    rdf:type archi:BusinessProcess ;
406.    bmea:businessProcess_servedBy_ApplicationService bmicdca:ApplicationService_Trai
        ningBIMManagerService ;
407.    rdfs:label "BusinessProcess TrainingOfBIMManagersOnTheField"@en ;
408.    .
409.    bmicdca:BusinessRole_BIMManager
410.    rdf:type eo:Employee ;
411.    rdfs:label "BusinessRole BIMManager"@en ;
412.    .
413.    bmicdca:BusinessRole_GeneralPlanerCompaniesInNeedOfBIMManagers
414.    rdf:type eo:Customer ;
415.    rdfs:label "BusinessRole GeneralPlanerCompaniesInNeedOfBIMManagers"@en ;
416.    .
417.    bmicdca:BusinessRole_TotalContractorCompaniesInNeedOfBIMManagers
418.    rdf:type eo:Customer ;
419.    rdfs:label "BusinessRole TotalContractorCompaniesInNeedOfBIMManagers"@en ;
420.    .
421.    bmicdca:BusinessRole_TrainingFacilityForTrainingBIMManagers
422.    rdf:type eo:BusinessPartner ;
423.    rdfs:label "BusinessRole TrainingFacilityForTrainingBIMManagers"@en ;
```

```
424.   .
425.   bmicdca:BusinessService_BIMManagerRecruiting
426.   rdf:type archi:BusinessService ;
427.   rdfs:label "BusinessService BIMManagerRecruiting"@en ;
428.   .
429.   bmicdca:BusinessService_SalesMarketing
430.   rdf:type archi:BusinessService ;
431.   rdfs:label "BusinessService SalesMarketing"@en ;
432.   .
433.   bmicdca:BusinessStateCharacteristicsAggregated
434.   rdf:type bmicm:BusinessStateCharacteristics ;
435.   bmicm:businessStateCharacteristics_specializedBy_StateAfterInnovating bmicdca:Bu
       sinessModelAfterInnovating ;
436.   rdfs:label "BusinessStateCharacteristicsAggregated" ;
437.   .
438.   bmicdca:Capability_CoCreationWithPeople
439.   rdf:type archimateV3:Capability ;
440.   bmea:capability_servedBy_BusinessCollaboration bmicdca:BusinessCollaboration_CoC
       reationWithPeople ;
441.   rdfs:label "Capability CoCreationWithPeople"@en ;
442.   .
443.   bmicdca:Capability_PersonalAssistance
444.   rdf:type archimateV3:Capability ;
445.   bmea:capability_servedBy_BusinessFunction bmicdca:BusinessFunction_PersonalAssis
       tanceThroughSalesTeam ;
446.   rdfs:label "Capability PersonalAssistance"@en ;
447.   .
448.   bmicdca:Capability_SalesForce
449.   rdf:type archimateV3:Capability ;
450.   rdfs:label "Capability SalesForce"@en ;
451.   .
452.   bmicdca:Capability_WebSale
453.   rdf:type archimateV3:Capability ;
454.   rdfs:label "Capability WebSale"@en ;
455.   .
456.   bmicdca:CateringToTheNeedsOfTheCustomersBusiness
457.   rdf:type bm:CustomerCoCreation ;
458.   bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;
459.   bmea:offeringValues_composedOf_Value bmicdca:Value_CateringToTheNeedsOfTheCustom
       ersBusiness ;
460.   rdfs:label "Catering to the needs of the customer's business"@en ;
461.   .
462.   bmicdca:ChannelElementsAggregated
463.   rdf:type bmicm:ChannelElements ;
464.   bmicm:channelElements_specializedBy_DirectChannelElements bmicdca:DirectChannelE
       lementsAggregated ;
465.   bmicm:channelElements_specializedBy_IndirectChannelElements bmicdca:IndirectChan
       nelElementsAggregated ;
466.   rdfs:label "ChannelElementsAggregated" ;
467.   .
468.   bmicdca:ConstructionIndustrySpecificsAggregated
469.   rdf:type bmicm:ConstructionIndustrySpecifics ;
470.   bmicm:constructionIndustrySpecifics_specializedBy_CompanyExecutionAreas ci:Rural
        ;
471.   bmicm:constructionIndustrySpecifics_specializedBy_CompanyExecutionAreas ci:Urban
        ;
472.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
       PreliminaryStudy ;
473.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
       ProjectPlanning ;
474.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
       Realization ;
475.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
       StrategicPlanning ;
```

476. `bmicm:`constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases `ci:`Tendering ;
477. `bmicm:`constructionIndustrySpecifics_specializedBy_ConstructionRelatedCompanies `ci:`LosingerMarazzi ;
478. `bmicm:`constructionIndustrySpecifics_specializedBy_ConstructionStakeholderTypes `ci:`Architecture ;
479. `bmicm:`constructionIndustrySpecifics_specializedBy_ConstructionStakeholderTypes `ci:`Contractor ;
480. `bmicm:`constructionIndustrySpecifics_specializedBy_ConstructionStakeholderTypes `ci:`Engineering ;
481. `bmicm:`constructionIndustrySpecifics_specializedBy_ExecutionModels `ci:`GeneralContractor ;
482. `bmicm:`constructionIndustrySpecifics_specializedBy_ExecutionModels `ci:`GeneralPlanner ;
483. `rdfs:`label "ConstructionIndustrySpecificsAggregated" ;
484. .
485. `bmicdca:`CostStructureElementsAggregated
486. `rdf:`type `bmicm:`CostStructureElements ;
487. `bmicm:`costStructureElements_specializedBy_FixedCost `bmicdca:`BIMManagerSalaries ;
488. `bmicm:`costStructureElements_specializedBy_FixedCost `bmicdca:`SalesMarketing ;
489. `bmicm:`costStructureElements_specializedBy_VariableCost `bmicdca:`TrainingCostsForTrainingBIMManagers ;
490. `rdfs:`label "CostStructureElementsAggregated" ;
491. .
492. `bmicdca:`CreateANewCustomerSegment
493. `rdf:`type `bic:`StrategicGoals ;
494. `rdfs:`label "Create a New Customer Segment"@en ;
495. .
496. `bmicdca:`CustomerInterfaceElementsAggregated
497. `rdf:`type `bmicm:`CustomerInterfaceElements ;
498. `bmicm:`customerInterfaceElements_specializedBy_ChannelElements `bmicdca:`ChannelElementsAggregated ;
499. `bmicm:`customerInterfaceElements_specializedBy_CustomerRelationshipElements `bmicdca:`CustomerRelationshipElementsAggregated ;
500. `bmicm:`customerInterfaceElements_specializedBy_CustomerSegmentElements `bmicdca:`CustomerSegmentElementsAggregated ;
501. `rdfs:`label "CustomerInterfaceElementsAggregated" ;
502. .
503. `bmicdca:`CustomerRelationshipElementsAggregated
504. `rdf:`type `bmicm:`CustomerRelationshipElements ;
505. `bmicm:`customerRelationshipElements_specializedBy_HumanInteractionElements `bmicdca:`HumanInteractionElementsAggregated ;
506. `bmicm:`customerRelationshipElements_specializedBy_NonHumanInteractionElements `bmicdca:`NonHumanInteractionElementsAggregated ;
507. `rdfs:`label "CustomerRelationshipElementsAggregated" ;
508. .
509. `bmicdca:`CustomerSegmentElementsAggregated
510. `rdf:`type `bmicm:`CustomerSegmentElements ;
511. `bmicm:`customerSegmentElements_specializedBy_NicheMarket `bmicdca:`GeneralPlanerCompaniesInNeedOfBIMManagers ;
512. `bmicm:`customerSegmentElements_specializedBy_NicheMarket `bmicdca:`TotalContractorCompaniesInNeedOfBIMManagers ;
513. `rdfs:`label "CustomerSegmentElementsAggregated" ;
514. .
515. `bmicdca:`DataObject_QuantityOfSuccessfulBIMProjects
516. `rdf:`type `archi:`DataObject ;
517. `rdfs:`label "DataObject QuantityOfSuccessfulBIMProjects"@en ;
518. .
519. `bmicdca:`DataObject_ReputationScoreOfBIMManagers
520. `rdf:`type `archi:`DataObject ;
521. `rdfs:`label "DataObject ReputationScoreOfBIMManagers"@en ;
522. .
523. `bmicdca:`DirectChannelElementsAggregated
524. `rdf:`type `bmicm:`DirectChannelElements ;
525. `bmicm:`directChannelElements_specializedBy_SalesForce `bmicdca:`SalesForceTeam ;

526. `bmicm:directChannelElements_specializedBy_WebSale` `bmicdca:Website` ;
527. `rdfs:label` "DirectChannelElementsAggregated" ;
528. .
529. `bmicdca:FeeBasedRevenueElementsAggregated`
530. `rdf:type` `bmicm:FeeBasedRevenueElements` ;
531. `bmicm:feeBasedRevenueElements_specializedBy_LendingRentingLeasing` `bmicdca:FixedF`
    `ee` ;
532. `bmicm:feeBasedRevenueElements_specializedBy_LendingRentingLeasing` `bmicdca:Perfor`
    `manceBasedFee` ;
533. `rdfs:label` "FeeBasedRevenueElementsAggregated" ;
534. .
535. `bmicdca:FinancialAspectElementsAggregated`
536. `rdf:type` `bmicm:FinancialAspectElements` ;
537. `bmicm:financialAspectElements_specializedBy_CostStructureElements` `bmicdca:CostSt`
    `ructureElementsAggregated` ;
538. `bmicm:financialAspectElements_specializedBy_RevenueStreamElements` `bmicdca:Revenu`
    `eStreamElementsAggregated` ;
539. `rdfs:label` "FinancialAspectElementsAggregated" ;
540. .
541. `bmicdca:FinancialElementsAggregated`
542. `rdf:type` `bmicm:FinancialElements` ;
543. `rdfs:label` "FinancialElementsAggregated" ;
544. .
545. `bmicdca:FixedFee`
546. `rdf:type` `bm:LendingRentingLeasing` ;
547. `bm:revenueStreams_dependOn_Offerings` `bmicdca:BIMManagerAsAService` ;
548. `bm:revenueStreams_pricedBy_PricingMechanisms` `bm:Negotiation` ;
549. `bmea:revenueStreams_associatedWith_Outcome` `bmicdca:Outcome_FixedFee` ;
550. `rdfs:label` "50% fixed fee"@en ;
551. .
552. `bmicdca:GeneralPlanerCompaniesInNeedOfBIMManagers`
553. `rdf:type` `bm:NicheMarket` ;
554. `bm:customerSegment_isAMultiSidedPlatform` "false"^^`xsd:boolean` ;
555. `bm:customerSegment_isDiversified` "false"^^`xsd:boolean` ;
556. `bm:customerSegments_receive_Offerings` `bmicdca:BIMManagerAsAService` ;
557. `bmea:customerSegments_composedOf_Stakeholder` `bmicdca:Stakeholder_GeneralPlanerCo`
    `mpaniesInNeedOfBIMManagers` ;
558. `bmicis:customerSegments_isOfType_ConstructionStakeholderTypes` `ci:Architecture` ;
559. `bmicis:customerSegments_isOfType_ConstructionStakeholderTypes` `ci:Engineering` ;
560. `rdfs:label` "General planer companies using BIM and in need of a BIM-
    Manager for the coordination of the BIM-based construction project "@en ;
561. .
562. `bmicdca:GrowTheOfferForCustomersToBuildBIMCompliantConstructions`
563. `rdf:type` `bm:Status` ;
564. `bm:offeringValues_influencedBy_CostStructureModels` `bm:ValueDriven` ;
565. `bmea:offeringValues_composedOf_Value` `bmicdca:Value_GrowTheOfferForCustomersToBui`
    `ldBIMCompliantConstructions` ;
566. `rdfs:label` "Grow the offer for customers to build BIM-
    compliant constructions"@en ;
567. .
568. `bmicdca:HalfOfThePriceIsContingentOnTheSuccessOfTheBIMManagersDelivery`
569. `rdf:type` `bm:Price` ;
570. `bm:offeringValues_influencedBy_CostStructureModels` `bm:ValueDriven` ;
571. `bmea:offeringValues_composedOf_Value` `bmicdca:Value_HalfOfThePriceIsContingentOnT`
    `heSuccessOfTheBIMManagersDelivery` ;
572. `rdfs:label` "Half of the price is contingent on the success of the BIM-
    Managers delivery"@en ;
573. .
574. `bmicdca:HandleBIMProjects`
575. `rdf:type` `bc:CoreCapabilities` ;
576. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdca:ManageClientsBIMprojects`
    ;
577. `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdca:HowToPerformSuccessfulBIMP`
    `rojects` ;

578. `bmbc:coreCapabilities_composedOf_KeyResources bmicdca:TrackRecordOfSuccessfulBIM Projects ;`
579. `rdfs:label "Handle BIM-Projects"@en ;`
580. `.`
581. `bmicdca:HiringTooManyBIMManagers`
582. `rdf:type bic:RisksOfInnovation ;`
583. `rdfs:label "Hiring Too Many BIM Managers"@en ;`
584. `.`
585. `bmicdca:HowToPerformSuccessfulBIMProjects`
586. `rdf:type bm:ProprietaryKnowledge ;`
587. `bm:infrastructureParts_affects_FinancialAspectParts bmicdca:TrainingCostsForTrainingBIMManagers ;`
588. `bm:infrastructureParts_enables_Offerings bmicdca:BIMManagerAsAService ;`
589. `bm:keyRessources_enables_KeyActivities bmicdca:ManageClientsBIMprojects ;`
590. `bm:keyRessources_enables_KeyActivities bmicdca:SubcontractBIMManagersToThirdParties ;`
591. `bm:keyRessources_enables_KeyActivities bmicdca:TrainingOfBIMManagersOnTheField ;`
592. `bmbc:keyResources_isACoreCapability "false"^^xsd:boolean ;`
593. `bmea:keyResources_composedOf_Resource bmicdca:Resource_HowToPerformSuccessfulBIMProjects ;`
594. `rdfs:label "How to perform successful BIM projects"@en ;`
595. `.`
596. `bmicdca:HumanBasedCapabilityElementsAggregated`
597. `rdf:type bmicm:HumanBasedCapabilityElements ;`
598. `bmicm:humanBasedCapabilityElements_specializedBy_Competencies bc:Flexibility ;`
599. `bmicm:humanBasedCapabilityElements_specializedBy_Competencies bc:Professionalism ;`
600. `bmicm:humanBasedCapabilityElements_specializedBy_Competencies bc:Responsibility ;`
601. `bmicm:humanBasedCapabilityElements_specializedBy_Competencies bc:TeamPlayer ;`
602. `bmicm:humanBasedCapabilityElements_specializedBy_Skills bc:Communication ;`
603. `bmicm:humanBasedCapabilityElements_specializedBy_Skills bc:Leadership ;`
604. `bmicm:humanBasedCapabilityElements_specializedBy_Skills bc:ProblemSolving ;`
605. `bmicm:humanBasedCapabilityElements_specializedBy_Skills bc:ProjectManagement ;`
606. `bmicm:humanBasedCapabilityElements_specializedBy_Skills bc:Teamwork ;`
607. `bmicm:humanBasedCapabilityElements_specializedBy_Skills bmicdca:BIM ;`
608. `rdfs:label "HumanBasedCapabilityElementsAggregated" ;`
609. `.`
610. `bmicdca:HumanInteractionElementsAggregated`
611. `rdf:type bmicm:HumanInteractionElements ;`
612. `bmicm:humanInteractionElements_specializedBy_CoCreationWithPeople bmicdca:ProjectBasedRelationThroughTheBIMManager ;`
613. `bmicm:humanInteractionElements_specializedBy_PersonalAssistance bmicdca:SalesTeam ;`
614. `rdfs:label "HumanInteractionElementsAggregated" ;`
615. `.`
616. `bmicdca:ImprovedWorkloadOptimization`
617. `rdf:type bic:StrategicGoals ;`
618. `rdfs:label "Improved Workload Optimization"@en ;`
619. `.`
620. `bmicdca:IndirectChannelElementsAggregated`
621. `rdf:type bmicm:IndirectChannelElements ;`
622. `rdfs:label "IndirectChannelElementsAggregated" ;`
623. `.`
624. `bmicdca:InfrastructureElementsAggregated`
625. `rdf:type bmicm:InfrastructureElements ;`
626. `bmicm:infrastructureElements_specializedBy_KeyActivityElements bmicdca:KeyActivityElementsAggregated ;`
627. `bmicm:infrastructureElements_specializedBy_KeyPartnerElements bmicdca:KeyPartnerElementsAggregated ;`
628. `bmicm:infrastructureElements_specializedBy_KeyResourceElements bmicdca:KeyResourceElementsAggregated ;`
629. `rdfs:label "InfrastructureElementsAggregated" ;`
630. `.`
631. `bmicdca:InfrastructureService_ContractManagementPlatformService`

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632.    rdf:type archi:InfrastructureService ;
633.    bmea:infrastructureService_realizedBy_SystemSoftware bmicdca:SystemSoftware_Capt
        erra ;
634.    rdfs:label "InfrastructureService ContractManagementPlatformService"@en ;
635.    .
636.    bmicdca:InfrastructureService_ProjectManagementPlatformService
637.    rdf:type archi:InfrastructureService ;
638.    bmea:infrastructureService_realizedBy_SystemSoftware bmicdca:SystemSoftware_Jira
         ;
639.    rdfs:label "InfrastructureService ProjectManagementPlatformService"@en ;
640.    .
641.    bmicdca:InfrastructureService_RecruitingPlatformService
642.    rdf:type archi:InfrastructureService ;
643.    bmea:infrastructureService_realizedBy_SystemSoftware bmicdca:SystemSoftware_Uman
        tis ;
644.    rdfs:label "InfrastructureService RecruitingPlatformService"@en ;
645.    .
646.    bmicdca:InfrastructureService_TrainingPlatformService
647.    rdf:type archi:InfrastructureService ;
648.    bmea:infrastructureService_realizedBy_SystemSoftware bmicdca:SystemSoftware_Mood
        le ;
649.    rdfs:label "InfrastructureService TrainingPlatformService"@en ;
650.    .
651.    bmicdca:IntellectualElementsAggregated
652.    rdf:type bmicm:IntellectualElements ;
653.    bmicm:intellectualElements_specializedBy_Brand bmicdca:ReputationOfBIMManagers ;
654.    bmicm:intellectualElements_specializedBy_Brand bmicdca:TrackRecordOfSuccessfulBI
        MProjects ;
655.    bmicm:intellectualElements_specializedBy_ProprietaryKnowledge bmicdca:HowToPerfo
        rmSuccessfulBIMProjects ;
656.    rdfs:label "IntellectualElementsAggregated" ;
657.    .
658.    bmicdca:KeyActivityElementsAggregated
659.    rdf:type bmicm:KeyActivityElements ;
660.    bmicm:keyActivityElements_specializedBy_CoreProcess bmicdca:ManageClientsBIMproj
        ects ;
661.    bmicm:keyActivityElements_specializedBy_CoreProcess bmicdca:SubcontractBIMManage
        rsToThirdParties ;
662.    bmicm:keyActivityElements_specializedBy_SupportProcess bmicdca:RecruitBIMManager
        s ;
663.    bmicm:keyActivityElements_specializedBy_SupportProcess bmicdca:TrainingOfBIMMana
        gersOffTheField ;
664.    bmicm:keyActivityElements_specializedBy_SupportProcess bmicdca:TrainingOfBIMMana
        gersOnTheField ;
665.    rdfs:label "KeyActivityElementsAggregated" ;
666.    .
667.    bmicdca:KeyPartnerElementsAggregated
668.    rdf:type bmicm:KeyPartnerElements ;
669.    bmicm:keyPartnerElements_specializedBy_AcademicInstitute bmicdca:TrainingFacilit
        yForTrainingBIMManagers ;
670.    rdfs:label "KeyPartnerElementsAggregated" ;
671.    .
672.    bmicdca:KeyResourceElementsAggregated
673.    rdf:type bmicm:KeyResourceElements ;
674.    bmicm:keyResourceElements_specializedBy_FinancialElements bmicdca:FinancialEleme
        ntsAggregated ;
675.    bmicm:keyResourceElements_specializedBy_Human bmicdca:BIMManager ;
676.    bmicm:keyResourceElements_specializedBy_IntellectualElements bmicdca:Intellectua
        lElementsAggregated ;
677.    bmicm:keyResourceElements_specializedBy_PhysicalElements bmicdca:PhysicalElement
        sAggregated ;
678.    rdfs:label "KeyResourceElementsAggregated" ;
679.    .
680.    bmicdca:LearnedBMICaseAA
681.    rdf:type cbr:CaseStateHistory ;
```

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682.    cbr:belongsToCase bmicdca:BMICase_A ;
683.    cbr:caseStateTimestamp "2020-12-04T23:32:31.08"^^xsd:dateTime ;
684.    cbr:hasCaseState cbr:Learned_CaseState ;
685.    rdfs:label "LearnedBMICaseAA" ;
686.    .
687.    bmicdca:LosingerMarazzi
688.    rdf:type bic:InvolvedParties ;
689.    bic:involvedParties_belongsTo_Industry bic:Construction ;
690.    bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdca:BetterWorkloadUtil
        izationOfBIMManagers ;
691.    bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdca:NewValueStream ;
692.    bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics
         bmicdca:BusinessModelAfterInnovating ;
693.    bic:involvedParties_hasGoals_StrategicGoals bmicdca:CreateANewCustomerSegment ;
694.    bic:involvedParties_hasGoals_StrategicGoals bmicdca:ImprovedWorkloadOptimization
         ;
695.    bic:involvedParties_hasInnovationDrivers_Drivers bmicdca:NotEnoughWorkloadForBIM
        Managers ;
696.    bic:involvedParties_innovationBudgetIs 150000 ;
697.    bic:involvedParties_isCaseCompany "true"^^xsd:boolean ;
698.    bic:involvedParties_isPartnerCompany "false"^^xsd:boolean ;
699.    bic:involvedParties_mustOvercome_BarriersToOvercome bmicdca:MaintainAHighLevelOf
        BIMCompetency ;
700.    bic:involvedParties_mustOvercome_BarriersToOvercome bmicdca:WillingnessOfBIMMana
        gersToBeOutsourced ;
701.    bic:involvedParties_numberOfEmployeesIs 800 ;
702.    bic:involvedParties_partOf_Cases bmicdca:BMICase_A ;
703.    bic:involvedParties_requiresForInnovation_RequiredRessources bmicdca:BIMManagers
         ;
704.    bic:involvedParties_requiresForInnovation_RequiredRessources bmicdca:ReputationF
        orBIM ;
705.    bic:involvedParties_risksOf_RisksOfInnovation bmicdca:HiringTooManyBIMManagers ;
706.    bic:involvedParties_risksOf_RisksOfInnovation bmicdca:NotHavingEnoughBIMManagers
        ForCustomerDemands ;
707.    bic:involvedParties_risksOf_RisksOfInnovation bmicdca:NotHavingEnoughBIMManagers
        ForOwnProjects ;
708.    bic:involvedParties_turnoverIs 800000000 ;
709.    bmicis:involvedParties_aggregates_ConstructionRelatedCompanies ci:LosingerMarazz
        i ;
710.    rdfs:label "Losinger Marazzi"@en ;
711.    .
712.    bmicdca:MaintainAHighLevelOfBIMCompetency
713.    rdf:type bic:IntellectualBarriers ;
714.    rdfs:label "Maintain A High Level Of BIM Competency"@en ;
715.    .
716.    bmicdca:ManageClientsBIMprojects
717.    rdf:type bm:CoreProcess ;
718.    bm:infrastructureParts_affects_FinancialAspectParts bmicdca:BIMManagerSalaries ;
719.    bm:infrastructureParts_enables_Offerings bmicdca:BIMManagerAsAService ;
720.    bm:keyActivities_require_KeyRessources bmicdca:BIMManager ;
721.    bm:keyActivities_require_KeyRessources bmicdca:HowToPerformSuccessfulBIMProjects
         ;
722.    bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
723.    bmea:keyActivities_associatedWith_ValueStream bmicdca:ValueStream_ManageClientsB
        IMprojects ;
724.    bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:ProjectPlanning
        ;
725.    bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:Realization ;
726.    rdfs:label "Manage client's BIM-projects"@en ;
727.    .
728.    bmicdca:MotivationAspectElementsAggregated
729.    rdf:type bmicm:MotivationAspectElements ;
730.    bmicm:motivationAspectElements_specializedBy_Outcome bmicdca:Outcome_BIMManagerS
        alaries ;
731.    bmicm:motivationAspectElements_specializedBy_Outcome bmicdca:Outcome_FixedFee ;
```

732. `bmicm:motivationAspectElements_specializedBy_Outcome bmicdca:Outcome_PerformanceBasedFee ;`
733. `bmicm:motivationAspectElements_specializedBy_Outcome bmicdca:Outcome_SalesMarketing ;`
734. `bmicm:motivationAspectElements_specializedBy_Outcome bmicdca:Outcome_TrainingCostsForTrainingBIMManagers ;`
735. `bmicm:motivationAspectElements_specializedBy_Stakeholder bmicdca:Stakeholder_GeneralPlanerCompaniesInNeedOfBIMManagers ;`
736. `bmicm:motivationAspectElements_specializedBy_Stakeholder bmicdca:Stakeholder_TotalContractorCompaniesInNeedOfBIMManagers ;`
737. `bmicm:motivationAspectElements_specializedBy_Stakeholder bmicdca:Stakeholder_TrainingFacilityForTrainingBIMManagers ;`
738. `bmicm:motivationAspectElements_specializedBy_Value bmicdca:Value_BIMMangersWithSeveralYearsOfExperienceOnBIMProjects ;`
739. `bmicm:motivationAspectElements_specializedBy_Value bmicdca:Value_BuildBIMCompliantConstructions ;`
740. `bmicm:motivationAspectElements_specializedBy_Value bmicdca:Value_CateringToTheNeedsOfTheCustomersBusiness ;`
741. `bmicm:motivationAspectElements_specializedBy_Value bmicdca:Value_GrowTheOfferForCustomersToBuildBIMCompliantConstructions ;`
742. `bmicm:motivationAspectElements_specializedBy_Value bmicdca:Value_HalfOfThePriceIsContingentOnTheSuccessOfTheBIMManagersDelivery ;`
743. `bmicm:motivationAspectElements_specializedBy_Value bmicdca:Value_NoNeedOfHiringABIMManager ;`
744. `rdfs:label "Motivation Aspect Elements Aggregated" ;`
745. `.`
746. `bmicdca:NewValueStream`
747. `rdf:type bic:InvolvedPartyBenefits ;`
748. `rdfs:label "new value stream"@en ;`
749. `.`
750. `bmicdca:NoNeedOfHiringABIMManager`
751. `rdf:type bm:RiskReduction ;`
752. `bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;`
753. `bmea:offeringValues_composedOf_Value bmicdca:Value_NoNeedOfHiringABIMManager ;`
754. `rdfs:label "No need of hiring a BIM-manager"@en ;`
755. `.`
756. `bmicdca:NonHumanInteractionElementsAggregated`
757. `rdf:type bmicm:NonHumanInteractionElements ;`
758. `rdfs:label "NonHumanInteractionElementsAggregated" ;`
759. `.`
760. `bmicdca:NotEnoughWorkloadForBIMManagers`
761. `rdf:type bic:Drivers ;`
762. `rdfs:label "Not Enough Workload For BIM Managers"@en ;`
763. `.`
764. `bmicdca:NotHavingEnoughBIMManagersForCustomerDemands`
765. `rdf:type bic:RisksOfInnovation ;`
766. `rdfs:label "Not Having Enough BIM Managers For Customer Demands"@en ;`
767. `.`
768. `bmicdca:NotHavingEnoughBIMManagersForOwnProjects`
769. `rdf:type bic:RisksOfInnovation ;`
770. `rdfs:label "Not Having Enough BIM Managers For Own Projects"@en ;`
771. `.`
772. `bmicdca:OfferingElementsAggregated`
773. `rdf:type bmicm:OfferingElements ;`
774. `bmicm:offeringElements_specializedBy_Service bmicdca:BIMManagerAsAService ;`
775. `rdfs:label "OfferingElementsAggregated" ;`
776. `.`
777. `bmicdca:OfferingValueElementsAggregated`
778. `rdf:type bmicm:OfferingValueElements ;`
779. `bmicm:offeringValueElements_specializedBy_QualitativeValueElements bmicdca:QualitativeValueElementsAggregated ;`
780. `bmicm:offeringValueElements_specializedBy_QuantitativeValueElements bmicdca:QuantitativeValueElementsAggregated ;`
781. `rdfs:label "OfferingValueElementsAggregated" ;`
782. `.`

783. `bmicdca:`Outcome_BIMManagerSalaries
784. `rdf:`type `archimateV3:`Outcome ;
785. `bmea:`outcome_realizedBy_BusinessService `bmicdca:`BusinessService_BIMManagerRecrui
    ting ;
786. `rdfs:`label "Outcome BIMManagerSalaries"@en ;
787. .
788. `bmicdca:`Outcome_FixedFee
789. `rdf:`type `archimateV3:`Outcome ;
790. `rdfs:`label "Outcome FixedFee"@en ;
791. .
792. `bmicdca:`Outcome_PerformanceBasedFee
793. `rdf:`type `archimateV3:`Outcome ;
794. `rdfs:`label "Outcome PerformanceBasedFee"@en ;
795. .
796. `bmicdca:`Outcome_SalesMarketing
797. `rdf:`type `archimateV3:`Outcome ;
798. `bmea:`outcome_realizedBy_BusinessService `bmicdca:`BusinessService_SalesMarketing ;
799. `rdfs:`label "Outcome SalesMarketing"@en ;
800. .
801. `bmicdca:`Outcome_TrainingCostsForTrainingBIMManagers
802. `rdf:`type `archimateV3:`Outcome ;
803. `rdfs:`label "Outcome TrainingCostsForTrainingBIMManagers"@en ;
804. .
805. `bmicdca:`PerformanceBasedFee
806. `rdf:`type `bm:`LendingRentingLeasing ;
807. `bm:`revenueStreams_dependOn_Offerings `bmicdca:`BIMManagerAsAService ;
808. `bm:`revenueStreams_pricedBy_PricingMechanisms `bm:`Negotiation ;
809. `bmea:`revenueStreams_associatedWith_Outcome `bmicdca:`Outcome_PerformanceBasedFee ;
810. `rdfs:`label "50% performance-based fee"@en ;
811. .
812. `bmicdca:`PhysicalElementsAggregated
813. `rdf:`type `bmicm:`PhysicalElements ;
814. `rdfs:`label "PhysicalElementsAggregated" ;
815. .
816. `bmicdca:`Product_BIMManagerAsAService
817. `rdf:`type `eo:`IntangibleProduct ;
818. `bmea:`product_aggregates_BusinessService `bmicdca:`BusinessService_BIMManagerRecrui
    ting ;
819. `bmea:`product_aggregates_BusinessService `bmicdca:`BusinessService_SalesMarketing ;
820. `rdfs:`label "Product BIMManagerAsAService"@en ;
821. .
822. `bmicdca:`ProjectBasedRelationThroughTheBIMManager
823. `rdf:`type `bm:`CoCreationWithPeople ;
824. `bm:`customerInterfaceParts_affects_FinancialAspectParts `bmicdca:`BIMManagerSalarie
    s ;
825. `bm:`customerInterfaceParts_affects_FinancialAspectParts `bmicdca:`SalesMarketing ;
826. `bm:`customerRelationships_enabledBy_KeyRessources `bmicdca:`BIMManager ;
827. `bm:`customerRelationships_enabledBy_KeyRessources `bmicdca:`ReputationOfBIMManagers
     ;
828. `bm:`customerRelationships_influencedBy_CostStructureModels `bm:`ValueDriven ;
829. `bm:`customerRelationships_maintain_CustomerSegments `bmicdca:`GeneralPlanerCompanie
    sInNeedOfBIMManagers ;
830. `bm:`customerRelationships_maintain_CustomerSegments `bmicdca:`TotalContractorCompan
    iesInNeedOfBIMManagers ;
831. `bm:`customerRelationships_promote_Offerings `bmicdca:`BIMManagerAsAService ;
832. `bmea:`customerRelationships_associatedWith_Capability `bmicdca:`Capability_CoCreati
    onWithPeople ;
833. `rdfs:`label "Project-based relation through the BIM-Manager"@en ;
834. .
835. `bmicdca:`QualitativeValueElementsAggregated
836. `rdf:`type `bmicm:`QualitativeValueElements ;
837. `bmicm:`qualitativeValueElements_specializedBy_Accessibility `bmicdca:`BIMMangersWit
    hSeveralYearsOfExperienceOnBIMProjects ;
838. `bmicm:`qualitativeValueElements_specializedBy_CustomerCoCreation `bmicdca:`Catering
    ToTheNeedsOfTheCustomersBusiness ;

839. `bmicm:qualitativeValueElements_specializedBy_Status bmicdca:GrowTheOfferForCusto`
     `mersToBuildBIMCompliantConstructions ;`
840. `rdfs:label "QualitativeValueElementsAggregated" ;`
841. `.`
842. `bmicdca:QuantitativeValueElementsAggregated`
843. `rdf:type bmicm:QuantitativeValueElements ;`
844. `bmicm:quantitativeValueElements_specializedBy_GettingTheJobDone bmicdca:BuildBIM`
     `CompliantConstructions ;`
845. `bmicm:quantitativeValueElements_specializedBy_Price bmicdca:HalfOfThePriceIsCont`
     `ingentOnTheSuccessOfTheBIMManagersDelivery ;`
846. `bmicm:quantitativeValueElements_specializedBy_RiskReduction bmicdca:NoNeedOfHiri`
     `ngABIMManager ;`
847. `rdfs:label "QuantitativeValueElementsAggregated" ;`
848. `.`
849. `bmicdca:RecruitBIMManagers`
850. `rdf:type bm:SupportProcess ;`
851. `bm:infrastructureParts_affects_FinancialAspectParts bmicdca:BIMManagerSalaries ;`
852. `bm:infrastructureParts_affects_FinancialAspectParts bmicdca:SalesMarketing ;`
853. `bm:infrastructureParts_enables_Offerings bmicdca:BIMManagerAsAService ;`
854. `bm:keyActivities_require_KeyRessources bmicdca:ReputationOfBIMManagers ;`
855. `bm:keyActivities_require_KeyRessources bmicdca:TrackRecordOfSuccessfulBIMProject`
     `s ;`
856. `bmbc:keyActivities_isACoreCapability "false"^^xsd:boolean ;`
857. `bmea:keyActivities_associatedWith_ValueStream bmicdca:ValueStream_RecruitBIMMana`
     `gers ;`
858. `rdfs:label "Recruit BIM-Managers"@en ;`
859. `.`
860. `bmicdca:ReputationForBIM`
861. `rdf:type bic:IntellectualRessources ;`
862. `bmic:requiredResources_aggregates_KeyResources bmicdca:ReputationOfBIMManagers ;`
863. `bmic:requiredResources_aggregates_KeyResources bmicdca:TrackRecordOfSuccessfulBI`
     `MProjects ;`
864. `bmic:requiredResources_represents_Resource bmicdca:Resource_ReputationOfBIMManag`
     `ers ;`
865. `bmic:requiredResources_represents_Resource bmicdca:Resource_TrackRecordOfSuccess`
     `fulBIMProjects ;`
866. `rdfs:label "Reputation For BIM"@en ;`
867. `.`
868. `bmicdca:ReputationOfBIMManagers`
869. `rdf:type bm:Brand ;`
870. `bm:infrastructureParts_affects_FinancialAspectParts bmicdca:BIMManagerSalaries ;`
871. `bm:infrastructureParts_enables_Offerings bmicdca:BIMManagerAsAService ;`
872. `bm:keyRessources_enables_KeyActivities bmicdca:RecruitBIMManagers ;`
873. `bm:keyRessources_enables_KeyActivities bmicdca:SubcontractBIMManagersToThirdPart`
     `ies ;`
874. `bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;`
875. `bmea:keyResources_composedOf_Resource bmicdca:Resource_ReputationOfBIMManagers ;`
876. `rdfs:label "Reputation of BIM-Managers"@en ;`
877. `.`
878. `bmicdca:RequiredResourcesAggregated`
879. `rdf:type bmicm:RequiredResources ;`
880. `bmicm:requiredResources_specializedBy_HumanRessources bmicdca:BIMManagers ;`
881. `bmicm:requiredResources_specializedBy_IntellectualRessources bmicdca:ReputationF`
     `orBIM ;`
882. `rdfs:label "RequiredResourcesAggregated" ;`
883. `.`
884. `bmicdca:Resource_BIMManager`
885. `rdf:type archimateV3:Resource ;`
886. `bmea:resource_composedOf_BusinessActor bmicdca:BusinessActor_BIMManagerUnit ;`
887. `rdfs:label "Resource BIMManager"@en ;`
888. `.`
889. `bmicdca:Resource_HowToPerformSuccessfulBIMProjects`
890. `rdf:type archimateV3:Resource ;`
891. `bmea:resource_composedOf_BusinessObject bmicdca:BusinessObject_HowToPerformSucce`
     `ssfulBIMProjects ;`

```
892.    rdfs:label "Resource HowToPerformSuccessfulBIMProjects"@en ;
893.    .
894.    bmicdca:Resource_ReputationOfBIMManagers
895.    rdf:type archimateV3:Resource ;
896.    bmea:resource_composedOf_BusinessObject bmicdca:BusinessObject_ReputationOfBIMMa
        nagers ;
897.    rdfs:label "Resource ReputationOfBIMManagers"@en ;
898.    .
899.    bmicdca:Resource_SalesForceTeam
900.    rdf:type archimateV3:Resource ;
901.    bmea:resource_assignedTo_Capability bmicdca:Capability_SalesForce ;
902.    bmea:resource_hasAssigned_BusinessInterface bmicdca:BusinessInterface_SalesForce
        Team ;
903.    rdfs:label "Resource SalesForceTeam"@en ;
904.    .
905.    bmicdca:Resource_TrackRecordOfSuccessfulBIMProjects
906.    rdf:type archimateV3:Resource ;
907.    bmea:resource_composedOf_BusinessObject bmicdca:BusinessObject_TrackRecordOfSucc
        essfulBIMProjects ;
908.    rdfs:label "Resource TrackRecordOfSuccessfulBIMProjects"@en ;
909.    .
910.    bmicdca:Resource_Website
911.    rdf:type archimateV3:Resource ;
912.    bmea:resource_assignedTo_Capability bmicdca:Capability_WebSale ;
913.    bmea:resource_hasAssigned_BusinessInterface bmicdca:BusinessInterface_Website ;
914.    rdfs:label "Resource Website"@en ;
915.    .
916.    bmicdca:RevenueStreamElementsAggregated
917.    rdf:type bmicm:RevenueStreamElements ;
918.    bmicm:revenueStreamElements_specializedBy_FeeBasedRevenueElements bmicdca:FeeBas
        edRevenueElementsAggregated ;
919.    rdfs:label "RevenueStreamElementsAggregated" ;
920.    .
921.    bmicdca:SalesForceTeam
922.    rdf:type bm:SalesForce ;
923.    bm:channel_hasChannelOwnerType "Own"@en ;
924.    bm:channel_hasChannelPhaseType "After Sales"@en ;
925.    bm:channel_hasChannelPhaseType "Evaluation"@en ;
926.    bm:channel_hasChannelPhaseType "Purchase"@en ;
927.    bm:channels_deliverTo_CustomerSegments bmicdca:GeneralPlanerCompaniesInNeedOfBIM
        Managers ;
928.    bm:channels_deliverTo_CustomerSegments bmicdca:TotalContractorCompaniesInNeedOfB
        IMManagers ;
929.    bm:channels_deliver_Offerings bmicdca:BIMManagerAsAService ;
930.    bm:channels_fits_CustomerRelationships bmicdca:SalesTeam ;
931.    bm:channels_generate_RevenueStreams bmicdca:FixedFee ;
932.    bm:customerInterfaceParts_affects_FinancialAspectParts bmicdca:FixedFee ;
933.    bm:customerInterfaceParts_affects_FinancialAspectParts bmicdca:SalesMarketing ;
934.    bmea:channels_associatedWith_Capability bmicdca:Capability_SalesForce ;
935.    bmea:channels_composedOf_Resource bmicdca:Resource_SalesForceTeam ;
936.    rdfs:label "Sales force team"@en ;
937.    .
938.    bmicdca:SalesMarketing
939.    rdf:type bm:FixedCost ;
940.    bm:costStructureElements_affectedBy_Offerings bmicdca:BIMManagerAsAService ;
941.    bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
942.    bmea:costStructureElements_associatedWith_Outcome bmicdca:Outcome_SalesMarketing
        ;
943.    rdfs:label "Sales & Marketing"@en ;
944.    .
945.    bmicdca:SalesTeam
946.    rdf:type bm:PersonalAssistance ;
947.    bm:customerInterfaceParts_affects_FinancialAspectParts bmicdca:SalesMarketing ;
948.    bm:customerRelationships_enabledBy_KeyRessources bmicdca:ReputationOfBIMManagers
        ;
```

949. `bm:customerRelationships_enabledBy_KeyRessources` `bmicdca:TrackRecordOfSuccessful BIMProjects` ;
950. `bm:customerRelationships_maintain_CustomerSegments` `bmicdca:GeneralPlanerCompanie sInNeedOfBIMManagers` ;
951. `bm:customerRelationships_maintain_CustomerSegments` `bmicdca:TotalContractorCompan iesInNeedOfBIMManagers` ;
952. `bm:customerRelationships_promote_Offerings` `bmicdca:BIMManagerAsAService` ;
953. `bmea:customerRelationships_associatedWith_Capability` `bmicdca:Capability_Personal Assistance` ;
954. `rdfs:label` `"Sales team"@en` ;
955. .
956. `bmicdca:Stakeholder_GeneralPlanerCompaniesInNeedOfBIMManagers`
957. `rdf:type` `archimateV3:Stakeholder` ;
958. `bmea:stakeholder_associatedWith_BusinessActor` `bmicdca:BusinessActor_NicheMarketC ustomerSegmentA` ;
959. `rdfs:label` `"Stakeholder GeneralPlanerCompaniesInNeedOfBIMManagers"@en` ;
960. .
961. `bmicdca:Stakeholder_TotalContractorCompaniesInNeedOfBIMManagers`
962. `rdf:type` `archimateV3:Stakeholder` ;
963. `bmea:stakeholder_associatedWith_BusinessActor` `bmicdca:BusinessActor_NicheMarketC ustomerSegmentB` ;
964. `rdfs:label` `"Stakeholder TotalContractorCompaniesInNeedOfBIMManagers"@en` ;
965. .
966. `bmicdca:Stakeholder_TrainingFacilityForTrainingBIMManagers`
967. `rdf:type` `archimateV3:Stakeholder` ;
968. `bmea:stakeholder_associatedWith_BusinessActor` `bmicdca:BusinessActor_AcademicInst itute` ;
969. `rdfs:label` `"Stakeholder Training Facility For Training BIM-Managers"@en` ;
970. .
971. `bmicdca:StrategyLayerElementsAggregated`
972. `rdf:type` `bmicm:StrategyLayerElements` ;
973. `bmicm:strategyLayerElements_specializedBy_Capability` `bmicdca:Capability_CoCreati onWithPeople` ;
974. `bmicm:strategyLayerElements_specializedBy_Capability` `bmicdca:Capability_Personal Assistance` ;
975. `bmicm:strategyLayerElements_specializedBy_Capability` `bmicdca:Capability_SalesFor ce` ;
976. `bmicm:strategyLayerElements_specializedBy_Capability` `bmicdca:Capability_WebSale` ;
977. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdca:Resource_BIMManager` ;
978. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdca:Resource_HowToPerform SuccessfulBIMProjects` ;
979. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdca:Resource_ReputationOf BIMManagers` ;
980. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdca:Resource_SalesForceTe am` ;
981. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdca:Resource_TrackRecordO fSuccessfulBIMProjects` ;
982. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdca:Resource_Website` ;
983. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdca:ValueStream_Manage ClientsBIMprojects` ;
984. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdca:ValueStream_Recrui tBIMManagers` ;
985. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdca:ValueStream_Subcon tractBIMManagersToThirdParties` ;
986. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdca:ValueStream_Traini ngOfBIMManagersOffTheField` ;
987. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdca:ValueStream_Traini ngOfBIMManagersOnTheField` ;
988. `rdfs:label` `"Strategy Layer Elements Aggregated"` ;
989. .
990. `bmicdca:SubcontractBIMManagersToThirdParties`
991. `rdf:type` `bm:CoreProcess` ;
992. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdca:BIMManagerSalaries` ;
993. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdca:SalesMarketing` ;

994. `bm:infrastructureParts_enables_Offerings bmicdca:BIMManagerAsAService ;`
995. `bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;`
996. `bm:keyActivities_require_KeyRessources bmicdca:BIMManager ;`
997. `bm:keyActivities_require_KeyRessources bmicdca:HowToPerformSuccessfulBIMProjects ;`
998. `bm:keyActivities_require_KeyRessources bmicdca:ReputationOfBIMManagers ;`
999. `bm:keyActivities_require_KeyRessources bmicdca:TrackRecordOfSuccessfulBIMProjects ;`
1000. `bmbc:keyActivities_isACoreCapability "false"^^xsd:boolean ;`
1001. `bmea:keyActivities_associatedWith_ValueStream bmicdca:ValueStream_SubcontractBIMManagersToThirdParties ;`
1002. `bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:ProjectPlanning ;`
1003. `bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:StrategicPlanning ;`
1004. `rdfs:label "Subcontract BIM-Managers to third parties"@en ;`
1005. `.`
1006. `bmicdca:SystemSoftware_BIM`
1007. `rdf:type archi:Node ;`
1008. `bmea:node_realizedBy_SystemSoftware bmicdca:SystemSoftware_Moodle ;`
1009. `bmea:node_realizedBy_SystemSoftware bmicdca:SystemSoftware_Solibri ;`
1010. `rdfs:label "SystemSoftware BIM"@en ;`
1011. `.`
1012. `bmicdca:SystemSoftware_Capterra`
1013. `rdf:type archi:SystemSoftware ;`
1014. `rdfs:label "SystemSoftware Capterra"@en ;`
1015. `.`
1016. `bmicdca:SystemSoftware_Jira`
1017. `rdf:type archi:SystemSoftware ;`
1018. `rdfs:label "SystemSoftware Jira"@en ;`
1019. `.`
1020. `bmicdca:SystemSoftware_Moodle`
1021. `rdf:type archi:SystemSoftware ;`
1022. `rdfs:label "SystemSoftware Moodle"@en ;`
1023. `.`
1024. `bmicdca:SystemSoftware_Solibri`
1025. `rdf:type archi:SystemSoftware ;`
1026. `rdfs:label "SystemSoftware Solibri"@en ;`
1027. `.`
1028. `bmicdca:SystemSoftware_Umantis`
1029. `rdf:type archi:SystemSoftware ;`
1030. `rdfs:label "SystemSoftware Umantis"@en ;`
1031. `.`
1032. `bmicdca:TeamOfBIMManagers`
1033. `rdf:type bc:CoreCapabilities ;`
1034. `bmbc:coreCapabilities_composedOf_KeyActivities bmicdca:RecruitBIMManagers ;`
1035. `bmbc:coreCapabilities_composedOf_KeyResources bmicdca:BIMManager ;`
1036. `rdfs:label "Team of BIM-Managers"@en ;`
1037. `.`
1038. `bmicdca:TechnologyLayerElementsAggregated`
1039. `rdf:type bmicm:TechnologyLayerElements ;`
1040. `bmicm:technologyLayerElements_specializedBy_InfrastructureService bmicdca:InfrastructureService_ContractManagementPlatformService ;`
1041. `bmicm:technologyLayerElements_specializedBy_InfrastructureService bmicdca:InfrastructureService_ProjectManagementPlatformService ;`
1042. `bmicm:technologyLayerElements_specializedBy_InfrastructureService bmicdca:InfrastructureService_RecruitingPlatformService ;`
1043. `bmicm:technologyLayerElements_specializedBy_InfrastructureService bmicdca:InfrastructureService_TrainingPlatformService ;`
1044. `bmicm:technologyLayerElements_specializedBy_Node bmicdca:SystemSoftware_BIM ;`
1045. `bmicm:technologyLayerElements_specializedBy_Node bmicdca:SystemSoftware_Capterra ;`
1046. `bmicm:technologyLayerElements_specializedBy_Node bmicdca:SystemSoftware_Jira ;`
1047. `bmicm:technologyLayerElements_specializedBy_Node bmicdca:SystemSoftware_Moodle ;`

1048. bmicm:technologyLayerElements_specializedBy_Node bmicdca:SystemSoftware_Solibri
     ;
1049. bmicm:technologyLayerElements_specializedBy_Node bmicdca:SystemSoftware_Umantis
     ;
1050. bmicm:technologyLayerElements_specializedBy_SystemSoftware bmicdca:SystemSoftwar
     e_Capterra ;
1051. bmicm:technologyLayerElements_specializedBy_SystemSoftware bmicdca:SystemSoftwar
     e_Jira ;
1052. bmicm:technologyLayerElements_specializedBy_SystemSoftware bmicdca:SystemSoftwar
     e_Moodle ;
1053. bmicm:technologyLayerElements_specializedBy_SystemSoftware bmicdca:SystemSoftwar
     e_Solibri ;
1054. bmicm:technologyLayerElements_specializedBy_SystemSoftware bmicdca:SystemSoftwar
     e_Umantis ;
1055. rdfs:label "Technology Layer Elements Aggregated" ;
1056. .
1057. bmicdca:TotalContractorCompaniesInNeedOfBIMManagers
1058. rdf:type bm:NicheMarket ;
1059. bm:customerSegment_isAMultiSidedPlatform "false"^^xsd:boolean ;
1060. bm:customerSegment_isDiversified "false"^^xsd:boolean ;
1061. bm:customerSegments_receive_Offerings bmicdca:BIMManagerAsAService ;
1062. bmea:customerSegments_composedOf_Stakeholder bmicdca:Stakeholder_TotalContractor
     CompaniesInNeedOfBIMManagers ;
1063. bmicis:customerSegments_isOfType_ConstructionStakeholderTypes ci:Contractor ;
1064. rdfs:label "(Total) contractor companies using BIM and in need of a BIM-
     Manager for the coordination of the BIM-based construction project"@en ;
1065. .
1066. bmicdca:TrackRecordOfSuccessfulBIMProjects
1067. rdf:type bm:Brand ;
1068. bm:infrastructureParts_enables_Offerings bmicdca:BIMManagerAsAService ;
1069. bm:keyRessources_enables_KeyActivities bmicdca:RecruitBIMManagers ;
1070. bm:keyRessources_enables_KeyActivities bmicdca:SubcontractBIMManagersToThirdPart
     ies ;
1071. bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;
1072. bmea:keyResources_composedOf_Resource bmicdca:Resource_TrackRecordOfSuccessfulBI
     MProjects ;
1073. rdfs:label "Track record of successful BIM-projects"@en ;
1074. .
1075. bmicdca:TrainingCostsForTrainingBIMManagers
1076. rdf:type bm:VariableCost ;
1077. bm:costStructureElements_affectedBy_Offerings bmicdca:BIMManagerAsAService ;
1078. bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
1079. bmea:costStructureElements_associatedWith_Outcome bmicdca:Outcome_TrainingCostsF
     orTrainingBIMManagers ;
1080. rdfs:label "Training costs for training BIM-Managers"@en ;
1081. .
1082. bmicdca:TrainingFacilityForTrainingBIMManagers
1083. rdf:type bm:AcademicInstitute ;
1084. bm:infrastructureParts_affects_FinancialAspectParts bmicdca:TrainingCostsForTrai
     ningBIMManagers ;
1085. bm:infrastructureParts_enables_Offerings bmicdca:BIMManagerAsAService ;
1086. bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
1087. bm:keyPartners_facilitate_KeyActivities bmicdca:TrainingOfBIMManagersOffTheField
      ;
1088. bm:keyPartners_influencedBy_CostStructureModels bm:CostDriven ;
1089. bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:Knowledge ;
1090. bm:keyPartners_provide_KeyRessources bmicdca:HowToPerformSuccessfulBIMProjects ;
1091. bmea:keyPartners_composedOf_Stakeholder bmicdca:Stakeholder_TrainingFacilityForT
     rainingBIMManagers ;
1092. rdfs:label "Training facility for training BIM-Managers"@en ;
1093. .
1094. bmicdca:TrainingOfBIMManagersOffTheField
1095. rdf:type bm:SupportProcess ;
1096. bm:infrastructureParts_affects_FinancialAspectParts bmicdca:TrainingCostsForTrai
     ningBIMManagers ;

1097. `bm:infrastructureParts_enables_Offerings` `bmicdca:`BIMManagerAsAService ;
1098. `bmbc:keyActivities_isACoreCapability` `"false"^^xsd:`boolean ;
1099. `bmea:keyActivities_associatedWith_ValueStream` `bmicdca:`ValueStream_TrainingOfBIMM
    anagersOffTheField ;
1100. `rdfs:label` `"Training of BIM-Managers off the field"@en` ;
1101. .
1102. `bmicdca:`TrainingOfBIMManagersOnTheField
1103. `rdf:type` `bm:`SupportProcess ;
1104. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdca:`TrainingCostsForTrai
    ningBIMManagers ;
1105. `bm:infrastructureParts_enables_Offerings` `bmicdca:`BIMManagerAsAService ;
1106. `bm:infrastructureParts_influencedBy_EconomicAdvantages` `bm:`EconomiesOfScope ;
1107. `bm:keyActivities_require_KeyRessources` `bmicdca:`HowToPerformSuccessfulBIMProjects
     ;
1108. `bmbc:keyActivities_isACoreCapability` `"true"^^xsd:`boolean ;
1109. `bmea:keyActivities_associatedWith_ValueStream` `bmicdca:`ValueStream_TrainingOfBIMM
    anagersOnTheField ;
1110. `rdfs:label` `"Training of BIM-Managers on the field"@en` ;
1111. .
1112. `bmicdca:`TransferBIMKnowledge
1113. `rdf:type` `bc:`CoreCapabilities ;
1114. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdca:`TrainingOfBIMManagersOffT
    heField ;
1115. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdca:`TrainingOfBIMManagersOnTh
    eField ;
1116. `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdca:`HowToPerformSuccessfulBIMP
    rojects ;
1117. `rdfs:label` `"Transfer BIM Knowledge"@en` ;
1118. .
1119. `bmicdca:`ValuePropositionElementsAggregated
1120. `rdf:type` `bmicm:`ValuePropositionElements ;
1121. `bmicm:valuePropositionElements_specializedBy_OfferingElements` `bmicdca:`OfferingEl
    ementsAggregated ;
1122. `bmicm:valuePropositionElements_specializedBy_OfferingValueElements` `bmicdca:`Offer
    ingValueElementsAggregated ;
1123. `rdfs:label` `"ValuePropositionElementsAggregated"` ;
1124. .
1125. `bmicdca:`ValueStream_ManageClientsBIMprojects
1126. `rdf:type` `archimateV3:`ValueStream ;
1127. `bmea:valueStream_realizedBy_BusinessProcess` `bmicdca:`BusinessProcess_ManageClient
    sBIMprojects ;
1128. `rdfs:label` `"ValueStream ManageClientsBIMprojects"@en` ;
1129. .
1130. `bmicdca:`ValueStream_RecruitBIMManagers
1131. `rdf:type` `archimateV3:`ValueStream ;
1132. `bmea:valueStream_realizedBy_BusinessProcess` `bmicdca:`BusinessProcess_RecruitBIMMa
    nagers ;
1133. `rdfs:label` `"ValueStream RecruitBIMManagers"@en` ;
1134. .
1135. `bmicdca:`ValueStream_SubcontractBIMManagersToThirdParties
1136. `rdf:type` `archimateV3:`ValueStream ;
1137. `bmea:valueStream_realizedBy_BusinessProcess` `bmicdca:`BusinessProcess_SubcontractB
    IMManagersToThirdParties ;
1138. `rdfs:label` `"ValueStream SubcontractBIMManagersToThirdParties"@en` ;
1139. .
1140. `bmicdca:`ValueStream_TrainingOfBIMManagersOffTheField
1141. `rdf:type` `archimateV3:`ValueStream ;
1142. `bmea:valueStream_realizedBy_BusinessProcess` `bmicdca:`BusinessProcess_TrainingOfBI
    MManagersOffTheField ;
1143. `rdfs:label` `"ValueStream TrainingOfBIMManagersOffTheField"@en` ;
1144. .
1145. `bmicdca:`ValueStream_TrainingOfBIMManagersOnTheField
1146. `rdf:type` `archimateV3:`ValueStream ;
1147. `bmea:valueStream_realizedBy_BusinessProcess` `bmicdca:`BusinessProcess_TrainingOfBI
    MManagersOnTheField ;

```
1148.    rdfs:label "ValueStream TrainingOfBIMManagersOnTheField"@en ;
1149.  .
1150.  bmicdca:Value_BIMMangersWithSeveralYearsOfExperienceOnBIMProjects
1151.    rdf:type archimateV3:Value ;
1152.    bmea:value_realizedBy_BusinessObject bmicdca:BusinessObject_HowToPerformSuccessf
         ulBIMProjects ;
1153.    bmea:value_realizedBy_BusinessObject bmicdca:BusinessObject_ReputationOfBIMManag
         ers ;
1154.    bmea:value_realizedBy_BusinessObject bmicdca:BusinessObject_TrackRecordOfSuccess
         fulBIMProjects ;
1155.    rdfs:label "Value BIMMangersWithSeveralYearsOfExperienceOnBIMProjects"@en ;
1156.  .
1157.  bmicdca:Value_BuildBIMCompliantConstructions
1158.    rdf:type archimateV3:Value ;
1159.    bmea:value_realizedBy_BusinessObject bmicdca:BusinessObject_HowToPerformSuccessf
         ulBIMProjects ;
1160.    rdfs:label "Value BuildBIMCompliantConstructions"@en ;
1161.  .
1162.  bmicdca:Value_CateringToTheNeedsOfTheCustomersBusiness
1163.    rdf:type archimateV3:Value ;
1164.    rdfs:label "Value CateringToTheNeedsOfTheCustomersBusiness"@en ;
1165.  .
1166.  bmicdca:Value_GrowTheOfferForCustomersToBuildBIMCompliantConstructions
1167.    rdf:type archimateV3:Value ;
1168.    rdfs:label "Value GrowTheOfferForCustomersToBuildBIMCompliantConstructions"@en ;
1169.  .
1170.  bmicdca:Value_HalfOfThePriceIsContingentOnTheSuccessOfTheBIMManagersDelivery
1171.    rdf:type archimateV3:Value ;
1172.    bmea:value_realizes_Outcome bmicdca:Outcome_FixedFee ;
1173.    bmea:value_realizes_Outcome bmicdca:Outcome_PerformanceBasedFee ;
1174.    rdfs:label "Value HalfOfThePriceIsContingentOnTheSuccessOfTheBIMManagersDelivery
         "@en ;
1175.  .
1176.  bmicdca:Value_NoNeedOfHiringABIMManager
1177.    rdf:type archimateV3:Value ;
1178.    rdfs:label "Value NoNeedOfHiringABIMManager"@en ;
1179.  .
1180.  bmicdca:Website
1181.    rdf:type bm:WebSale ;
1182.    bm:channel_hasChannelOwnerType "Own"@en ;
1183.    bm:channel_hasChannelPhaseType "Awareness"@en ;
1184.    bm:channels_deliverTo_CustomerSegments bmicdca:GeneralPlanerCompaniesInNeedOfBIM
         Managers ;
1185.    bm:channels_deliverTo_CustomerSegments bmicdca:TotalContractorCompaniesInNeedOfB
         IMManagers ;
1186.    bm:channels_deliver_Offerings bmicdca:BIMManagerAsAService ;
1187.    bmea:channels_associatedWith_Capability bmicdca:Capability_WebSale ;
1188.    bmea:channels_composedOf_Resource bmicdca:Resource_Website ;
1189.    rdfs:label "Website"@en ;
1190.  .
1191.  bmicdca:WillingnessOfBIMManagersToBeOutsourced
1192.    rdf:type bic:OrganisationalBarriers ;
1193.    rdfs:label "Willingness Of BIM Managers To Be Outsourced"@en ;
1194.  .
1195.  <http://ikm-group.ch/bmiciscsm#BMIPossibilitiesView>
1196.    cbr:caseViewDefinesCharacterisationOfCases bmicdca:BMICase_A ;
1197.  .
1198.  <http://ikm-group.ch/bmiciscsm#BMITransformationView>
1199.    cbr:caseViewDefinesCharacterisationOfCases bmicdca:BMICase_A ;
1200.  .
1201.  <http://ikm-group.ch/bmiciscsm#EAInnovationView>
1202.    cbr:caseViewDefinesCharacterisationOfCases bmicdca:BMICase_A ;
1203.  .
```

The Business Model Innovation Case: BIM-room leasing

This appendix section shows the code to represent the business model innovation case *BIM-room leasing* stored within the file BMICaseDataCaseB.ttl.

```
1.    # baseURI: http://ikm-group.ch/bmicdcb
2.    # imports: http://ikm-group.ch/bmiciscsm
3.    # prefix: bmicdcb
4.
5.    @prefix archimateV3: <http://ikm-group.ch/archimateV3#> .
6.    @prefix bic: <http://ikm-group.ch/bic#> .
7.    @prefix bm: <http://ikm-group.ch/bm#> .
8.    @prefix bmbc: <http://ikm-group.ch/bmbc#> .
9.    @prefix bmic: <http://ikm-group.ch/bmic#> .
10.   @prefix bmicdcb: <http://ikm-group.ch/bmicdcb#> .
11.   @prefix bmicis: <http://ikm-group.ch/bmicis#> .
12.   @prefix bmicm: <http://ikm-group.ch/bmicm#> .
13.   @prefix cbr: <http://ikm-group.ch/cbr#> .
14.   @prefix ci: <http://ikm-group.ch/ci#> .
15.   @prefix eo: <http://ikm-group.ch/archiMEO/eo#> .
16.   @prefix owl: <http://www.w3.org/2002/07/owl#> .
17.   @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
18.   @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
19.   @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
20.
21.   <http://ikm-group.ch/bmicdcb>
22.   rdf:type owl:Ontology ;
23.   owl:imports <http://ikm-group.ch/bmiciscsm> ;
24.   owl:versionInfo "Created with TopBraid Composer"@en ;
25.   .
26.   bmicdcb:Accounting
27.   rdf:type bm:SupportProcess ;
28.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Accounting_costs ;
29.   bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
30.   bmbc:keyActivities_isACoreCapability "false"^^xsd:boolean ;
31.   rdfs:label "Accounting"@en ;
32.   .
33.   bmicdcb:Accounting_costs
34.   rdf:type bm:FixedCost ;
35.   bm:costStructureElements_affectedBy_Offerings bmicdcb:BIM-room_leasing ;
36.   bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
37.   rdfs:label "Accounting costs"@en ;
38.   .
39.   bmicdcb:Acquisition_costs_for_the_office_containers
40.   rdf:type bm:VariableCost ;
41.   bm:costStructureElements_affectedBy_Offerings bmicdcb:BIM-room_leasing ;
42.   bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
43.   rdfs:label "Acquisition costs for the office containers"@en ;
44.   .
45.   bmicdcb:Acquisition_of_the_furniture_and_material_for_the_office_containers
46.   rdf:type bm:CoreProcess ;
47.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Furniture_Material_f
      or_the_office_container ;
48.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Maintenance_costs_fo
      r_the_office_containers ;
49.   bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
50.   bm:keyActivities_require_KeyRessources bmicdcb:Knowledge_of_ICE-sessions ;
51.   bmbc:keyActivities_isACoreCapability "false"^^xsd:boolean ;
52.   rdfs:label "Acquisition of the furniture and material (such as screens) for the
      office containers"@en ;
53.   .
54.   bmicdcb:ApplicationLayerElementsAggregated
55.   rdf:type bmicm:ApplicationLayerElements ;
```

```
56.    rdfs:label "ApplicationLayerElementsAggregated" ;
57.    .
58.    bmicdcb:BIM-room_leasing
59.    rdf:type bm:Service ;
60.    bm:offerings_basedOn_KeyRessources bmicdcb:Containers_with_ICE-
       equipment_installed ;
61.    bm:offerings_basedOn_KeyRessources bmicdcb:Knowledge_of_ICE-sessions ;
62.    bm:offerings_basedOn_KeyRessources bmicdcb:Office_container_set-up_team ;
63.    bm:offerings_basedOn_KeyRessources bmicdcb:Sales_Marketing_team ;
64.    bm:offerings_basedOn_KeyRessources bmicdcb:Storage_place_for_the_containers ;
65.    bm:offerings_provide_OfferingValues bmicdcb:Only_all-in-
       one_solution_provider_for_ICE-sessions_at_the_construction_site ;
66.    bm:offerings_provide_OfferingValues bmicdcb:PlugPlay-
       solution_of_office_containers_for_ICE-sessions_at_the_construction_site ;
67.    bm:offerings_provide_OfferingValues bmicdcb:Set-up_office_container_for_ICE-
       sessions ;
68.    bm:offerings_provide_OfferingValues bmicdcb:Transparent_monthly_renting_payments
       ;
69.    bm:offerings_require_KeyActivities bmicdcb:Accounting ;
70.    bm:offerings_require_KeyActivities bmicdcb:Acquisition_of_the_furniture_and_mate
       rial_for_the_office_containers ;
71.    bm:offerings_require_KeyActivities bmicdcb:Sales_Marketing ;
72.    bm:offerings_require_KeyActivities bmicdcb:Setting-up_the_office_containers ;
73.    bm:offerings_require_KeyActivities bmicdcb:Storing_and_distributing_the_office_c
       ontainers ;
74.    bm:offerings_valueFor_CustomerSegments bmicdcb:Building_planners_using_BIM ;
75.    bm:offerings_valueFor_CustomerSegments bmicdcb:General_planer_companies_using_BI
       M ;
76.    bm:offerings_valueFor_CustomerSegments bmicdcb:Total_contractor_companies_using_
       BIM ;
77.    rdfs:label "BIM-room leasing"@en ;
78.    .
79.    bmicdcb:BMICase_B
80.    rdf:type bmic:BusinessModelInnovationCases ;
81.    bic:cases_caseName "BIM-room leasing"@en ;
82.    bic:cases_consistsOf_BarriersToOvercome bmicdcb:Find_a_place_to_store_the_contai
       ners ;
83.    bic:cases_consistsOf_BarriersToOvercome bmicdcb:Get_the_necessary_funding ;
84.    bic:cases_consistsOf_BarriersToOvercome bmicdcb:Have_a_team_of_ICE-experts ;
85.    bic:cases_consistsOf_BenefitsOfInnovation bmicdcb:New_customer_segment_created ;
86.    bic:cases_consistsOf_BenefitsOfInnovation bmicdcb:New_revenue_stream_created ;
87.    bic:cases_consistsOf_BenefitsOfInnovation bmicdcb:Plug_and_Play_infrastructure_f
       or_ICE_sessions ;
88.    bic:cases_consistsOf_BusinessStateCharacteristics bmicdcb:Business_Model_after_i
       nnovating ;
89.    bic:cases_consistsOf_CaseCharacteristics bmicdcb:LosingerMarazzi ;
90.    bic:cases_consistsOf_CaseCharacteristics bmicdcb:Storage_supplier ;
91.    bic:cases_consistsOf_Drivers bmicdcb:Generating_more_revenue ;
92.    bic:cases_consistsOf_RequiredRessources bmicdcb:Captial_for_buying_containers_an
       d_materials ;
93.    bic:cases_consistsOf_RequiredRessources bmicdcb:Containers ;
94.    bic:cases_consistsOf_RequiredRessources bmicdcb:Knowledge_on_what_the_best_set-
       up_for_the_ICE-sessions_is ;
95.    bic:cases_consistsOf_RequiredRessources bmicdcb:Material_for_the_interior ;
96.    bic:cases_consistsOf_RequiredRessources bmicdcb:Set-up_team_for_the_containers ;
97.    bic:cases_consistsOf_RequiredRessources bmicdcb:Storage_place ;
98.    bic:cases_consistsOf_RisksOfInnovation bmicdcb:Buying_too_many_containers ;
99.    bic:cases_consistsOf_RisksOfInnovation bmicdcb:Not_having_enough_containers_for_
       customer_demands ;
100.   bic:cases_consistsOf_StrategicGoals bmicdcb:Create_a_new_customer_segment ;
101.   bic:cases_consistsOf_StrategicGoals bmicdcb:Create_a_new_revenue_stream ;
102.   bic:cases_isSuccessfulInnovation "true"^^xsd:boolean ;
103.   bic:cases_transformationDurationIs 180 ;
104.   bmic:businessModelInnovationCases_composedOf_InvolvedParties bmicdcb:LosingerMar
       azzi ;
```

```
105.    bmic:businessModelInnovationCases_composedOf_InvolvedParties bmicdcb:Storage_sup
        plier ;
106.    bmicm:businessModelInnovationCases_aggregates_ApplicationLayerElements bmicdcb:A
        pplicationLayerElementsAggregated ;
107.    bmicm:businessModelInnovationCases_aggregates_BusinessLayerElements bmicdcb:Busi
        nessLayerElementsAggregated ;
108.    bmicm:businessModelInnovationCases_aggregates_MotivationAspectElements bmicdcb:M
        otivationAspectElementsAggregated ;
109.    bmicm:businessModelInnovationCases_aggregates_StrategyLayerElements bmicdcb:Stra
        tegyLayerElementsAggregated ;
110.    bmicm:businessModelInnovationCases_aggregates_TechnologyLayerElements bmicdcb:Te
        chnologyLayerElementsAggregated ;
111.    bmicm:businessModelInnovationCases_composedOf_BarriersToOvercome bmicdcb:Barrier
        sToOvercomeAggregated ;
112.    bmicm:businessModelInnovationCases_composedOf_BenefitsOfInnovation bmicdcb:Benef
        itsOfInnovationAggregated ;
113.    bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements bmicdcb
        :BusinessCapabilityElementsAggregated ;
114.    bmicm:businessModelInnovationCases_composedOf_BusinessStateCharacteristics bmicd
        cb:BusinessStateCharacteristicsAggregated ;
115.    bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics bmic
        dcb:ConstructionIndustrySpecificsAggregated ;
116.    bmicm:businessModelInnovationCases_composedOf_CustomerInterfaceElements bmicdcb:
        CustomerInterfaceElementsAggregated ;
117.    bmicm:businessModelInnovationCases_composedOf_Drivers bmicdcb:Generating_more_re
        venue ;
118.    bmicm:businessModelInnovationCases_composedOf_FinancialAspectElements bmicdcb:Fi
        nancialAspectElementsAggregated ;
119.    bmicm:businessModelInnovationCases_composedOf_Industries bic:Construction ;
120.    bmicm:businessModelInnovationCases_composedOf_Industries bic:TransportationAndLo
        gistics ;
121.    bmicm:businessModelInnovationCases_composedOf_InfrastructureElements bmicdcb:Inf
        rastructureElementsAggregated ;
122.    bmicm:businessModelInnovationCases_composedOf_InvolvedParties bmicdcb:LosingerMa
        razzi ;
123.    bmicm:businessModelInnovationCases_composedOf_InvolvedParties bmicdcb:Storage_su
        pplier ;
124.    bmicm:businessModelInnovationCases_composedOf_RequiredResources bmicdcb:Required
        ResourcesAggregated ;
125.    bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation bmicdcb:Buying_t
        oo_many_containers ;
126.    bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation bmicdcb:Not_havi
        ng_enough_containers_for_customer_demands ;
127.    bmicm:businessModelInnovationCases_composedOf_StrategicGoals bmicdcb:Create_a_ne
        w_customer_segment ;
128.    bmicm:businessModelInnovationCases_composedOf_StrategicGoals bmicdcb:Create_a_ne
        w_revenue_stream ;
129.    bmicm:businessModelInnovationCases_composedOf_ValuePropositionElements bmicdcb:V
        aluePropositionElementsAggregated ;
130.    rdfs:label "BMI Case: BIM-room leasing"@en ;
131.    .
132.    bmicdcb:BarriersToOvercomeAggregated
133.    rdf:type bmicm:BarriersToOvercome ;
134.    bmicm:barriersToOvercome_specializedBy_FinancialBarriers bmicdcb:Get_the_necessa
        ry_funding ;
135.    bmicm:barriersToOvercome_specializedBy_IntellectualBarriers bmicdcb:Have_a_team_
        of_ICE-experts ;
136.    bmicm:barriersToOvercome_specializedBy_PhysicalBarriers bmicdcb:Find_a_place_to_
        store_the_containers ;
137.    rdfs:label "CustomerSegmentElementsAggregated" ;
138.    .
139.    bmicdcb:BenefitsOfInnovationAggregated
140.    rdf:type bmicm:BenefitsOfInnovation ;
141.    bmicm:benefitsOfInnovation_specializedBy_CustomerBenefits bmicdcb:Plug_and_Play_
        infrastructure_for_ICE_sessions ;
```

142. `bmicm:`benefitsOfInnovation_specializedBy_InvolvedPartyBenefits `bmicdcb:`New_custo
     mer_segment_created ;
143. `bmicm:`benefitsOfInnovation_specializedBy_InvolvedPartyBenefits `bmicdcb:`New_reven
     ue_stream_created ;
144. `rdfs:`label "BenefitsOfInnovationAggregated" ;
145. .
146. `bmicdcb:`Building_planners_using_BIM
147. `rdf:`type `bm:`SegmentedMarket ;
148. `bm:`customerSegment_isAMultiSidedPlatform "false"^^`xsd:`boolean ;
149. `bm:`customerSegment_isDiversified "false"^^`xsd:`boolean ;
150. `bm:`customerSegments_receive_Offerings `bmicdcb:`BIM-room_leasing ;
151. `bmic:`customerSegments_benefitFrom_CustomerBenefits `bmicdcb:`Plug_and_Play_infrast
     ructure_for_ICE_sessions ;
152. `bmicis:`customerSegments_isOfType_ConstructionStakeholderTypes `ci:`Architecture ;
153. `bmicis:`customerSegments_isOfType_ConstructionStakeholderTypes `ci:`Engineering ;
154. `rdfs:`label "Building planners, such as architects or electrical system planners,
     using BIM "@en ;
155. .
156. `bmicdcb:`BusinessCapabilityElementsAggregated
157. `rdf:`type `bmicm:`BusinessCapabilityElements ;
158. `bmicm:`businessCapabilityElements_specializedBy_HumanBasedCapabilityElements `bmic`
     `dcb:`HumanBasedCapabilityElementsAggregated ;
159. `rdfs:`label "BusinessCapabilityElementsAggregated" ;
160. .
161. `bmicdcb:`BusinessLayerElementsAggregated
162. `rdf:`type `bmicm:`BusinessLayerElements ;
163. `bmicm:`businessLayerElements_specializedBy_Product `bmicdcb:`IntangibleProduct_BIM-
     room_leasing ;
164. `rdfs:`label "BusinessLayerElementsAggregated" ;
165. .
166. `bmicdcb:`BusinessStateCharacteristicsAggregated
167. `rdf:`type `bmicm:`BusinessStateCharacteristics ;
168. `bmicm:`businessStateCharacteristics_specializedBy_StateAfterInnovating `bmicdcb:`Bu
     siness_Model_after_innovating ;
169. `rdfs:`label "BusinessStateCharacteristicsAggregated" ;
170. .
171. `bmicdcb:`Business_Model_after_innovating
172. `rdf:`type `bic:`StateAfterInnovating ;
173. `bic:`businessStateCharacteristics_classifiesAs_ViewsOnBusiness `bmic:`BusinessModel
     ;
174. `bmic:`businessStateCharacteristics_aggregates_Channels `bmicdcb:`Sales_team_for_dir
     ect_orders ;
175. `bmic:`businessStateCharacteristics_aggregates_Channels `bmicdcb:`Website_to_order_t
     he_office_containers ;
176. `bmic:`businessStateCharacteristics_aggregates_CostStructureElements `bmicdcb:`Accou
     nting_costs ;
177. `bmic:`businessStateCharacteristics_aggregates_CostStructureElements `bmicdcb:`Acqui
     sition_costs_for_the_office_containers ;
178. `bmic:`businessStateCharacteristics_aggregates_CostStructureElements `bmicdcb:`Distr
     ibution_costs_of_the_office_containers ;
179. `bmic:`businessStateCharacteristics_aggregates_CostStructureElements `bmicdcb:`Furni
     ture_Material_for_the_office_container ;
180. `bmic:`businessStateCharacteristics_aggregates_CostStructureElements `bmicdcb:`Maint
     enance_costs_for_the_office_containers ;
181. `bmic:`businessStateCharacteristics_aggregates_CostStructureElements `bmicdcb:`Sales
     _Marketing_costs ;
182. `bmic:`businessStateCharacteristics_aggregates_CostStructureElements `bmicdcb:`Stora
     ge_cost ;
183. `bmic:`businessStateCharacteristics_aggregates_CustomerRelationships `bmicdcb:`Sales
     _team ;
184. `bmic:`businessStateCharacteristics_aggregates_CustomerSegments `bmicdcb:`Building_p
     lanners_using_BIM ;
185. `bmic:`businessStateCharacteristics_aggregates_CustomerSegments `bmicdcb:`General_pl
     aner_companies_using_BIM ;

186. `bmic:`businessStateCharacteristics_aggregates_CustomerSegments `bmicdcb:`Total_contractor_companies_using_BIM ;
187. `bmic:`businessStateCharacteristics_aggregates_KeyActivities `bmicdcb:`Accounting ;
188. `bmic:`businessStateCharacteristics_aggregates_KeyActivities `bmicdcb:`Acquisition_of_the_furniture_and_material_for_the_office_containers ;
189. `bmic:`businessStateCharacteristics_aggregates_KeyActivities `bmicdcb:`Sales_Marketing ;
190. `bmic:`businessStateCharacteristics_aggregates_KeyActivities `bmicdcb:`Setting-up_the_office_containers ;
191. `bmic:`businessStateCharacteristics_aggregates_KeyActivities `bmicdcb:`Storing_and_distributing_the_office_containers ;
192. `bmic:`businessStateCharacteristics_aggregates_KeyPartners `bmicdcb:`Office_furniture_distributor ;
193. `bmic:`businessStateCharacteristics_aggregates_KeyPartners `bmicdcb:`Producer_of_office_containers_for_the_construction_site ;
194. `bmic:`businessStateCharacteristics_aggregates_KeyPartners `bmicdcb:`Storage_renter ;
195. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdcb:`Containers_with_ICE-equipment_installed ;
196. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdcb:`Knowledge_of_ICE-sessions ;
197. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdcb:`Office_container_set-up_team ;
198. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdcb:`Sales_Marketing_team ;
199. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdcb:`Storage_place_for_the_containers ;
200. `bmic:`businessStateCharacteristics_aggregates_OfferingValues `bmicdcb:`Only_all-in-one_solution_provider_for_ICE-sessions_at_the_construction_site ;
201. `bmic:`businessStateCharacteristics_aggregates_OfferingValues `bmicdcb:`PlugPlay-solution_of_office_containers_for_ICE-sessions_at_the_construction_site ;
202. `bmic:`businessStateCharacteristics_aggregates_OfferingValues `bmicdcb:`Set-up_office_container_for_ICE-sessions ;
203. `bmic:`businessStateCharacteristics_aggregates_OfferingValues `bmicdcb:`Transparent_monthly_renting_payments ;
204. `bmic:`businessStateCharacteristics_aggregates_Offerings `bmicdcb:`BIM-room_leasing ;
205. `bmic:`businessStateCharacteristics_aggregates_RevenueStreams `bmicdcb:`Leasing_of_the_office_containers ;
206. `rdfs:`label "Business Model after innovating"@en ;
207. .
208. `bmicdcb:`Buying_too_many_containers
209. `rdf:`type `bic:`RisksOfInnovation ;
210. `rdfs:`label "Buying too many containers"@en ;
211. .
212. `bmicdcb:`Capability_Sales_team_for_direct_orders
213. `rdf:`type `archimateV3:`Capability ;
214. `rdfs:`label "Capability Sales team for direct orders" ;
215. .
216. `bmicdcb:`Capability_Website_to_order_the_office_containers
217. `rdf:`type `archimateV3:`Capability ;
218. `rdfs:`label "Capability Website to order the office containers" ;
219. .
220. `bmicdcb:`Captial_for_buying_containers_and_materials
221. `rdf:`type `bic:`FinancialRessources ;
222. `rdfs:`label "Captial for buying containers and materials"@en ;
223. .
224. `bmicdcb:`ChannelElementsAggregated
225. `rdf:`type `bmicm:`ChannelElements ;
226. `bmicm:`channelElements_specializedBy_DirectChannelElements `bmicdcb:`DirectChannelElementsAggregated ;
227. `bmicm:`channelElements_specializedBy_IndirectChannelElements `bmicdcb:`IndirectChannelElementsAggregated ;
228. `rdfs:`label "ChannelElementsAggregated" ;
229. .

```
230.  bmicdcb:ConstructionIndustrySpecificsAggregated
231.  rdf:type bmicm:ConstructionIndustrySpecifics ;
232.  bmicm:constructionIndustrySpecifics_specializedBy_CompanyExecutionAreas ci:Rural
      ;
233.  bmicm:constructionIndustrySpecifics_specializedBy_CompanyExecutionAreas ci:Urban
      ;
234.  bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
      PreliminaryStudy ;
235.  bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
      ProjectPlanning ;
236.  bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
      Realization ;
237.  bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
      StrategicPlanning ;
238.  bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
      Tendering ;
239.  bmicm:constructionIndustrySpecifics_specializedBy_ConstructionRelatedCompanies c
      i:LosingerMarazzi ;
240.  bmicm:constructionIndustrySpecifics_specializedBy_ExecutionModels ci:GeneralCont
      ractor ;
241.  bmicm:constructionIndustrySpecifics_specializedBy_ExecutionModels ci:GeneralPlan
      ner ;
242.  rdfs:label "ConstructionIndustrySpecificsAggregated" ;
243.  .
244.  bmicdcb:Containers
245.  rdf:type bic:PhysicalRessources ;
246.  bmic:requiredResources_aggregates_KeyResources bmicdcb:Containers_with_ICE-
      equipment_installed ;
247.  rdfs:label "Containers"@en ;
248.  .
249.  bmicdcb:Containers_with_ICE-equipment_installed
250.  rdf:type bm:Physical ;
251.  bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Acquisition_costs_fo
      r_the_office_containers ;
252.  bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Furniture_Material_f
      or_the_office_container ;
253.  bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Leasing_of_the_offic
      e_containers ;
254.  bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Maintenance_costs_fo
      r_the_office_containers ;
255.  bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
256.  bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;
257.  bm:keyRessources_enables_KeyActivities bmicdcb:Sales_Marketing ;
258.  bm:keyRessources_enables_KeyActivities bmicdcb:Storing_and_distributing_the_offi
      ce_containers ;
259.  bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;
260.  rdfs:label "Containers with ICE-equipment installed"@en ;
261.  .
262.  bmicdcb:CostStructureElementsAggregated
263.  rdf:type bmicm:CostStructureElements ;
264.  bmicm:costStructureElements_specializedBy_FixedCost bmicdcb:Accounting_costs ;
265.  bmicm:costStructureElements_specializedBy_FixedCost bmicdcb:Sales_Marketing_cost
      s ;
266.  bmicm:costStructureElements_specializedBy_VariableCost bmicdcb:Acquisition_costs
      _for_the_office_containers ;
267.  bmicm:costStructureElements_specializedBy_VariableCost bmicdcb:Distribution_cost
      s_of_the_office_containers ;
268.  bmicm:costStructureElements_specializedBy_VariableCost bmicdcb:Furniture_Materia
      l_for_the_office_container ;
269.  bmicm:costStructureElements_specializedBy_VariableCost bmicdcb:Maintenance_costs
      _for_the_office_containers ;
270.  bmicm:costStructureElements_specializedBy_VariableCost bmicdcb:Storage_cost ;
271.  rdfs:label "CostStructureElementsAggregated" ;
272.  .
273.  bmicdcb:Create_a_new_customer_segment
```

```
274.  rdf:type bic:StrategicGoals ;
275.  rdfs:label "Create a new customer segment"@en ;
276.  .
277.  bmicdcb:Create_a_new_revenue_stream
278.  rdf:type bic:StrategicGoals ;
279.  rdfs:label "Create a new revenue stream"@en ;
280.  .
281.  bmicdcb:CustomerInterfaceElementsAggregated
282.  rdf:type bmicm:CustomerInterfaceElements ;
283.  bmicm:customerInterfaceElements_specializedBy_ChannelElements bmicdcb:ChannelEle
      mentsAggregated ;
284.  bmicm:customerInterfaceElements_specializedBy_CustomerRelationshipElements bmicd
      cb:CustomerRelationshipElementsAggregated ;
285.  bmicm:customerInterfaceElements_specializedBy_CustomerSegmentElements bmicdcb:Cu
      stomerSegmentElementsAggregated ;
286.  rdfs:label "CustomerInterfaceElementsAggregated" ;
287.  .
288.  bmicdcb:CustomerRelationshipElementsAggregated
289.  rdf:type bmicm:CustomerRelationshipElements ;
290.  bmicm:customerRelationshipElements_specializedBy_HumanInteractionElements bmicdc
      b:HumanInteractionElementsAggregated ;
291.  bmicm:customerRelationshipElements_specializedBy_NonHumanInteractionElements bmi
      cdcb:NonHumanInteractionElementsAggregated ;
292.  rdfs:label "CustomerRelationshipElementsAggregated" ;
293.  .
294.  bmicdcb:CustomerSegmentElementsAggregated
295.  rdf:type bmicm:CustomerSegmentElements ;
296.  bmicm:customerSegmentElements_specializedBy_NicheMarket bmicdcb:General_planer_c
      ompanies_using_BIM ;
297.  bmicm:customerSegmentElements_specializedBy_NicheMarket bmicdcb:Total_contractor
      _companies_using_BIM ;
298.  bmicm:customerSegmentElements_specializedBy_SegmentedMarket bmicdcb:Building_pla
      nners_using_BIM ;
299.  rdfs:label "CustomerSegmentElementsAggregated" ;
300.  .
301.  bmicdcb:DirectChannelElementsAggregated
302.  rdf:type bmicm:DirectChannelElements ;
303.  bmicm:directChannelElements_specializedBy_SalesForce bmicdcb:Sales_team_for_dire
      ct_orders ;
304.  bmicm:directChannelElements_specializedBy_WebSale bmicdcb:Website_to_order_the_o
      ffice_containers ;
305.  rdfs:label "DirectChannelElementsAggregated" ;
306.  .
307.  bmicdcb:Distribution_costs_of_the_office_containers
308.  rdf:type bm:VariableCost ;
309.  bm:costStructureElements_affectedBy_Offerings bmicdcb:BIM-room_leasing ;
310.  bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
311.  rdfs:label "Distribution costs of the office containers"@en ;
312.  .
313.  bmicdcb:FeeBasedRevenueElementsAggregated
314.  rdf:type bmicm:FeeBasedRevenueElements ;
315.  bmicm:feeBasedRevenueElements_specializedBy_LendingRentingLeasing bmicdcb:Leasin
      g_of_the_office_containers ;
316.  rdfs:label "FeeBasedRevenueElementsAggregated" ;
317.  .
318.  bmicdcb:FinancialAspectElementsAggregated
319.  rdf:type bmicm:FinancialAspectElements ;
320.  bmicm:financialAspectElements_specializedBy_CostStructureElements bmicdcb:CostSt
      ructureElementsAggregated ;
321.  bmicm:financialAspectElements_specializedBy_RevenueStreamElements bmicdcb:Revenu
      eStreamElementsAggregated ;
322.  rdfs:label "FinancialAspectElementsAggregated" ;
323.  .
324.  bmicdcb:FinancialElementsAggregated
325.  rdf:type bmicm:FinancialElements ;
```

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326.    rdfs:label "FinancialElementsAggregated" ;
327.    .
328.    bmicdcb:Find_a_place_to_store_the_containers
329.    rdf:type bic:PhysicalBarriers ;
330.    rdfs:label "Find a place to store the containers"@en ;
331.    .
332.    bmicdcb:Furniture_Material_for_the_office_container
333.    rdf:type bm:VariableCost ;
334.    bm:costStructureElements_affectedBy_Offerings bmicdcb:BIM-room_leasing ;
335.    bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
336.    rdfs:label "Furniture & material for the office container"@en ;
337.    .
338.    bmicdcb:General_planer_companies_using_BIM
339.    rdf:type bm:NicheMarket ;
340.    bm:customerSegment_isAMultiSidedPlatform "false"^^xsd:boolean ;
341.    bm:customerSegment_isDiversified "false"^^xsd:boolean ;
342.    bm:customerSegments_receive_Offerings bmicdcb:BIM-room_leasing ;
343.    bmic:customerSegments_benefitFrom_CustomerBenefits bmicdcb:Plug_and_Play_infrast
        ructure_for_ICE_sessions ;
344.    bmicis:customerSegments_isOfType_ConstructionStakeholderTypes ci:Architecture ;
345.    bmicis:customerSegments_isOfType_ConstructionStakeholderTypes ci:Engineering ;
346.    rdfs:label "General planer companies using BIM"@en ;
347.    .
348.    bmicdcb:Generating_more_revenue
349.    rdf:type bic:Drivers ;
350.    rdfs:label "Generating more revenue"@en ;
351.    .
352.    bmicdcb:Get_the_necessary_funding
353.    rdf:type bic:FinancialBarriers ;
354.    rdfs:label "Get the necessary funding"@en ;
355.    .
356.    bmicdcb:Have_a_team_of_ICE-experts
357.    rdf:type bic:IntellectualBarriers ;
358.    rdfs:label "Have a team of ICE-experts"@en ;
359.    .
360.    bmicdcb:HumanBasedCapabilityElementsAggregated
361.    rdf:type bmicm:HumanBasedCapabilityElements ;
362.    rdfs:label "HumanBasedCapabilityElementsAggregated" ;
363.    .
364.    bmicdcb:HumanInteractionElementsAggregated
365.    rdf:type bmicm:HumanInteractionElements ;
366.    bmicm:humanInteractionElements_specializedBy_PersonalAssistance bmicdcb:Sales_te
        am ;
367.    rdfs:label "HumanInteractionElementsAggregated" ;
368.    .
369.    bmicdcb:IndirectChannelElementsAggregated
370.    rdf:type bmicm:IndirectChannelElements ;
371.    rdfs:label "IndirectChannelElementsAggregated" ;
372.    .
373.    bmicdcb:InfrastructureElementsAggregated
374.    rdf:type bmicm:InfrastructureElements ;
375.    bmicm:infrastructureElements_specializedBy_KeyActivityElements bmicdcb:KeyActivi
        tyElementsAggregated ;
376.    bmicm:infrastructureElements_specializedBy_KeyPartnerElements bmicdcb:KeyPartner
        ElementsAggregated ;
377.    bmicm:infrastructureElements_specializedBy_KeyResourceElements bmicdcb:KeyResour
        ceElementsAggregated ;
378.    rdfs:label "InfrastructureElementsAggregated" ;
379.    .
380.    bmicdcb:IntangibleProduct_BIM-room_leasing
381.    rdf:type eo:IntangibleProduct ;
382.    rdfs:label "IntangibleProduct BIM-room leasing" ;
383.    .
384.    bmicdcb:IntellectualElementsAggregated
385.    rdf:type bmicm:IntellectualElements ;
```

386. `bmicm:intellectualElements_specializedBy_ProprietaryKnowledge bmicdcb:Knowledge_`
     `of_ICE-sessions ;`
387. `rdfs:label "IntellectualElementsAggregated" ;`
388. `.`
389. `bmicdcb:KeyActivityElementsAggregated`
390. `rdf:type bmicm:KeyActivityElements ;`
391. `bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcb:Acquisition_of_the_f`
     `urniture_and_material_for_the_office_containers ;`
392. `bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcb:Setting-`
     `up_the_office_containers ;`
393. `bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcb:Storing_and_distribu`
     `ting_the_office_containers ;`
394. `bmicm:keyActivityElements_specializedBy_SupportProcess bmicdcb:Accounting ;`
395. `bmicm:keyActivityElements_specializedBy_SupportProcess bmicdcb:Sales_Marketing ;`
396. `rdfs:label "KeyActivityElementsAggregated" ;`
397. `.`
398. `bmicdcb:KeyPartnerElementsAggregated`
399. `rdf:type bmicm:KeyPartnerElements ;`
400. `bmicm:keyPartnerElements_specializedBy_Business bmicdcb:Office_furniture_distrib`
     `utor ;`
401. `bmicm:keyPartnerElements_specializedBy_Business bmicdcb:Producer_of_office_conta`
     `iners_for_the_construction_site ;`
402. `bmicm:keyPartnerElements_specializedBy_Business bmicdcb:Storage_renter ;`
403. `rdfs:label "KeyPartnerElementsAggregated" ;`
404. `.`
405. `bmicdcb:KeyResourceElementsAggregated`
406. `rdf:type bmicm:KeyResourceElements ;`
407. `bmicm:keyResourceElements_specializedBy_FinancialElements bmicdcb:FinancialEleme`
     `ntsAggregated ;`
408. `bmicm:keyResourceElements_specializedBy_Human bmicdcb:Office_container_set-`
     `up_team ;`
409. `bmicm:keyResourceElements_specializedBy_Human bmicdcb:Sales_Marketing_team ;`
410. `bmicm:keyResourceElements_specializedBy_IntellectualElements bmicdcb:Intellectua`
     `lElementsAggregated ;`
411. `bmicm:keyResourceElements_specializedBy_PhysicalElements bmicdcb:PhysicalElement`
     `sAggregated ;`
412. `rdfs:label "KeyResourceElementsAggregated" ;`
413. `.`
414. `bmicdcb:Knowledge_of_ICE-sessions`
415. `rdf:type bm:ProprietaryKnowledge ;`
416. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Furniture_Material_f`
     `or_the_office_container ;`
417. `bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;`
418. `bm:keyRessources_enables_KeyActivities bmicdcb:Setting-`
     `up_the_office_containers ;`
419. `bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;`
420. `rdfs:label "Knowledge on what the best set-up for the ICE-sessions is"@en ;`
421. `.`
422. `bmicdcb:Knowledge_on_what_the_best_set-up_for_the_ICE-sessions_is`
423. `rdf:type bic:IntellectualRessources ;`
424. `bmic:requiredResources_aggregates_KeyResources bmicdcb:Knowledge_of_ICE-`
     `sessions ;`
425. `rdfs:label "Knowledge on what the best set-up for the ICE-sessions is"@en ;`
426. `.`
427. `bmicdcb:LearnedBMICaseBB`
428. `rdf:type cbr:CaseStateHistory ;`
429. `cbr:belongsToCase bmicdcb:BMICase_B ;`
430. `cbr:caseStateTimestamp "2020-12-04T23:32:33.08"^^xsd:dateTime ;`
431. `cbr:hasCaseState cbr:Learned_CaseState ;`
432. `rdfs:label "LearnedBMICaseBB" ;`
433. `.`
434. `bmicdcb:Leasing_of_the_office_containers`
435. `rdf:type bm:LendingRentingLeasing ;`
436. `bm:revenueStreams_dependOn_Offerings bmicdcb:BIM-room_leasing ;`
437. `bm:revenueStreams_pricedBy_PricingMechanisms bm:ListPrice ;`

```
438.    rdfs:label "Leasing of the office containers"@en ;
439.    .
440.    bmicdcb:LosingerMarazzi
441.    rdf:type bic:InvolvedParties ;
442.    bic:involvedParties_belongsTo_Industry bic:Construction ;
443.    bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdcb:New_customer_segme
        nt_created ;
444.    bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdcb:New_revenue_stream
        _created ;
445.    bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics
         bmicdcb:Business_Model_after_innovating ;
446.    bic:involvedParties_hasGoals_StrategicGoals bmicdcb:Create_a_new_customer_segmen
        t ;
447.    bic:involvedParties_hasGoals_StrategicGoals bmicdcb:Create_a_new_revenue_stream
        ;
448.    bic:involvedParties_hasInnovationDrivers_Drivers bmicdcb:Generating_more_revenue
         ;
449.    bic:involvedParties_innovationBudgetIs 250000 ;
450.    bic:involvedParties_isCaseCompany "true"^^xsd:boolean ;
451.    bic:involvedParties_isPartnerCompany "false"^^xsd:boolean ;
452.    bic:involvedParties_mustOvercome_BarriersToOvercome bmicdcb:Find_a_place_to_stor
        e_the_containers ;
453.    bic:involvedParties_mustOvercome_BarriersToOvercome bmicdcb:Get_the_necessary_fu
        nding ;
454.    bic:involvedParties_mustOvercome_BarriersToOvercome bmicdcb:Have_a_team_of_ICE-
        experts ;
455.    bic:involvedParties_numberOfEmployeesIs 800 ;
456.    bic:involvedParties_partOf_Cases bmicdcb:BMICase_B ;
457.    bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcb:Captial_for
        _buying_containers_and_materials ;
458.    bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcb:Containers
        ;
459.    bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcb:Knowledge_o
        n_what_the_best_set-up_for_the_ICE-sessions_is ;
460.    bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcb:Material_fo
        r_the_interior ;
461.    bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcb:Set-
        up_team_for_the_containers ;
462.    bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcb:Storage_pla
        ce ;
463.    bic:involvedParties_risksOf_RisksOfInnovation bmicdcb:Buying_too_many_containers
         ;
464.    bic:involvedParties_risksOf_RisksOfInnovation bmicdcb:Not_having_enough_containe
        rs_for_customer_demands ;
465.    bic:involvedParties_turnoverIs 800000000 ;
466.    bmicis:involvedParties_aggregates_ConstructionRelatedCompanies ci:LosingerMarazz
        i ;
467.    rdfs:label "Losinger Marazzi"@en ;
468.    .
469.    bmicdcb:Maintenance_costs_for_the_office_containers
470.    rdf:type bm:VariableCost ;
471.    bm:costStructureElements_affectedBy_Offerings bmicdcb:BIM-room_leasing ;
472.    bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
473.    rdfs:label "Maintenance costs for the office containers"@en ;
474.    .
475.    bmicdcb:Material_for_the_interior
476.    rdf:type bic:PhysicalRessources ;
477.    bmic:requiredResources_aggregates_KeyResources bmicdcb:Containers_with_ICE-
        equipment_installed ;
478.    rdfs:label "Material for the interior"@en ;
479.    .
480.    bmicdcb:MotivationAspectElementsAggregated
481.    rdf:type bmicm:MotivationAspectElements ;
482.    bmicm:motivationAspectElements_specializedBy_Outcome bmicdcb:Outcome_Accounting_
        costs ;
```

483. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcb:`Outcome_Acquisition
     _costs_for_the_office_containers ;
484. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcb:`Outcome_Distributio
     n_costs_of_the_office_containers ;
485. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcb:`Outcome_Furniture_M
     aterial_for_the_office_container ;
486. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcb:`Outcome_Leasing_of_
     the_office_containers ;
487. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcb:`Outcome_Maintenance
     _costs_for_the_office_containers ;
488. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcb:`Outcome_Sales_Marke
     ting_costs ;
489. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcb:`Outcome_Storage_cos
     t ;
490. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcb:`Stakeholder_Bui
     lding_planners_using_BIM ;
491. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcb:`Stakeholder_Gen
     eral_planer_companies_using_BIM ;
492. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcb:`Stakeholder_Off
     ice_furniture_distributor ;
493. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcb:`Stakeholder_Pro
     ducer_of_office_containers_for_the_construction_site ;
494. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcb:`Stakeholder_Sto
     rage_renter ;
495. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcb:`Stakeholder_Tot
     al_contractor_companies_using_BIM ;
496. `bmicm:`motivationAspectElements_specializedBy_Value `bmicdcb:`Value_Only_all-in-
     one_solution_provider_for_ICE-sessions_at_the_construction_site ;
497. `bmicm:`motivationAspectElements_specializedBy_Value `bmicdcb:`Value_PlugPlay-
     solution_of_office_containers_for_ICE-sessions_at_the_construction_site ;
498. `bmicm:`motivationAspectElements_specializedBy_Value `bmicdcb:`Value_Set-
     up_office_container_for_ICE-sessions ;
499. `bmicm:`motivationAspectElements_specializedBy_Value `bmicdcb:`Value_Transparent_mon
     thly_renting_payments ;
500. `rdfs:`label `"MotivationAspectElementsAggregated"` ;
501. .
502. `bmicdcb:`New_customer_segment_created
503. `rdf:`type `bic:`InvolvedPartyBenefits ;
504. `rdfs:`label `"New customer segment created"`@en ;
505. .
506. `bmicdcb:`New_revenue_stream_created
507. `rdf:`type `bic:`InvolvedPartyBenefits ;
508. `rdfs:`label `"New revenue stream created"`@en ;
509. .
510. `bmicdcb:`NonHumanInteractionElementsAggregated
511. `rdf:`type `bmicm:`NonHumanInteractionElements ;
512. `rdfs:`label `"NonHumanInteractionElementsAggregated"` ;
513. .
514. `bmicdcb:`Not_having_enough_containers_for_customer_demands
515. `rdf:`type `bic:`RisksOfInnovation ;
516. `rdfs:`label `"Not having enough containers for customer demands"`@en ;
517. .
518. `bmicdcb:`OfferingElementsAggregated
519. `rdf:`type `bmicm:`OfferingElements ;
520. `bmicm:`offeringElements_specializedBy_Service `bmicdcb:`BIM-room_leasing ;
521. `rdfs:`label `"OfferingElementsAggregated"` ;
522. .
523. `bmicdcb:`OfferingValueElementsAggregated
524. `rdf:`type `bmicm:`OfferingValueElements ;
525. `bmicm:`offeringValueElements_specializedBy_QualitativeValueElements `bmicdcb:`Quali
     tativeValueElementsAggregated ;
526. `bmicm:`offeringValueElements_specializedBy_QuantitativeValueElements `bmicdcb:`Quan
     titativeValueElementsAggregated ;
527. `rdfs:`label `"OfferingValueElementsAggregated"` ;
528. .

529. `bmicdcb:Office_container_set-up_team`
530. `rdf:type bm:Human ;`
531. `bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;`
532. `bm:keyRessources_enables_KeyActivities bmicdcb:Setting-up_the_office_containers ;`
533. `bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;`
534. `rdfs:label "Office container set-up team "@en ;`
535. `.`
536. `bmicdcb:Office_furniture_distributor`
537. `rdf:type bm:Business ;`
538. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Furniture_Material_for_the_office_container ;`
539. `bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;`
540. `bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;`
541. `bm:keyPartners_facilitate_KeyActivities bmicdcb:Acquisition_of_the_furniture_and_material_for_the_office_containers ;`
542. `bm:keyPartners_facilitate_KeyActivities bmicdcb:Setting-up_the_office_containers ;`
543. `bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:OutsourcingInfrastructure ;`
544. `bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:ReduceCosts ;`
545. `rdfs:label "Office furniture distributor "@en ;`
546. `.`
547. `bmicdcb:Only_all-in-one_solution_provider_for_ICE-sessions_at_the_construction_site`
548. `rdf:type bm:Newness ;`
549. `bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;`
550. `rdfs:label "Only all-in-one solution provider for ICE-sessions at the construction site"@en ;`
551. `.`
552. `bmicdcb:Outcome_Accounting_costs`
553. `rdf:type archimateV3:Outcome ;`
554. `rdfs:label "Outcome Accounting costs" ;`
555. `.`
556. `bmicdcb:Outcome_Acquisition_costs_for_the_office_containers`
557. `rdf:type archimateV3:Outcome ;`
558. `rdfs:label "Outcome Acquisition costs for the office containers" ;`
559. `.`
560. `bmicdcb:Outcome_Distribution_costs_of_the_office_containers`
561. `rdf:type archimateV3:Outcome ;`
562. `rdfs:label "Outcome Distribution costs of the office containers" ;`
563. `.`
564. `bmicdcb:Outcome_Furniture_Material_for_the_office_container`
565. `rdf:type archimateV3:Outcome ;`
566. `rdfs:label "Outcome Furniture Material for the office container" ;`
567. `.`
568. `bmicdcb:Outcome_Leasing_of_the_office_containers`
569. `rdf:type archimateV3:Outcome ;`
570. `rdfs:label "Outcome Leasing of the office containers" ;`
571. `.`
572. `bmicdcb:Outcome_Maintenance_costs_for_the_office_containers`
573. `rdf:type archimateV3:Outcome ;`
574. `rdfs:label "Outcome Maintenance costs for the office containers" ;`
575. `.`
576. `bmicdcb:Outcome_Sales_Marketing_costs`
577. `rdf:type archimateV3:Outcome ;`
578. `rdfs:label "Outcome Sales Marketing costs" ;`
579. `.`
580. `bmicdcb:Outcome_Storage_cost`
581. `rdf:type archimateV3:Outcome ;`
582. `rdfs:label "Outcome Storage cost" ;`
583. `.`
584. `bmicdcb:PhysicalElementsAggregated`
585. `rdf:type bmicm:PhysicalElements ;`
586. `bmicm:physicalElements_specializedBy_Building bmicdcb:Storage_place_for_the_containers ;`

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587.    rdfs:label "PhysicalElementsAggregated" ;
588.    .
589.    bmicdcb:PlugPlay-solution_of_office_containers_for_ICE-
        sessions_at_the_construction_site
590.    rdf:type bm:Convenience ;
591.    bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;
592.    rdfs:label ""Plug&Play"-solution of office containers for ICE-
        sessions at the construction site"@en ;
593.    .
594.    bmicdcb:Plug_and_Play_infrastructure_for_ICE_sessions
595.    rdf:type bic:CustomerBenefits ;
596.    bmic:customerBenefits_extends_OfferingValues bmicdcb:PlugPlay-
        solution_of_office_containers_for_ICE-sessions_at_the_construction_site ;
597.    rdfs:label "Plug & Play infrastructure for ICE-sessions"@en ;
598.    .
599.    bmicdcb:Producer_of_office_containers_for_the_construction_site
600.    rdf:type bm:Business ;
601.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Acquisition_costs_fo
        r_the_office_containers ;
602.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Maintenance_costs_fo
        r_the_office_containers ;
603.    bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
604.    bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;
605.    bm:keyPartners_facilitate_KeyActivities bmicdcb:Setting-
        up_the_office_containers ;
606.    bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:OutsourcingInfrastructure ;
607.    bm:keyPartners_provide_KeyRessources bmicdcb:Containers_with_ICE-
        equipment_installed ;
608.    rdfs:label "Producer of office containers for the construction site"@en ;
609.    .
610.    bmicdcb:QualitativeValueElementsAggregated
611.    rdf:type bmicm:QualitativeValueElements ;
612.    bmicm:qualitativeValueElements_specializedBy_Convenience bmicdcb:PlugPlay-
        solution_of_office_containers_for_ICE-sessions_at_the_construction_site ;
613.    bmicm:qualitativeValueElements_specializedBy_Newness bmicdcb:Only_all-in-
        one_solution_provider_for_ICE-sessions_at_the_construction_site ;
614.    rdfs:label "QualitativeValueElementsAggregated" ;
615.    .
616.    bmicdcb:QuantitativeValueElementsAggregated
617.    rdf:type bmicm:QuantitativeValueElements ;
618.    bmicm:quantitativeValueElements_specializedBy_CostReduction bmicdcb:Transparent_
        monthly_renting_payments ;
619.    bmicm:quantitativeValueElements_specializedBy_GettingTheJobDone bmicdcb:Set-
        up_office_container_for_ICE-sessions ;
620.    rdfs:label "QuantitativeValueElementsAggregated" ;
621.    .
622.    bmicdcb:RequiredResourcesAggregated
623.    rdf:type bmicm:RequiredResources ;
624.    bmicm:requiredResources_specializedBy_FinancialRessources bmicdcb:Captial_for_bu
        ying_containers_and_materials ;
625.    bmicm:requiredResources_specializedBy_HumanRessources bmicdcb:Set-
        up_team_for_the_containers ;
626.    bmicm:requiredResources_specializedBy_IntellectualRessources bmicdcb:Knowledge_o
        n_what_the_best_set-up_for_the_ICE-sessions_is ;
627.    bmicm:requiredResources_specializedBy_PhysicalRessources bmicdcb:Containers ;
628.    bmicm:requiredResources_specializedBy_PhysicalRessources bmicdcb:Material_for_th
        e_interior ;
629.    bmicm:requiredResources_specializedBy_PhysicalRessources bmicdcb:Storage_place ;
630.    rdfs:label "RequiredResourcesAggregated" ;
631.    .
632.    bmicdcb:Resource_Containers_with_ICE-equipment_installed
633.    rdf:type archimateV3:Resource ;
634.    rdfs:label "Resource Containers with ICE-equipment installed" ;
635.    .
636.    bmicdcb:Resource_Knowledge_of_ICE-sessions
```

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637.    rdf:type archimateV3:Resource ;
638.    rdfs:label "Resource Knowledge of ICE-sessions" ;
639.    .
640.    bmicdcb:Resource_Office_container_set-up_team
641.    rdf:type archimateV3:Resource ;
642.    rdfs:label "Resource Office container set-up team" ;
643.    .
644.    bmicdcb:Resource_Sales_Marketing_team
645.    rdf:type archimateV3:Resource ;
646.    rdfs:label "Resource Sales Marketing team" ;
647.    .
648.    bmicdcb:Resource_Storage_place_for_the_containers
649.    rdf:type archimateV3:Resource ;
650.    rdfs:label "Resource Storage place for the containers" ;
651.    .
652.    bmicdcb:Resource_Website
653.    rdf:type archimateV3:Resource ;
654.    rdfs:label "Resource Website" ;
655.    .
656.    bmicdcb:RevenueStreamElementsAggregated
657.    rdf:type bmicm:RevenueStreamElements ;
658.    bmicm:revenueStreamElements_specializedBy_FeeBasedRevenueElements bmicdcb:FeeBas
        edRevenueElementsAggregated ;
659.    rdfs:label "RevenueStreamElementsAggregated" ;
660.    .
661.    bmicdcb:Sales_Marketing
662.    rdf:type bm:SupportProcess ;
663.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Leasing_of_the_offic
        e_containers ;
664.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Sales_Marketing_cost
        s ;
665.    bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
666.    bm:keyActivities_require_KeyRessources bmicdcb:Sales_Marketing_team ;
667.    bmbc:keyActivities_isACoreCapability "false"^^xsd:boolean ;
668.    rdfs:label "Sales & Marketing"@en ;
669.    .
670.    bmicdcb:Sales_Marketing_costs
671.    rdf:type bm:FixedCost ;
672.    bm:costStructureElements_affectedBy_Offerings bmicdcb:BIM-room_leasing ;
673.    bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
674.    rdfs:label "Sales & Marketing costs"@en ;
675.    .
676.    bmicdcb:Sales_Marketing_team
677.    rdf:type bm:Human ;
678.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Accounting_costs ;
679.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Distribution_costs_o
        f_the_office_containers ;
680.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Leasing_of_the_offic
        e_containers ;
681.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Sales_Marketing_cost
        s ;
682.    bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
683.    bm:keyRessources_enables_KeyActivities bmicdcb:Accounting ;
684.    bm:keyRessources_enables_KeyActivities bmicdcb:Sales_Marketing ;
685.    bm:keyRessources_enables_KeyActivities bmicdcb:Storing_and_distributing_the_offi
        ce_containers ;
686.    bmbc:keyResources_isACoreCapability "false"^^xsd:boolean ;
687.    rdfs:label "Sales & Marketing team "@en ;
688.    .
689.    bmicdcb:Sales_team
690.    rdf:type bm:PersonalAssistance ;
691.    bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcb:Sales_Marketing_c
        osts ;
692.    bm:customerRelationships_enabledBy_KeyRessources bmicdcb:Containers_with_ICE-
        equipment_installed ;
```

```
693.   bm:customerRelationships_enabledBy_KeyRessources bmicdcb:Knowledge_of_ICE-
       sessions ;
694.   bm:customerRelationships_enabledBy_KeyRessources bmicdcb:Sales_Marketing_team ;
695.   bm:customerRelationships_influencedBy_CostStructureModels bm:ValueDriven ;
696.   bm:customerRelationships_maintain_CustomerSegments bmicdcb:Building_planners_usi
       ng_BIM ;
697.   bm:customerRelationships_maintain_CustomerSegments bmicdcb:General_planer_compan
       ies_using_BIM ;
698.   bm:customerRelationships_maintain_CustomerSegments bmicdcb:Total_contractor_comp
       anies_using_BIM ;
699.   bm:customerRelationships_promote_Offerings bmicdcb:BIM-room_leasing ;
700.   rdfs:label "Sales team"@en ;
701.   .
702.   bmicdcb:Sales_team_for_direct_orders
703.   rdf:type bm:SalesForce ;
704.   bm:channel_hasChannelOwnerType "Own"@en ;
705.   bm:channel_hasChannelPhaseType "After Sales"@en ;
706.   bm:channel_hasChannelPhaseType "Evaluation"@en ;
707.   bm:channel_hasChannelPhaseType "Purchase"@en ;
708.   bm:channels_deliverTo_CustomerSegments bmicdcb:Building_planners_using_BIM ;
709.   bm:channels_deliverTo_CustomerSegments bmicdcb:General_planer_companies_using_BI
       M ;
710.   bm:channels_deliverTo_CustomerSegments bmicdcb:Total_contractor_companies_using_
       BIM ;
711.   bm:channels_deliver_Offerings bmicdcb:BIM-room_leasing ;
712.   bm:channels_fits_CustomerRelationships bmicdcb:Sales_team ;
713.   bm:channels_generate_RevenueStreams bmicdcb:Leasing_of_the_office_containers ;
714.   bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcb:Leasing_of_the_of
       fice_containers ;
715.   bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcb:Sales_Marketing_c
       osts ;
716.   rdfs:label "Sales team for direct orders"@en ;
717.   .
718.   bmicdcb:Set-up_office_container_for_ICE-sessions
719.   rdf:type bm:GettingTheJobDone ;
720.   bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;
721.   rdfs:label "Set-up office container for ICE-sessions"@en ;
722.   .
723.   bmicdcb:Set-up_team_for_the_containers
724.   rdf:type bic:HumanRessources ;
725.   bmic:requiredResources_aggregates_KeyResources bmicdcb:Office_container_set-
       up_team ;
726.   rdfs:label "Set-up team for the containers"@en ;
727.   .
728.   bmicdcb:Setting-up_the_office_containers
729.   rdf:type bm:CoreProcess ;
730.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Acquisition_costs_fo
       r_the_office_containers ;
731.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Furniture_Material_f
       or_the_office_container ;
732.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Maintenance_costs_fo
       r_the_office_containers ;
733.   bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
734.   bm:keyActivities_require_KeyRessources bmicdcb:Containers_with_ICE-
       equipment_installed ;
735.   bm:keyActivities_require_KeyRessources bmicdcb:Knowledge_of_ICE-sessions ;
736.   bm:keyActivities_require_KeyRessources bmicdcb:Office_container_set-up_team ;
737.   bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
738.   rdfs:label "Setting-up the office containers "@en ;
739.   .
740.   bmicdcb:Stakeholder_Building_planners_using_BIM
741.   rdf:type archimateV3:Stakeholder ;
742.   rdfs:label "Stakeholder Building planners using BIM" ;
743.   .
744.   bmicdcb:Stakeholder_General_planer_companies_using_BIM
```

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745.    rdf:type archimateV3:Stakeholder ;
746.    rdfs:label "Stakeholder General planer companies using BIM" ;
747.    .
748.    bmicdcb:Stakeholder_Office_furniture_distributor
749.    rdf:type archimateV3:Stakeholder ;
750.    rdfs:label "Stakeholder Office furniture distributor" ;
751.    .
752.    bmicdcb:Stakeholder_Producer_of_office_containers_for_the_construction_site
753.    rdf:type archimateV3:Stakeholder ;
754.    rdfs:label "Stakeholder Producer of office containers for the construction site"
         ;
755.    .
756.    bmicdcb:Stakeholder_Storage_renter
757.    rdf:type archimateV3:Stakeholder ;
758.    rdfs:label "Stakeholder Storage renter" ;
759.    .
760.    bmicdcb:Stakeholder_Total_contractor_companies_using_BIM
761.    rdf:type archimateV3:Stakeholder ;
762.    rdfs:label "Stakeholder Total contractor companies using BIM" ;
763.    .
764.    bmicdcb:Storage_cost
765.    rdf:type bm:VariableCost ;
766.    bm:costStructureElements_affectedBy_Offerings bmicdcb:BIM-room_leasing ;
767.    bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
768.    rdfs:label "Storage cost"@en ;
769.    .
770.    bmicdcb:Storage_place
771.    rdf:type bic:PhysicalRessources ;
772.    bmic:requiredResources_aggregates_KeyResources bmicdcb:Storage_place_for_the_con
        tainers ;
773.    rdfs:label "Storage place"@en ;
774.    .
775.    bmicdcb:Storage_place_for_the_containers
776.    rdf:type bm:Building ;
777.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Storage_cost ;
778.    bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
779.    bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;
780.    bm:keyRessources_enables_KeyActivities bmicdcb:Setting-
        up_the_office_containers ;
781.    bm:keyRessources_enables_KeyActivities bmicdcb:Storing_and_distributing_the_offi
        ce_containers ;
782.    bmbc:keyResources_isACoreCapability "false"^^xsd:boolean ;
783.    rdfs:label "Storage place for the containers"@en ;
784.    .
785.    bmicdcb:Storage_renter
786.    rdf:type bm:Business ;
787.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Distribution_costs_o
        f_the_office_containers ;
788.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Storage_cost ;
789.    bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
790.    bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;
791.    bm:keyPartners_facilitate_KeyActivities bmicdcb:Storing_and_distributing_the_off
        ice_containers ;
792.    bm:keyPartners_influencedBy_CostStructureModels bm:CostDriven ;
793.    bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:OutsourcingInfrastructure ;
794.    bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:ReductionOfRiskAndUncertainty
        ;
795.    bm:keyPartners_provide_KeyRessources bmicdcb:Storage_place_for_the_containers ;
796.    rdfs:label "Storage renter"@en ;
797.    .
798.    bmicdcb:Storage_supplier
799.    rdf:type bic:InvolvedParties ;
800.    bic:involvedParties_belongsTo_Industry bic:TransportationAndLogistics ;
801.    bic:involvedParties_hasInnovationDrivers_Drivers bmicdcb:Generating_more_revenue
         ;
```

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802.  bic:involvedParties_isCaseCompany "false"^^xsd:boolean ;
803.  bic:involvedParties_isPartnerCompany "true"^^xsd:boolean ;
804.  bic:involvedParties_partOf_Cases bmicdcb:BMICase_B ;
805.  bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcb:Storage_pla
      ce ;
806.  bmic:involvedParties_aggregates_KeyPartners bmicdcb:Storage_renter ;
807.  rdfs:label "Storage supplier"@en ;
808.  .
809.  bmicdcb:Storing_and_distributing_the_office_containers
810.  rdf:type bm:CoreProcess ;
811.  bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Distribution_costs_o
      f_the_office_containers ;
812.  bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Leasing_of_the_offic
      e_containers ;
813.  bm:infrastructureParts_affects_FinancialAspectParts bmicdcb:Storage_cost ;
814.  bm:infrastructureParts_enables_Offerings bmicdcb:BIM-room_leasing ;
815.  bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;
816.  bm:keyActivities_require_KeyRessources bmicdcb:Containers_with_ICE-
      equipment_installed ;
817.  bm:keyActivities_require_KeyRessources bmicdcb:Storage_place_for_the_containers
      ;
818.  bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
819.  bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:Realization ;
820.  rdfs:label "Storing and distributing the office containers "@en ;
821.  .
822.  bmicdcb:StrategyLayerElementsAggregated
823.  rdf:type bmicm:StrategyLayerElements ;
824.  bmicm:strategyLayerElements_specializedBy_Capability bmicdcb:Capability_Sales_te
      am_for_direct_orders ;
825.  bmicm:strategyLayerElements_specializedBy_Capability bmicdcb:Capability_Website_
      to_order_the_office_containers ;
826.  bmicm:strategyLayerElements_specializedBy_Resource bmicdcb:Resource_Containers_w
      ith_ICE-equipment_installed ;
827.  bmicm:strategyLayerElements_specializedBy_Resource bmicdcb:Resource_Knowledge_of
      _ICE-sessions ;
828.  bmicm:strategyLayerElements_specializedBy_Resource bmicdcb:Resource_Office_conta
      iner_set-up_team ;
829.  bmicm:strategyLayerElements_specializedBy_Resource bmicdcb:Resource_Sales_Market
      ing_team ;
830.  bmicm:strategyLayerElements_specializedBy_Resource bmicdcb:Resource_Storage_plac
      e_for_the_containers ;
831.  bmicm:strategyLayerElements_specializedBy_Resource bmicdcb:Resource_Website ;
832.  bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcb:ValueStream_Accoun
      ting ;
833.  bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcb:ValueStream_Acquis
      ition_of_the_furniture_and_material_for_the_office_containers ;
834.  bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcb:ValueStream_Sales_
      Marketing ;
835.  bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcb:ValueStream_Settin
      g-up_the_office_containers ;
836.  bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcb:ValueStream_Storin
      g_and_distributing_the_office_containers ;
837.  rdfs:label "StrategyLayerElementsAggregated" ;
838.  .
839.  bmicdcb:TechnologyLayerElementsAggregated
840.  rdf:type bmicm:TechnologyLayerElements ;
841.  rdfs:label "TechnologyLayerElementsAggregated" ;
842.  .
843.  bmicdcb:Total_contractor_companies_using_BIM
844.  rdf:type bm:NicheMarket ;
845.  bm:customerSegment_isAMultiSidedPlatform "false"^^xsd:boolean ;
846.  bm:customerSegment_isDiversified "false"^^xsd:boolean ;
847.  bm:customerSegments_receive_Offerings bmicdcb:BIM-room_leasing ;
848.  bmic:customerSegments_benefitFrom_CustomerBenefits bmicdcb:Plug_and_Play_infrast
      ructure_for_ICE_sessions ;
```

849. bmicis:customerSegments_isOfType_ConstructionStakeholderTypes ci:Contractor ;
850. rdfs:label "Total contractor companies using BIM "@en ;
851. .
852. bmicdcb:Transparent_monthly_renting_payments
853. rdf:type bm:CostReduction ;
854. bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;
855. rdfs:label "Transparent monthly renting payments"@en ;
856. .
857. bmicdcb:ValuePropositionElementsAggregated
858. rdf:type bmicm:ValuePropositionElements ;
859. bmicm:valuePropositionElements_specializedBy_OfferingElements bmicdcb:OfferingEl
      ementsAggregated ;
860. bmicm:valuePropositionElements_specializedBy_OfferingValueElements bmicdcb:Offer
      ingValueElementsAggregated ;
861. rdfs:label "ValuePropositionElementsAggregated" ;
862. .
863. bmicdcb:ValueStream_Accounting
864. rdf:type archimateV3:ValueStream ;
865. rdfs:label "ValueStream Accounting" ;
866. .
867. bmicdcb:ValueStream_Acquisition_of_the_furniture_and_material_for_the_office_con
      tainers
868. rdf:type archimateV3:ValueStream ;
869. rdfs:label "ValueStream Acquisition of the furniture and material for the office
       containers" ;
870. .
871. bmicdcb:ValueStream_Sales_Marketing
872. rdf:type archimateV3:ValueStream ;
873. rdfs:label "ValueStream Sales Marketing" ;
874. .
875. bmicdcb:ValueStream_Setting-up_the_office_containers
876. rdf:type archimateV3:ValueStream ;
877. rdfs:label "ValueStream Setting-up the office containers" ;
878. .
879. bmicdcb:ValueStream_Storing_and_distributing_the_office_containers
880. rdf:type archimateV3:ValueStream ;
881. rdfs:label "ValueStream Storing and distributing the office containers" ;
882. .
883. bmicdcb:Value_Only_all-in-one_solution_provider_for_ICE-
      sessions_at_the_construction_site
884. rdf:type archimateV3:Value ;
885. rdfs:label "Value Only all-in-one solution provider for ICE-
      sessions at the construction site" ;
886. .
887. bmicdcb:Value_PlugPlay-solution_of_office_containers_for_ICE-
      sessions_at_the_construction_site
888. rdf:type archimateV3:Value ;
889. rdfs:label "Value PlugPlay-solution of office containers for ICE-
      sessions at the construction site" ;
890. .
891. bmicdcb:Value_Set-up_office_container_for_ICE-sessions
892. rdf:type archimateV3:Value ;
893. rdfs:label "Value Set-up office container for ICE-sessions" ;
894. .
895. bmicdcb:Value_Transparent_monthly_renting_payments
896. rdf:type archimateV3:Value ;
897. rdfs:label "Value Transparent monthly renting payments" ;
898. .
899. bmicdcb:Website_to_order_the_office_containers
900. rdf:type bm:WebSale ;
901. bm:channel_hasChannelOwnerType "Own"@en ;
902. bm:channel_hasChannelPhaseType "Awareness"@en ;
903. bm:channel_hasChannelPhaseType "Evaluation"@en ;
904. bm:channel_hasChannelPhaseType "Purchase"@en ;
905. bm:channels_deliverTo_CustomerSegments bmicdcb:Building_planners_using_BIM ;

```
906.  bm:channels_deliverTo_CustomerSegments bmicdcb:General_planer_companies_using_BI
      M ;
907.  bm:channels_deliverTo_CustomerSegments bmicdcb:Total_contractor_companies_using_
      BIM ;
908.  bm:channels_deliver_Offerings bmicdcb:BIM-room_leasing ;
909.  bm:channels_generate_RevenueStreams bmicdcb:Leasing_of_the_office_containers ;
910.  bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcb:Leasing_of_the_of
      fice_containers ;
911.  bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcb:Sales_Marketing_c
      osts ;
912.  rdfs:label "Website to order the office containers"@en ;
913.  .
914.  <http://ikm-group.ch/bmiciscsm#BMIPossibilitiesView>
915.  cbr:caseViewDefinesCharacterisationOfCases bmicdcb:BMICase_B ;
916.  .
917.  <http://ikm-group.ch/bmiciscsm#BMITransformationView>
918.  cbr:caseViewDefinesCharacterisationOfCases bmicdcb:BMICase_B ;
919.  .
920.  <http://ikm-group.ch/bmiciscsm#EAInnovationView>
921.  cbr:caseViewDefinesCharacterisationOfCases bmicdcb:BMICase_B ;
922.  .
```

The Business Model Innovation Case: Insurance through banks

This appendix section shows the code to represent the business model innovation case *Insurance through banks* stored within the file BMICaseDataCaseC.ttl.

```
1.   # baseURI: http://ikm-group.ch/bmicdcc
2.   # imports: http://ikm-group.ch/bmiciscsm
3.   # prefix: bmicdcc
4.
5.   @prefix archimateV3: <http://ikm-group.ch/archimateV3#> .
6.   @prefix bc: <http://ikm-group.ch/bc#> .
7.   @prefix bic: <http://ikm-group.ch/bic#> .
8.   @prefix bm: <http://ikm-group.ch/bm#> .
9.   @prefix bmbc: <http://ikm-group.ch/bmbc#> .
10.  @prefix bmic: <http://ikm-group.ch/bmic#> .
11.  @prefix bmicdcc: <http://ikm-group.ch/bmicdcc#> .
12.  @prefix bmicm: <http://ikm-group.ch/bmicm#> .
13.  @prefix cbr: <http://ikm-group.ch/cbr#> .
14.  @prefix ci: <http://ikm-group.ch/ci#> .
15.  @prefix eo: <http://ikm-group.ch/archiMEO/eo#> .
16.  @prefix owl: <http://www.w3.org/2002/07/owl#> .
17.  @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
18.  @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
19.  @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
20.
21.  <http://ikm-group.ch/bmicdcc>
22.  rdf:type owl:Ontology ;
23.  owl:imports <http://ikm-group.ch/bmiciscsm> ;
24.  owl:versionInfo "Created with TopBraid Composer"@en ;
25.  .
26.  bmicdcc:ApplicationLayerElementsAggregated
27.  rdf:type bmicm:ApplicationLayerElements ;
28.  rdfs:label "ApplicationLayerElementsAggregated" ;
29.  .
30.  bmicdcc:Automated_suggestion_of_insurance_price_on_online_mortgages
31.  rdf:type bm:AutomatedService ;
32.  bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcc:IT_development ;
```

33. `bm:customerInterfaceParts_affects_FinancialAspectParts` `bmicdcc:IT_maintenance` ;
34. `bm:customerInterfaceParts_affects_FinancialAspectParts` `bmicdcc:Insurance_police_on_the_customer_house` ;
35. `bm:customerInterfaceParts_affects_FinancialAspectParts` `bmicdcc:Sales_and_Marketing` ;
36. `bm:customerRelationships_enabledBy_KeyRessources` `bmicdcc:Information_on_customers` ;
37. `bm:customerRelationships_enabledBy_KeyRessources` `bmicdcc:Insurance_workflow-system` ;
38. `bm:customerRelationships_influencedBy_CostStructureModels` `bm:CostDriven` ;
39. `bm:customerRelationships_maintain_CustomerSegments` `bmicdcc:People_needing_a_mortgage_from_the_bank` ;
40. `bm:customerRelationships_promote_Offerings` `bmicdcc:Insurance_through_banks` ;
41. `rdfs:label` "Automated suggestion of insurance price on online mortgages "@en ;
42. .
43. `bmicdcc:BMICase_C`
44. `rdf:type` `bmic:BusinessModelInnovationCases` ;
45. `bic:cases_caseName` "Insurance through banks"@en ;
46. `bic:cases_consistsOf_BarriersToOvercome` `bmicdcc:The_bank_has_to_share_customer_data_with_the_insurance_company` ;
47. `bic:cases_consistsOf_BarriersToOvercome` `bmicdcc:The_bank_has_to_trust_the_partnership_with_the_insurance_company` ;
48. `bic:cases_consistsOf_BarriersToOvercome` `bmicdcc:The_insurance_company_has_to_integrate_their_insurance_workflow_into_the_bank_software` ;
49. `bic:cases_consistsOf_BenefitsOfInnovation` `bmicdcc:Customer_does_not_have_to_make_another_appointment_for_insurance_consultancy` ;
50. `bic:cases_consistsOf_BenefitsOfInnovation` `bmicdcc:Introduce_insurance_options_early_on` ;
51. `bic:cases_consistsOf_BenefitsOfInnovation` `bmicdcc:Wider_range_of_services` ;
52. `bic:cases_consistsOf_BusinessStateCharacteristics` `bmicdcc:Business_Model_after_innovating` ;
53. `bic:cases_consistsOf_CaseCharacteristics` `bmicdcc:Helvetia` ;
54. `bic:cases_consistsOf_CaseCharacteristics` `bmicdcc:Large_swiss-based_bank` ;
55. `bic:cases_consistsOf_Drivers` `bmicdcc:Increase_satisfaction_rate_of_customers` ;
56. `bic:cases_consistsOf_Drivers` `bmicdcc:Sell_more_insurance_policies` ;
57. `bic:cases_consistsOf_RequiredRessources` `bmicdcc:Bank_employees` ;
58. `bic:cases_consistsOf_RequiredRessources` `bmicdcc:Enough_capital_for_IT_development` ;
59. `bic:cases_consistsOf_RequiredRessources` `bmicdcc:Enough_capital_for_instructing_bank_employees` ;
60. `bic:cases_consistsOf_RequiredRessources` `bmicdcc:IT_integration_from_insurance_company_to_bank` ;
61. `bic:cases_consistsOf_RequiredRessources` `bmicdcc:Knowledge_of_the_insurance_process` ;
62. `bic:cases_consistsOf_RisksOfInnovation` `bmicdcc:Customers_do_not_trust_the_bank_employee_for_insuarance_information` ;
63. `bic:cases_consistsOf_RisksOfInnovation` `bmicdcc:Teaching_of_bank_employees_takes_time_and_costs_money` ;
64. `bic:cases_consistsOf_StrategicGoals` `bmicdcc:Get_customers_early_on_for_house_insurances` ;
65. `bic:cases_consistsOf_StrategicGoals` `bmicdcc:Provide_more_services_to_customers` ;
66. `bic:cases_isSuccessfulInnovation` "true"^^`xsd:boolean` ;
67. `bic:cases_transformationDurationIs` 540 ;
68. `bmic:businessModelInnovationCases_composedOf_InvolvedParties` `bmicdcc:Helvetia` ;
69. `bmic:businessModelInnovationCases_composedOf_InvolvedParties` `bmicdcc:Large_swiss-based_bank` ;
70. `bmicm:businessModelInnovationCases_aggregates_ApplicationLayerElements` `bmicdcc:ApplicationLayerElementsAggregated` ;
71. `bmicm:businessModelInnovationCases_aggregates_BusinessLayerElements` `bmicdcc:BusinessLayerElementsAggregated` ;
72. `bmicm:businessModelInnovationCases_aggregates_MotivationAspectElements` `bmicdcc:MotivationAspectElementsAggregated` ;
73. `bmicm:businessModelInnovationCases_aggregates_StrategyLayerElements` `bmicdcc:StrategyLayerElementsAggregated` ;

74. `bmicm:businessModelInnovationCases_aggregates_TechnologyLayerElements` `bmicdcc:`TechnologyLayerElementsAggregated ;
75. `bmicm:businessModelInnovationCases_composedOf_BarriersToOvercome` `bmicdcc:`BarriersToOvercomeAggregated ;
76. `bmicm:businessModelInnovationCases_composedOf_BenefitsOfInnovation` `bmicdcc:`BenefitsOfInnovationAggregated ;
77. `bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements` `bmicdcc`:BusinessCapabilityElementsAggregated ;
78. `bmicm:businessModelInnovationCases_composedOf_BusinessStateCharacteristics` `bmicdcc:`BusinessStateCharacteristicsAggregated ;
79. `bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics` `bmicdcc:`ConstructionIndustrySpecificsAggregated ;
80. `bmicm:businessModelInnovationCases_composedOf_CustomerInterfaceElements` `bmicdcc:`CustomerInterfaceElementsAggregated ;
81. `bmicm:businessModelInnovationCases_composedOf_Drivers` `bmicdcc:`Increase_satisfaction_rate_of_customers ;
82. `bmicm:businessModelInnovationCases_composedOf_Drivers` `bmicdcc:`Sell_more_insurance_policies ;
83. `bmicm:businessModelInnovationCases_composedOf_FinancialAspectElements` `bmicdcc:`FinancialAspectElementsAggregated ;
84. `bmicm:businessModelInnovationCases_composedOf_Industries` `bic:`Finance ;
85. `bmicm:businessModelInnovationCases_composedOf_Industries` `bic:`Insurance ;
86. `bmicm:businessModelInnovationCases_composedOf_InfrastructureElements` `bmicdcc:`InfrastructureElementsAggregated ;
87. `bmicm:businessModelInnovationCases_composedOf_InvolvedParties` `bmicdcc:`Helvetia ;
88. `bmicm:businessModelInnovationCases_composedOf_InvolvedParties` `bmicdcc:`Large_swiss-based_bank ;
89. `bmicm:businessModelInnovationCases_composedOf_RequiredResources` `bmicdcc:`RequiredResourcesAggregated ;
90. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation` `bmicdcc:`Customers_do_not_trust_the_bank_employee_for_insuarance_information ;
91. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation` `bmicdcc:`Teaching_of_bank_employees_takes_time_and_costs_money ;
92. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals` `bmicdcc:`Get_customers_early_on_for_house_insurances ;
93. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals` `bmicdcc:`Provide_more_services_to_customers ;
94. `bmicm:businessModelInnovationCases_composedOf_ValuePropositionElements` `bmicdcc:`ValuePropositionElementsAggregated ;
95. `rdfs:`label "BMI Case: Insurance through banks"@en ;
96. .
97. `bmicdcc:`Bank_employee
98. `rdf:`type `bm:`PersonalAssistance ;
99. `bm:`customerInterfaceParts_affects_FinancialAspectParts `bmicdcc:`Bank_employee_training ;
100. `bm:`customerInterfaceParts_affects_FinancialAspectParts `bmicdcc:`Sales_and_Marketing ;
101. `bm:`customerRelationships_enabledBy_KeyRessources `bmicdcc:`Information_on_customers ;
102. `bm:`customerRelationships_enabledBy_KeyRessources `bmicdcc:`Insurance_workflow-system ;
103. `bm:`customerRelationships_enabledBy_KeyRessources `bmicdcc:`Integration_into_the_bank_platform ;
104. `bm:`customerRelationships_influencedBy_CostStructureModels `bm:`ValueDriven ;
105. `bm:`customerRelationships_maintain_CustomerSegments `bmicdcc:`People_needing_a_mortgage_from_the_bank ;
106. `bm:`customerRelationships_promote_Offerings `bmicdcc:`Insurance_through_banks ;
107. `rdfs:`label "Bank employee "@en ;
108. .
109. `bmicdcc:`Bank_employee_training
110. `rdf:`type `bm:`FixedCost ;
111. `bm:`costStructureElements_affectedBy_Offerings `bmicdcc:`Insurance_through_banks ;
112. `bm:`costStructureElements_justifiedBy_CostStructureModels `bm:`ValueDriven ;
113. `rdfs:`label "Bank employee training "@en ;
114. .

```
115.  bmicdcc:Bank_employees
116.  rdf:type bic:HumanRessources ;
117.  rdfs:label "Bank employees"@en ;
118.  .
119.  bmicdcc:BarriersToOvercomeAggregated
120.  rdf:type bmicm:BarriersToOvercome ;
121.  bmicm:barriersToOvercome_specializedBy_IntellectualBarriers bmicdcc:The_bank_has
      _to_share_customer_data_with_the_insurance_company ;
122.  bmicm:barriersToOvercome_specializedBy_OrganisationalBarriers bmicdcc:The_bank_h
      as_to_trust_the_partnership_with_the_insurance_company ;
123.  bmicm:barriersToOvercome_specializedBy_TechnologicalBarriers bmicdcc:The_insuran
      ce_company_has_to_integrate_their_insurance_workflow_into_the_bank_software ;
124.  rdfs:label "BarriersToOvercomeAggregated" ;
125.  .
126.  bmicdcc:BenefitsOfInnovationAggregated
127.  rdf:type bmicm:BenefitsOfInnovation ;
128.  bmicm:benefitsOfInnovation_specializedBy_CustomerBenefits bmicdcc:Customer_does_
      not_have_to_make_another_appointment_for_insurance_consultancy ;
129.  bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits bmicdcc:Introduce
      _insurance_options_early_on ;
130.  bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits bmicdcc:Wider_ran
      ge_of_services ;
131.  rdfs:label "BenefitsOfInnovationAggregated" ;
132.  .
133.  bmicdcc:BusinessCapabilityElementsAggregated
134.  rdf:type bmicm:BusinessCapabilityElements ;
135.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcc:Capabili
      ty_Check_if_insurance_case_is_eligible_for_reimbursement ;
136.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcc:Capabili
      ty_Check_insurance_eligibility_of_the_customer ;
137.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcc:Capabili
      ty_Information_on_customers ;
138.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcc:Capabili
      ty_Insurance_workflow-system ;
139.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcc:Capabili
      ty_Integration_into_the_bank_platform ;
140.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcc:Capabili
      ty_Provide_insurance ;
141.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcc:Capabili
      ty_Reimbursement_of_an_insurance_case ;
142.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcc:Capabili
      ty_Teach_bank_employee_regarding_insurances ;
143.  bmicm:businessCapabilityElements_specializedBy_HumanBasedCapabilityElements bmic
      dcc:HumanBasedCapabilityElementsAggregated ;
144.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcc
      :Capability_Check_if_insurance_case_is_eligible_for_reimbursement ;
145.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcc
      :Capability_Check_insurance_eligibility_of_the_customer ;
146.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcc
      :Capability_Information_on_customers ;
147.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcc
      :Capability_Insurance_workflow-system ;
148.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcc
      :Capability_Integration_into_the_bank_platform ;
149.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcc
      :Capability_Provide_insurance ;
150.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcc
      :Capability_Reimbursement_of_an_insurance_case ;
151.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcc
      :Capability_Teach_bank_employee_regarding_insurances ;
152.  rdfs:label "BusinessCapabilityElementsAggregated" ;
153.  .
154.  bmicdcc:BusinessLayerElementsAggregated
155.  rdf:type bmicm:BusinessLayerElements ;
```

156. `bmicm:businessLayerElements_specializedBy_Product` `bmicdcc:IntangibleProduct_Insu`rance_through_banks ;
157. `rdfs:label` "BusinessLayerElementsAggregated" ;
158. .
159. `bmicdcc:BusinessStateCharacteristicsAggregated`
160. `rdf:type` `bmicm:BusinessStateCharacteristics` ;
161. `bmicm:businessStateCharacteristics_specializedBy_StateAfterInnovating` `bmicdcc:Bu`siness_Model_after_innovating ;
162. `rdfs:label` "BusinessStateCharacteristicsAggregated" ;
163. .
164. `bmicdcc:Business_Model_after_innovating`
165. `rdf:type` `bic:StateAfterInnovating` ;
166. `bic:businessStateCharacteristics_classifiesAs_ViewsOnBusiness` `bmic:BusinessModel` ;
167. `bmic:businessStateCharacteristics_aggregates_Channels` `bmicdcc:Swiss_bank` ;
168. `bmic:businessStateCharacteristics_aggregates_CostStructureElements` `bmicdcc:Bank_`employee_training ;
169. `bmic:businessStateCharacteristics_aggregates_CostStructureElements` `bmicdcc:IT_de`velopment ;
170. `bmic:businessStateCharacteristics_aggregates_CostStructureElements` `bmicdcc:IT_ma`intenance ;
171. `bmic:businessStateCharacteristics_aggregates_CostStructureElements` `bmicdcc:Sales`_and_Marketing ;
172. `bmic:businessStateCharacteristics_aggregates_CustomerRelationships` `bmicdcc:Autom`ated_suggestion_of_insurance_price_on_online_mortgages ;
173. `bmic:businessStateCharacteristics_aggregates_CustomerRelationships` `bmicdcc:Bank_`employee ;
174. `bmic:businessStateCharacteristics_aggregates_CustomerRelationships` `bmicdcc:Insur`ance_customer_contact ;
175. `bmic:businessStateCharacteristics_aggregates_CustomerSegments` `bmicdcc:People_nee`ding_a_mortgage_from_the_bank ;
176. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcc:Check_if_insu`rance_case_is_eligible_for_reimbursement ;
177. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcc:Check_insuran`ce_eligibility_of_the_customer ;
178. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcc:Constantly_ch`eck_for_changes_in_customer_base_on_the_bank_platform ;
179. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcc:Provide_insur`ance ;
180. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcc:Reimbursement`_of_an_insurance_case ;
181. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcc:Teach_bank_em`ployee_regarding_insurances ;
182. `bmic:businessStateCharacteristics_aggregates_KeyPartners` `bmicdcc:Large_Swiss_ban`k ;
183. `bmic:businessStateCharacteristics_aggregates_KeyResources` `bmicdcc:Information_on`_customers ;
184. `bmic:businessStateCharacteristics_aggregates_KeyResources` `bmicdcc:Insurance_work`flow-system ;
185. `bmic:businessStateCharacteristics_aggregates_KeyResources` `bmicdcc:Integration_in`to_the_bank_platform ;
186. `bmic:businessStateCharacteristics_aggregates_OfferingValues` `bmicdcc:Fast_offer_o`n_the_insurance_price_for_the_house ;
187. `bmic:businessStateCharacteristics_aggregates_OfferingValues` `bmicdcc:One-Stop-`Shop ;
188. `bmic:businessStateCharacteristics_aggregates_Offerings` `bmicdcc:Insurance_through`_banks ;
189. `bmic:businessStateCharacteristics_aggregates_RevenueStreams` `bmicdcc:Insurance_po`lice_on_the_customer_house ;
190. `rdfs:label` "Business Model after innovating"@en ;
191. .
192. `bmicdcc:Capability_Automated_suggestion_of_insurance_price_on_online_mortgages`
193. `rdf:type` `archimateV3:Capability` ;
194. `rdfs:label` "Capability Automated suggestion of insurance price on online mortgages" ;

```
195.    .
196.    bmicdcc:Capability_Bank_employee
197.    rdf:type archimateV3:Capability ;
198.    rdfs:label "Capability Bank employee" ;
199.    .
200.    bmicdcc:Capability_Check_if_insurance_case_is_eligible_for_reimbursement
201.    rdf:type bc:CoreCapabilities ;
202.    bmbc:coreCapabilities_composedOf_KeyActivities bmicdcc:Check_if_insurance_case_i
        s_eligible_for_reimbursement ;
203.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Information_on_customers ;
204.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Insurance_workflow-
        system ;
205.    rdfs:label "Capability Check if insurance case is eligible for reimbursement"@en
         ;
206.    .
207.    bmicdcc:Capability_Check_insurance_eligibility_of_the_customer
208.    rdf:type bc:CoreCapabilities ;
209.    bmbc:coreCapabilities_composedOf_KeyActivities bmicdcc:Check_insurance_eligibili
        ty_of_the_customer ;
210.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Information_on_customers ;
211.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Insurance_workflow-
        system ;
212.    rdfs:label "Capability Check insurance eligibility of the customer"@en ;
213.    .
214.    bmicdcc:Capability_Information_on_customers
215.    rdf:type bc:CoreCapabilities ;
216.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Information_on_customers ;
217.    rdfs:label "Capability Information on customers"@en ;
218.    .
219.    bmicdcc:Capability_Insurance_customer_contact
220.    rdf:type archimateV3:Capability ;
221.    rdfs:label "Capability Insurance customer contact" ;
222.    .
223.    bmicdcc:Capability_Insurance_workflow-system
224.    rdf:type bc:CoreCapabilities ;
225.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Insurance_workflow-
        system ;
226.    rdfs:label "Capability Insurance workflow-system"@en ;
227.    .
228.    bmicdcc:Capability_Integration_into_the_bank_platform
229.    rdf:type bc:CoreCapabilities ;
230.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Integration_into_the_bank_
        platform ;
231.    rdfs:label "Capability Integration into the bank platform"@en ;
232.    .
233.    bmicdcc:Capability_Provide_insurance
234.    rdf:type bc:CoreCapabilities ;
235.    bmbc:coreCapabilities_composedOf_KeyActivities bmicdcc:Provide_insurance ;
236.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Information_on_customers ;
237.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Insurance_workflow-
        system ;
238.    rdfs:label "Capability Provide insurance"@en ;
239.    .
240.    bmicdcc:Capability_Reimbursement_of_an_insurance_case
241.    rdf:type bc:CoreCapabilities ;
242.    bmbc:coreCapabilities_composedOf_KeyActivities bmicdcc:Reimbursement_of_an_insur
        ance_case ;
243.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Information_on_customers ;
244.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Insurance_workflow-
        system ;
245.    rdfs:label "Capability Reimbursement of an insurance case"@en ;
246.    .
247.    bmicdcc:Capability_Swiss_bank
248.    rdf:type archimateV3:Capability ;
249.    rdfs:label "Capability Swiss bank " ;
```

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250.    .
251.    bmicdcc:Capability_Teach_bank_employee_regarding_insurances
252.    rdf:type bc:CoreCapabilities ;
253.    bmbc:coreCapabilities_composedOf_KeyActivities bmicdcc:Teach_bank_employee_regar
        ding_insurances ;
254.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Insurance_workflow-
        system ;
255.    bmbc:coreCapabilities_composedOf_KeyResources bmicdcc:Integration_into_the_bank_
        platform ;
256.    rdfs:label "Capability Teach bank employee regarding insurances"@en ;
257.    .
258.    bmicdcc:ChannelElementsAggregated
259.    rdf:type bmicm:ChannelElements ;
260.    bmicm:channelElements_specializedBy_DirectChannelElements bmicdcc:DirectChannelE
        lementsAggregated ;
261.    bmicm:channelElements_specializedBy_IndirectChannelElements bmicdcc:IndirectChan
        nelElementsAggregated ;
262.    rdfs:label "ChannelElementsAggregated" ;
263.    .
264.    bmicdcc:Check_if_insurance_case_is_eligible_for_reimbursement
265.    rdf:type bm:CoreProcess ;
266.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:Insurance_police_on_
        the_customer_house ;
267.    bm:infrastructureParts_enables_Offerings bmicdcc:Insurance_through_banks ;
268.    bm:keyActivities_require_KeyRessources bmicdcc:Information_on_customers ;
269.    bm:keyActivities_require_KeyRessources bmicdcc:Insurance_workflow-system ;
270.    bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
271.    rdfs:label "Check if insurance case is eligible for reimbursement "@en ;
272.    .
273.    bmicdcc:Check_insurance_eligibility_of_the_customer
274.    rdf:type bm:CoreProcess ;
275.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:Insurance_police_on_
        the_customer_house ;
276.    bm:infrastructureParts_enables_Offerings bmicdcc:Insurance_through_banks ;
277.    bm:keyActivities_require_KeyRessources bmicdcc:Information_on_customers ;
278.    bm:keyActivities_require_KeyRessources bmicdcc:Insurance_workflow-system ;
279.    bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
280.    rdfs:label "Check insurance eligibility of the customer "@en ;
281.    .
282.    bmicdcc:Constantly_check_for_changes_in_customer_base_on_the_bank_platform
283.    rdf:type bm:SupportProcess ;
284.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:IT_development ;
285.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:IT_maintenance ;
286.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:Insurance_police_on_
        the_customer_house ;
287.    bm:infrastructureParts_enables_Offerings bmicdcc:Insurance_through_banks ;
288.    bm:keyActivities_require_KeyRessources bmicdcc:Information_on_customers ;
289.    bm:keyActivities_require_KeyRessources bmicdcc:Insurance_workflow-system ;
290.    bm:keyActivities_require_KeyRessources bmicdcc:Integration_into_the_bank_platfor
        m ;
291.    bmbc:keyActivities_isACoreCapability "false"^^xsd:boolean ;
292.    rdfs:label "Constantly check for changes in customer base on the bank's platform
        "@en ;
293.    .
294.    bmicdcc:ConstructionIndustrySpecificsAggregated
295.    rdf:type bmicm:ConstructionIndustrySpecifics ;
296.    rdfs:label "ConstructionIndustrySpecificsAggregated" ;
297.    .
298.    bmicdcc:CostStructureElementsAggregated
299.    rdf:type bmicm:CostStructureElements ;
300.    bmicm:costStructureElements_specializedBy_FixedCost bmicdcc:Bank_employee_traini
        ng ;
301.    bmicm:costStructureElements_specializedBy_FixedCost bmicdcc:IT_development ;
302.    bmicm:costStructureElements_specializedBy_FixedCost bmicdcc:Sales_and_Marketing
        ;
```

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303.    bmicm:costStructureElements_specializedBy_VariableCost bmicdcc:IT_maintenance ;
304.    rdfs:label "CostStructureElementsAggregated" ;
305.    .
306.    bmicdcc:CustomerInterfaceElementsAggregated
307.    rdf:type bmicm:CustomerInterfaceElements ;
308.    bmicm:customerInterfaceElements_specializedBy_ChannelElements bmicdcc:ChannelEle
        mentsAggregated ;
309.    bmicm:customerInterfaceElements_specializedBy_CustomerRelationshipElements bmicd
        cc:CustomerRelationshipElementsAggregated ;
310.    bmicm:customerInterfaceElements_specializedBy_CustomerSegmentElements bmicdcc:Cu
        stomerSegmentElementsAggregated ;
311.    rdfs:label "CustomerInterfaceElementsAggregated" ;
312.    .
313.    bmicdcc:CustomerRelationshipElementsAggregated
314.    rdf:type bmicm:CustomerRelationshipElements ;
315.    bmicm:customerRelationshipElements_specializedBy_HumanInteractionElements bmicdc
        c:HumanInteractionElementsAggregated ;
316.    bmicm:customerRelationshipElements_specializedBy_NonHumanInteractionElements bmi
        cdcc:NonHumanInteractionElementsAggregated ;
317.    rdfs:label "CustomerRelationshipElementsAggregated" ;
318.    .
319.    bmicdcc:CustomerSegmentElementsAggregated
320.    rdf:type bmicm:CustomerSegmentElements ;
321.    bmicm:customerSegmentElements_specializedBy_NicheMarket bmicdcc:People_needing_a
        _mortgage_from_the_bank ;
322.    rdfs:label "CustomerSegmentElementsAggregated" ;
323.    .
324.    bmicdcc:Customer_does_not_have_to_make_another_appointment_for_insurance_consult
        ancy
325.    rdf:type bic:CustomerBenefits ;
326.    bmic:customerBenefits_extends_OfferingValues bmicdcc:One-Stop-Shop ;
327.    rdfs:label "Customer does not have to make another appointment for insurance con
        sultancy"@en ;
328.    .
329.    bmicdcc:Customers_do_not_trust_the_bank_employee_for_insuarance_information
330.    rdf:type bic:RisksOfInnovation ;
331.    rdfs:label "Customers do not trust the bank employee for insuarance information"
        @en ;
332.    .
333.    bmicdcc:DirectChannelElementsAggregated
334.    rdf:type bmicm:DirectChannelElements ;
335.    rdfs:label "DirectChannelElementsAggregated" ;
336.    .
337.    bmicdcc:Enough_capital_for_IT_development
338.    rdf:type bic:FinancialRessources ;
339.    bmic:requiredResources_aggregates_KeyResources bmicdcc:Insurance_workflow-
        system ;
340.    bmic:requiredResources_aggregates_KeyResources bmicdcc:Integration_into_the_bank
        _platform ;
341.    rdfs:label "Enough capital for IT development"@en ;
342.    .
343.    bmicdcc:Enough_capital_for_instructing_bank_employees
344.    rdf:type bic:FinancialRessources ;
345.    rdfs:label "Enough capital for instructing bank employees"@en ;
346.    .
347.    bmicdcc:Fast_offer_on_the_insurance_price_for_the_house
348.    rdf:type bm:Convenience ;
349.    bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;
350.    rdfs:label "Fast offer on the insurance price for the house "@en ;
351.    .
352.    bmicdcc:FeeBasedRevenueElementsAggregated
353.    rdf:type bmicm:FeeBasedRevenueElements ;
354.    rdfs:label "FeeBasedRevenueElementsAggregated" ;
355.    .
356.    bmicdcc:FinancialAspectElementsAggregated
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357.   rdf:type bmicm:FinancialAspectElements ;
358.   bmicm:financialAspectElements_specializedBy_CostStructureElements bmicdcc:CostSt
       ructureElementsAggregated ;
359.   bmicm:financialAspectElements_specializedBy_RevenueStreamElements bmicdcc:Revenu
       eStreamElementsAggregated ;
360.   rdfs:label "FinancialAspectElementsAggregated" ;
361.   .
362.   bmicdcc:FinancialElementsAggregated
363.   rdf:type bmicm:FinancialElements ;
364.   rdfs:label "FinancialElementsAggregated" ;
365.   .
366.   bmicdcc:Get_customers_early_on_for_house_insurances
367.   rdf:type bic:StrategicGoals ;
368.   bmic:strategicGoals_represents_KeyPartnershipGoals bm:AccessToCustomers ;
369.   rdfs:label "Get customers early on for house insurances"@en ;
370.   .
371.   bmicdcc:Helvetia
372.   rdf:type bic:InvolvedParties ;
373.   bic:involvedParties_belongsTo_Industry bic:Insurance ;
374.   bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdcc:Customer_does_not_
       have_to_make_another_appointment_for_insurance_consultancy ;
375.   bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdcc:Introduce_insuranc
       e_options_early_on ;
376.   bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics
        bmicdcc:Business_Model_after_innovating ;
377.   bic:involvedParties_hasGoals_StrategicGoals bmicdcc:Get_customers_early_on_for_h
       ouse_insurances ;
378.   bic:involvedParties_hasInnovationDrivers_Drivers bmicdcc:Increase_satisfaction_r
       ate_of_customers ;
379.   bic:involvedParties_hasInnovationDrivers_Drivers bmicdcc:Sell_more_insurance_pol
       icies ;
380.   bic:involvedParties_innovationBudgetIs 1500000 ;
381.   bic:involvedParties_isCaseCompany "true"^^xsd:boolean ;
382.   bic:involvedParties_isPartnerCompany "false"^^xsd:boolean ;
383.   bic:involvedParties_mustOvercome_BarriersToOvercome bmicdcc:The_bank_has_to_shar
       e_customer_data_with_the_insurance_company ;
384.   bic:involvedParties_mustOvercome_BarriersToOvercome bmicdcc:The_bank_has_to_trus
       t_the_partnership_with_the_insurance_company ;
385.   bic:involvedParties_mustOvercome_BarriersToOvercome bmicdcc:The_insurance_compan
       y_has_to_integrate_their_insurance_workflow_into_the_bank_software ;
386.   bic:involvedParties_numberOfEmployeesIs 5000 ;
387.   bic:involvedParties_partOf_Cases bmicdcc:BMICase_C ;
388.   bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcc:Enough_capi
       tal_for_IT_development ;
389.   bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcc:IT_integrat
       ion_from_insurance_company_to_bank ;
390.   bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcc:Knowledge_o
       f_the_insurance_process ;
391.   bic:involvedParties_risksOf_RisksOfInnovation bmicdcc:Customers_do_not_trust_the
       _bank_employee_for_insuarance_information ;
392.   bic:involvedParties_risksOf_RisksOfInnovation bmicdcc:Teaching_of_bank_employees
       _takes_time_and_costs_money ;
393.   bic:involvedParties_turnoverIs 150000000 ;
394.   rdfs:label "Helvetia"@en ;
395.   .
396.   bmicdcc:HumanBasedCapabilityElementsAggregated
397.   rdf:type bmicm:HumanBasedCapabilityElements ;
398.   rdfs:label "HumanBasedCapabilityElementsAggregated" ;
399.   .
400.   bmicdcc:HumanInteractionElementsAggregated
401.   rdf:type bmicm:HumanInteractionElements ;
402.   bmicm:humanInteractionElements_specializedBy_PersonalAssistance bmicdcc:Bank_emp
       loyee ;
403.   bmicm:humanInteractionElements_specializedBy_PersonalAssistance bmicdcc:Insuranc
       e_customer_contact ;
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404.    rdfs:label "HumanInteractionElementsAggregated" ;
405.    .
406.    bmicdcc:IT_development
407.    rdf:type bm:FixedCost ;
408.    bm:costStructureElements_affectedBy_Offerings bmicdcc:Insurance_through_banks ;
409.    bm:costStructureElements_justifiedBy_CostStructureModels bm:CostDriven ;
410.    rdfs:label "IT development "@en ;
411.    .
412.    bmicdcc:IT_integration_from_insurance_company_to_bank
413.    rdf:type bic:PhysicalRessources ;
414.    bmic:requiredResources_aggregates_KeyResources bmicdcc:Integration_into_the_bank
        _platform ;
415.    rdfs:label "IT integration from insurance company to bank"@en ;
416.    .
417.    bmicdcc:IT_maintenance
418.    rdf:type bm:VariableCost ;
419.    bm:costStructureElements_affectedBy_Offerings bmicdcc:Insurance_through_banks ;
420.    bm:costStructureElements_justifiedBy_CostStructureModels bm:CostDriven ;
421.    rdfs:label "IT maintenance "@en ;
422.    .
423.    bmicdcc:Increase_satisfaction_rate_of_customers
424.    rdf:type bic:Drivers ;
425.    rdfs:label "Increase satisfaction rate of customers"@en ;
426.    .
427.    bmicdcc:IndirectChannelElementsAggregated
428.    rdf:type bmicm:IndirectChannelElements ;
429.    bmicm:indirectChannelElements_specializedBy_PartnerStore bmicdcc:Swiss_bank ;
430.    rdfs:label "IndirectChannelElementsAggregated" ;
431.    .
432.    bmicdcc:Information_on_customers
433.    rdf:type bm:CustomerData ;
434.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:Insurance_police_on_
        the_customer_house ;
435.    bm:infrastructureParts_enables_Offerings bmicdcc:Insurance_through_banks ;
436.    bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
437.    bm:keyRessources_enables_KeyActivities bmicdcc:Check_if_insurance_case_is_eligib
        le_for_reimbursement ;
438.    bm:keyRessources_enables_KeyActivities bmicdcc:Check_insurance_eligibility_of_th
        e_customer ;
439.    bm:keyRessources_enables_KeyActivities bmicdcc:Constantly_check_for_changes_in_c
        ustomer_base_on_the_bank_platform ;
440.    bm:keyRessources_enables_KeyActivities bmicdcc:Provide_insurance ;
441.    bm:keyRessources_enables_KeyActivities bmicdcc:Reimbursement_of_an_insurance_cas
        e ;
442.    bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;
443.    rdfs:label "Information on customers "@en ;
444.    .
445.    bmicdcc:InfrastructureElementsAggregated
446.    rdf:type bmicm:InfrastructureElements ;
447.    bmicm:infrastructureElements_specializedBy_KeyActivityElements bmicdcc:KeyActivi
        tyElementsAggregated ;
448.    bmicm:infrastructureElements_specializedBy_KeyPartnerElements bmicdcc:KeyPartner
        ElementsAggregated ;
449.    bmicm:infrastructureElements_specializedBy_KeyResourceElements bmicdcc:KeyResour
        ceElementsAggregated ;
450.    rdfs:label "InfrastructureElementsAggregated" ;
451.    .
452.    bmicdcc:Insurance_customer_contact
453.    rdf:type bm:PersonalAssistance ;
454.    bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcc:Sales_and_Marketi
        ng ;
455.    bm:customerRelationships_enabledBy_KeyRessources bmicdcc:Information_on_customer
        s ;
456.    bm:customerRelationships_enabledBy_KeyRessources bmicdcc:Insurance_workflow-
        system ;
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457. `bm:customerRelationships_influencedBy_CostStructureModels bm:ValueDriven ;`
458. `bm:customerRelationships_maintain_CustomerSegments bmicdcc:People_needing_a_mort gage_from_the_bank ;`
459. `bm:customerRelationships_promote_Offerings bmicdcc:Insurance_through_banks ;`
460. `rdfs:label "Insurance customer contact"@en ;`
461. `.`
462. `bmicdcc:Insurance_police_on_the_customer_house`
463. `rdf:type bm:AssetSale ;`
464. `bm:revenueStreams_dependOn_Offerings bmicdcc:Insurance_through_banks ;`
465. `bm:revenueStreams_pricedBy_PricingMechanisms bm:Negotiation ;`
466. `rdfs:label "Insurance police on the customer's house "@en ;`
467. `.`
468. `bmicdcc:Insurance_through_banks`
469. `rdf:type bm:Service ;`
470. `bm:offerings_basedOn_KeyRessources bmicdcc:Information_on_customers ;`
471. `bm:offerings_basedOn_KeyRessources bmicdcc:Insurance_workflow-system ;`
472. `bm:offerings_basedOn_KeyRessources bmicdcc:Integration_into_the_bank_platform ;`
473. `bm:offerings_provide_OfferingValues bmicdcc:Fast_offer_on_the_insurance_price_fo r_the_house ;`
474. `bm:offerings_provide_OfferingValues bmicdcc:One-Stop-Shop ;`
475. `bm:offerings_require_KeyActivities bmicdcc:Check_if_insurance_case_is_eligible_f or_reimbursement ;`
476. `bm:offerings_require_KeyActivities bmicdcc:Check_insurance_eligibility_of_the_cu stomer ;`
477. `bm:offerings_require_KeyActivities bmicdcc:Constantly_check_for_changes_in_custo mer_base_on_the_bank_platform ;`
478. `bm:offerings_require_KeyActivities bmicdcc:Provide_insurance ;`
479. `bm:offerings_require_KeyActivities bmicdcc:Reimbursement_of_an_insurance_case ;`
480. `bm:offerings_require_KeyActivities bmicdcc:Teach_bank_employee_regarding_insuran ces ;`
481. `bm:offerings_valueFor_CustomerSegments bmicdcc:People_needing_a_mortgage_from_th e_bank ;`
482. `rdfs:label "Insurance through banks"@en ;`
483. `.`
484. `bmicdcc:Insurance_workflow-system`
485. `rdf:type bm:ITSystems ;`
486. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:IT_development ;`
487. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:IT_maintenance ;`
488. `bm:infrastructureParts_enables_Offerings bmicdcc:Insurance_through_banks ;`
489. `bm:keyRessources_enables_KeyActivities bmicdcc:Check_if_insurance_case_is_eligib le_for_reimbursement ;`
490. `bm:keyRessources_enables_KeyActivities bmicdcc:Check_insurance_eligibility_of_th e_customer ;`
491. `bm:keyRessources_enables_KeyActivities bmicdcc:Provide_insurance ;`
492. `bm:keyRessources_enables_KeyActivities bmicdcc:Reimbursement_of_an_insurance_cas e ;`
493. `bm:keyRessources_enables_KeyActivities bmicdcc:Teach_bank_employee_regarding_ins urances ;`
494. `bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;`
495. `rdfs:label "Insurance workflow-system "@en ;`
496. `.`
497. `bmicdcc:IntangibleProduct_Insurance_through_banks`
498. `rdf:type eo:IntangibleProduct ;`
499. `rdfs:label "IntangibleProduct Insurance through banks" ;`
500. `.`
501. `bmicdcc:Integration_into_the_bank_platform`
502. `rdf:type bm:ITSystems ;`
503. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:Bank_employee_traini ng ;`
504. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:IT_development ;`
505. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:IT_maintenance ;`
506. `bm:infrastructureParts_enables_Offerings bmicdcc:Insurance_through_banks ;`
507. `bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;`
508. `bm:keyRessources_enables_KeyActivities bmicdcc:Constantly_check_for_changes_in_c ustomer_base_on_the_bank_platform ;`

509. `bm:keyRessources_enables_KeyActivities bmicdcc:Teach_bank_employee_regarding_ins urances ;`
510. `bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;`
511. `rdfs:label "Integration into the bank's platform "@en ;`
512. `.`
513. `bmicdcc:IntellectualElementsAggregated`
514. `rdf:type bmicm:IntellectualElements ;`
515. `bmicm:intellectualElements_specializedBy_CustomerData bmicdcc:Information_on_cus tomers ;`
516. `rdfs:label "IntellectualElementsAggregated" ;`
517. `.`
518. `bmicdcc:Introduce_insurance_options_early_on`
519. `rdf:type bic:InvolvedPartyBenefits ;`
520. `rdfs:label "Introduce insurance options early on"@en ;`
521. `.`
522. `bmicdcc:KeyActivityElementsAggregated`
523. `rdf:type bmicm:KeyActivityElements ;`
524. `bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcc:Check_if_insurance_c ase_is_eligible_for_reimbursement ;`
525. `bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcc:Check_insurance_elig ibility_of_the_customer ;`
526. `bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcc:Provide_insurance ;`
527. `bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcc:Reimbursement_of_an_ insurance_case ;`
528. `bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcc:Teach_bank_employee_ regarding_insurances ;`
529. `bmicm:keyActivityElements_specializedBy_SupportProcess bmicdcc:Constantly_check_ for_changes_in_customer_base_on_the_bank_platform ;`
530. `rdfs:label "KeyActivityElementsAggregated" ;`
531. `.`
532. `bmicdcc:KeyPartnerElementsAggregated`
533. `rdf:type bmicm:KeyPartnerElements ;`
534. `bmicm:keyPartnerElements_specializedBy_Business bmicdcc:Large_Swiss_bank ;`
535. `rdfs:label "KeyPartnerElementsAggregated" ;`
536. `.`
537. `bmicdcc:KeyResourceElementsAggregated`
538. `rdf:type bmicm:KeyResourceElements ;`
539. `bmicm:keyResourceElements_specializedBy_FinancialElements bmicdcc:FinancialEleme ntsAggregated ;`
540. `bmicm:keyResourceElements_specializedBy_IntellectualElements bmicdcc:Intellectua lElementsAggregated ;`
541. `bmicm:keyResourceElements_specializedBy_PhysicalElements bmicdcc:PhysicalElement sAggregated ;`
542. `rdfs:label "KeyResourceElementsAggregated" ;`
543. `.`
544. `bmicdcc:Knowledge_of_the_insurance_process`
545. `rdf:type bic:IntellectualRessources ;`
546. `bmic:requiredResources_aggregates_KeyResources bmicdcc:Insurance_workflow- system ;`
547. `rdfs:label "Knowledge of the insurance process"@en ;`
548. `.`
549. `bmicdcc:Large_Swiss_bank`
550. `rdf:type bm:Business ;`
551. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:Bank_employee_traini ng ;`
552. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:Sales_and_Marketing ;`
553. `bm:infrastructureParts_enables_Offerings bmicdcc:Insurance_through_banks ;`
554. `bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;`
555. `bm:keyPartners_facilitate_KeyActivities bmicdcc:Check_insurance_eligibility_of_t he_customer ;`
556. `bm:keyPartners_facilitate_KeyActivities bmicdcc:Constantly_check_for_changes_in_ customer_base_on_the_bank_platform ;`
557. `bm:keyPartners_facilitate_KeyActivities bmicdcc:Provide_insurance ;`

558. `bm:keyPartners_facilitate_KeyActivities` `bmicdcc:Teach_bank_employee_regarding_in` surances ;
559. `bm:keyPartners_influencedBy_CostStructureModels` `bm:ValueDriven` ;
560. `bm:keyPartners_justifiedBy_KeyPartnershipGoals` `bm:AccessToCustomers` ;
561. `bm:keyPartners_provide_KeyRessources` `bmicdcc:Integration_into_the_bank_platform` ;
562. `bm:keyPartners_provide_Offerings` `bmicdcc:Insurance_through_banks` ;
563. `rdfs:label` "Large Swiss bank "@en ;
564. .
565. `bmicdcc:Large_swiss-based_bank`
566. `rdf:type` `bic:InvolvedParties` ;
567. `bic:involvedParties_belongsTo_Industry` `bic:Finance` ;
568. `bic:involvedParties_benefitsFrom_BenefitsOfInnovation` `bmicdcc:Wider_range_of_ser` vices ;
569. `bic:involvedParties_hasGoals_StrategicGoals` `bmicdcc:Provide_more_services_to_cus` tomers ;
570. `bic:involvedParties_hasInnovationDrivers_Drivers` `bmicdcc:Increase_satisfaction_r` ate_of_customers ;
571. `bic:involvedParties_innovationBudgetIs` 250000 ;
572. `bic:involvedParties_isCaseCompany` "false"^^`xsd:boolean` ;
573. `bic:involvedParties_isPartnerCompany` "true"^^`xsd:boolean` ;
574. `bic:involvedParties_mustOvercome_BarriersToOvercome` `bmicdcc:The_bank_has_to_shar` e_customer_data_with_the_insurance_company ;
575. `bic:involvedParties_mustOvercome_BarriersToOvercome` `bmicdcc:The_bank_has_to_trus` t_the_partnership_with_the_insurance_company ;
576. `bic:involvedParties_mustOvercome_BarriersToOvercome` `bmicdcc:The_insurance_compan` y_has_to_integrate_their_insurance_workflow_into_the_bank_software ;
577. `bic:involvedParties_numberOfEmployeesIs` 8000 ;
578. `bic:involvedParties_partOf_Cases` `bmicdcc:BMICase_C` ;
579. `bic:involvedParties_requiresForInnovation_RequiredRessources` `bmicdcc:Bank_employ` ees ;
580. `bic:involvedParties_requiresForInnovation_RequiredRessources` `bmicdcc:Enough_capi` tal_for_instructing_bank_employees ;
581. `bic:involvedParties_requiresForInnovation_RequiredRessources` `bmicdcc:Knowledge_o` f_the_insurance_process ;
582. `bic:involvedParties_risksOf_RisksOfInnovation` `bmicdcc:Customers_do_not_trust_the` _bank_employee_for_insuarance_information ;
583. `bic:involvedParties_risksOf_RisksOfInnovation` `bmicdcc:Teaching_of_bank_employees` _takes_time_and_costs_money ;
584. `bic:involvedParties_turnoverIs` 1500000000 ;
585. `bmic:involvedParties_aggregates_KeyPartners` `bmicdcc:Large_Swiss_bank` ;
586. `rdfs:label` "Large_swiss-based_bank"@en ;
587. .
588. `bmicdcc:LearnedBMICaseCC`
589. `rdf:type` `cbr:CaseStateHistory` ;
590. `cbr:belongsToCase` `bmicdcc:BMICase_C` ;
591. `cbr:caseStateTimestamp` "2020-12-04T23:32:31.09"^^`xsd:dateTime` ;
592. `cbr:hasCaseState` `cbr:Learned_CaseState` ;
593. `rdfs:label` "LearnedBMICaseCC" ;
594. .
595. `bmicdcc:MotivationAspectElementsAggregated`
596. `rdf:type` `bmicm:MotivationAspectElements` ;
597. `bmicm:motivationAspectElements_specializedBy_Outcome` `bmicdcc:Outcome_Bank_employ` ee_training ;
598. `bmicm:motivationAspectElements_specializedBy_Outcome` `bmicdcc:Outcome_IT_developm` ent ;
599. `bmicm:motivationAspectElements_specializedBy_Outcome` `bmicdcc:Outcome_IT_maintena` nce ;
600. `bmicm:motivationAspectElements_specializedBy_Outcome` `bmicdcc:Outcome_Insurance_p` olice_on_the_customer_house ;
601. `bmicm:motivationAspectElements_specializedBy_Outcome` `bmicdcc:Outcome_Sales_and_M` arketing ;
602. `bmicm:motivationAspectElements_specializedBy_Stakeholder` `bmicdcc:Stakeholder_Lar` ge_Swiss_bank ;

603. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcc:`Stakeholder_Peo
ple_needing_a_mortgage_from_the_bank ;
604. `bmicm:`motivationAspectElements_specializedBy_Value `bmicdcc:`Value_Fast_offer_on_t
he_insurance_price_for_the_house ;
605. `bmicm:`motivationAspectElements_specializedBy_Value `bmicdcc:`Value_One-Stop-Shop ;
606. `rdfs:`label "MotivationAspectElementsAggregated" ;
607. .
608. `bmicdcc:`NonHumanInteractionElementsAggregated
609. `rdf:`type `bmicm:`NonHumanInteractionElements ;
610. `bmicm:`nonHumanInteractionElements_specializedBy_AutomatedService `bmicdcc:`Automat
ed_suggestion_of_insurance_price_on_online_mortgages ;
611. `rdfs:`label "NonHumanInteractionElementsAggregated" ;
612. .
613. `bmicdcc:`OfferingElementsAggregated
614. `rdf:`type `bmicm:`OfferingElements ;
615. `bmicm:`offeringElements_specializedBy_Service `bmicdcc:`Insurance_through_banks ;
616. `rdfs:`label "CustomerSegmentElementsAggregated" ;
617. .
618. `bmicdcc:`OfferingValueElementsAggregated
619. `rdf:`type `bmicm:`OfferingValueElements ;
620. `bmicm:`offeringValueElements_specializedBy_QualitativeValueElements `bmicdcc:`Quali
tativeValueElementsAggregated ;
621. `bmicm:`offeringValueElements_specializedBy_QuantitativeValueElements `bmicdcc:`Quan
titativeValueElementsAggregated ;
622. `rdfs:`label "OfferingValueElementsAggregated" ;
623. .
624. `bmicdcc:`One-Stop-Shop
625. `rdf:`type `bm:`Convenience ;
626. `bm:`offeringValues_influencedBy_CostStructureModels `bm:`ValueDriven ;
627. `rdfs:`label "One-Stop-
Shop for the mortgage customers, as they also usually need an insurance on their
 house "@en ;
628. .
629. `bmicdcc:`Outcome_Bank_employee_training
630. `rdf:`type `archimateV3:`Outcome ;
631. `rdfs:`label "Outcome Bank employee training " ;
632. .
633. `bmicdcc:`Outcome_IT_development
634. `rdf:`type `archimateV3:`Outcome ;
635. `rdfs:`label "Outcome IT development" ;
636. .
637. `bmicdcc:`Outcome_IT_maintenance
638. `rdf:`type `archimateV3:`Outcome ;
639. `rdfs:`label "Outcome IT maintenance" ;
640. .
641. `bmicdcc:`Outcome_Insurance_police_on_the_customer_house
642. `rdf:`type `archimateV3:`Outcome ;
643. `rdfs:`label "Outcome Insurance police on the customer house" ;
644. .
645. `bmicdcc:`Outcome_Sales_and_Marketing
646. `rdf:`type `archimateV3:`Outcome ;
647. `rdfs:`label "Outcome Sales and Marketing" ;
648. .
649. `bmicdcc:`People_needing_a_mortgage_from_the_bank
650. `rdf:`type `bm:`NicheMarket ;
651. `bm:`customerSegment_isAMultiSidedPlatform "true"^^`xsd:`boolean ;
652. `bm:`customerSegment_isDiversified "false"^^`xsd:`boolean ;
653. `bm:`customerSegments_receive_Offerings `bmicdcc:`Insurance_through_banks ;
654. `bmic:`customerSegments_benefitFrom_CustomerBenefits `bmicdcc:`Customer_does_not_hav
e_to_make_another_appointment_for_insurance_consultancy ;
655. `rdfs:`label "People needing a mortgage from the bank "@en ;
656. .
657. `bmicdcc:`PhysicalElementsAggregated
658. `rdf:`type `bmicm:`PhysicalElements ;

659. `bmicm:physicalElements_specializedBy_ITSystems` `bmicdcc:Insurance_workflow-system` ;
660. `bmicm:physicalElements_specializedBy_ITSystems` `bmicdcc:Integration_into_the_bank_platform` ;
661. `rdfs:label` "PhysicalElementsAggregated" ;
662. .
663. `bmicdcc:Provide_insurance`
664. `rdf:type` `bm:CoreProcess` ;
665. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdcc:Insurance_police_on_the_customer_house` ;
666. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdcc:Sales_and_Marketing` ;
667. `bm:infrastructureParts_enables_Offerings` `bmicdcc:Insurance_through_banks` ;
668. `bm:keyActivities_require_KeyRessources` `bmicdcc:Information_on_customers` ;
669. `bm:keyActivities_require_KeyRessources` `bmicdcc:Insurance_workflow-system` ;
670. `bmbc:keyActivities_isACoreCapability` "true"^^`xsd:boolean` ;
671. `rdfs:label` "Provide insurance "@en ;
672. .
673. `bmicdcc:Provide_more_services_to_customers`
674. `rdf:type` `bic:StrategicGoals` ;
675. `rdfs:label` "Provide more services to customers"@en ;
676. .
677. `bmicdcc:QualitativeValueElementsAggregated`
678. `rdf:type` `bmicm:QualitativeValueElements` ;
679. `bmicm:qualitativeValueElements_specializedBy_Convenience` `bmicdcc:Fast_offer_on_the_insurance_price_for_the_house` ;
680. `bmicm:qualitativeValueElements_specializedBy_Convenience` `bmicdcc:One-Stop-Shop` ;
681. `rdfs:label` "QualitativeValueElementsAggregated" ;
682. .
683. `bmicdcc:QuantitativeValueElementsAggregated`
684. `rdf:type` `bmicm:QuantitativeValueElements` ;
685. `rdfs:label` "QuantitativeValueElementsAggregated" ;
686. .
687. `bmicdcc:Reimbursement_of_an_insurance_case`
688. `rdf:type` `bm:CoreProcess` ;
689. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdcc:Insurance_police_on_the_customer_house` ;
690. `bm:keyActivities_require_KeyRessources` `bmicdcc:Information_on_customers` ;
691. `bm:keyActivities_require_KeyRessources` `bmicdcc:Insurance_workflow-system` ;
692. `bmbc:keyActivities_isACoreCapability` "true"^^`xsd:boolean` ;
693. `rdfs:label` "Reimbursement of an insurance case "@en ;
694. .
695. `bmicdcc:RequiredResourcesAggregated`
696. `rdf:type` `bmicm:RequiredResources` ;
697. `bmicm:requiredResources_specializedBy_FinancialRessources` `bmicdcc:Enough_capital_for_IT_development` ;
698. `bmicm:requiredResources_specializedBy_FinancialRessources` `bmicdcc:Enough_capital_for_instructing_bank_employees` ;
699. `bmicm:requiredResources_specializedBy_HumanRessources` `bmicdcc:Bank_employees` ;
700. `bmicm:requiredResources_specializedBy_IntellectualRessources` `bmicdcc:Knowledge_of_the_insurance_process` ;
701. `bmicm:requiredResources_specializedBy_PhysicalRessources` `bmicdcc:IT_integration_from_insurance_company_to_bank` ;
702. `rdfs:label` "RequiredResourcesAggregated" ;
703. .
704. `bmicdcc:Resource_Information_on_customers`
705. `rdf:type` `archimateV3:Resource` ;
706. `rdfs:label` "Resource Information on customers" ;
707. .
708. `bmicdcc:Resource_Insurance_workflow-system`
709. `rdf:type` `archimateV3:Resource` ;
710. `rdfs:label` "Resource Insurance workflow-system" ;
711. .
712. `bmicdcc:Resource_Integration_into_the_bank_platform`
713. `rdf:type` `archimateV3:Resource` ;

```
714.    rdfs:label "Resource Integration into the bank platform" ;
715.    .
716.    bmicdcc:Resource_Swiss_bank
717.    rdf:type archimateV3:Resource ;
718.    rdfs:label "Resource Swiss bank " ;
719.    .
720.    bmicdcc:RevenueStreamElementsAggregated
721.    rdf:type bmicm:RevenueStreamElements ;
722.    bmicm:revenueStreamElements_specializedBy_AssetSale bmicdcc:Insurance_police_on_
        the_customer_house ;
723.    bmicm:revenueStreamElements_specializedBy_FeeBasedRevenueElements bmicdcc:FeeBas
        edRevenueElementsAggregated ;
724.    rdfs:label "RevenueStreamElementsAggregated" ;
725.    .
726.    bmicdcc:Sales_and_Marketing
727.    rdf:type bm:FixedCost ;
728.    bm:costStructureElements_affectedBy_Offerings bmicdcc:Insurance_through_banks ;
729.    bm:costStructureElements_justifiedBy_CostStructureModels bm:ValueDriven ;
730.    rdfs:label "Sales & Marketing "@en ;
731.    .
732.    bmicdcc:Sell_more_insurance_policies
733.    rdf:type bic:Drivers ;
734.    rdfs:label "Sell more insurance policies"@en ;
735.    .
736.    bmicdcc:Stakeholder_Large_Swiss_bank
737.    rdf:type archimateV3:Stakeholder ;
738.    rdfs:label "Stakeholder Large Swiss bank" ;
739.    .
740.    bmicdcc:Stakeholder_People_needing_a_mortgage_from_the_bank
741.    rdf:type archimateV3:Stakeholder ;
742.    rdfs:label "Stakeholder People needing a mortgage from the bank " ;
743.    .
744.    bmicdcc:StrategyLayerElementsAggregated
745.    rdf:type bmicm:StrategyLayerElements ;
746.    bmicm:strategyLayerElements_specializedBy_Capability bmicdcc:Capability_Automate
        d_suggestion_of_insurance_price_on_online_mortgages ;
747.    bmicm:strategyLayerElements_specializedBy_Capability bmicdcc:Capability_Bank_emp
        loyee ;
748.    bmicm:strategyLayerElements_specializedBy_Capability bmicdcc:Capability_Insuranc
        e_customer_contact ;
749.    bmicm:strategyLayerElements_specializedBy_Capability bmicdcc:Capability_Swiss_ba
        nk ;
750.    bmicm:strategyLayerElements_specializedBy_Resource bmicdcc:Resource_Information_
        on_customers ;
751.    bmicm:strategyLayerElements_specializedBy_Resource bmicdcc:Resource_Insurance_wo
        rkflow-system ;
752.    bmicm:strategyLayerElements_specializedBy_Resource bmicdcc:Resource_Integration_
        into_the_bank_platform ;
753.    bmicm:strategyLayerElements_specializedBy_Resource bmicdcc:Resource_Swiss_bank ;
754.    bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcc:ValueStream_Check_
        if_insurance_case_is_eligible_for_reimbursement ;
755.    bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcc:ValueStream_Check_
        insurance_eligibility_of_the_customer ;
756.    bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcc:ValueStream_Consta
        ntly_check_for_changes_in_customer_base_on_the_bank_platform ;
757.    bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcc:ValueStream_Provid
        e_insurance ;
758.    bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcc:ValueStream_Reimbu
        rsement_of_an_insurance_case ;
759.    bmicm:strategyLayerElements_specializedBy_ValueStream bmicdcc:ValueStream_Teach_
        bank_employee_regarding_insurances ;
760.    rdfs:label "StrategyLayerElementsAggregated" ;
761.    .
762.    bmicdcc:Swiss_bank
763.    rdf:type bm:PartnerStore ;
```

764. `bm:channel_hasChannelOwnerType "Paid"@en ;`
765. `bm:channel_hasChannelPhaseType "Awareness"@en ;`
766. `bm:channel_hasChannelPhaseType "Evaluation"@en ;`
767. `bm:channel_hasChannelPhaseType "Purchase"@en ;`
768. `bm:channels_deliverTo_CustomerSegments bmicdcc:People_needing_a_mortgage_from_the_bank ;`
769. `bm:channels_deliver_Offerings bmicdcc:Insurance_through_banks ;`
770. `bm:channels_fits_CustomerRelationships bmicdcc:Automated_suggestion_of_insurance_price_on_online_mortgages ;`
771. `bm:channels_fits_CustomerRelationships bmicdcc:Bank_employee ;`
772. `bm:channels_generate_RevenueStreams bmicdcc:Insurance_police_on_the_customer_house ;`
773. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcc:Bank_employee_training ;`
774. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcc:IT_development ;`
775. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcc:IT_maintenance ;`
776. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcc:Insurance_police_on_the_customer_house ;`
777. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcc:Sales_and_Marketing ;`
778. `rdfs:label "Swiss bank "@en ;`
779. `.`
780. `bmicdcc:Teach_bank_employee_regarding_insurances`
781. `rdf:type bm:CoreProcess ;`
782. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcc:Bank_employee_training ;`
783. `bm:infrastructureParts_enables_Offerings bmicdcc:Insurance_through_banks ;`
784. `bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScale ;`
785. `bm:keyActivities_require_KeyRessources bmicdcc:Insurance_workflow-system ;`
786. `bm:keyActivities_require_KeyRessources bmicdcc:Integration_into_the_bank_platform ;`
787. `bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;`
788. `rdfs:label "Teach bank employee regarding insurances "@en ;`
789. `.`
790. `bmicdcc:Teaching_of_bank_employees_takes_time_and_costs_money`
791. `rdf:type bic:RisksOfInnovation ;`
792. `rdfs:label "Teaching of bank employees takes time and costs money"@en ;`
793. `.`
794. `bmicdcc:TechnologyLayerElementsAggregated`
795. `rdf:type bmicm:TechnologyLayerElements ;`
796. `rdfs:label "TechnologyLayerElementsAggregated" ;`
797. `.`
798. `bmicdcc:The_bank_has_to_share_customer_data_with_the_insurance_company`
799. `rdf:type bic:IntellectualBarriers ;`
800. `rdfs:label "The bank has to share customer data with the insurance company"@en ;`
801. `.`
802. `bmicdcc:The_bank_has_to_trust_the_partnership_with_the_insurance_company`
803. `rdf:type bic:OrganisationalBarriers ;`
804. `rdfs:label "The bank has to trust the partnership with the insurance company"@en ;`
805. `.`
806. `bmicdcc:The_insurance_company_has_to_integrate_their_insurance_workflow_into_the_bank_software`
807. `rdf:type bic:TechnologicalBarriers ;`
808. `rdfs:label "The insurance company has to integrate their insurance workflow into the bank software"@en ;`
809. `.`
810. `bmicdcc:ValuePropositionElementsAggregated`
811. `rdf:type bmicm:ValuePropositionElements ;`
812. `bmicm:valuePropositionElements_specializedBy_OfferingElements bmicdcc:OfferingElementsAggregated ;`
813. `bmicm:valuePropositionElements_specializedBy_OfferingValueElements bmicdcc:OfferingValueElementsAggregated ;`
814. `rdfs:label "ValuePropositionElementsAggregated" ;`
815. `.`

```
816.    bmicdcc:ValueStream_Check_if_insurance_case_is_eligible_for_reimbursement
817.    rdf:type archimateV3:ValueStream ;
818.    rdfs:label "ValueStream Check if insurance case is eligible for reimbursement "
        ;
819.    .
820.    bmicdcc:ValueStream_Check_insurance_eligibility_of_the_customer
821.    rdf:type archimateV3:ValueStream ;
822.    rdfs:label "ValueStream Check insurance eligibility of the customer" ;
823.    .
824.    bmicdcc:ValueStream_Constantly_check_for_changes_in_customer_base_on_the_bank_pl
        atform
825.    rdf:type archimateV3:ValueStream ;
826.    rdfs:label "ValueStream Constantly check for changes in customer base on the ban
        k platform" ;
827.    .
828.    bmicdcc:ValueStream_Provide_insurance
829.    rdf:type archimateV3:ValueStream ;
830.    rdfs:label "ValueStream Provide insurance " ;
831.    .
832.    bmicdcc:ValueStream_Reimbursement_of_an_insurance_case
833.    rdf:type archimateV3:ValueStream ;
834.    rdfs:label "ValueStream Reimbursement of an insurance case" ;
835.    .
836.    bmicdcc:ValueStream_Teach_bank_employee_regarding_insurances
837.    rdf:type archimateV3:ValueStream ;
838.    rdfs:label "ValueStream Teach bank employee regarding insurances" ;
839.    .
840.    bmicdcc:Value_Fast_offer_on_the_insurance_price_for_the_house
841.    rdf:type archimateV3:Value ;
842.    rdfs:label "Value Fast offer on the insurance price for the house" ;
843.    .
844.    bmicdcc:Value_One-Stop-Shop
845.    rdf:type archimateV3:Value ;
846.    rdfs:label "Value One-Stop-Shop" ;
847.    .
848.    bmicdcc:Wider_range_of_services
849.    rdf:type bic:InvolvedPartyBenefits ;
850.    rdfs:label "Wider range of services"@en ;
851.    .
852.    <http://ikm-group.ch/bmiciscsm#BMIPossibilitiesView>
853.    cbr:caseViewDefinesCharacterisationOfCases bmicdcc:BMICase_C ;
854.    .
855.    <http://ikm-group.ch/bmiciscsm#BMITransformationView>
856.    cbr:caseViewDefinesCharacterisationOfCases bmicdcc:BMICase_C ;
857.    .
858.    <http://ikm-group.ch/bmiciscsm#EAInnovationView>
859.    cbr:caseViewDefinesCharacterisationOfCases bmicdcc:BMICase_C ;
860.    .
```

The Business Model Innovation Case: BM-Pattern "Add-on"

This appendix section shows the code to represent the business model innovation case *BM-pattern*

"Add-on" stored within the file BMICaseDataCaseD.ttl.

```
1.    # baseURI: http://ikm-group.ch/bmicdcd
2.    # imports: http://ikm-group.ch/bmiciscsm
3.    # prefix: bmicdcd
4.
5.    @prefix archimateV3: <http://ikm-group.ch/archimateV3#> .
```

```
6.    @prefix bc: <http://ikm-group.ch/bc#> .
7.    @prefix bic: <http://ikm-group.ch/bic#> .
8.    @prefix bm: <http://ikm-group.ch/bm#> .
9.    @prefix bmbc: <http://ikm-group.ch/bmbc#> .
10.   @prefix bmic: <http://ikm-group.ch/bmic#> .
11.   @prefix bmicdcd: <http://ikm-group.ch/bmicdcd#> .
12.   @prefix bmicm: <http://ikm-group.ch/bmicm#> .
13.   @prefix cbr: <http://ikm-group.ch/cbr#> .
14.   @prefix ci: <http://ikm-group.ch/ci#> .
15.   @prefix eo: <http://ikm-group.ch/archiMEO/eo#> .
16.   @prefix owl: <http://www.w3.org/2002/07/owl#> .
17.   @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
18.   @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
19.   @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
20.
21.   <http://ikm-group.ch/bmicdcd>
22.   rdf:type owl:Ontology ;
23.   owl:imports <http://ikm-group.ch/bmiciscsm> ;
24.   owl:versionInfo "Created with TopBraid Composer"@en ;
25.   .
26.   bmicdcd:A_lot_of_capital
27.   rdf:type bic:FinancialRessources ;
28.   rdfs:label "A lot of capital"@en ;
29.   .
30.   bmicdcd:Additional_comfort_is_payed_extra
31.   rdf:type bic:CustomerBenefits ;
32.   bmic:customerBenefits_extends_OfferingValues bmicdcd:Assigned_seats ;
33.   bmic:customerBenefits_extends_OfferingValues bmicdcd:Fast_travel_for_business_pe
      ople ;
34.   bmic:customerBenefits_extends_OfferingValues bmicdcd:Low-cost_flight ;
35.   rdfs:label "Additional comfort is payed extra"@en ;
36.   .
37.   bmicdcd:Additional_things_can_be_sold_to_customers
38.   rdf:type bic:InvolvedPartyBenefits ;
39.   rdfs:label "Additional things can be sold to customers"@en ;
40.   .
41.   bmicdcd:Air_crews
42.   rdf:type bm:Human ;
43.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Salaries ;
44.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Ticket_sales ;
45.   bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
      cost_flight_service ;
46.   bm:keyRessources_enables_KeyActivities bmicdcd:Flight_operations ;
47.   bm:keyRessources_enables_KeyActivities bmicdcd:Productivity-
      based_pay_incentives ;
48.   bm:keyRessources_enables_KeyActivities bmicdcd:Timetable_planning ;
49.   bm:keyRessources_enables_KeyActivities bmicdcd:Training_of_the_staff ;
50.   bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;
51.   rdfs:label "Air crews"@en ;
52.   .
53.   bmicdcd:Aircraft
54.   rdf:type bm:Vehicles ;
55.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Aircraft_maintenance
       ;
56.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Fuel_costs ;
57.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:New_aircrafts ;
58.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Ticket_sales ;
59.   bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
      cost_flight_service ;
60.   bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
61.   bm:keyRessources_enables_KeyActivities bmicdcd:Airplane_cleaning ;
62.   bm:keyRessources_enables_KeyActivities bmicdcd:Airplane_maintenance ;
63.   bm:keyRessources_enables_KeyActivities bmicdcd:Flight_operations ;
64.   bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;
65.   rdfs:label "Aircraft"@en ;
```

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66.    .
67.    bmicdcd:Aircraft_crew
68.    rdf:type bic:HumanRessources ;
69.    bmic:requiredResources_aggregates_KeyResources bmicdcd:Air_crews ;
70.    rdfs:label "Aircraft crew"@en ;
71.    .
72.    bmicdcd:Aircraft_maintenance
73.    rdf:type bm:VariableCost ;
74.    bm:costStructureElements_affectedBy_Offerings bmicdcd:Provide_low-
       cost_flight_service ;
75.    bm:costStructureElements_justifiedBy_CostStructureModels bm:CostDriven ;
76.    rdfs:label "Aircraft maintenance"@en ;
77.    .
78.    bmicdcd:Aircrafts
79.    rdf:type bic:PhysicalRessources ;
80.    bmic:requiredResources_aggregates_KeyResources bmicdcd:Aircraft ;
81.    rdfs:label "Aircrafts"@en ;
82.    .
83.    bmicdcd:Airplane_cleaning
84.    rdf:type bm:CoreProcess ;
85.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Aircraft_maintenance
       ;
86.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Salaries ;
87.    bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
       cost_flight_service ;
88.    bm:keyActivities_require_KeyRessources bmicdcd:Air_crews ;
89.    bm:keyActivities_require_KeyRessources bmicdcd:Aircraft ;
90.    bmbc:keyActivities_isACoreCapability "false"^^xsd:boolean ;
91.    rdfs:label "Airplane cleaning"@en ;
92.    .
93.    bmicdcd:Airplane_maintenance
94.    rdf:type bm:CoreProcess ;
95.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Aircraft_maintenance
       ;
96.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Salaries ;
97.    bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
       cost_flight_service ;
98.    bm:keyActivities_require_KeyRessources bmicdcd:Air_crews ;
99.    bm:keyActivities_require_KeyRessources bmicdcd:Aircraft ;
100.   bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
101.   rdfs:label "Airplane maintenance"@en ;
102.   .
103.   bmicdcd:ApplicationLayerElementsAggregated
104.   rdf:type bmicm:ApplicationLayerElements ;
105.   rdfs:label "ApplicationLayerElementsAggregated" ;
106.   .
107.   bmicdcd:Assigned_seats
108.   rdf:type bm:Convenience ;
109.   bm:offeringValues_influencedBy_CostStructureModels bm:CostDriven ;
110.   rdfs:label "Assigned seats"@en ;
111.   .
112.   bmicdcd:Aviation_authorities
113.   rdf:type bm:Government ;
114.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:New_aircrafts ;
115.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Salaries ;
116.   bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
       cost_flight_service ;
117.   bm:keyPartners_facilitate_KeyActivities bmicdcd:Flight_operations ;
118.   bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:Licenses ;
119.   rdfs:label "Aviation authorities"@en ;
120.   .
121.   bmicdcd:BMICase_D
122.   rdf:type bmic:BusinessModelInnovationCases ;
123.   bic:cases_caseName "BM-Pattern \"Add-on\" on the example of Ryanair"@en ;
124.   bic:cases_consistsOf_BarriersToOvercome bmicdcd:EU_regulations_have_to_be_met ;
```

125. `bic:cases_consistsOf_BarriersToOvercome bmicdcd:Enough_places_for_the_aircrafts_ at_the_airports_are_needed ;`
126. `bic:cases_consistsOf_BarriersToOvercome bmicdcd:Investors_are_needed ;`
127. `bic:cases_consistsOf_BenefitsOfInnovation bmicdcd:Additional_comfort_is_payed_ex tra ;`
128. `bic:cases_consistsOf_BenefitsOfInnovation bmicdcd:Additional_things_can_be_sold_ to_customers ;`
129. `bic:cases_consistsOf_BenefitsOfInnovation bmicdcd:Cheap_flights ;`
130. `bic:cases_consistsOf_BenefitsOfInnovation bmicdcd:Customer_pays_only_for_what_he _needs ;`
131. `bic:cases_consistsOf_BenefitsOfInnovation bmicdcd:Increase_of_capacity_rate_of_s eats ;`
132. `bic:cases_consistsOf_BusinessStateCharacteristics bmicdcd:Business_Model_after_i nnovating ;`
133. `bic:cases_consistsOf_CaseCharacteristics bmicdcd:Other_airlines_for_code- sharing ;`
134. `bic:cases_consistsOf_CaseCharacteristics bmicdcd:Ryanair ;`
135. `bic:cases_consistsOf_Drivers bmicdcd:Becoming_Amazon_of_Travel ;`
136. `bic:cases_consistsOf_Drivers bmicdcd:Undercut_prices_of_competition ;`
137. `bic:cases_consistsOf_RequiredRessources bmicdcd:A_lot_of_capital ;`
138. `bic:cases_consistsOf_RequiredRessources bmicdcd:Aircraft_crew ;`
139. `bic:cases_consistsOf_RequiredRessources bmicdcd:Aircrafts ;`
140. `bic:cases_consistsOf_RisksOfInnovation bmicdcd:Bad_flight_hours ;`
141. `bic:cases_consistsOf_RisksOfInnovation bmicdcd:Low_budget_leads_to_bad_service ;`
142. `bic:cases_consistsOf_RisksOfInnovation bmicdcd:Unpunctual_flights_because_of_bud get_cuts ;`
143. `bic:cases_consistsOf_StrategicGoals bmicdcd:Low-cost_strategy ;`
144. `bic:cases_consistsOf_StrategicGoals bmicdcd:Marketfocus_Europa ;`
145. `bic:cases_consistsOf_StrategicGoals bmicdcd:Only_cheap_airports ;`
146. `bic:cases_consistsOf_StrategicGoals bmicdcd:Only_one_aircraft_type ;`
147. `bic:cases_consistsOf_StrategicGoals bmicdcd:Reach_200_mio_of_customers_per_year ;`
148. `bic:cases_isSuccessfulInnovation "true"^^xsd:boolean ;`
149. `bic:cases_transformationDurationIs 720 ;`
150. `bmic:businessModelInnovationCases_composedOf_InvolvedParties bmicdcd:Other_airli nes_for_code-sharing ;`
151. `bmic:businessModelInnovationCases_composedOf_InvolvedParties bmicdcd:Ryanair ;`
152. `bmicm:businessModelInnovationCases_aggregates_ApplicationLayerElements bmicdcd:A pplicationLayerElementsAggregated ;`
153. `bmicm:businessModelInnovationCases_aggregates_BusinessLayerElements bmicdcd:Busi nessLayerElementsAggregated ;`
154. `bmicm:businessModelInnovationCases_aggregates_MotivationAspectElements bmicdcd:M otivationAspectElementsAggregated ;`
155. `bmicm:businessModelInnovationCases_aggregates_StrategyLayerElements bmicdcd:Stra tegyLayerElementsAggregated ;`
156. `bmicm:businessModelInnovationCases_aggregates_TechnologyLayerElements bmicdcd:Te chnologyLayerElementsAggregated ;`
157. `bmicm:businessModelInnovationCases_composedOf_BarriersToOvercome bmicdcd:Barrier sToOvercomeAggregated ;`
158. `bmicm:businessModelInnovationCases_composedOf_BenefitsOfInnovation bmicdcd:Benef itsOfInnovationAggregated ;`
159. `bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements bmicdcd :BusinessCapabilityElementsAggregated ;`
160. `bmicm:businessModelInnovationCases_composedOf_BusinessStateCharacteristics bmicd cd:BusinessStateCharacteristicsAggregated ;`
161. `bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics bmic dcd:ConstructionIndustrySpecificsAggregated ;`
162. `bmicm:businessModelInnovationCases_composedOf_CustomerInterfaceElements bmicdcd: CustomerInterfaceElementsAggregated ;`
163. `bmicm:businessModelInnovationCases_composedOf_Drivers bmicdcd:Becoming_Amazon_of _Travel ;`
164. `bmicm:businessModelInnovationCases_composedOf_Drivers bmicdcd:Undercut_prices_of _competition ;`
165. `bmicm:businessModelInnovationCases_composedOf_FinancialAspectElements bmicdcd:Fi nancialAspectElementsAggregated ;`

166. `bmicm:businessModelInnovationCases_composedOf_Industries` `bic:TravelAndTourismAndHospitality` ;
167. `bmicm:businessModelInnovationCases_composedOf_InfrastructureElements` `bmicdcd:InfrastructureElementsAggregated` ;
168. `bmicm:businessModelInnovationCases_composedOf_InvolvedParties` `bmicdcd:Other_airlines_for_code-sharing` ;
169. `bmicm:businessModelInnovationCases_composedOf_InvolvedParties` `bmicdcd:Ryanair` ;
170. `bmicm:businessModelInnovationCases_composedOf_RequiredResources` `bmicdcd:RequiredResourcesAggregated` ;
171. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation` `bmicdcd:Bad_flight_hours` ;
172. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation` `bmicdcd:Low_budget_leads_to_bad_service` ;
173. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation` `bmicdcd:Unpunctual_flights_because_of_budget_cuts` ;
174. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals` `bmicdcd:Low-cost_strategy` ;
175. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals` `bmicdcd:Marketfocus_Europa` ;
176. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals` `bmicdcd:Only_cheap_airports` ;
177. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals` `bmicdcd:Only_one_aircraft_type` ;
178. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals` `bmicdcd:Reach_200_mio_of_customers_per_year` ;
179. `bmicm:businessModelInnovationCases_composedOf_ValuePropositionElements` `bmicdcd:ValuePropositionElementsAggregated` ;
180. `rdfs:label` `"BMI Case: BM-Pattern \"Add-on\" (Ryanair)"@en` ;
181. .
182. `bmicdcd:Bad_flight_hours`
183. `rdf:type` `bic:RisksOfInnovation` ;
184. `rdfs:label` `"Bad flight hours"@en` ;
185. .
186. `bmicdcd:BarriersToOvercomeAggregated`
187. `rdf:type` `bmicm:BarriersToOvercome` ;
188. `bmicm:barriersToOvercome_specializedBy_FinancialBarriers` `bmicdcd:Investors_are_needed` ;
189. `bmicm:barriersToOvercome_specializedBy_OrganisationalBarriers` `bmicdcd:EU_regulations_have_to_be_met` ;
190. `bmicm:barriersToOvercome_specializedBy_PhysicalBarriers` `bmicdcd:Enough_places_for_the_aircrafts_at_the_airports_are_needed` ;
191. `rdfs:label` `"CustomerSegmentElementsAggregated"` ;
192. .
193. `bmicdcd:Becoming_Amazon_of_Travel`
194. `rdf:type` `bic:Drivers` ;
195. `rdfs:label` `"Becoming Amazon of Travel"@en` ;
196. .
197. `bmicdcd:BenefitsOfInnovationAggregated`
198. `rdf:type` `bmicm:BenefitsOfInnovation` ;
199. `bmicm:benefitsOfInnovation_specializedBy_CustomerBenefits` `bmicdcd:Additional_comfort_is_payed_extra` ;
200. `bmicm:benefitsOfInnovation_specializedBy_CustomerBenefits` `bmicdcd:Cheap_flights` ;
201. `bmicm:benefitsOfInnovation_specializedBy_CustomerBenefits` `bmicdcd:Customer_pays_only_for_what_he_needs` ;
202. `bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits` `bmicdcd:Additional_things_can_be_sold_to_customers` ;
203. `bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits` `bmicdcd:Increase_of_capacity_rate_of_seats` ;
204. `rdfs:label` `"CustomerSegmentElementsAggregated"` ;
205. .
206. `bmicdcd:Boeing`
207. `rdf:type` `bm:Business` ;
208. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdcd:Aircraft_maintenance` ;

209. `bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:New_aircrafts ;`
210. `bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-cost_flight_service ;`
211. `bm:keyPartners_facilitate_KeyActivities bmicdcd:Airplane_maintenance ;`
212. `bm:keyPartners_facilitate_KeyActivities bmicdcd:Flight_operations ;`
213. `bm:keyPartners_influencedBy_CostStructureModels bm:CostDriven ;`
214. `bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:OutsourcingInfrastructure ;`
215. `bm:keyPartners_provide_KeyRessources bmicdcd:Aircraft ;`
216. `rdfs:label "Boeing"@en ;`
217. `.`
218. `bmicdcd:BusinessCapabilityElementsAggregated`
219. `rdf:type bmicm:BusinessCapabilityElements ;`
220. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcd:Capability_Air_crews ;`
221. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcd:Capability_Aircraft ;`
222. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcd:Capability_Airplane_maintenance ;`
223. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcd:Capability_Flight_operations ;`
224. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcd:Capability_Online_ticket_sales ;`
225. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcd:Capability_Productivity-based_pay_incentives ;`
226. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcd:Capability_Timetable_planning ;`
227. `bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdcd:Capability_Training_of_the_staff ;`
228. `bmicm:businessCapabilityElements_specializedBy_HumanBasedCapabilityElements bmicdcd:HumanBasedCapabilityElementsAggregated ;`
229. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcd:Capability_Air_crews ;`
230. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcd:Capability_Aircraft ;`
231. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcd:Capability_Airplane_maintenance ;`
232. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcd:Capability_Flight_operations ;`
233. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcd:Capability_Online_ticket_sales ;`
234. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcd:Capability_Productivity-based_pay_incentives ;`
235. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcd:Capability_Timetable_planning ;`
236. `bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdcd:Capability_Training_of_the_staff ;`
237. `rdfs:label "BusinessCapabilityElementsAggregated" ;`
238. `.`
239. `bmicdcd:BusinessLayerElementsAggregated`
240. `rdf:type bmicm:BusinessLayerElements ;`
241. `bmicm:businessLayerElements_specializedBy_Product bmicdcd:IntangibleProduct_Provide_low-cost_flight_service ;`
242. `rdfs:label "BusinessLayerElementsAggregated" ;`
243. `.`
244. `bmicdcd:BusinessStateCharacteristicsAggregated`
245. `rdf:type bmicm:BusinessStateCharacteristics ;`
246. `bmicm:businessStateCharacteristics_specializedBy_StateAfterInnovating bmicdcd:Business_Model_after_innovating ;`
247. `rdfs:label "BusinessStateCharacteristicsAggregated" ;`
248. `.`
249. `bmicdcd:Business_Model_after_innovating`
250. `rdf:type bic:StateAfterInnovating ;`
251. `bic:businessStateCharacteristics_classifiesAs_ViewsOnBusiness bmic:BusinessModel ;`
252. `bmic:businessStateCharacteristics_aggregates_Channels bmicdcd:Ryanair_website ;`

253. `bmic:businessStateCharacteristics_aggregates_CostStructureElements` `bmicdcd:Aircraft_maintenance` ;
254. `bmic:businessStateCharacteristics_aggregates_CostStructureElements` `bmicdcd:Fuel_costs` ;
255. `bmic:businessStateCharacteristics_aggregates_CostStructureElements` `bmicdcd:New_aircrafts` ;
256. `bmic:businessStateCharacteristics_aggregates_CostStructureElements` `bmicdcd:Salaries` ;
257. `bmic:businessStateCharacteristics_aggregates_CostStructureElements` `bmicdcd:Website_costs` ;
258. `bmic:businessStateCharacteristics_aggregates_CustomerRelationships` `bmicdcd:Call_center` ;
259. `bmic:businessStateCharacteristics_aggregates_CustomerRelationships` `bmicdcd:Web_site` ;
260. `bmic:businessStateCharacteristics_aggregates_CustomerSegments` `bmicdcd:Business_travelers` ;
261. `bmic:businessStateCharacteristics_aggregates_CustomerSegments` `bmicdcd:Private_travelers` ;
262. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcd:Airplane_cleaning` ;
263. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcd:Airplane_maintenance` ;
264. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcd:Flight_operations` ;
265. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcd:Hiring_temporary_employees` ;
266. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcd:Online_ticket_sales` ;
267. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcd:Productivity-based_pay_incentives` ;
268. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcd:Timetable_planning` ;
269. `bmic:businessStateCharacteristics_aggregates_KeyActivities` `bmicdcd:Training_of_the_staff` ;
270. `bmic:businessStateCharacteristics_aggregates_KeyPartners` `bmicdcd:Aviation_authorities` ;
271. `bmic:businessStateCharacteristics_aggregates_KeyPartners` `bmicdcd:Boeing` ;
272. `bmic:businessStateCharacteristics_aggregates_KeyPartners` `bmicdcd:Code-sharing_airlines` ;
273. `bmic:businessStateCharacteristics_aggregates_KeyResources` `bmicdcd:Air_crews` ;
274. `bmic:businessStateCharacteristics_aggregates_KeyResources` `bmicdcd:Aircraft` ;
275. `bmic:businessStateCharacteristics_aggregates_KeyResources` `bmicdcd:Fuel` ;
276. `bmic:businessStateCharacteristics_aggregates_KeyResources` `bmicdcd:Website` ;
277. `bmic:businessStateCharacteristics_aggregates_OfferingValues` `bmicdcd:Assigned_seats` ;
278. `bmic:businessStateCharacteristics_aggregates_OfferingValues` `bmicdcd:Fast_travel_for_business_people` ;
279. `bmic:businessStateCharacteristics_aggregates_OfferingValues` `bmicdcd:Low-cost_flight` ;
280. `bmic:businessStateCharacteristics_aggregates_Offerings` `bmicdcd:Provide_low-cost_flight_service` ;
281. `bmic:businessStateCharacteristics_aggregates_RevenueStreams` `bmicdcd:Extras` ;
282. `bmic:businessStateCharacteristics_aggregates_RevenueStreams` `bmicdcd:Ticket_sales` ;
283. `rdfs:label` "Business Model after innovating"@en ;
284. .
285. `bmicdcd:Business_travelers`
286. `rdf:type` `bm:SegmentedMarket` ;
287. `bm:customerInterfaceParts_affects_FinancialAspectParts` `bmicdcd:Extras` ;
288. `bm:customerInterfaceParts_affects_FinancialAspectParts` `bmicdcd:Ticket_sales` ;
289. `bm:customerSegment_isAMultiSidedPlatform` "false"^^`xsd:boolean` ;
290. `bm:customerSegment_isDiversified` "false"^^`xsd:boolean` ;
291. `bm:customerSegments_receive_Offerings` `bmicdcd:Provide_low-cost_flight_service` ;
292. `bmic:customerSegments_benefitFrom_CustomerBenefits` `bmicdcd:Additional_comfort_is_payed_extra` ;

293. `bmic:customerSegments_benefitFrom_CustomerBenefits` `bmicdcd:Cheap_flights` ;
294. `bmic:customerSegments_benefitFrom_CustomerBenefits` `bmicdcd:Customer_pays_only_fo`
     `r_what_he_needs` ;
295. `rdfs:label` "Business travelers"@en ;
296. .
297. `bmicdcd:Call_center`
298. `rdf:type` `bm:PersonalAssistance` ;
299. `bm:customerInterfaceParts_affects_FinancialAspectParts` `bmicdcd:Salaries` ;
300. `bm:customerRelationships_influencedBy_CostStructureModels` `bm:CostDriven` ;
301. `bm:customerRelationships_maintain_CustomerSegments` `bmicdcd:Business_travelers` ;
302. `bm:customerRelationships_maintain_CustomerSegments` `bmicdcd:Private_travelers` ;
303. `bm:customerRelationships_promote_Offerings` `bmicdcd:Provide_low-`
     `cost_flight_service` ;
304. `rdfs:label` "Call center"@en ;
305. .
306. `bmicdcd:Capability_Air_crews`
307. `rdf:type` `bc:CoreCapabilities` ;
308. `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdcd:Air_crews` ;
309. `rdfs:label` "Capability Air crews"@en ;
310. .
311. `bmicdcd:Capability_Aircraft`
312. `rdf:type` `bc:CoreCapabilities` ;
313. `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdcd:Aircraft` ;
314. `rdfs:label` "Capability Aircraft"@en ;
315. .
316. `bmicdcd:Capability_Airplane_maintenance`
317. `rdf:type` `bc:CoreCapabilities` ;
318. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdcd:Airplane_cleaning` ;
319. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdcd:Airplane_maintenance` ;
320. `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdcd:Aircraft` ;
321. `rdfs:label` "Capability Airplane maintenance"@en ;
322. .
323. `bmicdcd:Capability_Call_center`
324. `rdf:type` `archimateV3:Capability` ;
325. `rdfs:label` "Capability Call center" ;
326. .
327. `bmicdcd:Capability_Flight_operations`
328. `rdf:type` `bc:CoreCapabilities` ;
329. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdcd:Flight_operations` ;
330. `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdcd:Air_crews` ;
331. `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdcd:Aircraft` ;
332. `rdfs:label` "Capability Flight operations"@en ;
333. .
334. `bmicdcd:Capability_Online_ticket_sales`
335. `rdf:type` `bc:CoreCapabilities` ;
336. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdcd:Online_ticket_sales` ;
337. `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdcd:Website` ;
338. `rdfs:label` "Capability Online ticket sales"@en ;
339. .
340. `bmicdcd:Capability_Productivity-based_pay_incentives`
341. `rdf:type` `bc:CoreCapabilities` ;
342. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdcd:Hiring_temporary_employee`
     `s` ;
343. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdcd:Productivity-`
     `based_pay_incentives` ;
344. `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdcd:Air_crews` ;
345. `rdfs:label` "Capability Productivity-based pay incentives"@en ;
346. .
347. `bmicdcd:Capability_Ryanair_website`
348. `rdf:type` `archimateV3:Capability` ;
349. `rdfs:label` "Capability Ryanair website" ;
350. .
351. `bmicdcd:Capability_Timetable_planning`
352. `rdf:type` `bc:CoreCapabilities` ;
353. `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdcd:Timetable_planning` ;

354.   `rdfs:label` "Capability Timetable planning"@en ;
355.   .
356.   `bmicdcd:Capability_Training_of_the_staff`
357.   `rdf:type` `bc:CoreCapabilities` ;
358.   `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdcd:Hiring_temporary_employee`
       `s` ;
359.   `bmbc:coreCapabilities_composedOf_KeyActivities` `bmicdcd:Training_of_the_staff` ;
360.   `bmbc:coreCapabilities_composedOf_KeyResources` `bmicdcd:Air_crews` ;
361.   `rdfs:label` "Capability Training of the staff"@en ;
362.   .
363.   `bmicdcd:ChannelElementsAggregated`
364.   `rdf:type` `bmicm:ChannelElements` ;
365.   `bmicm:channelElements_specializedBy_DirectChannelElements` `bmicdcd:DirectChannelE`
       `lementsAggregated` ;
366.   `bmicm:channelElements_specializedBy_IndirectChannelElements` `bmicdcd:IndirectChan`
       `nelElementsAggregated` ;
367.   `rdfs:label` "ChannelElementsAggregated" ;
368.   .
369.   `bmicdcd:Cheap_flights`
370.   `rdf:type` `bic:CustomerBenefits` ;
371.   `bmic:customerBenefits_extends_OfferingValues` `bmicdcd:Low-cost_flight` ;
372.   `rdfs:label` "Cheap flights"@en ;
373.   .
374.   `bmicdcd:Code-sharing_airlines`
375.   `rdf:type` `bm:Business` ;
376.   `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdcd:Extras` ;
377.   `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdcd:Ticket_sales` ;
378.   `bm:infrastructureParts_enables_Offerings` `bmicdcd:Provide_low-`
       `cost_flight_service` ;
379.   `bm:infrastructureParts_influencedBy_EconomicAdvantages` `bm:EconomiesOfScale` ;
380.   `bm:keyPartners_facilitate_KeyActivities` `bmicdcd:Flight_operations` ;
381.   `bm:keyPartners_facilitate_KeyActivities` `bmicdcd:Timetable_planning` ;
382.   `bm:keyPartners_influencedBy_CostStructureModels` `bm:CostDriven` ;
383.   `bm:keyPartners_justifiedBy_KeyPartnershipGoals` `bm:OutsourcingInfrastructure` ;
384.   `bm:keyPartners_justifiedBy_KeyPartnershipGoals` `bm:ReduceCosts` ;
385.   `bm:keyPartners_provide_KeyRessources` `bmicdcd:Air_crews` ;
386.   `bm:keyPartners_provide_KeyRessources` `bmicdcd:Aircraft` ;
387.   `bm:keyPartners_provide_KeyRessources` `bmicdcd:Fuel` ;
388.   `rdfs:label` "Code-sharing airlines"@en ;
389.   .
390.   `bmicdcd:ConstructionIndustrySpecificsAggregated`
391.   `rdf:type` `bmicm:ConstructionIndustrySpecifics` ;
392.   `rdfs:label` "ConstructionIndustrySpecificsAggregated" ;
393.   .
394.   `bmicdcd:CostStructureElementsAggregated`
395.   `rdf:type` `bmicm:CostStructureElements` ;
396.   `bmicm:costStructureElements_specializedBy_FixedCost` `bmicdcd:New_aircrafts` ;
397.   `bmicm:costStructureElements_specializedBy_FixedCost` `bmicdcd:Salaries` ;
398.   `bmicm:costStructureElements_specializedBy_FixedCost` `bmicdcd:Website_costs` ;
399.   `bmicm:costStructureElements_specializedBy_VariableCost` `bmicdcd:Aircraft_maintena`
       `nce` ;
400.   `bmicm:costStructureElements_specializedBy_VariableCost` `bmicdcd:Fuel_costs` ;
401.   `rdfs:label` "CostStructureElementsAggregated" ;
402.   .
403.   `bmicdcd:CustomerInterfaceElementsAggregated`
404.   `rdf:type` `bmicm:CustomerInterfaceElements` ;
405.   `bmicm:customerInterfaceElements_specializedBy_ChannelElements` `bmicdcd:ChannelEle`
       `mentsAggregated` ;
406.   `bmicm:customerInterfaceElements_specializedBy_CustomerRelationshipElements` `bmicd`
       `cd:CustomerRelationshipElementsAggregated` ;
407.   `bmicm:customerInterfaceElements_specializedBy_CustomerSegmentElements` `bmicdcd:Cu`
       `stomerSegmentElementsAggregated` ;
408.   `rdfs:label` "CustomerInterfaceElementsAggregated" ;
409.   .
410.   `bmicdcd:CustomerRelationshipElementsAggregated`

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411.    rdf:type bmicm:CustomerRelationshipElements ;
412.    bmicm:customerRelationshipElements_specializedBy_HumanInteractionElements bmicdc
        d:HumanInteractionElementsAggregated ;
413.    bmicm:customerRelationshipElements_specializedBy_NonHumanInteractionElements bmi
        cdcd:NonHumanInteractionElementsAggregated ;
414.    rdfs:label "CustomerRelationshipElementsAggregated" ;
415.    .
416.    bmicdcd:CustomerSegmentElementsAggregated
417.    rdf:type bmicm:CustomerSegmentElements ;
418.    bmicm:customerSegmentElements_specializedBy_SegmentedMarket bmicdcd:Business_tra
        velers ;
419.    bmicm:customerSegmentElements_specializedBy_SegmentedMarket bmicdcd:Private_trav
        elers ;
420.    rdfs:label "CustomerSegmentElementsAggregated" ;
421.    .
422.    bmicdcd:Customer_pays_only_for_what_he_needs
423.    rdf:type bic:CustomerBenefits ;
424.    bmic:customerBenefits_extends_OfferingValues bmicdcd:Low-cost_flight ;
425.    rdfs:label "Customer pays only for what he needs"@en ;
426.    .
427.    bmicdcd:DirectChannelElementsAggregated
428.    rdf:type bmicm:DirectChannelElements ;
429.    bmicm:directChannelElements_specializedBy_WebSale bmicdcd:Ryanair_website ;
430.    rdfs:label "DirectChannelElementsAggregated" ;
431.    .
432.    bmicdcd:EU_regulations_have_to_be_met
433.    rdf:type bic:OrganisationalBarriers ;
434.    rdfs:label "EU regulations have to be met"@en ;
435.    .
436.    bmicdcd:Enough_places_for_the_aircrafts_at_the_airports_are_needed
437.    rdf:type bic:PhysicalBarriers ;
438.    rdfs:label "Enough places for the aircrafts at the airports are needed"@en ;
439.    .
440.    bmicdcd:Extras
441.    rdf:type bm:AssetSale ;
442.    bm:revenueStreams_dependOn_Offerings bmicdcd:Provide_low-cost_flight_service ;
443.    bm:revenueStreams_pricedBy_PricingMechanisms bm:YieldManagement ;
444.    rdfs:label "Extras such as food, beveragesm, ..."@en ;
445.    .
446.    bmicdcd:Fast_travel_for_business_people
447.    rdf:type bm:SpeedOfService ;
448.    bm:offeringValues_influencedBy_CostStructureModels bm:CostDriven ;
449.    rdfs:label "Fast travel for business people"@en ;
450.    .
451.    bmicdcd:FeeBasedRevenueElementsAggregated
452.    rdf:type bmicm:FeeBasedRevenueElements ;
453.    rdfs:label "FeeBasedRevenueElementsAggregated" ;
454.    .
455.    bmicdcd:FinancialAspectElementsAggregated
456.    rdf:type bmicm:FinancialAspectElements ;
457.    bmicm:financialAspectElements_specializedBy_CostStructureElements bmicdcd:CostSt
        ructureElementsAggregated ;
458.    bmicm:financialAspectElements_specializedBy_RevenueStreamElements bmicdcd:Revenu
        eStreamElementsAggregated ;
459.    rdfs:label "FinancialAspectElementsAggregated" ;
460.    .
461.    bmicdcd:FinancialElementsAggregated
462.    rdf:type bmicm:FinancialElements ;
463.    rdfs:label "FinancialElementsAggregated" ;
464.    .
465.    bmicdcd:Flight_operations
466.    rdf:type bm:CoreProcess ;
467.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Extras ;
468.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Fuel_costs ;
469.    bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Salaries ;
```

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470.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Ticket_sales ;
471.   bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
       cost_flight_service ;
472.   bm:keyActivities_require_KeyRessources bmicdcd:Air_crews ;
473.   bm:keyActivities_require_KeyRessources bmicdcd:Aircraft ;
474.   bm:keyActivities_require_KeyRessources bmicdcd:Fuel ;
475.   bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
476.   rdfs:label "Flight operations"@en ;
477.   .
478.   bmicdcd:Fuel
479.   rdf:type bm:Physical ;
480.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Fuel_costs ;
481.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Ticket_sales ;
482.   bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
       cost_flight_service ;
483.   bm:keyRessources_enables_KeyActivities bmicdcd:Flight_operations ;
484.   bmbc:keyResources_isACoreCapability "false"^^xsd:boolean ;
485.   rdfs:label "Fuel"@en ;
486.   .
487.   bmicdcd:Fuel_costs
488.   rdf:type bm:VariableCost ;
489.   bm:costStructureElements_affectedBy_Offerings bmicdcd:Provide_low-
       cost_flight_service ;
490.   bm:costStructureElements_justifiedBy_CostStructureModels bm:CostDriven ;
491.   rdfs:label "Fuel costs"@en ;
492.   .
493.   bmicdcd:Hiring_temporary_employees
494.   rdf:type bm:SupportProcess ;
495.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Salaries ;
496.   bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
       cost_flight_service ;
497.   bm:keyActivities_require_KeyRessources bmicdcd:Air_crews ;
498.   bmbc:keyActivities_isACoreCapability "false"^^xsd:boolean ;
499.   rdfs:label "Hiring temporary employees"@en ;
500.   .
501.   bmicdcd:HumanBasedCapabilityElementsAggregated
502.   rdf:type bmicm:HumanBasedCapabilityElements ;
503.   rdfs:label "HumanBasedCapabilityElementsAggregated" ;
504.   .
505.   bmicdcd:HumanInteractionElementsAggregated
506.   rdf:type bmicm:HumanInteractionElements ;
507.   bmicm:humanInteractionElements_specializedBy_PersonalAssistance bmicdcd:Call_cen
       ter ;
508.   rdfs:label "HumanInteractionElementsAggregated" ;
509.   .
510.   bmicdcd:Increase_of_capacity_rate_of_seats
511.   rdf:type bic:InvolvedPartyBenefits ;
512.   rdfs:label "Increase of capacity rate of seats"@en ;
513.   .
514.   bmicdcd:IndirectChannelElementsAggregated
515.   rdf:type bmicm:IndirectChannelElements ;
516.   rdfs:label "CustomerSegmentElementsAggregated" ;
517.   .
518.   bmicdcd:InfrastructureElementsAggregated
519.   rdf:type bmicm:InfrastructureElements ;
520.   bmicm:infrastructureElements_specializedBy_KeyActivityElements bmicdcd:KeyActivi
       tyElementsAggregated ;
521.   bmicm:infrastructureElements_specializedBy_KeyPartnerElements bmicdcd:KeyPartner
       ElementsAggregated ;
522.   bmicm:infrastructureElements_specializedBy_KeyResourceElements bmicdcd:KeyResour
       ceElementsAggregated ;
523.   rdfs:label "InfrastructureElementsAggregated" ;
524.   .
525.   bmicdcd:IntangibleProduct_Provide_low-cost_flight_service
526.   rdf:type eo:IntangibleProduct ;
```

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527.   rdfs:label "IntangibleProduct Provide low-cost flight service" ;
528.   .
529.   bmicdcd:IntellectualElementsAggregated
530.   rdf:type bmicm:IntellectualElements ;
531.   rdfs:label "CustomerSegmentElementsAggregated" ;
532.   .
533.   bmicdcd:Investors_are_needed
534.   rdf:type bic:FinancialBarriers ;
535.   rdfs:label "Investors are needed"@en ;
536.   .
537.   bmicdcd:KeyActivityElementsAggregated
538.   rdf:type bmicm:KeyActivityElements ;
539.   bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcd:Airplane_cleaning ;
540.   bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcd:Airplane_maintenance
       ;
541.   bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcd:Flight_operations ;
542.   bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcd:Online_ticket_sales
       ;
543.   bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcd:Productivity-
       based_pay_incentives ;
544.   bmicm:keyActivityElements_specializedBy_CoreProcess bmicdcd:Timetable_planning ;
545.   bmicm:keyActivityElements_specializedBy_SupportProcess bmicdcd:Hiring_temporary_
       employees ;
546.   bmicm:keyActivityElements_specializedBy_SupportProcess bmicdcd:Training_of_the_s
       taff ;
547.   rdfs:label "KeyActivityElementsAggregated" ;
548.   .
549.   bmicdcd:KeyPartnerElementsAggregated
550.   rdf:type bmicm:KeyPartnerElements ;
551.   bmicm:keyPartnerElements_specializedBy_Business bmicdcd:Boeing ;
552.   bmicm:keyPartnerElements_specializedBy_Business bmicdcd:Code-sharing_airlines ;
553.   bmicm:keyPartnerElements_specializedBy_Government bmicdcd:Aviation_authorities ;
554.   rdfs:label "KeyPartnerElementsAggregated" ;
555.   .
556.   bmicdcd:KeyResourceElementsAggregated
557.   rdf:type bmicm:KeyResourceElements ;
558.   bmicm:keyResourceElements_specializedBy_FinancialElements bmicdcd:FinancialEleme
       ntsAggregated ;
559.   bmicm:keyResourceElements_specializedBy_Human bmicdcd:Air_crews ;
560.   bmicm:keyResourceElements_specializedBy_IntellectualElements bmicdcd:Intellectua
       lElementsAggregated ;
561.   bmicm:keyResourceElements_specializedBy_PhysicalElements bmicdcd:PhysicalElement
       sAggregated ;
562.   rdfs:label "CustomerSegmentElementsAggregated" ;
563.   .
564.   bmicdcd:LearnedBMICaseDD
565.   rdf:type cbr:CaseStateHistory ;
566.   cbr:belongsToCase bmicdcd:BMICase_D ;
567.   cbr:caseStateTimestamp "2020-12-04T23:32:31.07"^^xsd:dateTime ;
568.   cbr:hasCaseState cbr:Learned_CaseState ;
569.   rdfs:label "LearnedBMICaseDD" ;
570.   .
571.   bmicdcd:Low-cost_flight
572.   rdf:type bm:Price ;
573.   bm:offeringValues_influencedBy_CostStructureModels bm:CostDriven ;
574.   rdfs:label "Low-cost flight "@en ;
575.   .
576.   bmicdcd:Low-cost_strategy
577.   rdf:type bic:StrategicGoals ;
578.   rdfs:label "Low-cost strategy"@en ;
579.   .
580.   bmicdcd:Low_budget_leads_to_bad_service
581.   rdf:type bic:RisksOfInnovation ;
582.   rdfs:label "Low budget leads to bad service"@en ;
583.   .
```

584. `bmicdcd:`Marketfocus_Europa
585. `rdf:`type `bic:`StrategicGoals ;
586. `rdfs:`label "Marketfocus Europa"@en ;
587. .
588. `bmicdcd:`MotivationAspectElementsAggregated
589. `rdf:`type `bmicm:`MotivationAspectElements ;
590. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcd:`Outcome_Aircraft_ma intenance ;
591. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcd:`Outcome_Extras ;
592. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcd:`Outcome_Fuel_costs ;
593. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcd:`Outcome_New_aircraf ts ;
594. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcd:`Outcome_Salaries ;
595. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcd:`Outcome_Ticket_sale s ;
596. `bmicm:`motivationAspectElements_specializedBy_Outcome `bmicdcd:`Outcome_Website_cos ts ;
597. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcd:`Stakeholder_Avi ation_authorities ;
598. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcd:`Stakeholder_Boe ing ;
599. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcd:`Stakeholder_Bus iness_travelers ;
600. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcd:`Stakeholder_Cod e-sharing_airlines ;
601. `bmicm:`motivationAspectElements_specializedBy_Stakeholder `bmicdcd:`Stakeholder_Pri vate_travelers ;
602. `bmicm:`motivationAspectElements_specializedBy_Value `bmicdcd:`Value_Assigned_seats ;
603. `bmicm:`motivationAspectElements_specializedBy_Value `bmicdcd:`Value_Fast_travel_for _business_people ;
604. `bmicm:`motivationAspectElements_specializedBy_Value `bmicdcd:`Value_Low- cost_flight ;
605. `rdfs:`label "MotivationAspectElementsAggregated" ;
606. .
607. `bmicdcd:`New_aircrafts
608. `rdf:`type `bm:`FixedCost ;
609. `bm:`costStructureElements_affectedBy_Offerings `bmicdcd:`Provide_low- cost_flight_service ;
610. `bm:`costStructureElements_justifiedBy_CostStructureModels `bm:`CostDriven ;
611. `rdfs:`label "New aircrafts"@en ;
612. .
613. `bmicdcd:`NonHumanInteractionElementsAggregated
614. `rdf:`type `bmicm:`NonHumanInteractionElements ;
615. `bmicm:`nonHumanInteractionElements_specializedBy_SelfService `bmicdcd:`Web_site ;
616. `rdfs:`label "CustomerSegmentElementsAggregated" ;
617. .
618. `bmicdcd:`OfferingElementsAggregated
619. `rdf:`type `bmicm:`OfferingElements ;
620. `bmicm:`offeringElements_specializedBy_Service `bmicdcd:`Provide_low- cost_flight_service ;
621. `rdfs:`label "CustomerSegmentElementsAggregated" ;
622. .
623. `bmicdcd:`OfferingValueElementsAggregated
624. `rdf:`type `bmicm:`OfferingValueElements ;
625. `bmicm:`offeringValueElements_specializedBy_QualitativeValueElements `bmicdcd:`Quali tativeValueElementsAggregated ;
626. `bmicm:`offeringValueElements_specializedBy_QuantitativeValueElements `bmicdcd:`Quan titativeValueElementsAggregated ;
627. `rdfs:`label "CustomerSegmentElementsAggregated" ;
628. .
629. `bmicdcd:`Online_ticket_sales
630. `rdf:`type `bm:`CoreProcess ;
631. `bm:`infrastructureParts_affects_FinancialAspectParts `bmicdcd:`Extras ;

632.　bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Salaries ;
633.　bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Ticket_sales ;
634.　bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-cost_flight_service ;
635.　bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
636.　bm:keyActivities_require_KeyRessources bmicdcd:Website ;
637.　bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
638.　rdfs:label "Online ticket sales"@en ;
639.　.
640.　bmicdcd:Only_cheap_airports
641.　rdf:type bic:StrategicGoals ;
642.　bmic:strategicGoals_represents_KeyPartnershipGoals bm:ReduceCosts ;
643.　rdfs:label "Only cheap airports"@en ;
644.　.
645.　bmicdcd:Only_one_aircraft_type
646.　rdf:type bic:StrategicGoals ;
647.　bmic:strategicGoals_represents_KeyPartnershipGoals bm:ReduceCosts ;
648.　rdfs:label "Only one aircraft type"@en ;
649.　.
650.　bmicdcd:Other_airlines_for_code-sharing
651.　rdf:type bic:InvolvedParties ;
652.　bic:involvedParties_belongsTo_Industry bic:TravelAndTourismAndHospitality ;
653.　bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdcd:Increase_of_capacity_rate_of_seats ;
654.　bic:involvedParties_isCaseCompany "false"^^xsd:boolean ;
655.　bic:involvedParties_isPartnerCompany "true"^^xsd:boolean ;
656.　bic:involvedParties_partOf_Cases bmicdcd:BMICase_D ;
657.　bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcd:Aircraft_crew ;
658.　bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcd:Aircrafts ;
659.　bmic:involvedParties_aggregates_KeyPartners bmicdcd:Code-sharing_airlines ;
660.　rdfs:label "Other airlines for code-sharing"@en ;
661.　.
662.　bmicdcd:Outcome_Aircraft_maintenance
663.　rdf:type archimateV3:Outcome ;
664.　rdfs:label "Outcome Aircraft maintenance" ;
665.　.
666.　bmicdcd:Outcome_Extras
667.　rdf:type archimateV3:Outcome ;
668.　rdfs:label "Outcome Extras" ;
669.　.
670.　bmicdcd:Outcome_Fuel_costs
671.　rdf:type archimateV3:Outcome ;
672.　rdfs:label "Outcome Fuel costs" ;
673.　.
674.　bmicdcd:Outcome_New_aircrafts
675.　rdf:type archimateV3:Outcome ;
676.　rdfs:label "Outcome New aircrafts" ;
677.　.
678.　bmicdcd:Outcome_Salaries
679.　rdf:type archimateV3:Outcome ;
680.　rdfs:label "Outcome Salaries" ;
681.　.
682.　bmicdcd:Outcome_Ticket_sales
683.　rdf:type archimateV3:Outcome ;
684.　rdfs:label "Outcome Ticket sales" ;
685.　.
686.　bmicdcd:Outcome_Website_costs
687.　rdf:type archimateV3:Outcome ;
688.　rdfs:label "Outcome Website costs" ;
689.　.
690.　bmicdcd:PhysicalElementsAggregated
691.　rdf:type bmicm:PhysicalElements ;
692.　bmicm:physicalElements_specializedBy_ITSystems bmicdcd:Website ;
693.　bmicm:physicalElements_specializedBy_Vehicles bmicdcd:Aircraft ;

694.   rdfs:label "PhysicalElementsAggregated" ;
695.   .
696.   bmicdcd:Private_travelers
697.   rdf:type bm:SegmentedMarket ;
698.   bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcd:Extras ;
699.   bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcd:Ticket_sales ;
700.   bm:customerSegment_isAMultiSidedPlatform "false"^^xsd:boolean ;
701.   bm:customerSegment_isDiversified "false"^^xsd:boolean ;
702.   bm:customerSegments_receive_Offerings bmicdcd:Provide_low-cost_flight_service ;
703.   bmic:customerSegments_benefitFrom_CustomerBenefits bmicdcd:Additional_comfort_is
       _payed_extra ;
704.   bmic:customerSegments_benefitFrom_CustomerBenefits bmicdcd:Cheap_flights ;
705.   bmic:customerSegments_benefitFrom_CustomerBenefits bmicdcd:Customer_pays_only_fo
       r_what_he_needs ;
706.   rdfs:label "Private travelers"@en ;
707.   .
708.   bmicdcd:Productivity-based_pay_incentives
709.   rdf:type bm:CoreProcess ;
710.   bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Salaries ;
711.   bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
       cost_flight_service ;
712.   bm:keyActivities_require_KeyRessources bmicdcd:Air_crews ;
713.   bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
714.   rdfs:label "Productivity-based pay incentives"@en ;
715.   .
716.   bmicdcd:Provide_low-cost_flight_service
717.   rdf:type bm:Service ;
718.   bm:offerings_basedOn_KeyRessources bmicdcd:Air_crews ;
719.   bm:offerings_basedOn_KeyRessources bmicdcd:Aircraft ;
720.   bm:offerings_basedOn_KeyRessources bmicdcd:Fuel ;
721.   bm:offerings_basedOn_KeyRessources bmicdcd:Website ;
722.   bm:offerings_provide_OfferingValues bmicdcd:Assigned_seats ;
723.   bm:offerings_provide_OfferingValues bmicdcd:Fast_travel_for_business_people ;
724.   bm:offerings_provide_OfferingValues bmicdcd:Low-cost_flight ;
725.   bm:offerings_require_KeyActivities bmicdcd:Airplane_cleaning ;
726.   bm:offerings_require_KeyActivities bmicdcd:Airplane_maintenance ;
727.   bm:offerings_require_KeyActivities bmicdcd:Flight_operations ;
728.   bm:offerings_require_KeyActivities bmicdcd:Hiring_temporary_employees ;
729.   bm:offerings_require_KeyActivities bmicdcd:Online_ticket_sales ;
730.   bm:offerings_require_KeyActivities bmicdcd:Productivity-based_pay_incentives ;
731.   bm:offerings_require_KeyActivities bmicdcd:Timetable_planning ;
732.   bm:offerings_require_KeyActivities bmicdcd:Training_of_the_staff ;
733.   bm:offerings_valueFor_CustomerSegments bmicdcd:Business_travelers ;
734.   bm:offerings_valueFor_CustomerSegments bmicdcd:Private_travelers ;
735.   rdfs:label "Provide low-cost flight service"@en ;
736.   .
737.   bmicdcd:QualitativeValueElementsAggregated
738.   rdf:type bmicm:QualitativeValueElements ;
739.   bmicm:qualitativeValueElements_specializedBy_Convenience bmicdcd:Assigned_seats
       ;
740.   rdfs:label "QualitativeValueElementsAggregated" ;
741.   .
742.   bmicdcd:QuantitativeValueElementsAggregated
743.   rdf:type bmicm:QuantitativeValueElements ;
744.   bmicm:quantitativeValueElements_specializedBy_Price bmicdcd:Low-cost_flight ;
745.   bmicm:quantitativeValueElements_specializedBy_SpeedOfService bmicdcd:Fast_travel
       _for_business_people ;
746.   rdfs:label "QuantitativeValueElementsAggregated" ;
747.   .
748.   bmicdcd:Reach_200_mio_of_customers_per_year
749.   rdf:type bic:StrategicGoals ;
750.   rdfs:label "Reach 200 mio of customers per year"@en ;
751.   .
752.   bmicdcd:RequiredResourcesAggregated
753.   rdf:type bmicm:RequiredResources ;

754.   `bmicm:requiredResources_specializedBy_FinancialRessources bmicdcd:A_lot_of_capit`
     `al ;`
755.   `bmicm:requiredResources_specializedBy_HumanRessources bmicdcd:Aircraft_crew ;`
756.   `bmicm:requiredResources_specializedBy_PhysicalRessources bmicdcd:Aircrafts ;`
757.   `rdfs:label "CustomerSegmentElementsAggregated" ;`
758.   `.`
759.   `bmicdcd:Resource_Air_crews`
760.   `rdf:type archimateV3:Resource ;`
761.   `rdfs:label "Resource Air crews" ;`
762.   `.`
763.   `bmicdcd:Resource_Aircraft`
764.   `rdf:type archimateV3:Resource ;`
765.   `rdfs:label "Resource Aircraft" ;`
766.   `.`
767.   `bmicdcd:Resource_Fuel`
768.   `rdf:type archimateV3:Resource ;`
769.   `rdfs:label "Resource Fuel" ;`
770.   `.`
771.   `bmicdcd:Resource_Website`
772.   `rdf:type archimateV3:Resource ;`
773.   `rdfs:label "Resource Website" ;`
774.   `.`
775.   `bmicdcd:RevenueStreamElementsAggregated`
776.   `rdf:type bmicm:RevenueStreamElements ;`
777.   `bmicm:revenueStreamElements_specializedBy_AssetSale bmicdcd:Extras ;`
778.   `bmicm:revenueStreamElements_specializedBy_AssetSale bmicdcd:Ticket_sales ;`
779.   `bmicm:revenueStreamElements_specializedBy_FeeBasedRevenueElements bmicdcd:FeeBas`
     `edRevenueElementsAggregated ;`
780.   `rdfs:label "CustomerSegmentElementsAggregated" ;`
781.   `.`
782.   `bmicdcd:Ryanair`
783.   `rdf:type bic:InvolvedParties ;`
784.   `bic:involvedParties_belongsTo_Industry bic:TravelAndTourismAndHospitality ;`
785.   `bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdcd:Additional_things_`
     `can_be_sold_to_customers ;`
786.   `bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdcd:Cheap_flights ;`
787.   `bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics`
     `bmicdcd:Business_Model_after_innovating ;`
788.   `bic:involvedParties_hasGoals_StrategicGoals bmicdcd:Low-cost_strategy ;`
789.   `bic:involvedParties_hasGoals_StrategicGoals bmicdcd:Marketfocus_Europa ;`
790.   `bic:involvedParties_hasGoals_StrategicGoals bmicdcd:Only_cheap_airports ;`
791.   `bic:involvedParties_hasGoals_StrategicGoals bmicdcd:Only_one_aircraft_type ;`
792.   `bic:involvedParties_hasGoals_StrategicGoals bmicdcd:Reach_200_mio_of_customers_p`
     `er_year ;`
793.   `bic:involvedParties_hasInnovationDrivers_Drivers bmicdcd:Becoming_Amazon_of_Trav`
     `el ;`
794.   `bic:involvedParties_hasInnovationDrivers_Drivers bmicdcd:Undercut_prices_of_comp`
     `etition ;`
795.   `bic:involvedParties_isCaseCompany "true"^^xsd:boolean ;`
796.   `bic:involvedParties_isPartnerCompany "false"^^xsd:boolean ;`
797.   `bic:involvedParties_mustOvercome_BarriersToOvercome bmicdcd:EU_regulations_have_`
     `to_be_met ;`
798.   `bic:involvedParties_mustOvercome_BarriersToOvercome bmicdcd:Enough_places_for_th`
     `e_aircrafts_at_the_airports_are_needed ;`
799.   `bic:involvedParties_mustOvercome_BarriersToOvercome bmicdcd:Investors_are_needed`
     `;`
800.   `bic:involvedParties_numberOfEmployeesIs 16800 ;`
801.   `bic:involvedParties_partOf_Cases bmicdcd:BMICase_D ;`
802.   `bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcd:A_lot_of_ca`
     `pital ;`
803.   `bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcd:Aircraft_cr`
     `ew ;`
804.   `bic:involvedParties_requiresForInnovation_RequiredRessources bmicdcd:Aircrafts ;`
805.   `bic:involvedParties_risksOf_RisksOfInnovation bmicdcd:Bad_flight_hours ;`

806. `bic:involvedParties_risksOf_RisksOfInnovation` `bmicdcd:Low_budget_leads_to_bad_se`
      `rvice` ;
807. `bic:involvedParties_risksOf_RisksOfInnovation` `bmicdcd:Unpunctual_flights_because`
      `_of_budget_cuts` ;
808. `bic:involvedParties_turnoverIs` `7600000000` ;
809. `rdfs:label` `"Ryanair"@en` ;
810. .
811. `bmicdcd:Ryanair_website`
812. `rdf:type` `bm:WebSale` ;
813. `bm:channel_hasChannelOwnerType` `"Own"@en` ;
814. `bm:channel_hasChannelPhaseType` `"After Sales"@en` ;
815. `bm:channel_hasChannelPhaseType` `"Awareness"@en` ;
816. `bm:channel_hasChannelPhaseType` `"Evaluation"@en` ;
817. `bm:channel_hasChannelPhaseType` `"Purchase"@en` ;
818. `bm:channels_deliverTo_CustomerSegments` `bmicdcd:Business_travelers` ;
819. `bm:channels_deliverTo_CustomerSegments` `bmicdcd:Private_travelers` ;
820. `bm:channels_deliver_Offerings` `bmicdcd:Provide_low-cost_flight_service` ;
821. `bm:channels_fits_CustomerRelationships` `bmicdcd:Web_site` ;
822. `bm:channels_generate_RevenueStreams` `bmicdcd:Extras` ;
823. `bm:channels_generate_RevenueStreams` `bmicdcd:Ticket_sales` ;
824. `bm:customerInterfaceParts_affects_FinancialAspectParts` `bmicdcd:Extras` ;
825. `bm:customerInterfaceParts_affects_FinancialAspectParts` `bmicdcd:Ticket_sales` ;
826. `bm:customerInterfaceParts_affects_FinancialAspectParts` `bmicdcd:Website_costs` ;
827. `rdfs:label` `"Ryanair website"@en` ;
828. .
829. `bmicdcd:Salaries`
830. `rdf:type` `bm:FixedCost` ;
831. `bm:costStructureElements_affectedBy_Offerings` `bmicdcd:Provide_low-`
      `cost_flight_service` ;
832. `bm:costStructureElements_justifiedBy_CostStructureModels` `bm:CostDriven` ;
833. `rdfs:label` `"Salaries"@en` ;
834. .
835. `bmicdcd:Stakeholder_Aviation_authorities`
836. `rdf:type` `archimateV3:Stakeholder` ;
837. `rdfs:label` `"Stakeholder Aviation authorities"` ;
838. .
839. `bmicdcd:Stakeholder_Boeing`
840. `rdf:type` `archimateV3:Stakeholder` ;
841. `rdfs:label` `"Stakeholder Boeing"` ;
842. .
843. `bmicdcd:Stakeholder_Business_travelers`
844. `rdf:type` `archimateV3:Stakeholder` ;
845. `rdfs:label` `"Stakeholder Business travelers "` ;
846. .
847. `bmicdcd:Stakeholder_Code-sharing_airlines`
848. `rdf:type` `archimateV3:Stakeholder` ;
849. `rdfs:label` `"Stakeholder Code-sharing airlines "` ;
850. .
851. `bmicdcd:Stakeholder_Private_travelers`
852. `rdf:type` `archimateV3:Stakeholder` ;
853. `rdfs:label` `"Stakeholder Private travelers"` ;
854. .
855. `bmicdcd:StrategyLayerElementsAggregated`
856. `rdf:type` `bmicm:StrategyLayerElements` ;
857. `bmicm:strategyLayerElements_specializedBy_Capability` `bmicdcd:Capability_Call_cen`
      `ter` ;
858. `bmicm:strategyLayerElements_specializedBy_Capability` `bmicdcd:Capability_Ryanair_`
      `website` ;
859. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdcd:Resource_Air_crews` ;
860. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdcd:Resource_Aircraft` ;
861. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdcd:Resource_Fuel` ;
862. `bmicm:strategyLayerElements_specializedBy_Resource` `bmicdcd:Resource_Website` ;
863. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdcd:ValueStream_Airpla`
      `ne_cleaning` ;

864. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdcd:ValueStream_Airplane_maintenance` ;
865. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdcd:ValueStream_Flight_operations` ;
866. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdcd:ValueStream_Hiring_temporary_employees` ;
867. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdcd:ValueStream_Online_ticket_sales` ;
868. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdcd:ValueStream_Timetable_planning` ;
869. `bmicm:strategyLayerElements_specializedBy_ValueStream` `bmicdcd:ValueStream_Training_of_the_staff` ;
870. `rdfs:label` "StrategyLayerElementsAggregated" ;
871. .
872. `bmicdcd:TechnologyLayerElementsAggregated`
873. `rdf:type` `bmicm:TechnologyLayerElements` ;
874. `rdfs:label` "TechnologyLayerElementsAggregated" ;
875. .
876. `bmicdcd:Ticket_sales`
877. `rdf:type` `bm:AssetSale` ;
878. `bm:revenueStreams_dependOn_Offerings` `bmicdcd:Provide_low-cost_flight_service` ;
879. `bm:revenueStreams_pricedBy_PricingMechanisms` `bm:YieldManagement` ;
880. `rdfs:label` "Ticket sales"@en ;
881. .
882. `bmicdcd:Timetable_planning`
883. `rdf:type` `bm:CoreProcess` ;
884. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdcd:Ticket_sales` ;
885. `bm:infrastructureParts_enables_Offerings` `bmicdcd:Provide_low-cost_flight_service` ;
886. `bmbc:keyActivities_isACoreCapability` "true"^^`xsd:`boolean ;
887. `rdfs:label` "Timetable planning"@en ;
888. .
889. `bmicdcd:Training_of_the_staff`
890. `rdf:type` `bm:SupportProcess` ;
891. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdcd:Salaries` ;
892. `bm:infrastructureParts_enables_Offerings` `bmicdcd:Provide_low-cost_flight_service` ;
893. `bm:keyActivities_require_KeyRessources` `bmicdcd:Air_crews` ;
894. `bmbc:keyActivities_isACoreCapability` "true"^^`xsd:`boolean ;
895. `rdfs:label` "Training of the staff"@en ;
896. .
897. `bmicdcd:Undercut_prices_of_competition`
898. `rdf:type` `bic:Drivers` ;
899. `rdfs:label` "Undercut prices of competition"@en ;
900. .
901. `bmicdcd:Unpunctual_flights_because_of_budget_cuts`
902. `rdf:type` `bic:RisksOfInnovation` ;
903. `rdfs:label` "Unpunctual flights because of budget cuts"@en ;
904. .
905. `bmicdcd:ValuePropositionElementsAggregated`
906. `rdf:type` `bmicm:ValuePropositionElements` ;
907. `bmicm:valuePropositionElements_specializedBy_OfferingElements` `bmicdcd:OfferingElementsAggregated` ;
908. `bmicm:valuePropositionElements_specializedBy_OfferingValueElements` `bmicdcd:OfferingValueElementsAggregated` ;
909. `rdfs:label` "ValuePropositionElementsAggregated" ;
910. .
911. `bmicdcd:ValueStream_Airplane_cleaning`
912. `rdf:type` `archimateV3:ValueStream` ;
913. `rdfs:label` "ValueStream Airplane cleaning" ;
914. .
915. `bmicdcd:ValueStream_Airplane_maintenance`
916. `rdf:type` `archimateV3:ValueStream` ;
917. `rdfs:label` "ValueStream Airplane maintenance" ;
918. .

```
919.  bmicdcd:ValueStream_Flight_operations
920.  rdf:type archimateV3:ValueStream ;
921.  rdfs:label "ValueStream Flight operations" ;
922.  .
923.  bmicdcd:ValueStream_Hiring_temporary_employees
924.  rdf:type archimateV3:ValueStream ;
925.  rdfs:label "ValueStream Hiring temporary employees" ;
926.  .
927.  bmicdcd:ValueStream_Online_ticket_sales
928.  rdf:type archimateV3:ValueStream ;
929.  rdfs:label "ValueStream Online ticket sales" ;
930.  .
931.  bmicdcd:ValueStream_Timetable_planning
932.  rdf:type archimateV3:ValueStream ;
933.  rdfs:label "ValueStream Timetable planning" ;
934.  .
935.  bmicdcd:ValueStream_Training_of_the_staff
936.  rdf:type archimateV3:ValueStream ;
937.  rdfs:label "ValueStream Training of the staff " ;
938.  .
939.  bmicdcd:Value_Assigned_seats
940.  rdf:type archimateV3:Value ;
941.  rdfs:label "Value Assigned seats" ;
942.  .
943.  bmicdcd:Value_Fast_travel_for_business_people
944.  rdf:type archimateV3:Value ;
945.  rdfs:label "Value Fast travel for business people " ;
946.  .
947.  bmicdcd:Value_Low-cost_flight
948.  rdf:type archimateV3:Value ;
949.  rdfs:label "Value Low-cost flight" ;
950.  .
951.  bmicdcd:Web_site
952.  rdf:type bm:SelfService ;
953.  bm:customerInterfaceParts_affects_FinancialAspectParts bmicdcd:Website_costs ;
954.  bm:customerRelationships_enabledBy_KeyRessources bmicdcd:Website ;
955.  bm:customerRelationships_influencedBy_CostStructureModels bm:CostDriven ;
956.  bm:customerRelationships_maintain_CustomerSegments bmicdcd:Business_travelers ;
957.  bm:customerRelationships_maintain_CustomerSegments bmicdcd:Private_travelers ;
958.  bm:customerRelationships_promote_Offerings bmicdcd:Provide_low-
      cost_flight_service ;
959.  rdfs:label "Web site"@en ;
960.  .
961.  bmicdcd:Website
962.  rdf:type bm:ITSystems ;
963.  bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Ticket_sales ;
964.  bm:infrastructureParts_affects_FinancialAspectParts bmicdcd:Website_costs ;
965.  bm:infrastructureParts_enables_Offerings bmicdcd:Provide_low-
      cost_flight_service ;
966.  bm:keyRessources_enables_KeyActivities bmicdcd:Online_ticket_sales ;
967.  bm:keyRessources_enables_KeyActivities bmicdcd:Timetable_planning ;
968.  bmbc:keyResources_isACoreCapability "false"^^xsd:boolean ;
969.  rdfs:label "Website"@en ;
970.  .
971.  bmicdcd:Website_costs
972.  rdf:type bm:FixedCost ;
973.  bm:costStructureElements_affectedBy_Offerings bmicdcd:Provide_low-
      cost_flight_service ;
974.  bm:costStructureElements_justifiedBy_CostStructureModels bm:CostDriven ;
975.  rdfs:label "Website costs"@en ;
976.  .
977.  <http://ikm-group.ch/bmiciscsm#BMIPossibilitiesView>
978.  cbr:caseViewDefinesCharacterisationOfCases bmicdcd:BMICase_D ;
979.  .
980.  <http://ikm-group.ch/bmiciscsm#BMITransformationView>
```

```
981.   cbr:caseViewDefinesCharacterisationOfCases bmicdcd:BMICase_D ;
982.   .
983.   <http://ikm-group.ch/bmiciscsm#EAInnovationView>
984.   cbr:caseViewDefinesCharacterisationOfCases bmicdcd:BMICase_D ;
985.   .
```

Appendix-E: Application Scenario Case

This appendix shows the code developed as part of this research to represent the application scenario case. The code is stored within the file BMICaseDataCaseE.ttl.

```
1.    # baseURI: http://ikm-group.ch/bmicdce
2.    # imports: http://ikm-group.ch/bmiciscsm
3.    # prefix: bmicdce
4.
5.    @prefix archi: <http://ikm-group.ch/archiMEO/archimate#> .
6.    @prefix archimateV3: <http://ikm-group.ch/archimateV3#> .
7.    @prefix bc: <http://ikm-group.ch/bc#> .
8.    @prefix bic: <http://ikm-group.ch/bic#> .
9.    @prefix bm: <http://ikm-group.ch/bm#> .
10.   @prefix bmbc: <http://ikm-group.ch/bmbc#> .
11.   @prefix bmea: <http://ikm-group.ch/bmea#> .
12.   @prefix bmic: <http://ikm-group.ch/bmic#> .
13.   @prefix bmicdce: <http://ikm-group.ch/bmicdce#> .
14.   @prefix bmicis: <http://ikm-group.ch/bmicis#> .
15.   @prefix bmicm: <http://ikm-group.ch/bmicm#> .
16.   @prefix cbr: <http://ikm-group.ch/cbr#> .
17.   @prefix ci: <http://ikm-group.ch/ci#> .
18.   @prefix eo: <http://ikm-group.ch/archiMEO/eo#> .
19.   @prefix owl: <http://www.w3.org/2002/07/owl#> .
20.   @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
21.   @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
22.   @prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
23.
24.   <http://ikm-group.ch/bmicdce>
25.   rdf:type owl:Ontology ;
26.   owl:imports <http://ikm-group.ch/bmiciscsm> ;
27.   owl:versionInfo "Created with TopBraid Composer"@en ;
28.   .
29.   bmicdce:Adapt_to_new_BIM-supporting_tools
30.   rdf:type bic:TechnologicalBarriers ;
31.   bmic:barriersToOvercome_represents_Constraint bmicdce:Constraint_Adapt_to_new_BIM-supporting_tools ;
32.   rdfs:label "Adapt to new BIM-supporting tools"@en ;
33.   .
34.   bmicdce:Adaption_to_modern_construction_method
35.   rdf:type bic:InvolvedPartyBenefits ;
36.   bmic:benefitsOfInnovation_represents_Value bmicdce:Value_Design_state-of-the-art_buildings ;
37.   bmic:benefitsOfInnovation_represents_Value bmicdce:Value_One-of-a-kind_building ;
38.   rdfs:label "Adaption to modern construction method"@en ;
39.   .
40.   bmicdce:ApplicationInterface_BIM-tool-GUI
41.   rdf:type archi:ApplicationInterface ;
42.   rdfs:label "ApplicationInterface BIM-tool GUI"@en ;
43.   .
44.   bmicdce:ApplicationLayerElementsAggregated
45.   rdf:type bmicm:ApplicationLayerElements ;
46.   bmicm:applicationLayerElements_specializedBy_ApplicationInterface bmicdce:ApplicationInterface_BIM-tool-GUI ;
47.   bmicm:applicationLayerElements_specializedBy_ApplicationService bmicdce:ApplicationService_Design_buildings_service ;
48.   bmicm:applicationLayerElements_specializedBy_ApplicationService bmicdce:ApplicationService_Oversee_the_construction_service ;
49.   bmicm:applicationLayerElements_specializedBy_ApplicationService bmicdce:ApplicationService_Plan_of_the_construction_service ;
50.   bmicm:applicationLayerElements_specializedBy_DataObject bmicdce:DataObject_Quantity_Of_Successful_BIM-Projects ;
```

```
51.   bmicm:applicationLayerElements_specializedBy_DataObject bmicdce:DataObject_Quant
      ity_Of_Successful_Construction-Projects ;
52.   rdfs:label "Application Layer Elements Aggregated" ;
53.   .
54.   bmicdce:ApplicationService_Design_buildings_service
55.   rdf:type archi:ApplicationService ;
56.   rdfs:label "ApplicationService Design buildings service"@en ;
57.   .
58.   bmicdce:ApplicationService_Oversee_the_construction_service
59.   rdf:type archi:ApplicationService ;
60.   rdfs:label "ApplicationService Oversee the construction service"@en ;
61.   .
62.   bmicdce:ApplicationService_Plan_of_the_construction_service
63.   rdf:type archi:ApplicationService ;
64.   rdfs:label "ApplicationService Plan of the construction service"@en ;
65.   .
66.   bmicdce:Architects
67.   rdf:type bm:Human ;
68.   bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Contraction_fee_for_
      planning_and_overseeing_the_construction ;
69.   bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Salaries ;
70.   bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Sale_of_building_des
      ign ;
71.   bm:infrastructureParts_enables_Offerings bmicdce:Design_a_building ;
72.   bm:infrastructureParts_enables_Offerings bmicdce:Oversee_construction_work ;
73.   bm:infrastructureParts_enables_Offerings bmicdce:Plan_a_construction_for_a_build
      ing ;
74.   bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
75.   bm:keyRessources_enables_KeyActivities bmicdce:Collaborate_with_customer_on_desi
      gn ;
76.   bm:keyRessources_enables_KeyActivities bmicdce:Design_new_buildings ;
77.   bm:keyRessources_enables_KeyActivities bmicdce:Oversee_the_construction ;
78.   bm:keyRessources_enables_KeyActivities bmicdce:Plan_of_the_construction ;
79.   bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;
80.   bmea:keyResources_composedOf_Resource bmicdce:Resource_Architects ;
81.   rdfs:label "Architects"@en ;
82.   .
83.   bmicdce:Architects_and_BIM-managers
84.   rdf:type bc:CoreCapabilities ;
85.   rdfs:label "Architects and BIM-managers"@en ;
86.   .
87.   bmicdce:Architects_with_BIM_experience
88.   rdf:type bic:HumanRessources ;
89.   bmic:requiredResources_aggregates_KeyResources bmicdce:Architects ;
90.   bmic:requiredResources_aggregates_KeyResources bmicdce:BIM-managers ;
91.   bmic:requiredResources_aggregates_KeyResources bmicdce:Track_record_of_successfu
      l_BIM-projects_ ;
92.   bmic:requiredResources_represents_Requirement bmicdce:Requirement_Architects_wit
      h_BIM_experience ;
93.   bmic:requiredResources_represents_Resource bmicdce:Resource_Architects ;
94.   bmic:requiredResources_represents_Resource bmicdce:Resource_BIM-managers ;
95.   rdfs:label "Architects with BIM experience"@en ;
96.   .
97.   bmicdce:Architectural_office
98.   rdf:type bic:InvolvedParties ;
99.   bic:involvedParties_belongsTo_Industry bic:Construction ;
100.  bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdce:Adaption_to_modern
      _construction_method ;
101.  bic:involvedParties_benefitsFrom_BenefitsOfInnovation bmicdce:Capable_of_perform
      ing_BIM-projects ;
102.  bic:involvedParties_hasBusinessStateCharacteristics_BusinessStateCharacteristics
       bmicdce:BusinessModelAfterInnovating ;
103.  bic:involvedParties_hasGoals_StrategicGoals bmicdce:Maintain_or_even_increase_re
      venue ;
```

104. `bic:involvedParties_hasGoals_StrategicGoals` `bmicdce:Offer_a_new_value_propositio`
     `n_to_customers` ;
105. `bic:involvedParties_hasInnovationDrivers_Drivers` `bmicdce:Modernize_the_portfolio`
     ;
106. `bic:involvedParties_innovationBudgetIs` 150000 ;
107. `bic:involvedParties_isCaseCompany` "true"^^`xsd:`boolean ;
108. `bic:involvedParties_isPartnerCompany` "false"^^`xsd:`boolean ;
109. `bic:involvedParties_mustOvercome_BarriersToOvercome` `bmicdce:Adapt_to_new_BIM-`
     `supporting_tools` ;
110. `bic:involvedParties_mustOvercome_BarriersToOvercome` `bmicdce:Get_the_knowledge_fo`
     `r_BIM-projects` ;
111. `bic:involvedParties_mustOvercome_BarriersToOvercome` `bmicdce:Maintain_the_compete`
     `ncy_of_construction` ;
112. `bic:involvedParties_mustOvercome_BarriersToOvercome` `bmicdce:Resilence_from_archi`
     `tects_not_willing_to_adapt_to_the_BIM-method` ;
113. `bic:involvedParties_numberOfEmployeesIs` 16 ;
114. `bic:involvedParties_partOf_Cases` `bmicdce:BMICase_E` ;
115. `bic:involvedParties_requiresForInnovation_RequiredRessources` `bmicdce:Architects_`
     `with_BIM_experience` ;
116. `bic:involvedParties_requiresForInnovation_RequiredRessources` `bmicdce:BIM-`
     `Knowledge` ;
117. `bic:involvedParties_requiresForInnovation_RequiredRessources` `bmicdce:BIM-`
     `software` ;
118. `bic:involvedParties_requiresForInnovation_RequiredRessources` `bmicdce:Funds_to_hi`
     `re_experienced_BIM-managers` ;
119. `bic:involvedParties_risksOf_RisksOfInnovation` `bmicdce:BIM_becomes_obsolete` ;
120. `bic:involvedParties_risksOf_RisksOfInnovation` `bmicdce:Not_having_enough_BIM-`
     `projects_for_the_BIM-managers` ;
121. `bic:involvedParties_turnoverIs` 3500000 ;
122. `bmic:involvedParties_represents_Stakeholder` `bmicdce:Stakeholder_Architectural_of`
     `fice` ;
123. `bmicis:involvedParties_aggregates_ConstructionRelatedCompanies` `bmicdce:Architect`
     `ural_office_from_case_E` ;
124. `rdfs:`label "Architectural office"@en ;
125. .
126. `bmicdce:Architectural_office_from_case_E`
127. `rdf:`type `ci:ConstructionRelatedCompanies` ;
128. `ci:constructionRelatedCompanies_appliesModel_ExecutionModels` `ci:GeneralPlanner` ;
129. `ci:constructionRelatedCompanies_appliesModel_ExecutionModels` `ci:IPD` ;
130. `ci:constructionRelatedCompanies_appliesModel_ExecutionModels` `ci:Traditional` ;
131. `ci:constructionRelatedCompanies_isOfType_ConstructionStakeholderTypes` `ci:Archite`
     `cture` ;
132. `ci:constructionRelatedCompanies_operatesIn_CompanyExecutionAreas` `ci:Urban` ;
133. `ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases` `ci:Pro`
     `jectPlanning` ;
134. `ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases` `ci:Rea`
     `lization` ;
135. `ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases` `ci:Str`
     `ategicPlanning` ;
136. `ci:constructionRelatedCompanies_performsWithin_ConstructionPlanningPhases` `ci:Ten`
     `dering` ;
137. `rdfs:`label "Architectural office from case E"@en ;
138. .
139. `bmicdce:BIM-Knowledge`
140. `rdf:`type `bic:IntellectualRessources` ;
141. `bmic:requiredResources_represents_Requirement` `bmicdce:Requirement_BIM-`
     `Knowledge` ;
142. `bmic:requiredResources_represents_Resource` `bmicdce:Resource_BIM-managers` ;
143. `bmic:requiredResources_represents_Resource` `bmicdce:Resource_Track_record_of_succ`
     `essful_BIM-projects` ;
144. `rdfs:`label "BIM-Knowledge"@en ;
145. .
146. `bmicdce:BIM-based_projects_can_be_bought`
147. `rdf:`type `bic:CustomerBenefits` ;

148. bmic:benefitsOfInnovation_represents_Value bmicdce:Value_Build_BIM-
      compliant_constructions ;
149. bmic:benefitsOfInnovation_represents_Value bmicdce:Value_One_architectural_firm_
      for_design_planning_and_overseeing_the_construction ;
150. rdfs:label "BIM-based projects can be bought"@en ;
151. .
152. bmicdce:BIM-managers
153. rdf:type bm:Human ;
154. bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Contraction_fee_for_
      planning_and_overseeing_the_construction ;
155. bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Salaries ;
156. bm:infrastructureParts_enables_Offerings bmicdce:Oversee_construction_work ;
157. bm:infrastructureParts_enables_Offerings bmicdce:Plan_a_construction_for_a_build
      ing ;
158. bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
159. bm:keyRessources_enables_KeyActivities bmicdce:Oversee_the_construction ;
160. bm:keyRessources_enables_KeyActivities bmicdce:Plan_of_the_construction ;
161. bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;
162. bmea:keyResources_composedOf_Resource bmicdce:Resource_BIM-managers ;
163. rdfs:label "BIM-managers"@en ;
164. .
165. bmicdce:BIM-method
166. rdf:type bc:Skills ;
167. rdfs:label "BIM-method"@en ;
168. .
169. bmicdce:BIM-software
170. rdf:type bic:PhysicalRessources ;
171. bmic:requiredResources_aggregates_KeyResources bmicdce:BIM-tools ;
172. bmic:requiredResources_represents_Requirement bmicdce:Requirement_BIM-software ;
173. bmic:requiredResources_represents_Resource bmicdce:Resource_BIM-tools ;
174. rdfs:label "BIM-software"@en ;
175. .
176. bmicdce:BIM-tooling
177. rdf:type bc:Skills ;
178. rdfs:label "BIM-tooling"@en ;
179. .
180. bmicdce:BIM-tools
181. rdf:type bm:ITSystems ;
182. bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Software_fees ;
183. bm:infrastructureParts_enables_Offerings bmicdce:Design_a_building ;
184. bm:infrastructureParts_enables_Offerings bmicdce:Oversee_construction_work ;
185. bm:infrastructureParts_enables_Offerings bmicdce:Plan_a_construction_for_a_build
      ing ;
186. bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
187. bm:keyRessources_enables_KeyActivities bmicdce:Collaborate_with_customer_on_desi
      gn ;
188. bm:keyRessources_enables_KeyActivities bmicdce:Design_new_buildings ;
189. bm:keyRessources_enables_KeyActivities bmicdce:Oversee_the_construction ;
190. bm:keyRessources_enables_KeyActivities bmicdce:Plan_of_the_construction ;
191. bmbc:keyResources_isACoreCapability "false"^^xsd:boolean ;
192. bmea:keyResources_composedOf_Resource bmicdce:Resource_BIM-tools ;
193. rdfs:label "BIM-tools"@en ;
194. .
195. bmicdce:BIM_becomes_obsolete
196. rdf:type bic:RisksOfInnovation ;
197. bmic:risksOfInnovation_represents_Constraint bmicdce:Constraint_BIM_becomes_obso
      lete ;
198. rdfs:label "BIM_becomes_obsolete"@en ;
199. .
200. bmicdce:BMICase_E
201. rdf:type bmic:BusinessModelInnovationCases ;
202. bic:cases_caseName "Adaption of BIM"@en ;
203. bic:cases_isSuccessfulInnovation "true"^^xsd:boolean ;
204. bic:cases_transformationDurationIs 180 ;

205. `bmic:businessModelInnovationCases_composedOf_InvolvedParties` `bmicdce:`Architectural_office ;
206. `bmicm:businessModelInnovationCases_aggregates_ApplicationLayerElements` `bmicdce:`ApplicationLayerElementsAggregated ;
207. `bmicm:businessModelInnovationCases_aggregates_BusinessLayerElements` `bmicdce:`BusinessLayerElementsAggregated ;
208. `bmicm:businessModelInnovationCases_aggregates_MotivationAspectElements` `bmicdce:`MotivationAspectElementsAggregated ;
209. `bmicm:businessModelInnovationCases_aggregates_StrategyLayerElements` `bmicdce:`StrategyLayerElementsAggregated ;
210. `bmicm:businessModelInnovationCases_aggregates_TechnologyLayerElements` `bmicdce:`TechnologyLayerElementsAggregated ;
211. `bmicm:businessModelInnovationCases_composedOf_BarriersToOvercome` `bmicdce:`BarriersToOvercomeAggregated ;
212. `bmicm:businessModelInnovationCases_composedOf_BenefitsOfInnovation` `bmicdce:`BenefitsOfInnovationAggregated ;
213. `bmicm:businessModelInnovationCases_composedOf_BusinessCapabilityElements` `bmicdce:`BusinessCapabilityElementsAggregated ;
214. `bmicm:businessModelInnovationCases_composedOf_BusinessStateCharacteristics` `bmicdce:`BusinessStateCharacteristicsAggregated ;
215. `bmicm:businessModelInnovationCases_composedOf_ConstructionIndustrySpecifics` `bmicdce:`ConstructionIndustrySpecificsAggregated ;
216. `bmicm:businessModelInnovationCases_composedOf_CustomerInterfaceElements` `bmicdce:`CustomerInterfaceElementsAggregated ;
217. `bmicm:businessModelInnovationCases_composedOf_Drivers` `bmicdce:`Modernize_the_portfolio ;
218. `bmicm:businessModelInnovationCases_composedOf_FinancialAspectElements` `bmicdce:`FinancialAspectElementsAggregated ;
219. `bmicm:businessModelInnovationCases_composedOf_Industries` `bic:`Construction ;
220. `bmicm:businessModelInnovationCases_composedOf_InfrastructureElements` `bmicdce:`InfrastructureElementsAggregated ;
221. `bmicm:businessModelInnovationCases_composedOf_InvolvedParties` `bmicdce:`Architectural_office ;
222. `bmicm:businessModelInnovationCases_composedOf_RequiredResources` `bmicdce:`RequiredResourcesAggregated ;
223. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation` `bmicdce:`BIM_becomes_obsolete ;
224. `bmicm:businessModelInnovationCases_composedOf_RisksOfInnovation` `bmicdce:`Not_having_enough_BIM-projects_for_the_BIM-managers ;
225. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals` `bmicdce:`Maintain_or_even_increase_revenue ;
226. `bmicm:businessModelInnovationCases_composedOf_StrategicGoals` `bmicdce:`Offer_a_new_value_proposition_to_customers ;
227. `bmicm:businessModelInnovationCases_composedOf_ValuePropositionElements` `bmicdce:`ValuePropositionElementsAggregated ;
228. `rdfs:`label "BMI Case: Adaption of BIM"@en ;
229. .
230. `bmicdce:`BarriersToOvercomeAggregated
231. `rdf:`type `bmicm:`BarriersToOvercome ;
232. `bmicm:barriersToOvercome_specializedBy_IntellectualBarriers` `bmicdce:`Get_the_knowledge_for_BIM-projects ;
233. `bmicm:barriersToOvercome_specializedBy_IntellectualBarriers` `bmicdce:`Maintain_the_competency_of_construction ;
234. `bmicm:barriersToOvercome_specializedBy_OrganisationalBarriers` `bmicdce:`Resilence_from_architects_not_willing_to_adapt_to_the_BIM-method ;
235. `bmicm:barriersToOvercome_specializedBy_TechnologicalBarriers` `bmicdce:`Adapt_to_new_BIM-supporting_tools ;
236. `rdfs:`label "BarriersToOvercome Aggregated" ;
237. .
238. `bmicdce:`BenefitsOfInnovationAggregated
239. `rdf:`type `bmicm:`BenefitsOfInnovation ;
240. `bmicm:benefitsOfInnovation_specializedBy_CustomerBenefits` `bmicdce:`BIM-based_projects_can_be_bought ;
241. `bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits` `bmicdce:`Adaption_to_modern_construction_method ;

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242.  bmicm:benefitsOfInnovation_specializedBy_InvolvedPartyBenefits bmicdce:Capable_o
      f_performing_BIM-projects ;
243.  rdfs:label "BenefitsOfInnovation Aggregated" ;
244.  .
245.  bmicdce:Build_BIM-compliant_constructions_
246.  rdf:type bm:Performance ;
247.  bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;
248.  bmea:offeringValues_composedOf_Value bmicdce:Value_Build_BIM-
      compliant_constructions ;
249.  rdfs:label "Build BIM-compliant constructions "@en ;
250.  .
251.  bmicdce:BusinessCapabilityElementsAggregated
252.  rdf:type bmicm:BusinessCapabilityElements ;
253.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdce:Architec
      ts_and_BIM-managers ;
254.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdce:Construc
      tion_planning ;
255.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdce:Customer
      _co-creation ;
256.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdce:Designin
      g_new_buildings ;
257.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdce:Overseei
      ng_construction ;
258.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdce:Partners
      hip_with_key_contractors ;
259.  bmicm:businessCapabilityElements_specializedBy_CoreCapabilities bmicdce:Successf
      ul_track_record ;
260.  bmicm:businessCapabilityElements_specializedBy_HumanBasedCapabilityElements bmic
      dce:HumanBasedCapabilityElementsAggregated ;
261.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdce
      :Architects_and_BIM-managers ;
262.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdce
      :BIM-method ;
263.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdce
      :BIM-tooling ;
264.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdce
      :Construction_planning ;
265.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdce
      :Customer_co-creation ;
266.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdce
      :Designing_new_buildings ;
267.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdce
      :Overseeing_construction ;
268.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdce
      :Partnership_with_key_contractors ;
269.  bmicm:businessCapabilityElements_specializedBy_ResourceBasedCapabilities bmicdce
      :Successful_track_record ;
270.  rdfs:label "BusinessCapabilityElements Aggregated" ;
271.  .
272.  bmicdce:BusinessInteraction_Project-Based_Relation_through_the_Architect
273.  rdf:type archi:BusinessInteraction ;
274.  rdfs:label "BusinessInteraction Project-
      Based Relation through the Architect"@en ;
275.  .
276.  bmicdce:BusinessInterface_Contractors
277.  rdf:type archi:BusinessInterface ;
278.  rdfs:label "BusinessInterface Contractors"@en ;
279.  .
280.  bmicdce:BusinessInterface_SalesForceTeam
281.  rdf:type archi:BusinessInterface ;
282.  rdfs:label "BusinessInterface SalesForceTeam"@en ;
283.  .
284.  bmicdce:BusinessInterface_Website
285.  rdf:type archi:BusinessInterface ;
286.  rdfs:label "BusinessInterface Website"@en ;
```

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287.  .
288.  bmicdce:BusinessLayerElementsAggregated
289.  rdf:type bmicm:BusinessLayerElements ;
290.  bmicm:businessLayerElements_specializedBy_BusinessInteraction bmicdce:BusinessIn
      teraction_Project-Based_Relation_through_the_Architect ;
291.  bmicm:businessLayerElements_specializedBy_BusinessInterface bmicdce:BusinessInte
      rface_Contractors ;
292.  bmicm:businessLayerElements_specializedBy_BusinessInterface bmicdce:BusinessInte
      rface_SalesForceTeam ;
293.  bmicm:businessLayerElements_specializedBy_BusinessInterface bmicdce:BusinessInte
      rface_Website ;
294.  bmicm:businessLayerElements_specializedBy_BusinessObject bmicdce:BusinessObject_
      Partnership_with_contractors ;
295.  bmicm:businessLayerElements_specializedBy_BusinessObject bmicdce:BusinessObject_
      Track_record_of_successful_BIM-projects ;
296.  bmicm:businessLayerElements_specializedBy_BusinessObject bmicdce:BusinessObject_
      Track_record_of_successful_construction-projects ;
297.  bmicm:businessLayerElements_specializedBy_BusinessProcess bmicdce:BusinessProces
      s_Collaborate_with_customer_on_design ;
298.  bmicm:businessLayerElements_specializedBy_BusinessProcess bmicdce:BusinessProces
      s_Design_new_buildings ;
299.  bmicm:businessLayerElements_specializedBy_BusinessProcess bmicdce:BusinessProces
      s_Oversee_the_construction ;
300.  bmicm:businessLayerElements_specializedBy_BusinessProcess bmicdce:BusinessProces
      s_Plan_of_the_construction ;
301.  bmicm:businessLayerElements_specializedBy_BusinessService bmicdce:BusinessServic
      e_Construction_planning ;
302.  bmicm:businessLayerElements_specializedBy_BusinessService bmicdce:BusinessServic
      e_Design_new_buildings ;
303.  bmicm:businessLayerElements_specializedBy_BusinessService bmicdce:BusinessServic
      e_Oversee_construction-project ;
304.  bmicm:businessLayerElements_specializedBy_BusinessService bmicdce:BusinessServic
      e_SalesMarketing ;
305.  bmicm:businessLayerElements_specializedBy_Product bmicdce:IntangibleProduct_Over
      see_construction_work ;
306.  bmicm:businessLayerElements_specializedBy_Product bmicdce:TangibleProduct_Design
      _a_building ;
307.  bmicm:businessLayerElements_specializedBy_Product bmicdce:TangibleProduct_Plan_a
      _construction_for_a_building ;
308.  rdfs:label "BusinessLayer Elements Aggregated" ;
309.  .
310.  bmicdce:BusinessModelAfterInnovating
311.  rdf:type bic:StateAfterInnovating ;
312.  bic:businessStateCharacteristics_classifiesAs_ViewsOnBusiness bmic:BusinessModel
       ;
313.  bmic:businessStateCharacteristics_aggregates_Channels bmicdce:Contractors ;
314.  bmic:businessStateCharacteristics_aggregates_Channels bmicdce:Sales_force_team_
      ;
315.  bmic:businessStateCharacteristics_aggregates_Channels bmicdce:Website ;
316.  bmic:businessStateCharacteristics_aggregates_CostStructureElements bmicdce:Salar
      ies ;
317.  bmic:businessStateCharacteristics_aggregates_CostStructureElements bmicdce:Sales
      _Marketing ;
318.  bmic:businessStateCharacteristics_aggregates_CostStructureElements bmicdce:Softw
      are_fees ;
319.  bmic:businessStateCharacteristics_aggregates_CustomerRelationships bmicdce:Colla
      boration_with_contractors ;
320.  bmic:businessStateCharacteristics_aggregates_CustomerRelationships bmicdce:Colla
      boration_with_customer ;
321.  bmic:businessStateCharacteristics_aggregates_CustomerSegments bmicdce:Companies_
      planning_to_build_a_building ;
322.  bmic:businessStateCharacteristics_aggregates_CustomerSegments bmicdce:Constructi
      on_contractors_that_need_architects_or_BIM-managers ;
323.  bmic:businessStateCharacteristics_aggregates_CustomerSegments bmicdce:Individual
      s_planning_to_build_a_house ;
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324. `bmic:`businessStateCharacteristics_aggregates_KeyActivities `bmicdce:`Collaborate_w
     ith_customer_on_design ;
325. `bmic:`businessStateCharacteristics_aggregates_KeyActivities `bmicdce:`Design_new_bu
     ildings ;
326. `bmic:`businessStateCharacteristics_aggregates_KeyActivities `bmicdce:`Oversee_the_c
     onstruction ;
327. `bmic:`businessStateCharacteristics_aggregates_KeyActivities `bmicdce:`Plan_of_the_c
     onstruction ;
328. `bmic:`businessStateCharacteristics_aggregates_KeyPartners `bmicdce:`Construction_co
     ntractors ;
329. `bmic:`businessStateCharacteristics_aggregates_KeyPartners `bmicdce:`Software_suppli
     er ;
330. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdce:`Architects ;
331. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdce:`BIM-managers ;
332. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdce:`BIM-tools ;
333. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdce:`Partnership_wi
     th_contractors ;
334. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdce:`Track_record_o
     f_successful_BIM-projects_ ;
335. `bmic:`businessStateCharacteristics_aggregates_KeyResources `bmicdce:`Track_record_o
     f_successful_construction-projects ;
336. `bmic:`businessStateCharacteristics_aggregates_OfferingValues `bmicdce:`Build_BIM-
     compliant_constructions_ ;
337. `bmic:`businessStateCharacteristics_aggregates_OfferingValues `bmicdce:`Collaboratio
     n_with_the_customer ;
338. `bmic:`businessStateCharacteristics_aggregates_OfferingValues `bmicdce:`Design_state
     -of-the-art_buildings ;
339. `bmic:`businessStateCharacteristics_aggregates_OfferingValues `bmicdce:`One-of-a-
     kind_building ;
340. `bmic:`businessStateCharacteristics_aggregates_OfferingValues `bmicdce:`One_architec
     tural_firm_for_design_planning_and_overseeing_the_construction ;
341. `bmic:`businessStateCharacteristics_aggregates_Offerings `bmicdce:`Design_a_building
      ;
342. `bmic:`businessStateCharacteristics_aggregates_Offerings `bmicdce:`Oversee_construct
     ion_work ;
343. `bmic:`businessStateCharacteristics_aggregates_Offerings `bmicdce:`Plan_a_constructi
     on_for_a_building ;
344. `bmic:`businessStateCharacteristics_aggregates_RevenueStreams `bmicdce:`Contraction_
     fee_for_planning_and_overseeing_the_construction ;
345. `bmic:`businessStateCharacteristics_aggregates_RevenueStreams `bmicdce:`Sale_of_buil
     ding_design ;
346. `rdfs:`label "BusinessModelAfterInnovating"@en ;
347. .
348. `bmicdce:`BusinessObject_Partnership_with_contractors
349. `rdf:`type `archi:`BusinessObject ;
350. `rdfs:`label "BusinessObject Partnership with contractors"@en ;
351. .
352. `bmicdce:`BusinessObject_Track_record_of_successful_BIM-projects
353. `rdf:`type `archi:`BusinessObject ;
354. `rdfs:`label "BusinessObject Track record of successful BIM-projects"@en ;
355. .
356. `bmicdce:`BusinessObject_Track_record_of_successful_construction-projects
357. `rdf:`type `archi:`BusinessObject ;
358. `rdfs:`label "BusinessObject Track record of successful construction-
     projects"@en ;
359. .
360. `bmicdce:`BusinessProcess_Collaborate_with_customer_on_design
361. `rdf:`type `archi:`BusinessProcess ;
362. `rdfs:`label "BusinessProcess Collaborate with customer on design"@en ;
363. .
364. `bmicdce:`BusinessProcess_Design_new_buildings
365. `rdf:`type `archi:`BusinessProcess ;
366. `rdfs:`label "BusinessProcess Design new buildings"@en ;
367. .
368. `bmicdce:`BusinessProcess_Oversee_the_construction

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369.  rdf:type archi:BusinessProcess ;
370.  rdfs:label "BusinessProcess Oversee the construction"@en ;
371.  .
372.  bmicdce:BusinessProcess_Plan_of_the_construction
373.  rdf:type archi:BusinessProcess ;
374.  rdfs:label "BusinessProcess Plan of the construction"@en ;
375.  .
376.  bmicdce:BusinessService_Construction_planning
377.  rdf:type archi:BusinessService ;
378.  rdfs:label "BusinessService Construction planning"@en ;
379.  .
380.  bmicdce:BusinessService_Design_new_buildings
381.  rdf:type archi:BusinessService ;
382.  rdfs:label "BusinessService Design new buildings"@en ;
383.  .
384.  bmicdce:BusinessService_Oversee_construction-project
385.  rdf:type archi:BusinessService ;
386.  rdfs:label "BusinessService Oversee construction-project"@en ;
387.  .
388.  bmicdce:BusinessService_SalesMarketing
389.  rdf:type archi:BusinessService ;
390.  rdfs:label "BusinessService SalesMarketing"@en ;
391.  .
392.  bmicdce:BusinessStateCharacteristicsAggregated
393.  rdf:type bmicm:BusinessStateCharacteristics ;
394.  bmicm:businessStateCharacteristics_specializedBy_StateAfterInnovating bmicdce:Bu
      sinessModelAfterInnovating ;
395.  rdfs:label "BusinessStateCharacteristics Aggregated" ;
396.  .
397.  bmicdce:Capability_Collaboration_with_contractors
398.  rdf:type archimateV3:Capability ;
399.  rdfs:label "Capability Collaboration with contractors"@en ;
400.  .
401.  bmicdce:Capability_Collaboration_with_customer
402.  rdf:type archimateV3:Capability ;
403.  rdfs:label "Capability Collaboration with customer"@en ;
404.  .
405.  bmicdce:Capability_Contractors
406.  rdf:type archimateV3:Capability ;
407.  rdfs:label "Capability Contractors"@en ;
408.  .
409.  bmicdce:Capability_Sales_force_team
410.  rdf:type archimateV3:Capability ;
411.  rdfs:label "Capability Sales force team"@en ;
412.  .
413.  bmicdce:Capability_Website
414.  rdf:type archimateV3:Capability ;
415.  rdfs:label "Capability Website"@en ;
416.  .
417.  bmicdce:Capable_of_performing_BIM-projects
418.  rdf:type bic:InvolvedPartyBenefits ;
419.  bmic:benefitsOfInnovation_represents_Value bmicdce:Value_Build_BIM-
      compliant_constructions ;
420.  bmic:benefitsOfInnovation_represents_Value bmicdce:Value_One_architectural_firm_
      for_design_planning_and_overseeing_the_construction ;
421.  rdfs:label "Capable of performing BIM-projects"@en ;
422.  .
423.  bmicdce:ChannelElementsAggregated
424.  rdf:type bmicm:ChannelElements ;
425.  bmicm:channelElements_specializedBy_DirectChannelElements bmicdce:DirectChannelE
      lementsAggregated ;
426.  bmicm:channelElements_specializedBy_IndirectChannelElements bmicdce:IndirectChan
      nelElementsAggregated ;
427.  rdfs:label "ChannelElements Aggregated" ;
428.  .
```

429. bmicdce:Collaborate_with_customer_on_design
430. rdf:type bm:CoreProcess ;
431. bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Salaries ;
432. bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Software_fees ;
433. bm:infrastructureParts_enables_Offerings bmicdce:Design_a_building ;
434. bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
435. bm:keyActivities_require_KeyRessources bmicdce:Architects ;
436. bm:keyActivities_require_KeyRessources bmicdce:BIM-managers ;
437. bm:keyActivities_require_KeyRessources bmicdce:BIM-tools ;
438. bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
439. bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:ProjectPlanning ;
440. bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:Realization ;
441. rdfs:label "Collaborate with customer on design"@en ;
442. .
443. bmicdce:Collaboration_with_contractors
444. rdf:type bm:CoCreationWithPeople ;
445. bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Salaries ;
446. bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Sales_Marketing ;
447. bm:customerRelationships_enabledBy_KeyRessources bmicdce:Architects ;
448. bm:customerRelationships_enabledBy_KeyRessources bmicdce:BIM-managers ;
449. bm:customerRelationships_enabledBy_KeyRessources bmicdce:Partnership_with_contractors ;
450. bm:customerRelationships_influencedBy_CostStructureModels bm:ValueDriven ;
451. bm:customerRelationships_maintain_CustomerSegments bmicdce:Construction_contractors_that_need_architects_or_BIM-managers ;
452. bm:customerRelationships_promote_Offerings bmicdce:Design_a_building ;
453. bm:customerRelationships_promote_Offerings bmicdce:Oversee_construction_work ;
454. bm:customerRelationships_promote_Offerings bmicdce:Plan_a_construction_for_a_building ;
455. bmea:customerRelationships_associatedWith_Capability bmicdce:Capability_Collaboration_with_contractors ;
456. rdfs:label "Collaboration with contractors"@en ;
457. .
458. bmicdce:Collaboration_with_customer
459. rdf:type bm:CoCreationWithPeople ;
460. bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Salaries ;
461. bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Sales_Marketing ;
462. bm:customerRelationships_enabledBy_KeyRessources bmicdce:Architects ;
463. bm:customerRelationships_enabledBy_KeyRessources bmicdce:BIM-managers ;
464. bm:customerRelationships_influencedBy_CostStructureModels bm:ValueDriven ;
465. bm:customerRelationships_maintain_CustomerSegments bmicdce:Companies_planning_to_build_a_building ;
466. bm:customerRelationships_maintain_CustomerSegments bmicdce:Individuals_planning_to_build_a_house ;
467. bm:customerRelationships_promote_Offerings bmicdce:Design_a_building ;
468. bm:customerRelationships_promote_Offerings bmicdce:Oversee_construction_work ;
469. bm:customerRelationships_promote_Offerings bmicdce:Plan_a_construction_for_a_building ;
470. bmea:customerRelationships_associatedWith_Capability bmicdce:Capability_Collaboration_with_customer ;
471. rdfs:label "Collaboration with customer"@en ;
472. .
473. bmicdce:Collaboration_with_the_customer
474. rdf:type bm:CustomerCoCreation ;
475. bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;
476. bmea:offeringValues_composedOf_Value bmicdce:Value_Collaboration_with_the_customer ;
477. rdfs:label "Collaboration with the customer"@en ;
478. .
479. bmicdce:Companies_planning_to_build_a_building
480. rdf:type bm:SegmentedMarket ;
481. bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Contraction_fee_for_planning_and_overseeing_the_construction ;

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482.   bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Sale_of_building_
       design ;
483.   bm:customerSegment_isAMultiSidedPlatform "false"^^xsd:boolean ;
484.   bm:customerSegment_isDiversified "false"^^xsd:boolean ;
485.   bm:customerSegments_receive_Offerings bmicdce:Design_a_building ;
486.   bm:customerSegments_receive_Offerings bmicdce:Oversee_construction_work ;
487.   bm:customerSegments_receive_Offerings bmicdce:Plan_a_construction_for_a_building
       ;
488.   bmea:customerSegments_composedOf_Stakeholder bmicdce:Stakeholder_Companies_plann
       ing_to_build_a_building ;
489.   rdfs:label "Companies planning to build a building"@en ;
490.   .
491.   bmicdce:Constraint_Adapt_to_new_BIM-supporting_tools
492.   rdf:type archimateV3:Constraint ;
493.   rdfs:label "Constraint Adapt to new BIM supporting tools" ;
494.   .
495.   bmicdce:Constraint_BIM_becomes_obsolete
496.   rdf:type archimateV3:Constraint ;
497.   rdfs:label "Constraint BIM becomes obsolete" ;
498.   .
499.   bmicdce:Constraint_Get_the_knowledge_for_BIM-projects
500.   rdf:type archimateV3:Constraint ;
501.   rdfs:label "Constraint Get the knowledge for BIM-projects" ;
502.   .
503.   bmicdce:Constraint_Maintain_the_competency_of_construction
504.   rdf:type archimateV3:Constraint ;
505.   rdfs:label "Constraint Maintain the competency of construction" ;
506.   .
507.   bmicdce:Constraint_Not_having_enough_BIM-projects_for_the_BIM-managers
508.   rdf:type archimateV3:Constraint ;
509.   rdfs:label "Constraint Not having enough BIM-projects for the BIM-managers" ;
510.   .
511.   bmicdce:Constraint_Resilence_from_architects_not_willing_to_adapt_to_the_BIM-
       method
512.   rdf:type archimateV3:Constraint ;
513.   rdfs:label "Constraint Resilence from architects not willing to adapt to the BIM
       -method" ;
514.   .
515.   bmicdce:ConstructionIndustrySpecificsAggregated
516.   rdf:type bmicm:ConstructionIndustrySpecifics ;
517.   bmicm:constructionIndustrySpecifics_specializedBy_CompanyExecutionAreas ci:Urban
       ;
518.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
       ProjectPlanning ;
519.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
       Realization ;
520.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
       StrategicPlanning ;
521.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionPlanningPhases ci:
       Tendering ;
522.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionRelatedCompanies b
       micdce:Architectural_office_from_case_E ;
523.   bmicm:constructionIndustrySpecifics_specializedBy_ConstructionStakeholderTypes c
       i:Architecture ;
524.   bmicm:constructionIndustrySpecifics_specializedBy_ExecutionModels ci:GeneralPlan
       ner ;
525.   bmicm:constructionIndustrySpecifics_specializedBy_ExecutionModels ci:IPD ;
526.   bmicm:constructionIndustrySpecifics_specializedBy_ExecutionModels ci:Traditional
       ;
527.   rdfs:label "ConstructionIndustrySpecifics Aggregated" ;
528.   .
529.   bmicdce:Construction_contractors
530.   rdf:type bm:Business ;
531.   bm:infrastructureParts_enables_Offerings bmicdce:Design_a_building ;
532.   bm:infrastructureParts_enables_Offerings bmicdce:Oversee_construction_work ;
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533. `bm:infrastructureParts_enables_Offerings bmicdce:Plan_a_construction_for_a_build
ing ;`
534. `bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;`
535. `bm:keyPartners_facilitate_KeyActivities bmicdce:Collaborate_with_customer_on_des
ign ;`
536. `bm:keyPartners_facilitate_KeyActivities bmicdce:Design_new_buildings ;`
537. `bm:keyPartners_facilitate_KeyActivities bmicdce:Oversee_the_construction ;`
538. `bm:keyPartners_facilitate_KeyActivities bmicdce:Plan_of_the_construction ;`
539. `bm:keyPartners_influencedBy_CostStructureModels bm:ValueDriven ;`
540. `bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:AccessToCustomers ;`
541. `bm:keyPartners_justifiedBy_KeyPartnershipGoals bm:ReductionOfRiskAndUncertainty
;`
542. `bm:keyPartners_provide_KeyRessources bmicdce:Partnership_with_contractors ;`
543. `bmea:keyPartners_composedOf_Stakeholder bmicdce:Stakeholder_Construction_contrac
tors ;`
544. `bmea:keyPartners_composedOf_Stakeholder bmicdce:Stakeholder_Construction_contrac
tors_that_need_architects_or_BIM-managers ;`
545. `rdfs:label "Construction contractors"@en ;`
546. `.`
547. `bmicdce:Construction_contractors_that_need_architects_or_BIM-managers`
548. `rdf:type bm:SegmentedMarket ;`
549. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Contraction_fee_f
or_planning_and_overseeing_the_construction ;`
550. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Sale_of_building_
design ;`
551. `bm:customerSegment_isAMultiSidedPlatform "false"^^xsd:boolean ;`
552. `bm:customerSegment_isDiversified "false"^^xsd:boolean ;`
553. `bm:customerSegments_receive_Offerings bmicdce:Design_a_building ;`
554. `bm:customerSegments_receive_Offerings bmicdce:Oversee_construction_work ;`
555. `bm:customerSegments_receive_Offerings bmicdce:Plan_a_construction_for_a_building
;`
556. `bmea:customerSegments_composedOf_Stakeholder bmicdce:Stakeholder_Construction_co
ntractors ;`
557. `bmea:customerSegments_composedOf_Stakeholder bmicdce:Stakeholder_Construction_co
ntractors_that_need_architects_or_BIM-managers ;`
558. `bmicis:customerSegments_aggregates_ConstructionRelatedCompanies ci:LosingerMaraz
zi ;`
559. `bmicis:customerSegments_isOfType_ConstructionStakeholderTypes ci:Contractor ;`
560. `rdfs:label "Construction contractors that need architects or BIM-managers"@en ;`
561. `.`
562. `bmicdce:Construction_planning`
563. `rdf:type bc:CoreCapabilities ;`
564. `rdfs:label "Construction planning"@en ;`
565. `.`
566. `bmicdce:Contraction_fee_for_planning_and_overseeing_the_construction`
567. `rdf:type bm:LendingRentingLeasing ;`
568. `bm:revenueStreams_dependOn_Offerings bmicdce:Oversee_construction_work ;`
569. `bm:revenueStreams_dependOn_Offerings bmicdce:Plan_a_construction_for_a_building
;`
570. `bm:revenueStreams_pricedBy_PricingMechanisms bm:Negotiation ;`
571. `bmea:revenueStreams_associatedWith_Outcome bmicdce:Outcome_Contraction_fee_for_p
lanning_and_overseeing_the_construction ;`
572. `rdfs:label "Contraction fee for planning and overseeing the construction"@en ;`
573. `.`
574. `bmicdce:Contractors`
575. `rdf:type bm:PartnerStore ;`
576. `bm:channel_hasChannelOwnerType "Earned"@en ;`
577. `bm:channel_hasChannelPhaseType "Awareness"@en ;`
578. `bm:channel_hasChannelPhaseType "Evaluation"@en ;`
579. `bm:channel_hasChannelPhaseType "Purchase"@en ;`
580. `bm:channels_deliverTo_CustomerSegments bmicdce:Companies_planning_to_build_a_bui
lding ;`
581. `bm:channels_deliverTo_CustomerSegments bmicdce:Individuals_planning_to_build_a_h
ouse ;`
582. `bm:channels_deliver_Offerings bmicdce:Design_a_building ;`

583. `bm:channels_deliver_Offerings bmicdce:Oversee_construction_work ;`
584. `bm:channels_deliver_Offerings bmicdce:Plan_a_construction_for_a_building ;`
585. `bm:channels_fits_CustomerRelationships bmicdce:Collaboration_with_contractors ;`
586. `bm:channels_generate_RevenueStreams bmicdce:Contraction_fee_for_planning_and_ove`
    `rseeing_the_construction ;`
587. `bm:channels_generate_RevenueStreams bmicdce:Sale_of_building_design ;`
588. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Contraction_fee_f`
    `or_planning_and_overseeing_the_construction ;`
589. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Salaries ;`
590. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Sale_of_building_`
    `design ;`
591. `bmea:channels_associatedWith_Capability bmicdce:Capability_Contractors ;`
592. `bmea:channels_composedOf_Resource bmicdce:Resource_Contractors ;`
593. `rdfs:label "Contractors"@en ;`
594. `.`
595. `bmicdce:CostStructureElementsAggregated`
596. `rdf:type bmicm:CostStructureElements ;`
597. `bmicm:costStructureElements_specializedBy_FixedCost bmicdce:Salaries ;`
598. `bmicm:costStructureElements_specializedBy_FixedCost bmicdce:Sales_Marketing ;`
599. `bmicm:costStructureElements_specializedBy_FixedCost bmicdce:Software_fees ;`
600. `rdfs:label "CostStructureElements Aggregated" ;`
601. `.`
602. `bmicdce:CustomerInterfaceElementsAggregated`
603. `rdf:type bmicm:CustomerInterfaceElements ;`
604. `bmicm:customerInterfaceElements_specializedBy_ChannelElements bmicdce:ChannelEle`
    `mentsAggregated ;`
605. `bmicm:customerInterfaceElements_specializedBy_CustomerRelationshipElements bmicd`
    `ce:CustomerRelationshipElementsAggregated ;`
606. `bmicm:customerInterfaceElements_specializedBy_CustomerSegmentElements bmicdce:Cu`
    `stomerSegmentElementsAggregated ;`
607. `rdfs:label "CustomerInterfaceElements Aggregated" ;`
608. `.`
609. `bmicdce:CustomerRelationshipElementsAggregated`
610. `rdf:type bmicm:CustomerRelationshipElements ;`
611. `bmicm:customerRelationshipElements_specializedBy_HumanInteractionElements bmicdc`
    `e:HumanInteractionElementsAggregated ;`
612. `bmicm:customerRelationshipElements_specializedBy_NonHumanInteractionElements bmi`
    `cdce:NonHumanInteractionElementsAggregated ;`
613. `rdfs:label "CustomerRelationshipElements Aggregated" ;`
614. `.`
615. `bmicdce:CustomerSegmentElementsAggregated`
616. `rdf:type bmicm:CustomerSegmentElements ;`
617. `bmicm:customerSegmentElements_specializedBy_SegmentedMarket bmicdce:Companies_pl`
    `anning_to_build_a_building ;`
618. `bmicm:customerSegmentElements_specializedBy_SegmentedMarket bmicdce:Construction`
    `_contractors_that_need_architects_or_BIM-managers ;`
619. `bmicm:customerSegmentElements_specializedBy_SegmentedMarket bmicdce:Individuals_`
    `planning_to_build_a_house ;`
620. `rdfs:label "CustomerSegmentElements Aggregated" ;`
621. `.`
622. `bmicdce:Customer_co-creation`
623. `rdf:type bc:CoreCapabilities ;`
624. `rdfs:label "Customer co-creation"@en ;`
625. `.`
626. `bmicdce:DataObject_Quantity_Of_Successful_BIM-Projects`
627. `rdf:type archi:DataObject ;`
628. `rdfs:label "DataObject Quantity Of Successful BIM-Projects"@en ;`
629. `.`
630. `bmicdce:DataObject_Quantity_Of_Successful_Construction-Projects`
631. `rdf:type archi:DataObject ;`
632. `rdfs:label "DataObject Quantity Of Successful Construction-Projects"@en ;`
633. `.`
634. `bmicdce:Design_a_building`
635. `rdf:type bm:Service ;`
636. `bm:offerings_basedOn_KeyRessources bmicdce:Architects ;`

637. `bm:offerings_basedOn_KeyRessources` `bmicdce:BIM-tools` ;
638. `bm:offerings_basedOn_KeyRessources` `bmicdce:Partnership_with_contractors` ;
639. `bm:offerings_basedOn_KeyRessources` `bmicdce:Track_record_of_successful_BIM-projects_` ;
640. `bm:offerings_basedOn_KeyRessources` `bmicdce:Track_record_of_successful_construction-projects` ;
641. `bm:offerings_provide_OfferingValues` `bmicdce:Build_BIM-compliant_constructions_` ;
642. `bm:offerings_provide_OfferingValues` `bmicdce:Collaboration_with_the_customer` ;
643. `bm:offerings_provide_OfferingValues` `bmicdce:Design_state-of-the-art_buildings` ;
644. `bm:offerings_provide_OfferingValues` `bmicdce:One-of-a-kind_building` ;
645. `bm:offerings_provide_OfferingValues` `bmicdce:One_architectural_firm_for_design_planning_and_overseeing_the_construction` ;
646. `bm:offerings_require_KeyActivities` `bmicdce:Collaborate_with_customer_on_design` ;
647. `bm:offerings_require_KeyActivities` `bmicdce:Design_new_buildings` ;
648. `bm:offerings_valueFor_CustomerSegments` `bmicdce:Companies_planning_to_build_a_building` ;
649. `bm:offerings_valueFor_CustomerSegments` `bmicdce:Construction_contractors_that_need_architects_or_BIM-managers` ;
650. `bm:offerings_valueFor_CustomerSegments` `bmicdce:Individuals_planning_to_build_a_house` ;
651. `bmea:offerings_composedOf_Product` `bmicdce:TangibleProduct_Design_a_building` ;
652. `rdfs:label` "Design a building"@en ;
653. .
654. `bmicdce:Design_new_buildings`
655. `rdf:type` `bm:CoreProcess` ;
656. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdce:Salaries` ;
657. `bm:infrastructureParts_affects_FinancialAspectParts` `bmicdce:Software_fees` ;
658. `bm:infrastructureParts_enables_Offerings` `bmicdce:Design_a_building` ;
659. `bm:infrastructureParts_influencedBy_EconomicAdvantages` `bm:EconomiesOfScope` ;
660. `bm:keyActivities_require_KeyRessources` `bmicdce:Architects` ;
661. `bm:keyActivities_require_KeyRessources` `bmicdce:BIM-managers` ;
662. `bm:keyActivities_require_KeyRessources` `bmicdce:BIM-tools` ;
663. `bmbc:keyActivities_isACoreCapability` "true"^^`xsd:boolean` ;
664. `bmea:keyActivities_associatedWith_ValueStream` `bmicdce:ValueStream_Design_new_buildings` ;
665. `bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases` `ci:ProjectPlanning` ;
666. `bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases` `ci:Realization` ;
667. `bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases` `ci:Tendering` ;
668. `rdfs:label` "Design new buildings"@en ;
669. .
670. `bmicdce:Design_state-of-the-art_buildings`
671. `rdf:type` `bm:Design` ;
672. `bm:offeringValues_influencedBy_CostStructureModels` `bm:ValueDriven` ;
673. `bmea:offeringValues_composedOf_Value` `bmicdce:Value_Design_state-of-the-art_buildings` ;
674. `rdfs:label` "Design state-of-the-art buildings"@en ;
675. .
676. `bmicdce:Designing_new_buildings`
677. `rdf:type` `bc:CoreCapabilities` ;
678. `rdfs:label` "Designing new buildings"@en ;
679. .
680. `bmicdce:DirectChannelElementsAggregated`
681. `rdf:type` `bmicm:DirectChannelElements` ;
682. `bmicm:directChannelElements_specializedBy_SalesForce` `bmicdce:Sales_force_team_` ;
683. `bmicm:directChannelElements_specializedBy_WebSale` `bmicdce:Website` ;
684. `rdfs:label` "DirectChannelElements Aggregated" ;
685. .
686. `bmicdce:Driver_Modernize_the_portfolio`
687. `rdf:type` `archimateV3:Driver` ;
688. `rdfs:label` "Driver Modernize the portfolio" ;
689. .
690. `bmicdce:FeeBasedRevenueElementsAggregated`
691. `rdf:type` `bmicm:FeeBasedRevenueElements` ;

692. `bmicm:feeBasedRevenueElements_specializedBy_LendingRentingLeasing bmicdce:Contraction_fee_for_planning_and_overseeing_the_construction ;`
693. `rdfs:label "FeeBasedRevenueElements Aggregated" ;`
694. `.`
695. `bmicdce:FinancialAspectElementsAggregated`
696. `rdf:type bmicm:FinancialAspectElements ;`
697. `bmicm:financialAspectElements_specializedBy_CostStructureElements bmicdce:CostStructureElementsAggregated ;`
698. `bmicm:financialAspectElements_specializedBy_RevenueStreamElements bmicdce:RevenueStreamElementsAggregated ;`
699. `rdfs:label "FinancialAspectElements Aggregated" ;`
700. `.`
701. `bmicdce:FinancialElementsAggregated`
702. `rdf:type bmicm:FinancialElements ;`
703. `rdfs:label "FinancialElementsAggregated" ;`
704. `.`
705. `bmicdce:Funds_to_hire_experienced_BIM-managers`
706. `rdf:type bic:FinancialRessources ;`
707. `bmic:requiredResources_represents_Requirement bmicdce:Requirement_Funds_to_hire_experienced_BIM-managers ;`
708. `rdfs:label "Funds to hire experienced BIM-managers"@en ;`
709. `.`
710. `bmicdce:Get_the_knowledge_for_BIM-projects`
711. `rdf:type bic:IntellectualBarriers ;`
712. `bmic:barriersToOvercome_represents_Constraint bmicdce:Constraint_Get_the_knowledge_for_BIM-projects ;`
713. `rdfs:label "Get the knowledge for BIM-projects"@en ;`
714. `.`
715. `bmicdce:Goal_Maintain_or_even_increase_revenue`
716. `rdf:type archimateV3:Goal ;`
717. `rdfs:label "Goal Maintain or even increase revenue" ;`
718. `.`
719. `bmicdce:Goal_Offer_a_new_value_proposition_to_customers`
720. `rdf:type archimateV3:Goal ;`
721. `rdfs:label "Goal Offer a new value proposition to customers" ;`
722. `.`
723. `bmicdce:HumanBasedCapabilityElementsAggregated`
724. `rdf:type bmicm:HumanBasedCapabilityElements ;`
725. `bmicm:humanBasedCapabilityElements_specializedBy_Skills bmicdce:BIM-method ;`
726. `bmicm:humanBasedCapabilityElements_specializedBy_Skills bmicdce:BIM-tooling ;`
727. `rdfs:label "HumanBasedCapabilityElements Aggregated" ;`
728. `.`
729. `bmicdce:HumanInteractionElementsAggregated`
730. `rdf:type bmicm:HumanInteractionElements ;`
731. `bmicm:humanInteractionElements_specializedBy_CoCreationWithPeople bmicdce:Collaboration_with_contractors ;`
732. `bmicm:humanInteractionElements_specializedBy_CoCreationWithPeople bmicdce:Collaboration_with_customer ;`
733. `rdfs:label "HumanInteractionElements Aggregated" ;`
734. `.`
735. `bmicdce:IndirectChannelElementsAggregated`
736. `rdf:type bmicm:IndirectChannelElements ;`
737. `bmicm:indirectChannelElements_specializedBy_PartnerStore bmicdce:Contractors ;`
738. `rdfs:label "IndirectChannelElements Aggregated" ;`
739. `.`
740. `bmicdce:Individuals_planning_to_build_a_house`
741. `rdf:type bm:SegmentedMarket ;`
742. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Contraction_fee_for_planning_and_overseeing_the_construction ;`
743. `bm:customerInterfaceParts_affects_FinancialAspectParts bmicdce:Sale_of_building_design ;`
744. `bm:customerSegment_isAMultiSidedPlatform "false"^^xsd:boolean ;`
745. `bm:customerSegment_isDiversified "false"^^xsd:boolean ;`
746. `bm:customerSegments_receive_Offerings bmicdce:Design_a_building ;`
747. `bm:customerSegments_receive_Offerings bmicdce:Oversee_construction_work ;`

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748.  bm:customerSegments_receive_Offerings bmicdce:Plan_a_construction_for_a_building
      ;
749.  bmea:customerSegments_composedOf_Stakeholder bmicdce:Stakeholder_Individuals_pla
      nning_to_build_a_house ;
750.  rdfs:label "Individuals planning to build a house"@en ;
751.  .
752.  bmicdce:InfrastructureElementsAggregated
753.  rdf:type bmicm:InfrastructureElements ;
754.  bmicm:infrastructureElements_specializedBy_KeyActivityElements bmicdce:KeyActivi
      tyElementsAggregated ;
755.  bmicm:infrastructureElements_specializedBy_KeyPartnerElements bmicdce:KeyPartner
      ElementsAggregated ;
756.  bmicm:infrastructureElements_specializedBy_KeyResourceElements bmicdce:KeyResour
      ceElementsAggregated ;
757.  rdfs:label "InfrastructureElements Aggregated" ;
758.  .
759.  bmicdce:InfrastructureService_BIM-infrastructure_service
760.  rdf:type archi:InfrastructureService ;
761.  rdfs:label "InfrastructureService BIM-infrastructure service"@en ;
762.  .
763.  bmicdce:InfrastructureService_Project-Management_platform_service
764.  rdf:type archi:InfrastructureService ;
765.  rdfs:label "InfrastructureService Project-Management platform service"@en ;
766.  .
767.  bmicdce:IntangibleProduct_Oversee_construction_work
768.  rdf:type eo:IntangibleProduct ;
769.  rdfs:label "IntangibleProduct Oversee construction work"@en ;
770.  .
771.  bmicdce:IntellectualElementsAggregated
772.  rdf:type bmicm:IntellectualElements ;
773.  bmicm:intellectualElements_specializedBy_Brand bmicdce:Track_record_of_successfu
      l_BIM-projects_ ;
774.  bmicm:intellectualElements_specializedBy_Brand bmicdce:Track_record_of_successfu
      l_construction-projects ;
775.  bmicm:intellectualElements_specializedBy_Partnership bmicdce:Partnership_with_co
      ntractors ;
776.  rdfs:label "IntellectualElements Aggregated" ;
777.  .
778.  bmicdce:KeyActivityElementsAggregated
779.  rdf:type bmicm:KeyActivityElements ;
780.  bmicm:keyActivityElements_specializedBy_CoreProcess bmicdce:Collaborate_with_cus
      tomer_on_design ;
781.  bmicm:keyActivityElements_specializedBy_CoreProcess bmicdce:Design_new_buildings
      ;
782.  bmicm:keyActivityElements_specializedBy_CoreProcess bmicdce:Oversee_the_construc
      tion ;
783.  bmicm:keyActivityElements_specializedBy_CoreProcess bmicdce:Plan_of_the_construc
      tion ;
784.  rdfs:label "KeyActivityElements Aggregated" ;
785.  .
786.  bmicdce:KeyPartnerElementsAggregated
787.  rdf:type bmicm:KeyPartnerElements ;
788.  bmicm:keyPartnerElements_specializedBy_Business bmicdce:Construction_contractors
      ;
789.  bmicm:keyPartnerElements_specializedBy_Business bmicdce:Software_supplier ;
790.  rdfs:label "KeyPartnerElements Aggregated" ;
791.  .
792.  bmicdce:KeyResourceElementsAggregated
793.  rdf:type bmicm:KeyResourceElements ;
794.  bmicm:keyResourceElements_specializedBy_FinancialElements bmicdce:FinancialEleme
      ntsAggregated ;
795.  bmicm:keyResourceElements_specializedBy_Human bmicdce:Architects ;
796.  bmicm:keyResourceElements_specializedBy_Human bmicdce:BIM-managers ;
797.  bmicm:keyResourceElements_specializedBy_IntellectualElements bmicdce:Intellectua
      lElementsAggregated ;
```

798. `bmicm:keyResourceElements_specializedBy_PhysicalElements bmicdce:PhysicalElementsAggregated ;`
799. `rdfs:label "KeyResourceElements Aggregated" ;`
800. `.`
801. `bmicdce:LearnedBMICaseE`
802. `rdf:type cbr:CaseStateHistory ;`
803. `cbr:belongsToCase bmicdce:BMICase_E ;`
804. `cbr:caseStateTimestamp "2019-12-04T23:32:31.08"^^xsd:dateTime ;`
805. `cbr:hasCaseState cbr:Learned_CaseState ;`
806. `rdfs:label "LearnedBMICaseE"@en ;`
807. `.`
808. `bmicdce:Maintain_or_even_increase_revenue`
809. `rdf:type bic:StrategicGoals ;`
810. `bmic:strategicGoals_represents_Goal bmicdce:Goal_Maintain_or_even_increase_revenue ;`
811. `rdfs:label "Maintain or even increase revenue"@en ;`
812. `.`
813. `bmicdce:Maintain_the_competency_of_construction`
814. `rdf:type bic:IntellectualBarriers ;`
815. `bmic:barriersToOvercome_represents_Constraint bmicdce:Constraint_Maintain_the_competency_of_construction ;`
816. `rdfs:label "Maintain the competency of construction"@en ;`
817. `.`
818. `bmicdce:Modernize_the_portfolio`
819. `rdf:type bic:Drivers ;`
820. `bmic:drivers_represent_Driver bmicdce:Driver_Modernize_the_portfolio ;`
821. `rdfs:label "Modernize the portfolio"@en ;`
822. `.`
823. `bmicdce:MotivationAspectElementsAggregated`
824. `rdf:type bmicm:MotivationAspectElements ;`
825. `bmicm:motivationAspectElements_specializedBy_Constraint bmicdce:Constraint_Adapt_to_new_BIM-supporting_tools ;`
826. `bmicm:motivationAspectElements_specializedBy_Constraint bmicdce:Constraint_BIM_becomes_obsolete ;`
827. `bmicm:motivationAspectElements_specializedBy_Constraint bmicdce:Constraint_Get_the_knowledge_for_BIM-projects ;`
828. `bmicm:motivationAspectElements_specializedBy_Constraint bmicdce:Constraint_Maintain_the_competency_of_construction ;`
829. `bmicm:motivationAspectElements_specializedBy_Constraint bmicdce:Constraint_Not_having_enough_BIM-projects_for_the_BIM-managers ;`
830. `bmicm:motivationAspectElements_specializedBy_Constraint bmicdce:Constraint_Resilence_from_architects_not_willing_to_adapt_to_the_BIM-method ;`
831. `bmicm:motivationAspectElements_specializedBy_Driver bmicdce:Driver_Modernize_the_portfolio ;`
832. `bmicm:motivationAspectElements_specializedBy_Goal bmicdce:Goal_Maintain_or_even_increase_revenue ;`
833. `bmicm:motivationAspectElements_specializedBy_Goal bmicdce:Goal_Offer_a_new_value_proposition_to_customers ;`
834. `bmicm:motivationAspectElements_specializedBy_Outcome bmicdce:Outcome_Contraction_fee_for_planning_and_overseeing_the_construction ;`
835. `bmicm:motivationAspectElements_specializedBy_Outcome bmicdce:Outcome_Salaries ;`
836. `bmicm:motivationAspectElements_specializedBy_Outcome bmicdce:Outcome_Sale_of_building_design ;`
837. `bmicm:motivationAspectElements_specializedBy_Outcome bmicdce:Outcome_Sales_Marketing ;`
838. `bmicm:motivationAspectElements_specializedBy_Outcome bmicdce:Outcome_Software_fees ;`
839. `bmicm:motivationAspectElements_specializedBy_Requirement bmicdce:Requirement_Architects_with_BIM_experience ;`
840. `bmicm:motivationAspectElements_specializedBy_Requirement bmicdce:Requirement_BIM-Knowledge ;`
841. `bmicm:motivationAspectElements_specializedBy_Requirement bmicdce:Requirement_BIM-software ;`
842. `bmicm:motivationAspectElements_specializedBy_Requirement bmicdce:Requirement_Funds_to_hire_experienced_BIM-managers ;`

843. bmicm:motivationAspectElements_specializedBy_Stakeholder bmicdce:Stakeholder_Companies_planning_to_build_a_building ;
844. bmicm:motivationAspectElements_specializedBy_Stakeholder bmicdce:Stakeholder_Construction_contractors ;
845. bmicm:motivationAspectElements_specializedBy_Stakeholder bmicdce:Stakeholder_Construction_contractors_that_need_architects_or_BIM-managers ;
846. bmicm:motivationAspectElements_specializedBy_Stakeholder bmicdce:Stakeholder_Individuals_planning_to_build_a_house ;
847. bmicm:motivationAspectElements_specializedBy_Stakeholder bmicdce:Stakeholder_Software_supplier ;
848. bmicm:motivationAspectElements_specializedBy_Value bmicdce:Value_Build_BIM-compliant_constructions ;
849. bmicm:motivationAspectElements_specializedBy_Value bmicdce:Value_Collaboration_with_the_customer ;
850. bmicm:motivationAspectElements_specializedBy_Value bmicdce:Value_Design_state-of-the-art_buildings ;
851. bmicm:motivationAspectElements_specializedBy_Value bmicdce:Value_One-of-a-kind_building ;
852. bmicm:motivationAspectElements_specializedBy_Value bmicdce:Value_One_architectural_firm_for_design_planning_and_overseeing_the_construction ;
853. rdfs:label "MotivationAspectElementsAggregated" ;
854. .
855. bmicdce:Node_Colibri
856. rdf:type archi:Node ;
857. rdfs:label "Node Colibri" ;
858. .
859. bmicdce:NonHumanInteractionElementsAggregated
860. rdf:type bmicm:NonHumanInteractionElements ;
861. rdfs:label "NonHumanInteractionElements Aggregated" ;
862. .
863. bmicdce:Not_having_enough_BIM-projects_for_the_BIM-managers
864. rdf:type bic:RisksOfInnovation ;
865. bmic:risksOfInnovation_represents_Constraint bmicdce:Constraint_Not_having_enough_BIM-projects_for_the_BIM-managers ;
866. rdfs:label "Not having enough BIM-projects for the BIM-managers"@en ;
867. .
868. bmicdce:Offer_a_new_value_proposition_to_customers
869. rdf:type bic:StrategicGoals ;
870. bmic:strategicGoals_represents_Goal bmicdce:Goal_Offer_a_new_value_proposition_to_customers ;
871. rdfs:label "Offer a new value proposition to customers"@en ;
872. .
873. bmicdce:OfferingElementsAggregated
874. rdf:type bmicm:OfferingElements ;
875. bmicm:offeringElements_specializedBy_Service bmicdce:Design_a_building ;
876. bmicm:offeringElements_specializedBy_Service bmicdce:Oversee_construction_work ;
877. bmicm:offeringElements_specializedBy_Service bmicdce:Plan_a_construction_for_a_building ;
878. rdfs:label "OfferingElements Aggregated" ;
879. .
880. bmicdce:OfferingValueElementsAggregated
881. rdf:type bmicm:OfferingValueElements ;
882. bmicm:offeringValueElements_specializedBy_QualitativeValueElements bmicdce:QualitativeValueElementsAggregated ;
883. bmicm:offeringValueElements_specializedBy_QuantitativeValueElements bmicdce:QuantitativeValueElementsAggregated ;
884. rdfs:label "OfferingValueElements Aggregated" ;
885. .
886. bmicdce:One-of-a-kind_building
887. rdf:type bm:Status ;
888. bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;
889. bmea:offeringValues_composedOf_Value bmicdce:Value_One-of-a-kind_building ;
890. rdfs:label "One-of-a-kind building"@en ;
891. .

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892.  bmicdce:One_architectural_firm_for_design_planning_and_overseeing_the_constructi
      on
893.  rdf:type bm:Convenience ;
894.  bm:offeringValues_influencedBy_CostStructureModels bm:ValueDriven ;
895.  bmea:offeringValues_composedOf_Value bmicdce:Value_One_architectural_firm_for_de
      sign_planning_and_overseeing_the_construction ;
896.  rdfs:label "One architectural firm for design, planning and overseeing the const
      ruction"@en ;
897.  .
898.  bmicdce:Outcome_Contraction_fee_for_planning_and_overseeing_the_construction
899.  rdf:type archimateV3:Outcome ;
900.  rdfs:label "Outcome Contraction fee for planning and overseeing the construction
      "@en ;
901.  .
902.  bmicdce:Outcome_Salaries
903.  rdf:type archimateV3:Outcome ;
904.  rdfs:label "Outcome Salaries"@en ;
905.  .
906.  bmicdce:Outcome_Sale_of_building_design
907.  rdf:type archimateV3:Outcome ;
908.  rdfs:label "Outcome Sale of building design"@en ;
909.  .
910.  bmicdce:Outcome_Sales_Marketing
911.  rdf:type archimateV3:Outcome ;
912.  rdfs:label "Outcome_Sales_Marketing"@en ;
913.  .
914.  bmicdce:Outcome_Software_fees
915.  rdf:type archimateV3:Outcome ;
916.  rdfs:label "Outcome_Software_fees"@en ;
917.  .
918.  bmicdce:Oversee_construction_work
919.  rdf:type bm:Service ;
920.  bm:offerings_basedOn_KeyRessources bmicdce:Architects ;
921.  bm:offerings_basedOn_KeyRessources bmicdce:BIM-managers ;
922.  bm:offerings_basedOn_KeyRessources bmicdce:BIM-tools ;
923.  bm:offerings_basedOn_KeyRessources bmicdce:Partnership_with_contractors ;
924.  bm:offerings_basedOn_KeyRessources bmicdce:Track_record_of_successful_BIM-
      projects_ ;
925.  bm:offerings_basedOn_KeyRessources bmicdce:Track_record_of_successful_constructi
      on-projects ;
926.  bm:offerings_provide_OfferingValues bmicdce:Build_BIM-compliant_constructions_ ;
927.  bm:offerings_provide_OfferingValues bmicdce:One_architectural_firm_for_design_pl
      anning_and_overseeing_the_construction ;
928.  bm:offerings_require_KeyActivities bmicdce:Oversee_the_construction ;
929.  bm:offerings_valueFor_CustomerSegments bmicdce:Companies_planning_to_build_a_bui
      lding ;
930.  bm:offerings_valueFor_CustomerSegments bmicdce:Construction_contractors_that_nee
      d_architects_or_BIM-managers ;
931.  bm:offerings_valueFor_CustomerSegments bmicdce:Individuals_planning_to_build_a_h
      ouse ;
932.  bmea:offerings_composedOf_Product bmicdce:IntangibleProduct_Oversee_construction
      _work ;
933.  rdfs:label "Oversee construction work"@en ;
934.  .
935.  bmicdce:Oversee_the_construction
936.  rdf:type bm:CoreProcess ;
937.  bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Contraction_fee_for_
      planning_and_overseeing_the_construction ;
938.  bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Salaries ;
939.  bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Software_fees ;
940.  bm:infrastructureParts_enables_Offerings bmicdce:Oversee_construction_work ;
941.  bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
942.  bm:keyActivities_require_KeyRessources bmicdce:Architects ;
943.  bm:keyActivities_require_KeyRessources bmicdce:BIM-managers ;
944.  bm:keyActivities_require_KeyRessources bmicdce:BIM-tools ;
```

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945.    bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
946.    bmea:keyActivities_associatedWith_ValueStream bmicdce:ValueStream_Oversee_the_co
        nstruction ;
947.    bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:Realization ;
948.    rdfs:label "Oversee the construction"@en ;
949.    .
950.    bmicdce:Overseeing_construction
951.    rdf:type bc:CoreCapabilities ;
952.    rdfs:label "Overseeing construction"@en ;
953.    .
954.    bmicdce:Partnership_with_contractors
955.    rdf:type bm:Partnership ;
956.    bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Contraction_fee_for_
        planning_and_overseeing_the_construction ;
957.    bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Salaries ;
958.    bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Sale_of_building_des
        ign ;
959.    bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Sales_Marketing ;
960.    bm:infrastructureParts_enables_Offerings bmicdce:Design_a_building ;
961.    bm:infrastructureParts_enables_Offerings bmicdce:Oversee_construction_work ;
962.    bm:infrastructureParts_enables_Offerings bmicdce:Plan_a_construction_for_a_build
        ing ;
963.    bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
964.    bm:keyRessources_enables_KeyActivities bmicdce:Collaborate_with_customer_on_desi
        gn ;
965.    bm:keyRessources_enables_KeyActivities bmicdce:Design_new_buildings ;
966.    bm:keyRessources_enables_KeyActivities bmicdce:Oversee_the_construction ;
967.    bm:keyRessources_enables_KeyActivities bmicdce:Plan_of_the_construction ;
968.    bmbc:keyResources_isACoreCapability "true"^^xsd:boolean ;
969.    bmea:keyResources_composedOf_Resource bmicdce:Resource_Partnership_with_contract
        ors ;
970.    rdfs:label "Partnership with contractors"@en ;
971.    .
972.    bmicdce:Partnership_with_key_contractors
973.    rdf:type bc:CoreCapabilities ;
974.    rdfs:label "Partnership with key contractors"@en ;
975.    .
976.    bmicdce:PhysicalElementsAggregated
977.    rdf:type bmicm:PhysicalElements ;
978.    bmicm:physicalElements_specializedBy_ITSystems bmicdce:BIM-tools ;
979.    rdfs:label "PhysicalElements Aggregated" ;
980.    .
981.    bmicdce:Plan_a_construction_for_a_building
982.    rdf:type bm:Service ;
983.    bm:offerings_basedOn_KeyRessources bmicdce:Architects ;
984.    bm:offerings_basedOn_KeyRessources bmicdce:BIM-managers ;
985.    bm:offerings_basedOn_KeyRessources bmicdce:BIM-tools ;
986.    bm:offerings_basedOn_KeyRessources bmicdce:Partnership_with_contractors ;
987.    bm:offerings_basedOn_KeyRessources bmicdce:Track_record_of_successful_BIM-
        projects_ ;
988.    bm:offerings_basedOn_KeyRessources bmicdce:Track_record_of_successful_constructi
        on-projects ;
989.    bm:offerings_provide_OfferingValues bmicdce:Build_BIM-compliant_constructions_ ;
990.    bm:offerings_provide_OfferingValues bmicdce:One_architectural_firm_for_design_pl
        anning_and_overseeing_the_construction ;
991.    bm:offerings_require_KeyActivities bmicdce:Plan_of_the_construction ;
992.    bm:offerings_valueFor_CustomerSegments bmicdce:Companies_planning_to_build_a_bui
        lding ;
993.    bm:offerings_valueFor_CustomerSegments bmicdce:Construction_contractors_that_nee
        d_architects_or_BIM-managers ;
994.    bm:offerings_valueFor_CustomerSegments bmicdce:Individuals_planning_to_build_a_h
        ouse ;
995.    bmea:offerings_composedOf_Product bmicdce:TangibleProduct_Plan_a_construction_fo
        r_a_building ;
996.    rdfs:label "Plan a construction for a building"@en ;
```

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997.    .
998.    bmicdce:Plan_of_the_construction
999.    rdf:type bm:CoreProcess ;
1000.   bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Contraction_fee_for_
        planning_and_overseeing_the_construction ;
1001.   bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Salaries ;
1002.   bm:infrastructureParts_affects_FinancialAspectParts bmicdce:Software_fees ;
1003.   bm:infrastructureParts_enables_Offerings bmicdce:Plan_a_construction_for_a_build
        ing ;
1004.   bm:infrastructureParts_influencedBy_EconomicAdvantages bm:EconomiesOfScope ;
1005.   bm:keyActivities_require_KeyRessources bmicdce:Architects ;
1006.   bm:keyActivities_require_KeyRessources bmicdce:BIM-managers ;
1007.   bm:keyActivities_require_KeyRessources bmicdce:BIM-tools ;
1008.   bmbc:keyActivities_isACoreCapability "true"^^xsd:boolean ;
1009.   bmea:keyActivities_associatedWith_ValueStream bmicdce:ValueStream_Plan_of_the_co
        nstruction ;
1010.   bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:ProjectPlanning
        ;
1011.   bmicis:keyActivities_aggregatedIn_ConstructionPlanningPhases ci:StrategicPlannin
        g ;
1012.   rdfs:label "Plan of the construction"@en ;
1013.   .
1014.   bmicdce:QualitativeValueElementsAggregated
1015.   rdf:type bmicm:QualitativeValueElements ;
1016.   bmicm:qualitativeValueElements_specializedBy_Convenience bmicdce:One_architectur
        al_firm_for_design_planning_and_overseeing_the_construction ;
1017.   bmicm:qualitativeValueElements_specializedBy_CustomerCoCreation bmicdce:Collabor
        ation_with_the_customer ;
1018.   bmicm:qualitativeValueElements_specializedBy_Design bmicdce:Design_state-of-the-
        art_buildings ;
1019.   bmicm:qualitativeValueElements_specializedBy_Status bmicdce:One-of-a-
        kind_building ;
1020.   rdfs:label "QualitativeValueElements Aggregated" ;
1021.   .
1022.   bmicdce:QuantitativeValueElementsAggregated
1023.   rdf:type bmicm:QuantitativeValueElements ;
1024.   bmicm:quantitativeValueElements_specializedBy_Performance bmicdce:Build_BIM-
        compliant_constructions_ ;
1025.   rdfs:label "QuantitativeValueElements Aggregated" ;
1026.   .
1027.   bmicdce:RequiredResourcesAggregated
1028.   rdf:type bmicm:RequiredResources ;
1029.   bmicm:requiredResources_specializedBy_FinancialRessources bmicdce:Funds_to_hire_
        experienced_BIM-managers ;
1030.   bmicm:requiredResources_specializedBy_HumanRessources bmicdce:Architects_with_BI
        M_experience ;
1031.   bmicm:requiredResources_specializedBy_IntellectualRessources bmicdce:BIM-
        Knowledge ;
1032.   bmicm:requiredResources_specializedBy_PhysicalRessources bmicdce:BIM-software ;
1033.   rdfs:label "RequiredResources Aggregated" ;
1034.   .
1035.   bmicdce:Requirement_Architects_with_BIM_experience
1036.   rdf:type archimateV3:Requirement ;
1037.   rdfs:label "Requirement Architects with BIM experience" ;
1038.   .
1039.   bmicdce:Requirement_BIM-Knowledge
1040.   rdf:type archimateV3:Requirement ;
1041.   rdfs:label "Requirement BIM-Knowledge" ;
1042.   .
1043.   bmicdce:Requirement_BIM-software
1044.   rdf:type archimateV3:Requirement ;
1045.   rdfs:label "Requirement BIM-software" ;
1046.   .
1047.   bmicdce:Requirement_Funds_to_hire_experienced_BIM-managers
1048.   rdf:type archimateV3:Requirement ;
```

```
1049.   rdfs:label "Requirement Funds to hire experienced BIM-managers" ;
1050.   .
1051.   bmicdce:Resilence_from_architects_not_willing_to_adapt_to_the_BIM-method
1052.   rdf:type bic:OrganisationalBarriers ;
1053.   bmic:barriersToOvercome_represents_Constraint bmicdce:Constraint_Resilence_from_
        architects_not_willing_to_adapt_to_the_BIM-method ;
1054.   rdfs:label "Resilence from architects not willing to adapt to the BIM-
        method"@en ;
1055.   .
1056.   bmicdce:Resource_Architects
1057.   rdf:type archimateV3:Resource ;
1058.   rdfs:label "Resource Architects"@en ;
1059.   .
1060.   bmicdce:Resource_BIM-managers
1061.   rdf:type archimateV3:Resource ;
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1101.   bm:costStructureElements_affectedBy_Offerings bmicdce:Oversee_construction_work
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1127.    bm:channel_hasChannelPhaseType "Purchase"@en ;
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1129.    bm:channels_deliverTo_CustomerSegments bmicdce:Individuals_planning_to_build_a_h
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1148.    bm:costStructureElements_affectedBy_Offerings bmicdce:Plan_a_construction_for_a_
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1259. bm:infrastructureParts_enables_Offerings bmicdce:Plan_a_construction_for_a_build
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Appendix-F: Expert Interview Summaries

This appendix shows the summaries of the different expert interviews conducted for this thesis.

Expert Interview with Construction Expert

Protocol information

Place	Olten, Switzerland	
Date and Time	Tuesday, 17.09.2019 – 11.00	
Attendees	Prof. Dr. Manfred Huber	Head of Institute of Digital Construction at the University of Applied Sciences and Arts Northwestern Switzerland
	Marco Peter	PhD-Student at the University of Camerino

Interview questions (Q) and answers (A)

Q: What are the specific properties of a construction company?

A: A company from the construction sector can be further categorized into sub-areas from the construction sector, such as architect or contractor. Further, a construction project can be mapped to the SIA standard of construction phases, such as the project planning phase. There are different execution models available for a construction company to work within as well as different geographical areas of execution a company can be specialized in.

Q: Ok, so summarizing, can we say that the specifics of the construction sector is that it has specific sub-sectors, specific phases that a construction project must go through, specific execution models a construction company can be working in, and specific geographical execution areas.

A: Yes, exactly. One can say that the construction sector has those four specific properties.

Q: Can you please tell me, which are the sub-sectors of the construction sector that you talked about?

A: Sure. The construction sector is usually divided into seven different stakeholder groups. There are the architects and the engineers who do the planning and design. Then there are the contractors who do the actual building, such as bricklayer. Of course, you have an owner of the building as well as a user. Most of the time you have an operator who oversees the maintenance after the building is constructed.

Q: Are there other stakeholders that are important for construction?

A: Yes, public authority is always important for any construction.

Q: Can you please tell me, which are the planning phases of construction?

A: Sure, the SIA norm has defined six phases: strategic planning, preliminary study, project planning, tendering, realization, and facility management.

Q: Can you please tell me, which are the possible execution models?

A: Sure, there exists of course the traditional approach of having individual contracts for each involved party. Second, you have the execution model of having a general planner in charge of the whole planning. Third, you have the execution model of a general contractor, who is in charge to coordinate all the different parties of a construction. Fourth is the execution model of a total contractor, who has all or most of the different skills in-house. Fifth is the execution model of integrated project delivery called IPD where all the different parties come together as one and deliver a construction as a group, almost as a joint venture.

Q: Can you please tell me, which are the execution areas of a construction company?

A: Usually the execution area is differentiated between rural and urban.

Q: Are all these four construction specifics for a business model innovation case of interest for a top-level manager, a transformation manager, or an enterprise architect?

No. From my experience, these specifics are of interest for top-level managers and transformation managers or innovation managers since these parties act on a strategic level of the company. An enterprise architect would have more interest in knowing the detailed processes or the technologies in place.

First Expert Interview with C-level Manager

Protocol information

Place	Adliswil, Switzerland	
Date and Time	Monday, 20.01.2020 – 18.00	
Attendees	Natalie Bühler	Head of Projects at Annanow Group AG
	Marco Peter	PhD-Student at the University of Camerino

Interview questions (Q) and answers (A)

Q: Can you please tell me, what your experiences around business transformation are?

A: I oversee all the projects of Annanow including the business transformation projects. From the theoretical point of view, I have a Master's in Business Innovation and thus, I have in-depth knowledge of the topic of business transformation from a practical and theoretical perspective.

Q: If you think of a business model innovation that you have supported in the past when you were ideating for a new business model innovation, which business model properties were of interest to you?

A: We always use the Business Model Canvas by Osterlwader to design our visions for Annanow. Thus, I would say the nine dimensions of the Business Model Canvas.

Q: If you think of a business model innovation that you have supported in the past when you were ideating for a new business model innovation, which business innovation transformation properties were of interest to you?

A. When we looked for ideas, we browsed the internet to find inspiration, such as what the competition is doing. It always is interesting to see, if these companies are partnering up with other companies and of which sectors these companies are. Of course, we always looked at their result and if that result would be a match for our business.

Q: Which are further properties you would be interested in for a business innovation case regarding the business innovation transformation properties?

A: The motives and challenges the company had would be interesting to know. Also, the resources the company required. Unfortunately, usually, we do not get that information.

Q: If you think of a business model innovation that you have supported in the past when you were ideating for a new business model innovation, which enterprise architecture properties were of interest to you?

A: Since I plan the transformation projects with our CEO and our founder and we all aren't techies, we do not look at the enterprise architecture. We leave that part to our CTO after we came up with a new idea/vision.

Q: If you think of a business model innovation that you have supported in the past when you were ideating for a new business model innovation, which business capabilities were of interest to you?

A: We always look at our resources we have in-house and how we can come up with something new or a specific improvement by leveraging those resources. The main resources for us are our employees as well as our partnerships.

Q: How about dynamic capabilities?

A: Sure, these capabilities are important for us due to the fact that we are always changing and transforming in order to maintain viability in the fast-changing delivery market.

Second Expert Interview with C-level Manager

Protocol information

Place	Adliswil, Switzerland	
Date and Time	Tuesday, 08.12.2020 – 18.00	
Attendees	Natalie Bühler	Head of Projects at Annanow Group AG
	Marco Peter	PhD-Student at the University of Camerino

Interview questions (Q) and answers (A)

Q: Do you have any questions about the shown application scenario?

A: No.

Q: Can you please rank the four example cases according to how relevant you think they are for the application scenario case?

A: In my opinion, the BIM-Manager-as-a-Service case is the best matching one since the application scenario case builds BIM knowledge and recruits BIM managers, which is a central aspect of the BIM-Manager-as-a-Service case. Second would be the BIM-room-leasing case since the application scenario company now has to conduct BIM-meetings and thus, a BIM-room-leasing concept could be of interest to them. I see the BM Pattern "Add-on" as the third best matching case since the application scenario could apply such a generic approach for its business model. Concluding, the insurance case is fourth in my opinion since it is very specific for the insurance or finance sector.

Q: Do you think the case-based similarity-retrieval service is useful when it comes to the ideation phase of a business model innovation process?

A: Yes definitely. It would reduce a lot of trend scouting-like work and provide a first idea of what kind of direction the company could take.

Q: Do you see any missing aspects with the case-based similarity-retrieval service?

A: No. I only would like to see the filtering option integrated into the similarity-retrieval service.

First Expert Interview with Transformation Manager

Protocol information

Place	Online	
Date and Time	Thursday, 06.02.2020 – 18.00	
Attendees	Luca Baldelli	Strategy and Corporate Development Manager at Möbel Pfister AG
	Marco Peter	PhD-Student at the University of Camerino

Interview questions (Q) and answers (A)

Q: Can you please tell me, what your experiences around business transformation are?

A: I'm in charge of the digital transformation projects at Möbel Pfister and support the strategy development of Möbel Pfister. I have a Master's in Strategic Management and thus, I would say I have profound knowledge in the topic of business transformation.

Q: If you think of a business model innovation that you have supported in the past when you were ideating for a new business model innovation, which business model properties were of interest to you?

A: In our strategic development workshops we use the Business Model Canvas by Osterlwader to design new ideas of business models or services. Thus, the nine dimensions of the Business Model Canvas.

Q: If you think of a business model innovation that you have supported in the past when you were ideating for a new business model innovation, which business innovation transformation properties were of interest to you?

A. When we develop a business case, the major topics for us are the partners needed for a successful market introduction, the motives for us to not forget why we want to launch this innovation, and the resources we require for it. After a launch, we have a retrospective meeting and define the challenges we occurred so that for the next project these challenges can be anticipated.

Q: If you think of a business model innovation that you have supported in the past when you were ideating for a new business model innovation, which enterprise architecture properties were of interest to you?

A: To have a smooth integration between the business and the IT, it is very important for me to know our enterprise architect and what the implications of the launch of an innovation is. Therefore, I would say the entire enterprise architecture with all the layers.

Q: If you think of a business model innovation that you have supported in the past when you were ideating for a new business model innovation, which business capabilities were of interest to you?

A: It is important to us to leverage our current resources. Also, since we see ourselves as a digital leader in our market, it is important to us to be agile and use new technologies as soon as possible.

Second Expert Interview with Transformation Manager

Protocol information

Place	Online	
Date and Time	Saturday, 19.12.2020 – 10.00	
Attendees	Luca Baldelli	Strategy and Corporate Development Manager at Möbel Pfister AG
	Marco Peter	PhD-Student at the University of Camerino

Interview questions (Q) and answers (A)

Q: Do you have any questions about the shown application scenario?

A: No.

Q: Can you please rank the four example cases according to how relevant you think they are for the application scenario case?

A: I see the BIM-Manager-as-a-Service, followed by the case BIM-room-leasing, as the best matching cases since both have the topic of BIM included, yet the BIM-Manager-as-a-Service does not need to have special equipment for its introduction. I would put the case insurance through banks in third place since the main capability of that case is the close connection with a partner, the bank, and I see such a construct as well for the application scenario case. Thus, the BM-Pattern "Add-on" would be in the fourth place.

Q: Do you think the case-based similarity-retrieval service is useful when it comes to the ideation phase of a business model innovation process?

A: Definitely. I see a difficulty in building a large case base but the usefulness of such a service is definitely there.

Q: Do you see any missing aspects with the case-based similarity-retrieval service?

A: No, I don't see any.

First Expert Interview with IT-Transformation Manager

Protocol information

Place	Online	
Date and Time	Monday, 10.02.2020 – 18.00	
Attendees	Adrian Stierli	Manager Transformation Assurance at PwC
	Marco Peter	PhD-Student at the University of Camerino

Interview questions (Q) and answers (A)

Q: Can you please tell me, what your experiences around IT transformation and enterprise architecture are?

A: I work as a consultant of IT transformation projects. In my work I have to make reports of IT assurance. Thus, I'm in close contact with the enterprise architects. My scholar background is a Master's in Business Information Systems.

Q: If you think of a business model innovation that a client of yours has done, were the business model properties of interest to the enterprise architect?

A: No, not really. This is more a topic for the strategy department of the company.

Q: If you think of a business model innovation that a client of yours has done, were the business innovation transformation properties, such as motives for the innovation, challenges, or the sector of the involved parties of interest to the enterprise architect?

A: No, not really. This is also more a topic for the strategy or the innovation development department of the company.

Q: If you think of a business model innovation that a client of yours has done, which enterprise architecture properties were of interest to the enterprise architect?

A: For the enterprise architect it's important to know the current architecture as well as the target architecture of any transformation or change the company is planning to do. Thus, the entire enterprise architecture with all its layers is of importance for an enterprise architect.

Q: If you think of a business model innovation that a client of yours has done, were the business capabilities of interest to the enterprise architect?

A: Well, yes and no. It is important for the enterprise architect to model the capabilities a company has. However, it is not important for the architect to know which overarching capabilities are involved in a new idea, only what affects the enterprise architecture directly.

Second Expert Interview with IT-Transformation Manager

Protocol information

Place	Online	
Date and Time	Tuesday, 22.12.2020 – 18.00	
Attendees	Adrian Stierli	Manager Transformation Assurance at PwC
	Marco Peter	PhD-Student at the University of Camerino

Interview questions (Q) and answers (A)

Q: Do you have any questions about the shown application scenario?

A: No, it is clear to me.

Q: Can you please rank the four example cases according to how relevant you think they are for the application scenario case?

A: For me, the best matching case is the BIM-Manager-as-a-Service case. The second best matching case is the BIM-room-leasing case. The third and fourth are close and I'm not really sure. However, I would put the insurance case in third place if a ranking is required.

Q: Do you think the case-based similarity-retrieval service is useful when it comes to the ideation phase of a business model innovation process?

A: I think so, yes. Especially if the company would decide to leverage the enterprise architecture and reuse parts of it for new endeavors.

Q: Do you see any missing aspects with the case-based similarity-retrieval service?

A: I cannot think of any.