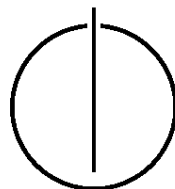# DEPARTMENT OF INFORMATICS

TECHNICAL UNIVERSITY OF MUNICH

Master's Thesis in Information Systems

Collecting and Analyzing Cases of Inter-Organizational Business Capability Modeling

Josephine Graul

# DEPARTMENT OF INFORMATICS

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Erfassen und Analysieren von Fällen organisationsübergreifender Geschäftsfähigkeitsmodellierung

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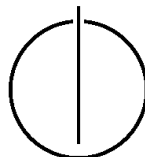
I confirm that this master's thesis is my own work and I have documented all sources and material used.

Munich, December 18, 2020   Josephine Graul

Abstract

In times of digitization and frequently changing business environments, organizations are increasingly faced with the challenges of managing their scarce resources and aligning business and information technology (IT) aspects of the company. This is realized in the company through IT governance. Additionally, to remain innovative, they are progressively engaging in collaborations with suppliers, customers and competitors. In this way, they want to achieve synergy effects and exchange knowledge. To support the new ways of working together, inter-enterprise architecture is becoming more relevant. One assisting instrument of that are business capability maps. Originally designed for the use within a single company, they are becoming increasingly relevant for alignment between different organizations.

However, the research is still limited in this domain. There is little scientific literature available on the experience of joint capability modeling. Therefore, this thesis identifies cases of inter-organizational business capability modeling to further analyse their experiences. Investigating the status quo will provide insights on the current distribution of these capability maps. The influence of factors such as company size or industry focus is also taken into account. Moreover, the research aims to identify reasons and challenges practitioners associate with the introduction and usage of capability modeling. The focus is on inter-organizational application scenarios. Nevertheless, also the intra-organizational use is considered as the findings can be transferred and form the basis for analysis in business networks. To get a profound and holistic understanding, a mixed-method approach is employed. At first, a short literature review is conducted as a theoretical foundation. Afterwards, data is collected through a web-based survey, followed by five semi-structured interviews to elaborate on certain aspects in depth. The target group includes all types of companies across different industries and countries. The results show an upward trend in the usage of business capability maps and that they are a suitable tool to support inter-enterprise architecture. The most relevant reasons are investigated, including application portfolio management and strategic mapping. In addition, ten categories of challenges are presented in detail, such as coordination effort.

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CHAPTER 2: FUNDAMENTALS

The Fundamentals define important terms and present the context in which this thesis is placed. This chapter provides a unified understanding of IT governance, enterprise architecture management and business capabilities.

CHAPTER 3: RELATED WORK

The third chapter summarizes existing literature on the use of business capability modeling and challenges of inter-enterprise architecture. It also highlights the research gap.

CHAPTER 4: PRIMARY RESEARCH METHODOLOGY

This chapter explains the scientific methodology of the data collection process. It also presents an overview of the interview partners.

CHAPTER 5: RESULTS

The results chapter presents the outcome of the survey and the interviews. The data is analyzed and structured according to the intra- and inter-organizational use of business capability maps. Furthermore, the challenges of the usage are discussed.

CHAPTER 6: DISCUSSION

The discussion outlines the key findings of the thesis with regard to the research questions. In addition, the limitations of this study are shown.

CHAPTER 7: CONCLUSION

The final chapter summarizes the work and presents an outlook to potential future work.

1. Introduction

This chapter starts with a brief introduction on the thesis' topic of inter-organizational collaboration and the use of business capability maps. Afterwards, the objective with the corresponding research questions are described in section 1.2 followed by the research approach presented in section 1.3.

1.1. Motivation

In times of globalized markets and rising digital transformation, organizations have to re-think their ways of working to adapt quickly to frequently changing environments [58, 72]. To stay competitive, companies need to manage their scarce resources more efficiently and focus on their core competencies. To identify these, they can make use of the concept of business capabilities (BC) [24]. Instead of focusing on *how* something works in the company, BCs define *what* needs to be done [71]. The aggregated BCs provide a holistic and static view of the company, independent of, for example, technologies used. The result of capability modeling is a business capability map (BCM) which visualizes inter-dependencies. Color coding the map provides additional insights like maturity levels or cost structures of specific capabilities [11, 26]. While focusing on the core capabilities with limited resources internally, additional value is created by joining networks with external organizations. Because it is not only important to possess capabilities, but also to manage and complement them with partnerships [24]. The collaborations can be of various types with suppliers, customers, competitors or others. They aim to reduce costs, share knowledge and scarce resources as well as introduce industry-wide standardization [18, 23, 53, 63]. To remain competitive in a frequently changing environment, business and information technology (IT) architecture must be analyzed and aligned. Enterprise architecture management (EAM) approaches are used to model the intertwinement [58]. However, collaborative networks lead to a higher level of complexity and need the support of inter-enterprise architecture [20]. One instrument to model this architecture is the inter-organizational BCM.

Originally designed for an application in a single company, the concept of business capabilities have enjoyed increasing popularity since 2000. But its use in an inter-organizational context also proves to be useful [77]. Additionally, in the light of digitization, BCMs are a popular tool for alignment of business and IT. This exemplifies the relevance of this thesis' topic. While there is sufficient research on the separate topics of business capability mod-

eling within a company and EAM across company borders, a lack of literature regarding the use of BCMs in an inter-organizational context is identified. Therefore, this thesis aims to fill this gap with current data from the practitioner's perspective. It will contribute to the research field by collecting and analyzing cases of inter-organizational business capability modeling through a web-based survey and semi-structured interviews. The results will provide insights into the reasons and challenges related to the use of BCMs across company borders.

1.2. Research Questions

This master's thesis aims to empirically investigate the status quo of business capability maps used in an inter-organizational context. Do companies use these modelings as a tool for efficient enterprise architecture management? Are they as relevant across company borders as they are within an organization? The final goal is the identification and analysis of reasons and obstacles that affect inter-organizational capability modeling. An initial investigation leads to the identification of a gap in the current literature. As there is a lack of scientific publications covering the practitioner's perspective on extended enterprise architecture [65] and the relevance of jointly defined capability maps, the following research questions (RQ) arise:

RQ1: Which reasons for inter-organizational business capability modeling can be found?
The objective of the first research part is to find out why and for what use companies introduce a business capability map. The focus is on capability maps which are defined and used in an inter-organizational context. Identifying the reasons can explain the status quo and provide indicators for the future. To not overlook any aspects regarding that topic, the analysis begins with a review of existing insights. Due to the gap in literature, reasons of capability modeling within organizations are combined with facets of inter-enterprise architecture and business ecosystem models. Conclusions drawn from the examination of related work are then compared with the results of the survey and interviews.

RQ2: What are the challenges associated with the inter-organizational use of BCMs?
In order to look at the concept of capability modeling from all perspectives, the challenges are also investigated. This includes both experienced problems during use as well as expected obstacles that prevent companies from implementing a BCM. The main focus is on inter-organizational settings. However, due to the data from the survey and the interviews, findings from intra-organizational usage are also analyzed and transferred.

RQ3: Which factors can influence the usage of inter-organizational BCMs?
The third research question complements the results of the first. By means of a survey and interviews, factors that affect the use of inter-organizational business capability modeling such as company size and industry characteristics are identified.

For a holistic view, practitioners from multiple countries are surveyed. The results of the three questions give an overall picture of the current situation of capability modeling. This information facilitates the assessment of future developments and the identification of need for support.

1.3. Research Approach

The main objective of this thesis is to gain in-depth knowledge about the practical usage of inter-organizational business capability maps. For that, a wide spectrum of research methods is available in the field of information systems. These are to be distinguished from development methods which support the creation or improvement of artifacts [64]. In order to answer the aforementioned research questions in a scientifically accurate way, the research in this thesis is based on the design science paradigms by Peffers et al. (2007) [57] and guidelines presented by Venkatesh et al. (2013). The latter set out how a mixed-method approach, meaning the combination of quantitative and qualitative methods, can increase the quality and significance of the research results [64, 73]. Figure 1.1 shows the by the researcher adapted approach in more detail.
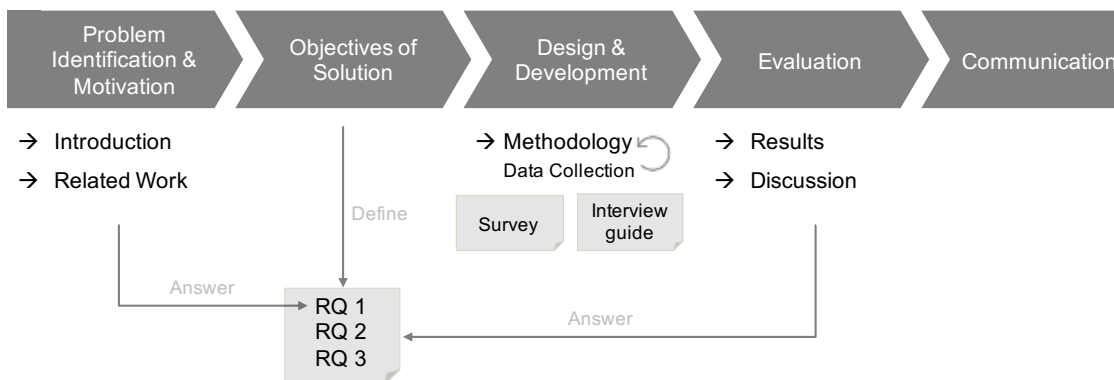
Figure 1.1.: Underlying research approach according to Peffers et al. (2007) [57]

As suggested by Peffers et al. (2007), the first of their six consecutive steps is to identify the underlying research problem and to explain the reasoning behind the investigation [57]. This is covered by the first chapter of this thesis. The problem revolves around a missing information base for inter-organizational business capability maps which might represent a solution to the growing demand for business and IT alignment across company borders. Justifying the relevance of this problem and setting the theoretical foundation is further done by a literature review in chapter 3. The second step, defining the objectives of a solution, is incorporated into this thesis by defining the research questions. The study is

designed to understand success factors and challenges of inter-organizational business capability modeling. To find as sound answers as possible to the research questions, data from actual applications is needed. For this purpose, a one-time data collection across several individuals is conducted, which is quantitatively and qualitatively coded and evaluated. The results from the sample participants usually allow conclusions to be drawn about the population [64]. In line with the mixed-method approach, the main information gathering is done by a web-based survey as described in chapter 4.1. Moreover, subsequent semi-structured interviews with experts in the domain enterprise architecture provide even more insights. The procedure for the interviews is described in chapter 4.2. Both methods are the most frequently used research strategies in the area of information science, especially for quantitative and qualitative data collection [68]. In Peffers' approach, design and development is the next step. However, during the current research no technical artifacts like new models or methods are developed. Therefore, this step can be combined with the demonstration and evaluation part. The outcome of the survey and interview analysis will be the status quo of business capability maps in an inter-organizational context and concrete success factors as well as challenges. The final sixth step is communicating the underlying research. This is achieved by the present thesis [57]. During data collection, participants are offered to provide personal data voluntarily. A database of individuals who use BCMs, preferable across company borders, can be created, which can be used for future research.

2. Fundamentals

This chapter gives an overview of the foundations on which this thesis is built. Relevant terminologies are defined and concepts that are used throughout the following work are explained. This writing will put *business capability modeling* in the context of *enterprise architecture management* which is a main function of *IT governance*.

2.1. IT Governance

The management discipline of IT governance is an essential component of corporate governance and is through this linked to the overall corporate strategy [35]. The subject of corporate governance describes the relationship network between the management of a company, its supervisory body, its shareholders and other stakeholders [54]. The aim is to achieve long-term value creation with a balanced consideration of the different interests of all stakeholders of the company. Just as corporate governance "mediates" between the corporate environment and the company, the key component of IT governance is a successful alignment of business and IT inside the firm. Figure 2.1 visualizes the relations. On the one hand, IT governance is influenced from the outside by the requirements of corporate governance as well as strategic aspects or a specific corporate culture. On the other hand, IT strategy, positioning of IT or the existing skills affect IT governance from the inside. This includes many different aspects and approaches to structure the topic in practice. Due to the heterogeneity and complexity of the requirements, models only cover parts of IT governance and there has no general standard framework been agreed upon yet [60]. Among well-known frameworks supporting IT governance are CobiT and ITIL [35].

With that in mind, IT governance can be described as it commonly does by the IT Governance Institute (USA) [34] as the "combination of leadership, organizational structures and processes that ensure that IT supports business goals and strategy". It is the responsibility of the board to take this into account in the management of the enterprise. Therefore, companies use IT governance to archive the following:

- Alignment of IT to the requirements of the company
- Increased enterprise value and maximized benefits from IT
- Responsible management of IT resources
- Appropriate management of IT and related risks [34]

As described at the beginning, globalization and digitalization are affecting current business activities. To drive digital transformation in the company, IT governance has to be
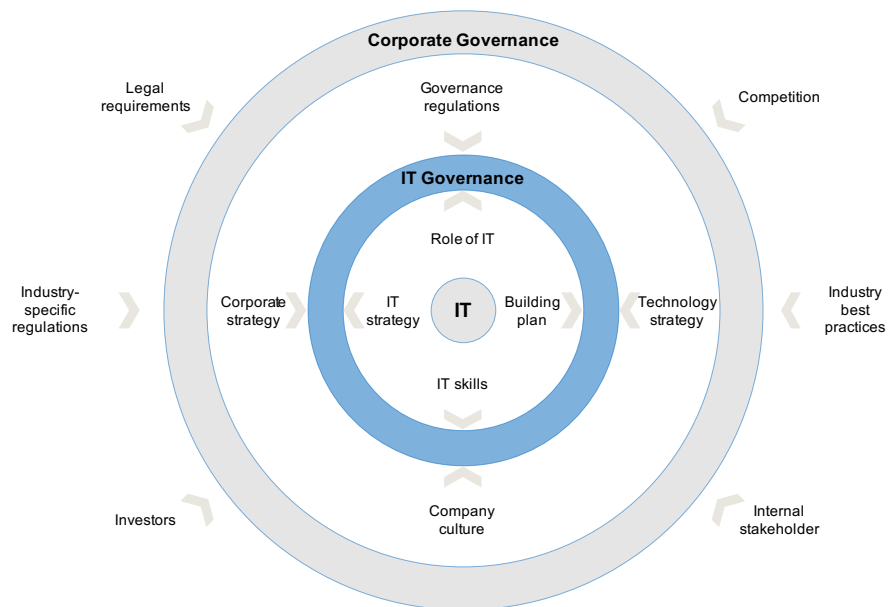
Figure 2.1.: IT governance set in context according to Rüter et al. (2010) [60]

effectively aligned with business transformation projects [14]. Therefore, it considers long-term value creation and takes into account not only internal but also external requirements (e.g. compliance) [35]. Thus, a successful IT governance relies on comprehensive information and transparency of IT processes and -assets. This is provided by one of the major functions of this management discipline, the enterprise architecture management (EAM). EAM implements a model which supports the activities of IT governance that are related to processes, the organization and information management [51].

2.2. Enterprise Architecture Management

Enterprise architecture provides a holistic view of a company by presenting business processes and IT systems together [45]. The primary idea is to model the organization's most important artifacts and their relationship to each other. A model of the actual state is used for documentation and analysis, while a visualization of the target state supports strategic and infrastructure planning [2]. Niemann (2005) compares a company to a building for illustration purposes. Just as every building has its architecture, so does every company have its own enterprise architecture (EA). Sometimes it is planned and adjusted like a building was specified beforehand in its size, functions and materials, sometimes it has simply grown. Some corporate architecture is known with every detail so its inherent potential can be used, some architecture just exists [52]. In the context of an enterprise, architecture can be simply described as a "structured and coordinated collection of plans

for the design of the IT-landscape of a company" [51]. But as a topic of high interest in the research community, a huge variety of definitions can be found in literature [12, 27, 45, 56, 82]. An overarching and widely used definition is presented in the IEEE Standard 1471-2000, specifying architecture as "the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution" [33]. In the scope of this thesis, EA will be understood more precisely as a tool that encompasses the interaction between IT and economic activities and therefore supports the overall alignment goal of IT governance [61].

In order to fulfil this goal, the potential of a well thought out enterprise architecture needs to be leveraged. The developing process, that leads to an EA is the enterprise architecture management. It is a combination of tools, procedures, applications and allocation of responsibilities [1, 51]. EAM has a wide range of possible applications [2]. According to a empirical study from Aier et al. (2008), the most relevant ones are

- Business / IT alignment
- Strategy management
- Process optimization
- Project architecture management
- Application portfolio management
- Quality management
- Security management [2]

Therefore, many different stakeholder are involved, each of them with their own viewpoints and interests. Their interaction in the whole process and the underlying universal concept of EAM is visualized in figure 2.2. The main responsibility for the process lies with the EA team as shown in the center of the figure. They perform recurring activities which are shown in the outer circle and can be categorized in three groups: model EA, communicate the outcome and incorporate feedback.

The responsible team has a high information demand. They collect data on existing EA but need additional information on the enterprise's architectural strategy and planned relationships. This knowledge is provided by many different stakeholders, like top management, business owners or IT operatives. In order to derive the greatest benefit from the data, the EA team creates a variety of different visualizations, such as metrics, views and reports. They are adapted to the information demand of the decision makers, illustrated on the right half. Last but not least, figure 2.2 displays the dialog of the core team with members of various project groups. They discuss with, for example, software developers the guidelines and proposed changes on the architecture [4].

The versatility of EA makes it so relevant. In order to meet the needs of each stakeholder group, enterprise architecture can focus on many different views. In a *business view,* for example, the business architecture is paramount. The holistic view supports changes associated with resources, people and the organization. The *IT view* on the other hand describes
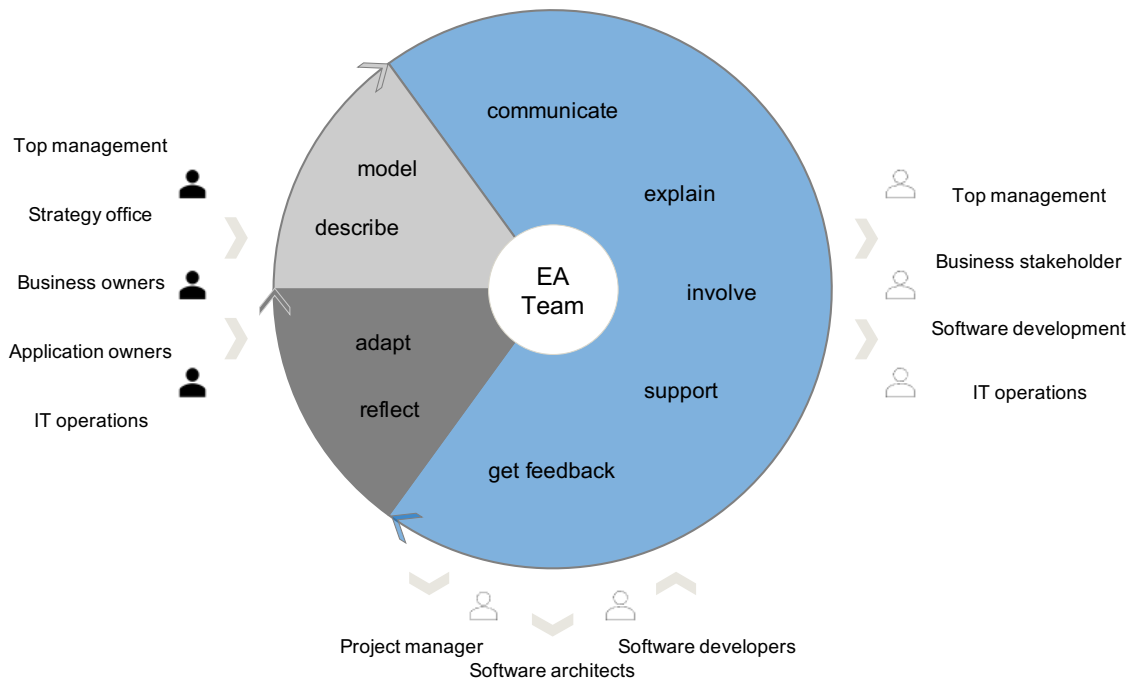
Figure 2.2.: EAM concept according to Aleatrati Khosroshahi et al. (2015) [4]

the interrelations between IT systems and highlights how they support the business objectives. The *governance view* ensures the "manageability and quality of the architecture implementation" and includes business and IT governance [56, 67]. Therefore, successful EA can lead to organizational benefits. The added value is created by a reduction of IT costs with simultaneous improvement of IT performance, quicker decision making and improved data access. The improved business-IT alignment as part of an overall organizational alignment receives most attention in literature related to information systems. This is only a selection of the most frequently mentioned benefits [66]. Independent of the view, a central task of EAM is describing the architecture of the enterprise. Thus a common language is needed to leverage the potential of EA and possible visualizations. Just as multiple definitions of EA exist, several frameworks have been developed to facilitate EAM, each of them developed for a specific purpose. The most prominent ones are The Open Group Architectural Framework (TOGAF) and the Zachman Framework. The latter offers a two-dimensional matrix to describe the organization's existing functions, elements and processes. It does not cover the implementation. In comparison, TOGAF focuses more on the methodological approach to develop an EA. Frameworks in general are the fundamental structure of an EA, they offer guidance on how to analyze both the current EA and the one that is to be built. However, they do not provide a formal step-by-step guide on how to implement an EA [4, 36, 51]. An overview and detailed descriptions of the most

common enterprise architecture frameworks are provided by Matthes (2011) [49]. This thesis addresses a specific aspect of EA, which is, according to TOGAF, a "key building block for developing" EA [28]. Therefore, the concept of business capabilities will now be introduced.

2.3. Business Capabilities

The role that business capabilities play in EAM has been of growing interest over the last two decades [77]. Thus a lot of research has been conducted on the concept and relationship with EAM [4, 5, 13, 26]. Thinking in business capabilities originates, besides from enterprise architecture, from the resource-based view (RBV) of a company [55, 79]. That view describes resources quite broadly, as processes, capabilities, knowledge etc. which enable the firm to design and implement strategies which improve the company's efficiency [9]. Capabilities in particular are considered as more distinct and stable over time than some of the other resources and therefore are more suitable to access the performance of the organization [55]. Capabilities have therefore been used for a very long time for strategic planning and control. Research distinguishes between different types of capabilities including business capabilities, core capabilities, EAM capabilities, IT capabilities and dynamic capabilities. The latter is, in contrast to the other types, used externally in the company's environment. IT capabilities, for example, focus on IT infrastructure and relate to IT services and/or products [55, 80]. However, this master's thesis is about business capabilities and they are used interchangeably with the shorter term capability. Due to the two streams of origin, literature is not consistent in its understanding of business capabilities. Definitions are not that precise and lead to misinterpretation. Frequently, and therefore also used in this thesis, is the wording of the standard of The Open Group which describes a business capability as

> *a particular ability or capacity that a business may possess or exchange to achieve a specific purpose or outcome.*

> — The Open Group [28]

Beimborn et al. (2005) differentiates them from processes as follows: Business capabilities are company-internal "encapsulable services" which "represent only the essential information" to assess the organization's performance. In comparison, a business process is "a composition of capabilities to fulfill a market demand" while a procedure describes end-to-end "how a capability is performed" [11]. BCs are abstractions and focus on *what* an organization does without describing the *how*, *who* or *where* [15, 28]. Regarding the naming convention, The Open Group defines the standard of using a concise noun together with a description. The focus should lay on the abilities to do things instead of how they could be archived. In practice, compound nouns are the most common way to label them. A company-wide, familiar language should be chosen to facilitate understanding and com-

munication. [28]. For example, general capabilities across industries are risk management, sales or product management.

According to the research of Freitag et al. (2011) [26], a well-defined business capability can be characterized by the following:

- Stability – Means that it is not dependent on the organizational structure or technology used within the enterprise.
- Horizontal structure – The total of capabilities shows a comprehensive, non- overlapping picture of the organization, however every single one is unique.
- Vertical Hierarchy – It can be decomposed into more specific elements, starting with the most generic view on level 1.
- Abstraction – Capabilities specify necessary roles but do not describe individual resources.

As mentioned before, business capabilities represent an important building block of the enterprise architecture which consists of three main layers. Bottom-up, there is the *infrastructure layer*, which comprises technical components such as software and hardware. The middle *application & information layer* describes the business applications and their interfaces. At the top is the *business model and strategy layer*. It describes organization related aspects like business processes or key performance indicators. It also includes business capabilities as an important building block. Every capability defined for the enterprise is used to perform a specific activity. As they interact efficiently with different levels of the enterprise architecture, the specified capabilities of an enterprise are a possible instrument to resolve the communication conflict between business and IT [4, 47].

The blueprint of all capabilities for a given business is called a business capability map. In the context of this thesis, the terms business capability map and business capability model are used as synonyms.

2.4. Business Capability Maps

A business capability map (BCM) is an ordered representation of capabilities, listed hierarchically in multiple layers. Every business can only have one single point of truth, means that only one BCM must exist for every business. This is recorded in the principles of the IT research company Cutter Consortium [71]. The visualization facilitates the analysis of capabilities and their interrelations from a strategic point of view [11].

Figure 2.3 illustrates an exemplary extract of a BCM. Consider an enterprise that works in the financial sector such as a bank. A business capability map follows usually a three-level decomposition approach. Top down, every capability is split into smaller, standalone elements [15]. The highest level 1 displays quite generic capabilities that are common in most companies. However, the naming is usually adapted to the enterprise specific taxonomy [11]. In the illustrated example, a bank needs in order to fulfill its financial duties, capabilities to complete the customers' transactions accurately. Therefore, they might define the BC "Bank Operations". "Client Interaction" as another high-level capability is related

to all interactions with the customer. The first level is decomposed into more focused capability groups which describe the needs in more detail. The granularity of the levels goes from a generic view to industry specific capability groups (e.g. "Cash Management"). In comparison, the software industry might define "License Management" whereas "Plant Management" might be more common in mining [80]. These capability groups will be iterated for sub-capabilities on lower levels which are referred to as business capabilities. The maximum number of levels is not centrally regulated. However, three levels are usually sufficient for strategic planning. Even for business / IT architecture mapping, the BCM rarely exceeds six levels, as the level of detail becomes too fragmented. Furthermore, not every capability needs to be segmented to the same level. It may depend on the size and complexity of the company [11, 71].
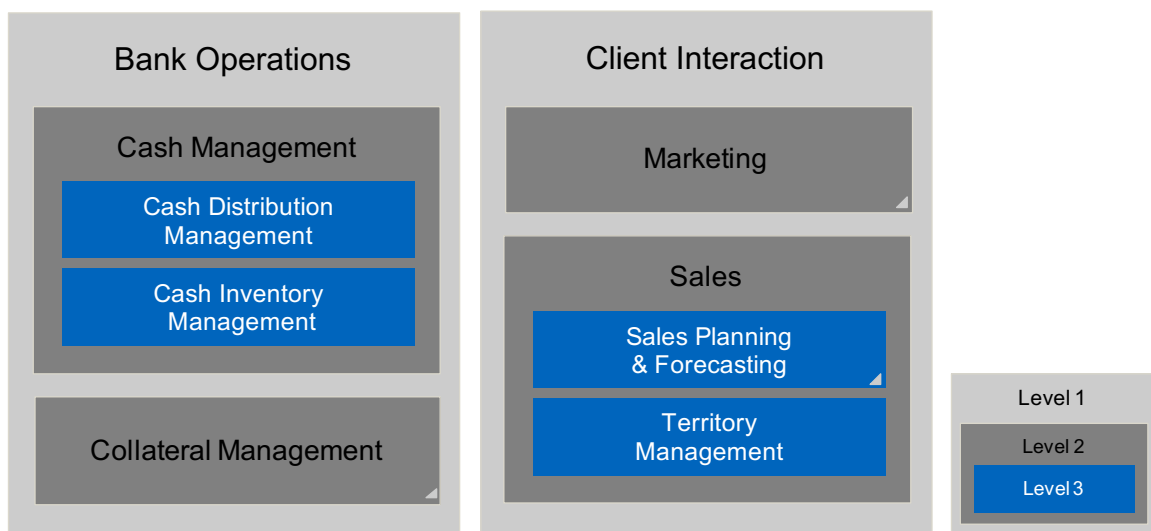
Figure 2.3.: Exemplary extract of a BCM in the financial sector

At first sight a BCM can easily be mistaken for an organizational chart which is used most commonly in every enterprise to show an authority-based structure. While the architecture of the business capabilities must be consistent to some extent with the decision-making structure, a BCM does not model responsibilities [30]. Besides the hierarchical representation of the capabilities, the BCM also displays their interplay during business activities. That is what it makes it so valuable. Processes and applications can be outlined on a single map which highlights hidden relationships based on the utilization of the same capabilities [11]. This mapping enables the BCM to act as an controlling management tool and to reflect the strategic orientation of the enterprise [5, 26]. A universal approach to make the BCM more accessible, is *heat mapping*. If a company has hundreds of capabilities, a BCM easily becomes overwhelming. Color coding helps to prioritize individual capabilities. The color scheme can be adapted for the perspectives of management, users or enterprise

architects [38]. Possible criteria are the evaluation of the capabilities according to their maturity level, the costs they cause or their revenue contribution. Also future capabilities can be highlighted with color [28]. The analysis based on heat maps is the most popular approach to work with business capability maps [5, 15, 26, 28, 43, 71].

3. Related Work

This chapter summarizes prevalent literature about the usage of business capability maps and challenges of inter-organizational enterprise architecture management.

3.1. Literature Review Approach

Before starting with an exploratory survey, a literature review is conducted to uncover related topics and publications and to set a theoretical framework. The approach by Webster and Watson (2020) is considered as the quasi-standard for literature reviews in the research field of information systems and is therefore used for the search process in this thesis. According to the authors, a review of publications is well suited for an emerging topic to place it into existing fundamental research. Thus, this thesis follows their scientific methodological structure presented in *Analyzing the Past to Prepare for the Future: Writing a Literature Review* in order to contribute to the first research question (Section 1.2) [78].

First of all, keywords are identified that are used for the search queries by which relevant journals and publications are detected. For this, the following well-known databases are searched: Scopus[1], IEEE Xplore[2], EBSCOhost[3], Web of Science[4], ACM Digital Library[5] and additionally Google Scholar[6]. The search string below looks for all publications with an explicit focus on business capability modeling in an inter-organizational context:

- **Initial Search String:**
  "business capabilit*" OR "capability map*" OR "capability model*"
  AND
  inter* OR cross*
  AND
  organi_ation* OR enterprise OR compan*

To ensure that the result list is as complete as possible, the most common synonyms are covered using the OR operator. Alternative terms for *capability* such as ability or skill were neglected as they are more commonly associated with people than with the application

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[1]https://www.scopus.com

[2]https://ieeexplore.ieee.org

[3]http://search.ebscohost.com

[4]http://webofknowledge.com

[5]https://dl.acm.org

[6]https://scholar.google.de

in the information systems. Additionally, different suffixes and spellings are considered. Overall, to ensure the sufficient quality and reliability of the research, peer-reviewed articles from renowned journals are preferred. Nevertheless, attention will also be paid to conference proceedings, since the topic of capability modeling is still gaining increasing relevance [41, 80]. The latest findings and experiences should also be taken into account for a holistic picture. The information may be less comprehensive, but is still of similar relevance for assessing the current situation [29]. Using the initial search string, the examination of leading journals only led to two relevant publications [8, 77] covering the topic of using business capabilities across company borders. One of them was published recently and is still in proceedings. However, they do not mention the visualization in a map. Therefore, the first review results confirm the knowledge gap. Most of the literature found in this field relates to changing business models or process modeling. In the present thesis, however, these topics are out of scope.

To still provide a theoretical basis for the survey, the search is divided into two parts. Therefore, for each topic an individual search string is used to find relevant literature. On the one hand, the reasons for intra-organizational business capability modeling are identified. This includes BCMs that are defined and used within a single company. The focus lays on literature in the context of enterprise architecture management which is preferable looking at organizations that are using the tool business capability map. It is not of interest how the creation process looks like in the company but what advantages they expect. On the other hand, the challenges of inter-organizational enterprise architecture management are looked at. This part aims to understand the research of cross-company collaborations. The findings are combined and form the basis for the survey. For both parts, the keyword search is mainly conducted in the publications' title, abstract and keywords as they summarize the most important points of the underlying research. In addition, exclusion criteria were defined to pre-select the papers:

- Not in German or English
- No full text availability
- Focus on pure technical not business capabilities
- Focus on specific capabilities for successful businesses
- No appearance of the term capability in the narrative text

The search is conducted quite broad as the field of information systems is interdisciplinary. The following search strings are discovered as the most effective ones to identify the relevant literature:

- **Search Query 1:**
  "business capability map*" OR "business capabilities" OR "business capability model*" AND
  reason* OR advantage* OR use* OR benefit*
- **Search Query 2:**

"inter-organizational" OR "inter-enterprise"
AND
EAM OR "enterprise architecture" OR "network organization"
AND
require* OR demand* OR challenge*

To ensure a relatively complete collection of publications related to the discussed topic, forward (who cited that article) and backward search (reviewing citations of that article) is incorporated [78]. Moreover, the search strings are also translated into German, whereby "Geschäftsfähigkeit" is rarely used for business capability. The overall findings of the literature review are presented in the next section.

3.2. Findings

The structure of this chapter is based on the two aforementioned search strings. The results of both queries are outlined in section 3.2.1 and section 3.2.2.

3.2.1. Reasons for Business Capability Maps

The following section presents the findings after evaluating the literature identified by the first search query. It addresses the reasons why companies are implementing a BCM. Not only publications explicitly naming business capability maps are considered but also literature that looks at advantages of defining and visualizing business capabilities without mentioning the map. Table 3.1 lists the concrete benefits and reasons for using and visualizing business capabilities inside a single organization.

As can be seen in table 3.1, only a few publications deal precisely with the reasons for using a business capability map. These will now be discussed in more detail.

Alignment of IT strategy and business needs Alignment can be seen as the overall purpose of business capability maps to which the other subjects are subordinate. Every organization has an economic point of view which needs to connect the interests of many different stakeholders. At the same time, a company has a complex underlying IT architecture which has its focus points in a quite different environment with a disparate language. A BCM does not reduce this complexity but rather visualizes it. This allows interrelations to be better recognized [71]. In addition, putting the focal point on business capabilities, they can be then mapped to processes and elements of the business model ensuring alignment of the company's activities to its strategy [28].

Common language / shared ontology When it comes to the strategy of a company, the defined capabilities are a base for decision making. Therefore, they have to be expressed in understandable terms for the political leaders. However, in order to derive technical

Reasons	Sources
Alignment of IT strategy and business needs	[15, 28, 38, 71]
Common language / Shared ontology	[26, 28, 71]
Identification of business opportunities and challenges	[10, 28]
Communication tool between management and IT	[6, 10, 15, 26, 71]
Investment and sourcing decisions	[28, 38, 43, 69, 81]
Strategic decision making	[11, 28, 43]
Strategy roadmap	[15, 69]
Benchmarking	[43]

Table 3.1.: Reasons for using a intra-organizational BCM

requirements from that strategy, they have to be rigorous enough for architectural decisions [26]. As it is easier to agree on the WHAT than all possible HOWs, capabilities are commonly understood by various units in an organization and thus represent a common language [28]. Ulrich and Rosen (2011) emphasize that with the help of a BCM executives have an ontology that all units have agreed on, with which they can communicate with various groups even if they have different focal points [71]. Evernden and Evernden (2003) support this and argue that it is desirable to use rather business than technical terms to describe relevant entities. Additionally, a map is a suitable tool to visualize this information in a structured way [22]. Even if they are focusing on more general information architecture models, it applies for business capability maps as well as they are part of EAM.

Communication tool between management and IT If a BCM provides a shared language inside an organization it functions clearly as an communication tool. Using a BCM as the missing link and decryption tool, Ulrich and Rosen (2011) call it the "Rosetta Stone", inspired by the ancient stone that contributed significantly to the deciphering of the Egyptian hieroglyphs [71]. But it is not only the common language what improves communication. Bondel et al. (2018) conducted a case study where they emphasize the choice of a map, implemented by following the approach of TOGAF. Visualizing the impact of a strategy is a powerful way to induce understanding among decision makers [15]. That this communication tool is especially important in the top management, states Amiri et al. (2015) using the capability-based view. They hypothesize that using this terminology instead of technical terms fosters the comprehensibility of the role of IT during conversations with executives [6].

Identification of business opportunities and challenges Strategic modeling of BC to iden-

tify risks and chances of a business is explicitly mentioned by Barroero et al. (2010). In their paper they do not deal with the specific concept of a BCM but rather broaden the point of view. They extend the business capability meta-model according to TOGAF by adding links between BC and responsibilities, processes and data. The resulting tool facilitates business executives the assessment [10]. Apart from this, the standard framework describes this reason for capability modeling by introducing heat mapping. One and the same BCM can be looked at from different perspectives. By color-coding the capabilities in the map, each capability can be assessed by its maturity level, cost contribution to the business or other criteria. For instance, a red capability needs to be prioritized at a glance. Integrating future, not yet implemented capabilities, the BC heat map can also visualize prospective opportunities [28]

Investment decisions Another outcome of BC heat maps are indicators for investment planning. Keller (2009) emphasizes that prioritized and strategic capabilities need highly functioning IT tools. If a mismatch is identified, investment needs to be adjusted. The varying degrees of detail in the hierarchical levels of the BCM allow for different viewing depths. Management boards and technical minded leaders might need different aspects for their decisions, like a quick overview with highlights vs. accuracy. The color-coding can be adjusted on every hierarchical level depending on the addressee [38]. Toppenberg et al. (2015) are looking at another investment use case. Using the example of Cisco, they present how EA capabilities facilitate the acquisition process including the selection of suitable businesses [69].

Strategic decision making Strategic decisions are rather long-term oriented but the frequently used process or organizational models are subject to regular changes. From this, the need for a capability map has emerged. It represents a more steady picture of the company, an "holistic, one-page view of the whole organization" [43]. Based on this, Beimborn et al. (2005) developed a resource- and competence-based method to present a company as a "structured network of capabilities". They highlight that a BCM provides the information needed for the managers to define their core competencies which in turn influence outsourcing decisions. Outsourcing is named as a particular and important strategic decision [11]. In addition, also The Open Group addresses this reason: They consider core competencies as strategic. Focusing on these will lead to competitive advantage. Mapping the capabilities to value streams or organizational units can provide even more insights. Strategies can be derived to reduce redundancies or improve critical customer processes [28].

Strategy roadmap Not only immediate strategic decisions can be made based on a BCM but also entire roadmaps are designed. The latter is in this context only distinguished from the immediate decision making to the extent that the roadmap takes a more holistic view of the company. Bondel et al. (2018) hold a workshop that shows how color-coding the BCM is used to visualize current and planned strategies [15]. In their observation of Cisco,

Toppenberg et al. (2015) demonstrate how a capability roadmap is used to plan, supervise and assess an merge of businesses due to an an acquisition. A roadmap captures the to-be scenario and points out the key activities to maximize the value creation [69].

Benchmarking Kurnia et al. (2020) see business capability modeling as one of eight main areas of EA. Modeling activities include the assessment of the maturity level of the capabilities, whereby the benchmark is often set by industry standards [43]. As these are external benchmarks which require the same business capability in several organisations, this can also be seen as an inter-organizational application.

3.2.2. Challenges of Inter-Organizational Enterprise Architecture Management

The previous section summarized the reasons for implementing a BCM within a company. And as described in the fundamentals (chapter 2), the concept of business capabilities originates in the EAM. Similar to the concept of capabilities, the existing EAM approaches usually focus on a single company. However, enterprises are increasingly interconnected, often in dynamic value-added networks. For these to be successful, the enterprise architectures of the participating organizations must be coordinated [44]. In accordance with the scope of this thesis, a commonly defined BCM is examined as an appropriate tool to support inter-organizational enterprise architecture management. After a short definition of how related literature understands inter-organizational collaboration, the requirements for a successful EAM across company borders is researched based on the second search string.

When several companies become part of a whole, they create an ecosystem, where resources and important market information are shared and alliances can be established. The collaborating companies enter a network that "shares a set of dependencies as it produces the goods, technologies, and services customers need" [83]. These networks can be understood as a subgroup of a bigger ecosystem [50]. The companies inside are organized as members of this network where everyone has a defined role and agreed on common principles [17]. A systematic characterization of all cooperation types is very complex and is not considered in the research questions. Therefor, two frequently used cooperation types are chosen. Arasteh et al. (2012) propose a topology that classifies the networks as follows: *supply-chain*, where the partner organizations are connected serially and each one interacts with its neighbor following the value-chain; *star or hub*, where a central organization manages the interaction between the members of the network and functions as a strategic center; and *peer to peer*, where participants are organized non-hierarchical and the collaboration can be arranged freely [7, 17]. Another frequently used classification refers to the direction of cooperation. Cross-organizational relationships can be horizontal, vertical or hybrid. The first refers to members that are involved in similar strategic business area or industry. The second describes a customer-supplier relationship. The last category combines the previous two [18, 23, 39, 76].

The second query results in a large number of publications of potential relevant papers. This indicates the relevance of inter-organizational EAM. Müller et al. (2013) identified in their research the 37 main challenges for network organizations and stated that they are only partly addressed by the TOGAF framework [50]. Taking this as a base and analysing the results of the literature review, the most common and relevant challenges are categorized and matched with the aforementioned reasons for capability modeling that can be possible solutions to those challenges.

Strategic decisions In order to utilize the business ecosystem, the organizations should aim the *synchronization of strategic thinking* [83]. Similarly, every company itself has a variety of stakeholder. The coordination of their priorities and goals becomes even more complicated when they negotiate with multiple companies [21]. Moreover, during the strategic decisions needs to be aware of their own core competencies [74]. As shown before, a BCM is seen as a strategic tool and can therefore serve as a roadmap for the network and for setting a common goal.

Standardization Another frequently mentioned challenge is the need for standards in all parts of the collaboration [21]. Uniform data formats must be agreed upon [46], interoperability of data and business processes ensured [40]. This can be provided by standards-based IT platforms [48]. Moreover, modeling conventions and a common documentation process would eases the coordination [20]. In an inter-organizational context, BCMs could be used as template, an high-level architecture everyone agrees on. A shared ontology fosters standardization and also assists in overcoming the following challenge.

Social Issues When companies are collaborating, different corporate cultures have to work together. For effective communication, they have to agree on common terms [3, 20, 75]. A shared ontology provided by a BCM could avoid misunderstandings. Furthermore, the map is frequently mentioned as a communication tool. The common language has also be used to share knowledge [42] so everyone gets the same access to information within the network [70]. In addition, the segregation of responsibilities is mentioned. A standard structure for inter-organizational EAM is needed to reduce that overhead [21].

The review shows that many of the application scenarios of the BCM withing the company can be transferred to the inter-organizational context. Whether this is applied in practice is verified by data collection and analysis in the following chapters.

3.3. Limitations

This section reflects upon the limitations of the literature review conducted in this chapter. In accordance with the first research question, the aim was to identify reasons for using BCMs in an inter-organizational context. The initial search revealed a lack of scientific pa-

pers. Therefore, the search was divided into two parts. The first looked at the reasons for modeling capabilities within the company. The majority of publications focus on frameworks used for capabilities models, look only at specific capabilities or neglect the visualization through a map. Still, several papers make the utilization of the BCM the subject of discussion. To make predictions about possible reasons for using inter-organizational BCMs, in the the second part the challenges of inter-enterprise architecture were collected. This topic was subject to extensive research. In this thesis, only the most common challenges that can be associated with the use of BCMs have been presented. The findings show that the capability map can also be used in an inter-organizational environment.

Collaborations and inter-enterprise architecture are of increasing interest and are discussed by various papers. However, the connection to business capability maps is missing although the mapping of business applications to business capabilities is identified as a major concern in EAM [4]. This highlights the relevance of the topic. Up to now, there is no exploratory study on the status quo, reasons and challenges of inter-organizational BCMs. That is the reason why the present thesis aims to fill this research gap.

4. Primary Research Methodology

After using secondary research to assess existing literature, this chapter describes the methodology used to collect and analyze new data. The main source to get information on the current usage of business capability maps is the survey which is presented in section 4.1. For an in-depth examination of certain aspects, additional interviews are conducted as described in section 4.2.

4.1. Data Collection: Survey

As the literature review shows, more data is needed to investigate the use of BCMs in an inter-organizational context. Therefore, an exploratory survey was conducted. In this case, this is an appropriate tool to collect information about a large population asking only a sample of it [25, 32]. The overall target group are all kinds of companies across various industries and countries as the research aims to characterize the current use of business capability modeling, preferable across company borders. As it is not possible to collect data from every existing organization worldwide, a non-probability sampling method was used. According to Henry (1990), this can be particularly useful when instead of testing a hypothesis, an early understanding in qualitative research is meant to be developed. Non-probability sampling means that the sample is not randomized but rather selected by the researcher based on availability and cases which tend to be relevant. It is frequently used in research projects where the opinion of particular member of the population is of interest [32]. For example, with a high probability, a one-person-firm will not use a capability map as it is too much overhead in proportion to value. Moreover, as seen by the literature review, the BCM is mainly perceived as an IT-tool. Therefore, people with a technical background are targeted to provide insights through the survey.

The survey was an online questionnaire, created with LamaPoll[1]. This German survey tool was chosen as it represents a high data security which is important when collecting contact details of the respondents. However, the questions are phrased in English as the target group is international. The survey was active for three months, from August until October 2020. It was published mainly in forums of the online business networks LinkedIn[2] and Xing[3]. The forums are related to knowledge exchange on building business capabil-

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[1]https://app.lamapoll.de/
[2]https://linkedin.com/
[3]https://xing.de/

ities, TOGAF, enterprise architecture management and IT strategy. These interest groups were targeted because literature shows that BCMs usually originate from people with an IT background [5, 26]. In addition, experts with a lot of work experience in IT strategy, IT Governance or EAM were contacted directly via e-mail. In order to find organizations using BCMs, tool provider that support the creation of capability maps were also messaged. However, the response rate through this channel was negligible.

The survey is self-administered and hence the intrinsic motivation of the respondents is critical. An advantage of these web-based surveys is the ability to target people who are already interested in EAM and the easy access to a large sample without constraints on location or time. Moreover, the holiday season and current pandemic have restricted in-person meetings. However, focusing on online platforms adds an availability bias because companies without a strong internet presence do not have the chance to appear in the sample. In addition, as most participants stay anonymous, incomplete answers cannot be clarified. The self-administered procedure is still preferred since a broad range of information is asked for. Lists of options can be visualized and the participants have the time to pause and to collect the information first [25].

The design of the survey is oriented towards the research questions, meaning reasons for and challenges of business capability modeling are explicitly asked for. It contains a mix of qualitative and quantitative questions, mainly closed-end ones where the participant can only choose from a limited number of options. This simplifies the process for the respondents and maximizes the number of returns. In addition, multiple choice answers can be evaluated more meaningful. They are comparable across all respondents and are less subjective than possibly incomplete answers that are freely formulated [25]. To further enhance the user experience, a branching logic is used to increase time efficiency and minimize the presentation of irrelevant questions [37]. Thus, the respondents are not asked about details to their BCMs if they indicated before that their company does not use one. The survey contains 22 questions in total.

The questionnaire consists of three parts: After a short introduction, the first section (Q2 - Q4) asks about the general use of a business capability map inside the company. The participants can select several predefined application scenarios and add individual ones as well. Questions about the organization's involvement in collaborations lead to the middle section (Q7 - Q15), which constitutes the major part of the survey. It addresses the application of inter-organizational BCMs including potential obstacles. As it is expected that the majority might not use a BCM across company borders yet, the likelihood to introduce one is also inquired. For this, a matrix question with a likert scale for each collaboration partner is used. Types of partners are clients / customers, competitors, suppliers, other organizations outside of their industry or others who can be specified. Forecasts for the future can then be derived. For identifying the challenges, an open-end question type was chosen to minimize the bias predefined choices could introduce. Finally, basic information

about the company (Q16 - Q19) such as industry and headcount are collected. The analysis should show whether the use of BCMs can be attributed to certain factors. In addition, respondents have the possibility to enter their contact details for further knowledge exchange. These optional questions are placed at the end of the questionnaire so that people know what surveyed data can be associated with their personal details. This should increase the willingness of the participants to share that information. The gathered data is also used to set up a database for further case study analysis. The full questionnaire can be found in the appendix A.1.

A total of 115 questionnaires were collected, but almost 25% of them ended their participation right at the beginning. Another 20% terminated the survey at Q7 where the interorganizational context was introduced. This indicates that they do not use a BCM across company borders. 55 surveys were finished completely by respondents and 18 of them stated their company and / or name which can be linked to all of their given answers. All responses are considered in the analysis. The findings are presented in chapter 5.

4.2. Data Collection: Interview

While a survey provides breadth to a study, an exploratory interview focuses more on qualitative data collection. It helps to get in-depth insights and individuals' perspectives on a topic. In addition, a dialog allows to clarify certain answers which is not possible with single-choice options in a survey, for example [62, 73]. Therefore, expert interviews are favored as the second method in this thesis. The purpose of them is to get professional opinions in addition to the broad feedback from the survey. The interviewed individuals were chosen from the small group of people that provided their contact details after answering the survey. They are all experts in the field of enterprise architecture but made different experience with business capability maps. The interviews were conducted right after the survey in order to minimize the time gap and to increase the alignment and consistency of the two methods [31].

Interviews can be conducted in many different ways, from just setting the general topic to planning every question in a specific order. As the resource time is limited, questions were planned beforehand in order to provide some guidance. In these semi-structured conversations, every question serves a purpose towards the research goal. However, the questions were not asked in a fixed interview guide's order but rather adapted to the answers of the interviewee to allow a natural flow of conversation [62]. After a short personal introduction, an overview of the research topic was given by the interviewer to set the context of the conversation. The prepared questions were designed to maximize the accuracy of the answers while not influencing the interlocutors [25]. In addition, closed-end and "either/or" questions were minimized as these standardized topics were already covered

4. Primary Research Methodology

in the survey and the goal was to uncover new information. The focus of the interviews varied according to the participants. If they stated in the survey that they do use business capability maps in an inter-organizational setting, the actual reasons or experienced challenges were discussed. However, most of the interview partners are only using a BCM within the organization. Then the questions focused on potential benefits and expected challenges. When considering the responses of the consultants, it must be taken into account that they reported mainly on their customers' experiences.

The interviews were structured in three parts. The participant's answers from the survey form the basis of each discussion. Therefore, details about their professional background etc. do not need to be inquired again. The first part covers the use of a BCM inside an organization. This is followed by questions about their involvement in cooperations. As the literature review revealed there are different types of networks and challenges in their working relationship are common. The third part serves to understand reasons and challenges the experts see in an inter-organizational application of the BCM. The full interview guide can be found in appendix B.1.

To guarantee the anonymity of the interview partners, an ID is assigned to each of them. In the scope of this thesis, they will be cited by those IDs (I1 - I5). The overview of all interviewees is presented in table 4.1. For a better understanding of the context, information on job role, industry and usage of an inter-organizational BCM are linked.
All interviews were conducted via online conference tools. For a profound analysis of the interviews, each conversation was recorded with the consent of the interviewees. The dialog is transcribed with the MAXQDA Plus 2020 transcription tool[4] that also allows to cluster the statements in accordance with the research questions. The transcription follows the guidelines of Dresing and Pehl (2012): The interviews are transcribed literally instead of phonetically, leaving out slips of the tongue and interrupted sentences [19]. I1, I3 and I5 are native in the German language. Therefore, the interviews were held in German. However, when quoting, statements and summaries are translated into English.

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[4]https://maxqda.de/

Interviewee	Job Role	Industry (Headquarter)	Relation to inter-org. BCM	Interview Duration
I1	Department Manager (IT)	Construction (Germany)	Usage only intra-organizational	0:31 h
I2	Enterprise Architect	Government (Netherlands)	Usage in European agency	0:35 h
I3	Managing Partner for EA	Consulting (Germany)	Consulting service for intra-organizational use	0:29 h
I4	Enterprise Architect	Consulting (Belgium)	Usage only intra-organizational & consulting service	0:31 h
I5 (2 people)	Enterprise Architects	Finance, Insurance (Germany)	Usage only intra-organizational	0:32 h

Table 4.1.: Participants of semi-structured interviews

5. Results

In this chapter, the results of the data from both the survey and the interviews are presented and analyzed. The structure is roughly based on the design of the survey, whereby the background information of the participants is considered first (section 5.1). In section 5.2, the reasons for using business capability maps in an intra-organizational context are looked at. Section 5.3 presents the results related to BCMs across company borders. The last part (section 5.4) provides an overview of the challenges associated with business capability modeling.

5.1. Background Information

Before it can be assessed how business capability maps are used and whether they are utilized across company borders, some background information should be analyzed at first. Information on the participants of the survey will enhance the understanding of the results. The following must be taken into account: 115 people started the online survey, but only about half of the participants have completed all questions. The data about the respondents background was requested at the end of the survey. Therefore, the number of responses varies. Furthermore, all interviewees except I3 participated in the survey prior to the interview. Redundant information from the same interviewee are removed.

As the survey was mainly presented in relevant groups about enterprise architecture or IT strategy, a high awareness level of business capability maps was expected. 80% of the respondents indicated at the beginning of the questionnaire to be familiar with the topic of BCMs. In addition, four participants who stated that they are not familiar with the topic, filled out all further questions in detail and affirmed the use or current creation of a BCM. In these cases, incorrect answers to the first question are assumed. As a result, it is believed that the queried data gives a reliable indication of the status quo of business capability maps. Table 5.1 shows the distribution of the job roles of the survey participants. The most frequently stated title was enterprise architect with 40% followed by IT-focused department and project manager with 9% each. The interview partner I3 has an IT background as well. That indicates that business capability maps are rather located and worked with in the IT departments of a company. Even though BCMs function as an alignment tool between business and IT (I4), the impulse is mainly given by IT architects (I1, I3, I4, I5). For a successful alignment, both business and IT departments have to be involved in the creation of that capability map. Therefore, question Q13 asked for the composition of the

Job Role	Count	Percentage
Enterprise Architect	22	40.0 %
Other	8	14.5 %
Dept. Manager (IT)	5	9.1 %
Project Manager (IT)	5	9.1 %
Solution Architect	4	7.3 %
Area Manager (IT)	3	5.5 %
Project Manager (Business)	3	5.5 %
Dept. Manager (Business)	2	3.6 %
Product Owner	2	3.6 %
Software Developer	1	1.8 %

Table 5.1.: Survey participants by job role

modeling team. Again, the enterprise architect plays a dominant role (32%). Only the domain expert was mentioned more frequently with 42%. This is comprehensible since the definition of capabilities requires a high level of expertise. Often, department specific strategies are derived from the business capability map (I1), so the subject matter experts should also be involved in its creation. Also frequently involved is the project manager (24.4%). Since the modeling team must consist of several people with different expertise, a considerable amount of coordination is required. A high turnover in these teams hampers the efficiency as it is currently experienced by I5. Apart from that, no significant difference was found in the composition of the team when controlled for the application context, meaning intra- or inter-organizational usage.

The survey asked for the industry in which the company operates. The results of Q16 can be seen in table 5.2. The participants who indicated that they do not use or create a BCM at all were filtered out to be able to make statements specifically about the occurrence of capability modeling. It is evident in the overview that the BCM is mainly represented in the technology focused industry, in the financial sector and the utilities industry. There is already a well-known example of an inter-organizational BCM for the banking business from the Banking Industry Architecture Network, short BIAN (I3, I4, I5). It was also mentioned by I5 that their architecture management is based on the standards set by BIAN, initially to get in contact with other banks. They do not actively engage in the creation of the inter-organizational BCM. However, they see potential in an industry-wide standard. If many banks comply with it and then join an ecosystem, their capabilities will be already defined in a consistent way and can be aligned and supplemented more easily (I5). In general, the interview partners have no common opinion on whether specific industries are better suited for capability modeling than others, especially with a view to inter-organizational application. For example, "consulting companies are often very standalone" says I4 and he therefore does not see application scenarios for capability maps.

Industry	Count	Percentage
IT, Technology	12	27.3 %
Finance, Insurance, Property	9	20.5 %
Communication, Utility	8	18.2 %
Consulting	3	6.8 %
Retail / Wholesale	3	6.8 %
Government	2	4.5 %
Education, University	2	4.5 %
Construction Industry	2	4.5 %
Other	1	2.3 %
Transportation, Logistic	1	2.3 %
Health Industry	1	2.6 %

Table 5.2.: BCM using survey participants by industry

However, if an organization interacts a lot with external partners, like they do in the supply chain industry, a map can be a great support for the collaboration (I4). Similar to the banking network, I2 mentioned it might be useful in the private sector where "this kind of ecosystem thinking" is widespread (I2). His government organization has the same thinking since it is part of a star-type cooperation. They use a common BCM as a template for all members. I3 sees a shared capability map rather at trading than product-oriented companies because the latter uses already processes as a reference framework (I3). A frequently mentioned industry in the interviews is automotive. On the one hand, I3 made the experience that a BCM could not take root at a car manufacturer so they went back to align on processes and products (I3). On the other hand, I1 and I5 believe a BCM is a suitable tool but for different reasons. I3 sees it as a tool for standardization, since only a few automobile manufacturer exist, leaving out the subcontractors. He sees the problem that the map will have a low degree of detail with less value if an industry has too many players, like suppliers and/or customers (I1). However, I5 sees automotive in particular as a sector with many suppliers. There it needs a structuring tool, which can be the BCM.

The survey revealed that business capability maps are a tool for larger companies. As in figure 5.1 visualized, more than half of all participants (53.5%) who stated they use or create a BCM in any organizational context have a headcount greater than 1,000. 74.4% is accounted for by companies with more than 500 employees. 7% are allotted to the groups less than 11 employees, 51 – 100 employees and 101 – 500 employees respectively. If Q18 is limited to inter-organizational use, no significant difference in the size of the company was found. Analysing the interviews, only I3 sees the number of employees as an explicit influencing factor on the decision to model capabilities. He mentions that firms with less than 500 people employed rather think in business domains and do not have the "money or time" to ask for a capability view. A BCM seems to be better suited for organizations with

a headcount greater than 5,000 (I3). I5 on the other hand believes that also a "small company, which is much involved in value chains and cooperates with many others", needs a capability map. The benefit is dependent on the complexity of the cooperation, not its size (I5).
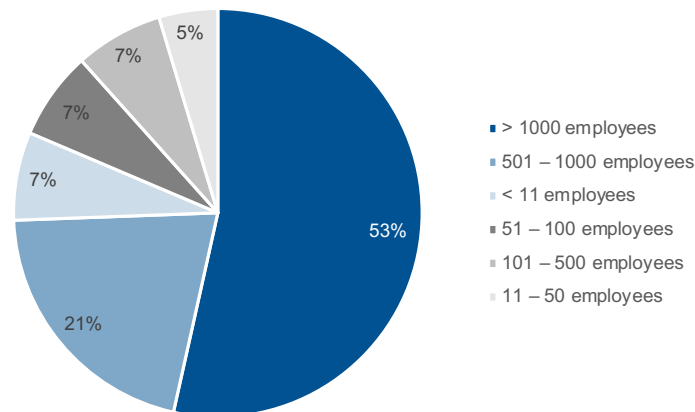

Figure 5.1.: Headcount of companies that use a BCM

Moreover, Q17 investigated the regional distribution of participants´ organizations. The headquarters are mainly located in Germany (25.6%). That was expected as the research of a German university reaches people from the same country much easier. But with the goal in mind to get an international picture, companies from 20 countries participated in the survey. Among them are Australia, Japan, South Africa and Norway. Looking only at the respondents who actually use or create a business capability map in either an intra- and/or inter-organizational context, the majority of headquarters is, besides Germany, located in English speaking countries like the United States (18.6%) and the United Kingdom (14.0%).

In order to evaluate the experience with business capability modeling, it should be taken into account how long companies have been applying the concept. The participants were asked how many years they have been using the map in their organization (Q3) or in collaborations (Q11). An overview is shown by figure 5.2. 64% of the 83 people who answered Q2 do use a business capability map intra-organizational or are in the process of developing one. If the company has one in use, more than two thirds do so for less than five years. Only five participants stated that with more than ten years of use, their company has extensive experience with business capability maps. This coincides with I3's statement that thinking in capabilities was relatively new ten years ago in 2009/10.
In comparison, the usage of inter-organizational BCMs is at an even earlier stage. 21 participants, i.e. one third of the respondents of that question, indicated that they use or create a BCM across company borders. The maturity level of the capability maps are, for the major-
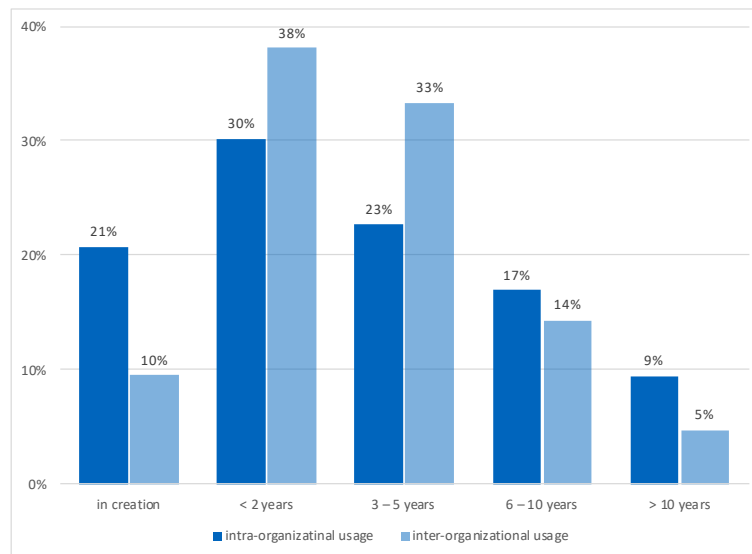
Figure 5.2.: Years of using the BCM divided by organizational context

ity (81%), rather low to medium. But the increased utilization of these maps in the recent past can also be seen here. Altogether it can be said that this concept is not completely new anymore but companies are still discovering it. In both the intra- and inter-organizational context, a clear upward trend can be recognized.

5.2. Reasons for Using Intra-Organizational BCMs

The context in which the answers were given has now been explained. To get a comprehensive picture, this thesis also aims to give a short overview of the current reasons of intra-organizational business capability map usage. This is addressed by the first questions of the online questionnaire, Q2 - Q4. The focus is on application scenarios. These will be compared shortly with the reasons highlighted in chapter 3.2.1. Based on 83 participants, 50.6% of the respondents use a BCM internally, 13.3% are in the process of creating one.

Q4 asked the survey participants about their company's current use of business capability maps. It was a multiple choice question with an option to add further application scenarios. Figure 5.3 shows the overview.
"Others" includes, inter alia, *merger & acquisition* which can go in line with *investment decisions*, and *dependencies of projects*. Another point that can be found here is *mapping of customer journeys and value streams to the capabilities*. This statement is taken from a survey participant who stated to work for a Swedish consultancy. Interviewee I4, who is an enterprise architect also working for a consultancy, mentioned the same. According to him, the
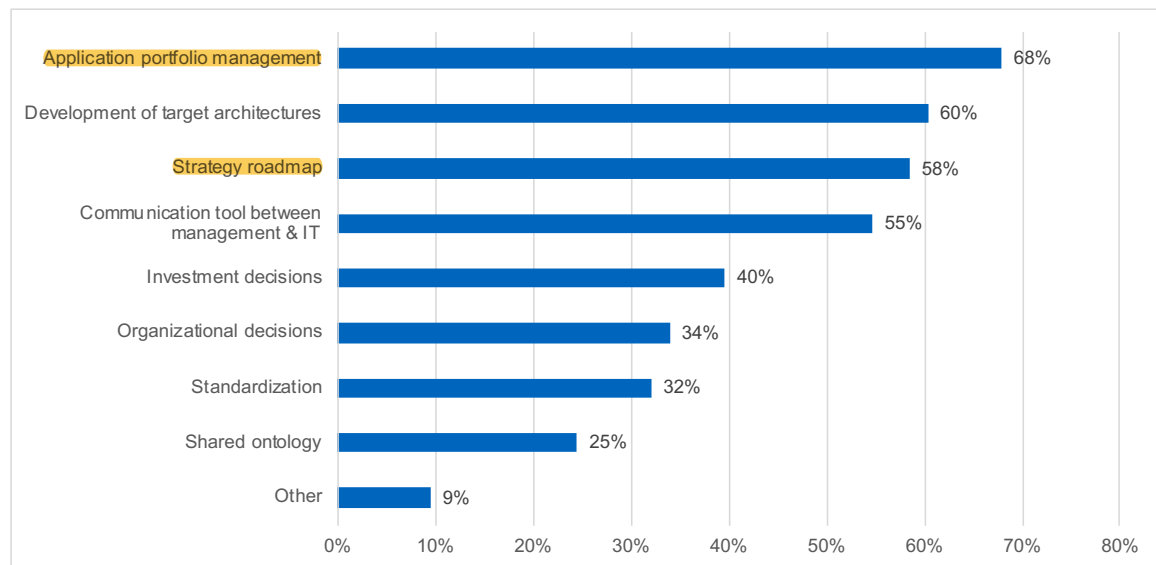
Figure 5.3.: Reasons for intra-organizational business capability modeling named by survey participants

more tangible concept of a journey adds "transversal aspects" to the capability view (I4).

The reasons for business capability modeling within the company, which were identified through literature in chapter 3.2.1, could be confirmed by the survey data. Many reasons were mentioned precisely by the participants like the use as a communication tool. Others can be allocated to the aspects found in literature as they are quite similar. It is evident that BCMs are much used for strategic mapping: The capability map is seen as a roadmap (58.5%), from which the "IT strategy but also a business unit strategy can be derived". Top management can utilize it to look for "new business areas" (I1, I5). In addition, as resources a scarce, investments have to be well considered. I4 explains that he sees the map as a tool for "correct translation of our strategy towards a set of initiatives in our portfolio". However, capabilities can lead to "silo thinking" and to overlooking customer centricity in the strategy if not adding behavioral thinking (I4). Overall, based on the collected data, the reasons found in the literature could be prioritized by frequency of mention.

Nevertheless, the most relevant reasons have not yet been listed in the literature. Approximately two thirds of the respondents mentioned to use the BCM for application portfolio management. I1 explains: If there is a problem in the company, it should often be solved by a new tool without putting it into context. However, not a Customer Relationship Management system increases sales but the capability to manage customer relations. The BCM is a tool to express that connection (I1). I5 wants to link the capabilities with cost controlling and risk assessment via that application mapping (I5). A similar amount of

participants develops a target architecture with the support of the capability map. This has again a strategic aspect as the goal of enterprise architecture is to manage scarce resources (I4). Heat mapping a BCM can visualize the as-is and target state. In summary, two major application scenarios could be identified.

5.3. Use of Inter-Organizational BCMs

This section summarizes the results of Q7 - Q14, including insights from the interviews. It is divided into general aspects related to inter-organizational BCMs and the specific reasons for their use.

5.3.1. Cooperation Partners

Q7 asked directly if the participant's company shares a jointly defined BCM with other organizations. The majority (67.2%) negates. Nevertheless, 29.7% have a map in use and 3.1% are in the process of creating one. These respondents are considered in more detail: The most frequent mentioned partners in the collaborations are the suppliers (76.2%), followed by customers / clients (52.4%). Cooperations with competitors (23.8%) or entirely different companies outside its own industry (14.3%) are rare. Organizations might be concerned to share their competitive advantages (I1). There was also the possibility to specify others. This includes the cooperation in which I2 is active. There, national competent authorities work together on a partnership level (I2). However, not all companies using an inter-organizational BCM have defined an additional own map. 23.8% answered Q2 in the negative while affirming Q7. This is an indication that an individual map is not necessarily a prerequisite for a commonly defined one and that the inter-organizational capability map can have a sufficient level of detail. The survey also looked at the number of members in the collaboration: Only 9 of the 21 participants who responded could indicate in Q10 how many organizations are involved in their cooperation. Answers range from one to 50 and, except for I2, all refer to vertical cooperation partners. Again, there might be a concern of sharing too much information. If competitors work together they prefer to use the business capability map for areas not critical to competition to achieve cost benefits (I5). I4 says, similar to the factor industry, it is not the partner that matters, but whether resources need to be shared.

Since a significant majority (67.2%) indicated not to use a BCM in an inter-organizational context, Q9 asked for the likelihood to define one in the future. Figure 5.4 shows the distribution by cooperation partners. For each partner type, the hesitant attitude (unlikely) outweighs the supporting one (likely), disregarding the neutral opinion. Nevertheless, comparing the partner types among themselves, it is most likely that a common BCM will be sought with suppliers, followed by clients / customers. This also reflects the current situation, as described in the previous paragraph. The benefits of a common map are

rather seen in vertical cooperation. If one only looks at those companies that already use or create an internal BCM, the general attitude towards a shared capability map does not change significantly. The not yet widespread use of the inter-organizational maps can therefore not necessarily be attributed to a lack of knowledge about capabilities. Only the likelihood of working with suppliers to create a common BCM improves. In this case, 40% stated that it is very or moderately likely that they will create one and 32% see it as moderately or very unlikely (based on 25 respondents).
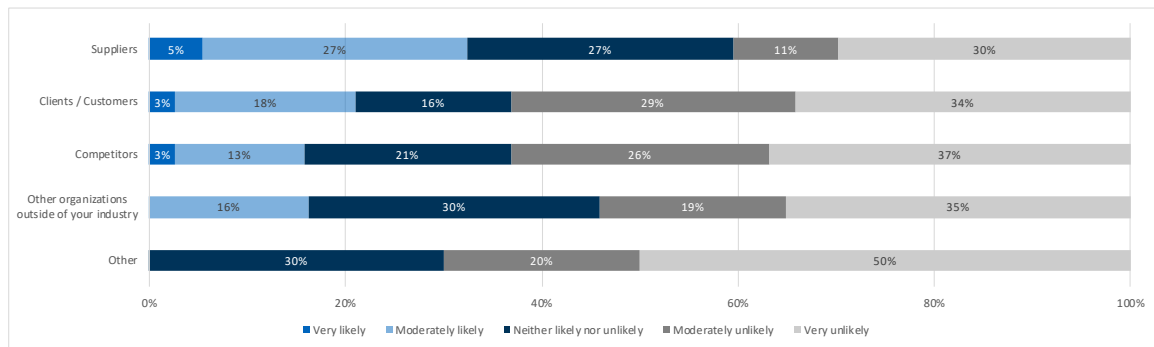

Figure 5.4.: Likelihood of defining an inter-organizational BCM in the future

5.3.2. Reasons

This section highlights the results of Q12. The participants of the survey were asked what their companies use the inter-organizational BCM for. Figure 5.5 reflects the 69 answers given by 21 participants. The reasons are clustered by the researcher to obtain a higher level view of domains.

Application architecture For more than half of the respondents (57.1%) the current primary use case is managing the application landscape to assess and develop applications for jointly defined capabilities. The BCM shows how capabilities and applications or IT systems are linked and how they can support each other (I2). Moreover, many participants (52.4%) rated the development of reference architecture as similarly relevant. A common BCM supports the specification of best practices and provides a template on "how to copy standard systems and how to integrate new members" in the way of working together in a cooperative manner (I2).

Decision focus Also, participants frequently mentioned scenarios regarding decision making. These include developing a common strategic roadmap (42.9%) and using the BCM for sourcing decisions (42.9%). The map can support a collaborative discussion about possibilities of outsourcing certain business capabilities. Even if the company of I5 does not use an inter-organizational BCM, they can envision to apply one for in- or outsourcing in

the future. Services are increasingly being outsourced and a unified view across company borders would help with the alignment (I5). Equally often mentioned was utilizing the common BCM as a roadmap to evaluate the capabilities from a strategic perspective. This might be especially useful for the "initiation of such cooperations". Then one can evaluate which capabilities are inherent in the company and which ones the partner can offer. This is based on mutual transparency. In general, this strategic alignment based on business capabilities is quite conceivable for a "project- or initiative-related context", for large-scale projects (I1). The supporting function of the map in mergers & acquisitions, mentioned four times, also belongs to the category of decisions.

Value stream mapping Furthermore, a shared identification and creation of new value streams or business ideas within the collaboration through the common BCM are of relevance for 42.9% of the respondents. Business ecosystems are established because the participating organizations see an advantage over working independently. Therefore, they need a tool that facilitates this value creation. Also in the interviews, value streams were frequently highlighted, especially by the EA consultants. However, they do not see BCMs as an independent tool for achieving that goal, but would rather supplement it with customer journeys (I4).
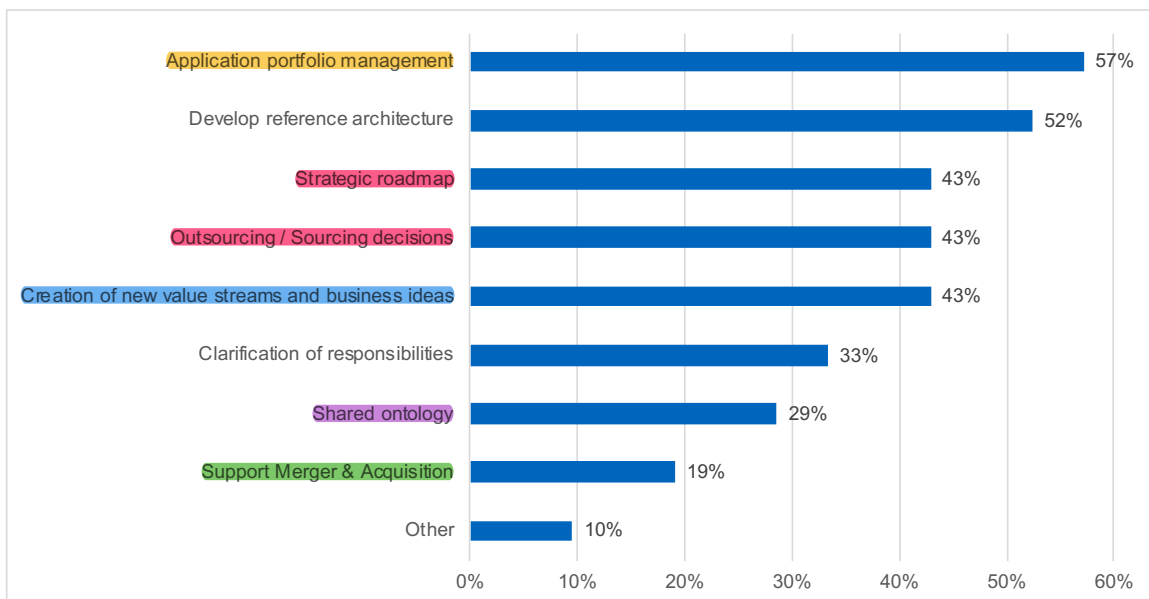

Figure 5.5.: Reasons for inter-organizational business capability modeling named by survey participants

Soft factors Every third participant uses the inter-organizational BCM to clarify the responsibilities during the cooperation. A capability should have a responsible department,

this must also apply across companies for efficient decision making (I3). In addition, 28.6% of the respondents mentioned a shared ontology as a relevant application. I3 also considers the map to foster a "common language understanding", at least on a high level (I3). Moreover, I1 sees a potential for standardization through an agreement on common capabilities alongside unification of language (I1).

The question also gave the option to add other reasons. *Clarification of interoperability* and the *identification of circular economy opportunities* were each mentioned once. The first is related to the application architecture as systems and capabilities have to be compatible for effective cooperation. The latter can be associated with value stream mapping.

5.4. Challenges

As the previous results have shown, the concept of business capability modeling is still relatively new and in an inter-organizational context not widely used yet. To better understand the obstacles companies see, the challenges associated with BCMs are now presented. The corresponding question in the survey is Q15 and explicitly refers to the usage of BCMs across company borders. If a participant's organization does not use a BCM, he was asked to indicate why not. These may be actual problems experienced or expected difficulties. In the interviews, however, the question and answers referred to both intra- and inter-organizational context. Even if the thesis focuses on the cross-border application, experience within the company may also apply to cooperations. It can also be assumed that it is a prerequisite for a jointly defined map that the companies individually think in terms of capabilities (I3). That does not necessarily mean, that organizations have to define an entire intra-organizational capability map beforehand but the general attitude towards capability modeling is crucial. Therefore, the individual experience also influences the preference towards the inter-organizational BCM.

Q15 is an open-ended question where the participants typed in their answer in their own words. The absence of suggestions could reveal obstacles which otherwise have been overlooked. In total, 44 participants answered the question of which two thirds contain evaluable information. The answers are, together with the feedback from the interviewees, divided into three categories for visualization purpose. The first one includes actual experienced challenges during inter-organizational usage based on both data collection types. If one interview partner named the same challenge in both the survey and the interview, it is only counted once. The second group aggregates the data related to intra-organizational use. Participants only indicated to use a BCM within the company. In addition to real experiences, obstacles that prevent companies from introducing a BCM are mentioned. This is covered by the third category where respondents use neither of them. The individually phrased answers are then clustered by the researcher for a sound analysis. Figure 5.6 provides an overview of all ten identified challenges.
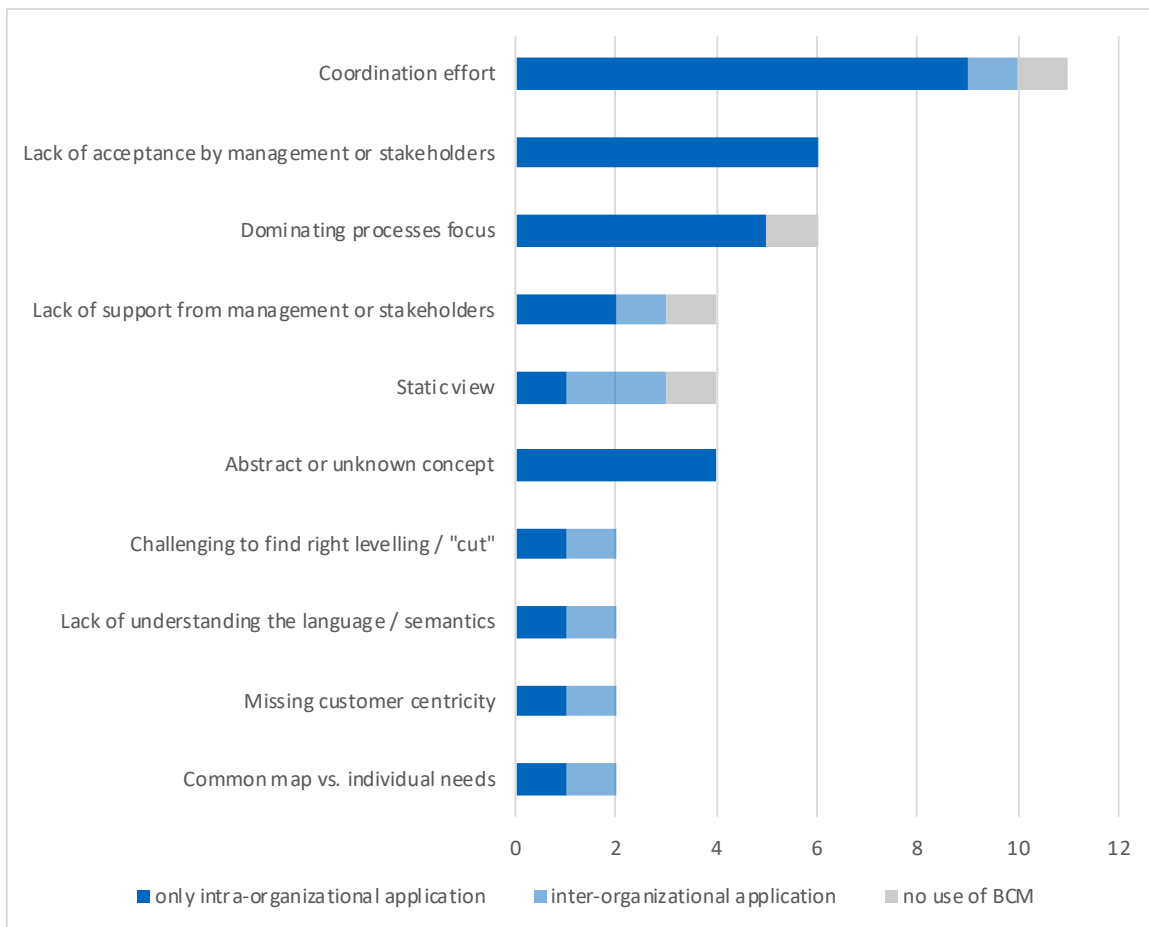
Figure 5.6.: Identified challenges of BCM usage divided by organizational context

Coordination effort The most frequent mentioned challenge is the complex agreement process. Introducing a business capability map inside a company involves long negotiation processes in order to achieve political agreement (I3). Every domain expert and stakeholder wants to see their own interests represented. Politics becomes even more crucial and resource consuming when multiple organizations work together (survey - product owner). The number of involved stakeholders multiply and communication channels are getting longer. Five more participants referred to the effort it takes to coordinate the stakeholders, their various perspectives and divisional needs which is similar to the politics aspects. It is an additional difficulty to agree on a common language (survey - enterprise architect, I1). In a single company, every department uses specific terms. Added to this, every member organization in a collaboration might use their own corporate language. A compromise must be found.

Lack of acceptance by management or stakeholders Company-wide acceptance is crucial for a success of BCMs. The BCM is perceived as a technology tool and the benefits are therefore "hard to convey to non IT-Management" (I5). Even if the map is used in a company, the top management is too pragmatic and does not utilize it in daily business (I4). Some may even find it "tedious and affiliate it with bureaucracy" (survey - business process architect), which in turn is associated with additional effort. . Three other survey participants also face the challenge that capability modeling is not common in the organisation which makes it difficult to argue within the capability context. Before the content can be presented, the underlying concept must first be verified as a basis for decision-making.

Dominating processes focus Processes are usually used and well documented already. In part, they have to be, because it must be legally clear who does what, how and when, especially when working with several market players (I3). When introducing the additional concept of capabilities, it is difficult to use the existing processes and built on it (I5). Two more participants see it as a challenge to shift the focus from already well-established processes towards capabilities. Also I1 mentioned already established standards, in his case in the automotive industry. There they use tools for data transfer, but partners are reluctant to exchange further architecture-based information (I1).

Lack of support from management or stakeholders A deficit of support by upper management was mentioned three times. Without an IT board member who spreads the idea among the decision makers, the concept of capabilities exists only in architecture management without domain specific input. Fostering capability modeling top-down is desired. Otherwise it is problematic to use the strategy tool for actual strategic planning because the IT department is not involved (survey - enterprise architect; I5).

Static view It was mentioned by the participants that not the application of the capability map leads to problems but keeping the information inside updated and consistent across the company. That is a vital prerequisite to manage lifecycles and reach synergies efficiently (survey - enterprise architect). I4 adds to this topic that the static view which the map depicts, is important for building an architecture. However, it misses a behavioral view like value streams to align with external organizations as theses are more tangible for people and rather adaptable.

Abstract or unknown concept A model is used to abstract the reality. But the majority, especially outcome driven people are "not able to move up to a higher abstraction layer, to start thinking conceptually" (I4). Domain experts tend to think in their functions and applications. It is resource intensive to explain the concept and value added of an additional abstract higher level (I5). This makes the capability map not the most tangible tool which restricts the general understanding. One respondent whose organization is using the BCM mentioned that it is an unknown concept, referring to the use across company

borders (survey - project manager (IT)). If members of a cooperation are not familiar with thinking in capabilities it is unlikely that they will jointly define a map. Even consultancies, which often support such collaborations, tend to use their own operating models (I5). Another survey participant raised the problem that the internal BCM is not yet mature enough to deal with an inter-organizational usage.

Challenge to find right levelling "cut" Before using a BCM, all stakeholder must agree on the "right cut" (I5). I5 for example explained how they want to attach capabilities to a business object in order to add a risk assessment afterwards. Similarly, one participant highlighted the right levelling of capabilities as a challenge in cross-company application (survey - project manager (IT)). All members of the jointly defined map have to agree on the same cut which is associated with preparatory work and coordination effort. But once an industry has agreed on a similar cut, capabilities are easier to compare and complement when entering an ecosystem (I5).

Common map vs. individual needs A challenge entirely related to inter-organizational utilization of BCMs is the level of detail of jointly defined maps. Even if several organizations collaborate they have individual needs. However, they have to agree on terms applicable for everyone. This leads to a highly aggregated map with less significance, as stated by I5. I2 confirms the fact that the superior map is the common dominator but does not include peculiarities of single members. To be relevant for each participating organization each party in the network has defined an adjusted capability map. This again increases the use of resources.

Lack of understanding the language / semantics One participant (survey - enterprise architect) mentioned that unclear semantics cause problems when sharing a BCM with external partners. This matches the previously named difficulty of levelling. Moreover, I1 elaborates on intra-organizational problems of comprehension with an example: People unfamiliar with the concept tend to use buzzwords, e.g. IoT is not a capability, but "managing charging stations remote" is. Colleagues are also easily discouraged by technical terms like enterprise architecture.

Missing customer centricity I3 and I4, both consultants, mentioned the missing focus on the customer value. A capability is not purchased, but a product or service is. The capability map is missing the perspective of a customer. Therefore, it seems not as a useful tool for customer centric organizations (I4). Both interview partner agree that the BCM is an "internally directed tool" (I3) which leads to "silo thinking". This in turn impedes value creation within the firm and across organizations (I4).

A final point that was not explicitly mentioned is the effort / benefit ration. It is not directly a challenge, rather a reason why companies hesitate to introduce business capability modeling or use it in an extended context. Many stated to not see the need or added value

for such a BCM. As figure 5.6 shows, the effort associated with capability maps is the most relevant challenge. The potential of such maps is not sufficient yet to offset the upfront investment.

6. Discussion

This part of the thesis summarizes the main findings from the previous chapter 5 and the preceding literature review with regard to the research questions. It is followed by a discussion of the limitations of this study.

6.1. Key Findings

The aim of this thesis is to analyse business capability maps that are defined and used in an inter-organizational context. This also includes a review of the map's internal use. Within this section, the key findings are discussed with regard to the three research questions.

RQ1: Which reasons for inter-organizational business capability modeling can be found?
To answer the first research question, a literature review was conducted as well as new data collected and analyzed. The reasons found in scientific literature are referring to intra-organizational BCMs and are presented in table 3.1. Through the data from the survey and the interviews, two additional reasons could be identified: *application portfolio management* and *developing a reference architecture*. In order to create an inter-organizational BCM, it is beneficial if companies are thinking in capabilities internally already. Therefore, the reasons for working with a capability map within the company can also be seen as a base for commonly defined maps. The reasons in both application environments do not differ much. Strategic and architecture-related application areas remain, only become more complex due to the increased number of stakeholders in cooperations. The identified reasons are *application portfolio management, developing reference architecture, strategic roadmap, sourcing decisions, creation of new value streams / business ideas, clarification of responsibilities, shared ontology, support merger & acquisition* (Figure 5.5).

RQ2: What are the challenges associated with the inter-organizational use of BCMs?
Since only few scientific papers deal with the application of business capability maps in an inter-organizational context, there is an even greater lack of research that investigates the challenges involved. Despite several reasons for modeling business capabilities and the associated potential, the usage depends mainly on the expected benefit / effort ratio. The majority of problems experienced while using the map as well as expected obstacles lead to additional resource costs. The in figure 5.6 presented points describe efforts related to the coordination and training of all people involved and the search for support and acceptance, especially from management. Moreover, a process view is already well

established in most companies. Therefore, the benefit of a new and additional model must first be presented in a credible way to the stakeholders. These efforts already apply to the use within the organization, but also across company borders. The greatest challenge is therefore that all parties involved in a cooperation estimate the benefits to be higher than the costs and then create a common capability map. Besides the associated effort, the BCM is a strategic tool, but it has its origin in IT. However, the company's strategy is mainly defined by management which is still not familiar enough with this tool.

RQ3: Which factors can influence the usage of inter-organizational BCMs? The third research question investigates whether there are company-specific characteristics that influence the use of inter-organizational BCMs. A first aspect is the location of the organization's headquarter. Data was collected from many different countries, but a larger amount of data per region is needed to derive regional characteristics. When you look at the industry in which the companies operate, opinions differ. Even though most of the respondents to the survey are working in areas of *Technology, Finance / Insurance / Property and Communication / Utility*, the interview partner described it differently. The use of a BCM across company borders seems to depend more on the number of cooperation partners and complexity of the value chain. Thereby the number of employees of each organization might influence the complexity but cannot be limited to the factor headcount. Agreeing on common capabilities means agreeing on a static, long-term view on the cooperation. Another important point is the maturity level. Defining a common BCM involves more stakeholders, requires more resources. Therefore, it is beneficial if every company is familiar with the concept and their own capabilities. When the intra-organizational BCM is mature enough, it can be used externally.

6.2. Limitations

To transparently present all aspects of this research, the limitations of this thesis are discussed in the following. They should be considered when drawing conclusions from the outcome of the work. The limitations of the literature review are already covered in section 3.3.

Reliability An often mentioned aspect is the reproducibility of a study. Meaning, the data and results of the analysis should not depend on the individual researcher [59]. Following countermeasure were taken to minimize this threat: All survey questions and the interview guideline with the corresponding audio recordings are documented in detail. Furthermore, all interviews were transcribed verbatim and if the interview partners participated in the survey as well, both parts can be linked. However, it should be mentioned that the sample size for the interviews is relatively small which makes a generalization of the results difficult [16]. Conducting the interviews with other experts in the field might lead to deviating results as the knowledge and maturity level of business capability mod-

eling differs. But is worth mentioning that the interviewees have very different opinions on BCMs, which makes it possible to still discuss a variety of advantages and disadvantages of the practitioner's perspective.

Methodological differences Questionnaires and interviews are frequently used together to look at a research topic as comprehensive as possible. However, the results of the methods may well differ. It took participants approximately six minutes to complete the survey but each interview lasted for half an hour which gives time to expose inconsistencies in the answers. A survey was chosen to produce generalizable results from a larger sample size but the outcome can be threatened by biased survey design and formulation. In addition, the reliability of respondents cannot be monitored as it is a self-administered survey. Interviews on the other hand help to understand the context of an answer and allow the participants to explain their perspectives in more detail. Nevertheless, the interviewer can influence the responses consciously or unconsciously by choosing the questions [31]. To minimize the limitation of each research method, the mixed-method approach was chosen. Additionally, the survey questions and interview guideline were reviewed by a second researcher to reduce misunderstanding.

Maturity level inter-organizational BCM The thesis was designed to investigate cases of inter-organizational business capability modeling in detail. However, the concept is still relatively new and the results show that it is mainly used in a single organizational context. The lack of cases across company borders makes an in-depth analysis of success factors difficult and it is limited to assumptions about possible application scenarios, especially by the interview partners. However, it as also a finding that the maturity level of BCM among collaborations is still at an early stage.

7. Conclusion

This final chapter summarizes the work of the present master's thesis and makes suggestions for future topics that can be investigated.

7.1. Summary

Prior work has outlined the relevance of business capability modeling and inter-enterprise architecture management as presented in chapter 1 and 3. However, this thesis identified a lack of scientific literature that analyzes the use of business capability maps in an inter-organizational context. Therefore, the present work aimed to identify cases where companies jointly defined a BCM. Following a qualitative research approach, the experiences were to be analyzed in detail. Afterwards, the status quo was investigated and reasons as well as challenges from the practitioner's perspective analyzed. For this purpose, three research questions were defined, which are answered in chapter 6. The results are based firstly on a literature review to provide a theoretical foundation. Since there are very few publications that address the experience with jointly defined BCMs, the application within companies was considered and the challenges of increasing collaborations were contrasted with this. The most common identified reasons for capability modeling were used as a foundation for the design of the survey. Secondly, a wide range of data from 115 surveys was assessed and enhanced with insights from five follow-up interviews with experts in the field of enterprise architecture. The evaluation of the collected data reveals an upward trend in BCM usage both within companies and across its borders. The majority of maps still have a relatively low degree of maturity whereby the use in an inter-organizational context is a little delayed. Moreover, a comparison of challenges of inter-enterprise architecture with the reasons for capability modeling proofs the suitability of BCMs to address these obstacles. Among users, the model is overall perceived as a supporting tool. Furthermore, the direction of cooperation was looked at in more detail. The research reveals a greater relevance of capability modeling in vertical collaborations, meaning with suppliers and customers, than in horizontal ones.

Through the investigation, nine major reasons for the use of BCMs across company borders could be identified (see section 5.3) and thus provide the answer for the first research question. They include two new reasons which were not explicitly mentioned in the literature yet. Both are also the most relevant ones and are related to application management and the development of a reference architecture. This is contrasted with the identified challenges associated with the introduction and application of BCMs (see section 5.4). In order

to answer research question 2, the individual responses of the participants were clustered into ten categories for a sound analysis. The coordination effort is experienced as the main obstacle. In addition, as information is gathered about the companies, new insights are gained that can influence the use of business capability maps. The results can be assigned to the third research question. The outcome of this master's thesis can serve as a basis to increase the use of BCMs, especially in an inter-organizational context, by improving the perceived benefit / effort ratio. The newly acquired contact data can be used for further research.

7.2. Future Work

This master's thesis shows the increasing relevance of business capability maps, not only intra- but also inter-organizational. It provides a deeper understanding of the status quo and factors influencing the usage. However, more qualitative research on the still emerging usage of inter-organizational BCMs is required. The following open issues are identified:

In-depth analysis of new identified cases
Through the online survey, some new cases of inter-organizational capability modeling were identified. Four of the relevant participants indicated their interest in further exchange by providing their contact details. On of them is the second interview partner, who uses a jointly defined BCM in a star-type collaboration. The analysis of the new cases can provide further insights into the actual use of these maps across company borders.

Use case development for vertical cooperations
Analysis of the data reveals that most participants consider jointly defined BCMs with suppliers and customers to be more relevant than at the horizontal level with competitors. Therefore, analyzing and developing potential use cases for capability modeling in vertical cooperations can be worthwhile. The new insights can support the application.

Interviews with business departments
Both survey participants and interview partners have IT backgrounds and give insights from an enterprise architecture perspective. Since many challenges identified relate to acceptance and understanding by business departments, follow-up interviews with other stakeholders like top management are recommended. Their perspectives are beneficial to overcome a majority of the mentioned challenges. Moreover, a wider variety of views will reduce bias.

Large-scale study
Of interest would also be a large-scale study with multiple participants from all parts of the world to get a comprehensive picture of the distribution worldwide. That would allow

to identify possible regional characteristics or specifics in the procedure of defining and using inter-organizational business capability maps. Nevertheless, this research provides a foundation from which individual results can be analyzed in greater depth.

A. Appendix

A.1. Survey

The following questions were used to conduct the semi-structured interviews for this thesis.

TUM

Inter-Organizational Business Capability Modeling

Hello and thank you for your contribution to our research!

My name is Josephine Graul and as part of my master's thesis at the Technical University of Munich I investigate the status quo of **jointly defined business capability maps**.

Many organizations face an increasing demand for collaboration and alignment of IT and business-perspectives. Capability modeling is a common way to address this problem but the inter-organizational context has not been adequately investigated yet.
In order to close this knowledge gap, I am kindly asking you to provide some information about your organization's experience with business capability maps. Your insights will help to improve the understanding of current trends and challenges.

I assure you that you queried data will be treated with the utmost confidentiality and is used for research purposes only.

I really appreciate your input!

TUM

Single Organization BCM

A **business capability** is a particular ability or capacity that a business may possess or exchange to achieve a specific purpose or outcome. (TOGAF Standard) It describes WHAT an organization does, not how.
A **business capability map (BCM)** is a structured visualization of these capabilities, that are usually grouped into logical categories. They can be modeled for one company only or a group of organizations jointly defines these capabilities for their network.

You can find further information [here](#).

★ **Are you familiar with the concept of business capability maps (BCMs)?**

◯ Yes   ◯ No

★ **Does your company use a BCM?**

◯ Yes   ◯ No   ◯ in Creation

★ **How many years have you been using BCMs in your company?**

◯ < 2 years   ◯ 3 – 5 years   ◯ 6 – 10 years

◯ > 10 years

★ **What does your company use the BCM for?**

Please select all applicable reasons.

☐ Application portfolio management

☐ Communication tool between management & IT

☐ Development of target architectures

☐ Investment decisions

☐ Organizational decisions

☐ Shared ontology

☐ Standardization

☐ Strategy roadmap

☐ Other... Please specify [   ]

★ **Does your company collaborate with other companies in form of a network?**

◯ Yes   ◯ No

★ **Who is part of that collaboration?**

☐ Clients / Customers

☐ Competitors

☐ Suppliers

☐ Other organizations outside of your industry

☐ Other... Please specify [   ]

TLM

Inter-Organizational BCM

★ **Does your company use a business capability map (BCM) together with other organizations?**

○ Yes   ○ No   ○ In Creation

★ **Who is part of that collaboration?**

☐ Clients / Customers

☐ Competitors

☐ Suppliers

☐ Other organizations outside of your industry

☐ Other... Please specify [   ]

How likely is it that your company will define a BCM with other organizations?

	Very unlikely	Moderately unlikely	Neither likely nor unlikely	Moderately likely	Very likely
Clients / Customers	○	○	○	○	○
Competitors	○	○	○	○	○
Suppliers	○	○	○	○	○
Other organizations outside of your industry	○	○	○	○	○
Other... Please specify [_____]	○	○	○	○	○

★ **How many organizations are involved in the inter-organizational BCM?**

Please indicate "0" if you do not know.

[_____]

★ **How many years have you been using the inter-organizational BCM?**

○ < 2 years   ○ 3 – 5 years   ○ 6 – 10 years

○ > 10 years

★ **What does your company use the jointly defined BCM for?**

Please select all applicable reasons.

☐ Application portfolio management

☐ Clarification of responsibilities

☐ Creation of new value streams and business ideas

☐ Develop reference architecture

☐ Outsourcing/Sourcing decisions

☐ Shared ontology

☐ Strategic roadmap

☐ Support Merger & Acquisition

☐ Other... Please specify [   ]

★ **How is the composition of the modeling team?**

Please select or add all applicable roles from your company.

☐ Domain Expert

☐ Enterprise Architect

☐ Project Manager

☐ Other... Please specify [   ]

★ Which other inter-organizational instruments does your company use?

Please name every other tool than a BCM that is used to support inter-organizational strategic/architectural goals? Please indicate "none" if you are not aware of any other tools.

Which challenges and problems occur with the inter-organizational usage of BCM?

If you do not use an inter-organizational BCM, please indicate why not.

TUM

Company Details

⭐ **Industry**

Please choose the industry your company identifies with the most.

- ◯ Agriculture, Mining
- ◯ Communication, Utility
- ◯ Construction Industry
- ◯ Education, University
- ◯ Finance, Insurance, Property
- ◯ Government
- ◯ Health Industry
- ◯ IT, Technology
- ◯ Media Industry
- ◯ Retail / Wholesale
- ◯ Service Industry
- ◯ Transportation, Logistic
- ◯ Other... Please specify [   ]

★ Headquarters

Please select your organization's headquarters location.

Europa

○ Albania

○ Andorra

○ Austria

○ Belarus

○ Belgium

○ Bosnia & Herzegovina

○ Bulgaria

○ Croatia

○ Czechia

○ Denmark

○ Estonia

○ Faroe Islands

○ Finland

○ France

○ Germany

○ Gibraltar

○ Greece

○ Guernsey

○ Hungary

...
Abbreviated for clarity

★ **Headcount**

Please choose your organization's number of employees.

○ <= 10 employees   ○ 11 – 50 employees

○ 51 – 100 employees

○ 101 – 500 employees   ○ 501 – 1000 employees

○ > 1001 employees

★ **Which role do you have in your company?**

○ Dept. Manager (IT)

○ Area Manager (IT)

○ Project Manager (IT)

○ Enterprise Architect

○ Software Developer

○ Solution Architect

○ Dept. Manager (Business)

○ Area Manager (Business)

○ Project Manager (Business)

○ Product Owner

○ Other... Please specify [   ]

Optional: Your Company

Please enter the name of your company. This information will help to increase the quality of this research. The data will be treated with the utmost confidentiality and is used for research purpose only.

Optional: Contact Person

For further knowledge exchange and evaluation of use cases of inter-organizational BCM, it would be great if you can provide me with a contact person within your organization or network.

In addition, I would be happy to provide you with the anonymized results of this survey.

Name

e-mail

Phone

Optional: Do you have any feedbacks, comments or suggestions?

B. Appendix

B.1. Interview Guide

The following presents the questions used during the semi-structured interviews. The actual selection depends on the participant's usage of business capability maps.

- Interviewer: Josephine Graul
- Interviewee ID:
- Date:

Introduction

Goal: Investigate the status quo of jointly defined business capability maps
Many organizations face an increasing demand for collaboration and alignment of IT and business-perspectives. Business capability maps are a common tool to address this problem, but the inter-organizational context has not been adequately investigated yet. We aim to get practical insights into the influencing factors and challenges related to the use of BCM.
The collected data will be treated with the *utmost confidentiality* and is used *for research purposes only*.

Business Capability Maps - Intra-Organizational Context

- What was the main idea behind creating a BCM for the company?
- Who introduced the idea?
- What information is mapped to the BCM?
- Did you experience any challenges while creating or using the BCM?
- How could these challenges be resolved?

Cooperations

- Who is part of the cooperation? (suppliers, customers, competitors, ...)
- Can you shortly name the objectives of your collaboration?
- How is the time horizon of the collaboration?
- How is the collaboration coordinated?

Business Capability Maps - Inter-Organizational Context

- What were the reasons for jointly defining a BCM?
- What information is mapped to the BCM?
- Which challenges and problems occur while introducing or using the BCM?
- How could these challenges be resolved?

Conclusion

- Acknowledgment & Feedback
- May I contact you again if I have additional questions?

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