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EXPLORING THE SCOPE OF ENTERPRISE ARCHITECTURE THINKING: PERSPECTIVES FROM FINNISH ORGANISATIONS

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ABSTRACT

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This study explores the scope of organisations' Enterprise Architecture thinking. Enterprise Architecture (EA) is often seen as something ambiguous and difficult to grasp. Even among the Enterprise Architecture practitioners themselves, there is often no consensus on what actually constitutes Enterprise Architecture in their respective thinking. The study sheds light on the various underlying ideas shaping the approaches that are being taken towards the Enterprise Architecture scoping, the various scopes of the real-life Enterprise Architecture configurations, the impact of various Enterprise Architecture scoping choices as well as the various contextual factors affecting the scope of Enterprise Architecture. The study was conducted in two parts. A systematic literature review was conducted in order to provide a cross-section view of the Enterprise Architecture scoping discussions in the prior literature. An empirical study was then conducted in order to enrich the understanding by providing additional qualitative insight. The empirical data was gathered from Finnish Enterprise Architecture practitioners using semi-structured interviews and analysed by applying an interpretive content analysis approach. The key findings of the study point out the multifaceted nature of Enterprise Architecture scoping, some of the current trends that are affecting the organisations' approaches towards Enterprise Architecture scoping, the potential overlap observed between the scopes of the Enterprise Architecture discipline and various management disciplines, several practical Enterprise Architecture scoping related considerations, the highly contextual nature of Enterprise Architecture scoping as well as the image problem potentially affecting the scope of Enterprise Architecture.

Keywords: Enterprise Architecture, Enterprise Architecture Management, scope, schools of thought, management

TIIVISTELMÄ

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Tämä tutkimus tarkastelee organisaatioiden kokonaisarkkitehtuuriajattelun laajuutta. Kokonaisarkkitehtuuri (KA) on usein nähty jokseenkin epämääräisenä ja vaikeasti lähestyttävänä. Jopa kokonaisarkkitehtuurin ammattilaisten keskuudessa puuttuu usein yhteisymmärrys siitä, mitä kokonaisarkkitehtuuri tarkoittaa kunkin ajattelussa. Tutkimus valaisee taustalla vaikuttavia kokonaisarkkitehtuurin laajuutta ohjaavia ajattelumalleja, kokonaisarkkitehtuurin laajuutta erilaisissa käytännön konfiguraatioissa, erilaisten kokonaisarkkitehtuurin laajuutta koskevien valintojen vaikutuksia sekä erilaisia kontekstitekijöitä, jotka voivat vaikuttaa kokonaisarkkitehtuurin laajuuteen. Tutkimus toteutettiin kahdessa osassa. Systemaattisen kirjallisuuskatsauksen avulla luotiin läpileikkaus kokonaisarkkitehtuurin laajuutta koskevaan keskusteluun aiemmassa kirjallisuudessa. Tämän jälkeen ymmärrystä rikastettiin empiirisen tutkimuksen avulla kvalitatiivisesti. Empiirinen aineisto kerättiin suomalaisilta kokonaisarkkitehtuurin ammattilaisilta puolistrukturoitujen haastattelujen avulla ja analysoitiin käyttäen lähestymistapana tulkitsevaa sisältöanalyysiä. Tutkimuksen tärkeimmät löydökset tuovat esille kokonaisarkkitehtuurin laajuuden monitahoisen luonteen, joitakin organisaatioiden kokonaisarkkitehtuurin laajuuteen vaikuttavia trendejä, mahdollisen päällekkäisyyden kokonaisarkkitehtuurin ja johtamisen tieteenalojen välillä, useita kokonaisarkkitehtuurin laajuuteen vaikuttavia käytännön kysymyksiä, kokonaisarkkitehtuurilaajuuden kontekstisidonnaisen luonteen sekä imago-ongelman kokonaisarkkitehtuurin laajuuteen vaikuttavana haasteena.

Asiasanat: kokonaisarkkitehtuuri, kokonaisakkitehtuurin hallinta, laajuus, koulukunnat, johtaminen

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1 INTRODUCTION

In the modern world, the organisations and the environments they operate in are getting increasingly complex in terms of the structures that need to work together as well as the pace at which they need to be changed in order for the organisation to remain viable. Enterprise Architecture has been suggested in the information systems discipline as a remedy for managing this complexity by applying holistic and systemic thinking. Simultaneously, the term Enterprise Architecture itself continues to divide opinions. There appears to be no consensus among academics or practitioners as to what actually constitutes *the scope of Enterprise Architecture based thinking* and how the Enterprise Architecture practice should be positioned among its neighboring management disciplines. Exploring this controversy is a core motivation behind the study at hand. By consolidating our understanding of what Enterprise Architecture is or could be, we can contribute to reducing the controversy and help focusing on how Enterprise Architecture should evolve as a practice in the future. This first introductory section of the study presents a brief summary of the history of Enterprise Architecture and Enterprise Architecture research, further discusses the need for exploring the scope of Enterprise Architecture and finally presents the research setup as well as the structure of the study.

1.1 A brief history of Enterprise Architecture

Enterprise Architecture is still a relatively young area of research. While the topic has been attracting an increasing amount of academic and practitioner attention throughout the 2000s, the use of the term Enterprise Architecture itself has involved some ambiguity as noted already by some of the earlier Enterprise Architecture literature reviews (Schöenherr, 2008). Enterprise Architecture is often claimed as having been ignited and made popular especially by the seminal work of John A. Zachman, later widely known as the Zachman Framework (Zachman, 1987 & 1997). According to some evidence, the roots of Enterprise

Architecture thinking can however be traced all the way back to the 1960s (Kotusev, 2016). Since the beginning, the Enterprise Architecture research tradition has been substantially rooted in practice, while Enterprise Architecture as an academic discipline can be seen as still being somewhat in the progress of establishing itself (Kotusev, 2017).

The current state of research in Enterprise Architecture has been studied extensively in a number of recent literature reviews. Nevertheless, up until recently, some controversy has remained about the very definition of the term Enterprise Architecture. This can be manifested by the plethora of definitions presented for the term, applying slightly varying approaches to Enterprise Architecture, some definitions even ending up contradictory to one another (Saint-Louis, Morency & Lapalme, 2019). Similarly, there have been calls for a more solid theoretical foundation that would provide additional structure to the research in the field of Enterprise Architecture. To this day, there seems to be no agreement among the academics on a uniform theoretical body for the field, although various theoretical directions have been explored and discussed by several authors (Weiss, Aier & Winter, 2012; Kotusev & Kurnia, 2021).

Enterprise Architecture as a field of research has not necessarily yet reached a mature state, with a lot of approaches taken and a certain amount of controversy involved in the very definitions and theoretical foundations of the Enterprise Architecture discipline itself. While there seems to be a significant amount of evidence that Enterprise Architecture based thinking has a potential of benefiting organisations in several ways (e.g. Niemi, 2006; Tamm et al., 2011), the ambiguity involved makes it difficult to meaningfully discuss how Enterprise Architecture implementations may actually manifest themselves in various organisational setups. This presents a challenge for both academics and practitioners trying to find a common language to facilitate the further development of the field. This is also stressed by Lapalme (2012), who discussed this very issue as something that needs to be resolved in order for Enterprise Architecture to become more established as a discipline:

> If a discipline is to be founded, the terminological challenges of the domain must be resolved in order to foster shared meaning: a key cornerstone to the establishment of a discipline or a community of practice. (Lapalme, 2012, p. 1)

According to a framework further proposed by Lapalme (2012, p. 5), three key schools of thought on Enterprise Architecture can be identified with slightly differing sets of definitions, concerns and assumptions behind them, also resulting in significantly different focus of the Enterprise Architecture practice in terms of its scope and purpose. The three schools of thought include the Enterprise IT Architecting School, the Enterprise Integrating School and the Enterprise Ecological Adaptation School, each employing distinct approaches towards what Enterprise Architecture is and where it is rooted. Lapalme's Enterprise Architecture schools of thought can be placed on the spectrum based on having a more technical IT focus, a more socio-technical information system focus and a more comprehensive ecosystemic focus in their thinking.

Bibliographic data from some of the earlier literature reviews provides certain perspectives on how Enterprise Architecture research has been typically positioned in the past. According to Kotusev (2017), Enterprise Architecture topics have been discussed in a relatively narrow set of outlets, with a small number of them accounting for the majority of publications. Many of the outlets are either specifically focused on Enterprise Architecture or can be clearly positioned in the field of information systems. Within a smaller number of outlets outside of the specific information systems scope, the IT-related outlets seem to be more common than business-related outlets. This could indicate that Enterprise Architecture as an area of research is more strongly rooted in looking at the world primarily from the perspective of aligning IT with the business (the Enterprise IT Architecting School) rather than looking at the world primarily from the perspective of the business and treating IT as just another part of it (the Enterprise Integrating School) – or, taking it even further, from the perspective of the enterprise's relationships with other enterprises as a part of its environment (the Enterprise Ecological Adaptation School).

The systems approach is commonly utilised to help sense-making in the field of Enterprise Architecture. Applying a systems lens, Enterprise Architecture can be seen as a representation of an enterprise as a system of systems, implying a holistic view of all of the various components of the enterprise. However, it remains unclear whether this holism is actually being realised with an equal emphasis placed on all of the enterprise dimensions. For example, Kloeckner and Birkmeier (2009) discuss Enterprise Architecture looking at enterprises as socio-technical systems. They argue that there is often an imbalance present between the perspectives covered within the scope of the Enterprise Architecture thinking, with the technical perspectives often dominating over the social ones. Similar observations are made by Simon, Fischbach and Schoder (2014), who discuss the applications of Enterprise Architecture especially in the context of strategic management. They argue that a significant amount of potential of applying holistic Enterprise Architecture thinking to support business-oriented strategic management practices still remains unused as the primary scope of Enterprise Architecture thinking is being reduced to more operational and IT-driven perspectives.

Even though some authors have attempted to provide insight on how the various Enterprise Architecture perspectives have been represented in theory and practice, this insight seems to be limited and somewhat inconclusive. While some of the earlier literature reviews have actually identified more Enterprise Architecture papers addressing non-technical than technical architectural layers (Schöenherr, 2008), some of them have found the technical, IT-related aspects often ending up in a more central role within the Enterprise Architecture research compared to the non-technical aspects (Simon, Fischbach & Schoder, 2013). Another earlier study supports this by concluding that Enterprise Architecture seems to be strongly driven by IT despite the recognised need for and the perceived importance of a more holistic consideration of various aspects of the enterprise (Aier, Riege & Winter, 2008). Further research identifies three

distinctive scoping approaches to Enterprise Architecture observed in organisational practice, namely the IT elements scope, the business capabilities scope and the business strategy scope (Rahimi, Gøtze & Møller, 2017). There is also some indication that the scope of Enterprise Architecture may affect the possible Enterprise Architecture applications, with the narrower approaches focusing on planning and implementation and the broader approaches extending more significantly to strategy formation (Rahimi, Gøtze & Møller, 2017).

Building upon the original "three schools of thought on Enterprise Architecture" introduced by Lapalme (2012), Korhonen et al. (2016) engage in what can be considered a philosophical discussion on the past, the current state and the future of the Enterprise Architecture practice. In response to an increasingly turbulent environment characterised by a growing demand for adaptivity, they call for the need of a reconceptualisation of Enterprise Architecture. They argue that while Enterprise Architecture seems to have been rooted in the Enterprise IT Architecting approach (assuming a technical focus) and is currently most typically associated with the Enterprise Integrating approach (assuming a socio-technical focus), the significance of the Enterprise Ecological Adaptation approach (adopting an ecosystemic focus) is bound to become more prominent in the future as the only approach that is seen by the authors as viable in the long run. This also seems to be in line with the recent findings of Nurmi, Penttinen and Seppänen (2019), who studied Enterprise Architecture definitions provided by literature and practitioners against Lapalme's (2012) schools of thought and confirmed that the integrating and ecological adaptation approaches seemed to be dominant in the commonly presented definitions.

In summary, there are various approaches to Enterprise Architecture that significantly differ in their approach to what is considered as being within the core scope of the Enterprise Architecture practice. This makes discussing Enterprise Architecture challenging as there is no consensus even among academics and practitioners themselves on what actually constitutes the scope of Enterprise Architecture in their individual thinking. Similarly, there seems to be no solid understanding on the implications of various Enterprise Architecture scoping choices on how the Enterprise Architecture practice is being deployed in various organisational settings and what kinds of effects can be expected from the Enterprise Architecture practice as a result.

1.2 On exploring the scope of Enterprise Architecture thinking

The ambiguity discussed in the previous section also presents an interesting opportunity for further research, providing motivation for this study. First, the study is interested in exploring some of the underlying approaches that are being taken in the organisations towards the Enterprise Architecture practice. One indicator of such approaches is whether the state of the art Enterprise Architecture practice still seems to be mostly IT-centric, focused primarily on traditional business-IT alignment perspectives (a technical focus), whether a more holistic

stance is being taken with equal emphasis on various Enterprise Architecture perspectives (a socio-technical focus) or whether there are signs of the Enterprise Architecture practice evolving towards crossing the traditional boundaries of an enterprise and considering issues of the enterprise within its environment (an ecosystemic focus). Second, the study is interested in exploring how real-life Enterprise Architecture practices are being configured within the organisations. Indicators of this include the organisational positioning and the design of the Enterprise Architecture function, the Enterprise Architecture aspects that are being considered within the scope of the Enterprise Architecture practice as well as the ways in which Enterprise Architecture is being applied in various settings. Third, the study is interested in the impact that the Enterprise Architecture practice may have as a result of various scoping choices and the results the practice is able to yield within the organisation. This is indicated by the perceived benefits and the evolving maturity of the Enterprise Architecture practice. Finally, the study should take into the account the various contextual and contingency factors that might affect the scoping choices being taken.

The existing literature that was reviewed within the study provides a starting point for examining the scope of the Enterprise Architecture practice. Building on the three schools of thought proposed by Lapalme (2012), the aim is to reduce some of the ambiguity and provide additional structure to the discussion around the scope of the Enterprise Architecture practice and create a foundation for empirically validating the existence and the practical implications of the distinctive schools of thought proposed. On the other hand, an attempt is made in order to acquire some additional insight on whether the actual real-life practice in the field seems to be moving in the direction envisioned by Korhonen et al. (2016). In addition to these conceptual discussions, some practice-oriented Enterprise Architecture literature was also studied in order to acquire a better understanding of the practical implications of Enterprise Architecture scoping and identify the need for more empiric understanding of scoping related issues relevant to the real-life Enterprise Architecture practice.

The current body of research on the topic can be argued to involve certain gaps, which also present several opportunities for further research. First, the amount of relevant research seems to be still quite limited. This could indicate room for additional contributions towards acquiring a better conceptual and empirical understanding of the phenomenon. Second, some of the relevant literature has been published over a decade ago. Especially in a context of a rapidly developing discipline strongly driven by practice, an updated view with more recent insights is assumed to be beneficial. Third, much of the earlier research is of a conceptual nature with a limited level of empirical evidence reported and many of the concepts presented not being backed by any empirical examination. Additional empirical data would contribute towards validating the concepts presented in the prior literature, enriching them with more practical insight and helping to build bridges between theory and practice.

The study attempts to contribute by responding to some of the research gaps mentioned above. This could have several potential implications. For the

academic Enterprise Architecture research community, the research does its small part in 1) contributing towards reducing the terminological ambiguity and offering inputs towards developing the underlying theory, 2) providing some additional empirical insight on how the theory is actually being applied in practice and 3) uncovering opportunities for further research in the area. For the community of Enterprise Architecture practitioners, the research could 1) help making sense of, understanding and applying the Enterprise Architecture theory on a practical level in their organisations, 2) provide some insight for benchmarking between organisations and 3) contribute towards recommendations on the optimal scoping of the Enterprise Architecture practice in organisations as well as the potential implications of making certain scoping decisions, considering the contextual factors of each individual organisation.

1.3 Research setup

The research problem of this study is exploring the scope of Enterprise Architecture thinking both from the perspective of the Enterprise Architecture theory and the perspective of the Enterprise Architecture practice in a sample of real-life public and private organisations in Finland. The study approaches the scope of the Enterprise Architecture practice in terms of 1) the fundamental thinking behind Enterprise Architecture, 2) the effects of the underlying thinking on the Enterprise Architecture practice as well as 3) the implications of the various Enterprise Architecture scoping choices taken by the organisations. The study attempts to address the following research questions (RQs):

> RQ1) How has Enterprise Architecture scoping been discussed in the existing body of Enterprise Architecture literature?
>
> RQ2) What are some of the Enterprise Architecture practitioners' perceptions of Enterprise Architecture scoping in some Finnish organisations today?
>
> RQ3) What theoretical and practical implications can be drawn from the understanding acquired based on the literature and the perceptions from the practice?

The rest of the paper is structured as follows. Section 2 begins by introducing some of the key terminology and theoretical concepts relevant to the topic, setting the context of the study in a format of an exploratory literature review. Section 3 reports the results of the systematic literature review conducted on Enterprise Architecture scoping, focusing on the RQ1. Section 4 reports the results of the empirical study conducted with Finnish Enterprise Architecture practitioners, focusing on the RQ2. Section 5 discusses the key findings of the study, focusing on the RQ3. Section 6 finally concludes the study.

2 KEY TERMINOLOGY AND THEORETICAL CONCEPTS

The following section provides definitions for some of the key terminology and introduces some theoretical concepts that can be considered focal to the scope of the study. Due to the multifaceted and somewhat ambiguous nature of Enterprise Architecture as a subject area, the initial literature review in this section takes an exploratory approach, with the primary purposes of 1) further justifying the relevance of the research problem and identifying individual points of view that are relevant to be covered by the study, 2) providing a brief overview of the status quo in the selected areas of the Enterprise Architecture research, 3) uncovering the relevant terminology and 4) informing the design of the focused literature review and the empirical research model in the subsequent sections. In order to accomplish these goals, a narrative literature review approach as discussed by Paré et al. (2015) was applied.

Literature reviews have played an important role in the development of academic knowledge as science can be essentially seen as "a cumulative endeavor - - a process of interpreting and combining existing knowledge" – however, there has been a call for a certain level of methodological rigor in conducting literature reviews in order to ensure their academic quality (vom Brocke et al., 2009, p. 1). A narrative review is a specific subtype of literature reviews, some typical characteristics of which include taking a relatively broad scope, applying a selective search strategy and presenting the synthesised findings in the form of a narrative summary (Paré et al., 2015). While the advantages of such an approach obviously include the flexibility provided especially in an exploratory setting as well as the relative feasibility compared to the more comprehensive systematic reviews, the critique towards narrative reviews typically revolves around their vulnerability for subjective bias as well as the lack of transparency and repeatability due to the limited reporting of the review process (Paré et al., 2015). Some of these shortcomings can be addressed by following the guidelines available for conducting narrative reviews in a more rigorous manner, following a three-step process reporting on various aspects of its input,

processing and output phases (Levy & Ellis, 2006) as well as applying identified good review practices (Webster & Watson, 2002).

A narrative review was considered justified for meeting the goals of the initial exploratory literature review as discussed above, providing the reader with sufficient theoretical context while still maintaining the feasibility of the review. As the term itself suggests, the analysis of the literature proceeds as a narrative, covering each theme in a concept-centric manner – defining the concept, justifying its relevance in terms of the study and introducing some of the key literature related to it. For each concept, the attempt is to present a balanced set of literature that would include some of the key studies that have contributed to the current mainstream understanding about the concept, but that would also include potentially valuable perspectives that are of a more critical nature or that have not necessarily yet reached the mainstream research. The purpose of the narrative is thus not to provide an exhaustive review of the body of Enterprise Architecture research as a whole, but to create a basis for the further discussion of the concepts relevant to the study.

In addition to a few key sources focal to the study, a comprehensive systematic literature review on Enterprise Architecture research by Kotusev (2017) was utilised as a starting point for identifying some of the key themes and keywords that could be considered relevant to be covered in the review. For each topic, initial searches were performed mainly by applying the Google Scholar search engine, using search terms such as *"enterprise architecture" + [keyword]*. Search results were then subjectively evaluated based on the title, the publication outlet and the year of the publication. Items initially considered relevant were studied further by assessing the abstract and the keywords. Based on the pre-assessment, items were finally investigated in full and included in the narrative if deemed as relevant by the author. Both backward and forward searches were additionally used to extract more literature from the references used in each item as well as the references made to each item from other literature. The search terms used were also adjusted and expanded as necessary as new relevant streams of research were uncovered.

Selection criteria were applied in order to ensure the relevance and the quality of the literature included in the review. The focus was put mostly on literature published in peer-reviewed academic outlets – however, some non-academic sources, such as industry standards, were also included if seen as value-adding. The review focused mostly on literature published in the 2000s, with an exception of certain essential classics. The reputation of the publication outlet as well as the citation count served as additional indicators of the literature quality, however no exclusions were made merely based on these metrics as this could have possibly resulted in the exclusion of relevant, yet little-known literature. The review was restricted to literature that was available via online databases and mostly written in English. There are evident limitations that apply to any non-systematic review despite the pursuit of rigor in the process. The subjective nature of the review leaves a lot at the author's discretion in terms of identifying the concepts to be covered, deriving the appropriate search terms as

well as selecting the literature to be included and presented in the review. An attempt has been made to address some of these issues further in the subsequent, more focused systematic literature review.

The rest of the section is structured as follows, providing the synthesis of the exploratory literature review. Section 2.1 discusses the core concepts of Enterprise Architecture and Enterprise Architecture Management, the goal of this section being to shed light on the multifaceted and somewhat conflicted set of definitions available for the concept of Enterprise Architecture. Section 2.2 proceeds to discuss Enterprise Architecture thinking and specifically various systems approaches, introducing some of the theoretical underpinnings of Enterprise Architecture that are relevant in the sensemaking of both academics and practitioners in the field. Section 2.3 discusses the various schools of thought identified in Enterprise Architecture research and practice, representing a set of distinctive traditions and ways of thinking that have shaped the approaches towards as well as the long-term evolution of the Enterprise Architecture practice. Sections 2.4, 2.5 and 2.6 discuss some of the popular Enterprise Architecture frameworks, the Enterprise Architecture dimensions as well as the Enterprise Architecture function, roles and processes; as these can be seen as some of the key issues to be considered in the practical implementation of the Enterprise Architecture practice in various organisational settings. Section 2.7 discusses Enterprise Architecture based organisational capabilities, which should be a result of the successful application of Enterprise Architecture as a part of the organisation's managerial processes. Section 2.8 discusses the need for Enterprise Architecture adaptivity and agility, a specific topic emerging in the recent Enterprise Architecture literature. Section 2.9 discusses organisational benefits as the end goal of the Enterprise Architecture practice, various benefit realisation models as well as success factors. Section 2.10 discusses the maturity the Enterprise Architecture practice, as well as ways of evaluating it using various maturity models. Section 2.11 finally discusses various contextual and contingency factors affecting the Enterprise Architecture practice.

2.1 Enterprise Architecture and Enterprise Architecture Management

Starting from the fundamental concept of the study, *Enterprise Architecture (EA)*, we immediately face a problem of lacking a single commonly accepted definition for the term. Applying a systematic literature review, Saint-Louis, Morency and Lapalme (2019) have studied explicit definitions for the term Enterprise Architecture as proposed by the prior literature, coming to a conclusion that there is a plethora of definitions that approach Enterprise Architecture from various perspectives and that are not necessarily always complementary, but can even be contradicting to one another. It is obvious that terminological ambiguity related to such a core concept is likely to cause issues

in achieving a common understanding among Enterprise Architecture scholars and practitioners alike. The lack of a common understanding can become problematic, hindering both the theory development in the field of Enterprise Architecture and the practical implementation of the Enterprise Architecture practice. Therefore, before proceeding further, it is worthwhile to spend at least some time discussing the meanings of the terms "enterprise" and "architecture" as well as their compound "enterprise architecture".

First, we are interested in what is fundamentally being referred to as "architecture". One specific issue causing terminological ambiguity as argued by Saint-Louis et al. (2019) is the use of the term Enterprise Architecture as a noun, as a verb and sometimes even both a noun and a verb at the same time. This implies that the term Enterprise Architecture can be referred to as an object, an activity or both. Definitions used in the literature have varied in their stance to Enterprise Architecture, referring to it for example as "deliverable", "process", "people", "tool", "thinking" and "discipline or practice" (Saint-Louis et al., 2019). It can be argued that the "deliverable" view mostly assumes a static object stance (focusing on what an enterprise's architecture is), the "process" and "people" views mostly assume a dynamic activity stance (focusing on what is done and by whom in order to manage an enterprise's architecture), while the "tool", "thinking" and "discipline or practice" views assume a more general stance (portraying Enterprise Architecture as a more high-level concept, possibly encompassing elements from both the static and the dynamic perspectives). Although several definitions do not differentiate between these perspectives, in some instances the term "enterprise architecture" is used specifically referring to the static perspective and a separate term "enterprise architecting" referring to the dynamic perspective (Saint-Louis et al., 2019).

Second, we are obviously interested in what actually constitutes the "enterprise". This is a significant notion as it's important to understand the boundaries of the entity whose architecture is in fact being investigated within the scope of the Enterprise Architecture practice. Considering the various stances that can be taken to the term "enterprise" in various contexts, it can be viewed as a specific part of an organisation, an individual organisation as a whole, a combination of several organisations or even organisations extended with other entities within the organisations' environment that are relevant to be included in architectural considerations of the holistic "enterprise". The specific meaning placed on the term "enterprise" may therefore have a direct effect on what is considered as being within the scope of "architecture" and "architecting" in the context of Enterprise Architecture. This specific topic will be touched upon later in the more detailed discussion of the various Enterprise Architecture stances and schools of thought (Lapalme, 2012; Drews & Schirmer, 2014).

A commonly used definition for Enterprise Architecture can be derived from the definitions presented in the ISO/IEC/IEEE 42020 standard Software, systems and enterprise - Architecture processes (International Organization for Standardization, 2019). These definitions seem to be quite suitable for the purpose of this study as they take a rather inclusive stance on both the term "enter-

prise", covering any relevant organisational configurations, and the term "architecture", comprising both the static and the dynamic view of Enterprise Architecture in a holistic manner. Keeping in mind the diversity of definitions presented in the literature, we will adopt these generic definitions when further referring to Enterprise Architecture, taking a broader stance to Enterprise Architecture as a *practice* rather than limiting our consideration to one of the narrower perspectives. The relevant definitions proposed by the ISO/IEC/IEEE 42020 standard are summarized in Table 1.

TABLE 1 Enterprise Architecture definitions according ISO/IEC/IEEE 42020:2019 (International Organization for Standardization, 2019)

Term	**Definition**
enterprise	bold or complex endeavor
architecture	fundamental concepts or properties of an entity in its environment and governing principles for the realization and evolution of this entity and its related life cycle processes
architecting	conceiving, defining, expressing, documenting, communicating, certifying proper implementation of, maintaining and improving an architecture throughout the life cycle for an architecture entity

In addition to the term Enterprise Architecture itself, *Enterprise Architecture Management (EAM)* is another term that can be frequently found being used in the literature. Similar to "enterprise architecting", it can be seen as a term that specifically highlights the dynamic perspective of Enterprise Architecture over the static one, and one that is used when referring to a management practice that "goes beyond EA modeling" and includes the tasks of establishing, maintaining and purposefully developing an organisation's EA (Aier, Gleichauf & Winter, 2011, p. 645). A similar viewpoint is provided by Kotusev, Singh and Storey (2015, p. 4070), who argue that "we should distinguish EA from EAM because EA is a description and EAM is what we do with this description". However, as the broader definitions of the term Enterprise Architecture are often used in an overlapping manner or interchangeably with the term Enterprise Architecture Management, differentiating between these terms can often end up being somewhat artificial. For the purposes of this study, what is referred to as Enterprise Architecture Management will therefore be considered as a subset of the *Enterprise Architecture practice*.

2.2 Enterprise Architecture thinking and systems approaches

Similar to the terminological ambiguity in the area of Enterprise Architecture, as discussed in the previous section, there seems to be no solid set of theoretical foundations that would be commonly accepted among Enterprise Architecture scholars and practitioners. This could be at least partly explained by the strong practical roots of the Enterprise Architecture practice and the yet relatively low maturity of Enterprise Architecture as an academic discipline (Kotusev, 2017). As a lack of clarity in terms of the theoretical underpinnings is obviously another issue hindering the development of Enterprise Architecture as a practice, and especially as an academic discipline, several potential theoretical directions have been investigated. A more solid theoretical grounding would support structuring the research agenda in the field of Enterprise Architecture and allow for a further consolidation of research in the field.

Weiss, Aier and Winter (2012) provide one of the earlier reviews of the theoretical foundations in the field of Enterprise Architecture Management, systematically mapping the characteristics of Enterprise Architecture Management to a list of well-known information systems theories. Syynimaa (2013) reflects potential theoretical underpinnings against three perspectives to Enterprise Architecture, which are Enterprise Architecture as a communication media, an activity and an information system. Kotusev and Kurnia (2021) go further by consolidating a body of Enterprise Architecture research in terms of theoretical underpinnings that have been suggested or applied in prior literature. Based on these reviews alone, it becomes clear that rather than identifying a single underpinning theory, an array of theories needs to be considered in order to cover all the various facets of the Enterprise Architecture practice.

Various *systems approaches* in particular have been a special point of interest in many of the prior discussions on the theoretical underpinnings of Enterprise Architecture. A typical starting point for these approaches is the classical General Systems Theory initially introduced by von Bertalanffy (1951) in the context of natural sciences and described by Boulding (1956, p. 197) in the context of management science as "a body of systematic theoretical constructs which will discuss the general relationships of the empirical world". Syynimaa (2017) discusses the applicability of the General Systems Theory as a fundamental theoretical foundation for Enterprise Architecture, as it seems suitable for describing both the static and the dynamic perspective of Enterprise Architecture. From the object point of view to Enterprise Architecture, the General Systems Theory can be used for describing what an enterprise's architecture is - as a system of systems (a closed system perspective) interacting with its environment at the system boundary through inputs and outputs (an open system perspective). This notion is useful for discussing both the current state and the target state of the enterprise and its subsystems (both social ones, such as people and organisational structures as well as technical ones, such as applications and infrastructure). From the activity point of view to Enterprise Architecture, the

General Systems Theory can be used for providing a high-level explanation of how the change from the current state towards the target state can be managed in the system and its subsystems by applying various control mechanisms. Here, a notion of feedback and control loop is applied to demonstrate how system inputs can be regulated based on the evaluation of system outputs in order to achieve a desired change in the behavior of the system.

Nurmi et al. (2018, p. 26-29) present an extensive review of literature discussing systems approaches and systems theories in the context of Enterprise Architecture research. While they conclude that "it appears plausible to anchor EA in the field of system sciences, a discipline providing the necessary theoretical foundations to design, model and manage socio-technical systems", they also observe that the "literature review results show maybe a more fragmented theory base than could be expected". Expanding the classic premises of the General Systems Theory, other system approaches they identify as being actively discussed in the Enterprise Architecture literature include the Living Systems Theory, the Viable Systems Model, Cybernetics, theories related to Multilevel Hierarchical Systems and Complex Adaptive Systems as well as the Orientor Theory. In addition to these specific theories, however, many studies seem to rely on a more abstract notion of "systems thinking" or unspecified "systems theories", which according to the authors "may indicate that the field of research does rely on some generic system related truths, as maybe a common 'mental model'" that shapes how Enterprise Architecture is being approached through a systems lens. Adapting Mingers and White (2010), the authors further introduce some common features identified behind the systems approaches and reflect on them in the context of Enterprise Architecture.

In contrast with their apparent popularity, systems approaches have also recently received some critique for only having little or anecdotal practical value, as they may be shaping the internal ways of thinking among the Enterprise Architecture stakeholders, but they cannot be considered as something that could be explicitly observed in the actors' behavior as a part of the Enterprise Architecture practice (Kotusev & Kurnia, 2021). A major practical problem with applying a systems thinking lens, an inherently theoretical approach to Enterprise Architecture, lays in the fact that "thinking, by definition, represents an isolated private mental activity, whereas improving business and IT alignment in organisations always requires exerting collective efforts involving multiple actors and, thus, represents an inherently social activity" (Kotusev, 2020a, p. 2). As a result, there is a risk of focusing too much on the idealistic concept of a holistic system of systems instead of its practical implications to the actual real-life Enterprise Architecture practice, which is why "systems thinking can be deemed harmful due to its tendency to disguise our lack of understanding of what successful EA practices actually require and substitute genuine knowledge with vague appeals for more holistic approaches" (Kotusev, 2020a, p. 6). Instead, the authors call for a paradigm shift in the Enterprise Architecture discipline – from placing a strong focus on systems thinking towards paying more attention to theories that are more explicitly applicable in practice (Ko-

tusev & Kurnia, 2021) and placing the communications perspective (Kotusev, 2020a) as the cornerstone of Enterprise Architecture research.

For the purpose of this study, while recognising the diversity of theoretical underpinnings behind the various perspectives of the Enterprise Architecture practice, systems approaches to Enterprise Architecture will be used as an underlying mental framework, helping understand both the static and the dynamic points of view towards Enterprise Architecture. Despite some of the relevant criticism that has been presented towards the practical value of systems thinking as an explainer for the Enterprise Architecture practice, the relevance of the systems approaches can be justified by the fact that they have evidently been an important means of sensemaking in the context of Enterprise Architecture, shaping the Enterprise Architecture practitioners' thinking about both the static and dynamic aspects of Enterprise Architecture as discussed above. The scope of *Enterprise Architecture thinking*, a notion central to this study, should therefore cover both 1) what subsystems are considered to be a part of the system of systems that is referred to as the "enterprise" and 2) what are considered to be the mechanisms that are used to control this system and its subsystems, and should be considered as a part of the "enterprise architecting" activity.

2.3 Enterprise Architecture schools of thought

The discussions related to the definitions and the theoretical underpinnings related to Enterprise Architecture in the previous subsections are a clear manifestation of the ambiguous nature of the Enterprise Architecture practice and the overall maturity of the discipline. In order to further structure the discussion of Enterprise Architecture thinking, we can apply some of the prior literature on various Enterprise Architecture traditions and schools of thought that have been proposed. These ideal schools of thought can be seen as a useful tool for further investigation as they comprise certain underlying premises that have shaped our thinking about Enterprise Architecture and therefore guided the development of both Enterprise Architecture theory and practice.

Addressing the issues discussed above, Lapalme (2012, p. 37-38) proposes a classification of *Enterprise Architecture schools of thought* based on a review of some Enterprise Architecture literature, arguing that "the belief systems underlying these schools of thought are at the heart of a number of challenges, such as fragmentation and misunderstanding, in the EA community because they are often implicitly held by people but not often explicitly discussed". The schools of thought have different sets of concerns and assumptions behind them, reflecting directly on the approaches they take to Enterprise Architecture thinking in terms of its scope, purpose and other fundamental aspects. Adopting a systems approach, they can be seen as having different stances to 1) what they consider as the "enterprise", the system of systems that is the object of the Enterprise Architecture practice as well as 2) what they consider as the purpose of

various activities taking place as a part of the Enterprise Architecture practice, aimed at managing the enterprise system and its sub-systems.

The three ideal Enterprise Architecture schools of thought proposed by Lapalme (2012, p. 39) are the Enterprise IT Architecting School (EITA), the Enterprise Integrating School (EI) and the Enterprise Ecological Adaptation School (EEA). The EITA school of thought views Enterprise Architecture from the perspective of aligning the IT assets of the enterprise with the business in order to achieve effective business strategy execution and operations, often referred to as "creating the glue between business and IT". Having strong roots in the practices of software engineering, it applies a reductionist approach with a special focus placed on the IT aspects of Enterprise Architecture. The EI school of thought views Enterprise Architecture from the perspective of creating the link between the business strategy and its execution by "designing all the facets of the enterprise with the goal of maximizing their overall coherency". Having its grounding in systems thinking, it attempts to apply a holistic approach that would equally take into account the various aspects of Enterprise Architecture. The EEA school of thought views Enterprise Architecture from the perspective of fostering organisational learning by "designing all the facets of the enterprise as well as its relationship to its environment to enable innovation and enterprise-in-environment adaption". Having its grounding in systems-in-environment thinking, it expands the holistic approach further by considering the surrounding environment not only as a context that needs to be understood and managed, but as something that is a part of and within the influence of Enterprise Architecture. The primary scopes and purposes of the Enterprise Architecture schools of thought are described in more detail in Table 2.

Each of the Enterprise Architecture schools of thought seems to build on the preceding one by adding more context, expanding the scope of consideration and thus creating a more complete picture of the whole. Lapalme (2012, p. 42) stresses, however, that the broader schools of thought not only encompass the narrower ones as subsets, but transcend them as there are "fundamental differences in the assumptions and values of the schools". The key difference between the schools of thought lies in whether their approach is inherently reductionist or holistic (EITA vs. EI), as well as in their stance to whether they view the environment as something that is a given or something that can be influenced by the Enterprise Architecture practice (EI vs. EEA). It is also noteworthy that Lapalme (2012) doesn't claim that all the various views on Enterprise Architecture should fit perfectly into a single ideal school of thought, but rather that they tend to gravitate towards one. Understanding the various underlying objectives, concerns, principles and assumptions behind the approach taken to Enterprise Architecture is essential in facilitating relevant discussion on the differences in Enterprise Architecture thinking. A more detailed discussion on the schools of thought is continued in section 3.

TABLE 2 Three Enterprise Architecture schools of thought (adapted from Lapalme, 2012, p. 38)

School of thought	Scope	Purpose
Enterprise IT Architecting School	Enterprise wide IT platform; all components (software, hardware, etc.) of the enterprise IT assets	Effective enterprise strategy execution and operation through IT-business alignment; the purpose is to enhance business strategy execution and operations; the primary means to this end is the alignment of the business and IT strategies so that the proper IT capabilities are developed to support current and future business needs
Enterprise Integrating School	Enterprise; the enterprise as a socio-cultural and techno-economic system; hence all the facets of the enterprise are considered, the enterprise IT assets being one facet	Effective enterprise strategy implementation through execution coherency; the purpose is effective enterprise strategy implement; the primary means to this end is designing the various facets of the enterprise (governance structures, IT capabilities, remuneration policies, work design, etc.) to maximize coherency between them and minimize contradictions
Enterprise Ecological Adaptation School	Enterprise-in-environment; includes the previous scope but adds the environment of the enterprise as a key component as well as the bidirectional relationship and transactions between the latter and its environment	Innovation and adaptation through organizational learning; the purpose is organizational innovation and adaptation; the primary means is the fostering of organizational learning by designing the various facets of the enterprise (governance structures, IT capabilities, remuneration policies, work design, etc.) as to maximize organizational learning throughout the enterprise

2.4 Enterprise Architecture frameworks

There are several *Enterprise Architecture frameworks* available that can be considered as key bodies of knowledge guiding the practical implementation of the organisations' Enterprise Architecture practices. Studying Enterprise Architecture frameworks can be relevant as they can be assumed to act as bridges between the Enterprise Architecture theory and its practical application in organisations and their various management practices. As there is a variety of Enterprise Architecture frameworks developed over time, stemming from

slightly different traditions and serving slightly different purposes, it could be useful to spend some time discussing these frameworks and their contributions towards the discussion of Enterprise Architecture scoping.

Franke et al. (2009, p. 327) identify the heterogeneous nature of Enterprise Architecture frameworks, noting that "the contents of present enterprise architecture frameworks - - differ substantially". In the context of Enterprise Architecture, they define a framework as a "a conceptual structure of what an EA should contain and how to create it, i.e. a set of models, principles, approaches, standards and visualizations that guide the development of enterprise architectures". They proceed to extract common features from a set of widely adopted Enterprise Architecture frameworks and consolidate these features into a model that they call the Enterprise Architecture Framework Framework (EAF^2). The EAF^2 recognises two main framework components, which are architecture governance and modeling concepts, components which can also be seen as analogous to the dynamic and the static perspective of Enterprise Architecture as discussed earlier. Similar conclusions can be made based on the results presented by Bui (2017), who identifies eight essential elements for the evaluation of Enterprise Architecture frameworks.

Cameron and McMillan (2013, p. 60) conduct a survey, analysing the current trends in the adoption of various Enterprise Architecture frameworks in real-life organisations. According to them, the growing number of Enterprise Architecture frameworks available "has led to an increasing challenge within organizations to develop a process for selecting the correct framework that best fits their unique needs, culture, and goals". Investigating the Enterprise Architecture practitioners' motives in the selection of Enterprise Architecture frameworks for their specific organisations, the authors observe a variety of approaches, applying some kind of a hybrid Enterprise Architecture framework being the most popular choice made by many of the organisations. Some of the most popular Enterprise Architecture frameworks the organisations were getting inspiration from included TOGAF, Zachman, Gartner, FEAF and DoDAF. The study concludes that the individual strengths of each popular framework were utilised in the hybrid approach. This is aligned with Franke et al. (2009) and Bui (2017), who note that each framework only covers a limited set of Enterprise Architecture perspectives. Kotusev (2016) in turn provides a more critical voice by discussing value realisation issues related to some of the popular Enterprise Architecture frameworks in the past, claiming that a successful Enterprise Architecture practice doesn't necessarily relate to the application of these frameworks in the first place.

Although not typically considered as stand-alone Enterprise Architecture frameworks, various Enterprise Architecture visualisation and modeling methodologies tend to play a big role in providing a metamodel for discussing the various components and viewpoints of the Enterprise Architecture structure. For this reason, for example Franke et al. (2009) considers the ArchiMate modeling language in their investigation of Enterprise Architecture frameworks despite it not including any architecture governance components. Zhou et al.

(2020) have performed an extensive literature review on Enterprise Architecture visualisation methodologies. Their results indicate ArchiMate as currently being both the most powerful language in its expressiveness as well as the most widely used language in the industry. For example, Jonkers et al. (2011, p. 294) discuss the application of the ArchiMate modeling language together with the architecture development and implementation cycle of the TOGAF framework, providing "an integrated architectural approach by which organizations can describe and visualize different architecture domains, as well as their underlying relationships and dependencies".

In the context of the Finnish organisations, especially the Finnish public sector, it might be useful to extend the investigation of Enterprise Architecture frameworks to the official Finnish public administration recommendation JHS 179 Enterprise architecture planning and development, which has in many ways been inspired by the TOGAF framework (Julkisen hallinnon tietohallinnon neuvottelukunta, 2017). The recommendation was made especially relevant by the fact that applying an Enterprise Architecture method in the Finnish public administration became mandatory by national law in 2011 (Laki julkisen hallinnon tietohallinnon ohjauksesta, 634/2011). Although later replaced by some updated legislation in which the reference to the use of the Enterprise Architecture method has become less explicit and more implicit (Laki julkisen hallinnon tiedonhallinnasta, 906/2019), the recommendation is still available and widely in use in Enterprise Architecture work in the context of public administration (Digi- ja väestötietovirasto, 2020). In the context of the public sector in the United States, especially FEAF and DoDAF seem to have similar roles as authoritative frameworks (Cameron & McMillan, 2013).

Based on the investigation of the current state Enterprise Architecture frameworks, it can be concluded that while there is a plethora of frameworks available, their adaptation in organisations' real-life Enterprise Architecture practices can be seen as being in the process of consolidating around the so-called industry standard frameworks, namely TOGAF for Enterprise Architecture processes, ArchiMate for Enterprise Architecture modeling and sometimes Zachman for Enterprise Architecture ontology. Both the TOGAF framework (The Open Group, 2018a) and the ArchiMate language (The Open Group, 2019) have been standards maintained by The Open Group since 1995 and 2008, respectively. The Zachman Framework (Zachman International, Inc., 2008) is based on the seminal work by John A. Zachman (Zachman, 1987) and can be seen as having been a strong influencer in the development of the Enterprise Architecture discipline, still providing a certain ontological backbone to the practitioners' thinking. In a local context, national frameworks such as the Finnish public sector's recommendation JHS 179 (Julkisen hallinnon tietohallinnon neuvottelukunta, 2017) can also be seen as relevant. The frameworks deemed as the most interesting in the context of this study are presented in Table 3.

TABLE 3 Enterprise Architecture frameworks relevant to the study

Framework	**Main focus**	**Justification of the relevance**
TOGAF (The Open Group, 2018a)	Architecture Development Method (ADM), Content Metamodel	Most comprehensive and widely adopted "industry standard" Enterprise Architecture framework
ArchiMate (The Open Group, 2019)	Modeling language	Most expressive and widely adopted "industry standard" Enterprise Architecture visualisation language
Recommendation JHS 179 (Julkisen hallinnon tietohallinnon neuvottelukunta, 2017)	National recommendation for public administration	Influential in guiding the setup of the Enterprise Architecture practice in the Finnish public sector

2.5 Enterprise Architecture dimensions

When discussing the scope of Enterprise Architecture, a key issue is recognising the various *Enterprise Architecture dimensions* that are considered as being a part of the holistic Enterprise Architecture. A typical concept in describing these dimensions is a set of architecture layers, architecture domains or architecture views, depending on the terminology used in each case. Enterprise Architecture dimensions are concerned with a distinctive set of architectural perspectives or components (or, aligned with the systems approach, sub-systems or sub-architectures) that describe specific types of assets that are somehow relevant to and involved in the holistic Enterprise Architecture. While the dimensions have been discussed and compared by several authors in the prior literature, there seems to be no single model that would be universally accepted in the discipline when describing the dimensions.

Iyer and Gottlieb (2004) propose a four-domain Enterprise Architecture consisting of the process domain, the organisation domain, the information domain and the infrastructure domain. Winter and Fischer (2006) identify Enterprise Architecture layers as the business architecture layer, the process architecture layer, the integration architecture layer, the software architecture layer and the technology architecture layer. Hirvonen and Pulkkinen (2004) and Pulkkinen (2006) discuss Enterprise Architecture dimensions as being the business architecture dimension, the information architecture dimension, the systems architecture dimension and the technology architecture dimension. Typically drawing from some of the commonly recognised Enterprise Architecture frameworks such as the Zachman Framework (Iyer & Gottlieb, 2004), TOGAF

(Winter & Fischer, 2006; Hirvonen & Pulkkinen, 2004; Pulkkinen, 2006), FEAF (Winter & Fischer, 2006) and ARIS (Winter & Fischer, 2006), the earlier work has not, however, resulted in a clear agreement on what terminology should be used when referring to the various perspectives or especially which elements of the enterprise should be specifically considered as parts of each dimension.

The ambiguity described above can be argued to be in line with the overall terminological ambiguity within the Enterprise Architecture discipline. It is also something that can make it significantly more difficult to discuss the scope of Enterprise Architecture thinking as the scope may remain unclear not only in terms of which Enterprise Architecture dimensions should be included, but also which Enterprise Architecture entities or elements should be included in each of these dimensions. The consolidation that can be seen occurring in the adoption of Enterprise Architecture frameworks towards a few widely recognised industry standard frameworks can be seen as a potential enabler for a more unified terminology. For the purpose of this study, we draw from some of the popular Enterprise Architecture frameworks discussed in the previous section, namely TOGAF, ArchiMate and JHS 179. Their stances on various Enterprise Architecture dimensions are compared in Table 4.

TABLE 4 Enterprise Architecture dimensions according to some popular frameworks

Framework	**Dimensions (and sub-dimensions) recognised**
TOGAF's Content Metamodel (The Open Group, 2018b)	• Architecture principles, vision and requirements (preliminary, vision, requirements) • Business Architecture (motivation, organisation, behavior) • Information Systems Architecture (data, application) • Technology Architecture • Architecture realization (opportunities, solutions and migration planning, implementation governance)
ArchiMate's layers (The Open Group, 2019)	• Motivation • Strategy • Business • Application • Technology • Physical • Implementation and migration
JHS 179's framework of architectural content (Julkisen hallinnon tietohallinnon neuvottelukunta, 2017)	• Principles, vision and requirements (preliminary, vision, development requirements) • Architecture structures (business architecture, information architecture, information systems architecture, technology architecture) • Architecture implementation (solutions and migration)

2.6 Enterprise Architecture function, roles and processes

Just like there is a discussion of which structural aspects of an enterprise should constitute the holistic Enterprise Architecture, there is a discussion of what activities an enterprise should undertake as a part of its Enterprise Architecture practice and how these activities should be organised together into a functional entity as a part of the organisational structure. The *Enterprise Architecture function, roles and processes* have therefore also been a subject of interest in the field of Enterprise Architecture. While there is a level of understanding of some of the typical responsibilities that are often being associated with the Enterprise Architecture practice, no universally accepted model exists that would prescribe what Enterprise Architecture should be as an activity.

Raadt and Vliet (2008) study the design of the Enterprise Architecture function, identifying its main responsibilities as Enterprise Architecture decision making, Enterprise Architecture delivery and Enterprise Architecture conformance, as well as proposing a set of Enterprise Architecture bodies and roles needed to fulfill these responsibilities. The role of the Enterprise Architect is studied by Strano and Rehmani (2007), who identify several functional roles for the Enterprise Architect along with their interfaces with other organisational roles, also suggesting some potential organisational positionings for the role as well as competences required to succeed in the role. Gøtze (2013) continues the discussion by examining the changing role of the Enterprise Architect in a modern Enterprise Architecture practice. Kotusev et al. (2015) study the diversity of Enterprise Architecture management approaches presented in literature, consolidating them into three main approaches they name as the traditional stepwise approach, the direction-setting approach and the just-enough, just-in-time approach. They also propose a classification of approaches on an axis from rigid and heavyweight to flexible and lightweight.

In the earlier work, Pulkkinen and Hirvonen (2005) as well as Pulkkinen (2006) have studied Enterprise Architecture management processes based on both academic literature and popular frameworks and proposed a generic Enterprise Architecture planning and development process model, building on the idea of iterating over four architectural dimensions (business architecture, information architecture, information systems architecture and technology architecture) and three architectural levels of abstraction (starting from the enterprise level and continuing down to the domain and the system level). Buckl, Matthes and Schweda (2010, p. 53) adapt the viable system model in studying the activities that are typically involved in organisations' Enterprise Architecture functions, classifying them as "develop and describe" (developing and describing the target, the current and the planned architecture, "communicate and enact" (enforcing the architectural plans in the organisation's management functions), "analyze and evaluate" (comparing architectural options as a basis for decision making) and "configure and adapt" (managing and developing the Enterprise Architecture function itself).

Much like with the Enterprise Architecture dimensions, the plethora of approaches available makes the activities that should be considered as a part of the Enterprise Architecture practice somewhat ambiguous and something that could be greatly affected by the scope of an individual organisation's Enterprise Architecture thinking. From the discussions above, it can be concluded that no single configuration of the Enterprise Architecture practice exists that would be widely accepted, and that there are several approaches that can be taken that may affect both the Enterprise Architecture activities and the ways in which they are designed, implemented, executed and integrated into the organisations' management practices. For the purpose of this study, we proceed to draw from some of the popular Enterprise Architecture frameworks discussed in the previous section, namely TOGAF and JHS 179, which share many of the activities, but differ in their approach to how they are structured. Their stances on various Enterprise Architecture processes are compared in Table 5.

TABLE 5 Enterprise Architecture processes according to some popular frameworks

Framework	**Phases (and some key sub-phases) recognised**
TOGAF's Architecture Development Model (The Open Group, 2018c)	• Preliminary • Architecture vision • Business Architecture (select reference models, viewpoints and tools; develop baseline architecture description; develop target architecture description; perform gap analysis; define candidate roadmap components; resolve impacts across the architecture landscape; conduct formal stakeholder review; finalize the architecture; create the architecture definition document) • Information Systems Architecture (same as above) • Technology Architecture (same as above) • Opportunities and solutions • Migration planning • Implementation governance • Architecture change management • Requirements management
JHS 179's architecture planning process (Julkisen hallinnon tietohallinnon neuvottelukunta, 2017)	• Preparations for architecture planning • Definition of architecture vision • Architecture current state analysis (business architecture, information architecture, information systems architecture, technology architecture) • Architecture target state planning (same as above) • Execution planning

2.7 Enterprise Architecture capabilities and applications

The traditional view of Enterprise Architecture as an object or as an activity can be seen as limited as neither of these perspectives create intrinsic value by themselves. It can be argued that the value realisation of the Enterprise Architecture practice only happens due to the emergence of *Enterprise Architecture capabilities* that have relevant *applications* when integrated as a part of the organisations' management processes. Korhonen and Molnar (2014, p. 175) discuss Enterprise Architecture specifically as a strategic capability which "pertains to the strategic application of competencies to organize and utilize the organization-specific resources towards desired ends" and which is especially relevant on the managerial level of the organisation, claimed to create "the link between strategy and execution". The idea of Enterprise Architecture as a capability is also strongly present in Korhonen et al. (2016, p. 278), who suggest the need for a tight integration of Enterprise Architecture capabilities with other managerial capabilities of the organisation, such as "upstream adaptive strategic management capability and downstream project management and operations management capabilities". As organisations differ in how they utilise Enterprise Architecture, it seems appropriate to include the discussion of capabilities and applications in the discussion of the Enterprise Architecture scoping. Some further views on the various Enterprise Architecture capabilities and their organisational applications are presented in the following.

Buckl, Matthes and Schweda (2009, p. 1484) discuss Enterprise Architecture management from a viable system perspective. They highlight that while the concern of Enterprise Architecture is "the holistic and integrated management" of various enterprise concepts, it is not an all-embracing management function, but should rather "integrate with the existing enterprise-level management functions and to act as a 'glue' between the processes to conjointly manage and develop the EA towards aligned business and IT". Functions that are typically seen as integrating with Enterprise Architecture management "via the exchange and provision of information" include for example strategy and goals management, project portfolio management, demand management, project life cycle, synchronization management and IT architecture management. The viable system model is further used in describing the enterprise as a system consisting of five interacting subsystems of different levels. The role of Enterprise Architecture management is then discussed in relation to the five system levels – operation (the primary activities of the enterprise-level management functions mentioned above), coordination (the information channels and bodies ensuring that the primary activities are working together in a coordinated manner), control (the structures and controls establishing the responsibilities and rights to maintain the resource allocation of the operating system), planning (the holistic and future-oriented activities to support strategic decision making) and identity (the steering of the overall direction, values and purpose of the system, addressing for example the scope of Enterprise Architecture manage-

ment itself). Overall, the viable system perspective brings out the multifaceted, multi-level nature of Enterprise Architecture capabilities.

Radeke (2011, p. 497) studies the role of Enterprise Architecture management specifically in the context of strategic change. He presents Enterprise Architecture management as "a mean to arrive at organizational forms that allow for timely reconfiguration and to guide strategy-aligned change", especially in response to rapidly changing environments in which modern organisations tend to operate. Applying a process approach to strategic change, the study then proceeds to investigate the ways in which Enterprise Architecture management can support organisations in managing the strategic change, identifying a number of Enterprise Architecture management practices that contribute to the phases of strategy planning (including strategy formulation and strategic planning – aiming to elaborate, evaluate and select strategic options) and strategy implementation (including operative planning as well as monitoring and evaluation – aiming to adapt and install the required organisational structures and processes in order to meet the strategy). The results indicate that Enterprise Architecture management is able to contribute positively to the organisation's strategic change capability, both by affecting the organisation's ability to effectively implement strategic change (via enhanced strategic fit and business-IT alignment) and by influencing the organisation's overall preparedness for change (through increased standardisation and modularisation of the architecture). This suggests a clear need for integrating Enterprise Architecture activities in organisations' strategic management processes.

Enterprise Architecture based capabilities seems to be an emerging topic in the recent Enterprise Architecture research. A good synthesis is provided by van de Wetering (2019, p. 221-223), who studies Enterprise Architecture based capabilities, adopting the dynamic capabilities perspective as discussed previously by Abraham, Air and Winter (2012). He attempts to conceptualise Enterprise Architecture based capabilities to uncover "the core areas in which organizations should infuse EA". The study makes a specific distinction between Enterprise Architecture capabilities (typically referring to "an organisation's ability to create and maintain Enterprise Architecture content") and Enterprise Architecture based capabilities (focusing on "the usage, deployment, and diffusion of EA in decision making processes, and the organizational routines that drive IT and business capabilities"). Referring to dynamic capabilities as "organizations' ability to integrate, build, and reconfigure internal and external competences", the purpose of the study is "the development of unique competencies and capabilities that can leverage EA assets and resources". As a synthesis, dynamic Enterprise Architecture capabilities are further defined as "an organization's ability to leverage its EA for asset sharing and recomposing and renewal of organizational resources, together with guidance to proactively address the rapidly changing internal and external business environment and achieve the organization's desirable state". The study identifies three distinct, high-level Enterprise Architecture based capabilities – including the EA sensing capability, the EA mobilising capability and the EA transformation capability. These capa-

bilities are aimed at identifying, selecting and acting on various needs for change, respectively. Further research on the topic also seems to suggest that the Enterprise Architecture based dynamic capabilities may have a significant relationship with the benefit realisation mechanisms of an organisation's Enterprise Architecture practice (van de Wetering, 2020).

2.8 Enterprise Architecture adaptivity and agility

A specific theme emerging in the Enterprise Architecture literature for some time now has been the need for *adaptivity and agility* in Enterprise Architecture (Gampfer et al., 2018). The ability of adapting to a fast-paced, constantly changing environment in an agile way can be seen as one of the major challenges faced by most organisations today, both in private and public sectors. As Enterprise Architecture based capabilities can support the organisation in becoming more adaptive and agile on the enterprise level, tackling this challenge is something that should belong to the agenda of Enterprise Architecture, as well. Simultaneously, the Enterprise Architecture practice itself also needs to be able respond to the requirements of adaptivity and agility in how it is designed to operate internally. These requirements are also bound to affect the scope of the Enterprise Architecture practice.

The increasing demand for adaptivity in the context of Enterprise Architecture is discussed by several authors, such as Lapalme et al. (2016) and Korhonen et al. (2016). Lapalme et al. (2016, p. 108) explore the future trends of Enterprise Architecture, identifying three Enterprise Architecture grand challenges. The increasing complexity and uncertainty are calling for a "shift of intent - - from 'designing in order to define an optimal solution' to 'designing in order to build capacity within the system to constantly adapt'". The organisations are affected by new realities, such as the shifting values or the emergence of completely new kinds of organisational setups. The evolving Enterprise Architecture practice needs to be able to respond to these challenges by challenging, rethinking and redefining certain underlying assumptions about both what Enterprise Architecture is and how it is done. Korhonen et al. (2016, p. 280) continue on this note by calling for a reconceptualisation of Enterprise Architecture specifically in order to meet the requirements of adaptivity. The authors present several views on what an adaptive Enterprise Architecture practice would entail, especially highlighting the importance of enterprise-in-environment thinking, in line with the Enterprise Ecological Adaptation school of thought by Lapalme (2012). They conceptualise Adaptive Enterprise Architecture as 1) "an ongoing process supporting organizational coherence vis-à-vis continuous coevolution with the environment", 2) "a shared competency and embedded concern" and 3) something "concerned with enacting adaptive change not only in the focal enterprise, but also in the environment it is embedded in".

Studying the relationship between Enterprise Architecture and the organisations' adaptive capabilities, Abraham et al. (2012, p. 114-115) discuss how En-

terprise Architecture management can support different types of organisational change activities, both ones that are proactively planned and those that are improvised in a more reactive nature. According to them, Enterprise Architecture management can be configured to support various "first-order capabilities", a set of reconfiguration capabilities that can be used by the organisation in order to effectively change the "zero-order capabilities", which are needed by the organisation's daily operations. With a majority of literature on the adaptive capabilities of Enterprise Architecture being conceptual in nature, Fallmyr and Bygstad (2014) provide an empirical account of the connection between the Enterprise Architecture practice and organisational agility. They find reasonable support for a claim that Enterprise Architecture can positively affect organisational agility specifically by improving the organisations' sensing and responding capabilities. They identify two distinct paths from the Enterprise Architecture practice to organisational agility, one being evolutionary learning (characterised by local Enterprise Architecture related initiatives), and top-down design (characterised by holistic Enterprise Architecture governance). The maturity of the organisation's Enterprise Architecture practice also seems to have an effect on the realisation of these capabilities.

The fast-paced environment also sets new kinds of requirements towards the Enterprise Architecture practice itself. An increasing amount of agility and a shift away from traditional waterfall-based approaches is demanded. The issue of how agility can be incorporated in organisations' Enterprise Architecture practices has been discussed by several authors. Hauder et al. (2014) study the application of agile principles in organisations' Enterprise Management practices, mostly borrowing from the field of software development in which they have initially emerged. Gill (2015, p. 1-2) discusses the conflict that may exist between Enterprise Architecture and individual development projects which follow agile principles, but often end up overlooking the strategic Enterprise Architecture issues. In contrast to traditional Enterprise Architecture, agile Enterprise Architecture is defined as "responsive (scans, senses and reacts appropriately to changes), flexible (adapts to changes), speedy (accommodates changes rapidly), lean (focuses on reducing waste and cost without compromising quality) and learning (focuses on enterprise fitness, improvement, transformation and innovation)". To address these issues, he proposes an "integrated adaptive Enterprise Architecture driven agile development approach" which employs a solution architecture level as a glue between the high-level Enterprise Architecture (enforced top-down) and the continuous Enterprise Architecture evolvement (emerging bottom-up within the agile development cycle). In the context of the Finnish public sector, Hosiaisluoma et al. (2018, p. 86-87) propose a Lean Enterprise Architecture Development method as a response to the Finnish public administration's Enterprise Architecture method being criticised as being rigid and resource-heavy when used in full scale. Adapting some principles from lean management and agile methodologies, they discuss a shift from traditional Enterprise Architecture methods associated with excessive planning and modeling towards agile Enterprise Architecture that can "address

the challenge of an unpredictable world by relying on people and their creativity instead of planned processes". The main difference compared to traditional Enterprise Architecture approaches is the tight integration of Enterprise Architecture work into the holistic enterprise development, reducing the alleged disconnectedness of Enterprise Architecture work.

Kotusev (2020b) provides a critical discussion on the meaning of agility in the context of Enterprise Architecture, highlighting that the polarisation between the two extremes can be harmful. While the traditional Enterprise Architecture approaches are often presented as too rigid and the agile Enterprise Architecture approaches are currently being inflated with large expectations, contextual factors need to be taken into account in selecting the appropriate level of agility for Enterprise Architecture practices in each organisation. Agility can be seen as a multidimensional phenomenon concerning various practices within an organisation. It should therefore not be seen as a binary, but rather as a spectrum. Although there is a risk of oversimplification, it could be argued that organisations operating in more stable environments may find the "rigid" end of the spectrum appropriate, while organisations operating in more dynamic environments will benefit more from the "agile" end of the spectrum.

2.9 Enterprise Architecture benefits and success factors

The end goal of any management practice should be acquiring some kind of an added value for the organisation. The Enterprise Architecture practice is not an exception as it is expected to bring the organisation certain benefits in order to justify the investment involved in setting up and developing the associated Enterprise Architecture capabilities. Another topic closely related to the *Enterprise Architecture benefits* is the study of various *Enterprise Architecture success factors* required by the Enterprise Architecture practice to deliver on its promises. The impact perspective of the Enterprise Architecture practice has understandably received a good amount of attention in the prior literature and can be considered one of the more saturated areas of Enterprise Architecture research, with both Enterprise Architecture benefits and success factors being still actively studied (Kotusev, 2017). As the goals of the Enterprise Architecture practice should be aligned with the ambition level and the level of investment the organisation is able make into it, both of these topics can be argued to be relevant when discussing the Enterprise Architecture scoping.

Niemi (2006) provides one of the earlier views on Enterprise Architecture benefits in his extensive study of the literature as well as the practitioners' perceptions of the topic. In response to the lack of systematic classification of Enterprise Architecture benefits in the prior literature, he proposes the tentative categories of hard, intangible, indirect and strategic Enterprise Architecture benefits. Further, he identifies several challenges in the examination of Enterprise Architecture benefits. For example, many overlapping benefits have been proposed by the literature with no insight provided on how the benefits might

interrelate, there is a large number of indirect and strategic benefits that are hard to attribute directly to the Enterprise Architecture practice and there are no clear measurement criteria associated with many of the benefits.

Recognising the need for a more systematic investigation of Enterprise Architecture benefits and benefit realisation mechanisms, Tamm et al. (2011) provide a synthesis of Enterprise Architecture benefits claims presented in prior literature, while also attempting to provide a theoretical explanation for how Enterprise Architecture may lead to organisational benefits. As a result of their study, they end up presenting what they call the Enterprise Architecture Benefits Model (EABM), suggesting several benefit enablers mediating between the quality of the organisation's Enterprise Architecture practices and the organisational benefits made possible by Enterprise Architecture. The authors identify two main types of Enterprise Architecture benefits – benefits that are acquired directly from the Enterprise Architecture practice itself and benefits acquired as a result of enacting the plans created with the help of various Enterprise Architecture planning processes. Further, four distinct benefit enablers are identified, including organisational alignment, information availability, resource portfolio optimisation and resource complementarity.

Success factors is a topic closely associated with Enterprise Architecture benefits as these factors can be considered important contextual issues affecting Enterprise Architecture benefit realisation. Based on a literature review and a focus group discussion with Enterprise Architecture practitioners, Ylimäki (2006) proposes a set of critical Enterprise Architecture success factors. The identified success factors include scoping and purpose, communication and common language, business driven approach, commitment, governance, development methodology and tool support, EA models and artifacts, project and program management, skilled team, training and education, organisational culture, IT investment and acquisition strategies as well as assessment and evaluation. Lange, Mendling and Recker (2012a) proceed to propose a theoretical model of Enterprise Architecture success factors and their mediating role between Enterprise Architecture practices and organisational benefits. Adapting the classic DeLone and McLean IS success model in the context of Enterprise Architecture, they identify four Enterprise Architecture characteristics (EA product quality, EA function setup quality, EA service quality and EA cultural aspects) that are leading to Enterprise Architecture user satisfaction, intended and actual use of Enterprise Architecture and ultimately Enterprise Architecture's net benefits. Further work by Lange, Mendling and Recker (2012b, 2012c, 2016) attempts an empirical validation of the Enterprise Architecture benefit realisation model, also making certain refinements to the model as a result.

Several other studies have been published on the topic of Enterprise Architecture benefits and success factors. Plessius, Slot and Pruijt (2012) propose an Enterprise Architecture value framework to enable the classification of Enterprise Architecture benefits created in various lifecycle phases. Weiss, Aier and Winter (2013) study factors affecting the institutionalisation and the subsequent effectiveness of Enterprise Architecture management practices within the

organisations, identifying seven institutional factors as predictors for a successful institutionalisation of Enterprise Architecture management, yielding organisational benefits via a more positive response towards Enterprise Architecture management and an increased Enterprise Architecture consistency. Foorthuis et al. (2016) discuss how an organisation's EA approach (the configuration of Enterprise Architecture practices), project compliance with EA, architectural insight and EA-induced capabilities are interrelated and contribute to the performance of individual projects within an organisation and the performance of the organisation as a whole. Niemi and Pekkola (2016, 2020) proceed to consolidate some of the previous models of Enterprise Architecture benefit realisation presented in the literature, proposing their own consolidated model and validating this model empirically using a set of case studies. Jusuf and Kurnia (2017) also attempt to consolidate the research on Enterprise Architecture benefits and success factors, arriving at a model for their categorisation. Kurnia et al. (2020) additionally study various benefits and blockers associated with specific Enterprise Architecture related activities and artifacts.

A recent stream of research in the area of Enterprise Architecture benefits and success factors has been emerging with a specific focus on Enterprise Architecture capabilities. Shanks et al. (2020) study the relationship between Enterprise Architecture advisory services and organisational benefits, highlighting the importance of Enterprise Architecture service capabilities and dynamic capabilities acquired as a result of applying Enterprise Architecture in business and IT driven changes. Continuing his investigation of Enterprise Architecture based capabilities, van de Wetering (2020) studies how dynamic Enterprise Architecture capabilities can lead to organisational benefits via an increased level of process innovation and business-IT alignment. Further, van de Wetering, Kurnia and Kotusev (2020) extend this model to cover how Enterprise Architecture deployment practices contribute towards the development of dynamic capabilities. Ahlemann, Legner and Lux (2021) apply a resource-based theory approach to study the value generation mechanisms of Enterprise Architecture management, suggesting that an organisation's Enterprise Architecture management resources (human, technological and intangible resources) lead to Enterprise Architecture management capabilities (EA planning, EA implementation EA modeling and EA governance), which in turn lead to increased information system capabilities and ultimately organisational performance.

2.10 Enterprise Architecture maturity

An organisation's Enterprise Architecture practice is likely to be subject for change, evolution and improvement over time, driven by the process of organisational learning. *Enterprise Architecture maturity* assessment can be a useful tool in studying the state of the Enterprise Architecture practice in its various lifecycle stages. Meyer, Helfert and O'Brien (2011, p. 167) state that "the evolvement of EA is best captured by employing a maturity model which

indicates the status quo of the EA and provides a means of further improving this evolvement" and proceed to analyse several popular Enterprise Architecture maturity frameworks comparing their scopes and characteristics. The maturity can be argued as having a relationship with the Enterprise Architecture scoping as several scope-related issues can be found as elements of evaluation in many of the maturity models. A general perception is that the more mature the Enterprise Architecture practice is, the more extensive the scope would be in terms of how well Enterprise Architecture is aligned with and being integrated as a part of various organisational practices. Carugati et al. (2020) also discuss the relationship between the evolution of Enterprise Architecture maturity and the perceived organisational benefits.

Lakhrouit and Baïna (2013) differentiate between three types of Enterprise Architecture maturity models as staged, continuous and focused, discussing their typical characteristics in terms of maturity levels, indicators and elements of evaluation deployed. A good representation of these various types of maturity models can be achieved by studying one model of each of the mentioned categories. The *Capability Maturity Model (CMM)*, initially developed in the 1980s in the context of evaluating software development process maturity, has been a starting point for several maturity models since. It is an example of a staged model, having five distinct maturity levels involving a number of indicators that need to be met in order to reach a certain level of maturity in terms of various elements of evaluation (Lakhrouit & Baïna, 2013). Various CMM derivatives are also referenced by some of the popular Enterprise Architecture frameworks, such as with TOGAF featuring the Architecture Capability Maturity Model (ACMM) developed for the US government (The Open Group, 2018d) and JHS 179 featuring a proprietary CMM based Enterprise Architecture maturity model (Valtiovarainministeriö, 2012). The NASCIO *Enterprise Architecture Maturity Model (EAMM)* was also developed in the government context, but can be used for evaluating Enterprise Architecture practices in more generic contexts as well (National Association of State Chief Information Officers, 2003). It is an example of a continuous model, also having five distinct maturity levels like the staged models, but in which reaching a certain maturity level requires the fulfillment of all other previous levels (Lakhrouit & Baïna, 2013). The *Dynamic Architecture Maturity Matrix (DyAMM)* was developed as a balanced approach for evaluating and developing the maturity of an organisation's Enterprise Architecture practice, featuring the most comprehensive list of evaluation elements (Steenbergen, van den Berg & Brinkkemper, 2007). It is an example of a focus model in which each indicator has its own specific level of maturity, with the overall maturity expressed as a combination of the individual indicators (Lakhrouit & Baïna, 2013). A summary of various Enterprise Architecture maturity models is presented in Table 6.

TABLE 6 Enterprise Architecture maturity models

Model	Levels of maturity	Elements of evaluation
ACMM	0) None 1) Initial 2) Under development 3) Defined 4) Manage 5) Measured	Architecture process, architecture development, business linkage, senior management involvement, operating unit participation, architecture communication, IT security, architecture governance, IT investment and acquisition strategy
JHKA	1) Unmanaged 2) Partial 3) Defined 4) Managed 5) Strategic	Description, method, management processes, development and implementation, organisation, competence, support for substance activities, architectural coherence
EAMM	0) No program 1) Informal program 2) Repeatable program 3) Well-defined program, 4) Managed program 5) Continuously improving vital program	Administration, planning, framework, blueprint, communication, compliance, integration, involvement
DyAMM	Maturity of each indicator evaluated according to levels defined for each indicator	Development of architecture, use of architecture, alignment with business, alignment with the development process, alignment with operations, relationship to the as-is-state, roles and responsibilities, coordination of developments, monitoring, quality management, maintenance of the architectural process, maintenance of the architectural deliverables, commitment and motivation, architectural roles and training, use of an architectural method, consultation, architectural tools, budgeting and planning

2.11 Enterprise Architecture contextual and contingency factors

As with any organisational practice, the Enterprise Architecture practice does not exist in a void, but always occurs in a certain organisational context and can be affected by various situational contingencies. It can therefore be assumed that various *contextual and contingency factors* could be identified that can shape the scope of Enterprise Architecture by affecting the appropriate design and implementation as well as the realisation of the Enterprise Architecture practice

in different types of organisational settings and situations. Such factors can be related to issues such as the environments in which the organisations exist, the organisations themselves as well as temporal differences caused by changes in various circumstances over time. A few prior studies can be found specifically discussing these factors in relation to the Enterprise Architecture practice.

Leppänen, Valtonen and Pulkkinen (2007, p. 436) introduce the contingency approach as "the idea according to which there is no universal 'solution pattern' that would fit every problem situation" and define contingency factors as "situational factors used to characterize the situation and match them with the properties of the patterns". Building upon prior work on contingency approaches in the information systems development context, they identify a set of contingency factors that can be applied in the context of the Enterprise Architecture method engineering, resulting in what they call the EACon framework. The framework proposes an ontology of aspects potentially affecting an Enterprise Architecture method engineering effort. They continue to identify several potential contingency factors related to each of the mentioned aspects. Similar contextual factors are identified also by Aier and Schlep (2009), who empirically study the effects of these factors on Enterprise Architecture implementation success. A summary of some of the identified contextual and contingency factors are presented in Table 7.

TABLE 7 Enterprise Architecture contextual and contingency factors (adapted from Leppänen, Valtonen & Pulkkinen, 2007, p. 440)

Factor group	**Example factors**
Enterprise	Type, industry, structure, culture, EA maturity
Environment	Regulation, trends, clients, competitors, suppliers
Management	Decision rights and structure, alignment, coordination means, communication means
Roles	Motivation, background, skills, experience, commitment, allocation, number of people, coordination, level of resistance, training
Resources	Time, human, budget, tools
Method engineering endeavour	Importance, impacts, risks, triggering
Method goals	Availability, understandability, stability, approvability
Method	Level of generality, scope, emphasis, rigidness, novelty, ownership, desired lifecycle
Target context	Largeness, complexity, level of maturity
Principles	Restrictions, standards

3 PRIOR LITERATURE ON ENTERPRISE ARCHITECTURE SCOPING

The following section presents a more focused systematic review of the prior Enterprise Architecture scoping related literature. Based on the understanding of the key Enterprise Architecture concepts introduced in the previous section, the purpose of the further literature review is to provide a structured approach to answering the first research question of the study, the primary purposes of this section being 1) identifying the various perspectives from which Enterprise Architecture scoping has already been studied earlier and the key findings that are available from the prior literature, 2) providing a synthesis of the findings and integrating them with the understanding of the key Enterprise Architecture concepts covered previously and 3) further informing the design of the research model of the empirical study in the subsequent section. A theoretical literature review approach was applied to accomplish this.

The rest of the section is structured as follows, presenting the results of the systematic literature review. Section 3.1 presents the method used in the literature review. Section 3.2 provides a more detailed overview of the undertaken review process and the reviewed body of literature. Section 3.3 finally focuses on providing a synthesis of some key themes emerging from the literature.

3.1 Method of the literature review

A theoretical review is a type of literature review aiming at explanation building, which "draws on existing conceptual and empirical studies to provide a context for identifying, describing, and transforming into a higher order of theoretical structure and various concepts, constructs or relationships" (Paré et al., 2015, p. 188). Such a review should go beyond assembling and describing past work, instead its attempt should be to develop novel conceptualisations and highlight possible knowledge gaps in the current body of literature (Paré et al., 2015). Even though theoretical reviews often start with a broad research ques-

tion and their setup gets refined as the research proceeds and additional evidence is gathered, a systematic approach to the search strategy is suggested to be applied in order to ensure a sufficient coverage of relevant literature (Paré et al., 2015). In order to ensure the methodological rigor of the review, a systematic literature review process such as that guided by Okoli (2015) can be applied in the endeavor. Despite being originally designed for standalone literature reviews, the process was deemed suitable here. The review process is described in Figure 1 and the setup of the literature review in Table 8.

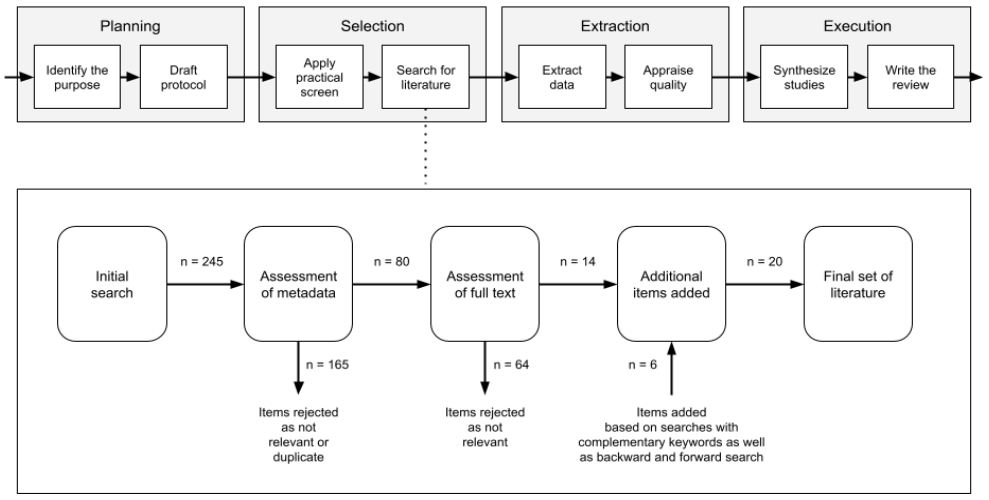

FIGURE 1 Literature review process (following Okoli, 2015)

The literature review process followed the guidelines of Okoli (2015) as far as this was feasible considering the limitations of the study. First, the purpose of the review was outlined as described above. Second, after a few trial searches, the protocol for conducting the review was drafted, specifying the review process, the initial details of the search (such as the sources and the search terms to be applied) as well as the reference management practices to be used when processing the results. The sources were selected to cover the major databases in the field of information systems and the search terms were defined broadly enough to be sufficiently inclusive. Third, the selection criteria were decided upon, designed to allow for an appropriate body of academically credible literature, focusing on peer-reviewed academic outlets, while also considering the practical feasibility of the study. Fourth, the search for the literature was performed according to the initial protocol defined in the planning phase. The search results were first assessed based on the metadata (the title, the abstract, the keywords, the date and the outlet of publication), also removing any duplicate entries. If deemed relevant against the selection criteria, the full text was then studied and the final inclusion decision was made. The search results were further utilised as a feedback mechanism for refining the search. Additional literature was uncovered using complementary keywords identified during the review process as well as backward and forward searches performed on the

literature items that were considered relevant. This was continued until a sufficient level of saturation was reached with no additional relevant results emerging. Fifth, insights relevant to the study were extracted from the selected literature and annotated in the reference management tool for further processing. Sixth, the quality of the literature was superficially appraised for methodological integrity in order to avoid the inclusion of literature clearly lacking in academic standards. It needs to be noted, however, that no in-depth methodological scrutiny was applied in the quality appraisal and most of the peer-reviewed publications were accepted. Seventh, a synthesis of the selected literature was created applying a grounded theory approach. This approach was considered appropriate as it "enables the researcher to come up with a theory-based or concept-centric yet accurate review" by enabling the emergence of theoretical insight from the literature by employing an iterative process of open, axial and selective coding (Wolfswinkel, Furtmueller & Wilderom, 2013, p. 3). Eighth, the findings of the literature review were summarised and reported.

TABLE 8 Setup of the literature review

Method	**Systematic literature review (following Okoli, 2015)**
Sources	Scopus, Web of Science, IEEE Xplore, ACM Digital Library, AIS eLibrary
Search terms used	*"enterprise architecture" AND scop** in title, abstract or keywords
Selection (inclusion and exclusion) criteria applied	Literature deemed relevant in answering the research question, specifically focusing on or discussing the scope perspective as a key point of view, published in peer-reviewed academic outlets, published in the 2000s, accessible in full via online databases and written in English
Analysis and synthesis approach	Grounded theory based iterative coding (following Wolfswinkel, Furtmueller & Wilderom, 2013)

A theoretical review approach, as described above, was considered justified for meeting the goals of this part of the study, providing an overview of the relevant Enterprise Architecture scoping literature and contributing towards laying a theoretical foundation for the rest of the study. However, the literature review method also has its limitations. An evident issue arises from the use of the term "scope", which can be considered ambiguous as it can be used in reference to a variety of concepts in different contexts. This creates a risk of ending up with a heterogenous set of literature, but also a risk of excluding relevant literature covering issues of interest while not explicitly referring to the term itself. The resource limitations related to the study also somewhat restricted the thoroughness that could be applied to the search, leading to the possibility of ignoring relevant pieces of literature missing the focal keywords in the metadata, but referring to them later in the full text. A level of author subjectivity in selection and analysis also remains even with a systematic review approach. Some of these issues are mitigated, but they cannot be completely eliminated by reporting the review process as comprehensively as possible.

3.2 Overview of the literature

The initial search ended resulted in a body of literature consisting of 245 items in total. After an initial assessment of the metadata and the rejection of 165 results that were deemed either not relevant in the context of the study (based on the title, the keywords and the abstract) or duplicate, the remaining 80 results were studied in full. 64 results were further rejected. The reasons for a rejection included not directly addressing the research question of the study, only dealing with the issue of scope as a nuance, using the term scope in a slightly different meaning, taking a specifically niche approach to a specific topic in Enterprise Architecture research or not being considered academically sound. After the rejection of the irrelevant literature, the data consisted of 14 remaining items. This set of literature was then further expanded by making searches using complementary keywords in addition to the original term *scop** (synonyms and related terms that had been extracted from the relevant literature, including *coverage*, *breadth*, *reach*, *boundar** and *"enterprise context"*) as well as adding references based on backward and forward searches. This resulted in the addition of 6 pieces of literature to the final data set. In the end, this resulted in a set of 20 pieces of literature to be studied in-depth. A summary of the reviewed literature as well as and the themes, the focus areas and the main contributions of each paper is presented in Table 9.

TABLE 9 Summary of the studies examined in the literature review
(L = literature review, C = conceptual focus, E = empirical focus)

Theme	**Source**	**Focus**	**Main contribution**
Underpinnings of Enterprise Architecture thinking	Schöenherr (2008)	L	Discusses the lack of common terminology within the Enterprise Architecture discipline, exploring the scope of layers considered within the various Enterprise Architecture approaches
	Lapalme (2012)	C	Discusses the traditions behind Enterprise Architecture and conceptualises three distinctive schools of thought in relation to Enterprise Architecture
	Korhonen and Poutanen (2013)	C	Discusses the theoretical under-pinnings behind the various Enterprise Architecture schools of thought, identifying three inter-linked architectural perspectives

	Drews and Schirmer (2014)	E	Discusses the need for and the challenges related to extending the scope of Enterprise Architecture to cover the enterprise-in-ecosystem context
	Korhonen and Molnar (2014)	C	Discusses the scope of Enterprise Architecture with the perspective of Enterprise Architecture as a transformational capability
	Proper and Lankhorst (2014)	C	Discusses the evolution and the expanding scope of concern of the Enterprise Architecture practice from a historical point of view
	Simon, Fischbach and Schoder (2014)	E	Discusses the role of Enterprise Architecture in the scope of strategic management processes, suggesting several application scenarios
	Korhonen et al. (2016)	C	Discusses the evolution of the Enterprise Architecture scope towards an ecosystemic stance in order to support the needs for ecosystemic adaptivity
Positioning Enterprise Architecture as a discipline	Bernus et al. (2016)	C	Discusses the limited scope of the current state Enterprise Architecture practice, calling for a more holistic interdisciplinary stance in Enterprise Architecture research
	Saint-Louis and Lapalme (2018)	L	Discusses the approaches towards Enterprise Architecture as a scientific research discipline by conducting a systematic mapping study
	Syynimaa (2018)	L	Discusses the parallel coverage of Enterprise Architecture topics in the scope of management-oriented research disciplines
Practical perspectives on Enterprise Architecture scoping	Bricknall et al. (2006)	E	Discusses success factors of Enterprise Architecture Management, raising several questions specifically in relation to the scope of Enterprise Architecture

	Aier, Gleichauf and Winter (2011)	E	Discusses Enterprise Architecture Management designs applied in practice, identifying three distinctive design approaches
	Rouhani et al. (2015)	L	Discusses success factors of Enterprise Architecture implementation methodologies, identifying scoping as one of the aspects
	Aier et al. (2016)	E	Discusses the holistic scope of Enterprise Architecture as one of the key enablers in supporting business transformation
	Rahimi, Gøtze and Møller (2017)	E	Discusses a taxonomy of Enterprise Architecture Management applications based on the adopted scope of Enterprise Architecture
	Nkundla-Mgudlwa and Mentz (2017)	L	Discusses success factors of Enterprise Architecture management, identifying scope as one of the effectiveness elements
	Nurmi, Penttinen and Seppänen (2019)	E	Discusses the definitions of Enterprise Architecture based on literature and practitioner interviews, reflecting against the three schools of thought on Enterprise Architecture
	Gong and Janssen (2019)	L	Discusses the value perspective of Enterprise Architecture, considering the scope of Enterprise Architecture as one of the contextual factors in value realisation
	Ylinen and Pekkola (2020)	E	Discusses the relationship between the scope of Enterprise Architecture and the role of as well as the competence requirements faced by Enterprise Architects

3.3 Key themes in the literature

Three high-level themes were identified based on the analysis of the literature. First, a total of 8 studies discussed underlying ways of thinking in relation to the scope of Enterprise Architecture, reflecting the spectrum of approaches that have possibly contributed towards the academics' and the practitioners' sensemaking within the field. Second, a total of 3 studies addressed the scoping of the Enterprise Architecture research as a scientific discipline against the socio-technical continuum, specifically in relation to management sciences as a neighboring discipline. Third, a total of 9 studies featured a more practical point of view to Enterprise Architecture scoping and its implications in real-life organisational settings, exploring the topic from a diverse set of perspectives. Several studies, specifically those focused on the underlying approaches and the scientific positioning, discussed Enterprise Architecture scoping primarily from a conceptual point of view. Some studies, specifically those more practice-oriented, were also able to provide various levels of empirical backing to their claims. There was also a number of prior literature reviews that address Enterprise Architecture scoping from various points of view. The following sections discuss the identified themes in more detail.

3.3.1 Underpinnings of Enterprise Architecture thinking

The most-cited work on Enterprise Architecture scoping seems to be the one by Lapalme (2012), whose **three schools of thought on enterprise architecture** has been already discussed extensively in section 2.3, and will thus only be referenced here briefly. Lapalme's work seems to be specifically influential as it provides an approachable conceptual model for identifying three main traditions behind the Enterprise Architecture practice as well as some of their philosophical underpinnings. For a more detailed introduction of Lapalme's work, please refer back to the previous section. Some further characteristics of the three Enterprise Architecture schools of thought (the IT-driven *Enterprise IT Architecting School*, the coherence-seeking *Enterprise Integrating School* and the environmentally-focused *Enterprise Ecological Adaptation School*) have been summarised in Table 10.

TABLE 10 Some characteristics of the three Enterprise Architecture schools of thought (adapted from Lapalme, 2012, p. 39)

	Enterprise IT Architecting School	**Enterprise Integrating School**	**Enterprise Ecological Adaptation School**
Motto	"EA as the glue between business and IT"	"EA as the link between strategy and execution"	"EA as the means for organizational innovation and sustainability"

Objectives and concerns	Effective enterprise strategy execution and operations; IT planning & cost reduction; business enablement	Effective enterprise strategy implementation; organizational coherence	Innovation & adaption; organizational coherence; system-in-environment coevolution
Principles and assumptions	Reductionism; business strategies and objectives are provided by the business and are correct; independent design of organizational dimensions; disinterest in none-IT dimensions	Holism; business strategies and objectives are provided by the business and are correct; environment as something to manage; joint design of all organizational dimensions	Holism; system-in-environment coevolution; environment can be changed; joint design of all organizational dimensions
Skills	Technical competence; engineering knowledge	Small group facilitation; systems thinking	Dialogue fostering; system & system-in-environment thinking; larger group facilitation
Perceived challenges	Organizational understanding and acceptance of designed plans	Understanding of organizational systemic dynamics; organizational collaboration; system thinking paradigm shift	Fostering sense-making; system-in-environment paradigm shift
Insights	Permits the design of robust and complex technological solutions; fosters the creation of high-quality models and planning scenarios	Permits the design of comprehensive solutions; enables significant organizational efficiency by eliminating unnecessary contradictions and paradoxes	Fosters enterprise-in-environment coevolution and enterprise coherency; fosters organizational innovation and sustainability
Limitations	Susceptible to producing inadequate or unfeasible solutions for the larger organizational context; susceptible to considerable solution acceptance and implementation barriers; susceptible to "perfect" designs for unsustainable strategies syndrome	Susceptible to "perfect" designs for unsustainable strategies syndrome; requires a paradigm shift from reductionism to holism	Requires many organizational pre-conditions with regards to management and strategy creation; requires environments that may be influenced

Building partly on the work of Lapalme (2012), Korhonen et al. (2016) further expand on the concept of the Enterprise Architecture schools of thought in their discussion on the past, the current state and the envisioned future of the Enterprise Architecture practice. Similar to the previous discussions, the authors recognise the ambiguity of Enterprise Architecture in terms of the nature of the term (a noun, a verb or both), the scope of concern (what issues should be considered within the scope of Enterprise Architecture) as well as the depth of actions (what actions should be considered as being within the scope of Enterprise Architecture). Conducting a short review of the history of Enterprise Architecture research, they discuss the evolution of the Enterprise Architecture discipline over time throughout various approaches. Enterprise Architecture seems to have been traditionally rooted in the EITA approach, with a largely technical focus of optimising enterprise-wide IT architectures, in which business has been seen primarily as an input or a context for the IT. With time, Enterprise Architecture has developed to be most commonly understood through the EI lens and with an extended architecture scope, encompassing various dimensions of the enterprise in addition to the IT architecture and with the aim of achieving coherence between all the enterprise assets in support of the common strategy execution. The authors question, however, whether either of these traditional approaches alone can adequately respond to the challenges of fast-moving environments and complex enterprise ecosystems faced by enterprises today. This development specifically highlights the need for the EEA approach to Enterprise Architecture in the future.

Pointing out the growing demand for adaptivity in a modern world characterised by turbulence and uncertainty (a topic which has also been discussed in more detail in section 2.8), Korhonen et al. (2016, p. 272-281) call for the need of a reconceptualisation of Enterprise Architecture towards the direction set specifically by the EEA school of thought. One of their arguments is that the narrower schools of thought may respond well to a limited set of issues, as long as the consideration is isolated to their particular "lower level" scopes, but fall short in their response to the complexity of the "higher level" issues. This means that while the EITA approach can be sufficient in responding to issues related to the technical architecture ("performing rational, deterministic and economic IT planning that aims at business-IT alignment, operational efficiency and IT cost reduction"), it is by itself insufficient when considering issues related to the socio-technical architecture, let alone the ecosystemic architecture. The EI approach is already significantly better suited to respond to issues related to the socio-technical architecture ("setting a new direction for the organization, responding to significant problems, or instigating changes that require significant investment and coordination"), but still remains insufficient when considering issues of the ecosystemic level. The EEA approach appears as the only one that fully embraces the issues related to the ecosystemic architecture ("allowing for co-evolution with the business ecosystem, industry, markets, and the larger society") and thus the full complexity of the enterprise considering the environment of which it is a part. This approach essentially views the environment

as not only something that the enterprise needs to take as given and adapt to reactively, but as something that the enterprise is also able to proactively influence with its actions and various strategic choices. According to the authors, the EEA approach also seems like the only viable one in the long run as the need for adaptivity will continue to call for more system-in-environment thinking as opposed to the more limited system-centric approaches. This discussion is summarised in the matrix presented in Table 11.

TABLE 11 Applicability of the Enterprise Architecture schools of thought (adapted from Korhonen et al., 2016, p. 276)

Ecosystemic architecture	☒ Insufficient Analysis paralysis; lock-in in the as-is	☒ Insufficient Inadequate renewal; failure to sense and seize opportunities; indifference to the wider context; adapting to but not creating change	☑ Sufficient EA that fosters innovation and sustainability; system-in-environment co-evolution; environment can be changed
Socio-technical architecture	☒ Insufficient Clinging to best practices; limited view of the scope and potential of architecture; disconnect with strategy	☑ Sufficient EA as the link between strategy and execution; holistic, systemic view of the enterprise; choosing tactics; changing the business	☑ Sufficient Adaptive enterprise; business modularity
Technical architecture	☑ Sufficient Architectural descriptions; EA as a glue between business and IT	☑ Sufficient EA aimed at business outcomes; solution architecture	☑ Sufficient Optimized core of digitized data and processes
	Enterprise IT Architecting School	**Enterprise Integrating School**	**Enterprise Ecological Adaptation School**

Several other studies have extended the line of research, building on the three Enterprise Architecture schools of thought, as well. Korhonen and Poutanen (2013) initially investigated the theoretical underpinnings of the three schools of thought by applying structural and metaphysical lenses. They identified three distinctive, but interlinked architectural perspectives: 1) focusing on *technical* assets (the key architectural elements being infrastructure, information systems, capabilities and solutions) that are aligned with business needs, 2) taking a holistic and systemic *socio-technical* approach to the organisation considering its various aspects (the key architectural elements being capabilities, solutions,

product and service portfolio and business models) and 3) expanding to *ecosystemic* issues involving the organisation's co-evolution within its environment (the key architectural elements being business models, business portfolio, mission and vision). They point out that the envisioned transcendence of the Enterprise Architecture practice towards a "more strategic and less technical territory" has simultaneously been reported to be somewhat problematic in practice as "since EA has technical origins and its practitioners are mostly from the IT function, business management does not fully accept EA to deal with higher-level architectural concerns" (Korhonen & Poutanen, 2013, p. 36). Korhonen and Molnar (2014, p. 180) further refer to the socio-technical architecture specifically as the "area of value ownership" of Enterprise Architecture. In their paper, they discuss Enterprise Architecture as a transformation-oriented organisational capability that links strategy to its execution. However, in their metastudy of Enterprise Architecture research, Saint-Louis and Lapalme (2018) note that while there has been a growing share of research done in the eco-technical and socio-technical contexts, the majority of Enterprise Architecture research published in the past still seemed to gravitate primarily towards the traditional technological context.

There has been some discussion on the evolution of the Enterprise Architecture practice outside of the school of thought line of research, as well. Schöenherr (2008) provides one of the earlier studies discussing the terminological ambiguity in the Enterprise Architecture discipline. Based on a review of the prior literature, he highlights the lack of a common understanding of the layers considered within the scope of Enterprise Architecture as well as the various architecture components addressed within each of the layers, also noting the technology-driven nature of the majority of prior Enterprise Architecture research. Proper and Lankhorst (2014) discuss the evolution of Enterprise Architecture in a historical context, in terms of a number of past and assumed future Enterprise Architecture trends. They describe the evolution of the discipline from computer architecture into information system architecture and eventually into the Enterprise Architecture we know today. They highlight the shift that has happened "from taking a business architecture as a given input, to the realisation that business and IT should be co-designed as a whole", as well as "from Business-to-IT-stack centricity to the broader notion of enterprise coherence" (Proper & Lankhorst, 2014, p. 7-8). Simon, Fischbach and Schoder (2014) discuss the issues that exist with the traditionally IT-centric positioning of Enterprise Architecture and the underutilisation of its capabilities as a tool of strategic management. They call for a more active adoption of Enterprise Architecture practices within the domain of strategic management by introducing a set of application scenarios in which Enterprise Architecture could increasingly support strategic management processes. Drews and Schirmer (2014) discuss extending the scope of Enterprise Architecture to increasingly cover the enterprise-in-ecosystem context. They identify five stages of evolution from the traditional Enterprise Architecture scope to the *Extended Enterprise Architecture* (considering external stakeholders), the *Federated or Collaborative Network Archi-*

tecture, the *Focused Business Ecosystem Architecture* and finally the *Business Ecosystem Architecture*.

Most of the discussions covered by the papers mentioned above seem to be more or less aligned with Lapalme's (2012) original conceptualisation of the Enterprise Architecture schools of thought and the vision of the Enterprise Architecture practice eventually evolving towards 1) an increasingly socio-technical, business-driven rather than IT-driven stance as well as 2) an increasingly ecosystemic, outside-looking rather than inwards-looking stance. Typical to these discussions is, however, that they tend to be rather conceptual in nature and that there is only a limited amount of empirical evidence of such changes happening in practice. Without more empirical data available on whether these changes are in fact ongoing, there is always a risk that the Enterprise Architecture researchers' and thought leaders' personal opinions and the real-life Enterprise Architecture practices can be following different trajectories.

3.3.2 Positioning Enterprise Architecture as a discipline

The previous discussion on the Enterprise Architecture schools of thoughts can also provoke a more general discussion on the **positioning of Enterprise Architecture as a scientific discipline**. Enterprise Architecture has traditionally been mostly studied in the context of *information systems (IS)*, the area in which it was originally introduced and established (Kotusev, 2017). However, based on the discussion above and depending on the approach taken to Enterprise Architecture, there seems to be a considerable demand for extending the concerns of the Enterprise Architecture practice significantly beyond the traditional information systems scope. This is especially true with the more inclusive Enterprise Architecture approaches, specifically the EEA school. These approaches are concerned with issues that not only cover the socio-technical architecture perspective, traditionally seen as central to information systems disciplines, but also an array of issues that have traditionally been viewed as a realm of other management disciplines, such as strategic management. The focus of the Enterprise Architecture practice shifts significantly from the optimisation of the organisation's internal structures towards the positioning of the organisation within its environment.

Bernus et al. (2016, p. 87-100) provide an extensive discussion on the state of the art in the Enterprise Architecture discipline, highlighting "the narrowness of scope of present practice in IS and EA" and calling to "re-gain the coverage of the entire business on all levels of management, and a holistic and systemic coverage of the enterprise as an economic entity in its social and ecological environment". They highlight this as being the original intent of Enterprise Architecture as opposed to most of the current Enterprise Architecture practices having a significant focus on the technological aspects of Enterprise Information Systems. They point out the status of Enterprise Architecture research at the crossroads of engineering and management disciplines, arguing that the discipline needs to evolve as "an interdisciplinary study of the enterprise as a complex sociotechnical system, covering all aspects (human and technical), and all

types of evolution (deliberate and emerging)". According to the authors, Enterprise Architecture should be able to disseminate its insights as a discipline more effectively into its neighboring disciplines, as Enterprise Architecture issues should be very much a management concern, spanning several managerial levels. They also promote a view of Enterprise Architecture that "should not necessarily be framework-centric, it is more the philosophy of EA as a systems science of socio-technical systems that needs to be shared across the enterprise". Similar views are shared by Korhonen et al. (2016, p. 281), who state that Enterprise Architecture should be "an ongoing process that supports organisational coherence", that it should be "a shared competency and embedded concern" and that "everyone is an enterprise architect to a degree".

The discussion above is somewhat valid in the context of information systems research, in general. In their meta-analysis of the research in the information systems discipline, Sarker et al. (2019) have discussed the "axis of cohesion" of information systems research, placing the socio-technical perspective as the unique feature distinguishing information systems sciences from most of its neighboring disciplines. They further propose that the research in the area of information systems can be roughly located on a social-technical continuum between two extremes, *pure social focus* (e.g. management, sociology or psychology) on the one end and *pure technical focus* (e.g. computer science) on the other. Between these extremes, areas can be identified that are either *dominated by one of the neighboring disciplines* or *shared by IS and a neighboring discipline*. In the middle, there is an area of equal emphasis between the social and the technical perspectives, which is argued as being at the core of what makes information systems research a distinctive discipline. The authors argue, however, that in practice, the research in information systems has been somewhat deviating from the idealistic socio-technical "golden middle way" with a varying focus between more *sociocentric* and more *technocentric* research.

Taking the social-technical continuum by Sarker et al. (2019) as a starting point, we can attempt to map the three Enterprise Architecture schools of thought of Lapalme (2012) in respect to their primary areas of architectural concern as discussed by Korhonen et al. (2016), assuming that the broader schools of thought both encompass and transcend the narrower ones. We can therefore argue that the EITA school could be positioned on the continuum closer to the technocentric end and inherently IT-related disciplines, its main focus being placed on the technical architecture. On the other hand, the EI school could find its place in the middle of the continuum in the traditional scope of information systems, its main focus being placed on socio-technical architecture. Finally, the EEA school can be argued to be closer to the sociocentric end of the continuum and inherently business-related disciplines, its main focus being on the ecosystemic architecture, expanding the socio-technical perspective. The mapping of the Enterprise Architecture schools of thoughts and their primary concerns against the social-technical continuum is presented in Figure 2.

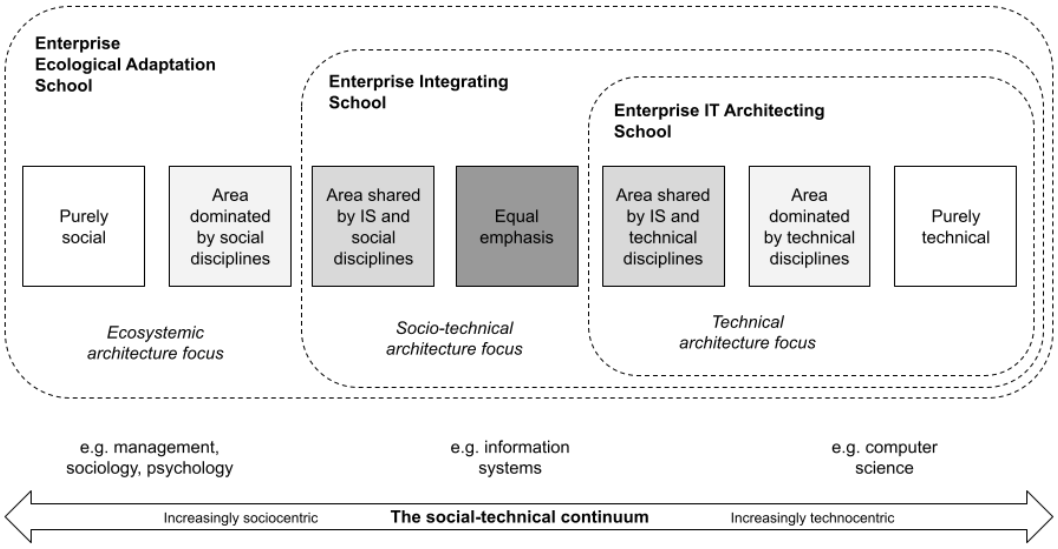

FIGURE 2 Socio-technical continuum of IS research (adapted from Sarker et al., 2019) mapped to the areas of concern of Enterprise Architecture schools of thought

Bibliographic data from some of the prior literature reviews provides us with some perspectives on how Enterprise Architecture research has typically been positioned in the past. According to Kotusev (2017), Enterprise Architecture topics have been discussed in a relatively narrow set of outlets, with a small number of them accounting for the majority of publications. Many of these outlets can either be clearly positioned in the field of information systems or are specifically focused on Enterprise Architecture. Within a smaller number of outlets outside of the explicit information systems scope, the IT-related outlets seem to be more common than business-related ones. Saint-Louis and Lapalme (2018) seem to confirm this observation, reporting that the majority of Enterprise Architecture research gets done and published in IT-rooted contexts with a smaller number of research done in the contexts of engineering and social studies. This could indicate that Enterprise Architecture as an area of research, while rooted in a traditionally socio-technical field of information systems, has generated slightly more interest in the technocentric end of the research (looking at the world primarily from the perspective of aligning IT with the business - the EITA school) compared to the sociocentric end of the research (looking at the world primarily from the perspective of the business and treating IT as just another part of it - the EI school; or, taking it even further, looking at the world from the perspective of the business as a part of its environment - the EEA school).

An assumption could be made that as the EEA school specifically expands the scope of Enterprise Architecture thinking into what is traditionally considered as the realm of management disciplines, we should also be able to see Enterprise Architecture being increasingly represented in management-oriented research published in various management outlets. At the moment, this seems

either not to be happening or, as speculated by Bernus et al. (2016), a parallel set of terminology is being used in the field of management for the concepts that in the field of information systems are labeled under the umbrella of Enterprise Architecture. The existence of this very phenomenon also seems to be indicated by Syynimaa (2018). In the long term, such development can end up being harmful for both disciplines as 1) similar issues and problem areas are being tackled in parallel in several disciplines without the existence a sufficient dialogue, leading to a loss of potential synergies and 2) there is a potential risk of creating unnecessary friction between the disciplines due to the lack of a common language or a mutual understanding.

3.3.3 Practical perspectives on Enterprise Architecture scoping

The literature on Enterprise Architecture schools of thought can be criticised for its conceptual, even philosophical nature and a lack of empirical evidence to back its claims. However, there seems to be a growing body of recent literature also providing some practice-oriented perspectives on Enterprise Architecture scoping and its implications. Themes covered by such literature included the **practitioners' definitions for Enterprise Architecture**, the **design and implementation of the Enterprise Architecture Management practice**, the **role of the Enterprise Architect**, the **Enterprise Architecture Management applications**, the **Enterprise Architecture value realisation** as well as the **Enterprise Architecture success factors**. Some of the literature in this category is introduced in more detail in the following.

Aier, Gleichauf and Winter (2011, p. 645) study various design approaches that can be taken towards setting up the Enterprise Architecture Management practice, defining Enterprise Architecture Management as "the management tasks of planning and controlling business change from an architectural perspective". Conducting an empirical study of various Enterprise Architecture Management approaches in the field, they identify three distinctive approaches clusters - a *balanced approach*, a *business-oriented approach* and an *IT-oriented approach*. They further continue to empirically examine the relationships between the underlying Enterprise Architecture Management approach and the perceived success of the Enterprise Architecture practice, confirming that the balanced approach with an equal business and IT focus seemed not only to be the most common approach to Enterprise Architecture Management, but also the one yielding the highest levels of benefits compared to the narrower approaches. This observation could speak for a more holistic, socio-technical Enterprise Architecture scope as recommended by the proponents of the more encompassing Enterprise Architecture schools of thought.

Rahimi, Gøtze and Møller (2017, p. 127-137) explore the various perspectives on Enterprise Architecture and views on Enterprise Architecture Management in the prior literature, arguing that "how an organization perceives EA's scope influences the range of processes that it can incorporate EAM into and, thereby, the goals and applications of EAM in the organization". As a result, they end up developing a taxonomy that classifies the applications of En-

terprise Architecture Management based on three distinctive Enterprise Architecture scoping options. In its narrowest scope (*IT management*), Enterprise Architecture has a primary focus on IT elements and the goal of Enterprise Architecture Management revolves around the "coherent and consistent design and evolution of IT elements in mutual alignment with business strategy and capabilities". In a broader scope (*business capability management*), Enterprise Architecture extends to business capability elements and Enterprise Architecture Management shifts towards the "coherent and consistent design and evolution of business capabilities' realization in mutual alignment with business strategy". In the broadest scope (*business strategy management*), Enterprise Architecture deals with business strategy elements, aiming towards the "coherent and consistent design and evolution of business model in mutual alignment with the market environment". The resulting three-level taxonomy has obvious resemblance to the three schools of thought. The authors proceed to validate the proposed taxonomy in the context of a number of case organisations in which different approaches to Enterprise Architecture scoping have been taken. The resulting taxonomy is summarised in Table 12.

TABLE 12 Taxonomy of Enterprise Architecture Management applications (adapted from Rahimi, Gøtze & Møller, 2017, p. 137)

EA's scope	*IT management*	*Business capability management*	*Business strategy management*
EAM's goal is the coherent and consistent design and evolution of…	… IT elements in mutual alignment with business strategy and capabilities	… business capabilities' realization in mutual alignment with business strategy	… business model in mutual alignment with the market environment
EAM's application...	… complements IT strategy formation, planning and implementation; influences business strategy formation and planning	… complements business strategy planning & implementation, influences business strategy formation	... complements business strategy formation

Nurmi, Penttinen and Seppänen (2019) explore the variety of definitions provided for Enterprise Architecture both based on the prior literature and empirically based on practitioner interviews they conducted. They proceed to compare the provided definitions with the three schools of thought, concluding that the they could generally be mapped reasonably well against the schools of thought. They also observe that the majority of definitions in their sample seemed to represent the Enterprise Integrating school, with a significant number of definitions representing the Enterprise Ecological Adaptation School and a smaller number of definitions representing the Enterprise IT Architecting school. These results could indicate that, at least on an idealistic level, the practice of Enterprise Architecture could indeed be moving away from the

earlier technical focus with the socio-technical view currently being prevalent and with the ecosystemic view starting to show some significance. These results alone, however, are not completely conclusive as the investigation focused on definitions instead of practice, and some additional definitions were found that did not directly match the schools of thought as a framework.

Several studies cover the scope of Enterprise Architecture as one of the success factors of the Enterprise Architecture practice. Bricknall et al. (2006, p. 10) raise several questions in relation to the scope of Enterprise Architecture as a success factor of an Enterprise Architecture initiative, even stating it as "the most crucial factor affecting the success or failure of the whole initiative". According to them, Enterprise Architecture should not be confused with IT architecture, implying that a holistic stance should be taken and that "the scope of Enterprise Architecture must be defined and agreed between business and IT" Bricknall et al. (2006, p. 1). Rouhani et al. (2015) identify not only the *holistic scope* (the scope addressing all the relevant aspects of the enterprise), but also the *clear scope and purpose* (the scope being aligned with the vision behind the Enterprise Architecture practice) as factors of a successful Enterprise Architecture implementation methodology. Nkundla-Mgudlwa and Mentz (2017) similarly mention scope as one of the Enterprise Architecture success factors, stating that the scope of Enterprise Architecture should be clear and documented, but also stressing that Enterprise Architecture should be sufficiently holistic. Aier et al. (2016) offer an empirical account of how a holistic scope of Enterprise Architecture can act as an important enabler in overcoming the boundaries of an IT function, supporting business transformation efforts.

Gong and Janssen (2019) discuss the value perspective of Enterprise Architecture, addressing five Enterprise Architecture myths based on a systematic literature review conducted based on the prior literature, covering various aspects of Enterprise Architecture value realisation. They argue that the value of Enterprise Architecture is realised only via the successful application of Enterprise Architecture practices, which can be found being affected by various contextual factors. When discussing value realisation, the scope of Enterprise Architecture should be one of the considerations as a scope that is too broad may result in an Enterprise Architecture practice that is too ambitious to be implemented successfully. Similarly, placing an extensive focus on detailed descriptions of all possible aspects of an enterprise may end up being a bad trade-off in terms of the effort required and the potential value acquired. This perspective raises important questions about the optimal scope of Enterprise Architecture from the value realisation perspective. Similar observations are also made by Bricknall et al. (2006, p. 10) who state that the risk of failure grows if Enterprise Architecture is trying to "take on too much" at the same time.

Ylinen and Pekkola (2020, p. 9) discuss the relationship between the scope of Enterprise Architecture and the role of the Enterprise Architect as well as the competence requirements they face as Enterprise Architecture practitioners. Against the observation that the scope of the Enterprise Architecture practice has remained largely ambiguous and context-dependent, they conclude that

"there is no all-inclusive skill portfolio that suites for every enterprise architect" and that "the significance of different skills varies depending on the type, role, and definition of the EA". In the empirical study they had conducted with a group of Enterprise Architecture practitioners, two distinctive groups of Enterprise Architects were identified. The groups shared partly uniform, but also partly differing views on the most important skills for the Enterprise Architect to have. The group of practitioners who had a strong focus on *modeling* highlighted Enterprise Architecture mostly as a way of providing a clear understanding of the organisation and highlighted skills related to achieving that as the most important ones. The group of practitioners who had a stronger focus on *strategic development* saw the role of Enterprise Architecture instead as a practice supporting strategic decision-making and correspondingly tended to emphasise related skills. This duality seems to be aligned with the earlier observations of Rahimi, Gøtze and Møller (2017) and could also, at least to some extent, reflect the various stances to the connection between the Enterprise Architecture practice and the strategy as either a one-way (Enterprise Architecture getting directions from the strategy) or a two-way (Enterprise Architecture actively influencing the strategy) interface in alignment with the Enterprise Integration and Enterprise Ecological Adaptation schools of thought.

Although the empirical insights from the practice were somewhat limited in both their availability and coherence, it can be concluded that scope can potentially become a significant factor in setting up the Enterprise Architecture practice, having several concrete, practical-level effects. Scoping can affect the design of the Enterprise Architecture function, the role and the competence requirements faced by the Enterprise Architecture practitioners as well as the selection of the most viable applications for the Enterprise Architecture practice within an organisation. Scoping itself can also act as a significant success factor for the Enterprise Architecture practice. As scoping choices that are too narrow, too wide or otherwise inappropriate in a certain context can hinder the successful deployment of Enterprise Architecture, they can directly influence the value realisation potential of the Enterprise Architecture practice. Scoping also appears as highly context dependent, which is why the practical implications of various scoping choices should be studied and considered carefully in each case alongside the practitioners' underlying views of what Enterprise Architecture should constitute idealistically.

4 PERSPECTIVES ON ENTERPRISE ARCHITECURE SCOPING FROM FINNISH ORGANISATIONS

The following section presents the empirical study conducted on Enterprise Architecture scoping based on perspectives gathered from a sample of Finnish organisations. Building on the understanding acquired from the Enterprise Architecture scoping literature as reported in the previous sections, the purpose of the empirical enquiry is to answer the second research question of the study, aiming at 1) developing a research model based on the insights from the prior literature, 2) gathering additional empirical insights by interviewing Enterprise Architecture practitioners with experience from a set of real-life Finnish organisations and 3) integrating the empirical data with the understanding from the prior literature, enriching the theory with additional insight from the practice. The empirical study takes a qualitative, interpretive approach; semi-structured interviews with Enterprise Architecture practitioners were used as a data collection method and a content analysis approach was applied in data analysis, identifying several themes to be addressed.

The rest of the section is structured as follows, presenting the results of the empirical study. Section 4.1 presents the method of the empirical study. Section 4.2 introduces the development of the research model, with four key themes defined as a basis for the interview questions. Section 4.2 provides an overview of the interview process and the empirical data collected in the study. Section 4.4 finally focuses on the analysis of the empirical data.

4.1 Method of the empirical study

The empirical study adopts a qualitative, interpretive approach. According to Myers and Avison (2002, p. 4), "qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena" and "they are designed to help us understand people and the social and cultural contexts within which they live". As discussed earlier, Enterprise Ar-

chitecture and Enterprise Architecture Management appear as predominantly socio-technical issues, heavily involving people and the various social structures they are a part of. They also have significant interfaces with neighboring social science rooted disciplines, such as management and organisational sciences. Applying a qualitative method seems to be justified for the purpose of getting a deeper understanding of the real-life Enterprise Architecture practice and its various contexts based on the practitioners' perceptions.

Qualitative research can generally take a positivist, an interpretive or a critical epistemological stance (Myers & Avison, 2002). The interpretive research paradigm studies the individuals' perceptions to "understand phenomena through the meanings that people assign to them" (Myers & Avison, 2002, p. 6). Challenging the possibility of acquiring an objective truth about the reality as a result of the inquiry, interpretive studies assume social constructionism and focus on exploring a phenomenon as it is perceived by an individual without an attempt of generalising the findings to a population (Orlikowski & Baroudi, 2002). As opposed to positivist approaches assuming the potential existence of an objective reality independent of the study setting and the possibility of drawing inferences from the sample to a population through quantifiable variables and hypothesis testing (Myers & Avison, 2002), the intent of interpretive research is instead "to understand the deeper structure of a phenomenon, which it is believed can then be used to inform other settings" (Orlikowski & Baroudi, 2002, p. 5). Although qualitative research in general has sometimes been primarily associated with interpretivism in some views, they should not be, however, considered as synonymous (Myers & Avison, 2002).

The interpretive paradigm has been emerging in the field of information systems for some time now. Interpretivism has been justified in various settings, from laying a ground for more rigorous positivist approaches in exploratory setups, to complementing positivist approaches, to being the most appropriate approach and replacing positivist approaches altogether in certain research settings (Walsham, 1995). Despite the fact that the approach selection often tends to revolve around the question of interpretivism versus positivism, some other qualitative approaches, such as critical research (concerned with the critical evaluation of various societal and cultural structures affecting a phenomenon under investigation), and pragmatism (concerned with the interplay between knowledge and action), have also been discussed as potential alternatives in many cases (Goldkuhl, 2012). Some of the questions involved in the selection of the approach for each research setting include the research problem, the degree of uncertainty surrounding the phenomenon being studied and the theoretical lens applied by the researcher, among others (Trauth, 2001). The epistemological questions related to the various approaches can also limit the type of theory development that is feasible as a result (Gregor, 2006).

Given the somewhat ambiguous and even subjective nature of the Enterprise Architecture practice as discussed earlier, as well as the lack of solid theoretical underpinnings in the discipline, positivist and quantitative approaches aiming at a level of objectivity and statistical significance were quickly ruled out

as too much uncertainty was considered to be involved in measuring the various abstract concepts at hand. Instead, it was assumed that an interpretive approach would be the most suitable for studying the various flavors of Enterprise Architecture in different kinds of organisational contexts and uncovering some of the topics that seem to be relevant in today's Enterprise Architecture practice. This is done by focusing on the individual practitioners' perceptions of the reality, while also employing an element of critical research in the discussion of various cultural issues involved in the practice. This is seen as not only more value-adding, but also more feasible in terms of the resources available. Aligned with the exploratory approach of the study, the purpose is to provide new perspectives rather than generalise (Orlikowski & Baroudi, 2002), to describe and explain rather than predict (Gregor, 2006).

Sampling, or the selection of units to be included in the research, has proven to be a difficult topic in qualitative research. It should not be confused as having the same underlying meaning of a statistically significant sample, which it often does in the context of quantitative research (Emmel, 2013a). Purposeful sampling is a pragmatically-oriented sampling approach, the objective of which is "to select information rich cases that best provide insight into the research questions and will convince the audience of the research" (Emmel, 2013b, p. 2). According to Patton (1990, p. 181-182), "the purposeful sampling strategy must be selected to fit the purpose of the study, the resources available, the questions being asked, and constraints being faced". As opposed to a heavily theoretical sampling approach, purposeful sampling allows the researcher to exercise more judgement in the selection of cases that are considered to provide sufficient information in order to address the goals of the study, while taking into account what is known by theory (Emmel, 2013b). This specific approach was deemed appropriate in an exploratory setting, in which the theory cannot be yet seen as being specifically established.

Another sampling consideration in qualitative research is that of the sample size. A considerable amount of controversy is present around whether it is possible to provide any well-founded guidelines related to sample sizes that would be appropriate in various types of research (Emmel, 2013c). Guest, Bunce and Johnson (2006) have suggested that already a relatively small sample of 12 can be sufficient to achieve saturation, especially if the experiences in the cases end up being relatively homogenous – although this obviously needs to be applied with extreme cautiousness in practice. They define saturation as "the point in data collection and analysis when new information produces little or no change to the codebook", referring to the point at which an addition of one to the sample size yields only a limited amount of relevant new information that would add value to the analysis (Guest, Bunce & Johnson, 2006, p. 65). Applying the purposeful sampling strategy, the sample of the study was initially designed to incorporate a diverse enough variety of organisations in terms of their sectors (public and private), industries, types and sizes as well as individuals in terms of their backgrounds and experiences, with the aim of reaching a

sufficient level of saturation in the sample while still keeping the study feasible in terms of the use of resources.

Data for the study was collected using semi-structured theme interviews as the data collection method. Interviews are a common and arguably one of the most important means of gathering data in qualitative research – they allow using one-on-one discussions with individuals in order to gather rich data about the issues of interest as well as the individuals' perceptions of them (Myers & Newman, 2007). Falling between structured and unstructured interviews in their nature, semi-structured interviews employ a partially incomplete script, which leaves room for adjusting the course of the questioning during the interview (Myers & Newman, 2007). This means that while a semi-structured interview may employ a pre-defined high-level structure and a set of themes or questions that are prepared in advance, a considerable amount of freedom is involved in how the interview is conducted. This feature allows the elicitation of unique perspectives from the interviewees, allowing them to freely describe their experiences, provide unanticipated points of view, add additional details and deal with follow-up questions that may rise based on the information uncovered during the interview. While there is great potential in interviews as a data gathering method, it is not without its pitfalls, although some of which can be mitigated by using good interview practices (Myers & Newman, 2007). The selection of semi-structured theme interviews as the data collection method was justified by the exploratory nature of the study and the aim of acquiring a deeper understanding of the phenomena through the individuals' perceptions, also allowing for the emergence of new and unique points of view. For these reasons, methods such as surveys and structured interviews, as well as group interviews were ruled out as too restrictive for the intended purpose.

Qualitative content analysis was used as the method for analysing the data gathered from the interviews. Qualitative content analysis is a method suitable for making inferences from various sorts of recorded communication, taking into account both themes and main ideas of the text as primary content and context information as latent content (Mayring, 2000). It is a "systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding" (Stemler, 2000, p. 1). The two main approaches to qualitative content analysis are deductive (application of categories defined a priori based on theory) and inductive (development of categories a posteriori based on the themes emerging from the content), and they can be applied based on what is more appropriate in the context of the study (Mayring, 2000; Stemler, 2000). Hsieh and Shannon (2005, p. 1278) define qualitative content analysis as "subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" and further discuss some specific content analysis approaches, referring to the inductive and deductive approaches as conventional and directed. Generally, a conventional approach seems to suit situations in which the existing theory is limited and the purpose is to describe and explore, while a directed approach is more suitable in situations in which the purpose is to evaluate and extend an

existing body of theory (Hsieh and Shannon, 2005). In the context of the study, a conventional, inductive approach was seen as more viable as it is not as much affected by the lack of a solid theoretical backdrop in the Enterprise Architecture discipline, and as it allows for the identification of issues as they emerge from the data. However, some characteristics of a directed, deductive approach were also applied, mainly through the a priori definition of the key interview themes and the tentative high-level content categories. The setup of the empirical study is presented in Table 13.

TABLE 13 Setup of the empirical study

Method	**Qualitative, interpretive exploration of Enterprise Architecture practitioners' perceptions of the status quo in the Finnish Enterprise Architecture practice**
Sampling	Purposeful sampling (following Patton ,1990), 12 individuals selected having experience in Enterprise Architecture roles from various sectors, industries and organisation types
Data collection	Semi-structured theme interviews (following Myers & Newman, 2007), four key themes of the interview questions defined based on a tentative research model
Data analysis	Qualitative content analysis of interview transcriptions; inductive, data-driven coding of content categories (following Hsieh & Shannon, 2005)

The approach described above was seen appropriate for further exploring the topic, enriching the understanding gathered from previous literature, acquiring deeper insight of the phenomena and uncovering further research topics by tapping into the experiences of Enterprise Architecture practitioners working in the field. However, the empirical method also has its limitations. While the use of qualitative methods has established its position in the context of information systems research, several methodological considerations remain in their proper application (Conboy, Fitzgerald and Mathiassen, 2012). Klein and Myers (1999) have earlier proposed a set of principles for conducting and evaluating interpretive field studies in information systems, most of them well applicable in the context of interviews as well, pointing out issues that may be sources of bias in such a qualitative study. Vulnerability to bias lies in all phases of the research, from sampling to data collection to data analysis. Due to the limited resources, the sample is limited in size and can be subject to a biased set of cases ending up in the sample. The data collection process is subject to the researcher's preconceptions through the design of the interview questions and the interaction with the interviewees. The data analysis process has a risk of subjectivity in the researcher's interpretations of the content and the assignment of the content categories. These limitations obviously need to be addressed and taken into account when evaluating the study and drawing inferences from its results, which is why comprehensive documentation of the study process is suggested. The undertaken research process is described in more detail in Figure 3.

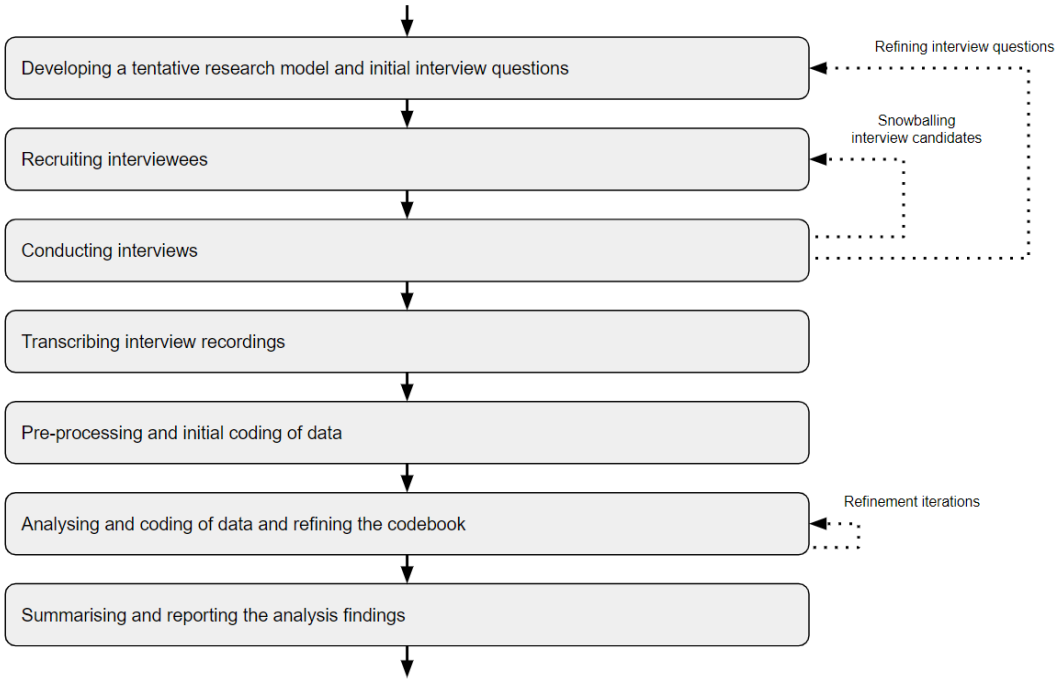

FIGURE 3 Empirical research process

4.2 Development of the research model

The tentative research model used in the empirical study was developed based on the synthesis of the exploratory and the systematic literature review presented in the previous sections. The research model focuses on addressing four high-level themes of interest, which are justified in more detail in the following section. The goal of developing the research model was to further inform the design of the subsequent empirical study and the definition of the interview structure. The tentative research model is visualised in Figure 4.

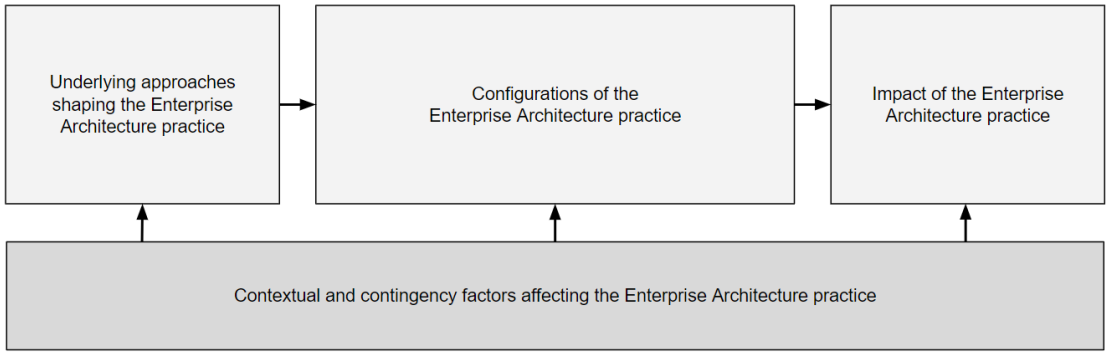

FIGURE 4 Tentative research model

Based on the premises of these four key themes, the semi-structured interview was designed with the aim of uncovering Enterprise Architecture practitioners' perceptions of the topics identified by the tentative research model. The key themes of interest, the underlying theoretical background behind them as well as the operationalisation approaches for the design of the theme interview structure have been summarised in Table 14. The high-level interview structure that was used as a starting point can be found in Appendix 1.

TABLE 14 Themes of interest, theoretical background and operationalisation approach

Theme of interest	**Theoretical background**	**Operationalisation approach**
Underlying approaches shaping the Enterprise Architecture practice	Enterprise Architecture thinking and systems approaches, Enterprise Architecture schools of thought	Fundamental thinking guiding the approach towards Enterprise Architecture scoping, e.g. through the lens of various EA schools of thought
Configurations of the Enterprise Architecture practice	Enterprise Architecture frameworks, Enterprise Architecture dimensions, Enterprise Architecture functions, roles and processes, Enterprise Architecture capabilities and applications, Enterprise Architecture agility and adaptivity	Accounts of how the Enterprise Architecture practice is being configured and scoped, e.g. in terms of organisational positioning of EA, significance of various EA dimensions or application of various EA based capabilities
Impact of the Enterprise Architecture practice	Enterprise Architecture benefits and success factors, Enterprise Architecture maturity	Perceived effects of Enterprise Architecture scoping choices, e.g. based on the realisation of benefits as a result of the EA practice or the evolution of the EA maturity
Contextual and contingency factors affecting the Enterprise Architecture practice	Enterprise Architecture contextual and contingency factors	Circumstances in which Enterprise Architecture is being practiced, considering various internal and external factors

First, we want to explore the fundamental underlying thinking that might shape organisations' approaches to their Enterprise Architecture practices and whether any patterns can be identified that would indicate the existence of distinctive clusters in the approaches taken. This exploration will be made against the three Enterprise Architecture schools of thought (Lapalme, 2012) and the related literature as a theoretical backdrop. Characteristics of the schools of

thought as discussed previously will be taken as a starting point for evaluating the organisations' stances towards what they view as the core scope of Enterprise Architecture. An assumption made here is that differing approaches may result in differing Enterprise Architecture practices, for example in terms of what can be seen as their primary objectives and concerns, how they have been historically positioned in the organisation in terms of the business or IT focus and what can be seen as some of their fundamental principles.

Second, we want to explore how the underlying approaches may affect the configurations of the organisations' Enterprise Architecture practices. This includes a diverse set of scoping issues, such as the organisational positioning of the Enterprise Architecture practice, the internal design of the organisations' Enterprise Architecture functions, the significance the organisations tend to place on the various Enterprise Architecture dimensions or the application of various Enterprise Architecture based capabilities as a part of the organisations' management processes. The review of literature related to these topics will be used as a starting point for this discussion. An assumption made here is that organisations will differ in how they configure the scope of their Enterprise Architecture practices, and that these decisions may at least partially relate to the underlying thinking that an organisation has taken towards Enterprise Architecture, resulting in a narrower or a broader Enterprise Architecture practice depending on the selected scoping approach.

Third, we want to explore the ways in which the scoping choices originating from the differing Enterprise Architecture approaches and configurations may affect the perceived impact of the organisations' Enterprise Architecture practices. The studies related to Enterprise Architecture benefits and success factors as well as Enterprise Architecture maturity models will be used here as a theoretical starting point. An assumption made here is that differing setups of the Enterprise Architecture practice could lead to differing sets and levels of benefits that are achievable with the Enterprise Architecture practice, and also that the distinctive configurations of the Enterprise Architecture practice can be associated with different levels of Enterprise Architecture maturity.

Finally, we want to explore the role of various contextual and contingency factors that may influence the scope of organisations' Enterprise Architecture practices. Exploring this perspective not only relevant because these factors act as potential explainers for the underlying approaches that are taken towards Enterprise Architecture in the first place, but because they can also have direct effects on the configuration as well as the impact of the Enterprise Architecture practice regardless of the underlying approach. This can be the case in situations in which the theoretical ideal and its practical implementation differ significantly due to various circumstances. The studies related to the contextual and contingency factors of Enterprise Architecture will be used as a theoretical starting point for this discussion. An assumption made here is that various contextual and contingency factors can be observed and can affect how the Enterprise Architecture practice is approached and implemented.

4.3 Overview of the interview process and the collected data

The empirical data is based on a total of 12 semi-structured theme interviews conducted individually with a group of Enterprise Architecture practitioners. The data was collected between March, 2022 and August, 2022.

The recruitment of the individuals to be interviewed was done mainly by cold emailing potential practitioners in the field based on LinkedIn searches, as well as by further utilising the professional networks of the individuals already recruited. The approached individuals were assumed to have relevant insight to share about the research topic based on their professional background – the roles they had previously held and the organisations they had previously worked in. The snowballing technique was further used to approach new potential interviewees based on the recommendations made by the previously interviewed ones. The response rate was generally higher among the interviewees recruited using this method, somewhat compensating for the relatively low response and acceptance rate of cold email recruitment.

The purposeful sampling approach aimed at a balanced sample of Enterprise Architecture practitioners having experience from various roles and organisational settings. Some of the interviewees (a total of 5 individuals) were currently acting in a consultant role and some interviewees (a total of 5 individuals) were currently representatives of a specific organisation, working in a Chief [Enterprise] Architect role. One interviewee simultaneously acted in both roles and one worked in the academia. The diversity of consultant and organisational roles was seen as valuable as the interviewees with a consultant background generally had a wider perspective of the discipline as a whole, while the interviewees with a background in specific organisations were able to provide deeper insights of various intra-organisational factors involved. The interviewees were generally well seasoned, having between 5 and 20 years of experience in the field. It needs to be noted, however, that the sample mostly focused on Enterprise Architecture practitioners and not on other management roles that were not explicitly labelled as Enterprise Architecture related. The interviewee profiles have been summarised in Table 15.

TABLE 15 Summary of the interviewees based on the current role, sector and experience (C = consultant, O = organisation, A = academic, PR = private, PU = public)

Interviewee	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
Role *(C/O/A)*	C	C	O/C	C	A	O	C	O	O	O	O	C
Sector *(PR/PU)*	PR	PR	PU	PR	PU	PU	PR	PR	PU	PU	PR	PR
Experience *(years)*	10+	10+	10+	15+	10+	5+	5+	15+	5+	5+	20+	5+

Despite their current position and employer, the interviewees typically had a diverse background from several organisations. The interviewees mentioned having some recent experience from the public sector (10 individuals) as well as the private sector (7 individuals). Some of the industries that the interviewees described as having significant current or previous work experience in included

various government agencies (7 individuals), municipalities (2 individuals), education (2 individuals), academia (2 individuals), infrastructure and logistics (2 individuals), manufacturing (2 individuals), ICT services (2 individuals), health services (1 individuals), defense (1 individual) and consulting (7 individuals), with consultants typically having experience from an array of industries not necessarily mentioned separately. All of the organisations were Finnish, either being a part of the Finnish public sector or being private companies based in Finland. The represented organisations mostly varied from medium-sized local organisations to large-sized multinational organisations, with a clear lack of small organisations being represented in the sample.

Each individual interview lasted between 60 and 90 minutes depending on the individual interviewee and the amount of insight they were willing to share. The interviews followed a similar high-level structure. After the introductions and a short briefing into the research topic, the purpose of the interview and the interview practicalities, the interviews proceeded into the discussion of the four key themes as introduced earlier. There were a few pre-defined interview questions prepared to get the discussion started, but not all the interviewees were asked all the questions and the direction of the discussion was allowed to take shape quite freely based on the unique insights provided by each interviewee. Further questions were often derived from the previous answers. Some of the interviewees provided compact answers to the pre-defined questions, while some were willing to raise their own themes and provide extensive examples to illustrate their arguments. This was generally allowed and the interviewees were also explicitly encouraged to do so, as the purpose of the research setting was to acquire rich insight from the practice. In the case of some of the interviewees', however, certain discussions sometimes ended up crossing the boundaries of the study and had to be disregarded. The interviewees were asked to discuss the themes based on all of their experiences from various organisations and roles, not limiting the perspective.

The interviews were recorded and the relevant parts of the recordings containing the interviewees' responses were transcribed for further analysis. During the transcription process, all content referring to or indicating individuals or individual organisations were removed from the data so that they could not be identified in the report. The interviews were originally conducted and transcribed in Finnish as it was the native language of all interviewees. After the analysis, the relevant parts of the content were translated to English by the author for reporting purposes. The interview transcriptions were first filtered for relevant paragraphs, which resulted in a total of 414 paragraphs of text to be analysed. At this stage, the content was also initially analysed and a tentative set of categories were assigned to each paragraph. The paragraphs were then further processed by re-reading them and combining the ones that were mutually related, which reduced the number to a total of 359 paragraphs.

The data was finally analysed by assigning the paragraphs into one or several content categories. The paragraphs were coded with a primary and a secondary category. The primary category represented the high-level interview

theme as discussed previously, while the secondary category was allowed to be adjusted based on the content. A codebook was maintained throughout the analysis work in order to keep the coding process consistent. The codebook was developed iteratively and some of the codes were adjusted, combined or split based on the new insight as the analysis proceeded. The coding was validated by iterating through the data several times during the analysis and the reporting process, and also by comparing the final categories against the initial categories assigned in the pre-processing phase. In addition to the primary and the secondary category, additional labels were assigned to the paragraphs as notes in order to help reporting, for example by indicating a potential sub-theme or the nature of the paragraph content. The data analysis resulted in a set of paragraphs assigned to 4 primary themes, 12 secondary themes as well as a set of additional content labels. The analysis results were then reported theme by theme, featuring the researcher's interpretation and examples of the interview data supporting it. Table 16 describes the resulting set of themes and the initial number of paragraphs within each theme. Section 4.4 then proceeds to introduce the themes in more detail, featuring examples from the data.

TABLE 16 Summary of the content by themes

Primary theme	**Secondary theme**	**# of paragraphs**
Underlying approaches shaping the Enterprise Architecture practice	Enterprise Architecture definitions and purpose statements	26
	Perceptions of the Enterprise Architecture Schools of thought	10
	Hard and soft approaches towards the Enterprise Architecture practice	43
Configurations of the Enterprise Architecture practice	Positioning of the Enterprise Architecture function	76
	Design of the Enterprise Architecture function	25
	Significance of the Enterprise Architecture dimensions	33
	Applications of Enterprise Architecture based capabilities	51
	Usage of the Enterprise Architecture frameworks	25
Impact of the Enterprise Architecture practice	Benefits of the Enterprise Architecture practice	30
	Maturity of the Enterprise Architecture practice	12
Contextual and contingency factors affecting the Enterprise Architecture practice	Environmental and organisational factors affecting the Enterprise Architecture practice	20
	Individual factors affecting the Enterprise Architecture practice	13

4.4 Key themes based on the data analysis

The following sections introduce the content categories and discuss some of the key findings of the content analysis, featuring a set of content examples supporting the findings related to each theme. Section 4.4.1 begins by discussing the underlying approaches shaping the Enterprise Architecture practice. Section 4.4.2 proceeds to discuss the configurations of the Enterprise Architecture practice. Section 4.4.3 then discusses the impact of the Enterprise Architecture practice. Section 4.4.4 finally concludes by discussing the contextual and contingency factors affecting the Enterprise Architecture practice.

4.4.1 Underlying approaches shaping the Enterprise Architecture practice

This category describes the fundamental thinking that was identified as shaping the practitioners' approach towards the Enterprise Architecture scoping. The category covers the practitioners' **Enterprise Architecture definitions and purpose statements**, the practitioners' **perceptions of various Enterprise Architecture schools of thought** as well as a set of **hard and soft approaches towards the Enterprise Architecture practice** that emerged during the study as something that was perceived as significant by the practitioners.

Enterprise Architecture definitions and purpose statements

The interviewees' *definitions of Enterprise Architecture* were very much in line with the observations made in the prior literature that was referred to in section 2.1, further highlighting the terminological ambiguity of the term Enterprise Architecture. The definitions typically featured Enterprise Architecture being referred to as a static entity, as a dynamic activity or sometimes both at the same time. Some interviewees' definitions focused primarily on the static perspective of Enterprise Architecture, presenting Enterprise Architecture as a holistic way of approaching and describing the various structural aspects that exist within an organisation. Some interviewees' definitions instead focused primarily on the dynamic perspective of Enterprise Architecture, presenting Enterprise Architecture as an activity that is being performed in an organisation in order to support its various managerial functions. Some interviewees' definitions also attempted to provide a holistic view of the complete scope of Enterprise Architecture, recognising both static and dynamic elements in their definitions, not stressing one element over the other.

> Enterprise Architecture thinking means taking a versatile high-level view of the object under consideration. It's usually an organisation, it could also be an entity of organisations, a coalition or an ecosystem, and by versatility, I mean that we look at it from different perspectives - business, information, information systems, technology. (Interview A)

> Enterprise Architecture is a way of understanding and developing the operations of an organisation in a holistic way. And that holism is what makes it Enterprise Architecture. […] The development of the operations and the various structures it requires, that's what Enterprise Architecture is all about. (Interview I)

> You can think of Enterprise Architecture as a noun, as a description of the various components of the organisation and their structures. Or you can think of it as a verb, that is, when we talk about Enterprise Architecture as an activity whose goal is to somehow lead, guide or develop [the organisation's operations]. (Interview L)

The diversity of definitions provided is problematic in the sense that even among practitioners who are familiar with the subject area, a clarification was often needed in order to understand what specifically was referred to as Enterprise Architecture in each context. This issue can become even more significant when interacting with stakeholders not familiar with the Enterprise Architecture concepts. The terminological ambiguity issue was also mentioned explicitly by several interviewees. Some practitioners had attempted to work around the problem in various ways by trying to establish their own definitions, which is not necessarily eliminating the problem, but often creating further ambiguity instead as the adopted definitions tend to be non-standard.

> Enterprise Architecture is really problematic as a term because it refers to so many things. It can refer to the organisational structure, and often it also refers to the work, the architectural practice. (Interview B)

When further discussing the *purpose statements of Enterprise Architecture*, some statements remained on a rather general level, characterising the distinctive purpose of Enterprise Architecture as a practice striving towards creating a systematic, holistic view of the organisation. In many purpose statements provided, support can be found for systems thinking as a mental foundation behind Enterprise Architecture, as discussed in section 2.2. Several interviewees' purpose statements highlighted the systemic-holistic approach as something that should be at the core of the Enterprise Architecture practice. These aspects were raised as something that makes Enterprise Architecture essentially distinctive from other management approaches, especially helping organisations in understanding and managing the complexity involved in their structures and operations by applying systems thinking to the holistic organisational scope.

> For me, it means that things can be developed in a systematic way, utilising what has been done and looking at things holistically. (Interview I)

> In a way, the promise or the goal of Enterprise Architecture is the understanding of the organisation, or whatever we are modeling, its operations and structure, and thereby managing the complexity. […] We understand how complicated it is, and then we understand how it can be developed. (Interview D)

Practitioners taking more pragmatic stances tended to associate the purpose of Enterprise Architecture with more concrete organisational applications, as discussed in section 2.7, such as supporting strategy execution or development work. Some interviewees' statements described the purpose of Enterprise Architecture in a rather generic way, as a tool of management, planning and decision making. Some interviewees focused more specifically on the strategy execution support function as the main purpose of Enterprise Architecture, presenting Enterprise Architecture as a way of splitting high-level strategic goals into concrete architectural development items for the purpose of execution. Some interviewees saw the main purpose of Enterprise Architecture through its function of supporting various kinds of development work, as a way of guiding development work on both the project portfolio level as well as on the level of individual projects. The variety of perspectives raised as the primary scope of Enterprise Architecture indicates that it is being utilised in several ways across various levels of management in different organisations. A relatively broad spectrum of approaches observed within a relatively small sample indicates that there is no single approach that would be a dominant one.

> In my opinion, it's a tool for management. It is a systematic approach and a tool to support decision-making and planning. (Interview B)

> My main goals, at least until now, have been the implementation of the strategy - and architecture is a tool, a management tool, which aims to achieve the goals set in the strategy, and the means are often the modeling of the strategy and chopping it into an architecture. (Interview C)

> EA must be able to take in the demand and structure it into reasonable solutions and then feed them to the backlogs and project portfolios for operationalisation. (Interview K)

> [...] like development support, guiding development. Which is probably a rather traditional idea of Enterprise Architecture, known from the ADM cycle, that in a way the development organisation runs and then the architecture kind of guides it and offers insights. (Interview J)

Perceptions of the Enterprise Architecture Schools of thought

The interviewees' *perceptions of the Enterprise Architecture schools of thought* were generally supportive of the idea of distinctive Enterprise Architecture scoping approaches, as introduced in section 2.3, as well as their existence in practice. Several interviewees seemed to generally recognise the Enterprise Architecture schools of thought, as discussed in the literature, quite well. When asked about their perception of the various schools of thought, the interviewees were also generally able to relate to them and identify characteristics of the schools of thought based on their personal experiences from the practice.

> I recognise all of them, I believe there is a certain kind of truth to them. (Interview G)

The conceptualisation of the schools of thought also faced some criticism. Some interviewees questioned the practical value of the theoretical conceptualisation or saw it as a somewhat restrictive framework. According to them, these perspectives might be observable implicitly, but rarely have practical significance. Some interviewees questioned the validity of the proposed classification in an increasingly digitalised world, one in which making the distinction between the technical and the social has become more and more challenging to begin with. As the digitalised world often brings the IT closer to the core of the business, the two perspectives become more and more inseparable. This seems to be especially true in technology-intensive business contexts. This development has a potential of affecting the scope of Enterprise Architecture, as well. This serves as a reminder that while a good conceptualisation per se, the schools of thought are not necessarily a definitive set of Enterprise Architecture approaches nor a model that would be consciously or explicitly applied in practice per se.

> Yeah, I've heard of those. All of them have something right in my opinion, if you look at what is done in practice in Enterprise Architecture, but they also have problems and, in my opinion, they do not cover everything that Enterprise Architecture and its utilisation is about. Such starting points are not really visible in practice at all. (Interview A)

> Of course, you left out the latest one which hasn't been researched that much yet, i.e. these radicals who think that companies have nothing but IT. So now there is a new trend, especially from the startup side, who have thought that if IT is not at the core, you are doing something very wrong, but perhaps it is not suitable for every context. (Interview F)

When asked about the typical Enterprise Architecture practices' stances against the schools of thought, the answers appeared as rather distributed across the spectrum. The technical tradition and the IT focus seemed to be widely recognised as the historical origin of the Enterprise Architecture practice. In fact, the technical issues were stated several times as something that still often ended up as the dominant aspect in the organisations' Enterprise Architecture work. The interviewees appeared to accept the suggested narrative about the overall evolution of the Enterprise Architecture practice from the narrower, predominantly technical scope towards more holistic, socio-technical and ecosystemic scopes over time. The socio-technical approach was often seen as the current focus of many organisations' Enterprise Architecture practices, although several practical issues were identified in turning the technical orientation into a socio-technical one. Many of the responses indicated that the shift from the technical focus towards the socio-technical focus was still very much ongoing and not necessarily as complete as the practitioners would have wanted. The ecosystemic point of view was also recognised, but often perceived as something that is not yet very well understood, defined or manifested on a practical level in organisations. This seems to support the findings of the earlier studies, indicating that no significant change in the situation has occurred over the last decade. Several interviewees addressed the ecosystemic approach as

something that has been generally recognised as a current topic, but generally not as something that has necessarily been at the core of the Enterprise Architecture work. In many cases, the maturity of the Enterprise Architecture practice does not seem to be ready to take on an ecosystemic stance as there is still some work to do in fully establishing the socio-technical focus first.

> According to my own experience, Enterprise Architecture in those organisations with whom I work the most, is still quite IT-oriented, even though there is a bit of an attempt to kick it out of that box – in a way, technology development is the target of Enterprise Architecture. (Interview D)

> I would claim that we are not currently exactly in either of those models, if we are being precise, but it looks something like maybe [a hybrid]. Approaching a holistic stance, but not quite there yet. (Interview F)

> The starting point of EA work over the years, it has changed the most to the extent that it has gone from a purely technical point of view to a socio-technical point of view. (Interview K)

> Yes, we have discussed ecosystem aspects and we have tried to describe them sometimes, [...] so yes, it is a current topic. [...] But maybe our focus is still on how to move away from that [IT orientation]. (Interview J)

There also often appeared to be significant differences between what would have been the Enterprise Architecture practitioners' personally preferred approach and what was actually happening in the organisations' reality. This observation also raises certain questions in terms of the evolution of the Enterprise Architecture discipline and whether the practice is actually proceeding in the direction envisioned by some of the thought leaders in the field, or whether a level of stagnation has been reached due to various practical limitations. This phenomenon is returned to in the further discussions.

> Then again, I see that Enterprise Architecture should definitely consider the entire organisation, its structure and operations and even customers and external actors, even the ecosystem. (Interview D)

Hard and soft approaches towards the Enterprise Architecture practice

The interviewees brought up various *hard and soft approaches towards the Enterprise Architecture practice* that have shaped their thinking beyond the topics of what constitutes Enterprise Architecture and what it should be used for. While not initially a part of the interview structure, this theme emerged from the data as a distinct category during the analysis as many of the interviewees seemed to be eager to discuss their personal views and experiences regarding a good way of approaching Enterprise Architecture and building a viable Enterprise Architecture practice. This category features a variety of underlying ways of thinking that extend the discussion of the Enterprise Architecture scoping beyond the themes discussed previously towards a set of soft issues, many of which being cultural and people-centric in nature. This discussion

touches upon some of the theory introduced in sections 2.7, 2.8 and 2.9, among others. A recurring theme in this category seemed to be the need for taking a pragmatic, stakeholder-oriented approach towards Enterprise Architecture. The need for a seamless integration of the Enterprise Architecture issues into the scope of the organisation's existing management practices was highlighted as an important success factor. Enterprise Architecture should not necessarily be emphasised as a distinctive method per se, but should be approached in a way that is as result-oriented as possible, even to the extent that the Enterprise Architecture practice and its scope should become invisible in a sense.

> Enterprise Architecture is at its best when it doesn't stand out. […] Somehow, I would see that the key thing in Enterprise Architecture is how to use practical "common sense", to seriously think about what it is aiming for and how it can contribute. At the end of the day, the model itself and the terms and such are not so important. (Interview E)

An important observation is made about the term Enterprise Architecture itself, as some practitioners specifically bring up their unwillingness to use the term Enterprise Architecture in their communications with stakeholders. This can be for example due to the lack of understanding or negative attitudes towards the term among the stakeholders, something that is also expanded on in the further discussion. A pragmatic response for some practitioners has been to continue using the Enterprise Architecture method pragmatically, focusing on the results, without explicitly referring to the term Enterprise Architecture.

> We actually don't use Enterprise Architecture as a term. I've been actively avoiding it, and if I see it somewhere I'll delete it. It's more like just saying "hi, we could help you with this job". I don't easily use the word architecture either, it has suffered some inflation and has a certain image. [...] Instead, our architects come to help and discuss things, to consult. [...] I don't use that term internally anywhere. There are those negative things involved. (Interview F)

The importance of the utilitarian value of Enterprise Architecture work was highlighted in several occasions. In order to yield benefits, Enterprise Architecture deliverables need to be used on a daily basis in various managerial applications. Especially some of the traditional, upfront modeling intensive approaches to Enterprise Architecture work were seen as particularly problematic due to them often being resource-heavy, their deliverables ending up underutilised and their return on investment remaining limited at best as a result. In order to tackle this issue, practitioners stressed the need of focusing on the practical value of Enterprise Architecture work and ensuring the utilisation of Enterprise Architecture deliverables by inducing concrete management activity rather than just modeling. Some practitioners also speculated about the potential existence of distinctive schools of thought around whether Enterprise Architecture was practiced with the focus on modeling or rather on management support.

> I have noticed that there are two schools of thought, at least in the public sector, and they are kind of fighting each other. The other is the school where Enterprise Architecture refers to how we describe things. - - Many times, this modeling school does not go deep enough into the management dimension. [...] For me, living, functional EA work is a kind of management sparring and searching for strategies. (Interview F)

The lack of intrinsic value related to the Enterprise Architecture practice and Enterprise Architecture descriptions was highlighted in several views. The key purpose of Enterprise Architecture was characterised as being a facilitator of dialogue and a creator of common understanding between the organisations' stakeholders, more than anything else. In this thinking, Enterprise Architecture is not seen as much as an implementing force, but as an enabler of co-operation. Some interviewees stressed the need for a collaborative approach to Enterprise Architecture as an antidote to the lacking value realisation, which has sometimes been experienced in some of the traditional modeling-oriented Enterprise Architecture practices. In this approach, the focus of Enterprise Architecture work is purposefully shifted. Instead of being mostly about something that Enterprise Architects do following a specific method, the main goal of Enterprise Architecture becomes facilitating co-operation between stakeholders, creating common understanding and shaping the stakeholders' thinking in the process. In this approach, strictly following the Enterprise Architecture method becomes less important as the approach is tailored to what is best suitable to serve the collaborative purpose.

> When I'm invited to the management team, it is not my job to meet the management team's expectations. Instead, my job is to also shape their expectations and thinking, bringing pieces together and enabling their growth in a way. (Interview K)

> The point of the Enterprise Architecture work is not that we make a model, [...] the point is that we model together. (Interview D)

In contrast with the collaborative approach, rigid approaches towards Enterprise Architecture scoping were generally seen as increasingly problematic and were in many cases characterised as a relic from the past. Such approaches traditionally featured Enterprise Architecture being primarily associated with strict control mechanisms, such as pre-defined gates in development models or various kinds of centralised architecture boards, often perceived as somewhat detached from the organisation's everyday life and reality. These kinds of arrangements were not only seen in a rather negative light politically, as "policing instead of promoting collaboration", but often also were not seen as performing very well in terms of their ultimate impact, either. Some interviewees explicitly referred to various lean-agile approaches as a way of promoting a collaborative approach as well as improving the utilisation rate of Enterprise Architecture work, while tackling the issue of rigidity. Common to these approaches is the attempt of maintaining a pragmatic focus to Enterprise Architecture work, con-

centrating on the results over the method as well as leaving room for learning, adaptation and local team level decision making regarding Enterprise Architecture issues. While these approaches were seen as generally desirable, the responses indicated that the lean-agile principles are not necessarily yet self-evident in many organisations' Enterprise Architecture practices.

> One thing that comes to mind now is that if the development model is very rigid and has certain types of gates, then in a way the risk is that the Enterprise Architect will drift into the role of some kind of a policeman. [...] That leads to a wrong kind of role and cooperation model. (Interview H)

> We should work in agile and lightweight manners, so that we don't model for the joy of modeling, but only do as many descriptions as are really needed and that those needs are actually business-oriented. [...] Not in some heavy framework or tool-oriented way, but so that things are done based on the real needs of the operations. (Interview A)

Expectations towards the Enterprise Architecture practice were also raised as a specific issue perhaps worth of a separate discussion. The Enterprise Architecture practice has a danger of being seen as a "silver bullet" that should be capable of solving all the organisations' problems. This can lead to inflated expectations that need to be understood and managed. It needs to be noted that Enterprise Architecture is only a part of the solution, and typically needs to be applied in tandem with other managerial methods for best results. In order to yield the desired results, the practice also needs to be scoped, resourced and deployed appropriately in relation to the organisational context. The unmanaged, unrealistic expectations can be problematic as one of the potential sources of negative attitudes towards the Enterprise Architecture practice.

> But I also have to say that when this issue is presented like this, it is easy to create a delusion that OK, we now have Enterprise Architecture, so things have been resolved, things are OK. I have always talked about the fact that Enterprise Architecture is just a tool among others. It alone does not solve the entire organisation's operations and development needs, but combined with others, it can achieve things. (Interview I)

4.4.2 Configurations of the Enterprise Architecture practice

This category describes the various configurations of the organisations' Enterprise Architecture practices as a result of different approaches to Enterprise Architecture scoping. The category covers the **positioning of the Enterprise Architecture function** within the organisation, the internal **design of the Enterprise Architecture function**, the **significance of various Enterprise Architecture dimensions** as perceived by the organisation, the **application of Enterprise Architecture based capabilities** as a part of the organisation's management as well as the **usage of the Enterprise Architecture frameworks** as a basis of the organisation's Enterprise Architecture practice.

Positioning of the Enterprise Architecture function

The interviewees' experiences on the *positioning of the Enterprise Architecture function* within the organisations varied across the spectrum, but also indicated some common topics that could be found across the organisations. The positioning of the Enterprise Architecture function was used as one of the further indicators of whether the theoretical Enterprise Architecture schools of thought, as discussed in section 2.3, could be observed in the organisations' actual Enterprise Architecture practices. Positioning was approached in a broad sense, including not only the organisational placement or responsibility of the Enterprise Architecture function, but also the overall indicators of how Enterprise Architecture was perceived within the organisation – which organisational functions Enterprise Architecture was mostly associated with and what parts of the organisation could be seen as the main driving forces behind the Enterprise Architecture practice. The results continue to paint a picture of Enterprise Architecture as a practice predominantly originating from the IT, with the Enterprise Architecture practitioners themselves however consciously striving to steer its scope towards more holistic, business-oriented and strategic stances. This evolution does not always appear as particularly straightforward.

> In the organisations I have been involved in, I have actually seen this whole scale and these kind of stages of evolution or periods, when certain approaches have been attempted. And it has not always been successful, and then the approach is changed a bit and something else is being tried instead. (Interview L)

The technical origin of Enterprise Architecture can be seen manifesting itself in the fact that the Enterprise Architecture function has typically been, and often still currently ends up positioned closer to the organisation's IT than to the business functions. In terms of the organisational responsibility, the ownership of the Enterprise Architecture function could often be found somewhere under the realm of the information management unit. Some interviewees wanted to highlight, however, that despite being primarily associated with the IT in terms of the organisational structure, the approach to Enterprise Architecture itself should be holistic by default. Close co-operation of the Enterprise Architecture function with a diverse set of organisational stakeholders was seen as important no matter where the ownership factually was. Some interviewees additionally pointed out the shift that is currently happening in the role of the information management on a general level. As the role of IT is getting more and more significant and even business-critical in many organisations, information management continues to get new kinds of responsibilities beyond the traditional scope of providing IT services for the business. At least based on some accounts, information management professionals are also in the process of embracing this new role. The organisational positioning of the Enterprise Architecture function cannot therefore be used as the only indicator of whether Enterprise Architecture practice itself takes an IT approach or a more holistic approach.

> Well, I guess the most typical scenario is that it's somehow IT- [...]. That it is there somehow related to the information management. At least that's the impression I've got. [...] the most common is that it has somehow grown there alongside IT and out of the needs of IT. (Interview B)

> In both organisations, that effort has indeed been IT-driven, but in both of them they have tried to approach it holistically from the beginning. (Interview I)

> It tends to easily end up within the realm of information management. However, it has to be understood what the role of information management is today, it is much more than a technical service provider, that technical role. [...] The role of information management is precisely that - to look at the big picture, what we are aiming for, what is our current position. (Interview E)

Among Enterprise Architecture practitioners, several interviewees still indicated a clear personal preference they had to ultimately shift the positioning of the Enterprise Architecture function towards a more holistic stance, specifically less associated with the IT perspective and more associated with the business. This has, however, sometimes proved to be a challenging mission in practice as the association with the IT remains strong in the mindsets of many organisations. Some interviewees, in contrast, did not perceive the IT focus as something that was necessarily problematic per se. A narrower, predominantly IT-driven Enterprise Architecture scope can still serve a purpose and offer concrete results, although the effects may remain more limited in nature. This can also serve as a stepping stone for the further evolution of Enterprise Architecture towards a more holistic stance. IT is often considered as an easy place to start as there are concrete problems that can be solved with architecture and the effects of architecture work can be made visible in a relatively short time span.

> Like I said, I have tried to sell it by force, but yes, we still have Enterprise Architecture positioned in information management. (Interview C)

> If you say Enterprise Architecture in an organisation, most people think that it is some IT stuff and the like. It always needs to be reminded that this is not the case. (Interview D)

> That is, if you want a wider impact, then it requires other things, but that is damn difficult, the holistic one is damn tricky. If you can get it working well in the IT context, then why not do it. If it is easier to do and there are tangible benefits, then it is probably a smart first step. (Interview I)

Despite having a clear vision of Enterprise Architecture as a holistic practice, shifting the focus of the Enterprise Architecture function from an IT focus towards a business focus is not necessarily just a matter of a simple scope expansion or moving the responsibility of Enterprise Architecture organisationally from the information management under some business-oriented unit. In some cases, this pursuit had resulted in the emergence of two completely separate architecture practices, a business-oriented one and an IT-oriented one. In the

worst cases, this had led to a gap and even some political friction between the two separate practices, which is by definition clearly against the initial objectives of employing a holistic Enterprise Architecture approach. Several interviewees saw that the best-case positioning for the Enterprise Architecture function would be as high as possible in the organisation, perhaps preferably on some kind of a "neutral ground" between the IT and the business. This kind of a positioning would allow the Enterprise Architecture practice to serve a more strategic purpose, providing a tighter coupling with the organisation's general management and mitigating the friction that might exist between the scopes of the IT and the business functions as discussed previously.

> In both organisations, unfortunately, it has to be said that when the business-first approach is taken, there is still this kind of a gap. [...] You could almost say that two different architectures are being formed. That is, there is the strategy-based, high-level abstract business architecture, and then there is the IT architecture that continues to go on independently. (Interview I)

> In a perfect world [Enterprise Architecture should be positioned as central as possible, high up in the organisation's hierarchy], but culture also has an effect on this. (Interview A)

The evolution of the Enterprise Architecture function over time is described by several practitioners. Typically, there have been some drivers identified within the organisation that have created the need for changing the positioning of the Enterprise Architecture function towards a more holistic stance. However, the change itself has often proven to be challenging. The shift from the technical focus towards the socio-technical focus is not straightforward, requiring changes in the organisation's mindset and often taking a long time to achieve. Some interviewees also mentioned the non-linear progress involved in the evolution of the Enterprise Architecture function. It appears to be not at all self-evident that a broader scope would automatically turn out to be superior to a narrower one. In some cases, several attempts of reconfiguring the practice have been necessary as some of the approaches have turned out not to be viable. In case the Enterprise Architecture practice fails to realise the expected value, it seems to be easy to lose the stakeholders' commitment towards the effort. Sometimes, after a failed attempt of expanding the scope of Enterprise Architecture, the organisation has decided to return to the old, narrower scope.

> It seems that the trend is heading that way. But I think we're still on the way, just like I said, it's very easy to take steps back. (Interview H)

> It's been complicated. Failures and hitting the wall. [...] I came to the house about 10 years ago, at that time this one person had already been talking about this for a few years, trying to get people involved in the Enterprise Architecture thing. And the management was not enthusiastic about it at all, and didn't really give it any resources. It then remained as this wishful thinking of the IT department at the time. (Interview J)

> When the understanding is not holistic, it weakens the chances of success. Even though for some time in [organisation] the EA function was positioned under the strategy function, despite that, the tools and the scope were not sufficient to have been able to produce value. It then returned very strongly back to the IT orientation. (Interview F)

Various factors were discussed that were seen as having potential in explaining the reasons behind the Enterprise Architecture scoping and the fact that it often ended up being somewhat IT-driven. Some of these explanations include tradition and history, "the way it has always been". As the Enterprise Architecture method seems to be rooted in technical sciences, its adoption in that context is still seen as being quite natural in comparison to other managerial contexts that are traditionally more associated with various social disciplines not as familiar with the Enterprise Architecture method. Simultaneously, as the growing significance of IT is inevitably increasing the organisational complexity, and as Enterprise Architecture has been viewed as a good way of managing that complexity, this development itself increases the need for deploying Enterprise Architecture practices specifically to help managing the organisations' IT landscapes. Some interviewees elaborated on this thought by noting that many times, the need for Enterprise Architecture tends to emerge specifically from the IT side of the organisations. There are concrete, daily-level challenges that need to be resolved and Enterprise Architecture is often recognised specifically in the context of the IT management as a potential tool in achieving this.

> I believe that it originates from the management of complexity, and in a way, the fact that the information systems discipline like the world of engineering sciences, and conceptually, the [Enterprise Architecture] tools traditionally have their roots there. (Interview H)

> Most of the time, the ones who start screaming for it first are the IT people, because they need to solve the problems they are wrestling with all days, such as the systems not playing together, the development being inefficient and so on. (Interview I)

Certain managerial, organisational and cultural issues explaining the IT focus of the Enterprise Architecture practice were raised as well, despite the possible desire of ultimately moving Enterprise Architecture away from its predominantly IT-driven positioning. These issues involve various kinds of soft factors, including management awareness, organisational structures and lack of clear ownership, siloed organisational cultures and lack of collaboration. These can act as factors hindering the possibilities of successfully deploying more holistic Enterprise Architecture scoping approaches. Some interviewees also raised competences as an issue making achieving a more holistic Enterprise Architecture practice difficult. These points of view paint a picture of Enterprise Architecture as an inherently challenging discipline, demanding various kinds of competences that are not necessarily straightforward to acquire by the organisations. In order to succeed in their holistic role, Enterprise Architecture practitioners do not only require a wide generalist understanding of various IT and

business issues, but need to possess certain personal characteristics and soft skills, which are not always easy to find from either discipline, the shift being especially difficult for practitioners having a strong IT background.

> I hate it when management commitment is always raised – but yes, in practice, if the management does not understand and does not see what EA is for, and has never seen any concrete results, then if they do not understand what EA can be used for, so they won't buy it. (Interview B)

> It is also affected by what kind of culture there is in the organisation and the history, and whether business and IT are cooperating in general, or whether the organisation is really siloed. (Interview A)

> First of all, the interface [between business and IT] I was talking about is a damn difficult position to be, that is, it requires certain kinds of people. And it's not just every IT guy who can jump into that position, and it's quite a few business guys who can jump into it, just because of their mental qualities, personality and also their own interests. (Interview I)

The ecosystemic stance of the Enterprise Architecture practice was explored in addition to the intra-organisational positioning of the Enterprise Architecture function itself. The ecosystemic thinking was indicated by whether the Enterprise Architecture practice was seen focusing primarily on the internal aspects of the organisation or whether it featured a broader consideration of the organisation's external aspects as well. From many responses it became evident that while the ecosystemic perspective is something that was generally being discussed in the organisations as an issue of relevance, it has rarely been approached primarily through an Enterprise Architecture lens. At least within the sample, the ecosystemic perspective was something that had yet not fully taken shape or something that may manifest itself in individual projects or point solutions, but not in a very systematic way, at least yet. Some interviewees, however, seemed to be somewhat hopeful about the significance of the ecosystemic perspective increasing in the future. It was also recognised that new kinds of capabilities and ways of co-operation will be needed due to this trend. While there were some individual examples of ecosystemic co-operation happening already, many of the statements were sill characterised by their speculative nature and expectations more than by them reflecting the current situation.

> For us, the ecosystem angle has not been viewed through Enterprise Architecture. [...] We have been busy with resolving the daily issues that we have not focused on the ecosystem side that much. But then again in our strategy [...] this ecosystem issue emerged strongly as a part of our strategy, and it then became its main theme. (Interview J)

> But the architecture field is in strong disruption, I think you were right that we are moving towards ecosystem thinking, I'm seeing it the same way. [...] Now that we start making ecosystem architectures, we need completely new abilities, which we don't have. (Interview C)

Design of the Enterprise Architecture function

The interviewees discussed their views and experiences on the internal *design of the Enterprise Architecture function* in their organisations, as touched upon by the theory in section 2.6. This included topics such as how the scope of the Enterprise Architecture work is organised internally in terms of various organisational structures, how the organisation's Enterprise Architecture work is resourced, what kind of a role should an Enterprise Architect have in the organisation and what are some of the key competences that are perceived as important in the organisation's Enterprise Architecture work.

> In relation to the practice, you also have to really manage and lead it. It's not enough that there are architects who just draw things, but there has to be someone who can organise the activities and manage them sensibly. (Interview B)

Many of the ideas raised earlier as underlying approaches towards Enterprise Architecture manifested themselves in the recommendations provided by the practitioners on how the Enterprise Architecture function should be designed on a more practical level. Several interviewees were willing to discuss the optimal organisational structure of the Enterprise Architecture function. In many cases, the preferred Enterprise Architecture team setup was not seen as a centralised entity, but rather as a virtual team bringing together participants from various roles and parts of the organisation. This approach has not only helped involving a holistic enough scope of perspectives and competences in the Enterprise Architecture work, but also keeping the Enterprise Architecture work more politically acceptable and closer to the organisation's daily life. At the same time, a certain level of structure as well as sufficient management support was seen as equally important. Some interviewees highlighted that a viable Enterprise Architecture function also needs to have solid management and leadership in place. Not only does the daily Enterprise Architecture work need to be managed, it also helps to have a strong sponsorship from senior managers, preferably connecting the practice all the way to the top management.

> The best EA team is one that is not organisationally centralised, but is like a virtual team. [...] That in my opinion, the best combo is one where there are people from different parts of the organisation involved, so that the connection with the actual operations remains. (Interview B)

> What is important to me in this role of the Chief Enterprise Architect in two different organisations is that I need a senior manager who is like an advocate and, in a certain way, the spokesman for Enterprise Architecture all the way up to the general manager. (Interview I)

The role of the Enterprise Architect as well as the relationship between Enterprise Architecture and general management was discussed extensively, noting that the two tend to share many of the same issues and often operate within the same problem areas. In fact, it was often stated that many of the decisions with-

in the scope of Enterprise Architecture were actually made by the management and not by the people working in explicit Enterprise Architecture related roles per se. The role of the Enterprise Architect was often viewed as a leadership role by itself, but also as a catalysator or a facilitator, having a primary goal of helping general management succeed in their work. Enterprise Architects should not hijack, but complement the role of the management. Some interviewees additionally raised the central role of various informal channels as facilitators of successful Enterprise Architecture co-operation between the Enterprise Architects and the management. In contrast with having rigid organisational structures in place and deploying strict control mechanisms, some of the best results in acquiring buy-in for Enterprise Architecture work were achieved by building trust through nurturing interpersonal connections and cumulating positive reputation. The benefits of such informal, collaborative approaches over formal, hierarchical ones seemed to be recognised by several interviewees to the point that this was mentioned as a key success factor.

> I have sometimes used an expression that our architects are more like catalysts. That they go and help parse things, but strictly speaking, most of the architectural work is done by non-architects. And I think it's the right idea specifically in Enterprise Architecture. [...] I think the case is that most of the architectural work in real life is probably done by the business management. (Interview F)

> We have invested in the fact that our architects have some vision. If you have that, you are invited again and again to various situations. That is, they don't necessarily always come as official assignments, although we have procedures for that as well. But they can happen sometimes, when someone stops you in the corridor and asks an innocent little question, which was in fact not so little, and that trust grows. [...] I would claim that those official management models are not the route through which it has grown, but it's really been more like building trust. (Interview F)

Resourcing and competence issues were raised as an important, but problematic aspect to be considered in building a viable Enterprise Architecture practice. Several interviewees discussed competence and resourcing issues extensively. There seems to be a clear lack of standardised, formal education available for the Enterprise Architect role, which leads to the diversity of competence in the Enterprise Architecture workforce as well as a limited availability of competent workforce. This seems to be a substantial issue as the competence requirements for the role are quite diverse, ranging from method knowledge to various kinds of soft skills. The human resources available as well as the competences of the personnel may affect how the Enterprise Architecture function ends up being scoped in practice. Some interviewees brought up using outsourcing in acquiring relevant Enterprise Architecture competences and capacity on-demand. This was seen both as an opportunity and as a risk. While utilising outsourced Enterprise Architecture consultants tends to be more flexible in terms of the resource usage, it is also important to keep the management side of things within the organisation and not outsource substance issues excessively.

> Technical know-how and planning abilities are one thing, but the EA work involves a lot competences that are not easily available. [...] When we are approaching various management dimensions, those skill requirements are quite tough. [...] There are challenging situations where the architect has to be a bit of a referee [...]. A surprising number of skills are needed to handle those situations in terms of management and communication. There have often been cases where the expectations are surprisingly high, you almost have to be able to walk on water. (Interview F)

> The ability to partner with the business is extremely important. It also requires a good ability to crystallise things, especially from the top architects. In my opinion, top EAs must be at the same level as company CEOs in terms of leadership and speaking skills. (Interview K)

Various contextual factors involved in designing the Enterprise Architecture function were also brought up in the discussion. This serves as a reminder that Enterprise Architecture should not be a one-size-fits-all solution, a notion which is expanded on in the further discussion of contextual factors. The design of the Enterprise Architecture function should be adapted to fit the purposes of each individual organisation in terms of the roles involved, the organisational structures established and the ways of acquiring the required resources.

> We have to think about the approach so that we can understand the whole and make it [the Enterprise Architecture function] look like our own. And think about it keeping the goals in mind – what do we want to achieve, how can we get better results using this model. (Interview E)

Significance of the Enterprise Architecture dimensions

The interviewees were asked about their perceptions of the *significance of various Enterprise Architecture dimensions*, as discussed in section 2.5, based on their experiences from the practice. The views varied somewhat between the practitioners, with some interviewees identifying having a clear focus or a priority on certain dimensions and some highlighting their aspirations towards a holistic consideration of various dimensions. Some interviewees' responses reflected that although several dimensions may have been idealistically considered as a part of the Enterprise Architecture scope, they were not necessarily being treated as equals or were not truly aligned to each other in practice.

> In an ideal situation, they would be in balance and in a suitable proportion to each other. But how to get to such a situation and how to maintain it, it's definitely challenging. (Interview H)

A clear emerging topic seems to be the perceived importance of the strategic dimension, which was simultaneously seen as a somewhat problematic dimension to deploy in practice. Several interviewees were willing to highlight the importance of the strategic dimension, with some going as far as seeing strategy as in fact the most important of all the Enterprise Architecture dimensions. Strategy was seen as a foundational issue, which is why Enterprise Architecture

practitioners often felt the need of having a sufficient understanding of various strategic issues. Some practitioners even argued that any Enterprise Architecture work that is being done without some kind of a connection with the strategy is essentially irrelevant. Some interviewees had, however, observed several issues in utilising the strategic dimension in the Enterprise Architecture work, leaving its actual significance trivial at best. Such issues sometimes included the lacking maturity of the organisation's strategy work itself, not providing sufficient guidance or resulting in strategy deliverables that are too generic and abstract to be usable in any practical applications.

> I see it as quite straightforward that we should start from the strategy, it is the most important. It is clearly the most important level of the architecture. It's hard for me to see how some other level could be more important. (Interview C)

> Strategy is something that must be involved in all operations [...]. And maybe the core of the discussion is whether the Enterprise Architecture model has enough potential for that, [...] tools for making strategic choices. (Interview E)

> The principle layer [describing strategic issues] is clearly peripheral, and it is not necessarily due to the Enterprise Architecture practice – it is often due to the maturity level of the strategy work. That is, if the strategy work doesn't result in any concrete results, then it does not really add any value that such a strategy written in prose would then then be modeled using architectural elements [...]. (Interview B)

The business dimension was also generally viewed as a core Enterprise Architecture dimension. Several interviewees also explicitly stated that the business dimension should come second, right after the strategy dimension. Business issues were seen as specifically important in achieving an understanding of the organisation's reasons for existence and operations as a whole.

> If the aim is to support strategic development and ensure that development resources are targeted correctly, there is a need for structuring the business and the operations as a whole. [...] I myself have experienced that great impact can be achieved by having that understanding of the business as a whole. (Interview H)

The information dimension was seen both as important and challenging. Several interviewees argued that despite being an important dimension to consider in the Enterprise Architecture scope, information was often seen as one of the most difficult dimensions to work with in practice. In a knowledge-intensive environment, the role of information seems to be undisputed. At the same time, many practitioners seem to be struggling with the information dimension as it is often perceived as something that is ambiguous and intangible, something that is not necessarily easy to understand in a common way of and something that requires specialised competences in order to get right.

> I think information architecture is now gaining attention, of which I'm glad. How information is managed, how information should be governed and what is related to it. (Interview D)

> And information is the difficult one. [...] It is also a bit more competence-intensive than those other areas in a certain way, that it requires a certain kind of angle that not an awful lot of experts have. (Interview F)

The information systems dimension was recognised as perhaps one of the most traditional Enterprise Architecture dimensions. Several interviewees argued that while it seems to be a traditional place to start with, the information systems dimension alone is only able to provide a limited amount of value without employing the other dimensions. While this also often seems to be one the most approachable dimensions, stemming from the well-established IT architecture tradition, it is often reminded that the information systems dimension is not enough by itself to constitute the holistic Enterprise Architecture.

> The focus has indeed traditionally been more on information systems and technologies. [...] It's somehow natural to start modeling from the technology perspective of architectural description and forget about the other layers. (Interview D)

The technology dimension was generally seen as somewhat less significant compared to the others. Several interviewees agreed that the technology dimension is perhaps currently not as much in focus as some of the other Enterprise Architecture dimensions. One of the issues involved in this dimension included finding the appropriate level of abstraction to be considered as a part of the technology architecture, as opposed to various lower-level operational IT asset catalogues. While considered relevant per se, the significance of the technology dimension was also diminished by the notion that technology should only come after the business and the information systems and is not as usable by itself when compared to these "higher-level" Enterprise Architecture dimensions.

> Technology architecture is becoming less and less significant in my view, but then I don't mean that it is not necessary. For example, if you think about any organisation these days, technological ability, technological know-how, that's such a big asset. - - They are important, but my priority order is that I can't do anything with the technology architecture if I don't have the others. (Interview C)

Some interviewees additionally mentioned implementation as an Enterprise Architecture dimension that is sometimes neglected. While less frequently brought up, this dimension was seen as useful in certain scenarios, specifically when focusing on supporting the architecture execution. This dimension appeared to be more implicit and was rarely explicitly discussed on its own.

> You can also add the implementation layer there, which I also forgot to mention. The issues are easily left [unimplemented] if you don't implement them. (Interview C)

The business and the information systems dimensions were often mentioned as the two most important dimensions of Enterprise Architecture. This should make intuitive sense as business-IT alignment has traditionally been at the core of the Enterprise Architecture discipline, which is then reflected by the perceived significance of these two dimensions in particular. Despite the aspiration towards a holistic stance in the Enterprise Architecture practice, there is often a need for prioritising between dimensions, in which case the focus is naturally placed on the dimensions that are considered to provide the most value.

> Yes, the core dimensions are business and information systems, they are probably the two most important. (Interview B)

> They should be considered as whole, but my way of looking at it has a priority from top to bottom in this order [from strategy to business, information, information systems and technology]. (Interview C)

The discussion also touched upon the possible focus shift between the dimensions over time as the scope of the Enterprise Architecture practice has evolved. On a general level, the insights seem to support the trend of Enterprise Architecture shifting from the more technically-oriented dimensions towards the business and the strategy dimensions. This was not, however, always straightforward and in many organisations, the shift seemed to be still ongoing. It also remained somewhat unclear whether the perceptions represented the practitioners' personal preferences or the organisations' actual reality.

> For us, perhaps business and information are currently being quite heavily emphasised in our architectural work. Earlier, before architecture had such a strong position in our organisation, then again IT architecture, or actually application architecture and information [were the dominant dimensions]. (Interview J)

Application of Enterprise Architecture based capabilities

The interviewees were also asked about the *application of Enterprise Architecture based capabilities*, as discussed in section 2.7. The insights revealed a variety of potential Enterprise Architecture applications. Several interviewees explicitly noted that there are distinct approaches to how Enterprise Architecture can be scoped in terms of its practical applications in various organisational contexts, with a wide spectrum of approaches being adopted by the organisations. Sometimes the reasoning behind a certain set of applications was a result of a conscious decision, while sometimes this process appeared as laissez-faire.

> I was allowed to interview all the members of the management team [...] and I asked about what we were looking based on five use cases. Architectural planning as support for projects, then as support for project portfolio management [...]. Then there was support for strategy implementation, business management and development support [...]. And then there was ICT development and management support. And then we went with what the CEO emphasised [...]. (Interview B)

Generally speaking, the value of the Enterprise Architecture practice in improving the organisations' dynamic capabilities was recognised as something helping organisations cope with change and make change easier. Several interviewees identified the role of Enterprise Architecture in a generic way as a dynamic capability of an organisation. By applying Enterprise Architecture, the organisation aims to improve its general abilities to change and adapt in a response to various sources of demand, while doing it as quickly and efficiently as possible. Enterprise Architecture supports this by facilitating a better understanding of the current state, the target state and the changes required as well as providing a systematic methodology for executing the change.

> Increasing flexibility in an environment which is initially very rigid, it is really important. […] That dynamic capability, I believe it's important. (Interview F)

Similar to the strategy dimension, the strategic application of Enterprise Architecture was seen as important. Several interviewees stressed the importance of the strategy support role of Enterprise Architecture. Practitioners generally tend to see significant potential in how the Enterprise Architecture practice could support strategy planning, as well as a clear demand for such support. However, some interviewees also identified certain issues hindering the strategic planning role of Enterprise Architecture. It was argued that the focus of Enterprise Architecture often seems to be predominantly placed on understanding and manipulating the current state of the organisation – not necessarily on planning the target state, which can be seen as being at the core of the strategy work. The current state perspective seems to be somewhat limited and does not allow for the realisation of the full potential of utilising Enterprise Architecture in strategy and target state discussions. The involvement of Enterprise Architecture was often being restricted to the current state perspective, identifying various kinds of gaps and issues and communicating them as an input to the actual strategy work that was being done elsewhere. While this can be beneficial as well, some practitioners questioned the value of such limited contributions.

> EA work could support that [strategy work] in two ways. On the other hand, by structuring the company's current world and existing development plans [...] so that we know where to start. And on the other hand, if EA work was directed towards structuring the business environment and ecosystems, it would perhaps be possible to identify various opportunities in the operating environment. (Interview H)

> The problem is that only in few organisations the target state is actually planned using Enterprise Architecture. The strategy does not really affect the current state in any way, it just is what it is. The strategy work is more about when individual development projects are planned, they try to justify the fact that we are trying to support this strategic goal with this project. The target state is actually created somewhere in the head of the business managers and then they turn it into a PowerPoint and make the actual decisions. (Interview A)

While the potential value of Enterprise Architecture as a tool of strategy planning seems to be well recognised, the involvement of Enterprise Architecture in strategy planning processes seems not to be self-evident due to various issues ranging from management awareness and commitment to various organisational structures preventing the involvement. In general, Enterprise Architecture seems to have some difficulties in shifting from a point solution focus towards a more holistic role in strategy work. The strategy process itself is often seen as a process involving a diverse set of strong-willed stakeholders and organisational politics, making it complex and difficult for the Enterprise Architecture practitioners to contribute to. A general feeling seems to be that strategy is something that is created among a relatively small group of people, typically top management and various kinds of management teams. Is often seen as something that is provided as more or less a given for the Enterprise Architecture practice to execute on. Enterprise Architecture practitioners often found their possibilities to influence the strategy process somewhat limited. The discussion paints a picture of Enterprise Architecture being generally more accepted as a tool of strategy implementation than strategy planning.

> In [organisation], we have now made a contact with the strategy unit, but the fact is that if you have a large organisation, there is typically a rather small strategy team. [...] There is also this kind of friction [...] when there are different parts of the organisation whose future prospects can be very different. [...] In practice, it tends to go so that the strategy comes from the top management [...] as a given, in a way. But if you can get involved in these projects that implement the strategy, then by directing those projects, you can bring value and provide guidance. (Interview H)

Certain explainers for the low involvement of Enterprise Architecture in organisations' strategy work could be identified. Often, a lack of understanding of the value of Enterprise Architecture among the management as well as the general maturity hindered the utilisation of Enterprise Architecture based thinking as a part of the strategy planning process. On the other hand, sometimes previous experiences from an overly methodological Enterprise Architecture approach have had negative effects, shifting the focus too much away from the strategy work itself. Additionally, there has sometimes been a lack of interest towards the strategic issues among the Enterprise Architecture professionals themselves, who consider strategy as something that is predominantly a management issue and not necessarily involving the Enterprise Architecture scope as much.

> We had an earlier strategy reform where the groundwork was done without any EA angle at all, and then after that when we started working really strongly with EA. [...] It was done so methodically using EA models, so that even the top management watched live as EA modeling was being done. That is perhaps an extreme example. And in that we maybe went wrong a little bit, the understanding and the idea of EA was not at the same level in the top management, maybe it took the focus away from the strategy work a little bit. (Interview J)

The specific role of Enterprise Architecture in the strategy work was discussed by several interviewees. Some highlighted that the Enterprise Architecture function is not, and should not, be the decision maker, but rather a supporting actor, helping to collect and analyse data, evaluate alternatives and make decisions. Enterprise Architecture practitioners should not be considered as strategy professionals, but they can provide value in linking the strategy to the organisation's reality and ensuring that the created strategy is viable and executable in practice. Some interviewees characterised the role of Enterprise Architects as possible facilitators of the organisation's strategy work. Enterprise Architecture was seen as something that could have potential in bringing together and integrating the various organisational stakeholders' viewpoints in the context of the strategy work. This was, however, not always the case as Enterprise Architecture was not necessarily welcomed to the tables where the strategy was discussed or it was not seen as a good method to go about conducting the strategy planning process in the first place. Sometimes, the involvement of Enterprise Architecture based way of thinking without highlighting the Enterprise Architecture method itself was seen as a more viable approach.

> And I emphasise the word support, the architecture function is not the decision maker. It's just like something that prepares things - it collects data, analyses various issues and presents alternatives to the management. [...] In my opinion, it is quite important in terms of the viability of the practice that we understand that role. (Interview B)

> I see that it's like a facilitator role, being able to bring out the different concerns of different parties and which things are seen as important in different areas and how these things are related to each other. Because in a way, some people look at issues from a certain angle, but the goal is to pursue the interests of the entire company. (Interview H)

Although the strategic planning application seems to be generally desired, perhaps some of the more established Enterprise Architecture applications were often found in strategy implementation and specifically development project support. Several interviewees identified project support as one of the most typical applications for Enterprise Architecture. This involved both the project level support, focusing on architecture in the context of individual development projects, as well as the project portfolio level support, focusing on architecture across the boundaries of individual development projects, aligning the project level architectures and making sure common architecture standards were being followed, for example by integrating Enterprise Architecture in various gate decisions within the development model. It appears that this application is also more likely to acquire buy-in when compared to the strategic applications.

> The starting point is practically always in the projects. Or at least we recommend it, and usually that architecture fits the projects the best, at least it's one of the first places to implement it. And there are different mechanisms for how it fits there. (Interview A)

> When I asked what we were looking for, the strategy support was one of the use cases, but it was not taken up. It was the development support, the architectural work for the projects, and in general, the development support was the priority, and then we started with that. […] Architectural design supporting projects, then supporting project portfolio management, they are two slightly different levels. (Interview B)

The importance of finding an appropriate balance for Enterprise Architecture being involved in both strategy planning and strategy implementation applications was discussed. Generally speaking, sufficient involvement in both was seen as optimal. However, earlier involvement in strategy planning could have a potential of making strategy implementation easier by tackling potential issues before they get realised on the implementation level. Some interviewees proceeded to discuss various resourcing issues involved in scoping Enterprise Architecture applications. Resourcing is something that limits the possibilities of utilising Enterprise Architecture in various scenarios in a very concrete way, as the limited resources cannot be allocated towards too many activities at the same time. Often, the supply is not able to meet the demand, leading to the need of making hard decisions on where to allocate the Enterprise Architecture resources that are available. Sometimes, this does not happen very systematically, but is rather a result of chance. It is recommended, however, to consider the applications that are the most appropriate in each organisational context, and focus the limited resources on supporting these applications well.

> What is the emphasis between supporting some projects versus trying to build a holistic big picture. The balance, you have to be sufficiently involved in both of these, so that you understand them well enough [...] and so that you have a more correct big picture. (Interview H)

> Realistically speaking, those projects are primarily targeted that have been identified as such that architecture is useful here and that we have people here who know how to do enough architecture. It means that from the mass of projects, quite a large part will be left unattended, because there is no expertise or resources or no one has thought about taking it [Enterprise Architecture] into account. (Interview I)

> Some stumble by trying to do all the things that can be done with EA. They have to be prioritised, because there are not so many architects anywhere to be able to do all the possible descriptions. (Interview B)

The evolution of Enterprise Architecture applications over time was additionally discussed. The relationship between the strategy and Enterprise Architecture seems to be growing in significance, to the point that some Enterprise Architecture practitioners have started to question whether they should become synonymous at some point. The potential value of Enterprise Architecture in introducing a level of systemic thinking into the strategy process seems to be recognised. At the same time, the more established applications of Enterprise Architecture still seem to be found on lower, tactical and operational levels of management. A more strategic positioning comes with a potential of realising great-

er benefits, but also takes significantly more time and effort to achieve compared to a more tactical or operational positioning. Starting small and expanding the scope as positive experiences and successes are cumulated is suggested as one viable approach for evolving the Enterprise Architecture practice.

> Unfortunately, it is often positioned on the operational-tactical level, and I think it understandable from the point of view that it can be utilised quickly there. [...] Instead, in the longer term, that strategic positioning would be more important. I mean that organisations are looking for quick profits. [...] If we focus on strategic level thinking, we are talking about 5 years or 10 years. But still, the big benefits are probably there. And in trying to operate on operational and tactical levels - of course many benefits remain unutilised. (Interview D)

Usage of the Enterprise Architecture frameworks

The interviewees additionally talked about the *usage of Enterprise Architecture frameworks*, as discussed in section 2.4. Frameworks appeared as somewhat of a controversial topic among the practitioners, with both support and criticism presented towards the use of some of the popular Enterprise Architecture frameworks, such as the TOGAF framework or the JHS 179 recommendations (in the context of the Finnish public sector). Several interviewees seemed to specifically question the practical value of such frameworks. While it may be widely recognised that the frameworks do have some valid and usable ideas behind them, many interviewees argued that their connection to the real-life Enterprise Architecture practice many times remained limited at best. The popular frameworks were sometimes seen as too rigid, bureaucratic or something that is challenging to communicate and get commitment for outside of the community of Enterprise Architecture practitioners. Some practitioners explicitly indicated that using terminology originating from an Enterprise Architecture framework would in their opinion carry a potential risk of hindering the acceptance rate of Enterprise Architecture work in their organisations. The popular Enterprise Architecture frameworks were not seen as something that would have, at least explicitly, affected the Enterprise Architecture scoping decisions.

> I came to a realisation that this [TOGAF] has no benefit in my job, on the contrary. I can't apply it to anything at all, but I'll be hauled under the keel if I start proposing it. It's too heavy, it's too stiff. It doesn't correspond to how things work in the real world in any way. (Interview F)

A diminishing role of the popular Enterprise Architecture frameworks in real-life Enterprise Architecture practices was something that seemed to be observed by many. The frameworks seem to represent an "old way of thinking", which is seen as somewhat out-of-sync with the requirements of the modern world. Instead, it seems that frameworks are being at least partially replaced by some more pragmatic approaches. The focus has shifted from complying with a certain framework to focusing on results and producing only the most essential deliverables in the spirit of lean Enterprise Architecture approaches. Some in-

terviewees proceeded by raising fundamental questions about the future of the Enterprise Architecture frameworks, which were seen as somewhat left behind compared to some other popular management frameworks gaining attention. In some radical views, the bad reputation of Enterprise Architecture frameworks was even seen as something that could ultimately lead to Enterprise Architecture being faded away as a term in favor of some other paradigm.

> I see that the use of TOGAF, and JHS in the public sector, has radically decreased in general. [...] It goes more so that certain practical deliverables remain in use. […] I don't really predict very good times for TOGAF. (Interview K)

> I wouldn't be surprised if Enterprise Architecture was to disappear in the next 5-10 years, so that it's not even talked about anymore. We'll probably do things like that, but I'm not at all sure that it will be sold as Enterprise Architecture anymore. (Interview I)

Contrary views, expressing support for common frameworks, were also presented. According to these views, having a common method in place should be seen as an enabler, making it easier to get started and making it possible to improve the maturity of the Enterprise Architecture practice. An interesting observation supporting this view was that even the opponents of the frameworks were often implicitly using concepts and terminology factually originating from the frameworks when discussing the scope of Enterprise Architecture, despite being openly critical towards them. This suggests that the popular frameworks are still somewhat influential and useful, at least as ontologies or mental models, despite the criticism often presented towards their deployment. Some interviewees further discussed the need for adapting and developing the frameworks to better suit the needs of each individual organisation. They saw many of the problems attributed to the frameworks as in fact originating from a faulty deployment rather than the frameworks themselves. Some interviewees described having replaced extensive Enterprise Architecture frameworks with solutions that were considered more lightweight as well as more connected and responding to the organisations' daily needs. Such solutions included coupling Enterprise Architecture practices with existing development models or internal service catalogues, offering low-threshold on-demand services to stakeholders instead of deploying extensive governance structures.

> It should be more like taking the best parts from the practice and the best parts from all the standards that make sense and defining what those things mean in our organisation. That is what's needed for a successful deployment. (Interview A)

Interoperability and enabling co-operation across the organisational boundaries were discussed as important drivers behind the need for common frameworks and tools. This was especially seen as important in the context of the public sector, where the need for interoperability becomes highlighted as several organisations are dealing with similar kinds of problems on a daily level. Having

more established common frameworks and tools in place could make the co-operation more fruitful. Some interviewees with a background in the Finnish public sector were also willing to discuss the effects of legislation on the role of Enterprise Architecture frameworks. As the legislation is no longer explicitly demanding the use of the Enterprise Architecture method and following the JHS recommendations has also been made optional, the organisations have had more freedom in selecting and tailoring their individual practices. The JHS recommendations still remain somewhat relevant, but they are more open to adaptation. This is seen as generally good, but also somewhat problematic in terms of the future of interoperability. As the scope of Enterprise Architecture thinking is predicted to expand towards ecosystemic thinking, spanning organisational boundaries, there is now less methodological common ground available for facilitating Enterprise Architecture co-operation in these ecosystems.

> The fact that it [the new legislation] gives more degrees of freedom to choose the method, that Enterprise Architecture is not mentioned directly, that is a conscious decision. [...] The idea is that the legislation should harmonise it. I don't really think that it can do that, at least in its current form, but yes, maybe it is a step in the right direction, or else the JHS 179 should have been really significantly renewed. (Interview I)

4.4.3 Impact of the Enterprise Architecture practice

This category describes the perceived impact of Enterprise Architecture practice in relation to the scoping choices made based on the underlying approaches to Enterprise Architecture as well as the various configurations of the Enterprise Architecture practice. The category covers the effects of the Enterprise Architecture scoping on the **benefits of the Enterprise Architecture practice** as well as the **maturity of the Enterprise Architecture practice**.

Benefits of the Enterprise Architecture practice

The interviewees' perceptions of the connection between the scope and the *benefits of the Enterprise Architecture practice* appeared as somewhat vague. A fundamental problem with the Enterprise Architecture benefits, as discussed in section 2.9, can be found in the difficulty of measuring. Isolating the effects of the Enterprise Architecture practice from all the other management activities happening within the organisation appears to be inherently difficult and few organisations seem to have any systematic mechanisms in place that would help in assessing and verifying the effectiveness of the practice. The claims about the benefits of Enterprise Architecture seemed to be based mostly on heuristics and somewhat subjective perceptions of whether having an Enterprise Architecture practice in place has generally led to better results than not having an Enterprise Architecture practice in place. To some extent, the perceived value of Enterprise Architecture seems to be a matter of belief and trust. Some interviewees described that their perception of the impact of the Enterprise Architecture practice was mostly based on various weak signals, such as the sense of achiev-

ing an improved common understanding about various issues, the stakeholders' attitudes or a feeling of development work proceeding better with the help of Enterprise Architecture. Some interviewees had attempted to quantify these kinds of subjective perceptions using various internal surveys measuring stakeholder experience. Some interviewees, on the contrary, questioned the need for measuring the Enterprise Architecture practice itself in the first place. In their thinking, measurement should be primarily based on achieving the strategic goals of an organisation, not so much on whether the benefits were achieved as a result of specifically using the Enterprise Architecture method or not. At the same time, the scoping of the Enterprise Architecture practice needs to be justified by demonstrating some concrete benefits, which is problematic.

> We haven't really figured out how to measure it, because they [effects] tend to be so indirect. (Interview B)

> It's a matter of faith in a way, yeah. And especially in the initial phase, when starting the whole thing and considering the investment, it is also partly a question of trust, so that the manager who makes the decision should be able to trust that the benefits will be obtained from it at some point. (Interview I)

The lack of intrinsic value involved in the Enterprise Architecture practice was often highlighted. When considering the benefits of the Enterprise Architecture practice, the primary focus should be placed on the ultimate goals that the organisation is willing to achieve by deploying it. The approach towards the Enterprise Architecture practice should then be selected based on these objectives. Several interviewees proceeded to discuss the benefit realisation mechanisms of the Enterprise Architecture practice, highlighting that the benefits can only be realised through the successful utilisation of Enterprise Architecture based capabilities within the organisation. Correspondingly, the investment made in the Enterprise Architecture practice in terms of the use of resources should be aligned with what the organisation is willing to achieve and which problems it is ultimately willing to solve by deploying the practice. The limited resources should be allocated wisely to where they provide the most value. This should significantly affect Enterprise Architecture scoping choices.

> In planning the Enterprise Architecture work, we have to think about what we are aiming for here. That's the very first thing when you start doing Enterprise Architecture work, it's not worth doing because others are doing it, but because there is a demand for it. And if there is, then what is the reason for it, what is the concrete benefit that we want to achieve with that work and that investment. (Interview D)

The connection between the scope of the Enterprise Architecture practice and the benefits that can be expected from it was also explicitly discussed by several practitioners. The selected scope should generally correlate with the goals and the resources available. Once again, a greater impact inherently requires more substantial investments and is generally more difficult to achieve. On the other

hand, sometimes a lesser impact is completely acceptable if it can be executed well, as opposed to striving for a greater impact, but failing to deliver. Several interviewees discussed the largely indirect benefits and the inherently long delay of benefit realisation as a core problem when evaluating the impact of the Enterprise Architecture practice. It seems to be generally hard to isolate the effects of the Enterprise Architecture practice from the other activities happening within the organisation and have the patience required to follow up with the long-term results, especially in organisational settings that are prioritising quick wins. It can be difficult to justify an investment needed towards an extended scope of the Enterprise Architecture practice if the results only come with a delay. Some interviewees, however, had a completely opposite view on the time span related to the benefit realisation. According to them, the benefits of the Enterprise Architecture practice should be visible almost immediately through an increased level of shared understanding. If this is not the case, something is being done wrong in the approach towards Enterprise Architecture.

> Well, first of all, it takes time. [...] The problem is that benefits are expected within a month, and if they are not delivered, the plug is pulled again. You have to understand that the higher-level work is different in nature. It is very demanding in its own way, and it takes time, and it's possible that those benefits only materialise after several years. (Interview I)

> Many times, you hear people say that architecture is difficult as the results are visible with such a long delay. I have completely different experiences. You sit with the management for two days [...], those results are visible pretty quickly. They are starting to understand [...]. In other words, the fact that the results of the architecture practice can be seen somewhere far away means that the approach must be wrong. (Interview C)

Maturity of the Enterprise Architecture practice

The interviewees' perceptions of the connection between the scope and the *maturity of the Enterprise Architecture practice* were almost as vague. Few organisations seemed to have formal Enterprise Architecture maturity models in place that would have enabled an explicit evaluation of how the organisation's Enterprise Architecture practice was evolving, as discussed in section 2.10, although the potential value of having such maturity models in place was somewhat recognised among the practitioners. Several interviewees were familiar with various Enterprise Architecture maturity models on a high level. However, a general perception seemed to be that these models have lost some of their popularity in practice compared to their peak some years ago. Enterprise Architecture maturity models were often seen as somewhat problematic due to their complexity, being too rigid or ending up having only trivial value in practice. Some interviewees had, however, recognised the value of Enterprise Architecture maturity models as useful tools in developing the Enterprise Architecture practice by assessing the current state, setting target state objectives and deciding on improvement activities needed in order to increase the maturity.

> Yes, [the maturity models are discussed] not so much. [...] Maybe it's a little bit because those evaluation scales are made too scientific and complicated, so their benefits are not necessarily that good. (Interview B)

> That is important in operations development […] If we start with an idea of how we can improve our way of working, then somehow, we need to know what the current state is and what the target state is. So, in my opinion, this maturity model is very suitable for that. (Interview E)

A general idea that the scope of the Enterprise Architecture practice should correlate with the maturity of the practice evolves seems to be well recognised and a stepwise approach to expanding the scope together with the maturity seems to be suggested by some practitioners. Several interviewees suggested that different stages of maturity will require different kinds of approaches to Enterprise Architecture and that the maturity will affect the configurations of the Enterprise Architecture practice that will be viable in each organisation's specific context. The increased maturity of the Enterprise Architecture practice was also seen as potentially having a positive impact on the benefits that can be expected from the Enterprise Architecture practice as a result. As the organisation's competences grow, the Enterprise Architecture function tends to become better resourced and more established. However, many of these ideas seem to have little foundation apart from the practitioners' personal perceptions.

> Those EA schools of thought and such, [...] if EA aims to understand the operations of organisations and support their development [...] different models of thought are needed for different situations and at different stages of maturity. (Interview H)

> I would argue that that's the way it is, that it [expanding the scope of Enterprise Architecture] should be done piece by piece, so that the maturity grows, the competences grow. (Interview B)

On the contrary, some views presented by the practitioners also seemed to argue against creating a tight coupling between the scope of Enterprise Architecture and the Enterprise Architecture maturity targets, as the Enterprise Architecture practice should always be tailored to suit the context of each individual organisation. A broad Enterprise Architecture scope does not always correlate with high Enterprise Architecture maturity, and vice versa. It was therefore also suggested that scoping should not be directly considered as an evaluation element within the Enterprise Architecture maturity model.

> In my opinion, it's not a good idea to build any such scoping issues into the maturity model, because which kind of architecture makes sense depends on the organisation's needs and the situation. (Interview A)

4.4.4 Contextual and contingency factors affecting the Enterprise Architecture practice

This category describes the contextual and contingency factors identified as affecting the Enterprise Architecture practice and its scoping. These factors are argued to potentially have either direct or indirect effects on all of the elements covered by the previous categories – the underlying Enterprise Architecture approaches, the configurations of the Enterprise Architecture practice as well as the impact of the Enterprise Architecture practice. The category covers the **environmental and organisational factors affecting the Enterprise Architecture practice** as well as the **individual factors affecting the Enterprise Architecture practice**. The topics covered in this category seemed to be overall well aligned with the discussion of contextual and contingency factors in section 2.11.

Environmental and organisational factors affecting the Enterprise Architecture practice

The interviewees generally identified several *environmental and organisational factors* that have a potential of affecting the scope of the organisation's Enterprise Architecture practice. Several interviewees recognised the fact that the Enterprise Architecture practice and its scoping can be significantly affected by various contextual and contingency factors. These factors can influence the ways in which the Enterprise Architecture is approached, configured and realised in various environmental and organisational contexts.

> Well, architecture is of course very much context-bound [...]. I believe I even listed these issues somewhere at some point. (Interview C)

Some of the typical environmental (extra-organisational) factors included the sector and the industry of the organisation as well as their characteristics, such as the nature of actors and activities, the relative stability or turbulence, the pace at which changes happening, the financial structures or the inherent information or IT intensity involved in the environment. The sector can typically manifest itself in how various Enterprise Architecture goals and perspectives are prioritised and how easy it is to acquire funding and resourcing for Enterprise Architecture work. The industry can be seen in issues such as the role of regulation, the information intensity, the level of digital disruption, the volatility of operations and the impact of globalisation. Both the sector and the industry may thus affect the specific set of concerns that the Enterprise Architecture practice needs to focus on and the scope of the Enterprise Architecture practice as a result. Sectors and industries tend to differ in what aspects are specifically important for the organisations to understand and manage.

> Yes, in general, it is the business or ROI thinking in the private sector, the focus is on the business. And it's maybe something that is not so common in the public sector. (Interview B)

> Of course, the nature of the industry also in terms of whether it is established in a way or rapidly changing. Is architecture valid for many years or are things changed every month. Then, of course, the general complexity of how difficult things we are talking about. Is the business very straightforward, or does it involve a lot of different variations. (Interview L)

Some of the typical organisational (intra-organisational) factors included the size of the organisation, affecting both the demand for the Enterprise Architecture work through the level of complexity involved as well as the supply of resources available to be allocated to Enterprise Architecture roles. Several interviewees raised the organisation's size and, accordingly, the available resourcing as a key factor affecting the organisation's Enterprise Architecture practice. The Enterprise Architecture practice is seen as having the greatest value potential in organisations that are larger and thus more complex by nature. On the other hand, larger organisations also tend to have more resources available to be allocated towards the Enterprise Architecture work. Some interviewees discussed the role of Enterprise Architecture specifically in the context of smaller organisations. While these organisations were not seen as prime candidates for having extensive Enterprise Architecture practices in place, it was argued that even some of the smaller organisations could benefit from smaller scale Enterprise Architecture approaches. One of the key success factors seems to be the ability to scale the scoping of the Enterprise Architecture practice appropriately in relation to the goals and the resources available.

> The important thing is how to scale the way of working. If there are a lot of human resources and financial resources available, then all the descriptions and modeling can be done more accurately and more systematically. But then there can be the case of a very small municipality where there are very few people. [...] If organisations of different sizes try to do it in the same way, it will fail as we see that it is starting to take up too many resources in itself. (Interview E)

Other contextual factors related to the organisation's internal aspects were discussed, including various management structures affecting the role and the influence of the Enterprise Architecture practice within the organisation as well as the overall maturity of the organisation and its management practices. Several interviewees brought up many of the issues touched upon earlier, such as the positioning of the Enterprise Architecture function within the organisation, the general nature of the organisation's management model, the organisation's cultural factors affecting the co-operation between the stakeholders, the rigidity or the agility of the organisation's operating model and whether the organisation's key resources were insourced or outsourced. Several interviewees also brought up the overall maturity of the organisation's management system as a contextual factor affecting the scope of Enterprise Architecture. Generally, the Enterprise Architecture practice was seen as easier to implement in an environment that was more mature and featured structures such as established development

models. It was noted that building the maturity might take time, and generally the maturity was higher in organisations that had practiced Enterprise Architecture for a longer time. The differences in the maturity could also potentially affect the co-operation between organisations of different maturity levels.

> One of the first things that comes to mind is the overall capability of the company's management and development model. […] The organisational structure and its management model also come to mind as contextual factors, whether it is a very strongly centrally managed company or more like a federated company or one with very independent parts. The Enterprise Architecture looks very different if there are very distinctive parts, what is the common area and where you should focus. (Interview H)

Various situational factors related to the environments' and the organisations' current contingencies were also discussed by several practitioners. The current events happening within the organisation and its environment may have an effect on what is seen as important for the Enterprise Architecture practice to focus on, as well as on its ability to meet the demand. The situational issues may be related to the already discussed environmental and the organisational factors, but they can also be additionally related to various temporal conditions, such as current market situations, financial cycles or managerial trends.

> How turbulent are the situations the organisations are in overall. [Both organisations] are in a world of diminishing funding, and at the same time growing and diversifying expectations. [...] budgets are reduced by millions per year and at the same time we want [the organisation] to be able to do tasks it has never done before and to handle all of its old tasks. This inevitably affects Enterprise Architecture, from which benefits can perhaps only be expected in a longer time span, how it is approached, what is expected of it and how it is invested in. (Interview I)

> Practice also seems to be susceptible to various managerial trends, such as the demand for agility. (Interview G)

Individual factors affecting the Enterprise Architecture practice

The interviewees also identified several *individual factors* that have a potential of affecting the scope of the Enterprise Architecture practice. These included the level of commitment towards the Enterprise Architecture practice, Enterprise Architecture awareness and competences as well as attitudes related to the Enterprise Architecture practice exhibited by both the organisation's management and the Enterprise Architecture practitioners themselves.

> Then maybe as one big thing you could raise the importance of people and personnel. And even perhaps above all, the importance of management. It feels like commitment to the Enterprise Architecture work often requires quite a lot, both from the management then from the experts, who are often selling the idea to the management. (Interview L)

Commitment towards the Enterprise Architecture practice was highlighted by several interviewees, and specifically management commitment was seen as one of the critical individual level factors affecting the ultimate scope of the Enterprise Architecture practice. Having sufficient commitment in place, or correspondingly having lacking commitment, can significantly affect the Enterprise Architecture practice's chances of success as well as the approach taken. Some interviewees specifically discussed the effects of various personal factors in acquiring commitment towards the Enterprise Architecture practice. An important issue that appeared to be widely recognised as significantly affecting the overall chances of success of the Enterprise Architecture practice was the key role individuals can play in the process. An individual's personal competences or even subjective preferences can become significant factors especially in situations in which the individual is acting in a key role, having a possibility of affecting or steering the approach that an organisation might end up taking towards its Enterprise Architecture practice. The characteristics of individual managers or practitioners acting in key Enterprise Architecture roles can thus significantly affect the resulting Enterprise Architecture practice.

> In both of these organisations, I can say with certainty that there would not have been any prerequisites for the success of EA in its full scope without a leader who takes ownership of the matter. I use the English word "champion" [...]. That's what it requires, that there's a leader who really pushes it through because he wants it. (Interview I)

> Enterprise Architecture is significantly dependent on the people who are working within the organisation, as well as their characteristics. If an Enterprise Architect is hired, this can affect how the practice looks like for years to come. This is also a source of randomness. (Interview G)

Competence factors were discussed by several interviewees as something that can significantly affect the Enterprise Architecture practice. Sometimes, the resources available in the organisation restrict the scope of the practice based on the competences that already exist within the organisation. Enterprise Architecture practitioners tend to have diverse backgrounds, and often no formal training in Enterprise Architecture issues. This can lead to situations in which the personnel's competences end up implicitly defining the scope. Some interviewees additionally discussed the social competences as a specific competence aspect requiring attention. Technical or methodological competences are often not alone sufficient for "selling" and running a successful Enterprise Architecture practice. Various social skills, such as being able to communicate and convince the management stakeholders, are often mentioned as something that are specifically important for the successful Enterprise Architecture practitioners.

> It's not just architectural skills, and of course many architectural frameworks also recognise this aspect, that you have to know the stakeholders, you have to understand what those stakeholders value, what kind of people they are. (Interview D)

> Another thing, in my opinion, are the people. Because neither of these organisations has started recruiting, like, let's start recruiting EA experts here. Rather, let's see who we have here and what we can achieve with them. [...] Before my arrival, there was no such person who would take over the business architecture, and that's why the architecture looked the way it did until then. (Interview I)

Attitudes that exist among the organisation's stakeholders in relation to the Enterprise Architecture practice were also discussed by several interviewees as a significant issue affecting the Enterprise Architecture scoping. It appears that Enterprise Architecture as a term has cumulated somewhat of a bad reputation among certain stakeholders, for example due to prior bad experiences with unsuccessful Enterprise Architecture practices. This potentially leads to a level of prejudice towards Enterprise Architecture in general. In the most extreme cases, Enterprise Architecture was considered a "forbidden term" that was consciously avoided in fear of losing stakeholder commitment and reducing the chances of successfully deploying Enterprise Architecture thinking.

> It very much depends on the maturity of the management. Or on attitudes - it can also depend on the attitudes, if someone has a hostile attitude towards Enterprise Architecture, like if a wrong impression has been made at some point, it can be really difficult to correct it and then it is not wanted. (Interview B)

> The former general manager of [the organisation] told me quite frankly that if it hadn't been called Enterprise Architecture, it would have already been done. That he just resented this whole term so much that he almost hated Enterprise Architecture as a term from the bottom of his heart. (Interview I)

> Indeed, in our history [...] Enterprise Architecture was even a bit of a "curse word", that if you went to the top management to give a presentation, usually the advice you got from more experienced colleagues was that just don't go and say the word Enterprise Architecture, because after that no one will listen at all. Fortunately, those times are behind us, so nowadays you can talk about Enterprise Architecture with your head held high. (Interview J)

5 DISCUSSION

The following section proceeds to present the main findings and contributions of the study. Six key themes have been discussed based on the consolidated insights from the literature review and the empirical study. They are addressed in more detail in the following sub-sections.

5.1 The general ambiguity and diversity involved in Enterprise Architecture scoping

The key research problem of the study has been exploring the scope of Enterprise Architecture thinking. The starting point for this discussion was the overall ambiguity related to Enterprise Architecture, both on a terminological and on a theoretical level, as indicated by several prior authors (e.g. Schöenherr, 2008; Saint-Louis, Morency & Lapalme, 2019; Weiss, Aier & Winter, 2012; Kotusev & Kurnia, 2021). The question of what constitutes Enterprise Architecture in various ways of thinking appears as multifaceted, starting from the variety of perspectives from which scoping can be addressed in the first place.

The literature review conducted within the study revealed a variety of potential Enterprise Architecture scoping aspects as well as scoping approaches that can be taken in relation to them. Section 2 identified several theoretical concepts as potential perspectives to be considered in Enterprise Architecture scoping discussions. Such perspectives included the underlying Enterprise Architecture thinking, the various Enterprise Architecture configurations, the impact of Enterprise Architecture as well as the contextual factors potentially affecting the Enterprise Architecture practice. Section 3 further investigated various Enterprise Architecture scoping discussions in the prior literature. The consolidated understanding served as an input for developing a tentative research model that was used in the subsequent empirical study in section 4. The empirical data was gathered with the aim of further enriching the understanding from the prior literature. The aspects of the tentative research model were studied in

order to evaluate their assumptions and provide additional insight into the variety of practical scoping considerations related to each of them.

The empirical data from the practitioner interviews can contribute to the prior understanding in several ways. First, the data uncovers some of the practitioners' perceptions of various Enterprise Architecture scoping aspects and some related considerations, including both issues that have been touched upon in the prior literature and issues that have not necessarily been explicitly studied before. There seems to be a plethora of scoping related aspects recognised by the practitioners, both validating and extending the tentative research model. Second, although not aiming at generalisability, the data does shed some light on where the Finnish practice might currently be in relation to various Enterprise Architecture scoping aspects. Both common themes and a level of diversity can be observed in how various Enterprise Architecture scoping aspects are manifesting themselves in the real-life settings of the Finnish organisations' Enterprise Architecture practices. Third, the data provides insights into the individual practitioners' personal opinions and differing ways of thinking. Just like with the organisations, differences can be found in what the individual practitioners themselves see as preferred approaches to Enterprise Architecture scoping. These opinions can also be significantly different from the actual approaches their organisations are taking, indicating a potential misalignment between the preferences of the Enterprise Architecture practitioners and the management stakeholders actually making the scoping decisions.

The results continue to support a picture of the Enterprise Architecture scoping as a highly multifaceted phenomenon. Due to the qualitative, exploratory nature of the study and the limited sample involved, we should refrain from implying any bold generalisations from the empirical data, such as making claims about the typical scoping choices taken in various organisations representing different sectors, industries or sizes or by Enterprise Architecture practitioners having certain profiles or backgrounds. Instead, the study provides valuable qualitative insight on various aspects of scoping that might be relevant to be considered in various settings. The study was able to refine the tentative research model with several scoping related considerations and raise several points of view that might be interesting both from the perspective of research and theory development as well as from the perspective of practical implications. The identified scoping aspects are summarised in Figure 5, describing the research model refined based on the findings. The updated model recognises the following scoping related concerns:

- *Definition and purpose statement assumed*. The fundamental perception of what Enterprise Architecture is and what is its primary objective.
- *School of thought adopted*. The emphasis set between technical, socio-technical and ecosystemic architecture perspectives, often implicit.
- *Hard vs. soft approaches applied*. The focus and balance between hard and soft issues (such as governance versus people and culture, methodical versus pragmatic and heavy-rigid versus lean-agile).

- *Function positioning*. The primary organisational ownership, proximity or implicit association with the IT, business or strategy units.
- *Function design*. The organisational structure, the model of co-operation with the management, the roles, the resourcing and the competences.
- *Dimensions considered*. The variety of architectural dimensions recognised as well as the coverage and the significance of these dimensions.
- *Applications utilised*. The variety of EA based capabilities used in various applications as a part of surrounding managerial processes.
- *Frameworks deployed*. The extent to which various standardised frameworks are being deployed and their strict versus applied usage.
- *Benefits expected*. The level of benefits that is expected as a result of the practice, affecting the appropriate scoping approaches.
- *Maturity targeted*. The level of maturity that is targeted with the practice, affecting the appropriate the scoping approaches.
- *Environmental and organisational factors*. The variety of extra- and intra-organisational factors, affecting the appropriate scoping approaches.
- *Individual factors*. The variety of factors related to the organisation's individuals, affecting the appropriate scoping approaches.

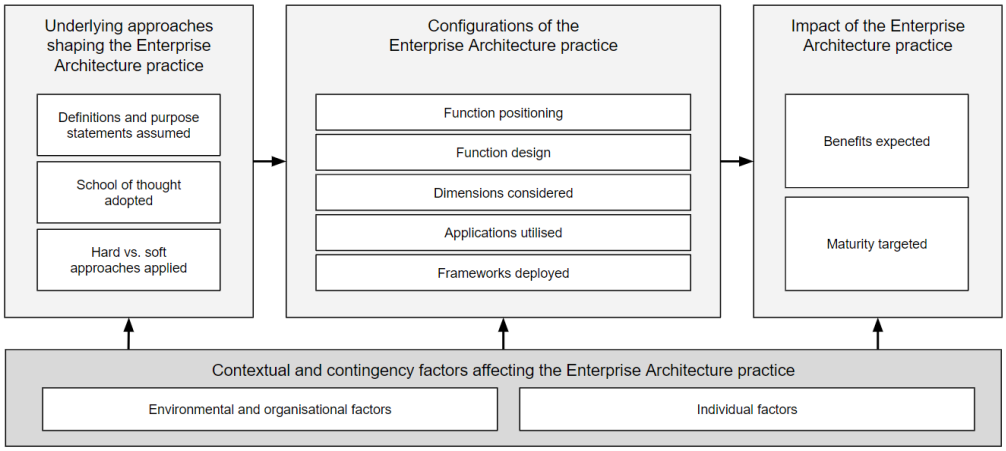

FIGURE 5 Tentative research model refined based on the empirical study

5.2 The shift from technical towards socio-technical and ecosystemic Enterprise Architecture schools of thought

A key topic within the research on Enterprise Architecture scoping seems to be the positioning of the Enterprise Architecture practice on a spectrum between the IT focus, the socio-technical focus and the ecosystemic focus. One of the key conceptual frameworks identified by the study was the three Enterprise Architecture schools of thought as proposed by Lapalme (2012) and further discussed by Korhonen et al. (2016). This study attempted to further contribute to the dis-

cussion of the three schools of thought by examining their coverage in the prior Enterprise Architecture literature as well as exploring whether the indicators of various schools of thought could be found empirically based on the perceptions of the Enterprise Architecture practitioners in Finnish organisations.

Based on the literature alone, the conceptualisation of the three Enterprise Architecture schools of thought seems to be well justified. The distinction between the IT focus, the socio-technical focus and the ecosystemic focus of Enterprise Architecture was well visible in the literature both within the three schools of thought line of research and outside of it. This was confirmed by several independent studies identifying the characteristics of the schools of thought both conceptually (Schöenherr, 2008; Proper & Lankhorst, 2014; Simon, Fischbach & Schoder, 2014; Drews & Schirmer, 2014) as well as based on empirical insight from the practice (Aier, Gleichauf & Winter, 2011; Rahimi, Gøtze & Møller, 2017; Nurmi, Penttinen & Seppänen, 2019). It appears plausible that the schools of thought can be seen as affecting the Enterprise Architecture practice if not explicitly, at least on an implicit level.

The empirical evidence gathered by the study seemed to further support the validity of the Enterprise Architecture schools of thought. The practitioners interviewed for the study seemed to recognise the schools of thought well and were able to associate them with their perception of the general evolution of the Enterprise Architecture discipline over time. While not always explicitly addressed, the schools of thought can be identified as something affecting the practice at least implicitly. The investigation of the organisations' actual Enterprise Architecture practices revealed a spectrum of approaches. Based on the empirical evidence, it appeared that while most of the organisations were idealistically striving towards a socio-technical Enterprise Architecture approach, the predominantly technical tradition behind Enterprise Architecture was still very much visible in most of the organisations. This could be seen in the responsibility of Enterprise Architecture often ending up somewhere under the IT management instead of the business and the operational business-IT alignment issues ending up as the core focus of Enterprise Architecture activities over the involvement of Enterprise Architecture practitioners in various strategic decision-making processes. The socio-technical focus and the strategic role of Enterprise Architecture were seen as preferred by many practitioners. However, this also appeared as something that was not always straightforward to achieve in practice. The ecosystemic perspective, while well recognised in some organisations, was not yet something that was seen as being at the core of the Enterprise Architecture practice in most practitioners' perceptions.

The results seem to be somewhat conclusive in that while the Enterprise Architecture practice seems to have significant potential in addressing strategic/ecosystemic issues, it often ends up in merely an operative/socio-technical or even an operative/technical role in practice. These roles are well aligned with the conceptualisations by Lapalme (2012) as well as Rahimi, Gøtze and Møller (2017). The study was able to enrich the prior understanding by identifying several explainers to this phenomenon. The Enterprise Architecture practi-

tioners' striving towards a more holistic, expansive role of the Enterprise Architecture practice seems to be somewhat limited by various cultural issues, such as Enterprise Architecture being perceived by the stakeholders as predominantly an IT-oriented discipline and primarily a tool of strategy implementation instead of strategy planning. This is somewhat misaligned with the fact that the Enterprise Architecture practitioners themselves seem to perceive the strategic role of Enterprise Architecture as something that should become increasingly important. The question of the scope expansion is not necessarily one of whether Enterprise Architecture as a method would be capable of handling a wider scope of issues, but whether it is accepted as a method to embark to new problem areas inherently controlled by the organisations' management.

The discussion above is further coneptualised in Figure 6. While some practitioners seem to be currently striving to shift the Enterprise Architecture practice towards the top-right corner of the matrix, it appears to be quite typical that Enterprise Architecture can often be found positioned somewhere closer to the center or the bottom-left corner in practice. It can be argued that a while broader scope should generally enable a greater impact potential in terms of making more significant Enterprise Architecture applications feasible, it should also be understood that it will require more effort and a certain level of maturity from both the Enterprise Architecture practice as well as the surrounding management practices. A scoping that is unfit in relation to these goals and limitations creates risks of the Enterprise Architecture practice ending up unviable due to being either insufficient or oversized. Consciously adopting a narrower Enterprise Architecture scope with a smaller impact potential might be well justified if it is seen as more appropriate all the factors considered.

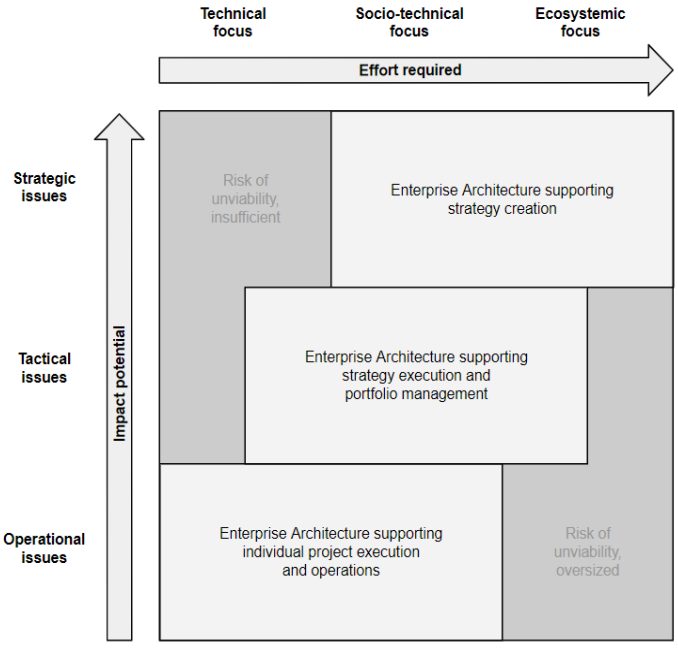

FIGURE 6 Conceptualisation of Enterprise Architecture focus areas and issues of concern

5.3 The synergies – and the conflict between Enterprise Architecture and management disciplines

The investigation of the scope of Enterprise Architecture revealed a clear overlap between the Enterprise Architecture practice and other management practices. This theme emerged both from the literature and the empirical data gathered within the study. The overlap appears to be somewhat problematic as it involves both a great opportunity in terms of achieving synergies and a great risk in terms of creating conflicts, collisions and friction between the two disciplines that should idealistically support rather than contradict each other. The need of a tight integration between Enterprise Architecture and other management activities appears to be well recognised (Buckl, Matthes & Schweda, 2009; Korhonen et al., 2016) and management commitment has also been specifically identified as one of the critical success factors of a viable Enterprise Architecture practice (Lange, Mendling & Recker, 2012a). Thus, the relationship between the Enterprise Architecture practice and the organisations' surrounding management practices seems to be well worth a separate discussion.

In the literature, the issue of Enterprise Architecture versus management is explicitly addressed by several authors. It seems to be clear that Enterprise Architecture in many ways already operates within problem areas that are very similar to those of the neighboring management practices. Some authors have discussed the need for an even tighter coupling of Enterprise Architecture and management practices, calling for the Enterprise Architecture discipline to be more active in disseminating its holistic systems approaches to benefit the management discipline (Bernus et al., 2016) as well as for building Enterprise Architecture into a common way of thinking within the organisation (Winter, 2014) and a shared competence (Korhonen et al., 2016) beyond the community of Enterprise Architecture practitioners solely. At the same time, the main streams of Enterprise Architecture research still seem to be primarily associated with the information systems discipline and are rarely addressed in management literature (Kotusev, 2017). The lack of dialogue between the disciplines presents a risk of creating parallel terminology and ultimately a language barrier between practitioners working with similar problem areas, but having educational backgrounds in different disciplines (Bernus et al., 2016; Syynimaa, 2018).

The empirical data seems to support the observations from the literature, also providing some further insight about the phenomenon. The discussion of the practitioners' approaches towards Enterprise Architecture indicates the general willingness of many practitioners to expand the scope of Enterprise Architecture from the technical focus towards more socio-technical and ecosystemic stances, which also shifts the key problem areas of Enterprise Architecture from the realm of IT management increasingly towards the realm of general management. This shift does not always happen without some inevitable confrontation between Enterprise Architecture and general management. This could be observed in the data as several mentions of the stakeholders' lacking

awareness of what Enterprise Architecture is about in the first place, the limited involvement of Enterprise Architecture practitioners in some of the key management processes or the Enterprise Architecture practitioners having to do a substantial amount of work in "selling" the practice to the management, struggling to acquire sufficient commitment. Even then, the cultural change cannot always be seen as certain or permanent. These appear to be major issues for several practitioners, to the point that some of them indicate not even willing to use the term Enterprise Architecture when referring to their work because of the problems involved in the management's perception of the term.

The results seem to be somewhat conclusive in that there is a clash that can be currently observed between the Enterprise Architecture discipline and the management discipline. Only time will show the true implications of this development. In the best case, this could lead to the gradual consolidation of the two disciplines through a mutual dissemination of their best insights and foundational thinking, as well as an emergence of shared concepts that could be easily understood by practitioners coming from either discipline. This development would, however, require more interdisciplinary approaches in order to consciously remove silos among academics, educators and practitioners alike. In the worst case, the issue of the lacking common language will remain and the two disciplines will continue drifting further apart, ultimately hurting both disciplines. In the most extreme case suggested by some of the practitioners, Enterprise Architecture as a practice could fade away with time, with its ideas being assimilated into some of the more generic management disciplines. Figure 7 describes some possible scenarios of this consolidation.

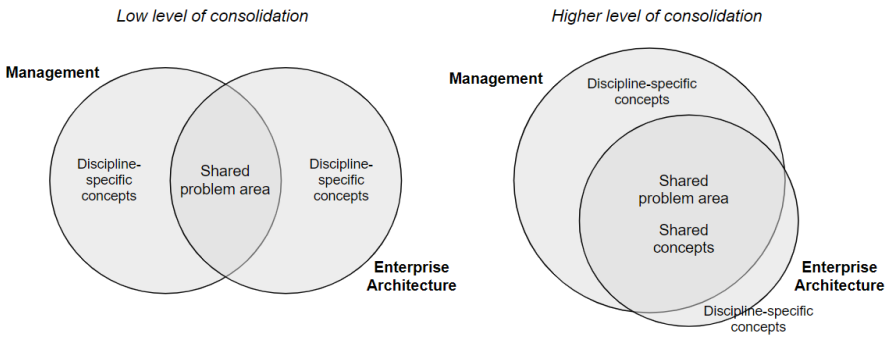

FIGURE 7 Scenarios of consolidation between Enterprise Architecture and management disciplines

5.4 The need for rethinking the optimal ways of implementing Enterprise Architecture in practice

The diverse set of practical issues that need to be considered when planning the Enterprise Architecture deployment is certainly a topic of interest in terms of scoping the Enterprise Architecture practice. The practical discussion around

the scope of Enterprise Architecture did not seem to be limited only to the traditional hard issues, such as the organisational positioning and the design of the Enterprise Architecture function, the set of dimensions considered within the scope of Enterprise Architecture and the various applications of the Enterprise Architecture capabilities, as already discussed above. Several people-centric and culture-related soft issues emerged during the study both in relation to the underlying approaches that were taken towards Enterprise Architecture and how the Enterprise Architecture practice was configured in practice. These issues need to be included in the discussion as well.

The prior literature raises several practical scoping considerations. It is suggested that various Enterprise Architecture scoping approaches can be associated with the success of the Enterprise Architecture practice (Aier, Gleichauf & Winter, 2011) and can limit the possible applications of Enterprise Architecture based capabilities (Rahimi, Gøtze & Møller, 2017). On the other hand, appropriate scoping is seen to be directly connected to the Enterprise Architecture success and benefit realisation, with several authors stressing the need for a holistic scope (Bricknall et al., 2006; Rouhani et al., 2015; Aier et al., 2016), but also the need for having a clear agreement about the scope (Bricknall et al., 2006; Rouhani et al., 2015; Nkundla-Mgudlwa & Mentz, 2017) as well as keeping the scope aligned with the resources available (Bricknall et al., 2006; Gong and Janssen, 2019). The discussion of the soft issues related to Enterprise Architecture implementation seems to be often related to the underlying Enterprise Architecture approaches, increasingly highlighting the principles of adaptivity and agility in their scoping instead of relying on rigid Enterprise Architecture frameworks and governance structures (e.g. Kotusev, 2020b). Another practical scoping issue that is being addressed in the prior literature is the one of Enterprise Architecture competences (Gøtze 2013; Ylinen & Pekkola, 2020).

The empirical data seems to support and further expand the understanding from the literature. The perceptions from the practice seem to agree that the Enterprise Architecture benefits can only be realised as a result of the successful application of Enterprise Architecture based capabilities in various organisational use cases. The scope of the Enterprise Architecture practice should therefore be well aligned with the ultimate goals that the organisation is willing to achieve using Enterprise Architecture against the practical realities. The perfect Enterprise Architecture scope is not necessarily the most holistic one, but is actually affected by several factors, such as the resourcing available within the organisation and the cultural issues affecting the level of commitment that is possible to be acquired for the Enterprise Architecture practice. Several soft issues were brought up in the empirical data, specifically related to the overall approach towards the Enterprise Architecture practice and the design of the Enterprise Architecture function. A visible trend seems to be the perceived diminishing relevance of traditional governance-oriented Enterprise Architecture frameworks, deemed as somewhat rigid, bureaucratic and out-of-touch with reality. The most successful Enterprise Architecture practices seem to be based on approaches that are more pragmatic, lean-agile and collaborative, focusing

on concrete return on value and committing the relevant stakeholders over emphasising the use of the Enterprise Architecture method itself. The awareness and the competences of both the Enterprise Architecture practitioners as well as the organisations' management was also a frequently discussed topic, indicating the need for, and often the limited availability of the diverse competences required for running a successful Enterprise Architecture practice.

The results seem to indicate that there are several practical scoping related considerations involved in deploying the Enterprise Architecture practice within various organisational settings. The scope of Enterprise Architecture is not something that should be based on idealistic one-size-fits-all Enterprise Architecture frameworks, but something that should stem from the reality of each individual organisation, taking into account both what is desirable against the organisation's individual goals and what is actually achievable in the organisation's specific context. The variety of soft issues associated with the Enterprise Architecture implementation is especially noteworthy as the selected approaches may end up pivotal in whether the Enterprise Architecture is able to achieve and sustain sufficient commitment among the key stakeholders.

5.5 The contextual nature of Enterprise Architecture

An important topic when discussing Enterprise Architecture scoping seems to be the contextual nature of the Enterprise Architecture practice. The contextual and contingency factors and their effects on the Enterprise Architecture implementation are explicitly discussed by some of the earlier studies (Leppänen, Valtonen & Pulkkinen, 2007; Aier & Schlep, 2009). They are also something that seem to be well supported by the empirical data gathered in the study. The apparent need of understanding and considering these factors in scoping choices therefore appears as another topic worthy of a more detailed discussion.

The prior literature addresses the contextual and contingency factors both explicitly and implicitly. In addition to the studies by Leppänen, Valtonen and Pulkkinen (2007) and Aier and Schlep (2009), these factors are touched upon in some of the literature mentioned in the previous section, highlighting the need of adapting the Enterprise Architecture scope to meet the specific needs of each individual organisational, taking issues such as the resource availability and the ultimate goals of the Enterprise Architecture practice into account. Beyond this, the explicit discussion of the Enterprise Architecture related contextual and contingency factors appears as somewhat limited in the literature.

The empirical evidence gathered expands the prior understanding by further exploring the various contextual and contingency factors potentially affecting the Enterprise Architecture scoping in practice. Such factors include various environmental and organisational as well as individual factors. Environmental factors include various extra-organisational aspects, such as the sector and the industry of the organisation along with their inherent characteristics. Organisational factors include various intra-organisational aspects, such as the organisa-

tion's size, the various management structures, the availability of resources as well as the various cultural issues. Individual factors include aspects related to the individuals acting in both Enterprise Architecture and management roles, covering issues including Enterprise Architecture awareness and competences as well as general attitudes towards Enterprise Architecture. There can also be some situational, time-bound contingencies that need to be considered. It is noteworthy that these contextual realities often limit and restrict the viability of various Enterprise Architecture deployments. They also sometimes seem to be in conflict with what the Enterprise Architecture practitioners themselves might idealistically consider as the optimal best-case scope for the practice.

The results indicate that the Enterprise Architecture practice and its optimal scoping often appear as highly context dependent. There seems to be evidence that various contextual and contingency factors may play a crucial role both in what is feasible and what is appropriate in terms of the Enterprise Architecture practice in various organisational settings. Enterprise Architecture practitioners should take these factors and their implications into account when planning the scope of the Enterprise Architecture deployment. The Enterprise Architecture practitioners' personal scoping preferences are not necessarily always aligned with what is in fact feasible in each setting. Again, a lesser scope done well can be superior to a more ambitious scope lacking in delivery.

5.6 The image problem of Enterprise Architecture

A somewhat concerning observation made while discussing the scope of Enterprise Architecture was the overall image problem that Enterprise Architecture seems to be suffering from as a discipline. As already touched upon in several of the previous discussions, this problem can be seen manifesting itself in several ways. The practitioners' striving towards a holistic stance of Enterprise Architecture can be hindered by the stakeholders' narrow-minded perceptions of what Enterprise Architecture is, could or should be. There is some evidence of Enterprise Architecture colliding with management practices. Further, the deployment of Enterprise Architecture practices is often faced with various cultural issues and individual factors at play. A common aspect for many of these issues seems to be the low level of stakeholder awareness of and commitment towards the Enterprise Architecture practice. Thus, it seems justified to discuss the reputation of the Enterprise Architecture discipline separately.

The issue has not been extensively discussed in the Enterprise Architecture scoping literature. There are mentions of stakeholder awareness and commitment being some of the important culture-related success factors of Enterprise Architecture deployment (Lange, Mendling & Recker, 2012a) as well as organisational anchoring and stakeholder satisfaction being some of the key aspects in Enterprise Architecture benefit realisation mechanisms (Lange, Mendling & Recker, 2016). Social legitimacy, efficiency, organisational grounding and trust have been studied as some of the potential aspects affecting the

stakeholders' response towards Enterprise Architecture (Weiss, Aier & Winter, 2013). There are a few other relevant studies in the line of research related to the cultural aspects of Enterprise Architecture, discussing issues such as the effect of the organisational culture (Aier, 2013) and the role of management commitment (Banaeianjahromi, 2018). Many of these aspects are also present in various Enterprise Architecture maturity models (e.g. Lakhrouit and Baïna, 2013).

The empirical data paints a picture of Enterprise Architecture as a somewhat isolated practice, at least when the larger audience outside of the core Enterprise Architecture community of practice is considered. In many experiences, Enterprise Architecture was perceived as something that had to be actively "sold" by the Enterprise Architecture practitioners to the management and other organisational stakeholders in order to achieve the required level of buy-in. In the best cases, these difficulties were related to simple issues of lacking awareness, knowledge or common language due to the diverse educational backgrounds or the overall terminological ambiguity. In the worst cases, more extensive cultural problems could be observed. There were several accounts of the Enterprise Architecture practitioners no longer willing the use the term Enterprise Architecture in their communication with the stakeholders in fear of being dismissed due to the prevailing negative attitudes towards the term. Possible prior negative experiences with unsuccessful Enterprise Architecture deployments, prejudices towards Enterprise Architecture or worries of Enterprise Architecture overstepping its boundaries were argued to be some of the potential explaining factors behind such attitudes. The situation is made worse by the significant effect played by individual factors in the Enterprise Architecture success. The reputation that Enterprise Architecture might have in the eyes of a few influential decision-makers could make or break the success of the practice, and the situation could change quickly as personnel changes occur.

The results suggest that the various cultural issues can become a key factor that needs to be considered and should not be taken lightly by the Enterprise Architecture practitioners. The image problem of the Enterprise Architecture discipline is something that seems to be significantly hindering the potential of the Enterprise Architecture practice both due to lacking awareness and generally negative attitudes among the stakeholders. Fixing the problem should probably not be seen only as an issue of educating the stakeholders, but the Enterprise Architecture discipline itself will likely need to reconsider some of its very foundations, as well. Continuing to address some of the prevailing terminological and theoretical ambiguity within the field is something that would not only improve the dialogue within the discipline itself, but also reduce the potential misalignment with other disciplines. Rethinking some of the traditional Enterprise Architecture deployment approaches of the past towards ones that are argued to better meet the requirements of today's organisations could also play a role in removing some of the stigma that is sometimes still being associated with the Enterprise Architecture discipline.

6 CONCLUSION

The research problem of this study was exploring the scope of Enterprise Architecture thinking. A key motivation behind the study was the ambiguity that seems to be present both among academics and practitioners around what is or should be considered within the scope of the Enterprise Architecture practice. The question of scope was approached from several different standpoints, including 1) the fundamental thinking behind Enterprise Architecture, 2) the effects of the underlying thinking on the Enterprise Architecture practice as well as 3) the implications of the various Enterprise Architecture scoping choices taken by the organisations. Various scoping perspectives were explored. These included both implicit issues, such as the underlying ideas and approaches taken towards Enterprise Architecture, as well as explicit issues, such as the practical ways of implementing Enterprise Architecture practices in various organisational settings. The main contribution of the study is providing a focused cross-section view of the various Enterprise Architecture scoping discussions in the prior literature as well as expanding the prior theoretical understanding of the topic with additional and recent empirical insight from the practice. To the best of the author's knowledge, no prior studies have been published that would have addressed the topic of the Enterprise Architecture scoping as comprehensively, exploring scoping systematically from a diverse set of viewpoints.

The study was structured as follows. Section 2 introduced some of the key terminology and theoretical concepts focal to the study. This provided a basis for the further discussion of the topic and the design of the subsequent research in sections 3 and 4. Section 3 focused on answering the first research question of the study. Using a systematic literature review, the prior discussions of Enterprise Architecture scoping were explored and summarised into a set of key themes. Section 4 focused on answering the second research question of the study. Taking the understanding from the literature review as a starting point, a tentative research model was designed and a qualitative study was conducted with a group of Finnish Enterprise Architecture practitioners in order to enrich the understanding by acquiring additional data from the practice. The data for the qualitative study was collected using semi-structured interviews and ana-

lysed with content analysis techniques, applying an interpretive approach. Section 5 focused on answering the third research question of the study. Consolidating the results of the literature review and the empirical study, some of the key findings of the study were further discussed. This final section now concludes the study by briefly discussing the findings' implications for both theory and practice, evaluating the study in terms of reliability, validity and limitations as well as presenting some potential topics for further research.

6.1 Implications for theory and practice

The study contributes towards increasing the understanding of various Enterprise Architecture scoping concerns. Some of the research gaps identified earlier are addressed by creating a cross-section view of the prior literature as well as providing more recent empirical data from the practice, updating and enriching the current state understanding of the topic. The results can be argued to have potential implications both from a theoretical and a practical standpoint. For the academics in the Enterprise Architecture discipline, the research does its small part in improving the understanding of the theoretical implications of Enterprise Architecture scoping. For the Enterprise Architecture practitioners, the study provides several scoping related aspects to be aware of and possibly to be used as recommendations or benchmarks when planning and deploying the Enterprise Architecture implementations in their respective organisations. As it is difficult to separate the often intertwined theoretical and practical implications of the key findings, they are discussed here in conjunction:

- The study sheds light on the multifaceted nature of Enterprise Architecture scoping as well as the ambiguity and diversity involved in the topic. Several scoping related concerns are identified based on the literature and further explored and enriched using empirical data. The results suggest several scoping related concerns both as an input for further research and to be applied in practice as a reference when making decisions related to the Enterprise Architecture scoping.
- Support is found for the propositions made in some of the earlier conceptual work in the Enterprise Architecture schools of thought line of research, as well as for the potential future Enterprise Architecture trends proposed in the prior literature. Additional empirical data was provided indicating where the practice might currently be in relation to the schools of thought and whether the envisioned trends can be observed.
- There seem to be indications of the scopes of the Enterprise Architecture discipline and various management disciplines increasingly overlapping, which appears as somewhat controversial. Some perceptions indicated a risk of the two disciplines colliding, hindering the potential success of the Enterprise Architecture practice in the worst case. More interdiscipli-

nary approaches are generally called for in order to bring the two disciplines and their practitioners closer together.

- Several practical issues were uncovered as important considerations in making Enterprise Architecture scoping decisions. Scoping was generally identified as a topic demanding attention. A scope that is both clearly defined and appropriate was seen as an important success factor for the overall Enterprise Architecture practice. Simultaneously, the most appropriate scope was not always seen as the most holistic one, but the one best aligned with the organisation's realities.
- There is evidence of the highly context dependent nature of Enterprise Architecture scoping. Insight was provided into the various environmental, organisational and individual factors that might affect the appropriate scoping. Specifically, the importance of various cultural and personal factors was discussed as something requiring attention. Such issues also often appear as key Enterprise Architecture success factors.
- Signs were observed indicating the existence of an image problem in the field of Enterprise Architecture. This is made worse by the terminological and theoretical ambiguity involved in the discipline. Additional insight is provided into why Enterprise Architecture might have a bad reputation and could sometimes be difficult to discuss even within the discipline itself. Resolving some of these underlying issues would provide a more solid foundation for the further development of the discipline.

6.2 Reliability, validity and limitations

Any study should undergo a critical evaluation to ensure its rigor and applicability. While evaluating in the context of qualitative research has been somewhat of a controversial topic, with the traditional terms of reliability and validity having slightly different meanings compared to the context of quantitative research, there are some ways available for evaluating qualitative studies, regardless of the terms used (Golafshani, 2003). Lincoln and Guba (1985) suggest that one of the key characteristics of qualitative research is the recognition of multiple possible realities, which questions the traditional definitions of reliability and validity and slightly alters the quality factors to be assessed in their evaluation. Instead of generalisability, qualitative research can be seen as striving towards applicability (Lincoln & Guba, 1985). Some concrete strategies available in evaluating qualitative research include acknowledging and accounting for various sources of bias, rigorous record keeping, demonstrating clarity of the thought processes as well as triangulation, among others (Noble & Smith, 2015). Several of these evaluation issues have been already addressed briefly in the method descriptions of sections 2, 3 and 4.

In the evaluation, the concept of reliability traditionally refers to the results of the study being reproducible or trustworthy, while the concept of valid-

ity traditionally refers to the results of the study representing the reality as accurately or as truthfully as possible (Golafshani, 2003). Reliability issues were addressed by applying rigorous procedures in conducting the literature review and the empirical study, as well as reporting on these procedures in detail and as transparently as possible in order to demonstrate the thought processes behind the construction of the study. This enables the audience to critically assess the soundness of the choices made and possibly reproduce the study. Validity issues were addressed by assessing the impact of the various potential sources of bias within the study, such as the procedures, the sample, the researcher or the individual study subjects. While this does not necessarily remove the bias altogether, it helps the reader acknowledge its existence. Triangulation refers to the use of a combination of methods in order to minimise the risks related to the limitations of a specific method (Golafshani, 2003). Triangulation was applied in the study by using two rigorous methods, both a systematic literature review and an empirical study, comparing the findings from several sources. A critical self-evaluation of the applied methods was also presented. Despite all the precautions taken, there are limitations involved in any research, this study not being an exception. The identified limitations should be taken into account before drawing conclusions based on the study findings. The limitations include, but are not necessarily limited to the following:

- The literature review was limited in scope. The keywords as well as the databases used were both selected based on the best understanding available at the time. There is a risk of relevant literature being unnecessarily excluded from the results due to inadequate definition of the search parameters or biased inclusion criteria applied.
- The empirical study was limited in scope. The themes included in the interview as well as the analysis were defined based on certain decisions and assumptions made. Some potentially relevant themes may have been left uncovered due to the design of the study.
- The empirical study featured a limited sample. The study only allowed for a limited number of practitioners to be interviewed. While the relatively small sample was aligned with the exploratory nature of the study, the sample is too small to draw any generalisations from.
- The empirical study featured practitioners with a relatively similar set of profiles. All of the practitioners interviewed were Enterprise Architecture practitioners with similar roles and backgrounds. The study suffers from the lack of opposite stakeholder insights, such as management representatives not having a background in the field.
- The empirical study similarly featured a relatively narrow set of organisations. The organisations were all Finnish, mostly represented the larger end of the scale and did not cover all the possible industries. The study does not paint a full picture of the situation in the smaller organisations, the situation in various industries or the situation outside of Finland.

- The research, both the literature review and the empirical study, was conducted by a single researcher. The considerable role of a single author is somewhat problematic as it can significantly predispose for subjective bias in planning, data collection, analysis and reporting.

6.3 Proposals for further research

The study contributes towards improving the general understanding of Enterprise Architecture scoping. Because of the exploratory nature of the study, it also contributes by uncovering several potential directions for further research in order to deepen the understanding and address some of the identified limitations. The following tentative proposals for further research are made:

- Increasing the coverage of the empirical data. The tentative findings of the study could be validated within a larger sample of organisations representing a more diverse array of characteristics. Based on the understanding acquired, a more detailed research model could be developed and quantitative methods could be applied in order to acquire more statistically generalisable data of the status quo of the Enterprise Architecture scoping in various types of organisations.
- Diversifying the points of view to cover stakeholders outside of the Enterprise Architecture practitioner community. As the study specifically identified the relationships between the Enterprise Architecture practitioners and the organisation's management as an important success factor, acquiring a better understanding of the management's perceptions of Enterprise Architecture scoping would be valuable in order to deepen the understanding about the phenomena discussed.
- Applying more interdisciplinary approaches in order to include the community outside of the Enterprise Architecture discipline and the information systems discipline into the discussion. The overlap between the Enterprise Architecture discipline and various management disciplines is something that presents itself as an interesting topic for further research, as more common understanding is clearly needed in order to bring these disciplines closer together.
- Focusing on a deeper investigation of some of the specific findings of the study. The exploratory nature of the study led to a rather broad cross-section of the subject. This provides a good overview of various Enterprise Architecture scoping concerns, but does not explain any of the findings in any particular depth. Several issues related to the underlying Enterprise Architecture approaches, the various aspects of Enterprise Architecture configuration, the impact of Enterprise Architecture and the contextual factors affecting Enterprise Architecture could be investigated further in order to acquire a more in-depth view.

REFERENCES

Abraham, R., Aier, S., & Winter, R. (2012). Two speeds of EAM – A dynamic capabilities perspective. Trends in Enterprise Architecture Research and Practice-Driven Research on Enterprise Transformation, 111-128.

Ahlemann, F., Legner, C., & Lux, J. (2021). A resource-based perspective of value generation through enterprise architecture management. Information & Management, 58(1), 103266.

Aier, S. (2013). Understanding the role of organizational culture for design and success of enterprise architecture management. In Wirtschaftsinformatik Proceedings, 56.

Aier, S., & Schelp, J. (2009). A reassessment of enterprise architecture implementation. In Service-Oriented Computing, ICSOC/ServiceWave 2009 Workshops, 35-47. Springer, Berlin, Heidelberg.

Aier, S., Gleichauf, B., & Winter, R. (2011). Understanding Enterprise Architecture Management Design – An Empirical Analysis. In 2011 10th International Conference on Wirtschaftsinformatik, 645-654.

Aier, S., Weiss, S., Winter, R., & Rytz, B. (2016). Untangling EA's long path of becoming a partner for business transformation: The case of Swiss Federal Railways. In 2016 IEEE 20th International Enterprise Distributed Object Computing Workshop (EDOCW), 1-7. IEEE.

Banaeianjahromi, N. (2018). The role of top management commitment in enterprise architecture development in governmental organizations. Complex Systems Informatics and Modeling Quarterly, (17), 95-113.

Bernus, P., Goranson, T., Gøtze, J., Jensen-Waud, A., Kandjani, H., Molina, A., Noran, O., Rabelo, R., Romero, D., Saha, P., & Turner, P. (2016). Enterprise engineering and management at the crossroads. Computers in industry, 79, 87-102.

Boulding, K. E. (1956). General systems theory – the skeleton of science. Management science, 2(3), 197-208.

Bricknall, R., Darrell, G., Nilsson, H., & Pessi, K. (2006). Enterprise Architecture: Critical Factors affecting modelling and management. In Proceedings of the 14th European Conference on Information Systems (ECIS 2006), 146. Association for Information Systems.

Buckl, S., Matthes, F., & Schweda, C. M. (2009). A viable system perspective on enterprise architecture management. In 2009 IEEE International Conference on Systems, Man and Cybernetics, 1483-1488. IEEE.

Buckl, S., Matthes, F., & Schweda, C. M. (2010). Towards a method framework for enterprise architecture management – a literature analysis from a

viable system perspective. In 5th International Workshop on Business/IT Alignment and Interoperability (BUSITAL 2010), 46-60.

Bui, Q. (2017). Evaluating enterprise architecture frameworks using essential elements. Communications of the association for information systems, 41(1), 6.

Cameron, B. H., & McMillan, E. (2013). Analyzing the current trends in enterprise architecture frameworks. Journal of Enterprise Architecture, 9(1), 60-71.

Carugati, A., Mola, L., Cunha, J., & Fernandez, W. (2020). The Changing Value of Enterprise Architecture Capability Maturity. In Academy of Management Proceedings, 2020, 1, 17752. Academy of Management, Briarcliff Manor, NY.

Conboy, K., Fitzgerald, G., & Mathiassen, L. (2012). Qualitative methods research in information systems: motivations, themes, and contributions. European Journal of Information Systems, 21(2), 113-118.

Digi- ja väestötietovirasto. (2020). Kokonaisarkkitehtuuri. Accessed 16.11.2021 at https://www.suomidigi.fi/ohjeet-ja-tuki/kokonaisarkkitehtuuri.

Drews, P., & Schirmer, I. (2014). From enterprise architecture to business ecosystem architecture: Stages and challenges for extending architectures beyond organizational boundaries. In 2014 IEEE 18th International Enterprise Distributed Object Computing Conference Workshops and Demonstrations, 13-22. IEEE.

Emmel, N. (2013a). Introduction: from sampling to choosing cases. In Sampling and choosing cases in qualitative research: A realist approach, 1-8. SAGE Publications.

Emmel, N. (2013b). Purposeful sampling. In Sampling and choosing cases in qualitative research: A realist approach, 33-44. SAGE Publications.

Emmel, N. (2013c). Sample size. In Sampling and choosing cases in qualitative research: A realist approach (pp. 137-156). SAGE Publications.

Fallmyr, T., & Bygstad, B. (2014). Enterprise architecture practice and organizational agility: An exploratory study. In 2014 47th Hawaii International Conference on System Sciences, 3788-3797. IEEE.

Foorthuis, R., Van Steenbergen, M., Brinkkemper, S., & Bruls, W. A. (2016). A theory building study of enterprise architecture practices and benefits. Information Systems Frontiers, 18(3), 541-564.

Franke, U., Hook, D., Konig, J., Lagerstrom, R., Narman, P., Ullberg, J., Gustafsson, P., & Ekstedt, M. (2009). EAF2-A framework for categorizing enterprise architecture frameworks. In 2009 10th ACIS International Conference on Software Engineering, Artificial Intelligences, Networking and Parallel/Distributed Computing, 327-332. IEEE.

Gampfer, F., Jürgens, A., Müller, M., & Buchkremer, R. (2018). Past, current and future trends in enterprise architecture – A view beyond the horizon. Computers in Industry, 100, 70-84.

Gill, A. Q. (2015). Adaptive enterprise architecture driven agile development. In International Conference on Information Systems Development, ISD 2015.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. The Qualitative Report, 8(4), 597-607.

Goldkuhl, G. (2012). Pragmatism vs interpretivism in qualitative information systems research. European journal of information systems, 21(2), 135-146.

Gong, Y., & Janssen, M. (2019). The value of and myths about enterprise architecture. International Journal of Information Management, 46, 1-9.

Gregor, S. (2006). The nature of theory in information systems. MIS quarterly, 611-642.

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. Field methods, 18(1), 59-82.

Gøtze, J. (2013). The changing role of the enterprise architect. In 2013 17th IEEE International Enterprise Distributed Object Computing Conference Workshops (pp. 319-326). IEEE.

Hauder, M., Roth, S., Schulz, C., & Matthes, F. (2014). Agile enterprise architecture management: an analysis on the application of agile principles. In 4th International Symposium on Business Modeling and Software Design, 38-46.

Hirvonen, A., & Pulkkinen, M. (2004). A practical approach to EA planning and development: the EA management grid. In Proceedings of 7th international conference on business information systems.

Hosiaisluoma, E., Penttinen, K., Mustonen, J., & Heikkilä, J. (2018). Lean enterprise architecture method for value chain based development in public sector. In ECDG 2018 18th European Conference on Digital Government, 86. Academic Conferences and publishing limited.

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. Qualitative health research, 15(9), 1277-1288.

International Organization for Standardization. (2019). ISO/IEC/IEEE 42020:2019 Software, systems and enterprise – Architecture processes. Accessed 12.11.2021 at https://www.iso.org/obp/ui/#iso:std:iso-iec-ieee:42020:ed-1:v1:en.

Iyer, B., & Gottlieb, R. (2004). The Four-Domain Architecture: An approach to support enterprise architecture design. IBM Systems Journal, 43(3), 587-597.

Jonkers, H., Proper, E., Lankhorst, M. M., Quartel, D. A., & Iacob, M. E. (2011). ArchiMate (R) for integrated modelling throughout the architecture development and implementation cycle. In 2011 IEEE 13th Conference on Commerce and Enterprise Computing, 294-301. IEEE.

Julkisen hallinnon tietohallinnon neuvottelukunta. (2017). JHS 179 Kokonaisarkkitehtuurin suunnittelu ja kehittäminen. Accessed 15.11.2021 at https://www.suomidigi.fi/ohjeet-ja-tuki/jhs-suositukset/jhs-179-kokonaisarkkitehtuurin-suunnittelu-ja-kehittaminen.

Jusuf, M. B., & Kurnia, S. (2017). Understanding the benefits and success factors of enterprise architecture. In Proceedings of the 50th Hawaii International Conference on System Sciences.

Klein, H. K., & Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. MIS quarterly, 67-93.

Korhonen, J. J., & Poutanen, J. (2013). Tripartite approach to enterprise architecture. Journal of Enterprise Architecture, 9(1), 28-38.

Korhonen, J. J., & Molnar, W. A. (2014). Enterprise architecture as capability: Strategic application of competencies to govern enterprise transformation. In 2014 IEEE 16th Conference on Business Informatics, 1, 175-182. IEEE.

Korhonen, J. J., Lapalme, J., McDavid, D., & Gill, A. Q. (2016). Adaptive enterprise architecture for the future: Towards a reconceptualization of EA. In 2016 IEEE 18th Conference on Business Informatics, 1, 272-281. IEEE.

Kotusev, S. (2016). Enterprise architecture frameworks: the fad of the century. British Computer Society (BCS). Accessed 10.9.2021 at http://www.bcs.org/content/conWebDoc/56347.

Kotusev, S. (2017). Enterprise architecture: what did we study? International Journal of Cooperative Information Systems, 26(04).

Kotusev, S. (2020a). Enterprise Architecture: Forget Systems Thinking, Improve Communication. British Computer Society (BCS). Accessed 10.9.2021 at https://www.bcs.org/articles-opinion-and-research/enterprise-architecture-forget-systems-thinking-improve-communication.

Kotusev, S. (2020b). What Is Agile Enterprise Architecture?. British Computer Society (BCS). Accessed 8.11.2021 at https://www.bcs.org/content-hub/what-is-agile-enterprise-architecture.

Kotusev, S., & Kurnia, S. (2021). The theoretical basis of enterprise architecture: A critical review and taxonomy of relevant theories. Journal of Information Technology, 36(3), 275-315.

Kotusev, S., Singh, M., & Storey, I. (2015). Consolidating enterprise architecture management research. In 2015 48th Hawaii International Conference on System Sciences, 4069-4078. IEEE.

Kurnia, S., Kotusev, S., Taylor, P., & Dilnutt, R. (2020). Artifacts, activities, benefits and blockers: Exploring enterprise architecture practice in depth. In Proceedings of the 53rd Hawaii International Conference on System Sciences.

Lakhrouit, J., & Baïna, K. (2013). State of the art of the maturity models to an evaluation of the enterprise architecture. In 2013 3rd International Symposium ISKO-Maghreb, 1-8. IEEE.

Laki julkisen hallinnon tiedonhallinnasta. (906/2019). Accessed 16.11.2021 at https://www.finlex.fi/fi/laki/ajantasa/2019/20190906.

Laki julkisen hallinnon tietohallinnon ohjauksesta. (634/2011). Accessed 16.11.2021 at https://www.finlex.fi/fi/laki/alkup/2011/20110634.

Lange, M., Mendling, J., & Recker, J. (2012a). A comprehensive EA benefit realization model – An exploratory study. In 2012 45th Hawaii International Conference on System Sciences, 4230-4239. IEEE.

Lange, M., Mendling, J., & Recker, J. (2012b). Measuring the realization of benefits from enterprise architecture management. Journal of Enterprise Architecture, 8(2), 30-44.

Lange, M., Mendling, J., & Recker, J. (2012c). Realizing benefits from enterprise architecture: a measurement model. In Proceedings of the 20th European Conference on Information Systems (ECIS), 1-12. Association for Information Systems.

Lange, M., Mendling, J., & Recker, J. (2016). An empirical analysis of the factors and measures of Enterprise Architecture Management success. European Journal of Information Systems, 25(5), 411-431.

Lapalme, J. (2012). Three schools of thought on enterprise architecture. IT professional, 14(6), 37-43.

Lapalme, J., Gerber, A., Van der Merwe, A., Zachman, J., De Vries, M., & Hinkelmann, K. (2016). Exploring the future of enterprise architecture: A Zachman perspective. Computers in Industry, 79, 103-113.

Leppänen, M., Valtonen, K., & Pulkkinen, M. (2007). Towards a Contingency Framework for Engineering an Enterprise Architecture Planning Method. In Proceedings of 30th Information Systems Research Seminar in Scandinavia (IRIS 2007), 430-449. D-Net Publications.

Levy, Y., & Ellis, T. J. (2006). A systems approach to conduct an effective literature review in support of information systems research. Informing Science, 9.

Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry. Sage.

Mayring, P. (2000). Qualitative Content Analysis. Forum: Qualitative Social Research, 1(2), 20.

Mingers, J., & White, L. (2010). A review of the recent contribution of systems thinking to operational research and management science. European journal of operational research, 207(3), 1147-1161.

Meyer, M., Helfert, M., & O'Brien, C. (2011). An analysis of enterprise architecture maturity frameworks. In International Conference on Business Informatics Research, 167-177. Springer, Berlin, Heidelberg.

Myers, M., & Avison, D. (2002). An introduction to qualitative research in information systems. In Myers, M., & Avison, D. (Eds.), Qualitative research in information systems, 2-12. SAGE Publications.

Myers, M., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. Information and organization, 17(1), 2-26.

National Association of State Chief Information Officers. (2003). Enterprise Architecture Maturity Model. Accessed 6.1.2022 at https://www.nascio.org/wp-content/uploads/2019/11/NASCIO-EAMM.pdf.

Niemi, E. (2006). Enterprise architecture benefits: Perceptions from literature and practice. In Proceedings of the 7th IBIMA Conference on Internet & Information Systems in the Digital Age.

Niemi, E. I., & Pekkola, S. (2016). Enterprise architecture benefit realization: Review of the models and a case study of a public organization. ACM SIGMIS Database: the DATABASE for Advances in Information Systems, 47(3), 55-80.

Niemi, E., & Pekkola, S. (2020). The benefits of enterprise architecture in organizational transformation. Business & information systems engineering, 62(6), 585-597.

Nkundla-Mgudlwa, S., & Mentz, J. C. (2017). A Synthesis of Enterprise Architecture Effectiveness Constructs. In Proceedings of the 19th International Conference on Enterprise Information Systems (ICEIS 2017), 3, 282–293. SCITEPRESS Science And Technology Publications.

Noble, H., & Smith, J. (2015). Issues of validity and reliability in qualitative research. Evidence-based nursing, 18(2), 34-35.

Nurmi, J., Pulkkinen, M., Seppänen, V., & Penttinen, K. (2018). Systems Approaches in the enterprise architecture field of research: a systematic literature review. In Enterprise Engineering Working Conference, 18-38. Springer, Cham.

Nurmi, J., Penttinen, K., & Seppänen, V. (2019). Examining Enterprise Architecture Definitions: Implications from Theory and Practice. In Selected Papers of the IRIS, 9. Association for Information Systems.

Okoli, C. (2015). A guide to conducting a standalone systematic literature review. Communications of the Association for Information Systems, 37(1), 43.

Orlikowski, W., & Baroudi, J. (2002). Studying information technology in organizations: research approaches and assumptions. In Myers, M., & Avison, D. (Eds.), Qualitative research in information systems, 50-77. SAGE Publications.

Paré, G., Trudel, M. C., Jaana, M., & Kitsiou, S. (2015). Synthesizing information systems knowledge: A typology of literature reviews. Information & Management, 52(2), 183-199.

Plessius, H., Slot, R., & Pruijt, L. (2012). On the categorization and measurability of enterprise architecture benefits with the enterprise architecture value framework. Trends in Enterprise Architecture Research and Practice-Driven Research on Enterprise Transformation, 79-92.

Pulkkinen, M., & Hirvonen, A. (2005). EA planning, development and management process for agile enterprise development. In Proceedings of the 38th annual Hawaii international conference on system sciences, 223. IEEE.

Pulkkinen, M. (2006). Systemic management of architectural decisions in enterprise architecture planning. four dimensions and three abstraction levels. In Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06), 8, 179. IEEE.

Proper, H., & Lankhorst, M. M. (2014). Enterprise architecture - towards essential sensemaking. Enterprise Modelling and Information Systems Architectures (EMISAJ), 9(1), 5-21.

Raadt, B. V. D., & Vliet, H. V. (2008). Designing the enterprise architecture function. In International Conference on the Quality of Software Architectures, 103-118. Springer, Berlin, Heidelberg.

Radeke, F. (2011). Toward understanding enterprise architecture management's role in strategic change: antecedents, processes, outcomes. In Proceedings of the 10th International Conference on Wirtschaftsinformatik, 2, 497-507.

Rahimi, F., Gøtze, J., & Møller, C. (2017). Enterprise architecture management: Toward a taxonomy of applications. Communications of the Association for Information Systems, 40(1), 7.

Rouhani, B. D., Mahrin, M. N. R., Nikpay, F., Ahmad, R. B., & Nikfard, P. (2015). A systematic literature review on Enterprise Architecture Implementation Methodologies. information and Software Technology, 62, 1-20.

Saint-Louis, P., & Lapalme, J. (2018). An exploration of the many ways to approach the discipline of enterprise architecture. International Journal of Engineering Business Management, 10.

Saint-Louis, P., Morency, M. C., & Lapalme, J. (2019). Examination of explicit definitions of enterprise architecture. International Journal of Engineering Business Management, 11, 1-18.

Sarker, S., Chatterjee, S., Xiao, X., & Elbanna, A. (2019). The sociotechnical axis of cohesion for the IS discipline: Its historical legacy and its continued relevance. MIS Quarterly, 43(3), 695-720.

Schöenherr, M. (2008). Towards a common terminology in the discipline of enterprise architecture. In International Conference on Service-Oriented Computing, 400-413. Springer, Berlin, Heidelberg.

Shanks, G., Gloet, M., Someh, I. A., Frampton, K., & Tamm, T. (2018). Achieving benefits with enterprise architecture. The Journal of Strategic Information Systems, 27(2), 139-156.

Simon, D., Fischbach, K., & Schoder, D. (2014). Enterprise architecture management and its role in corporate strategic management. Information Systems and e-Business Management, 12(1), 5-42.

Stemler, S. (2000). An overview of content analysis. Practical assessment, research, and evaluation, 7(1), 17.

Strano, C., & Rehmani, Q. (2007). The role of the enterprise architect. Information systems and e-business management, 5(4), 379-396.

Syynimaa, N. (2013). Theoretical perspectives of enterprise architecture. In 4th Nordic EA Summer School.

Syynimaa, N. (2017). The quest for underpinning theory of enterprise architecture: General systems theory. In ICEIS 2017: Proceedings of the 19th International Conference on Enterprise Information Systems, 3, 400-408. SCITEPRESS Science And Technology Publications.

Syynimaa, N. (2018). Enterprise Architecture: To Business or Not to Business? That Is The Question! ICEIS 2018: Proceedings of the 20th International Conference on Enterprise Information Systems, 2, 623–631. SCITEPRESS Science And Technology Publications.

Tamm, T., Seddon, P. B., Shanks, G., & Reynolds, P. (2011). How does enterprise architecture add value to organisations? Communications of the association for information systems, 28(1), 10.

The Open Group. (2018a). The TOGAF® Standard, Version 9.2. Accessed 4.12.2021 at https://pubs.opengroup.org/architecture/togaf92-doc/arch/.

The Open Group. (2018b). The TOGAF® Standard, Version 9.2 - Content Metamodel. Accessed 4.12.2021 at https://pubs.opengroup.org/architecture/togaf92-doc/arch/chap30.html.

The Open Group. (2018c). The TOGAF® Standard, Version 9.2 - Architecture Development Method. Accessed 4.12.2021 at https://pubs.opengroup.org/architecture/togaf92-doc/arch/chap04.html.

The Open Group. (2018d). The TOGAF® Standard, Version 9.2 - Architecture Maturity Models. Accessed 5.1.2022 at https://pubs.opengroup.org/architecture/togaf92-doc/arch/chap45.html.

The Open Group. (2019). ArchiMate® 3.1 Specification. Accessed 4.12.2021 at https://pubs.opengroup.org/architecture/archimate3-doc/.

Trauth, E. M. (2001). The choice of qualitative methods in IS research. In Qualitative research in IS: issues and trends, 1-19. IGI Global.

Valtiovarainministeriö. (2012). Julkisen hallinnon KA-kypsyystasomalli. Accessed 6.1.2022 at https://vm.fi/documents/10623/307673/Kypsyystasomalli/e15a9c97-bdcf-4cbf-b1fa-31e9e99a188b/Kypsyystasomalli.pdf.

van de Wetering, R. (2019). Dynamic enterprise architecture capabilities: Conceptualization and validation. In International Conference on Business Information Systems, 221-232. Springer, Cham.

van de Wetering, R. (2020). Dynamic Enterprise Architecture Capabilities and Organizational Benefits: An empirical mediation study. In The 28th European Conference on Information Systems (ECIS): Liberty, Equality and Fraternity in a Digitizing World, 1-18. AIS Electronic Library.

van de Wetering, R., Kurnia, S., & Kotusev, S. (2020). The Effect of Enterprise Architecture Deployment Practices on Organizational Benefits: A Dynamic Capability Perspective. Sustainability, 12(21), 8902.

van Steenbergen, M., van den Berg, M., & Brinkkemper, S. (2007). A balanced approach to developing the enterprise architecture practice. In International Conference on Enterprise Information Systems, 240-253. Springer, Berlin, Heidelberg.

von Bertalenffy, L. (1951). General system theory – A new approach to unity of science. Human Biology, 23(4), 303-361.

vom Brocke, J., Simons, A., Niehaves, B., Niehaves, B., Reimer, K., Plattfaut, R., & Cleven, A. (2009). Reconstructing the giant: On the importance of rigour in documenting the literature search process. In ECIS 2009 Proceedings, 161.

Walsham, G. (1995). The emergence of interpretivism in IS research. Information systems research, 6(4), 376-394.

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. MIS Quarterly, 13-23.

Weiss, S., Aier, S., & Winter, R. (2012). Towards a reconstruction of theoretical foundations of enterprise architecture management. In Information systems: crossroads for organization, management, accounting and engineering, 461-468. Physica, Heidelberg.

Weiss, S., Aier, S., & Winter, R. (2013). Institutionalization and the effectiveness of enterprise architecture management. Association for Information Systems.

Winter, R., & Fischer, R. (2006). Essential layers, artifacts, and dependencies of enterprise architecture. In 2006 10th IEEE International Enterprise Distributed Object Computing Conference Workshops (EDOCW'06), 30. IEEE.

Winter, R. (2014). Architectural thinking. Wirtschaftsinformatik, 56(6), 395-398.

Wolfswinkel, J. F., Furtmueller, E., & Wilderom, C. P. (2013). Using grounded theory as a method for rigorously reviewing literature. European journal of information systems, 22(1), 45-55.

Ylimäki, T. (2006). Potential critical success factors for enterprise architecture. Journal of Enterprise Architecture, 2(4), 29-40.

Ylinen, M., & Pekkola, S. (2020). Jack-of-all-trades torn apart: Skills and competences of an enterprise architect. In Proceedings of the 28th European Conference on Information Systems (ECIS). Association for Information Systems.

Zachman, J. A. (1987). A framework for information systems architecture. IBM systems journal, 26(3), 276-292.

Zachman International, Inc. (2008). The Zachman Framework. Accessed 2.12.2021 at https://www.zachman.com/about-the-zachman-framework.

Zhou, Z., Zhi, Q., Morisaki, S., & Yamamoto, S. (2020). A systematic literature review on Enterprise Architecture Visualization Methodologies. IEEE Access, 8, 96404-96427.

APPENDIX 1 INTERVIEW STRUCTURE

Introduction of the participants, the research topic
and the interview practicalities

Underlying approaches shaping the Enterprise Architecture practice

- How do you define Enterprise Architecture and what do you see as the main purpose of the Enterprise Architecture practice?
- How do you perceive the status quo of the Enterprise Architecture practice against the Enterprise Archtiecture schools of thought (between a technical focus, a sociotechnical focus and an ecosystemic focus)?
- What factors may have affected the selected approach towards the Enterprise Architecture practice?

Configurations of the Enterprise Architcture practice

- How is the Enterprise Architcture function positioned within the organisation and how is it designed?
- How do you see the relative significance of various Enterprise Archtiecture dimensions in the Enterprise Architecture practice?
- What do you see as the main applications for Enterprise Architecture and Enterprise Architecture based capabilities in the organisation?
- How has the selected configuration been working in your experience, are there some successes or challenges?

Impact of the Enterprise Architecture practice

- How do you perceive the relationship between the selected approach and configuration and the realisation of Enterprise Architecture benefits?
- How do you perceive the relationship between the selected approach and configuration and the Enterprise Architecture maturity?

Contextual and contingency factors affecting the Enterprise Architecture practice

- What are some of the potential contextual and contingency factors that may have affected the selected approach or configuration, or the resulting impact of the Enterprise Architecture practice?

Conclusion of the interview and the next steps