MASTER'S THESIS

Enterprise Architecture in a Cross-Organizational Value Network: Exploring the role and challenges of Cross-Organizational EA

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Abstract

This research explores the role of enterprise architecture artifacts in achieving alignment between business and IT within a cross-organizational value network. The research identifies and examines various artifacts that contribute to this alignment and analyzes their impact on collaboration, decision making and overall value creation. The research takes a multidisciplinary approach, considering insights from business and IT perspectives.

The findings indicate that enterprise architecture artifacts play a crucial role in facilitating alignment by providing a comprehensive view of the organization, bridging communication gaps, supporting improvement opportunities, enabling standardization and facilitating effective change management. The artifacts serve as boundary objects, promotes collaboration, improves shared understanding and ensures that business and IT initiatives align with the shared strategic goals of the value network.

The research provides valuable insights for practitioners, decision makers and researchers seeking to improve the alignment between business and IT in cross-organizational value networks. The findings underscore the importance of using enterprise architecture artifacts to optimize operations, improve decision making and achieve successful alignment in today's interconnected and dynamic business environment.

Key terms

Enterprise architecture, enterprise architecture artifacts, alignment, value network, collaboration, cross-organizational value network.

Summary

This thesis examines the role of enterprise architecture artifacts in facilitating alignment between business and IT within a cross-organizational value network. Enterprise architecture is defined as striving to achieve business objectives in the most efficient, sustainable and effective way possible. It acts as a bridge between the business strategy and the IT environment and helps identify process dependencies and streamline process execution within the value network. Enterprise architecture promotes transparency across operational businesses and prevents potential misuse of information. The interviews revealed that the focus of enterprise architecture is mainly on the business side and includes defining work processes and shaping the organization, leading to IT needs. The interviews revealed that the focus of enterprise architecture is mainly on the business side and includes defining work processes and shaping the organization, leading to IT needs. In a mature organization, enterprise architecture should be incorporated into the C-level and helps translate mission and strategy into organizational structure, capabilities and value streams.

Enterprise architecture artifacts play an important role in the alignment between IT and Business. Several artifacts are mentioned, including mission and vision, process flows, value stream models, business capability models and the Global aligning information model. These artifacts support communication, decision-making and the strategic focus and added value of enterprise architecture to the organization. However, the management of enterprise architecture artifacts currently does not appear to be standardized and there is a need for a single tool to capture the architecture. The lack of uniformity between the architectures of different operating companies was also highlighted. Enterprise architecture has a wider role than just solving IT problems. It plays an essential role in understanding and improving the governance of the business. A solid governance model and strategic alignment with the C-level are crucial. It is important that the enterprise architecture is integrated into decision making and plays a proactive role in identifying technology and business process opportunities and challenges.

The thesis concludes that a well-structured and effective enterprise architecture can contribute to business growth, profitability and competitiveness. It is important for top management to understand and support the value and importance of enterprise architecture so that its full value can be leveraged. Uniformity, standardization and good governance are crucial to the success of enterprise architecture. The findings from this study highlight the importance of a holistic approach to enterprise architecture, with strategic alignment, good governance and standardization at its core. It is essential that enterprise architecture is recognized as an integral part of the organization and plays an active role in achieving business objectives. Implementing an effective enterprise architecture requires a continuous focus on development and improvement, regular reviews and audits of the artifacts, and stakeholder engagement and feedback. It is also important to define measurable goals and outcomes to assess the value and impact of enterprise architecture. As a result, this study provides insight into the role of enterprise architecture and its value within a cross-organizational value network.

Contents

1. Introduction

This thesis describes how enterprise architecture artifacts (EA artifacts) can contribute to the alignment between Business and IT in a cross-organizational value network.

1.1. Background

In today's rapidly evolving business landscape, organizations face the constant challenge of aligning their operations with the dynamic environment. Business transformations are increasingly common because companies operate within interconnected networks, including various cross-organizational value networks. These networks include interactions with customers, partners and competitors, creating a complex web of activities, processes, IT developments and change management within organizations (Ioannidis, 2019). To navigate this complexity, organizations need a comprehensive understanding of their business functions, processes, information systems (IS) and technical platforms. Over time, the original concept of IS architecture has evolved into a mature practice known as enterprise architecture (EA). Documentation of these interconnected elements is essential for analyzing and planning the alignment between business and IT architectures within enterprises. This alignment can be facilitated through the use of artifacts that provide different perspectives on organizational aspects (Kotusev, Kurnia, & Dilnutt, 2022). EA consists of a collection of artifacts that holistically describe an organization from an integrated business and IT standpoint. The goal is to improve the management and effectiveness of complex enterprises and their information systems (Kotusev, 2019). Moreover, EA acts as a bridge between business and IT stakeholders, enabling better communication and alignment between these two crucial domains (Lapalme et al., 2016). By recognizing the importance of EA in the context of cross-organizational value networks, this research aims to deepen the understanding of how EA and its artifacts contribute to the alignment between business and IT. By exploring this relationship, the research aims to provide valuable insights for organizations that must navigate the complexity of today's interconnected business environments.

1.2. Exploration of the topic

The research focuses on the practice of EA, EA artifacts and value networks. In the 1980s, the increasing complexity of IS and their impact on the infrastructure of organizations led to the evolution of IS architecture into the mature practice of EA. In this research, EA is defined as a collection of artifacts that comprehensively describe an organization from an integrated business and IT perspective. These artifacts act as boundary objects that bridge the communication gap between business and IT stakeholders to improve alignment within organizations (Kotusev, Kurnia, & Dilnutt, 2022). However, the analysis of EA artifacts as boundary objects in the existing literature is currently inadequate and lacking in depth. Although lists of artifacts are available for use in EA, recent empirical research has only begun to highlight the benefits organizations can derive from EA artifacts (Foorthuis et al., 2016; Niemi & Pekkola, 2016; Pattij, Van de Wetering, & Kusters, 2020; Van de Wetering, 2021; Grave et al., 2021). These studies approach EA mainly from a traditional perspective, limited to the internal organization, despite the consensus among academics that taking into account the cross-organizational perspective is crucial for maintaining competitiveness in today's dynamic environment (Van de Wetering & Dijkman, 2021).

Contemporary organizations, driven by technological advances, are increasingly participating in different types of collaborative networks known as value networks. A value network consists of interconnected organizations and individuals that interact for the benefit of the entire group,

engaging in transactions, information exchange and mutual value creation (Kenton, 2022). However, applying EA within a value network presents challenges because different organizations may have different strategies and core activities. Moreover, unlike in the 1980s, organizations today must navigate internal complexity and the complexity that comes from crossing organizational boundaries. Unfortunately, there is too little attention to cross-organizational EA in the existing scientific literature (Pattij & Van de Wetering, 2021). In addition, it is becoming clear that the practical role and use of EA artifacts within the EA of a cross-organizational value network are currently characterized as complex, superficial and inadequate Kotusev, Kurnia and Dilnutt (2022),.

1.3. Problem statement

Despite the increasing adoption of EA and its recognized benefits in improving the alignment between business and IT within organizations, there are significant gaps and limitations in the current understanding and application of EA artifacts, particularly in the context of cross-organizational value networks. Existing literature focuses primarily on EA within individual organizations and does not address the complexities and challenges associated with applying EA in cross-organizational value networks (Kotusev, 2019; Pattij & van de Wetering, 2021). There is a lack of comprehensive research and empirical studies that specifically examine the role and use of EA artifacts within cross-organizational value networks. Because of this gap, organizations do not have adequate guidance to effectively navigate the interdependencies, diverse strategies and core activities present in these networks. As a result, organizations struggle to achieve optimal alignment between their internal activities and the collaborative dynamics of value networks, therefore obstructing their ability to adapt to the fast-changing business environment (Kotusev et al., 2022; Lapalme et al., 2016; Van de Wetering & Dijkman, 2021). Moreover, the available literature on EA artifacts offers only superficial insights into their practical use, leaving organizations with an incomplete understanding of how to use them as boundary artifacts between business and IT stakeholders in cross-organizational contexts (Kotusev et al., 2022). This knowledge gap prevents effective communication and alignment between business and IT, hindering organizational success (Lapalme et al., 2016).

Therefore, there is an urgent need for research that explores how EA artifacts play a key-role in cross-organizational value networks. This research should aim to a better understanding of the complexities, challenges and practical implications associated with the use of EA artifacts to improve alignment between business and IT in the dynamic and interconnected world of cross-organizational value networks (Foorthuis et al., 2016; Niemi & Pekkola, 2016). Addressing these gaps will help organizations improve their ability to manage and improve the complexity of cross-organizational value networks, leading to greater agility, competitiveness and value creation in today's business landscape.

1.4. Research objective and questions

The objective of this research is to expand the academic knowledge based on how EA artifacts contribute to the alignment between Business and IT in organizations participating in cross-organizational value networks. The research specifically focuses on identifying key artifacts that play a significant role in the EA of a cross-organizational value network and exploring their practical use in improving alignment between Business and IT.

The main research question underlying this research is: "How can EA artifacts contribute to the alignment between business and IT in a cross-organizational value network?".

By addressing this research question, this research aims to increase the understanding of the role and practical implications of EA artifacts within cross-organizational value networks.

1.5. Motivation/relevance

The motivation and relevance of this research comes from the need to improve the effective use of EA within cross-organizational value networks through the use of EA artifacts. These artifacts serve as valuable tools in analyzing and planning the interconnectedness of enterprise and IT architectures within organizations and provide specific perspectives on the organization. However, existing academic literature lacks a comprehensive understanding of EA in cross-enterprise value networks, with most studies focusing on the perspective of the internal organization (Niemi & Pekkola, 2016; Pattij et al., 2020; Van de Wetering, 2021; Grave et al., 2021). Moreover, EA artifacts are crucial for bridging the communication gap between business and IT stakeholders, improving alignment between the two domains. They can be considered boundary objects that facilitate collaboration between different business and IT communities (Kotusev, Kurnia, & Dilnutt, 2022). However, the existing literature offers only superficial insights into the role and practical use of these artifacts and lacks a comprehensive analysis of their potential as boundary objects (Kotusev, 2019; Kotusev, Kurnia, & Dilnutt, 2022).

This research is relevant to both academia and practice because it contributes to the academic understanding of EA in cross-organizational settings and provides practical insights that can help organizations effectively deploy EA artifacts to improve the alignment between their business and IT architectures within the dynamic and interconnected world of value networks. This will enable their organizations to effectively navigate complexity, achieve greater competitiveness and create value in the contemporary business landscape.

1.6. Main lines of approach

The structure of this thesis is as follows: chapter one, the section above, provides a concise introduction of EA, EA artifacts and cross-organizational value networks, providing the foundation for the research. Next, chapter two presents the theoretical framework, research methods and approach for this research. The third chapter describes the methodology used for the conceptual design and data analysis. Next, a case study will be conducted in an appropriate organization representing a cross-organizational value network. This case study will provide a practical context for identifying and exploring the challenges identified in the literature. Chapter four summarizes the findings and results of the case study, and finally, chapter five presents the conclusions and key insights gained, as well as references and appendices for further research.

Throughout the study, the APA reference style will be followed to ensure that all sources are cited accurately in the reference section. In addition, any additional information that is essential to the understanding of the study but not included in the main text will be included in the appendix.

2. Theoretical framework

This chapter presents the theoretical framework of this research. The theoretical framework is explained in several sections related to the research approach, implementation, results and objectives of the follow-up study.

2.1. Research approach

This section outlines the approach to developing the theoretical framework. A systematic literature review was conducted to construct the theoretical framework. The approach used for this is from Saunders et al. (2019), this describes a funnelling approach from themes toward the research question. The themes for the research are described below:

1. The role of EA
2. EA artifacts
3. Value networks

Based on the themes, the systematic literature review can be divided into three topics that are explained separately: note taking, search terms and approach and structuring the literature review. Structuring is further elaborated in 2.2 Implementation.

Note-taking
An important aspect of scientific research is gathering existing knowledge about the topic of the problem statement in order to be well-informed as a researcher about the subject of research. A large amount of literature must be reviewed, then a smaller amount is analysed, and a select number of articles must be read in full. To manage the finding and collecting of data, a strategy is needed to collect the data and keep track of its origin. The articles will be tracked in Google Scholar under my library. In addition, the cite function is available through Google Scholar to cite the sources according to APA guidelines and transfer them correctly to the research report.

Variables, search terms and approach
For the literature review, several criteria were established to determine the relevant sources for the research. The criteria's are presented below:

1. Published after 2009
2. Published in English or Dutch
3. Peer reviewed
4. Scientific articles

This research is part of the Open University curriculum. Therefore, the researchers have access to the Open University's online library. In addition, the Google Scholar database was used. The search terms used for the literature review are EA, EA artifacts, Benefits of EA, EA AND value networks, value networks, cross organizational value networks, EA AND enterprise artifacts and ecosystems.

2.2. Implementation

The research followed a structured review to identify relevant sources based on specific search terms. In total, 71 articles were reviewed and from these, the most relevant to the research were identified. The articles are shown in the table 1. structuring overview sources, these were selected as valuable sources to provide insights and support research on the role and practical implications of EA artifacts in improving the alignment between business and IT within cross-organizational value networks. The main articles that emerged as highly relevant to the research were Kotusev, Kurnia, & Dilnutt (2022), Kotusev (2019), and Niemi and Pekkola (2016).

Search term	Source	number of articles found	number of articles reviewed	number of articles relevant	number of articles used
EA	Google Scholar and OU Library	18400	15	8	7
EA artifacts	Google Scholar and OU Library	3350	10	7	3
Ecosystems EA	Google Scholar and OU Library	8960	10	5	2
Benefits of EA	Google Scholar and OU Library	5061	5	3	2
EA AND value networks	Google Scholar and OU Library	1980	4	2	1
Value networks (definition)	Google Scholar and OU Library	6412	10	4	2
Cross organizational value networks	Google Scholar and OU Library	855	7	3	1
EA EN enterprise artifacts	Google Scholar and OU Library	3220	10	5	2

Table 1. structuring overview sources

2.3. Results and conclusions

This section discusses the theory for each theme established in the research approach and the arguments that led to the answers. The conclusions are then listed, and these implications provide for the continuation of the research.

1. The role of EA

EA is defined as the process of defining and representing a high-level view of an enterprise's business processes and IT systems, including their interrelationships and the extent to which they are shared by different parts of the enterprise (Tamm et al., 2011). It includes both process definition and product representation, with EA processes guiding the design, management and transformation of EA in support of organizational strategy (Lange, 2012). These processes include activities such as EA planning, documentation and governance (Lange, 2012; Tamm et al., 2011). EA planning focuses on making decisions about the desired status of EA, which are captured in documents such as models and principles (Pulkkinen, 2006). EA governance ensures the use of these documents to guide development activities and ensure EA compliance (van der Raadt, 2011; Ren & Lyytinen, 2008). Common EA frameworks such as TOGAF or the Zachman framework provide guidelines for documenting and organizing EA work. The value of EA is its ability to support alignment between strategy and operations, and between business and IT, ensuring that changes are aligned with strategic objectives (Niemi, 2009). It also provides insight into the current and desired design of the organization and the relationship between processes and information assets. Furthermore, EA improves the quality of solutions, simplifies their development and maintenance, and increases their usability.

With well-designed EA functions, it helps monitor the quality of organizational actions. Defining roles and responsibilities, establishing processes and managing architecture knowledge are crucial aspects of this function. It is recommended that the roles of enterprise architect and solution architect be explicitly separated because they have different responsibilities. The enterprise architect is responsible for overseeing organization-wide consistency, while the solution architect focuses on delivering high-quality solutions within project constraints (Niemi, 2016). The literature highlights numerous benefits of EA, with research by Niemi and Pekkola providing a list of 40 individual benefits based on a review of extensive literature reviews on the benefits of EA (Boucharas et al., 2010; Foorthuis et al., 2015; Niemi, 2006; Tamm et al., 2011). These benefits cover a wide range of areas and highlight the positive effects of EA on organizational performance and effectiveness.

Benefits EA			
Document Knowledge on the EA	Improve change management	Improve enterprise wide goal	Improve organizational collaboration
Identify resource dependencies	Improve Compliance	Improve information quality	Improve organizational communication
Identify resource synergies	Improve customer satisfaction	Improve investment management	Improve resource alignment
Identify suboptimal resource use	Improve decision-making	Improve measurement	Improve resource consolidation
Improve Alignment with partners	Improve employee satisfaction	Improve organizational alignment	Improve resource integration
Increase market share	Increase resource flexibility	Increase resource reuse	Increase resource standards
Improve resource quality	Improve return on investment	Improve situational awareness	Improve stability
Improve situational development	Increase revenue	Increase agility	Increase economies of scale
Increase efficiency	Increase growth	Increase innovation	Provide a high level overview
Provide directions for improvement	Provide standards	Reduce costs	Reduce Complexity

Table 2. EA benefits (adapted from Niemi, S. Pekkola, 2016)

2. EA artifacts

EA artifacts are essential descriptive documents that provide a comprehensive view of an organization from both business and IT perspectives (Abraham, 2013; Bischoff et al., 2014; Kotusev et al., 2015; Niemi & Pekkola, 2017; Winter & Fischer, 2006). They serve as the basic components of EA and collectively describe various aspects of an organization's integrated business and IT landscape. These artifacts play a crucial role in bridging the communication gap between business and IT stakeholders, with the goal of improving alignment and collaboration within organizations. They can be viewed as boundary objects that facilitate interaction between different business and IT communities. However, current literature on EA artifacts lacks a comprehensive analysis of their role as boundary objects.

Different EA sources propose different sets of EA artifacts to be developed as part of an EA practice. For example, Spewak and Hill (1992) present more than 50 EA artifacts consistent with their prescribed EA methodology, covering areas such as planning initiation, business modelling, current systems and technology, data architecture, application architecture, technology architecture and migration plans. DoDAF (2007) describes 29 EA artifacts, divided into operational, services, technical

standards and "all" views. van't Wout et al. (2010) present more than 80 EA artifacts in the areas of context, business, information, information systems and technology infrastructure. TOGAF (2011) describes more than 50 EA artifacts and deliverables corresponding to the phases of the recommended architecture development method (ADM). Finally, Bernard (2012) lists 46 EA artifacts grouped into eight domains, including strategic goals and initiatives, business products and services, data and information, systems and applications, networks and infrastructure, security, standards and personnel. While these comprehensive lists of EA artifacts are often used in practice, it is important to note that they often lack a solid theoretical foundation (Kotusev, 2019). Despite their practical relevance, the underlying theoretical foundations for these artifacts require further exploration. This research addresses this gap by examining and analyzing the most commonly used EA artifacts in organizations. By examining their theoretical underpinnings and exploring their practical implications, this research aims to enhance our understanding of the role and importance of EA artifacts in improving business and IT alignment.

The table below lists the selected artifacts that are commonly used by businesses. However, it is important to recognize that these artifacts may lack a solid theoretical foundation (Kotusev, 2019).

Artifacts most commonly			
Solution Designs	Business Capability models	Guidelines	Solution overviews
Roadmaps	Inventories	Preliminary solution designs	Patterns
IT Roadmaps	Principles	IT principles	Direction Statements
Technology Reference models	Logical data models	Target states	Analytical reports
Initiative proposals	Policies	Context diagrams	Value chain
Landscape diagrams	Conceptual data models	Options assessments	Enterprise System Portfolios

Table 3. Most commonly EA artifacts (Kotusev, 2019)

EA at the highest level, as a collection of various EA artifacts, is typically conceptualized as a comprehensive description of an organization's current state, a description of its desired future state, and a roadmap for transitioning between these states (Drews, Schirmer, 2014). Additionally, the research of Kotusev, Kurnia & Dilnutt shows that EA artifacts can be classified into six different categories. These categories were identified based on the conceptual similarities and differences between the artifacts. In addition, the artifacts provide a framework for understanding their role in EA practice. The six general categories of EA artifacts are referred to: considerations, standards, visions, landscapes, contours and designs. These categories are shown in the table below with related EA artifacts and explanations.

Type	Related EA artifacts identified in organizations	Explanation
Considerations	Core drivers, data models, maxims, policies, principles, strategic papers and strategy papers	Provide some general considerations defining global architectural decision-making
Standards	Data schemas, IT principles, patterns, principles, reference architectures, standards and technology reference model	Provide some technical standards influencing the designs of all information systems
Visions	Blueprints, business capability models, business reference architectures, capability model, divisional roadmaps, enterprise investment roadmap, function roadmaps, process model, program of work and roadmaps	Provide some visions of the long-term future agreed by business and IT stakeholders
Landscapes	Asset register, domain roadmaps, inventories, one-page diagrams, platform architectures, platform roadmaps, reference architecture model, technical reference architectures, technology blueprints and technology roadmaps	Provide some views of the organizational IT landscape from the technical perspective
Outlines	Blueprints, conceptual architectures, idea briefs, key design decisions of SOs, solution overviews and solutions on a page	Provide some brief outlines of proposed IT initiatives
Designs	Detailed designs, full solution architectures, high-level designs, key design decisions of SAs, preliminary solution architectures, solution architectures, solution blueprints and solution designs	Provide some technical designs of proposed IT solutions

Table 4. related EA artifacts and explanation according to Kotusev, Kurnia & Dilnutt (2022).

By categorizing EA artifacts into these different categories, the analysis helps facilitate a better understanding of their purpose and significance in an EA practice. This theory provides a basic framework that enables practitioners to effectively use the different types of artifacts and leverage their unique characteristics to achieve desired results within the organization's architecture.

3. Value networks

A value network refers to a system of interconnected organizations and individuals who collaborate to create mutual benefits. Within a value network, members engage in the exchange of products, services, and information. Visualizing a value network can be done using a mapping tool that depicts nodes representing members and connectors representing their relationships (Kenton, 2022). By leveraging the resources, influence, and insights of its network connections, a company or individual can extract value from participating in a value network. This enables them to tap into the collective capabilities of other network members, fostering knowledge sharing, efficient processes, and accelerated innovation (Kenton, 2022). Effective knowledge and information sharing among networked companies can lead to increased agility and dynamic collaboration. The ability to swiftly and efficiently transfer competencies and processes across organizational boundaries allows organizations to combine their strengths and pursue strategic opportunities that combine customer intimacy, product leadership, and operational excellence. Collaboration reaches its highest potential when shared goals are defined, leading to win-win situations (Allee, 2009).

Value network analysis serves as a bridge between human interactions and business processes, overcoming the division often found in traditional management practices. While engineering approaches focus on eliminating variation, they may inadvertently hinder organizational agility and innovation. The value network perspective, with its human-centric orientation, integrates these two domains, offering a practical and powerful framework for modelling business activities and fostering more effective organizations (Allee, 2009).

Characteristics	Explanation
Mission	The different organizations have overlapping missions/ goals, a win-win situation on the same goal is possible.
Complementary competencies	Partners possess complementary competencies, allowing them to leverage each other's strengths and fill gaps in expertise.
Strategic advantage	Strategic advantage operating within an open network of relationships provides a strategic advantage, enabling organizations to benefit mutually from the partnership
Semi-stability	stability with regard to the relationship with partners, but lower costs with competitors can cause switching partner.
Good communication	Customers ask for an individualized product and service. This means that communication between the partners must be good to fulfil the individual customer demand. This means opening channels in which information flows.
Trust	Trust is necessary for the exchange of information and knowledge between organizations.
Chain integration	Processes among companies are integrated, creating better connectivity or redesigning them from a holistic chain perspective.

Table 5. characteristics according to Allee (2009)

By understanding and analyzing value networks, organizations can open up new opportunities for collaboration, leverage diverse expertise and drive innovation and competitiveness in today's interconnected business landscape.

2.4. Objective of the follow-up research

The objective of the research is to investigate and clarify the role and practical implications of EA artifacts in improving the alignment between business and IT within cross-organizational value networks. The research aims to expand the existing academic knowledge in this area by addressing the gaps and limitations in understanding and applying EA artifacts in this context

3. Methodology

The methodology of a research has a critical role in its credibility and comprehensibility. Therefore, this chapter is intended to provide a comprehensive explanation of the research design. It will outline both the conceptual and technical aspects of the research method, including a brief introduction to the organization of the case study. In addition, it will describe the approach used for the data analysis. Finally, the chapter will discuss important considerations such as reliability, validity and ethical issues.

3.1. Conceptual design: select the research method(s)

The purpose of the methodology is to define and justify the chosen research methods, providing a clear understanding of the steps taken to achieve the desired results, including data collection, analysis and the scope of the research. The research conducted is an exploratory research because the characteristics of the new situation, involving EA within cross-organizational value networks, differ from previous contexts. The aim is to establish a theoretical basis that can be applied to these new situations. The research strategy used is a qualitative case study, chosen because of the limited of existing research and literature in this field. Because of the unclear scope caused by the research topic and the lack of literature, a single-case study was chosen, focusing on a holistic approach to the research Saunders et al. (2019). A case study allowed for proper delimitation of the topic and research and due to the time frame, it was not possible to conduct a large-scale research. The selected case study is a large commercial entity operating in the staffing industry, where the researcher works. By providing a theoretical basis for the role of EA artifacts, this research aims to provide clarity and guidance to organizations involved in cross-organizational value networks so that they can effectively implement EA and EA artifacts and improve alignment between business and IT architecture. Qualitative data is essential to this research because it provides a deeper understanding of concepts, thoughts and experiences. Qualitative research is especially suited for exploring topics with limited existing knowledge, making it suitable for this research. An action research approach will be used, collecting data on EA artifacts within cross-organizational value networks and linking theory to case study findings. On these grounds, it is an inductive research approach. Data will be collected from EA architects, CIOs, domain architects, business process architects and users, as well as relevant documentation within the chosen case organization.

3.2. Technical design: elaboration of the method

Section 3.1 outlined that the case study was conducted within the researcher's organization, emphasizing the importance of selecting an appropriate case organization. The chosen case organization had to meet certain criteria, including the adoption of EA within a cross-organizational value network, willingness to participate in interviews, and providing access to relevant documents. The selected organization is based in the Netherlands and has a collaborative relationship with the operating company Global. Both organizations have their own EA but are in the process of aligning and improving the cross-organizational value network. In the further text, the operating companies will be mentioned as Netherlands and Global.

The data collection process relied primarily on qualitative methods, with interviews and document review being the main approaches used. Using multiple data sources and ensuring consistency in findings across different data sets reinforced the validity of the results. The following sections provide a detailed explanation of these methods. Document research was conducted to collect artifacts and relevant information. The case organization provided access to all the relevant documents, so it was not required to interview employees for the necessary data. After analyzing

and answering the pre-established questions from the document review, semi-structured interviews were conducted. The semi-structured interviews were designed based on topics from the existing literature and the insights gained from the document review. To ensure that the interview questions were clear and understandable, a pilot interview was conducted as a validation step. Next, interviews were scheduled with the enterprise architects and the questions were shared in advance. During the interviews, permission was obtained to record the conversations for later transcription, ensuring privacy and respect for the participants.

3.3. Data analysis

This chapter provides a comprehensive description and justification of the analysis approach used to examine the data collected. The data analysis in this study consisted of qualitative methods. The first step of the analysis consisted of fragmenting and reducing the data. This was accomplished by coding and reorganizing the transcripts into different analytical categories. The coding process involved categorizing data units with similar meanings and assigning labels to each unit to symbolize or summarize its essence. Three primary sources were used for coding: the actual terms used by the participants, labels developed from the data itself, and labels derived from existing theory and literature. For this particular study, the actual terms used by the participants were used. The first phase of coding was known as open coding, in which the collected data were broken down into conceptual units and given appropriate labels. This resulted in a significant number of codes. Next, axial coding was applied to condense the large number of codes obtained from open coding, resulting in a reduced set of codes associated with larger data units. Finally, selective coding was applied to examine and explain the phenomenon under investigation. This included identifying the events and the explanatory reasons behind this, considering the environmental factors that impacted them, assessing their management within the specific context and examining the results of the actions that were taken (Saunders, Lewis and Thornhill, 2019).

The following step involved thematic analysis, aimed at identifying recurring themes and patterns within the qualitative data and coded transcripts. Thematic analysis is a systematic and logical approach used to analyze large qualitative datasets, enabling the generation of comprehensive descriptions, explanations and theories. (Saunders, Lewis and Thornhill, 2019). After completing the analysis, the data was summarized, consolidating findings and highlighting key themes and patterns. This phase of the analysis focused on extracting meaningful information from the raw data and is presented in the document ''Coding- EA''. In addition, the results of the document review were added to the same document as the interview data. To ensure systematic organization and identification of relevant information in the documents, the analysis process while reading and coding the documents was guided by a predetermined set of questions. This coding process followed the guidelines of Saunders et al. (2019). By using these coding techniques an analysis of the documents was made. By applying these analysis techniques, the data collected from both the interviews and the document review were effectively analyzed, allowing for the identification of important insights and the achievement of the research objectives.

3.4. Reflection validity, reliability and ethical aspects

Given the limited knowledge on the topic, the research requires a case study to achieve the desired results and explore the topic thoroughly. The purpose of the research is to develop new theoretical insights, making a case study an appropriate research method. Moreover, because of the challenge of quantifying the data, a qualitative approach is used to express the results in descriptive terms. To increase the validity of the findings, a combination of interviews and document analysis is used, using triangulation to reinforce the results obtained. A pilot interview is conducted to ensure that

the questions are clear and well understood. The interview questions are then shared with the participants in advance, the interviews are recorded for transcription, and the transcripts are returned to the interviewees for verification. These measures not only validate the data, but also take into account ethical considerations. Anonymous interviews can be conducted to respect confidentiality, contributing to the overall integrity of the research. It is important to note that the research is based on one holistic case study and therefore the results may not be universally applicable across industries. The interviews reflect the perspectives and beliefs of individuals who may have preconceptions regarding the research topic. To limit this, multiple individuals in similar positions were interviewed and their responses were checked against available documentation. By taking these methodological aspects into consideration, the research design is carefully constructed to yield meaningful and reliable findings while recognizing potential limitations and incorporating ethical considerations.

4. Results

This chapter provides a brief overview of the conduct of the research, including the selection and design of the case study document analysis and interviews, addressing any deviations from the original plan of action. Based on the requirements described in the section 3.2, an appropriate case study research organization was identified and selected for the research. The lead enterprise architect from the Netherlands then was contacted who helped to establish contact with the other eight individuals that were interviewed based on their expertise and involvement in the cross-organizational value network. In addition, arrangements were made to access relevant documents within the organization. The interview questions were then reviewed with the lead architect and a pilot interview conducted. During the research process, any deviations from the original plan of action were carefully considered. This included changes to the interview questions after conducting the pilot interview, the use of document research to supplement the interviews, rather than a separate document survey. In addition, one interview was answered via e-mail because this respondent was absent for an extended period of time.

To come to the results, nine people were ultimately interviewed based on their expertise and involvement in the cross-organizational value network. There were interviewees from both the Dutch organization and the Global organization in order to identify the difference and reflect on the collaboration. The different roles of the interviewees are shown below:

1 Lead Enterprise Architect Netherlands
2 Enterprise Architect
3 CIO Netherlands
4 Lead Domain Architect
5 Enterprise Architect
6 Global CIO
7 North Europe CIO
8 Business Process Architect
9 Lead Enterprise Architect Global

The results of the interviews are presented below based on the six labels created from the open, axial and selective coding. The coding is attached as a separate attachment ''Coding – Enterprise Architecture'' and the detailed results for each label are presented in appendix 4 ''labels interview results''.

Role EA and value

Several insights emerged from the interviews about the role of EA and the enterprise architect. A useful definition emerged, quoted by interviewee number two: ''EA focuses on achieving business objectives in the most efficient, sustainable, and effective way possible. It acts as a bridge between the business strategy and the IT environment and helps to identify process dependencies and streamline process execution within the cross-organizational value network''. In addition, EA facilitates transparency between the various operating companies, each with their own interests, and prevents potential misuse of information. It is crucial that EA and transparency goes together, and that the organization has the nerve to be vulnerable within the value network. It also emerged from the interviews that the focus of EA is mainly on the business side and includes defining work processes and shaping the organization, which leads to IT needs. It was indicated that in a mature organization, EA is part of the C-level and helps translate mission and strategy into organizational structure, capabilities, and value streams. The designation C-level refers to senior executives in organizations, such as directors and top managers. The letter C stands for "chief," as in Chief Executive Officer (CEO) and Chief Information Officer (CIO).

The enterprise architects state that it is important to have broad interests and continuous development. Unfortunately, several interviewees indicated that EA is not currently considered a critical part of strategy, when it should be. The role of an enterprise architect is to provide objective advice and explore different scenarios to arrive at informed recommendations. One interviewee emphasized that it is important for an enterprise architect to be impartial and not be judged by financial performance or the business model. An important task of an enterprise architect is to monitor the relationship between the "why" and "the reason to exist" of an organization and the actual implementation of changes on the shop floor. However, EA is not just about aligning IT and business strategies. It is also important to identify trends and give stakeholders insight into what is happening within the organization.

In the bottom line, EA includes the description of systems, data flows and system boundaries. It is also about understanding how information moves through IT systems and how everything is logically connected. For operating organizations, there is a need for a clearer focus on the strategic aspect and added value of EA to the organization. This can be achieved by including strategic roadmaps, business cases and key performance indicators (KPIs) as artifacts. A clear capture of processes, architectures and information flows is crucial to get a clear picture of the current and desired state of EA. In addition, it should be closely aligned with reality and the artifacts must be up to date to remain relevant.

Artifacts management

From the interviews, it emerged that EA is captured in various artifacts through models and documentation to describe the multiple aspects of architecture, such as business architecture, information architecture, technical architecture and application architecture. Many different EA artifacts, which will be further explained below, have emerged that are important in the alignment between IT and Business from the value network. It is important not only for alignment, but also for relationships, follow-through developments and decision making. Interviewee number three indicated, ''if you want to work toward a common goal, capture should be done in the same way.'' It emerged that there is no management, it is unclear what artifacts are used and why they are important. It was also indicated that multiple tools are currently being used to document, but all nine interviewees expressed the need for one tool to capture the architecture. When working from one tool, there is one truth to which everyone from Business and IT can refer back when making decisions and changes. It also contributes to an unambiguous and overarching way of recording for the operating companies Netherlands and Global.

As indicated above, several artifacts were mentioned in the interviews conducted. The artifacts named by all nine interviewees are described below. It begins with the artifacts mission and vision. Next, the artifacts process flows are named based on the Business Process Modelling Notation (BPMN). This is used to capture the business requirements. It is emphasized that it is essential for good collaboration between business and IT, as is the output for the business and input for IT and provides the information flow of the requirements. In addition, the value stream model (VSM) which provides insight into the added value and services offered by the organization is mentioned. The value stream model is supported by the business capability model, which depicts what a company does in actuality. The value stream model and capability model contribute to the communication towards management. In addition, the Global aligning information model (GAIM) was mentioned as an artifact. This acts as a reference for the data structure, allowing everyone within the operating organizations to speak the same language. It is also important to establish policies that describe the boundary conditions that can be used in the different layers of architecture to provide direction. When these are aligned you always work within the established frameworks.

In addition to the above artifacts, other artifacts were named in the interviews. The Action Plan focuses on efficiently integrating existing applications and maintaining the application ecosystem. It also includes having an application portfolio connected to other artifacts and establishing architectural principles. Architectural principles are also used to communicate with stakeholders, as are roadmaps, KPIs and business cases. These artifacts also help promote a strategic focus and added value to the organization. Unfortunately, the EA is not currently assessed based on KPIs, so the effectivity of EA cannot be measured. The business case is used to justify and prioritize the rationale behind projects and investments. These the prioritizations are reflected in the artifact change portfolio. The change portfolio currently acts as a valuable artifact for management. It assists in effectively planning, managing, and directing change initiatives within the organization, and it helps achieve the desired changes in an organized and strategic manner. It was further stated that there is currently no artifact for the data flow diagram, which is desired and prioritized. It provides an overview of how data flows between different systems. It is important to manage and create standard artifacts with explanations of why the artifacts are important and should be used. When operating companies use the same artifacts it can lead to the reduction of duplication, standardization of processes resulting in cost reduction.

Strategy and operating

The interviews revealed that EA serves a broader purpose than just solving IT problems. It also plays an essential role in understanding and improving the governance of the business. EA should be considered an integral part of the change portfolio, at the strategic, business and IT levels. Leadership must understand the importance of a good governance model and the role EA plays in ensuring effective governance. One of the biggest challenges lies in the fact that not everyone recognizes the value and importance of a good governance model. The architects interviewed emphasize that effective EA is not possible without a solid control model. To achieve the transformation from individual operational units to a collaborative environment, a firm grip on the control model is critical. From the control model, it clearly defines how the business operates and who is responsible for what aspects. It must be supported by a vision that is articulated and approved by the person ultimately responsible, such as the CIO. Approval is important to prevent deviations from standardization and to drive a common approach. In addition, it is necessary to conduct regular reviews and feedback loops to continuously adapt and improve the EA. As indicated earlier, the translation of the EA into measurable goals and results is currently lacking. Regular reviews and audits are important to ensure

that the artifacts remain consistent and current. Stakeholder engagement and feedback loops are necessary to ensure that the artifacts match the needs and expectations of all stakeholders.

In addition to governance, strategy plays a critical role in implementing EA. Understanding the organization's strategic objectives and translating them into architectural principles that monitor implementation are key. This includes establishing a roadmap and vision for the future to implement changes in a structured and targeted manner. Measuring results and setting concrete goals is essential to assessing the value and impact of EA. Understanding the value of EA and creating a common feeling within the organization are essential steps yet to be taken. It is important that the company's mission, vision, and strategy be clearly communicated and understood. EA should be integrated into decision making and play a proactive role in identifying technology and business process opportunities and challenges. Interviewee number two stated, “No company has EA as a goal, it should be there to ensure that business objectives are realized”. This indicates that the purpose of EA is not to stand alone, but to ensure that business objectives are realized. It requires a holistic approach and a focus on both long-term philosophy and practical implementation. A well-structured and effective EA can contribute to company growth, profitability, and competitiveness. It is important that top management understand and support the importance of EA so that its full value can be leveraged.

Governance and standardization

After conducting the interviews, several insights emerged about the design, consistency and maintenance of EA. Important aspects highlighted were identifying gaps and aligning with business objectives. Understanding and defining current and desired business processes is essential, as is aligning processes between the operating companies Global and the Netherlands. Process alignment is critical to determine which processes actually contribute to value streams and to get a clear picture of the value being generated. Within the EA, directives, principles, and guidelines are used to support and align decisions. The previously mentioned artifacts such as strategic roadmaps, business cases and KPIs also play a role in communicating and sharing insights with stakeholders. Understanding the connections between systems and processes is essential. It was emphasized during the interviews that a common governance structure and decision-making process should be used to guide the development of the EA. Management support and strategic alignment with the C-level are key. All nine interviewees indicated that laws and regulations are challenging because of varying requirements in different countries. Compliance and security need to be ensured, especially in the case of legislation and regulation deviations.

There is currently a lack of uniformity between the architectures of different operating companies, as each country has made its own choices. Interviewee number one indicates ''There is no uniformity at all between these architectures which makes for a difficult discussion and that is exactly where EA becomes very important''. There is need for more standardization and harmonization to create common ground and increase standardization of overview. Setting up a steering committee and defining common standards, guidelines and processes play an important role in achieving uniformity. Standardization of processes and the creation of reference models contribute to unity. All in all, it has emerged that alignment, standardization and harmonization within EA are critical to promote efficiency, effectiveness and value creation.

Value network and communication

All nine interviewees stated that close collaboration between different stakeholders is essential for success in EA. It is not about negotiating with the individual operational units, but about finding synergy between different products and entities. This requires in-depth knowledge and close cooperation with all stakeholders. The importance of developing a common understanding and shared vision, as well as effective communication, has been shown to address challenges.

To this end, the case organization has established a central architecture group to promote alignment and communication among the various operational business units. Therefore, it is important to share information and best practices and align architectural goals. In addition, it has emerged that regular consultation and communication between the EA architects is very important and it is essential to speak the same language and respond consistently as an architecture group.

Within collaboration, it is important to compare change portfolios and pursue common goals. Transparency is important, but trust is crucial, especially with non-equal partners. Interviewee number six stated: ''In Ecosystem thinking, each party must see itself as part of an ecosystem and derive intrinsic value from it. When a party thinks to hold something back, which would happen quickly the EA becomes very complicated''. In terms of an ecosystem, each party gets value from working together, is essential. It's about benefiting from each other and understanding that all parties are part of a bigger picture. It is important to think chain-wide and not just focus on small functionalities within a system. All in all, close collaboration, communication and a shared vision is key to achieving successful EA.

Change management

The implementation of changes in the context of EA brings several challenges, as revealed in the interviews. One important aspect is to keep costs manageable during the change process, as changes require a lot of capacity and financial resources, which can hinder innovation capacity. It is often necessary to make compromises, but it is essential to determine who will be affected by this and what impact it will have. In addition, flexibility in architecture is crucial for effective communication and collaboration, especially when bridging language, time and cultural differences. However, integrating proprietary technologies, working methods and processes across different operational business units can be challenging. Getting the right mindset and mandate are major obstacles in achieving change management goals. In addition, it was mentioned earlier that EA is not considered as a critical aspect, which makes achieving uniformity and collaboration difficult. It takes time and effort to align all stakeholders and achieve uniformity, especially when there is a rush and pragmatism prevails. Changes have a direct impact on users and organizations, requiring sacrifices and learning new ways of working. It is important to understand the limits of change and consider the capacity of operational organizations to sustain change. In addition, the complexity of the architecture can be problematic, especially when the business does not fully understand the technical aspects of IT. Different processes can complicate integration and create additional complexity during the change process.

Interviewee number nine stated the following: “You need to avoid using exotic technologies that no one knows except for maybe 5 developers”. It emphasizes the importance of avoiding exotic technologies known only to a small number of developers to ensure the feasibility and understandability of the architecture. Change and transition are necessary to ensure that systems remain aligned with current needs and to facilitate business change. Change management poses significant challenges for both IT and the business and requires harmonization and a thorough approach to processes. Engaging stakeholders is also crucial in change management. They play a driving role in developing the architecture and successfully implementing change. Ultimately, people are central to making the architecture understandable and implementing change, documentation alone is not enough. It is essential to actively engage and recognize people as the most important factor in successfully implementing change. These insights highlight the complexity and challenges associated with change management in the context of EA. It requires a careful approach, stakeholder involvement and attention to both technical and human aspects to achieve successful change.

The results based on the case study for EA in a cross-organizational value network emphasize the importance of alignment at different levels, such as strategic, operational, process and system levels. Successful alignment requires communication, understanding and coordination between different parties. In addition, the results show that centralization, standardization, and the use of standardized artifacts are crucial for reducing redundancy, overlap and cost. This contributes to the efficient and optimal operation of value crossing value networks. In Addition, a wide range of artifacts are used to document, analyze and communicate different aspects of EA. These artifacts help to understand processes, identify improvement opportunities, support decision making and create a shared understanding within the organization. Implementing and managing EA presents several challenges, including financial constraints, change management, communication issues and time constraints. Addressing these challenges is essential to successful EA in cross-organizational value networks.

5. Discussion, conclusions and recommendations

This chapter contains a discussion of the results. This will answer the meaning of the results, the relationship of the results to previous studies, what is the position of the results in relation to the literature and what are the lessons learned.

5.1. Discussion – reflection

The literature review identified three themes. These themes have been used to compare the literature with the results from interviews.

The role of enterprise architecture

The results of the interviews shed light on the role of EA and its importance in aligning business and IT strategies, improving governance, and driving organizational effectiveness. EA is defined as the process of defining and representing a high-level view of an enterprise's business processes and IT systems, including their interrelationships and shared aspects. It encompasses activities such as EA planning, documentation, and governance, with the goal of supporting organizational strategy and improving the quality of solutions (Lange, 2012; Pulkkinen, 2006). The findings from the interviews align with previous studies on the benefits and role of EA (Tamm et al., 2011). The literature highlights numerous benefits of EA, including improved change management, organizational collaboration, decision-making, and resource alignment (Niemi & Pekkola, 2016). EA enables organizations to monitor the quality of their actions, identify resource dependencies and synergies, and increase market share and revenue (Niemi & Pekkola, 2016). The results from the interviews further support these benefits, highlighting the role of EA in bridging the gap between business and IT strategies, ensuring organizational consistency, and improving transparency within a value network. The role of the enterprise architect was identified as crucial in EA. The enterprise architect is responsible for overseeing organization-wide consistency and shaping the organization's structure, capabilities, and value streams. They play a key role in translating the organization's mission and strategy into actionable recommendations and monitoring the relationship between the organization's goals and actual implementation. However, the interviews also revealed that EA is not always considered a critical part of strategy, which can hinder its full potential. It is important for enterprise architects to be impartial, have a broad understanding of the organization, and continuously develop their skills and knowledge.

The findings contribute to the existing literature by providing insights into the challenges and considerations in implementing EA. Change management was identified as a significant challenge, as it requires managing costs, flexibility, and complexity. It is crucial to consider the impact of changes on users and organizations and to align stakeholders to achieve uniformity and collaboration.

The involvement of top management and the establishment of a governance model are essential in ensuring effective implementation and achieving the full value of EA.

The results emphasize the importance of EA in aligning business and IT strategies, improving governance, and driving organizational effectiveness. The role of the enterprise architect is crucial in overseeing consistency and shaping the organization's capabilities and value streams. The findings align with previous studies on the benefits of EA and provide insights into the challenges and considerations in implementing EA. The results contribute to our understanding of the role and impact of EA and provide valuable insights for practitioners in leveraging EA to achieve strategic objectives

Enterprise architecture artifacts

The findings from the interviews shed light on the management of EA artifacts within organizations. It was noted that EA artifacts are crucial for achieving alignment between IT and the business, as well as facilitating relationships, decision-making and developments within the value network. However, it was found that there is currently no standardized management of EA artifacts, leading to confusion about which artifacts are used and why they are important. Multiple tools are used to capture EA artifacts, indicating a need for a unified tool that can serve as a single source of truth for Business and IT stakeholders. The interviews also revealed a number of frequently mentioned EA artifacts. These artifacts included mission and vision statements, process flows captured with the Business Process Modelling Notation (BPMN), value stream models, business capability models and the Global aligning information model (GAIM). In addition, artifacts such as policies, roadmaps, architecture principles, KPIs, business cases and the change portfolio were highlighted as important for promoting strategic focus, value-added and effective planning and management of change initiatives. The need for standardized artifacts with clear explanations of their importance and use was emphasized. Using the same set of artifacts across the operating companies can reduce duplication, standardize processes and reduce costs. This highlights the importance of artifact management in achieving consistency and collaboration within organizations.

The literature review supports the findings from the interviews by recognizing the importance of EA artifacts in bridging the communication gap between business and IT stakeholders and improving alignment and collaboration within organizations (Abraham, 2013; Bischoff et al., 2014; Kotusev et al., 2015; Niemi & Pekkola, 2017; Winter & Fischer, 2006). However, the existing literature lacks a comprehensive analysis of the role of EA artifacts as boundary objects. The research by Kotusev, Kurnia & Dilnutt (2022) categorizes EA artifacts into six different categories: considerations, standards, visions, landscapes, contours and designs. This categorization provides a framework for understanding the role of different artifacts in an EA practice. The research enhances our understanding of EA artifacts and their theoretical underpinnings and contributes to the body of knowledge on improving alignment between business and IT. The results of the interviews and the existing literature highlight the importance of EA artifacts for capturing and managing the various aspects of architecture within organizations. Standardizing artifact management and using a unified tool for capturing artifacts can promote consistency, collaboration and cost reduction. The findings contribute to the understanding of EA artifact management and provide insights for practitioners to use artifacts effectively in achieving desired outcomes within their organization's architecture.

Value networks

The results of the interviews indicate the importance of value networks in EA and the need for effective communication and collaboration among stakeholders. Close collaboration, synergy between different products and entities, and a shared vision are key factors for success in EA. The establishment of a central architecture group and regular consultation and communication among

EA architects are crucial for promoting alignment and communication among different operational business units. The findings from the interviews align with previous studies that emphasizes the significance of value networks in driving collaboration, leveraging diverse expertise, and fostering innovation and competitiveness (Kenton, 2022; Allee, 2009). By understanding and analyzing value networks, organizations can tap into the collective capabilities of network members, foster knowledge sharing, and achieve strategic advantages. The characteristics of value networks identified by Allee (2009) align with the insights from the interviews. Mission alignment, complementary competencies, strategic advantage, semi-stability, good communication, trust, and chain integration were highlighted as essential characteristics for successful collaboration within a value network. These characteristics emphasize the importance of shared goals, effective communication, trust, and integrated processes among networked organizations.

The interviews also shed light on the role of governance and standardization in EA. It was emphasized that identifying gaps, aligning with business objectives, and understanding current and desired business processes are crucial for EA. Directives, principles, guidelines, strategic roadmaps, business cases, and KPIs play a role in communicating and aligning decisions. The importance of a common governance structure, management support, and strategic alignment with the C-level was highlighted. These principles align with the insights by Lange (2009). However, challenges related to laws, regulations, compliance, and security deviations across different countries were also identified.

The findings contribute to the existing literature by providing insights into the role of value networks, communication, and governance in EA. They highlight the need for effective collaboration, shared goals, and standardized practices to promote efficiency, effectiveness, and value creation within organizations. The results indicate that value networks, effective communication, and collaboration are crucial for successful EA. By leveraging the capabilities and insights of network members, organizations can tap into collective strengths and drive innovation. Governance, standardization, and harmonization play a key role in aligning processes, promoting efficiency, and achieving strategic goals. The findings contribute to our understanding of the role of value networks and governance in EA and provide insights for practitioners to enhance their EA practices.

Limitations

Several limitations must be recognized within this research. First, the study was conducted within a limited time frame, which could have limited the depth and breadth of data collected. The dynamics of cross-organizational value networks are subject to change over time, and capturing these changing dynamics would require a longer-term study to gain a more comprehensive understanding. Second, the sample size of nine participants was potentially small, leading to a potential limitation in terms of generalizability. The findings from this limited sample may not be fully representative of the broader population of organizations and value networks. Finally, it is important to note that the study focused on value networks within organizations that were not considered mature in terms of EA practices. This limitation implies that the findings may not fully reflect the experiences and challenges of organizations with mature EA practices operating within cross-organizational value networks. The dynamics and outcomes in less mature organizations may differ from those in more established and mature organizations.

5.2. Conclusions

This study investigated the role of Enterprise Architecture (EA) artifacts in promoting alignment between Business and IT in a cross-organizational value network. The research question stated, "How can EA artifacts contribute to alignment between Business and IT in a cross-organizational value network?".

The analysis indicates that EA artifacts play a crucial role in establishing alignment between Business and IT in a cross-organizational value network. The enterprise architect figures as a bridge between the business strategy and the IT environment, identifying process dependencies and streamlining process execution. Transparency is an important aspect facilitated by EA, which prevents information misuse and promotes vulnerability within the value network. In addition, it focuses primarily on the business side, defining work processes and shaping the organization, which leads to IT needs. In mature organizations, EA is often part of the C-level, translating mission and strategy into organizational structure, capabilities and value streams. Enterprise architects must have broad interests and continually evolve to provide objective advice and explore different scenarios for informed recommendations.

EA artifacts are captured through models and documentation that describe different aspects of architecture, such as business, information, technical and application architecture. Key artifacts include mission and vision statements, process flows, value stream models, business capability models, Global aligning information model (GAIM), policies, action plans, architecture principles, roadmaps, KPIs, change portfolio and business cases. These artifacts promote alignment, collaboration, relationship management and informed decision making between business and IT stakeholders. Managing these artifacts is essential for effective EA. A single tool for capturing architecture ensures consistency and provides a reference for decision-making and changes. Standardization and clarity of artifacts reduces duplication and cost, while improving communication and process efficiency. In addition, artifacts such as data flow charts, strategic roadmaps and change portfolios help to understand and manage the current and desired status of the organization.

In addition, EA goes further than IT and business alignment. It plays a dynamic role in understanding and improving business governance. Effective governance requires the artifact of a solid governance model supported by a vision articulated and approved by senior executives. Regular reviews, feedback loops and stakeholder engagement help ensure the relevance and consistency of artifacts. Strategy is another important aspect, where EA strategic objectives are translated into the artifacts architecture principles, roadmaps and measurable goals. Governance and standardization are crucial aspects in EA. Identifying gaps, aligning with business objectives and understanding current and desired processes are essential. Guidelines and architectural principles guide decision-making, while a common governance structure and decision-making process ensure consistency. Compliance and security, especially related to laws and regulations, present challenges that must be addressed.

Altogether, EA artifacts contribute to alignment between Business and IT by providing a mutual understanding, facilitating communication, supporting decision-making, and promoting transparency and collaboration within the cross-organizational value network.

5.3. Recommendations for practice

To improve alignment between Business and IT in a cross-organizational value network, there are several recommendations that can be applied in practice. First, it is important to establish a clear responsibility for EA within the organization. This can be done by assigning a specific role or function to manage and implement EA. An enterprise architect or an EA team can be made responsible for developing and maintaining the EA artifacts. In addition, it is essential to create a common platform or tool for capturing, managing and sharing EA artifacts. Implementing such a platform promotes consistency, collaboration and transparency among the various stakeholders in the cross-organizational value network. In addition, investing in the development of enterprise architects is also key. Ensure that enterprise architects have the right skills and knowledge to operate effectively as bridges between Business and IT. Another recommendation is to actively involve stakeholders

from both Business and IT in developing and validating EA artifacts. This ensures broad support and helps identify relevant needs and challenges within the value network. Implementing a structured governance framework is also critical. Establish a clear governance framework for managing EA artifacts, including guidelines, principles and processes for decision-making, review and change management. Regular reviews and feedback loops ensure that artifacts remain relevant and consistent with strategic objectives. It is also important to ensure proper integration between EA and its business strategy. Ensure that EA artifacts reflect the organization's strategic goals and objectives and translate them into concrete architecture principles, roadmaps and measurable goals. Encouraging open communication and collaboration between Business and IT stakeholders is another key recommendation. Organize regular meetings, workshops or working sessions to promote the exchange of information and insights. This will help create a shared understanding and promote alignment within the cross-organizational value network. Finally, it is critical to monitor and measure the impact of EA. Establish KPIs and measurement indicators to monitor the effectiveness and impact of EA on alignment between Business and IT. Regularly evaluate progress and make adjustments as needed to achieve desired results. By applying these recommendations in practice, organizations can take full advantage of EA artifacts and improve alignment between Business and IT in a cross-organizational

5.4. Recommendations for further research

There are a couple of recommendations for further research. The discussion also focuses on the governance of EA. It is important to understand how governance practices affect the effectiveness of EA. It is suggested that the impact of governance structures, decision-making processes and division of responsibilities on EA implementation and management be examined. Identifying best practices for EA governance and understanding the roles of different stakeholders are also important areas of focus. In addition, there is a strong need to further study the collaboration between Business and IT stakeholders. Researchers want to know what factors contribute to successful collaboration and how barriers can be overcome. They are interested in identifying effective methods and techniques for engaging stakeholders from both domains in EA activities. Further research is also recommended in the area of evaluating EA effectiveness. There is a need for methods and frameworks to measure and evaluate the impact of EA on alignment between Business and IT. Identifying measurable indicators and KPIs that can be used to track the progress and results of EA initiatives will provide valuable insights. Lastly, it emphasizes the need to address the ethical and social aspects of EA. It is important to study the ethical implications of using EA artifacts and understand their impact on various stakeholders.

6. References

A list of all references used, in accordance with the APA format.

Abraham, R. (2013, June). EA artifacts as boundary objects-A framework of properties. Association for Information Systems.

Allee, V. (2009). Value-creating networks: organizational issues and challenges. *The learning organization*.

Dara, M. (2013). Value networks and business models: formulating and demonstrating a methodology for the development of value networks and alignment of business models based on design science research methodology (Master's thesis, University of Twente).

Drews, P., & Schirmer, I. (2014). From EA to business ecosystem architecture: Stages and challenges for extending architectures beyond organizational boundaries. Proceedings - IEEE International Enterprise Distributed Object Computing Workshop, EDOCW, (September), 13–22.

Foorthuis, R., van Steenbergen, M., Mushkudiani, N., Bruls, W., Brinkkemper, S., & Bos, R. (2020). On course, but not there yet: EA conformance and benefits in systems development.

Ioannidis, E., Varsakelis, N., & Antoniou, I. (2019). Change agents and internal communications in organizational networks. Physica A: Statistical Mechanics and its Applications, 528, 121385.

Kotusev, S. (2017). Eight essential EA artifacts. British Computer Society (BCS), URL: http://www. bcs. org/content/conWebDoc/57318.

Kotusev, S. (2019). EA and EA artifacts: Questioning the old concept in light of new findings. *Journal of Information technology*, *34*(2), 102-128.

Kotusev, S., Kurnia, S., & Dilnutt, R. (2022). EA artifacts as boundary objects: An empirical analysis. *Information and Software Technology*, *155*, 107108.

Kotusev, S., Kurnia, S., & Dilnutt, R. (2022). The practical roles of EA artifacts: A classification and relationship. *Information and Software Technology*, *147*, 106897.

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

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

Niemi, E., & Pekkola, S. (2009). Adapting the DeLone and McLean model for the EA benefit realization process. In 2009 42nd Hawaii International Conference on System Sciences (pp. 1-10). IEEE.

Niemi, E. I., & Pekkola, S. (2016). EA Benefit Realization: Review of the Models and a Case Research of a Public Organization. The DATA BASE for Advances in Information Systems, 47(3), 55–80.

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

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

Saunders, M., Lewis, P., & Thornhill, A. (2015). Methoden en technieken van onderzoek. Amsterdam: Pearson Benelux.

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students*. Pearson education.

Van de Wetering, R., & Dijkman, J. (2021). Enhancing digital platform capabilities and networking capability with EA-driven dynamic capabilities. In 27th Americas Conference on Information Systems: Digital Innovation and Entrepreneurship (p. 16). AIS Electronic Library.

Van de Wetering, R. (2021). Understanding the Impact of EA Driven Dynamic Capabilities on Agility: A Variance and fsQCA Research. Pacific Asia Journal of the Association for Information Systems, 13(4), 2.

Wieringa, R. J., Engelsman, W., Gordijn, J., & Ionita, D. (2019, July). A business ecosystem architecture modeling framework. In *2019 IEEE 21st Conference on Business Informatics (CBI)* (Vol. 1, pp. 147-156). IEEE.

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

7. Appendixes

Appendix 1: Interview questions

General

1. Could you briefly introduce yourself and tell me about your background and experience in EA?
2. How do you currently see the role of EA within the organization and where would you like to take it?
3. How is it ensured that the EA aligns with Randstad's objectives and mission?
4. What is the common goal of Randstad Global and Randstad Groep Nederland?

Artifacts

5. Which artifacts are used and how are they documented?
6. How is the EA documented in different artifacts?
7. How are these artifacts used in communication with relevant stakeholders?
8. Which artifacts would you like to see within the EA, and why? (Which ones are currently missing)

Cross-organizational value network

9. How is the collaboration aligned between Randstad Global and Randstad Groep Nederland?
10. How is the development of the EA based on artifacts aligned between Randstad Global and Randstad Groep Nederland?
11. How are the IT applications integrated in the collaboration?
12. How are the processes integrated in de collaboration?
13. How is it ensured that the various stakeholders of a cross-organizational value network understand which artifacts are being used and why they are important?
14. What do you see as the challenge within EA in a cross-organizational value network? (Alignment between Business and IT within Global and the Netherlands)

Appendix 2: Interview script

Interview Script: EA in a Cross-Organizational Value Network

Duration: 1 hour

Introduction, greeting and introduction of the interviewer (5 minutes)

Thank you for accepting this invitation. My name is Amber Riechelman, and I work as a Process Analyst at the Department of Process & Business Management within Business Services in Diemen. Additionally, I am pursuing a Master's degree in Business Process Management and IT at the Open University in Amsterdam. Currently, I am in the final phase of my studies and writing a thesis on EA in cross-organizational value networks.

The aim of the research is to expand academic knowledge on how EA can contribute in a cross-organizational value network and identify key artifacts that play a crucial role in this context through a case study.

If possible, I would like to record the interview for transcription purposes. I will only share this recording with my lecturers at the Open University as evidence of the interview. If you have any objections to the recording, please let me know.

The interview consists of 14 questions, which I have shared with you in advance. I want to emphasize that the questions are meant as a guide to structure our conversation. If there are any topics that come up during the interview that are not covered in the question list, I am open to your personal experiences and insights.

Questions (50 minutes)

General (15 minutes)
1. Could you briefly introduce yourself and tell me about your background and experience in EA?
2. How do you currently see the role of EA within the organization and where would you like to take it?
3. How is it ensured that the EA aligns with Randstad's objectives and mission?
4. What is the common goal of Randstad Global and Randstad Groep Nederland?

Artifacts (20 minutes)
5. Which artifacts are used and how are they documented?
6. How is the EA documented in different artifacts?
7. How are these artifacts used in communication with relevant stakeholders?
8. Which artifacts would you like to see within the EA, and why? (Which ones are currently missing)

Cross-organizational value network (15 minutes)
9. How is the collaboration aligned between Randstad Global and Randstad Groep Nederland?
10. How is the development of the EA based on artifacts aligned between Randstad Global and Randstad Groep Nederland?
11. How are the IT applications integrated in the collaboration?
12. How are the processes integrated in de collaboration?
13. How is it ensured that the various stakeholders of a cross-organizational value network understand which artifacts are being used and why they are important?
14. What do you see as the challenge within EA in a cross-organizational value network? (Alignment between Business and IT within Global and the Netherlands)

Conclusion (5 minutes)

Thank the interviewee for their time and input.
Offer the opportunity for additional comments or questions.
Wrap up the interview.

Appendix 3: Case study interviews approach

In appendix 3, it is described that a case study is conducted within the researcher's organization. A suitable case organization was crucial for the research. The criteria for the case organization were the application of EA in a cross-organizational value network, participation in the interviews, and granting access to documents. The nine interviews will be conducted within the Global EA and the Netherlands EA.

Interview Roles:
1 Lead Enterprise Architect Netherlands
2 Enterprise Architect
3 CIO Netherlands
4 Lead Domain Architect
5 Lead Enterprise Architect
6 Global CIO
7 North Europe CIO
8 Business Process Architect
9 Lead Enterprise Architect Global

Interview Execution:
The interview will go through three phases: the preparation phase, the execution phase, and the analysis phase to obtain the research outcomes. The different phases are explained below.

1. Preparation Phase:

- Start and Introduction
- Thank the interviewee for their presence.
- Introduce yourself.
- Mention the purpose of the interview.
- Inform about the duration of the interview.
- Explain how the data will be handled.
- Indicate if the conversation will be recorded or documented (approval required).

Interview questions per topic
Prepare questions for each theme that contribute to answering your research questions. Ensure a logical structure of topics and corresponding interview questions. The themes derived from the theoretical framework are as follows:

1. The role of EA.
2. EA artifacts.
3. Value networks.

For each theme, incorporate the following types of questions: opening question, closed questions, open questions, follow-up questions, closing question.

Conclusion
When the interview is almost concluded, ask the interviewee if they have any further questions or comments, and thank them again for their participation. Additionally, in the concluding phase, you can discuss the following topics: suggestions for interviewing colleagues and whether contact can be made for clarifications.

2. Execution Phase:

- During the execution phase, consider the following guidelines:
- Introduce the research and yourself.
- Obtain approval for recording the interview.
- Structure the interview properly.
- Listen attentively to the respondent.
- Ask clear questions.
- Avoid influencing the responses.
- Probe and confirm.
- Maintain a neutral role as a researcher.

3. Analysis Phase:

During the analysis phase, analyze the answers that contribute to answering the research question. To analyze the interviews, they need to be transcribed and coded. Transcription involves literal transcription of the interviews based on the recorded audio, with the interviewee's approval.

Appendix 4: Interview results labels

Alignment

Identification of GAPS and search for alignment with business objectives: By identifying gaps (GAPS) between the current situation and the desired state, alignment can be sought to ensure that activities and processes are aligned with overarching business objectives.

Adjustments in processes and systems: The identified GAPS lead to changes in processes and systems. It is important to adjust processes and systems to ensure that they are aligned with the desired alignment and to enable effective execution at both the global and operational levels.

Defining IT applications based on API contracts: To achieve alignment, it is important that IT applications connect based on API contracts. These contracts are defined at the global level and determine how different systems communicate with each other.

Understanding end-to-end processes and system alignment: To achieve alignment, it is essential to understand how end-to-end processes run and how systems should be connected to them. This ensures a seamless flow of information and activities between the global and operational levels.

Governance and decision-making for EA development: The creation of the EA is aligned through a collaborative governance structure and decision-making process. This ensures that the artifacts and principles used in architecture development are aligned with the strategic goals of the organization.

Strategic alignment and management support: Creating strategic alignment and management support, including C-level executives, is critical to promote alignment and ensure that decisions and activities are aligned with the organization's overarching strategy.

Joint development of artifacts and unified communication: Creating artifacts together and using the same terminology helps achieve a common understanding and overall picture of the situation. This contributes to effective communication and promotes alignment among various stakeholders.

Guidelines, principles and processes for decision-making and change: Defining guidelines, principles and processes helps in making decisions and implementing changes in a consistent and aligned manner. This ensures that activities and decision-making within the organization are aligned with the overarching goals.

All in all, the text excerpts highlight the importance of alignment at different levels, such as strategic, operational, process and system levels, as well as the importance of communication, understanding and alignment between different parties to achieve successful alignment.

Standaardisatie – artifacts

Based on the additional text excerpts, the following results can be identified:

Elimination of overlap: By placing more capabilities from Global and aiming for centralization, redundancy and overlap of activities, investments and projects can be reduced. This leads to efficiency and cost savings.

Cost reduction through standardization: Increased centralization and standardization of processes contribute to cost reduction. By implementing generic capabilities and standardizing processes, efficiencies can be achieved, and costs reduced.

Managing artifacts: The most important thing is to use a standard set of artifacts across countries. Using consistent and standardized artifacts can improve communication and cooperation between countries. This also helps in sharing knowledge, reducing confusion and promoting a unified understanding of the situation.

All in all, these excerpts highlight the importance of centralization, standardization and the use of standardized artifacts to reduce redundancy, duplication and cost. This contributes to the efficient and optimized operation of the organization.

Artifacts

BPMN: Used for capturing business processes and defining information flow.

Functional descriptions: Used to describe the functional requirements of systems and applications.

Factual estimation: The use of artifacts to perform factual estimation and analysis.

Business model canvas: A model used to map the core aspects of a business model.

Business capability model: A model that maps an organization's capabilities and helps to understand the skills and resources required.

Process plates/flows: Visual representation of business processes and flows of activities.

Value stream model: A model that illustrates the value added in the organization and helps identify improvement opportunities.

Application portfolio: An overview of all applications within the organization, including links and dependencies.

Global aligning information model (GAIM): A model used to align the organization's information assets and needs on a global level.

Documentation: Artifacts such as architectural principles, models, blueprints, roadmaps and documentation that serve as reference points and guidelines for the EA.

Business cases: Are used to support and prioritize the rationale behind projects and investments.

Cost: Documenting the costs related to applications, licenses and personnel to understand the total cost.

Impact determination: Artifacts that help describe and understand the impact of changes and decisions.

Definitions: Clear definitions and terms used to create a common understanding and work toward a single goal.

References artifacts: Artifacts that serve as reference points for understanding and communicating the EA.

Alignment: Artifacts that provide alignment between different aspects of the organization, such as strategy, processes and IT systems.

Roadmap: A plan that describes the future development and implementation of the EA.

Application integration: Artifacts used to facilitate the integration of different applications and systems.

Fit gap analysis: An analysis that helps to identify differences between the existing processes and the desired situation in order to make adjustments when necessary.

Communication: Artifacts used to communicate with stakeholders and provide a clear picture of the current and desired situation.

Challenge

Staying affordable: A challenge to stay within budget and find cost-effective solutions.

Profit in each country: Generating profit in different countries can be a challenge.

Challenge. Change: Implementing changes within the organization can take a lot of capacity and money, which can limit innovation capacity.

Concession: Making compromises and identifying the parties that are disadvantaged as a result.

Spreading. Understandability: Creating flexibility within the architecture to deal with different expectations and circumstances.

Complexity. Challenge: Bridging language, time and cultural differences to enable effective communication and collaboration.

Own technologies: Integrating different technologies and practices from different operational units can be challenging.

Mindset and mandate: Obtaining the right mindset and mandate needed to achieve set goals.

No enterprise responsibility: The lack of overarching responsibility for different domains within the organization.

Time: It takes time to align all stakeholders and reach consensus.

Time and costs: EA can be seen as time-consuming and costly, which can be a risk if there is a rush.

Impact determination: Determining and understanding the impact of changes on users and organizations.

Sacrifices. Unhappy users: Making choices that may lead to concessions and dissatisfaction among certain users.

Timing: Meeting expectations and deadlines regarding the timing of projects and changes.

Cost and time: Improving and redesigning existing architectures can lead to additional costs and time delays.

Change management / artifact:

Change Limit: There is a recognition that there is a limit to how much change an operational company (opco) can handle.

Change from the Past: In the context of the Netherlands, there is a realization that existing systems may not align with the present after the change.

Transition: The focus is on understanding and navigating the transition process.

Change management: Change management is emphasized and considered crucial for both IT and business. It should not be underestimated, as it involves significant changes.

Harmonization and Challenge: There is a need for harmonization as individual processes and services may no longer fit into the overall picture. It poses a challenge that requires a considerable effort to address.

New Ways: Users will have to learn new ways of doing things, and certain elements may need to be sacrificed for the sake of unification and the greater good of the company.

Change Management Strategy: Global solutions need to be designed sensibly, taking into account the real needs of local teams. Collaboration between global and local teams has improved.

New Perspective: The changes implemented will ultimately benefit the entire company.

Change Portfolio: There is a reference to managing a portfolio of changes.

Artifacts and Stakeholders: The introduction of architecture to stakeholders aims to create support and then determine the desired outcomes and artifacts based on that.

Collaboration

Close Collaboration: There is a need for close collaboration, particularly with people from operating companies, to achieve shared goals and objectives.

Synergy: The goal is to find synergy between different products and entities, leveraging the strengths and capabilities of each.

Deep Knowledge with Close Collaboration: Collaboration is required to combine deep knowledge and expertise from various stakeholders.

Collaboration with the People: Collaboration needs to extend to various aspects, involving cooperation and interaction with people.

Collaboration between Enterprise Architects and Stakeholders: Collaboration between enterprise architects and stakeholders is crucial for aligning business strategies, IT investments, and architectural guidelines.

Collaboration and Synergy between Entities: Efforts are made to foster collaboration and create synergy between different entities within the organization.

Common Understanding and Shared Vision: It is essential to develop a shared vision and a common understanding among collaborators and effectively communicate to address challenges.

Determine Working Method with All: The working method should be determined collectively, considering the functionalities and objectives.

Architecture Community: A central architecture club or community has been formed to facilitate collaboration and knowledge sharing.

Challenge of Collaboration with Architects: The challenge lies in dealing with the autonomy of architects and their individual perspectives, despite the need for collaboration.

Collaboration Architects: A new EA Group has been created to facilitate coordination and communication among different operating companies.

Speaking the Same Language: Ensuring that the enterprise team speaks the same language and provides consistent answers is important for effective collaboration.

Communication

Communication between Enterprise Architects: Regular meetings and communication are necessary between enterprise architects from both entities to share information, best practices, and align architectural goals and guidelines.

Self-determination: Each country has its own EA due to a lack of effective communication between countries and a focus on individual revenue generation.

Understandable Language: EA should be presented in a business understandable and recognizable language to facilitate communication.

Communication in Presentations: Communication with stakeholders is facilitated through presentations, and living documentation is used for knowledge transfer among teams.

One Tool, One Truth: In advanced stages, there is a desire to communicate through a single tool to ensure consistency and a single source of truth.

From IT to Business: The business is interested in understanding technology, highlighting the need for effective communication between IT and the business side.

Business Language: Technical drawings should not be shared with C-level executives, emphasizing the importance of using a business language that is easily understood.

Need for Communication: Despite documentation, meetings and discussions are still necessary to explain, negotiate, and address concerns or disagreements.

Standardized also Need for Communication: Even with standardized processes, there is still a need for discussions and disagreements, indicating that effective communication goes beyond standardization.

Communication and Transparency: Communication is essential to explain the reasons for slowing down or deviating from expectations and to emphasize the long-term benefits.

Complexity

Based on the provided text fragments about complexity, here are some results:

Historic Reasons: Complexity can arise from historical factors or reasons, indicating that past decisions or actions contribute to the current complexity.

Understanding Complexity: There is a need to clarify and define what is meant by complexity, as it emerges as a topic of discussion or concern.

Complexity in Architecture: Architecture can be perceived as complex, especially when it becomes too focused on technical aspects that are not easily understood by the business.

Integration Challenges: Different process flavors or variations can lead to difficulties in integration, resulting in complexity.

Avoiding Exotic Technologies: To mitigate complexity, it is recommended to avoid using unfamiliar or uncommon technologies that only a small number of developers are familiar with.

Cross- organisational value network

Collaboration Value Network: The focus should be on comparing change portfolios and working towards a shared goal within the collaboration. This emphasizes the importance of collaboration in the value network.

Transparency: Transparency is essential among equal partners, but it can be challenging when dealing with partners of unequal standing. Building trust and avoiding misuse of information are crucial for maintaining effective collaboration.

Intrinsic Value in Ecosystem Thinking: Each party should view themselves as part of an ecosystem and derive intrinsic value from it. Withholding information or resources can complicate EA, highlighting the importance of embracing ecosystem thinking.

Shifting Mindset: Moving away from a "me first" mentality and embracing the idea of being part of a connected ecosystem is crucial for effective collaboration within the value network.

Mutual Benefit: The value network should facilitate the mutual benefit of its participants. Each organization should strive to leverage and benefit from the resources, expertise, and capabilities of others within the network.

System Integration in the Ecosystem: The value network operates within an ecosystem of interconnected systems where communication and integration between systems are crucial for its success.

Global Perspective: Shifting from a local or individual organizational perspective to a global perspective is important for effective collaboration and decision-making within the value network.

Supply Chain-wide Thinking: Instead of focusing on small functionalities within individual systems, there is a need to adopt a process-oriented, supply chain-wide perspective. This broader thinking helps avoid silos and promotes collaboration across the entire value network.

Documentation

Based on the provided text fragments about documentation, here are some results:

Good Documentation: Emphasizes the importance of proper documentation beyond just writing in Word and PowerPoint formats. It implies the need for comprehensive and well-structured documentation.

No Assurance: Lack of assurance regarding the consistency and reliability of documentation when individuals can freely make changes without proper control or oversight.

Capturing: The need to capture information, processes, models, and artifacts in documentation tools such as Blue Dolphin, spreadsheets, living documentation, API contracts, BPMN, and other systems.

Maintenance Management: Recognizing that documentation requires continuous effort and dedicated resources to keep it up to date and well-maintained.

Standardization: The importance of having consistent documentation across teams and organizations to ensure everyone has access to the same information and updates.

Documentation of Processes: The need to capture and document processes, especially at the global level, to avoid misunderstandings and facilitate discussions.

Capturing Artifacts: The use of models and documentation to describe different aspects of architecture, such as business architecture, information architecture, technical architecture, and application architecture.

Documentation Integration: Documenting integration processes and how data flows within systems.

Easy Visualization and Understandability: The desire to have documentation that allows easy navigation and visualization, particularly using BPMN and other notations, to involve business stakeholders effectively.

One Tool for Documentation: The preference for using a single tool to represent architecture, relationships, insights, and challenges, providing transparency and avoiding scattered documentation across different systems.

Capture and Management: Recognizing the importance of not only capturing documentation but also having effective management processes in place.

Transparent Documentation: The use of tools like Blue Dolphin, Confluence, Google Docs, Draw.io, and Google Drive for documentation purposes.

Architectural Principles: The documentation of established architectural principles.

Documentation for Legacy Applications and Technologies: Creating documentation for legacy applications and technologies to ensure knowledge preservation and facilitate future decision-making.

Documentation of Processes: The emphasis on capturing and documenting processes, including business processes, workflow processes, and end-to-end hierarchies, often using BPMN and other notations.

Easy Visualization for Business Involvement: Having documentation that allows easy navigation and visualization to involve business stakeholders and enable their understanding.

Documenting Decision-Making: Documenting decisions to provide evidence of well-considered choices and to serve as a reference for future evaluations.

Alignment and Collaboration: The importance of documentation and its proper management to ensure alignment and collaboration among team members.

Consolidating Documentation: The desire to have documentation centralized in one place rather than scattered across different systems like Confluence, Google Docs, and others.

Up-to-Date Documentation: The need for documentation to always be up to date, especially when IT and business stakeholders have different levels of knowledge about processes and systems.

Frameworks

Define Frameworks: The need to establish frameworks that provide guidance and direction to teams. These frameworks set boundaries and define what teams are allowed to do.

Guidelines: Frameworks serve as a basis for establishing guidelines or policies that can be used across different architectural layers. These guidelines help provide direction and ensure alignment.

Communicating Frameworks: Frameworks should be communicated from a global perspective to the local level, ensuring that everyone is aware of the established guidelines and operates within them.

Avoiding Direct Solutions: Instead of immediately providing specific solutions, it is important to outline the frameworks within which teams should operate. This approach encourages creativity and innovation while ensuring adherence to established guidelines.

Mission and Strategy: Frameworks should align with the mission and strategy of the enterprise. It is essential to consider the overarching goals and objectives when defining the frameworks.

Legal and Regulatory Compliance: Frameworks can include legal and regulatory requirements that teams must adhere to. These frameworks provide a structured approach and ensure compliance with applicable laws and regulations.

Governace

Build governance within the architecture so that the business will also work with the architecture

Implementation

Based on the provided text fragments about implementation, here are some results:

Re-implementation: The need to implement something again for each country or location, indicating that a solution or system needs to be replicated in different contexts.

Initiatives: Business initiatives that require IT implementation typically follow a process involving three individuals or groups represented as "the triangle." This suggests a collaborative approach involving multiple stakeholders in the implementation process.

Designing Meticulously: The choice between spending a significant amount of time analyzing and designing a solution with great attention to detail before implementation. This implies a careful and thorough planning phase to ensure a near-perfect implementation.

Integration

Based on the provided text fragments about integration, here are some results:

Be trained. fast integration: The need for people to be trained to facilitate integration and the desire to find alternative methods for faster integration, suggesting a potential delay or complexity in the integration process.

Artefacts for integration: GAIM (Global Application Integration Model) serves as the foundation for integration in the construction industry, and APIs are developed based on this model. This indicates the use of specific artifacts or frameworks to facilitate integration.

Coordinated approach: IT applications within the collaboration are designed to align with each other through a coordinated approach to system integration and data exchange. This highlights the importance of a strategic and coordinated effort to ensure seamless integration among different applications.

In conclusion, the text fragments highlight the need for training to support integration efforts, the use of specific artifacts such as GAIM and APIs for integration, and the significance of a coordinated approach to system integration and data exchange. These factors emphasize the challenges and considerations involved in achieving successful integration within a collaborative context.

Laws and regulation

Local Laws: The need to consider and comply with various local laws and regulations in different countries, indicating the importance of understanding and adhering to the specific legal requirements of each jurisdiction.

Adjust to legislation: The recognition that laws and regulations vary from country to country, requiring organizations to adapt and conform to the specific legal requirements of each jurisdiction.

Minor deviation by legal: The possibility of minor deviations from standard practices due to differences in laws and regulations, suggesting the need for flexibility and customization to ensure compliance.

Complexity. Laws: The complexity that arises from the differences in laws and regulations between countries, emphasizing the challenges and intricacies involved in navigating and complying with diverse legal frameworks.

Configuration for laws and regulations: The use of configuration or customization to meet the requirements of specific laws and regulations, indicating the need for tailored solutions to ensure compliance.

Reference architecture. Law and regulations: The consideration of legal requirements within the reference architecture, where deviations or exceptions to laws and regulations are documented while maintaining a common reference framework.

Exception laws and regulations: The understanding that laws and regulations often present exceptions or specific requirements that cannot be standardized, necessitating individual compliance efforts.

Compliance and security: The association of deviations from standard practices with compliance and security, highlighting the importance of ensuring adherence to legal requirements in these areas.

In conclusion, the text fragments highlight the need to navigate and comply with local laws and regulations, the complexity and variations introduced by different legal frameworks, the need for customization and configuration to meet specific legal requirements, and the association of deviations with compliance and security considerations. These factors underscore the importance of understanding and addressing legal obligations within organizational processes and architectures.

Linking

Based on the provided text fragments about linking, here are some results:

Linking information: The need to establish connections and relationships between different pieces of information, such as linking scenarios for advice and questions to business capabilities and value stream models to provide context and insights.

Artefacts as communication: The use of models like the GAIM model and other artifacts to facilitate communication and link information within the value network, ensuring a common understanding and alignment.

Linking processes: The practice of connecting and integrating various processes within a company, emphasizing the importance of establishing relationships and dependencies between different workflows to achieve organizational goals.

Linking systems and interfaces: The process of visually representing systems, interfaces, and their relationships, including annotations that indicate the responsibilities of systems, the types of data they handle, and the user personas and support associated with each system.

Standardization and non standardization

Each for their own: Each OpCo (operating company) has the freedom to operate and make its own choices, resulting in a lack of uniformity and standardization across the organization.

Own manner: OpCos have made their own choices regarding their architecture and system landscape, leading to variations in how things are done within each company.

Lack of uniformity: There is no uniformity between the architectures of different OpCos, creating challenges and emphasizing the importance of EA to address this issue.

Different artifacts: Each country or OpCo has different artifacts and approaches, further contributing to the lack of standardization.

Difference by country: Despite efforts to centralize decision-making under a Global CIO, there are still differences among countries, and standardization remains somewhat voluntary.

Self-determination: OpCos have the freedom to decide how their architecture is presented and implemented, which can lead to inconsistencies and difficulties in achieving standardization.

Too much freedom: The excessive freedom given to OpCos to deviate from standards and operate according to their preferences can hinder standardization efforts.

No alignment for artifacts: There is a lack of alignment and consistency in the use of artifacts, as OpCos may use what is provided globally but also deviate from it.

Complete freedom: OpCos have complete freedom to decide how they want to operate and make their own choices.

Create standardization: It is necessary to establish standardization to avoid chaos and ensure consistency across all OpCos.

One standard: The goal is to move towards having one standard across the organization, providing a common framework and approach.

Standard solution: The implementation of common standards and guidelines to address gaps and ensure consistency in processes and operations.

Guidelines. Framework. Standardization: EA frameworks and guidelines are important for setting standards and achieving standardization within the organization.

Value network. Process standardization: The processes within the organization are aligned and standardized through process harmonization, ensuring consistency and efficiency.

Harmonized processes: The aim is to have harmonized processes across different business units or entities.

Standardization. Fit gap: Standardization efforts focus on closing the gaps between existing processes and desired standardized processes.

Unifying their business processes: The objective is to unify and standardize the business processes across OpCos, allowing for seamless data exchange and alignment.

Adjust to legislation: Standard solutions should be adapted to comply with local laws and regulations.

Operating

Based on the provided text fragments about operating, here are some results:

Multidisciplinary thinking: To effectively address operating challenges, it is important to think in a multidisciplinary manner, considering both IT bottlenecks and the effectiveness of the company's management.

Part of change portfolio: EA should be included as part of the change portfolio, focusing on strategic aspects rather than just business and IT levels.

Strategic level: EA should operate at a strategic level, ensuring that leadership understands the importance of clear governance and operational processes.

Importance of operating: The operating function of the company is crucial, and without effective governance, EA cannot be successful.

Define and ensure: EA plays a role in defining business objectives and ensuring the alignment between IT systems and business processes.

Part in decision making: EA should be an integral part of the decision-making process, taking a proactive role in identifying opportunities and challenges related to technology and business processes.

React to changes: The goal of EA is to create an efficient and integrated organization capable of quickly responding to market changes and customer needs.

Artifacts in decision-making: Effective communication using artifacts helps involve stakeholders in the decision-making process.

Process optimization, end-to-end flows, efficiency identification: EA aims to identify common business processes, define end-to-end process flows, and identify opportunities for efficiency improvements.

Capturing: The core components of EA include documenting business processes, value chains, underlying applications, and well-organized and governed data.

Business objective: The focus is not only on IT but also on how the company is structured and operates to achieve its business objectives.

Give perspective: EA provides a perspective that allows both IT and business stakeholders to understand and align with the EA vision.

Spread central: EA should be centrally communicated and disseminated throughout the organization.

Decision-making: Decisions should be made in a way that considers the overall EA and avoids isolated decision-making.

Define: It is important to define requirements and necessary components upfront before starting implementation.

Spreading. Understandability: The goal is to communicate and make EA understandable to both IT and business stakeholders.

Standardization, Transparency, artifacts: EA aims to standardize processes and systems, promote transparency, and utilize artifacts for effective communication.

Set direction: EA provides guidance from top-level management, ensuring that goals and objectives flow through different layers of the architecture.

Capture. Documentation. Operating: EA processes should be captured and documented, facilitating effective governance and control.

Operating model: A well-described operating model, including how the company operates and the responsibilities of each stakeholder, is essential for EA.

Approval for deviation: The EA should have a process in place for requesting and approving deviations from standards when necessary.

Create and then standardize: Building a solution or process first and then standardizing it enables the organization to establish consistent practices across different countries or entities.

Architecture processes part of operating system: The processes of EA should be integrated into the organization's operating system.

From strategy to operating: EA ensures that the organization's mission and reliability considerations are incorporated into the decision-making process and system development.

Urgency EA: Although the expectation was to unify IT systems and processes, a sense of urgency was lacking until it reached the C-level executives.

Steering group. One standard: Working towards one standard is facilitated through the establishment of a steering group.

In summary, the text fragments emphasize the importance of considering operating aspects in EA. This includes understanding the significance of clear governance, involving EA in decision-making, setting strategic goals, optimizing processes, capturing and documenting information, promoting standardization and transparency, and integrating EA into the operating model of the organization

Output

Based on the provided text fragments about output, here are some results:

Measuring output: Currently, there is a lack of measurable goals and results in EA. It is important to understand the strategic goals of the organization, translate them into architectural principles, and monitor the execution to measure the output.

Improve and adjust: Regular evaluations and feedback loops are necessary to continuously adapt and improve the EA.

Measurability: It is important to establish a translation of EA into measurable goals and results.

Reviews and audits: Regular reviews and audits ensure that artifacts remain consistent and up-to-date.

Output artifacts: Stakeholder involvement and feedback loops help align artifacts with the needs and expectations of different stakeholders.

Communication. Output: Regular cycles of communication should be established to discuss progress, challenges, and achievements in relation to EA.

Reporting: A standard pattern should be established for reporting to collaborative partnerships or stakeholders.

In summary, the text fragments highlight the importance of measuring the output of EA, establishing measurable goals, continuous improvement, maintaining up-to-date artifacts, and effective communication and reporting to stakeholders.

People

Based on the provided text fragments about people, here are some results:

Business Knowledge: It is important to involve people from different operational units (opcos) who have a good understanding of the business when creating the architecture.

People create architecture: People play a crucial role in creating the architecture of an organization.

Working through with carefulness with people: The process of working through and implementing EA should be done with care and involve people closely.

Respect for people: It is important to treat people with respect and ensure that their contributions are valued.

Mis promoting people: Incorrectly rewarding people or promoting the wrong behaviors can lead to negative outcomes.

IT big role: While IT plays a significant role in becoming a digital organization, it is not the sole aspect. Other factors and people are also important.

Perception of people: Different individuals may have varying perceptions and understandings of the collective goals and objectives.

Using the right people: It is essential to utilize the skills and capabilities of people who are willing and motivated to contribute effectively.

Understandability: Architecture should be designed in a practical manner that is easily understandable for people. It is important to explain the relevance and purpose of the architecture to them.

Stakeholder driving force. Artifacts: Stakeholders play a crucial role in driving the development of artifacts and ensuring their relevance and effectiveness.

Stakeholders: Stakeholders should be actively involved in the EA process and have clear responsibilities assigned to them.

You need people: People are essential in EA, not just the documentation itself. Their involvement and collaboration are crucial for success.

Role EA

Read and develop: Enterprise architects need to have a broad interest and continuously read and develop their knowledge in various areas.

Crucial part of the strategy: EA should be seen as a crucial component of the organization's strategy.

Tool for objective advice: EA serves as a tool to provide objective advice by considering different scenarios.

EA is facilitating: Enterprise architects are impartial and not solely judged based on financial performance or business models. They facilitate and remain independent.

Connection substantiated by aspects: Enterprise architects monitor the relationship between the organization's purpose and the execution of change on the operational level, supported by various aspects.

Not only align IT and Business strategy: EA is not solely focused on aligning IT and business strategies but encompasses more.

Create understanding: Trends and activities within the organization need to be plotted and communicated to provide people with a clear understanding of what is happening.

Role EA: The role of EA is to ensure that business objectives are achieved in the most efficient, sustainable, and effective way possible.

Provides transparency: EA creates transparency by revealing the interests of multiple stakeholders.

Transparency: It is important to be transparent and not misuse the transparency provided by EA.

Importance EA: Stakeholders need to be made aware of the role and importance of EA.

Design and development: Enterprise architects should focus on creating a well-designed architecture and continuously develop it.

Collaboration. EA: EA promotes collaboration and cooperation between different architectures within the organization.

Create insights or impact determinations: Architecture should be described to gain insights or determine the impact of specific actions.

Reference architecture: Reference architecture helps identify deviations within processes and gain insights into specific areas.

Role EA: EA is more than just a description; it involves describing and understanding changes and their impacts.

Transparency. Impact: Architecture helps in identifying deviations and understanding their impact.

EA. Business: Enterprise architects play a role in guiding business processes and the overall organization, which leads to IT requirements.

Part of C-level: In mature organizations, EA is part of the C-level and helps translate mission and strategy into the organizational structure and capabilities.

EA as a bridge: EA should function as a bridge between business strategy and IT, as well as stimulate technological innovation.

Strategy

Based on the provided text fragments about strategy, here are some results:

Value to the organization: Strategy should focus on creating value for the organization.

Added value: Strategy should aim to create added value for the organization.

Predetermined goal: Strategy should be aligned with predetermined goals, even if it means letting go of smaller customers to achieve significant growth.

Growth and profit: Strategy should have objectives to increase both growth and profitability.

Modification: Strategy may involve modifying processes to accommodate increased volume while retaining customers.

Define in advance: Strategy should be defined in advance, based on the mission and vision of the organization, which is essential for aligning and motivating people.

New approach: Strategy may require adopting a new way of working to stay ahead of the competition.

Manage to achieve goals: Strategy aims to ensure that the organization as a whole achieves its goals.

Goal, mission, and vision: Strategy should clarify and communicate the objectives, mission, and vision of the organization.

More efficient and cheaper: Strategy should strive for efficiency and cost-effectiveness compared to a country-specific approach.

Artefacts for strategy: The value stream model and architectural artifacts help facilitate strategic discussions and policy formation.

Contribute to company goals: EA should exist to ensure the realization of the company's objectives.

Long-term planning: Architecture should consider longer-term philosophies and direction to determine where the organization wants to go and what it wants to achieve.

Strategy, concessions: Strategy formulation involves making choices and concessions based on the current state and future goals.

Strategy: While focusing on components, it is important not to lose sight of the overall strategic vision and how it should be standardized and implemented.

Shared objective: Strategies aim to renew and improve processes from end to end within one country and then adopt and roll out these solutions globally.

From business to IT: A business strategy needs to be translated into an IT strategy for effective implementation.

Figuring out Roadmap: Strategy involves determining the short-term and long-term plans and identifying the expected outcomes.

Roadmap: Strategy should provide a roadmap with a future vision to work towards.

Strategy. Change portfolio: Strategy formulation should consider the change portfolio and prioritize initiatives accordingly.

Value added

Substantiation: There is a need to substantiate and quantify the value added instead of relying on estimation.

Quality creating: Creating value should focus on ensuring and improving the quality of products or services.

Service offering: Understanding the global service offering of the organization and determining what is done and not done in the Netherlands is a significant challenge.

Added value: It is crucial to comprehend the actual added value and have a clear understanding of the business model.

EA value added: The role of the CIO is to communicate and convey the value of EA to the people within the organization.

EA value added: Gaining buy-in from the top management is essential. If the top management does not understand the value, it is important to ensure that C-level executives recognize the significant contribution of EA.