

MASTER'S THESIS

Business Value Creation through Enterprise Architecture Artifacts in Cross-Organizational Business Ecosystems: A Case Study in a Government Organization

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Business Value Creation through Enterprise Architecture Artifacts in Cross-Organizational Business Ecosystems: A Case Study in a Government Organization

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Abstract

This article investigates how Enterprise Architecture (EA) artifacts contribute to value creation in a cross-organizational business ecosystem within a government organization. The research utilizes a qualitative, inductive, and exploratory research approach, combining interviews with EA experts and a systematic literature review. The themes identified include EA Management (EAM) in the government organization, hierarchical organization of EA, types of EA artifacts, communication and collaboration in cross-organizational settings, and supplier guidelines. The key findings reveal that EA artifacts alone do not directly create business value. This article recommends measuring and tracking value achieved, improving communication with non-architects, considering various types of artifacts, addressing stringent requirements, and promoting sharing of EA artifacts to enhance future-proofing and understanding of EA in the business ecosystem.

Key terms

Enterprise architecture, EA Management, EA artifacts, Business value, Cross-organizational, Business ecosystem, Government organizations.

Summary

The increasing collaboration between enterprises and other organizations has led to interconnected business activities that extend beyond the boundaries of a single organization, giving rise to cross-organizational business ecosystems. In this context, Enterprise Architecture (EA) artifacts play a crucial role in connecting multiple actors within the ecosystem. This research aims to investigate the value creation potential of EA artifacts in a cross-organizational business ecosystem within a government organization.

The research consists of a systematic literature review to identify relevant literature related to EA, EA artifacts, business value creation, cross-organizational ecosystems and government organizations. The research approach consists of a systematic literature review using backward snowballing and keyword search. A total of 86 articles were reviewed that provided insight into the use and impact of EA artifacts in a cross-organizational context.

The study utilizes a qualitative, inductive, and exploratory research approach, with a focus on case study research in a government organization. Primary data is collected through interviews with various experts, including EA specialists, IT leads, and architects. Secondary data is analysed from documentation, specifically architecture guidelines derived from the Dutch Government Reference Architecture (NORA). The data analysis follows a thematic approach, using coding to categorize and structure the data.

The research highlights several themes regarding the use of EA artifacts in the government organization's cross-organizational business ecosystem:

- **EA Management (EAM) in the Government Organization:** The case organization has employed EA for over 20 years, primarily focusing on establishing frameworks for systems supporting business processes based on NORA. However, the direct business value of EA artifacts is not explicitly emphasized in the organization's business case.
- **Hierarchical Organization of EAM:** EA is structured hierarchically in the case organization, with different layers of EAM responsibilities aimed at creating more business value. However, there is a gap between the artifacts and end-users, necessitating alternative communication methods to bridge this divide.
- **Types of EA Artifacts:** The main EA artifacts in the organization include concern architecture, domain architecture, and solution architecture. While these artifacts guide the design of the process and IT landscape, they are primarily intended for architects and experts. Non-EA artifacts authored by non-architects play a role in addressing specific audiences effectively.
- **Collaboration and Communication in Cross-Organizational Settings:** Cross-organizational collaboration varies, depending on the complexity of IT facilities and the degree of reuse. However, there are no specific frameworks or guidelines for EA artifacts in cross-organizational ecosystems, and suppliers are generally hesitant to share their own artifacts.
- **Supplier Guidelines and Requirements:** The case organization focuses on meeting its own requirements and frameworks, with the solution architecture specifying functional and non-functional requirements. Suppliers' adherence to these guidelines can hinder collaboration, and increased transparency is needed for future-proofing.

Key Findings and Recommendations: The research findings indicate that EA artifacts alone do not directly create business value in the cross-organizational business ecosystem. The study recommends measuring and tracking the achieved business value, improving communication with non-architects, considering different types of artifacts, addressing stringent requirements, and

promoting the sharing of EA artifacts in the ecosystem. These actions can enhance future-proofing and understanding of EA in a cross-organizational environment.

In conclusion, this research contributes to the understanding of how EA artifacts create value in cross-organizational business ecosystems within government organizations. It emphasizes the importance of considering the broader context, measuring value, improving communication, and addressing requirements for effective value creation.

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1. Introduction

1.1. Background

Currently, enterprises are increasingly involved in collaborations with other organizations. Here, they link in terms of people, technology, and business procedures in addition to exchanging services. As a result, the chain of business activities in an organization do not takes place within the organization itself, but rather outside the organization. This indicates that multiple organizations are part of the chain of activities that are not directly related to each other. Also, the shifts to address the emerging scalability of technological advances, such as Cloud computing (Gampfer et al., 2018), will only increase the technical collaboration between organizations, systems and architectures. Which makes these organizations all, consciously or unconsciously, participants in one business ecosystem (Drews & Schirmer, 2014).

From an end-to-end perspective the business ecosystem of a government organization is often connected to systems acting outside the government organization. Due to the rules arising from the tender regulations¹ this has become more common. This entails that the actors in the business ecosystem have a strong connection with each other through the enterprise architecture (EA) of the government organization. This will lead to various taxonomic architectural frameworks as stated by Kotusev (2019).

The research of Lansiti & Levien (2004) involves a consideration of the interdependence of systems and the several businesses that are part of an business ecosystem. The health of one company in this ecosystem can influence the success of others. The purpose of this research is to investigate the EA artifacts used in a business ecosystem of a government organization for creating business value and will be proceed as follows. First, we will investigate, to what extend the EA artifacts are used and aligned with each other. We will then proceed to investigate to what extent the uniformity in cohesion affects the quality of the business ecosystem. Lastly, this research will further explore the concept of an ecosystem architect to clarify what added value he/she provides on the uniformity and cooperation between the actors of the individual EA artifacts within the business ecosystem of a government organization.

1.2. Exploration of the topic

The primary topic of this research will be EA. The other topics covered in the exploration phase are:

- the EA business ecosystem of a government organization and the various actors within,
- the Enterprise Architecture Management (EAM),
- the EA artifact and the central role of the ecosystem architect.

To effectively process the business ecosystem between business and IT, Enterprise Architecture Management (EAM) is a proven methodology. The guide to a successful and situational design of EAM helps in creating useful EA artifacts (Aier et al., 2011). EA artifacts are descriptions of an enterprise in the perspective of its business and IT, to help bridge the gap between them (Abraham, 2013; Bischoff et al., 2014; Kotusev et al., 2015b; Niemi & Pekkola, 2017; Winter & Fischer, 2006). EAM aims to achieve optimal utilization of EA artifacts and has been conceptualized as a set of processes that continuously supports the development of EA (Aier et al., 2011).

Knowing that EA and EAM in an enterprise are interrelated, it is necessary to have a central managing role to make the EA components of the business ecosystem work together optimally. According to Hedges & Furda (2019), the role of an ecosystem architect is growing as a result. An ecosystem architect approaches architecture from an end-to-end perspective, encompassing both the customer and technology. In contrast, an enterprise architect typically has limited experience with platforms outside their own business ecosystem. Drews & Schirmer (2014), investigated the extent to which the intra-

¹ <https://wetten.overheid.nl/BWBR0032203/2022-03-02>

organizational concept of enterprise architecture (EA) and enterprise architecture management (EAM) needs to be expanded to address the challenges and problems posed by enterprise interconnectedness. This suggests that there is a scope for further research and development in this field.

1.3. Problem statement

Many organizations experience rapid technical development. Global technology trends, such as Artificial intelligence (AI), cloud computing and software as a service, are being adopted in organizations to be able to develop a sustainable business. Higher demands are being set for flexibility, sustainability, and scalability of technological applications (Hedges & Furda, 2019). This development is also taking place in government organizations. In many government organizations, the requirement regarding these technological developments must be put into the market through a tendering procedure. This means that one business ecosystem can have multiple actors representing their own technology in a local enterprise architecture. Despite this interconnectivity, the associated EA artifacts are not linked to each other because there is no optimized EA openness between the organizations. Which eventually will lead to misinterpretation in the use and purpose of a purchased application (Hedges & Furda, 2019). This research will investigate the role of the EA artifacts in cross-organizational value creation for the business of a government organization.

1.4. Research objective and questions

The purpose of the research is to contribute to the academic literature on applying EA in an end-to-end process of the business ecosystem (Hedges & Furda, 2019). This will be done by conducting a literature review and semi-structured interviews with multiple experts in a government organization. The business ecosystem is a combination of a suppliers-user-customer environment of applications in a business process. Based on this, the research question is as follows:

How do EA artifacts create value for government organizations in a cross-organizational business ecosystem?

1.5. Motivation/relevance

Technical developments are moving rapidly, which requires flexibility from the actors to work more efficiently and deliver better quality to add value to the business process. Since there is little knowledge of the benefits of EA artifacts within Enterprise architecture in a cross-organizational business ecosystem, this research (1) intends to provide a standard list of EA artifacts that suppliers provide, (2) questioning the use and impact of EA artifacts on value creation for the business in a cross-organizational business ecosystem, (3) offers guidance to EA practitioners that establishes coherence among EA artifact in a cross-organizational business ecosystem.

Furthermore, this research provides added value to organizations that are experiencing an increasing coherence of the infrastructure of technologies, architectures, and business, between the different actors in a business ecosystem. In addition, this research aims to expand the academic knowledge base on how EA and EA artefacts can contribute to organizational EA alignment in cross-organizational business ecosystem.

1.6. Main lines of approach

The remainder of this article is structured as follows. The background of this research is presented, introducing EA related themes and the context of a government organization in the first section. The following section explains the methodology and process used to conduct the literature review and semi-structured interviews. The final chapters describe the results and discussion of the main findings of this research and ends with some final remarks and suggestions for further research.

2. Theoretical framework

2.1. Research approach

In order to develop a theoretical framework, a systematic literature review was conducted to identify, evaluate, and interpret literature in answering the research question and the themes within (Kitchenham, 2007). It also aims to find gaps in the literature, to synthesize themes and to generate insights from different perspectives. Therefore, it was chosen to apply backward snowballing and keywords searches. Based on the research question, the following main themes in table 1 were conceptualized and used in the literature review. During the literature review, an overview of key ideas and concepts were summarized in a literature matrix. The articles were compared in terms of contrast in their findings (Saunders et al., 2019). This made it possible to determine the different interpretations of the themes and to what extent they are interrelated.

Based on the backward snowball and keyword search methods, the literature related to the themes in table 1, were used as the basis for completing the following questions;

Main themes
Enterprise architecture
EA artifacts
Value creation
Cross Organizational
Business eco system
Government organizations

Table 1: Main themes research approach

- To what extent do EA artifacts from outside the organization add value for the cross-organizational business ecosystem?
- To what extent is an EA artifacts and business ecosystem complementary to each other?

The literature review process will include several cycles of capture, evaluate and refine the different interpretations, in order to write a critical review of the literature (Saunders et al., 2019). The Open University library was used as the search engine.

2.2. Implementation

To perform the literature review, backward snowballing and the keywords search methods were utilized. In addition, the building block method was applied in the keyword searches for refined results. These were applied because there are several themes that separately, but also in combination, generated interesting articles. Compared to backward snowballs, keyword search is also ideal for finding more recent articles. In the backward snowball search results, it is notable that the weakness was that articles were mainly older.

Backward snowballing search results

Using the backward snowballing method, a total of 66 articles were reviewed and documented into a literature matrix (table 2). The selection process began with evaluating 14 articles. Out of the 14 articles, 6 were selected as main articles regarding the six themes mentioned in table 1. In the context of backward snowballing, 52 articles were selected from these 6 main articles. Out of the 52 articles, 16 were found to be of added value in formulating the literature review. To identify the relevancy of the articles it was determined to what extent the results and findings could be used as a basis to broaden the understanding of the themes.

Snowballing articles			Analyzed findings		
Auteur	Titel	jaar	Auteur	Titel	jaar
Paul Drews, Ingrid Schirmer	From Enterprise Architecture to Business Ecosystem Architecture	sep-14	Marco Iansiti and Roy Levien	The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability	2004
			M. Iansiti and R. Levien	Strategy as ecology	2004
			Nicholas C Romano Jr., James B Pick & Narcyz Roztocki	A motivational model for technology-supported cross-organizational and cross-border collaboration	2017
James Hedges, Andrei Furda	The Emerging Role of the Ecosystems Architect	mrt-19	Elena Galateanu (Avram), Silvia Avasilcai	BUSINESS ECOSYSTEMS ARCHITECTURE	2013
			Donovan Isherwood, Marijke Coetzee	TrustCV: Reputation-based trust for collectivist digital business ecosystems	2014
			Peter James Williamson Arnoud De Meyer	Ecosystem Advantage: HOW TO SUCCESSFULLY HARNESS THE POWER OF PARTNERS	2012
Svyatoslav Kotusev	Enterprise architecture and enterprise architecture artifacts: Questioning the old concept in light of new findings	feb-19	Abraham, Ralf	ENTERPRISE ARCHITECTURE ARTIFACTS AS BOUNDARY OBJECTS – A FRAMEWORK OF PROPERTIES	2013
			Stefan Bischoff, Stephan Aier, Robert Winter	Use It or Lose It? The Role of Pressure for Use and Utility of Enterprise Architecture Artifacts	2014
			M. de Vries and A.C.J. van Rensburg	EVALUATING AND REFINING THE 'ENTERPRISE ARCHITECTURE AS STRATEGY' APPROACH AND ARTEFACTS	2009
			Robert Winter, Ronny Fischer	Essential Layers, Artifacts, and Dependencies of Enterprise Architecture	2006
			Niemi, E., & Pekkola, S.	Using enterprise architecture artefacts in an organisation.	2017
Eetu I. Niemi, Samuli Pekkola	Enterprise Architecture Benefit Realization: Review of the Models and a Case Study of a Public Organization	aug-16	Lenmetti, J. & Pekkola, S.	Understanding Enterprise Architecture: Perceptions by the Finnish Public Sector	2012
Maurice Pattij, Rogier van de Wetering, Rob J. Kusters	Improving Agility Through Enterprise Architecture Management: The Mediating Role of Aligning Business and IT	aug-20	Shanks, G., Gloet, M., Asadi Someh, I., Frampton, K., and Tamm, T.	Achieving benefits with enterprise architecture	2018
			rogier van de wetering	Enterprise Architecture Resources, Dynamic Capabilities, and their pathways to Operational Value	2019
Rogier van de Wetering	Dynamic enterprise architecture capabilities and organizational benefits: an empirical mediation study	jun-20	Shirley Gregor and Dennis Hart	Enterprise architectures: enablers of business strategy and IS/IT alignment in government	2007
			Someh, I. A., Frampton, K., Davern, M. J., & Shanks, G. G.	THE ROLE OF SYNERGY IN USING ENTERPRISE ARCHITECTURE FOR BUSINESS TRANSFORMATION	2016

Table 2: literature matrix backward snowballing

Keywords research results

The search query and search results from the keywords method are listed in table 3. The queries were applied in the search engine of OU library portal. Because there was a large overlap, of at least 50 articles, with the results of backward snowball research, the 20 articles that were newly reviewed and documented in the literature matrix were also reported separately. Table 3 also reveals that when there were too many results for one keyword, for example the 12.562 hits on the keyword cross-organizational, the building block method contributed to a more convenient and specific outcome for finding relevant articles.

Building block OU Library portal	Results 5y	Results 10y	Relevant	Used	New added
EA+Artifact	95	118	39	12	4
EA+Artifact+Benefits	20	27	7	5	0
EA+Artifact+Business+Benefits	5	9	5	5	1
Value creation+ Enterprise Architecture + Artifacts	4	7	1	1	1
Business value + Enterprise Architecture + Artifacts	12	28	5	5	1
Cross organizational	12562		N/A		
EA + Cross organizational	48	98	15	9	4
Cross-organizational + Alignment	15	36	0	0	0
Cross organizational + responsibility	30	57	1	1	1
Business ecosystem	43821		N/A		
EA + Business ecosystem	145	294	18	3	2
EA + Business ecosystem + roles	27	48	5	2	0
Enterprise Architecture + public organization	165	440	34	4	3
Concepts for Modeling Smart Cities					
Enterprise Architecture + Government organization	139	325	22	3	3
Total	57088		152	50	20

Table 3: Results Building block method

2.3. Results and conclusions

In this chapter, we further define the themes formulated based on the research question, namely; Enterprise architecture, EA artifacts, Business value creation, Cross-organizational, Business ecosystem and Government organizations. For each theme, we substantiate the extent to which it has been discussed so far in the literature, both in the field of EA and in other contexts. And finally, the follow-up research of this research will then be explained in detail.

Enterprise Architecture

Several definitions of EA have been found in the literature. Saint-louis & Morency (2017) defines EA as a comprehensive description or blueprint of the entire organization from a Business and IT perspective. According to Jallow et al., (2017), from an organizational perspective, EA can be applied differently. For example, in the Office of Management and Budget (OMB, 2012), EA is described as ' the management's best practice which can provide an overview across all program and service areas to support decision making.' The EA description of Tamm et al., (2011) which is deployed in a cross-organizational environment is interesting too. According to them, EA is "the definition and representation of a high-level view of an enterprise business processes and IT systems, their interrelationships, and the extent to which these processes and systems are shared by different parts of the enterprise" (Tamm et al., 2011, p. 142). With this in mind, EA is key to provide a view of what your organization has to offer and to what other organizations have to offer in order to benefit from it.

EA artifacts

EA artifacts are used to bridge the gap between IT and Business. Kotusev (2019) argue that the EA artifact themselves are explored empirically, while practicing them has been under-explored. In his research 24 EA artifacts were described that are proven to be useful in practice. They also described how to implement EA artifacts and provided insight into EA as part of the architecture of business information, - application and -technology. Bischoff et al., (2014) examines the benefits of EAM and EA artifacts, and its relationship in practice. They expressed 4 types of artifacts based on how intensively they are used for value creation and to what extent there is an increased management pressure on the use of the artifacts. This approach is a progressive of adopting business value creation. They catalogued the importance of an artifact into:

- EA shelf-warmers,
- EA superstars (these are also used even if there is no pressure),
- EA annoyances (important but no pressure by management to apply),
- EA pressure beneficiaries.

According to Winter & Fischer (2006) the EA artifact on the different architecture layers, can be filled in based on dependencies in the EA hierarchy. The value creation is to describe and capture dependencies between systems and data to secure the value of EA artifacts between the horizontal and vertical dependencies hierarchic layers.

Business value creation

Research on the value creation of EA, by Niemi & Pekkola (2016), has shown that few EA studies have been conducted on this topic. Therefore, these researchers have developed a model to investigate the constructs interacting in the EA benefits realization process. The relationship between EA constructs such as EA product Quality, EA Service, and social environment are a strong basis for further research to make the benefits of EA measurable. Van de Wetering (2019) also confirmed that there is little literature on EA-based capabilities that has impacted the business transformation and what benefits can be generated from it. The results of his study shows that the organizational benefits resulting from EA-based capabilities can be achieved through intermediary capabilities and IT business benefits. An organization's

goal is to thereby focus on dynamic EA capabilities and position them in a position where they enable both alignments and process innovation. It is hypothesized that the positioning and dynamics will allow an ecosystem in a cross-organizational environment to also be positively influenced by EA capabilities. According to Shanks et al., (2018), another way for EA to achieve its potential can be by positioning an enterprise architecture service capability (EASC) in the organization to offer advice and to turn the EA benefits into added value in projects. To what extent this also leads to the same benefits in the business (non-project) environment has to be explored. However, Van de Wetering (2021) conceptualizes and defines EA-based capabilities according to the Dynamic Capabilities view (DCV) and proposes a research model that attempts to explain how dynamic enterprise architecture capabilities enable operational business capabilities within companies. His findings show that dynamic enterprise architecture capabilities enhance operational business capabilities, and that enterprise EA resources are essential in the process in creating business value.

Cross-organizational

Toward the future of EA, a study was written by Lapalme et al., (2016). Here, it is endorsed that non-technical domains also contribute to the evolution of EA. By doing so, they show that progress towards the future will be not only based on the insights gained from thinking in systems, but also the new realism of doing businesses together (e.g., virtual, borderless, culturally heterogeneous and knowledge preservation). This sense of reality includes collaboration between enterprises and thus across boundaries of local system support of one organization. Regarding to this, Romano Jr. et al., (2010), investigated what motivates the cooperation between companies. From their model which is based on two key concepts namely inter-organizational systems and relationships, it appears that sharing information, having related (business) strategies and leadership driven, the relationship between Business Process Management (BPM) and outsourcing management, has a positive effect on the cooperation between companies. According to them the commitment of sharing data and the access to real-time external data, seems to have the most positive effect on the supply chain. This allows business managers to better position resources and to better understand their customer and market.

Business ecosystem (environments and roles)

According to Drew & Schirmer (2014), the diversity of systems in a network is an ecosystem. In their research, they have expanded EA and EAM to business enterprise architecture and ecosystem architecture. To process an ecosystem effectively between Business and IT, Enterprise Architecture Management (EAM) is a proven methodology (Aier et al., 2011). Although, the complexity of the environment goes beyond the standard EA and EAM concepts. The research of Lansiti & Levien (2004) involves a consideration of the interdependence of systems and of several businesses that are part of an ecosystem. The health of one company in this ecosystem can influence the success of the others. Other studies, investigated the influence of large companies in an ecosystem with suppliers, distributors, product manufacturers, etc. The influence of an ecosystem run by large keystone players is important because the participants in that ecosystem are growing, and investing, to improve services with the keystone players. But they also do so to improve its own position in other ecosystems. The dependent companies in an ecosystem are called niche players (Lansiti & Levien, 2004; Galateanu & Silvia, 2013). According to the research of Williamson & De Meyer (2012), the success of an ecosystem can be achieved with key principles, namely that the lead organization;

- define roles for architecture,
- encourage investment from partners,
- reduce costs,
- facilitate learning opportunities,
- and networking.

According to Hedges & Furda (2019), a gap where EA has not been sufficiently explored is how to deal with enterprise interconnectedness and architecture roles. The regular enterprise architect operating outside of the lead organization often does not have a clear view of the complex platforms and their business models of other enterprises. Therefore, they introduced the role of ecosystems architect as an essential new capability created as an extension of existing organizational roles such as Enterprise Architecture, Business Architecture, Business Strategy, Product Management and, General Business Management.

Government organization's

Government organization are, when setting up EA, often restricted to government standards. The main Dutch standards for architecture are listed in the NORA (Nederlandse Overheid Referentie Architectuur) guidelines. NORA is intended to provide direction and guidance. It contains frameworks and principles for setting up information management and digital architecture of Dutch government organizations. How these principles are interpreted can differ from organization to organization. For example, Lemmetti & Pekkola (2012) indicates that since the initiative for the EA framework came from the Finnish Ministry of Finance, most respondents interpreted EA as part of ICT governance. This led to conflicting interpretations. On one hand, the strategic objectives and role of ICT were seen as driver of the improvement for EA. On the other hand, it was found that the use of EA transferred decision-making authority from general Business management to ICT management. This gives a generic view on how government organization interpret EA. The importance of EA business strategy, even for government organizations, is endorsed by Gregor & Hart (2007). The Australian ABS (Dutch CBS), whose architecture is very dependent on external data has a strongly holistic architecture. It is characterized by a strong and equal focus on business operations, the deliberating of the frameworks, the structuring and hosting of business information for delivery to business, and the efficient reuse of IS/IT components. This means that the purpose of the business ecosystems must be strategically organized. The ABS case study demonstrated how a formal enterprise architecture mechanism can be integrated into business strategy to create a successful alignment process in a business ecosystem.

2.4. Objective of the follow-up research

According to Tamm et al., (2011) EA artifacts are a collection of descriptions which plays an important part in understanding what is happening in your organization. Especially for peoples that do not participate in your organization but are part of an business ecosystem. EA artifacts can be used as a mean to discover what is happening in other organizations in a cross-organizational business ecosystem. It also helps to understand the EA capabilities in an organization. As Van de Wetering (2019) points out, the focus is to position the EA capabilities in such a way that they can add business value and improve decision making in the organisation. Shanks et al., (2018), positioning of EASC in the organization also has a positive effect on the benefits gained from EA. The EA artifacts of the different systems or even of different organization in an ecosystem can, with proper assurance, provide better insights into creating business value. However, these benefits have only been investigated from a project perspective. It is useful to explore this from a business operations perspective and explore to what extent do EA artifacts from outside the organization add value for the cross-organisational business ecosystem. According to Lansiti & Levien (2004) the roles and responsibilities in a dynamic business ecosystem should be determined by the keystone organization. Government organizations are mainly the keystone organization while cooperating with suppliers. It has not yet been studied to what extent government organizations demand dynamic capabilities from their suppliers or if they adapt to their suppliers. Government organizations are required to comply with government standards in setting up EA. In the cross-organizational business ecosystem, it is important that the keystone organization role is fulfilled. The EA artifacts have to meet the keystone organization requirements that are set by the regulatory standards. The positioning of the keystone organization is explored from a commercial organization

perspective (Lansiti & Levien, 2004). This research therefore explores the literature to understand the extent to which EA artifacts contribute to the creation business value in a government organization's cross-organizational business ecosystem and was complemented by a case study to explore the extent to which EA artifacts and the business ecosystem are complementary to each other.

3. Methodology

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

Due to the not fully explored contribution of EA artifact in a cross-organizational setting the research approach chosen was qualitative, inductive and exploratory in nature (Saunders et al., 2019). The inductive approach helps to generate new theories or propositions and the holistic approach helps us to focus on the leading cause as a whole rather than only the symptoms. Therefore, the case study research method was chosen as the most appropriate approach to qualitatively study a contemporary but under-researched domain in its complexity and natural setting (Saunders et al., 2019). And lastly, to answer the research question, a multi method qualitative study consisting of both primary and secondary research methods was conducted. Within the case organization, secondary documentation was analysed, and EA specialists were interviewed to provide input for the exploration study. According to Saunders (2019), it is common to conduct interviews with experts in a relatively unstructured manner and rely on the quality of the contribution from those who participate to help guide the subsequent stage of the research (Saunders et al., 2019, p. 187). To keep the interviews structured, the various themes from the theoretical framework, table 1, were used as core themes to stay as close to the relevancy of the research question as possible.

3.2. Technical design: elaboration of the method

To analyse secondary data, the architecture NORA guidelines that governments organizations must commit to were studied. These commitments are translated by government organizations into the referential architectures that represent local architectural guidelines. These are, if done correctly, derived directly from the NORA guidelines. The analyses provided insight to which architecture guidelines are focused on adding value to the business and to gather information on how the organization is structured in terms of applying EAM for its intended purpose.

The government organizations have set up architectures in different governance layers. For example, there is an architecture board, which reviews the projects in the execution of the architectural guidelines. The review is based on the solution architecture described by an architect. For a proper impression about how EA is set up, an EA board member, IT-lead, enterprise-, domain-, solution- and business architects are interviewed. The list of interviewees, including a corresponding identification number that will be referenced in the results of this research, is presented in Table 4. The purpose was to discover in which practices these experts consider EA to be adding value to the business.

List of interviewees	
Respondent id	Role
1	Solution Architect
2	Enterprise Architect
3	Solution Architect
4	Domain Architect
5	IT Lead
6	Business Architect
7	EA Board member

Table 4: List of interviewees

The questionnaire for the semi-structured interview is based on Kotusev's (2022) research article, "Enterprise architecture artifacts as boundary objects: An empirical analysis". His case study examined the use of EA artifacts across roles and departments in a case organization. Since in this research, "cross-organization" and "business value creation" are important themes, the questionnaire was complemented with new questions based on the themes that were not covered yet. Furthermore, within the questionnaires, a distinction was made between architects and non-architects. This arose because an EA artifact is primarily written by an architect and from a non-architect's perspective there was a different informational foundation to explore. Note appendix 3 for the questionnaire given to the EA Board member, appendix 4 for the architects and appendix 5 for the non-architects. Appendix 2 includes the interview protocol shared prior to each interview. All interviews will be conducted one-on-one, both online and offline, between April and June 2023.

3.3. Data analysis

Based on the semi-structured interviews and secondary data collection, main findings were further substantiated. The interview results were summarized in transcripts and self-memos from the research notebook were also used for further data analysis. A thematic approach was used to analyse the collected data. This approach was chosen to identify themes and pattern in the data that are important to the related research question. The initial themes from the theoretical framework were used as the basis for further analysis. At its core, there is no linear progression in a thematic analysis (Saunders et al., 2019). Instead, the data was continuously reanalysed for improved insights. The data was categorized by using coding to gain structure in the collected raw data. Data labelling has proven effective to rearrange and retrieval data on a specific theme to then find relationships in the collected data (Saunders et al., 2019, p. 187). Discovering relationships were important in formulating the discussion and for concluding this research. The tool used was MaxQda and proved to be very suitable for analysing qualitative data such as text interview transcripts.

3.4. Reflection w.r.t. validity, reliability and ethical aspects

During this research, one of the purposes is to learn from past experiences. By logging observations in a research-notebook, one can retrospectively reflect on them, (Saunders et al., 2019).

In designing the interview questions, exploratory interviews were conducted beforehand. In which the themes were held up against EA specialists in the case organization. The reasoning behind this is to collect the appropriate secondary documents which are applicable for the case organization. Based on the themes, the secondary documents were collected and consulted at the initial source. In addition to the theoretical framework, the secondary documents were used as the basis for composing the interview questions. After designing the interview, a pilot interview was conducted to first test the interviewee's understanding of the questions. If necessary, questions were improved to increase reliability of the questions. The interviewees answered the questions anonymously, i.e., applicable only to the study, thus reducing the likelihood of socially desirable answers. The interviews are recorded and transcribed before any relationships and conclusions are drawn (Saunders et al., 2019). After the interviews were transcribed, they are reviewed with the interviewees to verify that what was said corresponds to what the interviewees intended to say.

Different research methods are used to answer the research question. Which, based on the concept of triangulation, helps in having a reliable study. Analysing the relationship between the results from the semi-structured interviews, secondary documents and a literature review helps to understand a problem from different perspectives increasing the validity of the proposed main findings.

As stated above, the various experts within the architecture landscape of the government organization, where interviewed in a semi-structured manner. By supplementing the literature review with the national NORA guidelines, we also increase generalizability of the research results for government organizations (Saunders et al., 2019).

4. Results

This chapter discusses the results of the literature review and interviews with the various EA experts from the case organization. The topics of this chapter are arranged thematically and reflect the main results that were obtained. The themes mentioned in table 1 that were formulated from the research question: “How do EA artifacts create value for government organizations in a cross-organizational business ecosystem?”, are enriched by main and sub-themes (table 5) that arose from coding the transcripts from the interviews. The segmentation in this chapter also reflects the relationship between these themes and subthemes. Before presenting the results of the different themes, we first describe the main topic of this research, EA(M).

Coded main EA themes	Coded sub-themes
Artefacts	Artefacts > non-artifact
	Artefacts > EA
	Artefacts > Business
Architects	Architects > Concern architect
	Architects > business architect
	Architects > Solution architect
	Architects > Domain architect
	Architects > EA Architect
Business value	Business value > Control
	Business value > maturity EA
	Business value > vision
	Business value > Business case
	Business value > KPI
Cross-organizational	Cross-organizational > Interdepartmental
	Cross-organizational > Domain
	Cross-organizational > Suppliers
Communication	
Environments	Environments > Business
	Environments > IT
	Environments > EA
Regulations	Regulations > Framework
Methodology and techniques	
Project	Project > Portfolio management
	Project > Budget

Table 5: Coded main themes and sub-themes

Enterprise Architecture Management

The main topic of this research is EA. In the section below, EAM, is discussed in the context of the Dutch government organization as well as in the context of the case organization subjected in this research.

EA in a Dutch government organization

Within the Dutch government organization, EA is not an unfamiliar concept. Respondent [1] referred that: “EA was introduced within the Dutch government when the first computers were installed over 20 years ago. It was not known as EA but thinking about the design of the application landscape and what resources are going to be deployed to make the landscape workable, existed back then already”. Nowadays, EA is used in the case organization to formulate the frameworks that one uses when setting up the systems supporting a business process. In other words, EA in the case organization is

providing the framework containing a set of guidelines. These guidelines are derived from the Dutch Government Reference Architecture (NORA). The NORA is the basis for a reference architecture. A reference architecture is a framework that addresses a specific knowledge area. The knowledge areas of which a reference architecture is described can be used by all Dutch Government organizations. The goal is to enable cross-organizational information sharing between government organizations when needed. The reference architectures are EA artifacts mainly used by architects and are barely used by the business. According to respondent [2]: “a reference architecture is too conceptual for the business and no business value can be gained from reading it”.

EAM in the case organization

In the case organization, the reference architecture is used as a framework guideline as well. In order to secure these architectural frameworks, EA is organized hierarchically in the case organization. Which

EA hierarchical layers	Descriptions
Enterprise architecture	Also called the concern architecture. It interprets the NORA national guidelines and translates them into the Enterprise architecture for the specific organization.
Domain architecture	Reference architectures are interpreted by the domain or board for a specific purpose in a domain.
Solution architecture	The solution must meet the guidelines from the reference architecture.
Business	The solution needs to be implemented in the business process.

Table 6: Hierarchical EAM layers

aims to ensure that the architecture frameworks are embedded in every layer of the organization. Table 6 summarizes the top-down hierarchical EAM layers of the case organization.

According to respondent [1]:

“Enterprise architecture in the case organization is hierarchically very comprehensive while the domain- and solution architectures are more focused on, for example, a knowledge area or solution for a business

process". With this hierarchical structure the architecture is deployed in a graduated manner to create more added value for the business. However, respondent [4] stated that: "EA artifacts at the very highest level is not quoted one-on-one in a value statement in the business case".

At the corporate level, the case organization divided the EA responsibilities into different EA and Information Technology (IT) roles that deal with the EAM layers, mentioned above. Where the EA-board particularly covers the business part of the architecture, the Chief Technical Officer (CTO) covers the technical and infrastructure part. Therefor the EAM hierarchical layers and the CTO work closely in various coactions. According to respondent [7]: the EA is stable toward the future in terms of frameworks. The technical interpretation of this is what IT is working on in cooperation with EAM.

The hierarchy of the different EAM layers and their responsibilities are mainly about consent and approval, on complying with the architecture guidelines. Communicating and substantiating the assent or approval is done by using EA artifacts. This is discussed in more detail in the next section on EA artifacts. Furthermore, it is critical for EA in the public sector to monitor compliance with the architecture framework as well. And making sure the frameworks are met is primarily the responsibility of the architects who create an EA artifact. Also, in case of deviations, it must be specified by the architect that the frameworks are not met. This quality assurance on EA artifacts is not explicitly about the assurance of the business value but mainly about the quality of the EA artifacts. To ensure the quality of the EA artifacts, the Domain Architecture Boards (DAB) and the Concern Architecture Board (CAB) form the final approval. They also provide advice on the solutions arising and assess whether the architecture frameworks are being complied with. In the next section, we elaborate on the various EA artifacts of the case organization.

EA Artifacts

At the case-organization, the phrase used is not EA artifacts but EA products, developed by architects. The main three EA products are:

- Concern architecture
- Domain architecture
- Solution architecture

These EA products contain principles and models that frame what the architectural landscape should look like in the intended situation. NORA, as mentioned earlier, is the basis for all EA products of a government organization. The above-mentioned EA products are a conserved shared vision of how organizational goals are connected to departmental goals. A realized solution (a process or an IT solution) must comply with the architecture frameworks of all EA products. Below we briefly explain the EA products, and in appendix 1 we provide a detailed explanation of the various EA products and the architects responsible for them.

Concern architecture

The concern architecture (CA) contains principles and a set of models that frame the design of the process and IT landscape of the case organization. The case organization is, from an architecture perspective, too complex and extensive to manage as a whole. Therefore, the CA contains a model that divides the case organization into domains.

Domain architecture

A domain is a defined area of business processes and IT facilities. For each domain, a domain architecture (DA) is created. That DA describes what the process and IT landscape of the domain looks like, what changes are necessary, and how the landscape is intended to develop in the coming years.

Solution architecture

A DA often does not yet contain the level of architectural detail needed to provide the necessary focus for a project to realize a specific value-added change for the business. *According to* respondent [1], the DA is the long-term vision, described at a high abstract level, in which a part of the business requirement is already outlined, but without the direct links to the operational business and its added value. In these cases, a solution architecture (SA) is provided. Different names are used for the SA, for example; Global Design, Project Start Architecture (PSA) and Minimum Viable Architecture (MVA). Respondent [3] stated: the SA is just a list of requirements and wishes in which the actual solution is described from both an IT and business perspective. As the IT perspective specifies the technical and infrastructural requirements of the application for a certain business process.

Type of EA-artifacts and communication

This research revealed that respondents were unanimous that not all architecture products were created or intended to be used by the same audience. It is therefore convenient to clarify the architecture products and their intended audiences or authors. Three types of architecture products have been identified:

- EA artifacts
- Business artifacts
- Non-artifacts

In the following, we specifically elaborate on the business artifact and the non-artifacts since EA artifacts, the CA, DA and SA, have been discussed in detail in the previous paragraph.

Business artifact

Prior to the SA, several business artifacts are prepared that substantiate the considerations for choosing the solutions. These are documents that within the case organization are not written directly by architects and therefore can be characterized as business rather than EA artifacts. Examples of business artefacts are:

- The business case, which depicts different scenario of different solutions under consideration, with the purpose of allowing the process owner to make a choice whether the solutions can meet the stated functional requirements in return of the investment capital.
- The implementation plan, which is written in preparation for the design, realization, and implementation of the business change.
- Operational process description or working instructions that have no direct connection to the enterprise architecture. Working instructions are artifacts provided for the end-users of the implemented application.

From these business artifacts, it can be stated that architects may participate in writing the architecture products, but are not the authors of these products.

Non-artifact

The EA products in the case organization are of a relatively high abstraction level with many pages. The target audience are primarily the EA experts rather than the business. The business architect or solution architect's responsibility is to translate these documents for the end user, using informal non-artefacts. Examples are "disposable" architecture blueprints also called the "charcoal-sketch". These informal documents provide a simple representation of EA products for non-architects. Interviewees indicated that the informal non-artifacts will be needed less as the knowledge of EA artifacts, or the EA maturity, among non-architects increases.

Other Artifacts

This brings us to the other Artifacts:

- Capability models
- Information plans
- Business objects model
 - Conceptual data model
 - Logical data model

According to respondent [5]: "These are indeed products that are instrumental for architects and related to the products delivered from architecture".

Applying EA Artefacts

Respondent [6] indicated that artifacts can indeed be audience sensitive in usage: "I don't think it makes sense to have an end user in a business environment, sitting behind the keyboards, reading the DA in order to explain what objectives are being pursued."

Respondent [4] indicated that the architects understand the EA diagrams very well but that the end user has quite little use for them: "So, I think you have to break down the information into the different types of people you meet along the way to tell the reader as much as possible what added value arises from an IT facility. A director who needs to make decisions doesn't need a user manual while an end user does. You will have to serve the different audiences with their own type of information."

Respondent [5], uses the DA to provide information for planning in his IT team for the coming years: "I would like the DA to also be understood by the business because it translates the business needs and links it to the several systems supported by IT."

It is notable that respondents indicated that EA artifacts are mostly used in the projects and not outside of them, referring to the regular procedural process of daily use of artifacts in the case-organization.

Applying EA-artifact cross-organizational

In this research, cross-organization refers to the relationship between organizations in a business ecosystem. The results revealed that there are two types of intensity in the case organization in collaborating with other organizations:

1. Limited Collaboration between Organizations

Due to the intricate and distinctive nature of government organizations, the IT department typically assumes the responsibility of developing the required IT infrastructure internally. This practice primarily arises from domain-specific regulations that exclusively apply within the Netherlands. The customized solutions implemented by the IT department render external suppliers less capable of catering to clients outside the Dutch government, thereby diminishing the attractiveness of collaboration contracts.

2. Extensive Collaboration between Organizations

In cases where generic solutions are needed for tasks such as office automation, HR administration, or facility services, external suppliers are more frequently engaged through public tendering. These generic applications, referred to as "reused" within the government, are adopted by various government departments that may require them. As a result, collaboration is intensified not only among external suppliers but also among the diverse government departments.

Whether collaboration is limited or extensive, domain architects have a responsibility to oversee which domains have already implemented which solutions within the government. The purpose is to ensure the

reuse of IT facilities as much as possible. If it is clear what the specific requirements of the business are, and the domain architect sees that such a solution has already been implemented at another government organization, then both domain architects will engage in dialogue with each other to test whether the business requirements of one domain matches the requirements of the other domain.

Respondent [4] stated that within the case organization the cross-organizational collaboration between governments but also between business and IT is already a complex business ecosystem. Meaning the collaboration across the various boundaries between business processes and the IT.

Cross-organization, EA-artifacts and suppliers

In terms of EA, the case organization firmly chose not to have openness with the participating suppliers about their EA. Thus, there are no frameworks or guidelines for EA artifacts in a cross-organizational business ecosystem. And there is no capability service or role that wishes to oversee this to create business value in a cross-organizational business ecosystem. Several reasons can be identified from the results as to why it is not relevant for government organizations to have sight of EA artifacts from collaborating suppliers, namely:

1. Supplier restraint;
All suppliers are procured through tender bidding. In the past, says respondent [6]: "EA artifacts from suppliers have been extensively requested in the tender requirements. However, you notice that few suppliers show interest in the tender. The reality is that suppliers don't like to give a peek into their own businesses".
2. The goal is that the supplier develops whatever is requested;
According to respondents [1] & [6], it is also not necessary to ask to see a supplier's EA artifacts: "In the way the tender is set up for purchasing an IT facility, it is not relevant to know how the supplier has built the facility, what the underlying architecture is or what techniques they have used".

Respondent [1] stated: "As a customer I have requirements and demands. If these are met, I should be satisfied. What happens in the black box (of the supplier) is irrelevant. The way a supplier develops their application is not at all that interesting to us, as long as they manage to deliver the solution conform the specs".

Respondent [6] stated: "What I want to have influence on is the process that goes through that black box. I don't really care what technology is behind it. Or what data structure is behind it, as long as my process is well supported".

Respondent [3] says: "Agreements are made with suppliers about requirements regarding privacy and security. As a customer I would like to know to what extent they are measurable or verifiable. But I wouldn't want to know how they have made it measurable or verifiable".

Cross-organizational and communication

In addition, as a researcher, the following question occurred to me: How do we communicate about EA-artifacts in a cross-organizational setting? It might be that there is added value to be gained when implementing or using an application. Below is the response of two respondents.

Respondent [2] says: "there is no need to pair artifacts in any way. You "just" sit around the table with the suppliers and make a cross-tabulation between your world and that of the supplier. This allows the supplier to retain their freedom in their design and intellectual property".

Respondent [5] indicates: "With every tender agreement with a supplier, ownership is transferred to our IT environment. This includes the responsibility to match or develop the artifacts to inform the business process end-user".

Supplier guidelines and requirements

As previously mentioned, suppliers are primarily expected to fulfil the requirements and frameworks established by the case organization. Within the case organization, these requirements are translated into a SA, which serves as an enterprise artifact encompassing both non-functional and functional requirements. The functional requirements mainly pertain to the specifications proposed for the application, infrastructure, and technology, while the non-functional requirements primarily concern the requirements proposed for the business process. Examples of such requirements include privacy, security, and adherence to local and international rules and regulations governing the business process. Furthermore, there may be instances where a specific government organization refers to additional frameworks, which will also be outlined and specified within these requirements.

When asked if the black box could be a disadvantage to achieving business added value, respondent [6] said: "It can go both ways. For example, a cloud solution provides more rapid solution delivery but as a result you are less aware of what is happening at the supplier. Therefore, the frameworks, guidelines, test cycle and audit statements, are more valuable to be demanded of the supplier. That's to prove that the black box is in fact secure".

Respondent [3] shares this view: "The majority of cloud suppliers provide an application, or a platform, or a piece of functionality that is often provided to multiple customers. The supplier provides you with a functionality and within that it meets our requirements".

Respondent [4] indicated that: "cloud services carry a number of risks that must be carefully analysed. Only when that has been done and the business accepts the remaining risks then the service can be purchased".

Business added value in EA artifacts

According to respondents [5] and [6], EA products are not used by the business to gain added value. EA products are mainly used to make decisions or to justify them. This justification is especially relevant during the duration of a project in order to stay within budget, for example. After the project, they are not used to create business added value.

However, the results did show that EA products and value-added creation do have some connection. According to respondents [1] and [5]: "you deploy architecture, as a mean to create business value. This value is captured in the value statement within a business case". However, you cannot say that the EA artifact at the very highest level is quoted one-to-one in the business case. This is because the EA artifacts are documents that tell something about the current and future state of the business process. The business case is thus the business artifact in which various scenarios are elaborated on the pros and cons of a specific solution, for a business process. This is where it could be said that the business' added value is being taken into consideration. And if this business value does not outweigh the benefits, then the solution will not be purchased. Interviews with experts revealed that while added value is specified, it is not sufficiently Specific, Measurable, Achievable, Relevant and Time-bound (SMART), to be measured over time.

According to respondent [5]: "the case organization is developing functionalities during the project with which we will support the entire process to achieve the business added value. The pros and cons scenarios included in the business case were only necessary to inform the managers about the options available in the solutions. The implementation of the application is ready when all these functionalities are built, tested, and approved by the process owners. This process owner is then going to add business value by using these functionalities in the application. This is not being monitored in the context of the underlying EA-artifacts".

Secondary literature analyses

The most important secondary EA-related literature within the government are the reference architectures. As mentioned earlier, these are the frameworks established for setting up and realizing IT facilities within Central government organizations, of which the case organization is a part of. Table 7 lists the main reference architectures for governments organizations. Starting from the European Union to the Dutch central government. These reference architectures were analysed to determine the extent to which they addressed the themes of this research. The result is that these sources only explicitly address the cross-organizational (cross-government) and the business ecosystem as related themes.

Reference Architecture	
EU	The European Interoperability Reference Architecture (EIRA) contains the frameworks for digital public services across the borders of EU countries.
NL	The Dutch Government Reference Architectures (NORA) contains frameworks and existing agreements for setting up the information management of the Dutch government. Realizing the facilities within those frameworks and agreements ensures that they work well with other facilities and that optimal reuse is made of existing solutions.
Central Government	The Enterprise Architecture Rijk (EAR) describes the current and desired design of the information provision of the civil service to the of computerization domains.

Table 7: Reference Architecture Government

Cross-government

The reference architectures are the frameworks for the EA establishment in the public sector. The basis of these frameworks starts at the European level with the EIRA. In the EIRA, a strong connection can be seen between the business ecosystem and its cross-organizational aspect within the public sector. It is recognized that interoperability is one of the means to improve collaboration between governments, businesses and citizens. The Interoperability Framework (EIF) defines interoperability as: "the ability of organizations to communicate toward mutually beneficial goals, sharing information and knowledge between them, through the business processes they support, through the exchange of data between their ICT systems"².

In line with EIRA, NORA is generally focusing on the knowledge areas that are common to many Dutch government organizations and more likely to be reused. For example, the general generic business management processes (PIOFACH³) and themes such as security, privacy or case-oriented processes. But also, interoperability between organizations and what that requires. The NORA⁴ formulated 5 core values, namely; trust, secure, future-oriented, effective and purposeful. The purpose of these core values is to refer to a shared language between the policy, operational, and designing actors of IT facilities across government organizations, in a business ecosystem.

In line with NORA, the EAR, which covers central government, describes the rules and administrative agreements for acquiring or implementation IT facilities. Mainly for collaborative environment where a lot of information exchange takes place within its business ecosystem. And where, partly using nodes, participating organizations can be helped in setting up organizational interoperability. The main functions of those nodes are to provide distribution of data, common facilities and coordination with other collaborative organizations. The goal is to collaborate, consult and improve, that is what "interoperability" is about: the seamless exchange of data within government organizations, between government organizations and with businesses and citizens.

² <https://joinup.ec.europa.eu/collection/european-interoperability-reference-architecture-eira/solution/eira/chapter-1-overview-eirac>

³ This stands for personnel, information, organization, finance, general affairs, communications and housing.

⁴ https://www.noraonline.nl/wiki/Kernwaarden_van_Dienstverlening

5. Discussion, conclusions and recommendations

This research aimed to explore the relationship between creating business value by using EA artifacts in a cross-organizational business ecosystem. It also explored the extent to which artifacts influence collaboration between various organizations and the extent to which EA artifacts are used by different actors, in different environments in a business ecosystem, in order to create business value. And to what extent do EA artifacts and the business ecosystem complement each other. Furthermore, the goal was to investigate how and which EA artifacts are shared between organizations and to determine the use of the right type of artifacts based on communication needs.

5.1. Discussion – reflection

EA artifact and business value creation are by themselves unrelated

EA artifacts do not directly contribute to generating business value within a cross-organizational business ecosystem. In the case organization, as described in the research by Shanks et al. (2018), the use of EA artifacts is primarily driven by project value. In other words, the focus lies more on securely establishing an IT facility for a business rather than understanding the business value achieved after the implementation of the IT facility. Therefore, business value is typically realized when the IT facility is used within the business process. The research findings indicate that EA artifacts in the case organization are used for decision-making and strategic planning to enhance business processes, with the most important artifacts being the CA, DA, and SA. This finding aligns with the article by Grave et al. (2021), which suggests that strategic plans are embodied in an EA artifact. Unsurprisingly, the case organization also utilizes EA artifacts for this purpose. This observation is not necessarily negative, as highlighted in the article by Van den Berg et al. (2019), where a relationship is established between organizational maturity, the quality of IT investments, and the number of artifacts created within the organization to facilitate informed decisions. The research conducted by Sarfaraz et al. (2012) also emphasizes the importance of well-founded decisions to avoid project miscalculations, an aspect the case organization would agree with. Furthermore, the research findings indicate that the case organization does not measure the impact of these informed decisions that add tangible value to the business process. Introducing the role of EA Controls, as described by Tamm et al. (2011), or a business ecosystem architect, as proposed by Drew & Schirmer (2014), can provide guidance to the case organization in achieving greater consistency through the use of EA. Additionally, Van Wetering et al. (2021) demonstrate that the fulfilment of EA-driven capabilities has a positive impact on organizational innovativeness and benefits. If organizational benefits are considered part of business value, then the case organization should contemplate establishing more EA-driven capabilities. Nevertheless, measuring business value through EA artifacts poses a significant challenge. As stated in the study by Kurnia et al. (2021), it is typically difficult to allocate business value to a root cause. To make accurate value determinations on the created value, it is necessary to keep track of the relationships among various components within a company ecosystem.

EA artifacts are used by those who understand its content

This research showed that EA artifacts are not understood by everyone in a business ecosystem so they are not used properly to create business value in an EA benefits realization process as was written by Niemi & Pekkola (2016). This may also explain the more intensive use of certain EA artifacts compared to other EA artifacts in the study by Bischoff et al., (2014). In which 4 types of artifacts were expressed based on how intensively they are used for value creation, for example, some were characterized as EA shelf warmers and others that are used much more intensively because of increased management pressure to use it. Seeking a more intensive use, this research shows that there is a significant content gap between an EA artifact and the business end-users. As a result, architects must communicate in other ways to close this gap. These boundaries are often crossed by using non-artifacts, such as a 'charcoal sketch'. Looking at earlier work by Kotusev et al., (2022) on EA artifacts as boundary objects, one can argue that it is not easy to use only artifacts when communicating across boundaries. In addition, with

each boundary in your business ecosystem, you need to be able to determine whether the EA artifact is understandable to your target audience to achieve added value. This is also recognized by Williamson & De Meyer (2012), who describe that facilitating networking and learning opportunities is key to creating benefits in an ecosystem. To do this, according to this researcher, there must be a key role for the participant in the business ecosystem organization who will intervene in keeping a business ecosystem running. Someone who is the architect, catalyst and facilitator in promoting the value of a business ecosystem. The catalyst benefits from what is proposed by Kotusev & Abraham (2013), who argued that defining boundary objects with the goal of improving communication and coordination by crossing syntactic boundaries requires that an EA artifact catalogues in place, which provides properties such as stability, accessibility and timeliness. And that, to cross pragmatic boundaries, it should be possible to compose and edit the EA artifact classes of matrices and diagrams together with multiple parties. So, the goal should not only be to make the context in an EA artifact more understandable for everyone. But also, to create resources you can use to blur the so-called boundaries so that EA artifacts become more accessible and recognizable to the various actors in a business ecosystem in order for them to be used more often.

Various artifacts exist in parallel to EA artifacts in a business ecosystem

An insightful result of this research is that a distinction was observed between different types of artifacts. In the literature of Bishoff et al., (2014) and Kotusev et al., (2022), EA artifacts can be distinguished into business-oriented and IT-oriented EA artifacts. In this research, it emerged that EA artifacts are primarily architectural products used primarily by architects. EA artifacts are required as a rationale for assessing whether the proposed system or functionality meets architectural requirements rather than for creating business value. They are frameworks of a more conceptual nature, although they are always underpinned using different types of artifacts, from different authors, as a foundation. As Kurnia et al., (2021) point out, it can be argued that the role of architects crosses different boundaries and therefore is difficult to plot one person on EA artifact, or in other words, a multidimensional EA artifact has different information layers and authors. In this research, the different types of layers in an EA artifact have been introduced as business and non-artifacts, these artifacts often have authors who are not architects. The exploration of different types of artifacts complements existing literature such as Bishoff et al., (2014) and Kotusev et al., (2022), which refers to EA artifacts without considering the author or audience of the artifact. By doing so, as proposed in this research, it does make it clearer where the boundaries in a business ecosystem are and what value which artifact has to offer to which audience. These non-EA artifacts are not identified as such in the exciting literature and can therefore be missed as a foundation of an EA artifact. Especially in an environment where EA, IT and business are a part of a business ecosystem and some artifacts appeal to a particular audience more effectively than others.

Stringent requirements are detrimental to collaborating in a cross-organizational environment

A government organization, like all large organizations, is very complicated. Especially in a cross-organizational setting where you would believe the government organization would be a leading body in a business ecosystem. Unfortunately, this did not appear in the results of this research. In the research by Lansiti & Levien (2004) in which the keystone organization, often allowed suppliers to grow along in favour of their clients, this does not occur in the setting of government organizations. Certainly not in the way they described in their research, in which the keystone organization, often allowed suppliers to grow with them for the benefit of their customers. At the case organization, the underlying reason for this appeared to be that government organizations are less suitable for IT facilities that can be commonly used in both public and commercial environments. As a result, there are often special requirements for government applications, leading to fewer suppliers joining the business ecosystem since there is no growth opportunity that helps improve services to other customers. Larger suppliers have an advantage over smaller suppliers because they do have the resources to respond to such stringent requirements. As respondent [5] argued: "there are currently more self-developed IT applications available than purchased

applications. Because of these special requirements, the case organization quickly becomes too demanding for most suppliers. And if the requirements become too stringent, for example, providing insight into the EA artifacts, or other requirements related to a suppliers' intellectual property, a unwillingness and perhaps even a lack of trust with a potential supplier will occur". As a result, fewer suppliers are participating in the tender process. Nonetheless, it is important for any organization entering into long-term tender agreements to be future-proofed by increasing transparency in a cross-organizational environment.

Sharing less EA artifacts is not future proof

One of the most surprising findings of this research is the limited sharing of EA artifacts between the case organization and external entities within the cross-organizational business ecosystem, as well as the lack of desirability for such sharing among respondents from the case organization. Consequently, no standardized list of EA artifacts shared in a cross-organizational business ecosystem has been developed. Suppliers, in turn, do not feel compelled to share EA artifacts due to their reluctance to disclose their internal operations, preferring instead to focus on meeting requirements and ensuring operational efficiency. According to Isherwood and Coetzee (2014), trust within an ecosystem extends beyond technological aspects. The study examined cultural norms and values that foster trust among individuals and consequently within the ecosystem, including the sharing of information such as EA artifacts. Managing artifacts with different stakeholders in a dynamic business ecosystem, as highlighted by Kallinikos et al. (2013), is also a challenging task. Contrary to initial expectations, sharing artifacts is not perceived as value-adding. The researcher initially believed that sharing artifacts among stakeholders would enhance overall business value within the ecosystem. However, this research revealed that the case organization is primarily driven by requirements. Consequently, if a supplier's product meets the specified requirements, no further action is deemed necessary to improve interoperability through ongoing information sharing. As a result, there are no guidelines in place for including disclosure agreements with suppliers, as proposed in the article by Hedges and Furda (2019). Looking towards the future, it is worth considering the rationale behind these requirements. Are they overly stringent or rather justifiable for suppliers? Considering the development of cloud computing and artificial intelligence (AI), and the increasing demands for transparency and disclosure of information and algorithms by customers and citizens, the urgency of sharing EA artifacts may become more noticeable sooner than expected. From a regulatory perspective, the European AI-Act⁵ imposes strict requirements on technical facilities, emphasizing the need for transparency and oversight within systems. Therefore, one could argue that AI, supported by EA artifacts, is valuable for understanding business processes. However, Kotusev et al. (2021) present a different perspective, stating that AI is not an EA product due to its composite nature and the challenges it poses when considering the current and future changes within an IT facility. Which is true from an EA perspective. Nonetheless, from the researcher's standpoint, it is crucial for a government organization to consider AI as an EA product, regardless of its complex components, to provide justifications when necessary. Ultimately, the case organization must carefully weigh these considerations against its business interests, the various actors within its business ecosystem, and the regulatory obligations imposed on a government organization.

Limitations of research

Some limitations of the current research are acknowledged. This paper is based on a single case study and, therefore, analyses only EA artifacts used in one particular organization, though these artifacts seem to be among the most widely used EA artifacts in the industry (Kotusev,2019). Secondly, the unanimity was notable among the interviewees in the case organization. This means that the fundamentals regarding EA are well established within the organization and well accepted in practice. As a result, however, few new insights emerged during the interviews. Therefore, it was difficult to find respondents

⁵ <https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence>

with different perspectives on this topic. Third, as indicated, this research was done a single case study however a multi case study would also be sufficient and perhaps bring more objectivity into the final result. Fourth, no business-oriented people were interviewed. Since the main topic of the research was EA artifacts, it was quickly clear that EA artifacts are not used to realize added business value for the business after an application is implemented. Artifacts that are not EA-related would be more valuable to investigate further on their relationship to business value.

5.2. Conclusions

This research aimed to explore the value created by EA artifacts in a government organization operating within a cross-organizational business ecosystem. The findings shed light on the complexity of interconnections among organizations within ecosystems. It was argued that there is no need to share EA artifacts with external actors in the business ecosystem of the case organization. As a result, a standardized list of shared EA artifacts for cross-organizational business ecosystems has not been established. This lack of necessity for sharing EA artifacts stems from the perception that once an application is developed by a supplier that meets prescribed requirements, sharing artifacts is deemed unnecessary to add value to the business. Furthermore, stricter requirements have been found to have a detrimental effect on attracting suppliers in a tender process. Consequently, this approach fails to ensure the future-proofing of business ecosystems, particularly for government organizations facing increasing regulatory demands. Additionally, it was argued that not all EA artifacts were effectively targeted towards their intended audience, particularly non-architects, thus limiting their optimal use in creating business value. To enhance communication among different roles and actors within a business ecosystem, it is recommended to define not only EA artifacts but also business- and non-artifacts. Moreover, it was argued that EA artifacts do not directly lead to measurable business value or allow for tracing their impact on achieved business outcomes. While EA artifacts primarily state the intended business value of the desired end result, quantification and measurement of this value are lacking. There is a lack of control authority or role responsible for providing insight into the actual business value generated by an EA artifact once the solution is developed. Taking this into account can facilitate the agility of organizations given the rapid digital transition that is foreseen. The insights gained from this research regarding the creation of business value using EA artifacts are expected to help organizations achieve better outcomes from their EA activities. Furthermore, this research provides valuable insights for researchers and practitioners seeking to gain a deeper understanding of EA artifacts within cross-organizational environments.

5.3. Recommendations for practice

The relationship with measuring achieved business value and EA artifacts is insufficiently demonstrated in the case organization. By making business value measurable - with predetermined KPIs - a CIO can measure whether the intended business value is achieved through the use of EA artifacts. And if value is not being achieved as planned, a root cause analysis can be performed to identify the underlying reason. This will have a positive impact continuous improvement and the relationship between all actors in a business ecosystem to achieve a common goal.

By investing in resources that can improve the communication between the various diverse actors in a cross-organizational ecosystem, the gap between them can be reduced. One connecting factor between an application and a business process is to share data. In practice, you can capture and define data from a technical layer to a business layer in a way that IT and Business can understand each other through these layers (DAMA-DMBoK, 2017). According to respondent [6]: “this is a way for the businesses to understand what is going on in an application and where to improve if necessary”.

Anticipating an openness between external actors in a business ecosystem is relevant for every organization. It not only appears in research of Hedges & Furda (2019), in fact, you see it reflected in European guidelines on outsourcing arrangements⁶ for banks as well. In which a business ecosystem, that determines the robustness of your business ecosystem process, is seen as a whole and thus carries a shared responsibility. The consequence could be that it will become unsatisfactory for a regulator to just accept a black box. The need for more openness on what in fact is going on in the black box is increasing. With this in mind, openness between actors should receive more attention when formulating tender requirements. That way you will have a head start on the increasingly stringent regulations.

5.4. Recommendations for further research

If this research were conducted at a commercial or financial organization, more results could be obtained regarding sharing and using EA artifact in a cross-organizational environment. This research found that the case organization have limited collaboration with other actors outside the case organisation due to various reasons, for example, the stringent requirements. Reasons that are less likely to occur in non-government organizations.

In this research, it emerged that EA artifacts are architectural products that are written and read primarily by architects. According to this research, using EA artifacts usually involves other types of artifacts created by the business to better understand EA artifacts. This is useful for future studies of EA artifacts in the context of business value, when there are one or more target audiences who must understand the EA artifacts first before they can achieve business value.

Finally, to discover the extent to which an EA artifact actually added value to the business, it would be valuable to take a retrospective look at the initial change in IT facility, the business case, and compare it with the results achieved. This was discovered during this research and it is valuable to address this in further research.

⁶ <https://www.eba.europa.eu/regulation-and-policy/internal-governance/guidelines-on-outsourcing-arrangements>

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Appendix 1

The concern architecture contains principles and models that frame the design of the process and IT landscape being too complex and extensive to govern as a whole from an architecture perspective. Therefore, the concern architecture contains a model that divides the Tax Administration into domains. A domain is a defined area of business processes and IT facilities.

A domain architecture is drawn up for each domain. That domain architecture describes what the process and IT landscape of the domain looks like, what changes are necessary in it and how the landscape is intended to develop in the coming years.

Often a domain architecture does not yet contain the level of architectural detail needed to give the necessary direction to a project that has to realize a specific change. In those cases, a solution architecture is prepared. Various names are in use for the solution architecture product; common are also solution architecture, global design, project start architecture (PSA) and minimum viable architecture (MVA).

The above architecture products (concern, domain and solution architecture) contain an elaboration of all relevant architecture aspects, such as products & services, processes, organization, data, applications and technology/infrastructure. The aspects of security, privacy and control/management (sing) are also addressed. The architectures are based on a vision of the future design. The architecture considers both the functional can of the solution (what should the process or system be able to do?) and the non-functional side (what numbers can the solution handle? what security risks will be mitigated and how? Etc.).

Architecture processes recognize 5 different architecture roles:

1. Enterprise architects draw up the Tax and Customs Administration's corporate architecture and are positioned at the IV&D corporate directorate
2. Concern IT architects contribute to the application and technology layer of the concern architecture and are positioned in the IV organization
3. Domain architects draft the domain architecture, are hierarchically positioned at the corporate directorate IV&D but are seconded to the chain president/director responsible for the domain
4. IT architects contribute to the application and technology layer of the domain architecture and are positioned in the IV organization
5. Solution architects draft the solution architecture (business, application and technology layer) and are positioned in the IV organization.

The roles Concern IT architect, IT architect and Solution architect are provisional working titles. Since these roles will be positioned in the IT organization, it is up to the IT organization to determine the definitive names for these roles. In doing so, a distinction at the solution level between a role that focuses on the business layer of the architecture and a role that focuses on the application and technology layer may still be considered.

Appendix 2

Interview protocol (Dutch)

Titel: Welke toegevoegde waarde hebben EA-artefacten voor een overheid/ publieke instantie, in een organisatie overstijgende business ecosysteem?

EA-artefacten zijn de middelen van communicatie om de werelden van IT en Business tot elkaar te brengen. Dit kunnen Standaarden, planningen, SLA's, architectuurplaten op verschillende hiërarchisch niveaus, technische of functionele ontwerpen maar ook overwegingen uit de business case of een instructie van een bepaalde tooling.

Business ecosysteem is de samenhang van systemen of applicaties die in elkaar verlengde werken voor een proces of business.

Onderzoeksvraag: *How do EA artifacts create value for government organizations in a cross-organizational business ecosystem?*

Doel: Het doel van het onderzoek is om te verkennen hoe EA-artefacten de business waarde in een organisatie overstijgende business ecosysteem beïnvloeden.

Onderzoeker: Ceagan Deets

Universiteit/ Organisatie werkzaam: Open Universiteit, Master Business Process Management, Variant Data Science. Werkzaam bij de Belastingdienst, SSO O&P, Bestuur en Ondersteuning.

Doelgroep interview: 8 tot 10 interviews. Met o.a. de volgende rollen/ functies binnen de Belastingdienst; Enterprise architect (Board), IT-manager, Business architect, Solution Architect, Domein architect, Proces manager.

Status onderzoek zover: Op het moment van de interviews is de literatuurstudie en secundaire documentatie ondernomen. Naar aanleiding hiervan zijn ten behoeve van de onderzoeksvraag enkele thema's geformuleerd die langs een meetlat worden gelegd bij de caseorganisatie, De Belastingdienst. De vragenlijst voor het semigestructureerde interview is gebaseerd op het onderzoek van *Kotusev (2022), Enterprise architecture artifacts as boundary objects: An empirical analysis*. Zijn casestudy onderzocht het gebruik van EA-artefacten bij de verschillende rollen en afdelingen in een caseorganisatie. Omdat mijn onderzoek, "organisatie overstijgend" is en de "toegevoegde waarde voor de business" belangrijke thema's zijn, is de vragenlijst aangevuld. Nadat de interviews zijn afgenomen is de data verzameling is afgerond, zal de data-analyse worden gestart. De antwoorden in combinatie met de literatuurstudie worden gebruikt om de discussie, conclusie en limitatie te formuleren.

Randvoorwaarden interview

- Bij akkoord aan deelname, zal interview worden opgenomen.
- Het interview duurt 1,5 uur.
- En zal plaatsvinden in de maanden April en Mei.

Gevolgen deelname interview

- Interview wordt getranscript.
- U blijft anoniem
- Irrelevante zaken die u kunnen schaden worden niet getranscript.
- Indien het transcript klaar is wordt de opname gelijk verwijderd.
- Indien wenselijk ontvangt u een kopie van het transcript en krijgt u de mogelijkheden deze te rectificeren
- Eventuele vervolg interview kan worden aangevraagd indien uw antwoorden om nog meer verheldering vragen.

Rechten

- Kun je bevestigen dat je deelnamen vrijwillig is?
- Ik wil je erop wijzen dat u vragen mag weigeren te beantwoorden
- Indien je wilt dat antwoorden niet mogen worden opgenomen of uit het transcript moeten dan bent u vrij om dat aan te geven.
- Je bent vrij om op elk moment te stoppen met het interview

Toegankelijkheid

- De opnames en het transcript zijn alleen toegankelijk voor mij en ten behoeve van mijn huidige onderzoek.

- Het wordt opgeslagen op mijn privé laptop dat vergrendeld is met een password
- Nadat het onderzoek is afgerond worden alle transcripten vernietigd
- Door 1 op 1 interviews en geanonimiseerd te transcripten wordt je anonimiteit en vertrouwelijkheid gewaarborgd

Thema's onderzoek

1. Enterprise Architecture

EA is "de definitie en weergave van een beeld op hoog niveau van de bedrijfsprocessen en IT-systemen van een onderneming, hun onderlinge relaties en de mate waarin deze processen en systemen door verschillende delen van de onderneming worden gedeeld" (Tamm et al., 2011, blz. 142).

2. EA Artefact

Volgens Winter & Fischer (2006) kan een EA-artefact op de verschillende architectuurlagen worden ingevuld op basis van afhankelijkheden in de EA-hiërarchie. De waarde creatie is het beschrijven en vastleggen van afhankelijkheden tussen systemen en gegevens om de waarde van EA-artefacten tussen hiërarchische lagen te borgen. Volgens Kotusev (2022) zijn EA-artefacten grensobjecten. Door communicatie tussen de verschillende rollen en verantwoordelijkheden komen met EA-artefacten dichter bij elkaar. Sommige artefacten kunnen zonder menselijk contact goed worden begrepen terwijl andere dat juist niet kunnen en bij fysiek contact meer effect hebben. Volgens Kotusev 2019 is dit de lijst van EA artefact (*zie bijlage 1*) die nuttige zijn gebleken voor de business. Desalniettemin, het praktische gebruik van EA-artefacten is grotendeels een onontgonnen gebied van de EA-discipline.

3. Toegevoegde waarde voor de business/ Value Creation

De resultaten uit de studie van Van de Wetering (2019) laten zien dat de toegevoegde waarde voor de business die voortvloeit uit EA-gebaseerde toepassingen kunnen worden bereikt via deelresultaten uit projecten, IT en business benefits. Onderzoeker Van de Berg (2019) ziet de toegevoegde waarde meer in de kwaliteit van het besluitvormingsproces voor investeringen en Sarfaraz (2012) denk dat de toegevoegde waarde wordt beïnvloed door leesbaarheid voor van EA gerelateerde documenten voor technische en niet-technische stakeholders die beslissingen moeten nemen over een IT-investering en/of die de applicatie of tool gaan gebruiken.

4. Organisatie overstijgend/ Cross-organizational

In de studie van Lapalme et al., (2015) wordt onderschreven dat ook niet-technische domeinen bijdragen aan de evolutie van EA. Daarmee laten ze zien dat de vooruitgang naar de toekomst niet alleen gebaseerd zal zijn op de inzichten die zijn opgedaan met het denken in systemen, maar ook op het nieuwe realiteitsbesef van samen ondernemen (bijvoorbeeld virtueel, grenzeloos, cultureel heterogeen en kennisbehoud). Deze realiteitszin omvat samenwerking tussen organisaties en dus over de grenzen van lokale systeemondersteuning van één organisatie heen.

5. Business Ecosysteem (enviroments and roles)

Volgens Drew & schirmer (2014) is de diversiteit van systemen in een netwerk een ecosysteem. In het onderzoek van Lansiti & Levien (2004) wordt gekeken naar de onderlinge afhankelijkheid van systemen en van verschillende bedrijven die deel uitmaken van een ecosysteem. De gezondheid van één bedrijf in dit ecosysteem kan het succes van de andere bedrijven beïnvloeden. Volgens Hedges & Furda (2019) is een hiaat waarin EA onvoldoende is verkend hoe om te gaan met Enterprise overstijgende architectuur en architectuurrollen. De reguliere Enterprise architect die buiten de lead organisatie opereert heeft vaak geen goed zicht op de complexe platformen en hun businessmodellen van andere organisaties. Daarom introduceerden zij de rol van ecosysteemarchitect als een essentiële nieuwe capaciteit, gecreëerd als uitbreiding van bestaande organisatorische rollen zoals Enterprise Architecture, Business Architecture etc.

6. Publieke organisatie

Overheidsorganisaties houden zich bij het opzetten van EA vaak tot de overheidsnormen. De belangrijkste Nederlandse normen voor architectuur zijn opgenomen in de NORA (Nederlandse Overheid Referentie Architectuur) richtlijnen. De NORA is bedoeld om richting en houvast te bieden op het gebied van EA. Het bevat kaders en principes voor de inrichting van het informatiebeheer en de digitale architectuur van Nederlandse overheidsorganisaties. De invulling van deze principes kan per organisatie verschillen.

Bijlage 1:

Table 2. Analysis of the identified EA artifacts from the perspective of their domains and states.

EA artifacts	Domains	States
Solution Designs	Usually all the four EA domains	Short-term future and often the current state as well
Roadmaps	Business and applications in some form	The full-time range between the current state and long-term future
Technology Reference Models Principles	Technology and sometimes applications Mostly business, but often can be also related to applications and information	Largely stateless Stateless
Business Capability Models Guidelines	Only business Usually relate to information, applications or technology	Mostly long-term future Stateless
Solution Overviews	Usually business, information and applications	Mid-term future and often the current state as well
Landscape Diagrams	Usually information, applications and technology and sometimes business as well	Mostly current state, but sometimes the short-term and mid-term future as well
IT Roadmaps	Technology and sometimes applications	The full-time range between the current state and mid-term future
Inventories Patterns	Usually information, applications and technology Usually relate to information, applications or technology	Current state Stateless
IT Principles	Usually relate to information, applications or technology	Stateless
Options Assessments	Usually business, information and applications	Mid-term future and sometimes the current state as well
Target States	Usually business, information and applications	Long-term future
Enterprise System Portfolios Policies	Always business and applications Usually relate to business and information	Current state Stateless
Initiative Proposals	Usually business, information and applications	Mid-term future and sometimes the current state as well
Preliminary Solution Designs	Usually all the four EA domains	Short-term future and often the current state as well
Conceptual Data Models	Only information	Stateless
Direction Statements	Usually business, information and applications	Mostly long-term future
Logical Data Models	Only information	Stateless
Analytical Reports	Usually business and technology	Mostly long-term future
Context Diagrams	Usually business, information and applications	Current state
Value Chains	Only business	Mostly long-term future

EA: enterprise architecture.

Appendix 3

Interview Protocol Architecten (CDO) (Dutch)

Achtergrond respondent (context)

- 1) Wat is uw functie in de organisatie?
- 2) Hoe lang werkt u al in de organisatie?
- 3) Kunt u uw verantwoordelijkheden kort beschrijven?

Enterprise Architectuur Functie (context)

- 1) Hoe lang is uw organisatie al bezig met EA?
- 2) Hoe past uw EA-functie in de hiërarchisch organisatiestructuur en het business ecosysteem?

Enterprise Architecture Artifacts (Main)

- 1) Wat zijn de belangrijkste soorten EA-artefacten die in uw organisatie worden gebruikt en kunt u deze kort beschrijven?
- 2) Wat is de typische omvang van EA-artefacten van elk type (aantal pagina's, diagrammen, enz.)?
- 3) Welke stakeholders werken met deze typen EA-artefacten?
- 4) Welke rol spelen deze EA-artefacten in de communicatie tussen architecten en stakeholders?
- 5) Kunt u beschrijven hoe de beslissingen van het bedrijf via deze EA-artefacten in IT-projecten worden vertaald naar de toegevoegde waarde voor business?

Organisatie overstijgend (Main)

- 1) Welke samenwerkingsverbanden met andere organisatie kent uw organisatie m.b.t. EA?
- 2) Welke eisen worden door uw organisatie opgesteld aan de andere organisatie rondom EA-artifact?

- 3) In hoeverre worden EA-artefacten door ander organisatie ontwikkeld ten behoeve van het business ecosysteem van uw organisatie?
- 4) In hoeverre is met samenwerkende organisatie in staat zijn EA-artefacten af te stemmen op de andere gebruikers in een organisatie overschrijdend business ecosysteem?

Business toegevoegde waarde (Main)

- 1) Wat vind je van de manier hoe EA is vertaald naar de business waarde?
- 2) Welke rol heeft EA in het creëren van toegevoegde waarde voor de business?
- 3) Met welke EA-artefacten krijgen wij de business value goed tot z'n recht?

Appendix 4

Interview Protocol Architecten (Dutch)

Achtergrond respondent (context)

- 4) Wat is uw functie in de organisatie?
- 5) Hoe lang werkt u al in de organisatie?
- 6) Kunt u uw verantwoordelijkheden kort beschrijven?

Achtergrond bedrijf (context)

- 1) Hoeveel mensen heeft uw organisatie in dienst?
- 2) Hoeveel IT-medewerkers heeft uw organisatie in dienst?

Enterprise Architectuur Functie (context)

- 3) Hoe lang is uw organisatie al bezig met EA?
- 4) Welke soorten architecten heeft uw organisatie in dienst?
- 5) Hoe past uw EA-functie in de hiërarchisch organisatiestructuur en het business ecosysteem?
- 6) Heeft uw organisatie een EA-methodologie of -kader om de EA-praktijk te organiseren?

Enterprise Architecture Artifacts (Main)

- 6) Wat zijn de belangrijkste soorten EA-artefacten die in uw organisatie worden gebruikt?
- 7) Kunt u deze soorten EA-artefacten kort beschrijven en waar zijn ze voor bedoelt?
- 8) Wat is de typische omvang van EA-artefacten van elk type (aantal pagina's, diagrammen, enz.)?
- 9) Welke architecten ontwikkelen welke van deze typen EA-artefacten?
- 10) Welke stakeholders werken met deze typen EA-artefacten?
- 11) Hoe gebruiken deze stakeholders EA-artefacten?
- 12) Welke informatie zoeken deze stakeholders in EA-artefacten?
- 13) Welke rol spelen deze EA-artefacten in de communicatie tussen architecten en stakeholders?
- 14) Kunt u beschrijven hoe de beslissingen van het bedrijf via deze EA-artefacten in IT-projecten worden vertaald naar de toegevoegde waarde voor business?

Organisatie overstijgend (Main)

- 5) Welke samenwerkingsverbanden met andere organisatie kent uw organisatie m.b.t. EA?
- 6) Kunt u deze soorten samenwerkingsverbanden omschrijven?
- 7) Zijn er op het gebied van EA verschillende normen en kaders tussen de samenwerkingsverbanden? Kun je deze verschillen uitleggen?
- 8) Welke eisen worden door uw organisatie opgesteld aan de andere organisatie rondom EA-artifact?
- 9) In hoeverre worden EA-artefacten door ander organisatie ontwikkeld ten behoeve van het business ecosysteem van uw organisatie?
- 10) In hoeverre is de samenwerkende in staat zijn EA-artefacten af te stemmen op de andere gebruikers in een organisatie overschrijdend business ecosysteem?

Business toegevoegde waarde (Main)

- 4) Wat vind je van de manier hoe EA is vertaald naar de business waarde?
- 5) Welke rol heeft EA in het creëren van toegevoegde waarde voor de business?
- 6) Met welke EA-artefacten krijgen wij de business value goed tot z'n recht?

- 7) In welke mate vullen EA-artefacten en het business ecosysteem elkaar aan?
- 8) In welke mate heeft de organisatie een rol om de business waarde creatie te organiseren op basis van EA-artefacten?

Aanvullende vragen

- 1) Welke tools worden in uw organisatie gebruikt om EA artefacten te ontwikkelen, op te slaan en te verspreiden (MS Office, MS Visio, ARIS, Troux, Casewise, Mega, alphabet, etc.)?)?
- 2) Welke modelleringstalen worden in uw organisatie gebruikt om EA-artefacten te creëren (ArchiMate, UML, ARIS, BPMN, IDEFO, etc.)?

Appendix 5

Het interviewprotocol voor niet architecten (Kotusev, 2022). (Dutch)

EA-artefacten zijn de middelen of documenten van communicatie om de werelden van IT en Business tot elkaar te brengen. Voor niet-architecten zijn dat o.a. de business analyses of cases, roadmaps implementatie solution, impact analyses, SLA's, architectuurplaten op functioneel niveau, functionele ontwerpen en de gebruikshandleiding van een bepaalde tooling. Het gebruik van EA-artefacten kan verschillen per persoon en de manier van overbrengen kan op meerdere manieren (Kotusev, 2022).

Achtergrond respondent (context)

- 1) Wat is uw functie in de organisatie?
- 2) Hoe lang werkt u al in de organisatie?
- 3) Kunt u kort uw verantwoordelijkheden beschrijven?
- 4) Wanneer en hoe vaak heeft u contact met architecten?

Enterprise Architectuur Artefacten (Gebruik)

- 1) Welke EA-artefacten gebruikt u persoonlijk?
- 2) Welke verantwoordelijkheden worden door deze EA-artefacten ondersteund?
- 3) Hoe helpen deze EA-artefacten u bij het vervullen van uw verantwoordelijkheden?
- 4) Hoe werkt u met deze EA-artefacten?
- 5) Hoe gebruikt u deze EA-artefacten precies en hoe vaak?
- 6) Welke van uw verantwoordelijkheden zijn het meest afhankelijk van EA-artefacten en waarom?
- 7) Hoe ondersteunen EA-artefacten uw communicatie met andere mensen?

Enterprise Architecture Artefacten (Informatie)

- 1) Welke specifieke informatie haalt u uit EA-artefacten om uw verantwoordelijkheden te vervullen?
- 2) Hoe is deze informatie nuttig voor u en waarom?
- 3) Hoe is deze informatie gepresenteerd en gestructureerd (tekst, lijsten, tabellen, modellen, diagrammen, kaarten, etc.)?
- 4) Welke EA-artefacten zijn voor u het belangrijkste en waarom?
- 5) Welke informatie uit EA-artefacten is voor u het belangrijkste en waarom?

Business toegevoegde waarde (Main)

- 1) Welke rol heeft EA in het behalen van uw strategische doelen?
- 2) Wat vind je van de manier hoe EA is vertaald naar de business waarde?
- 3) Welke rol heeft EA in het creëren van toegevoegde waarde voor de business?
- 4) Met welke EA-artefacten komt de business value goed tot z'n recht?
- 5) In welke mate vullen EA-artefacten en uw business ecosysteem elkaar aan?
- 6) In welke mate heeft de organisatie een verantwoordelijke opgesteld om de business waarde creatie te organiseren aan de hand van EA-artefacten?
- 7) In welke mate voegen EA-artefacten van buiten de organisatie waarde toe voor uw organisatie?

Overige vragen (additioneel)

- 1) Hoe verkrijgt en verkrijgt u toegang tot EA-artefacten?
- 2) In welke vorm gebruikt u EA-artefacten (papier, elektronisch, web-based, etc.)?

Appendix 6

Transcribed interviews (Dutch)

1. Solution architect
2. Enterprise architect
3. Solution architect
4. Domain architect
5. IT lead
6. Business architect
7. EA Board member