

MASTER'S THESIS

Applying Dynamic Enterprise Architecture Capabilities to Ordinary Capabilities A single case study in the information technology outsourcing vendor domain

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Award date:
2023

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Applying Dynamic Enterprise Architecture Capabilities to Ordinary Capabilities

A single case study in the information technology outsourcing vendor domain



Study: Open University, faculty Management, Science & Technology MSc Business Process Management & IT

Program: Open University of the Netherlands, Faculty of Management, Science & Technology. Master Business Process Management & IT

Course: Business Process Management & IT – IM9806

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Date: 26 February 2023

Thesis supervisor: Dr. Ir. Karel Lemmen

Examiner: Pien Walraven MSc

Version: 1.0

State: Definitive

Abstract

Information Technology Outsourcing (ITO) vendors face the challenge to successfully execute digital transformations for the ecosystems of customers they do not fully control. In order to deal with this uncertainty, Levina and Ross (2003) have identified necessary ITO vendor capabilities to mitigate this risk. These capabilities are customer relationship management, personnel and methodology development & dissemination.

This research aims to achieve insight into how the field of Enterprise Architecture (EA) can be infused within these ITO vendor capabilities to aid in this problem. This is realized by using the Dynamic Capability View (DCV) by Teece et al (1997) together with EA. This together forms Dynamic Enterprise Architecture capabilities (DEAC) as described by Van de Wetering (2020).

The research is conducted in the form of a holistic single case study. Data collection methods used are semi-structured interviews and a survey. Using the collected data, insight is given if DEAC can be infused in the mentioned ITO vendor capabilities. The study concludes amongst others that EA is a guiding factor in coordinating bottom-up innovation. Another conclusion is that EA artifacts span all DEAC but serve different purposes within each individual DEAC, additionally EA artifacts are found to be present in all ITO vendor capabilities.

Key words

Dynamic capabilities; dynamic enterprise architecture capabilities; Enterprise architecture; Information technology outsourcing

Summary

Utilizing the full potential of new technologies to drive innovation within a business context requires constant digital transformation to keep up. In recent years technologies such as RPA, cloud computing and the increasing importance of cyber security offer both threats and opportunities to organizations. In parallel the IT job market in the Netherlands has seen an increase in unfulfilled vacancies from 30.422 in 2020 to 39.246 vacancies in 2021 (IT Arbeidsmonitor, 2021). This scarcity can pose as an opportunity for Information Technology Outsourcing vendors. Other reasons for outsourcing IT includes: economic (cost reductions), technological innovation or strategic reasons (Liang et al, 2016). The challenge for an ITO vendor is being able to structurally deliver a successful digital transformation, at risk of damaging the reputation of the organization (Han et al, 2013).

To increase the chances of success of the ITO vendor, this research sets out to research if Enterprise Architecture (EA) can be applied within the ITO vendor context. Niemi and Pekkola (2020) have summarized a meta-review of fifty research papers regarding the benefits of EA in organizational transformations. To couple these benefits of EA to the ITO vendor context, research by Levina and Ross (2003) regarding the identification of required capabilities for ITO vendors is used. This leads to the following research question:

“Can Enterprise Architecture be infused into capabilities required for an Information Technology Outsourcing vendor?”

Empirical research is conducted in the form a single case study. Through a literature review an EA construct is created capable of answering the research question. This is achieved through concepts related to EA such as Enterprise Architecture Management (EAM) and Dynamic Enterprise Architecture Capabilities (DEAC). The DEAC extends the Dynamic Capability View (DCV) by Teece et al (1997) to EA. The DEAC consist of the sensing-, mobilizing- and transformation capability. These DEAC are infused into the ordinary capabilities identified by Levina and Ross (2003): Customer relationship management, personnel and methodology development & dissemination. This is processed further to:

- Form semi-structured interview questions. This aims to gain insight if the DEAC are applied to the ITO vendor capabilities within the case organization.
- To validate the construct. A survey is sent out regarding the subjective performance of the same ITO vendor capabilities by the case organization. This is to test for correlation between the outcome of the interviews and survey.
- Identify used EA artifacts. EA artifacts that are mentioned during the interviews are validated based on their function and existence.

Conclusions and findings from this study are amongst others:

- A positive correlation was found between the survey results and interview results: The subjective performance of the ITO vendor capabilities by the stakeholders and the degree to which the DEAC are applied to the same capabilities.

- A combination of EA artifacts are used in conjunction with each other to offer different levels of detail for different purposes and stakeholders. This concurs with the findings of Kotusev (2017) regarding the relationship between EA artifacts.
- The ITO vendor capabilities do not operate in silos but influence each other. This is in line with findings from Levina and Ross (2003). The same holds up for the DEAC as suggested by Van de Wetering (2020).
- Both a top-down and bottom-up approach is found in the relatedness of the DEAC in relation to the degree of centralization-decentralization inside the case organization. EA is found to be a guiding factor for both approaches.

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Glossary

Keyword	Definition
Enterprise Architecture (EA)	Lapkin et al. (2008): EA is the process of translating business vision and strategy into effective enterprise change by creating, communicating and improving the key principles and models that describe an enterprise's future state and enable its evolution
Information Technology Outsourcing (ITO) vendor	A company that provides IT services to other organizations. Examples include: Software development, network and infrastructure, data analysis and management.
Dynamic Enterprise Architecture Capabilities (DEAC)	Van de Wetering (2020): "A dynamic capability that helps organizations identify and implement new business and IT initiatives to ensure that the organizations' assets and resources are current with the needs of the business."
Sensing capability	An EA sensing capability highlights the role of EA in firms' deliberate posture toward sensing and identifying new business opportunities or potential threats and developing a greater reactive and proactive strength in the business domain (Shanks et al., 2018; Toppenberg et al., 2015, as cited in Van de Wetering, 2020)
Mobilizing capability	An EA mobilizing capability refers to organizations' capability to use EA in the process of evaluating, prioritizing, and selecting potential solutions and mobilize firm resources in line with a potential solution (Overby et al., 2006; Sambamurthy et al., 2003; Shanks et al., 2018, as cited in Van de Wetering, 2020).
Transformation capability	An EA transforming capability can be considered the ability to use the EA to successfully reconfigure business processes and the technology landscape, to engage in resource recombination and to adjust for and respond to unexpected changes (Drnevich & Kriauciunas, 2011; Mikalef, Pateli & Van de Wetering, 2016; Pavlou & El Sawy, 2006; Shanks et al., 2018, as cited in Van de Wetering, 2020)
EA artifact	A tangible asset describing (a part of) the EA of an organization.
Customer Relationship Management (CRM) capability	The ability to retain customers, drive sales growth and maintain a general positive relationship with the customer organization.
Methodology Development & Dissemination (MD&D) capability	The ability to consistently (re)produce results by defining methodologies, improving these and ensuring compliance.
Personnel capability	The ability to satisfy the needs of employees as well as being able to attract, keep and develop employees skills needed to execute the organizations' methodologies to the desired standard.

1: Introduction

The IT job market in The Netherlands has seen an increase from 30.422 placed vacancies in 2020 to 39.246 vacancies in 2021 (IT Arbeidsmonitor, 2021). The difficulty for organizations to attract qualified IT personnel offers an opportunity for Information Technology Outsourcing (ITO). Access to relatively new trends such RPA, cloud computing and the increasing importance of cyber security are in reach with ITO. This is in line with the findings of Liang et al (2016) who show different motivations for companies to outsource their IT, naming amongst others: economic (cost reductions), technological and strategic reasons.

Han et al (2013) identified IT capabilities at both the vendor and client side of ITO, examples including client management and vendor management respectively. This requires capabilities in managing organizations outside the scope of the own organization. In this research the possibilities regarding the improvement of such capabilities are investigated through the field of Enterprise Architecture (EA). Steen et al (2005) describes EA as a coherent whole of principles, methods and models that are used in the design and realization of the enterprises organizational structure, business processes, information systems and infrastructure.

1.1: Exploration of the Subject

ITO is a research domain that has been studied extensively. Liang et al (2016) have conducted a main path analysis encompassing a total of 798 research papers conducted in this domain from 1992 to 2013. A subset of themes from this main path analysis, relevant to this research paper, are: ITO motivations, ITO risks, client-vendor relationship, vendor's perspective and psychological & formal contracts.

Concurrently there is the research field of Enterprise Architecture (EA). Rahimi et al (2017) have assembled definitions for EA used in research papers and have distinguished the following four categories:

- The inherent enterprise structure.
- A blueprint of an enterprise in its various facets
- A set of principles prescribing enterprise architecture design.
- The methodology or process guiding the design of enterprise architecture.

Niemi and Pekkola (2020) make the case that the benefits of EA(M) are difficult to dissect since there are few empirical studies that show a relationship between EA activities and resulting benefits. A similar case has been made by Kotusev (2019) who argues that EA artifacts have been a product of commercial organizations instead of a result of empirical research.

1.2: Problem Statement

With new technology trends arising comes the challenge to transform organizations in a manner to exploit these new technologies. Nwankpa and Roumani (2016) state that while technological disruptions have led to new opportunities, organizations often have trouble with realizing digital transformation within their organization. This is strengthened by a study by Mulder & Mulder (2013) who state that 64% of failed IT projects were said to be caused by problems in the organization and communication. Liang et al (2016) have made the argument that this technological innovation is a reason for organizations to seek help in the form of ITO. This shifts the capability needed to successfully digitally transform the organization to the ITO vendor. At the same time the ITO vendor requires the capability to successfully provide digital transformations to be applicable to different organizations. Not being able to do so comes at the risk of damaging the ITO vendor's reputation (Han et al, 2013).

1.3: Research Objective and Questions

This research sets out to identify if EA can help ITO vendors address the problem described within the problem statement: Can EA be used to contribute to the capabilities needed for ITO vendors. This leads to the following research question:

“Can Enterprise Architecture be infused into capabilities required for an Information Technology Outsourcing vendor?”

This is achieved by gaining insight in the following subjects:

Theoretical research questions:

- What is Enterprise Architecture and what organizational benefits can it provide?
- How can Enterprise Architecture be deployed to provide the identified organizational benefits?
- Which capabilities are important for an Information Technology Outsourcing vendor to possess to achieve a competitive advantage?
- What theoretical frameworks and perspectives exist regarding the development and improvement of capabilities? How do these relate to Enterprise Architecture?
- What methods are suitable for identifying stakeholders inside a research domain?

Empirical research questions:

- Does the case organization deploy EA relative to the ITO vendor capabilities?
- Which stakeholders inside the case organization are relevant in order to answer the research question?
- Which conclusions can be made from applying EA to the ITO vendor domain?
- How do the results of the research relate to existing literature?

1.4: Motivation and Relevance

The main path analysis of the ITO research domain has continually seen a shift in topics. Once a topic has become saturated with consensus, it often functions as an antecedent for the following topic (Liang et al, 2016). While ITO research can be regarded as complete concerning certain topics, EA research is still undecided. Kotusev (2019) and Niemi and Pekkola (2020) observe that EA requires more empirical research regarding the relationship between organizational benefits and EA practices.

Du et al (2020) have classified the current research on vendor capabilities in three different perspectives: component perspective, implication perspective and the development perspective. These perspectives try to answer respectively what the vendor capabilities are, how they drive performance and how to develop these capabilities. Ethiray et al. (2005) and Jarvenpaa and Mao (2008) classify the improvement of capabilities by either deliberate investment or learning by doing. ITO research has identified capabilities for ITO vendors to succeed in fulfilling a client's needs in topics such as: ITO motivations, ITO risks, client-vendor relationship, vendor's perspective and psychological & formal contracts. This offers an opportunity for EA research to link EA practices to the improvement of these capabilities. This is in line with the EA definition by Lapkin et al (2008): *"EA is the process of translating business vision and strategy into effective enterprise change by creating, communicating, and improving the key principles and models that describe an enterprise's future state and enable its evolution"*.

1.5: Approach

The approach to the research is composed out of two stages: the literature review and the empirical study. In the literature review, the basis is formed regarding the formulated theoretical research questions. This composes literature regarding EA, ITO vendors and theory regarding the development and improvement of capabilities. Using the literature collected, sub-research questions will be formulated that are capable of answering the main research question. These are operationalized into interview questions. The construct will be validated by an expert in the field EA. The interviews will be conducted, analyzed and potential conclusions will be made. A high level overview of this approach is shown in figure 1.

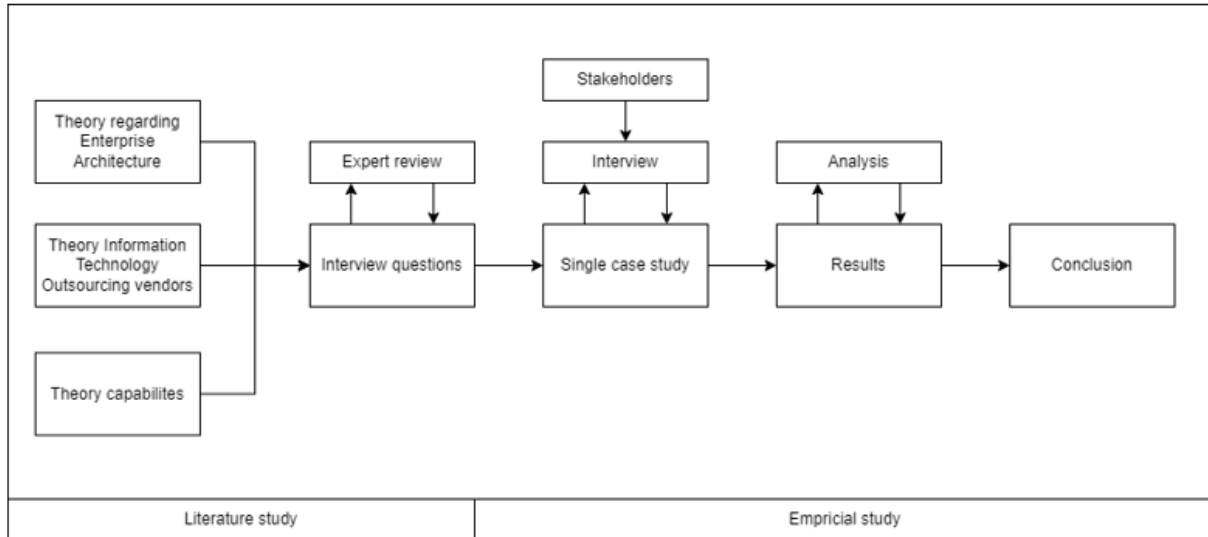


Figure 1: Approach research design

2: Theoretical Framework Literature Review

For the literature review the framework of Saunders et al (2019) is adopted. This is done to achieve the goal of identifying, evaluating and interpreting available research needed to answer the research question: *“Can Enterprise Architecture be infused into capabilities required for an Information Technology Outsourcing vendor?”*. The literature review attempts to achieve what current literature exists regarding the subjects, what theoretical frameworks are common within the domain and where gaps exist in the current literature.

The main research question is divided into the following theoretical research questions:

- What is Enterprise Architecture and what organizational benefits can it provide?
- How can Enterprise Architecture be deployed to provide the identified organizational benefits?
- Which capabilities are important for an Information Technology Outsourcing vendor to possess to achieve a competitive advantage?
- What theoretical frameworks and perspectives exist regarding the development and improvement of capabilities? How do these relate to Enterprise Architecture?
- What methods are suitable for identifying stakeholders inside a research domain?

2.1: Search Terminology

In the search terminology the theoretical research questions are deconstructed into key words. These key words form the basis for the further to be formulated research strategy.

Theoretical research question:	Identified key words:	Identified verbs:
What is Enterprise Architecture and what organizational benefits can they provide?	<ul style="list-style-type: none"> - Enterprise Architecture - Organizational benefits 	<ul style="list-style-type: none"> - To provide
How can Enterprise Architecture be deployed to provide the identified organizational benefits?	<ul style="list-style-type: none"> - Enterprise Architecture - Organizational benefits 	<ul style="list-style-type: none"> - To deploy - To provide
Which capabilities are important for an Information Technology Outsourcing vendor to possess to achieve a competitive advantage?	<ul style="list-style-type: none"> - Capabilities - Information Technology Outsourcing vendor (ITO) - Competitive advantage 	<ul style="list-style-type: none"> - Are important for (ranking) - To possess - To achieve
What theoretical frameworks and perspectives exist regarding the development and improvement of capabilities?	<ul style="list-style-type: none"> - Theoretical frameworks - Perspectives - Capabilities 	<ul style="list-style-type: none"> - To exist - To develop - To Improve
What methods are suitable for identifying stakeholders inside a research domain?	<ul style="list-style-type: none"> - Methods - Stakeholders - Research domain 	<ul style="list-style-type: none"> - To identify

Figure 2: Deconstructed research questions in to key words.

2.2: Search Strategy

For the formulation of the search strategy the concept of a funnel is used to continuously funnel down relevant results. The goal is that the results that remain at the end of the funnel are most suitable to answer the theoretical research question. The first output is therefore a longlist of articles that are processed further according to the literature review strategy. The following criteria and rationale for the funnel are used:

1. Search Engine	The search engine used for the identification of literature is Google Scholar and the digital library of the Open Universiteit of the Netherlands. Google Scholar is known for the regular Google search engine which can be considered market leader in the domain. Additionally Google is built on the concept of ranking based on number of- and popularity of citations by other papers (Brin, S; Page, L. 1998). Google Scholar also ensures a selection of research papers to ensure peer-reviewed work.
2. Search Engine	The main language considered for the identification of literature is English. Dutch literature can be considered if justified.
3. Search terms	For reproducibility the search terms are that the investigation starts with are mentioned above. If changes are justifiable by for example the identification of domain specific language during the search, this is documented.
4. Year of publication	Beforehand no requirements are set on a minimum year of publication. There is a preference for the most recent literature regarding subject yet exceptions can be made if justified.
5. Number of publications	A preference is made for research papers with a higher number of citations to ensure a higher degree of consensus on a subject.
6. Number of publications relative to years since published	To adjust for the fact that scientific papers that have been published for longer have had the opportunity to be referenced more the number of publications is divided by the number of years since published. This aims to make it easier to compare scientific papers.
7. Summary	The end results are analyzed based on the above criteria to select the most suitable results. The goal is to justify the search results so that the process can be reproduced to yield the same results.

Figure 3: Search strategy for the literature review

The output of the search strategy is a longlist per theoretical research question. For each article in the longlist: the abstract, introduction and conclusion is read to determine its' relevance to the theoretical research question. Articles that were found to be relevant were added to the shortlist. Each article in the shortlist was read fully. Additionally, articles in the shortlist are snowballed during the full read to find other possible relevant articles. For each article in the shortlist, the method how it was selected is added in the 'Method' column found in the next chapter.

2.3: Search Results

2.3.1: What is Enterprise Architecture and what organizational benefits can they provide?

For this domain the search query for the theoretical research questions one and two are the same. The first attempts to answer 'the what' and the second 'the how'. To adjust for this the list is extended to create a larger sample size to ten instead of five.

Search query: "Enterprise Architecture" AND "organizational benefits". – 470 results.

Title:	Language:	Year of publication:	No. of citations	No. of citation divided by years since publication (2022).
An empirical analysis of the factors and measures of Enterprise Architecture Management success	English	2016	136	23
A theory building study of enterprise architecture practices and benefits	English	2016	108	18
Enterprise architecture: Charting the territory for academic research	English	2008	92	7
The contribution of enterprise architecture to the achievement of organizational goals: Establishing the enterprise architecture benefits framework	English	2010	41	3
Institutionalization and the effectiveness of enterprise architecture management	English	2013	107	12
Dynamic enterprise architecture capabilities and organizational benefits: an empirical mediation study	English	2021	14	14
Understanding the benefits and success factors of enterprise architecture	English	2017	36	7
The effect of enterprise architecture deployment practices on organizational benefits: a dynamic capability perspective	English	2020	8	4
The role of enterprise architecture for digital transformations	English	2021	10	10
Artifacts, activities, benefits and blockers: Exploring enterprise architecture practice in depth	English	2020	13	7

Figure 4: Results query: "Enterprise Architecture" AND "organizational benefits".

Title:	Language:	Year of publication:	Method:
Lange, M., Mendling, J., & Recker, J. (2016). An empirical analysis of the factors and measures of Enterprise Architecture Management success. <i>European Journal of Information Systems</i> , 25(5), 411-431.	English	2016	From longlist
Van de Wetering, R. (2021). Dynamic enterprise architecture capabilities and organizational benefits: an empirical mediation study. <i>arXiv preprint arXiv:2105.10036</i> .	English	2021	From longlist
Aier, S., Gleichauf, B., & Winter, R. (2011). Understanding enterprise architecture management design—an empirical analysis.	English	2011	Snowball
Niemi, E., & Pekkola, S. (2020). The benefits of enterprise architecture in organizational transformation. <i>Business & information systems engineering</i> , 62(6), 585-597.	English	2020	Snowball
Shanks, G., Gloet, M., Someh, I. A., Frampton, K., & Tamm, T. (2018). Achieving benefits with enterprise architecture. <i>The Journal of Strategic Information Systems</i> , 27(2), 139-156.	English	2018	Snowball
Kotusev, S. (2019). Enterprise architecture and enterprise architecture artifacts: Questioning the old concept in light of new findings. <i>Journal of Information technology</i> , 34(2), 102-128.	English	2019	Book from EA course
Niemann, K. D. (2006). From enterprise architecture to IT governance (Vol. 1). Heidelberg: Springer Fachmedien.	English	2006	Chapter 1
Tamm, T., Seddon, P. B., Shanks, G., & Reynolds, P. (2011). How does enterprise architecture add value to organisations?. <i>Communications of the association for information systems</i> , 28(1), 10.	English	2011	Chapter 1 and book from EA course

Figure 5: Articles in shortlist

2.3.2: Which capabilities are important for an Information Technology Outsourcing vendor to possess to achieve a competitive advantage?

Search query: “Information Technology Outsourcing” AND “Capabilities”. - 6050 results.

Title:	Language:	Year of publication:	No. of citations	No. of citation divided by years since publication (2022).
From the vendor's perspective: Exploring the value proposition in information technology outsourcing	English	2003	1026	54
Information technology outsourcing chain: Literature review and implications for development of distributed coordination	English	2019	27	9
A review of the IT outsourcing literature: Insights for practice	English	2009	918	71
IT outsourcing success: A dynamic capability-based model	English	2020	22	11
Exploring relationships in information technology outsourcing: the interaction approach	English	2002	551	28

Figure 6: Results query: “Information Technology Outsourcing” AND “Capabilities”.

Title:	Language:	Year of publication:	Method:
Levina, N., & Ross, J. W. (2003). From the vendor's perspective: Exploring the value proposition in information technology outsourcing. <i>MIS quarterly</i> , 331-364.	English	2003	From longlist
Liang, H., Wang, J. J., Xue, Y., & Cui, X. (2016). IT outsourcing research from 1992 to 2013: A literature review based on main path analysis. <i>Information & Management</i> , 53(2), 227-251.	English	2016	From chapter one
Du, W., Pan, S. L., & Wu, J. (2020). How do IT outsourcing vendors develop capabilities? An organizational ambidexterity perspective on a multi-case study. <i>Journal of Information Technology</i> , 35(1), 49-65.	English	2020	From chapter one
Han, H. S., Lee, J. N., Chun, J. U., & Seo, Y. W. (2013). Complementarity between client and vendor IT capabilities: An empirical investigation in IT outsourcing projects. <i>Decision Support Systems</i> , 55(3), 777-791.	English	2013	From chapter one

Figure 7: Articles in shortlist

2.3.3: What theoretical frameworks and perspectives exist regarding the development and improvement of capabilities?

Search query:

- "Framework" AND "Capabilities" – 3.400.000 results
- "Framework" AND "Capabilities" AND "Information technology" – 927.000 results.

Title:	Language:	Year of publication:	No. of citations	No. of citation divided by years since publication (2022).
Capabilities for managing service innovation: towards a conceptual framework	English	2010	1009	84
Information technology as a facilitator for enhancing dynamic capabilities through knowledge management	English	2004	891	50
Dynamic capabilities and operational capabilities: A knowledge management perspective	English	2007	996	66
Dynamic capabilities for firm performance under the information technology governance framework	English	2020	33	17
IT capabilities, process-oriented dynamic capabilities, and firm financial performance	English	2011	553	50

Figure 8: Results query: "Framework" AND "Capabilities" (AND "Information technology")

Title:	Language:	Year of publication:	Reason:
Den Hertog, P., Van der Aa, W., & De Jong, M. W. (2010). Capabilities for managing service innovation: towards a conceptual framework. <i>Journal of service Management</i> .	English	2010	From longlist
Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. <i>Strategic management journal</i> , 18(7), 509-533.	English	1997	Snowball
Barney, J. (1991). Firm resources and sustained competitive advantage. <i>Journal of management</i> , 17(1), 99-120.	English	1991	Snowball

Figure 9: Articles in shortlist

2.3.4: What methods are suitable for identifying stakeholders inside a research domain?

Search query:

- “Stakeholders” AND (“selection” OR “selecting”) – 2.350.000 results.
- “Stakeholder” AND “analysis” AND “techniques” – 1.010.000 results.
- “Stakeholder” AND (“identification” OR “identifying”) AND “Methods” – 1.420.000 results.

Title:	Language:	Year of publication:	No. of citations:	No. of citations divided by years since publication (2022):
Razali, R., & Anwar, F. (2011). Selecting the right stakeholders for requirements elicitation: a systematic approach. <i>Journal of Theoretical and Applied Information Technology</i> , 33(2), 250-257.	English	2011	67	6
Bryson, J. M. (2004). What to do when stakeholders matter: stakeholder identification and analysis techniques. <i>Public management review</i> , 6(1), 21-53.	English	2004	2461	137
Pacheco, C., & Garcia, I. (2012). A systematic literature review of stakeholder identification methods in requirements elicitation. <i>Journal of Systems and Software</i> , 85(9), 2171-2181.	English	2012	174	17
Reed, M. S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., ... & Stringer, L. C. (2009). Who's in and why? A typology of stakeholder analysis methods for natural resource management. <i>Journal of environmental management</i> , 90(5), 1933-1949.	English	2009	2846	219
Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. <i>Academy of management review</i> , 22(4), 853-886.	English	1994	18919	676

Figure 10: Articles in longlist from queries

Title:	Language:	Year of publication:	Reason:
Razali, R., & Anwar, F. (2011). Selecting the right stakeholders for requirements elicitation: a systematic approach. <i>Journal of Theoretical and Applied Information Technology</i> , 33(2), 250-257.	English	2011	From longlist
Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. <i>Academy of management review</i> , 22(4), 853-886.	English	1997	From longlist
Saunders, M., Lewis, P., & Thornhill, A. (2009). <i>Research methods for business students</i> . Pearson education.	English	2009	Suggestion from thesis supervisor
Abbott, C., Bandara, W., Mathiesen, P., French, E., & Tate, M. (2020). A Typological Framework of Process Improvement Project Stakeholders. In <i>Business Process Management: 18th International Conference, BPM 2020, Seville, Spain, September 13–18, 2020, Proceedings 18</i> (pp. 384-399). Springer International Publishing.	English	2020	From study program related course

Figure 11: Articles in shortlist

2.4: Results

2.4.1: What is Enterprise Architecture and what organizational benefits can they provide?

Niemann (2006) describes EA as a structured collection of plans for the integrated representation of the business- and information technology landscape of the organization. Nevertheless there is not a consensus on one definition of EA. Rahimi et al (2017) have assembled the different definitions used for EA used in research papers and have distinguished the following four categories:

- The inherent enterprise structure.
- A blueprint of an enterprise in its various facets
- A set of principles prescribing enterprise architecture design.
- The methodology or process guiding the design of enterprise architecture.

Niemi and Pekkola (2020) present a summary of a meta-review study of fifty research papers conducted by Tamm et al (2011). Figure 12 shows the proclaimed benefits that are possible from adopting EA practices.

Table 1 Enterprise architecture benefits synthesized from the literature

From: [The Benefits of Enterprise Architecture in Organizational Transformation](#)

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

Figure 12: Proclaimed benefits of EA practices.

2.4.2: How can Enterprise Architecture be deployed to provide the identified organizational benefits?

In the extension of EA there is also Enterprise Architecture Management (EAM). Aier et al (2011) describe this as the management activities needed to install, maintain and develop the EA of an organization. EAM can therefore be seen as a method for reaping the proclaimed benefits seen in figure 10. Nevertheless, Niemi and Pekkola (2020) also make the case that the benefits of EA are difficult to dissect since there are few empirical studies that show a relationship between EA activities and resulting benefits. A similar case has been made by Kotusev (2019) who argues that EA artifacts have been a product of commercial organizations instead of a result of empirical research. So although numerous studies have claimed that EA delivers benefits the challenge lies in identifying how these benefits are achieved.

Van de Wetering et al (2020) classify EA resources as EA deployment practices that enable organizations to benefit from the use of EA. This is elaborated by defining EA deployment practices as the creation of EA artifacts and embedding these in routines. EA artifacts therefore form a tangible manner of measuring ‘the use of EA’. This is nevertheless not sufficient, the EA artifacts have to be embedded in routines to provide organizational benefits.

Shanks et al (2018) and Lange et al (2016) argue for the need of an EA service capability. The EA service capability intends to enable other organizational processes in creating organizational benefits. This is achieved by providing EA content, EA standards, EA stakeholder participation and the quality of EA professionals.

2.4.3: Which capabilities are important for an Information Technology Outsourcing vendor to possess to achieve a competitive advantage?

IT outsourcing (ITO) is a research domain that has been studied extensively. Liang et al (2016) have conducted a main path analysis encompassing a total of 798 research papers conducted in this domain from 1992 to 2013. A subset of themes from this main path analysis, relevant to this research paper, are: ITO motivations, ITO risks, client-vendor relationship, vendor's perspective and psychological & formal contracts.

Du et al (2020) have classified the current research on vendor capabilities in three different perspectives: component perspective, implication perspective and the development perspective. These perspectives try to answer respectively what the vendor capabilities are, how they drive performance and how to develop these capabilities.

Three IT capabilities a client can possess identified by Han et al (2013) and classified as necessary for outsourcing success are: technology management, organizational relationship and vendor management. The IT capabilities identified by Levina and Ross (2003) at the side of the vendor that are necessary for success are the: customer relationship management capability, methodology development & dissemination capability and personnel capability.

2.4.4: What theoretical frameworks and perspectives exist regarding the development and improvement of capabilities?

Current research shows two dominant theories regarding capabilities: the Resource Based View (RBV) proposed by Barney (1991) and the Dynamic Capability View (DCV) from Teece et al (1997).

RBV:

The RBV advocates that organizations that use resources that are: valuable, rare, inimitable and non-substitutable (VRIN) are more likely to achieve a competitive advantage. Amit and Schoemaker (1993) note that although many resources do not fit the VRIN classification, the differentiation with other organizations is made through the capability of how these resources are configured, this is expressed as a capability. Capabilities capable of achieving a competitive advantage can be formed by embedding such resources into processes (Peng et al, 2008 as cited by Irfan et al , 2019).

DCV:

The Dynamic Capability View is seen as an extension of the RBV. Teece et al (1997) found the RBV to be static in its' approach, and therefore found the need for a view that has the capacity to respond by renewing and reconfiguring resources to meet the requirements in a changing environment. This is especially relevant in domains that are susceptible to rapid change by for example innovation.

Van de Wetering et al. (2020) form a relationship between the DCV and Enterprise Architecture (EA) by introducing Dynamic Enterprise Architecture Capabilities (DEAC), described as: “A firm’s ability to leverage its’ EA for asset sharing and to recompose and renew organizational resources, together with guidance to proactively address the rapidly changing internal and external business environment and achieve the organization’s desirable state.”. These DEAC are divided further into three categories: EA sensing-, EA mobilizing- and EA transformation capability (Van de Wetering et al, 2020).

2.4.5: What methods are suitable for identifying stakeholders inside a research domain?

Razali and Anwar (2011) have developed a framework for selecting appropriate stakeholders inside the requirement elicitation domain. The framework is constructed in three stages. Stage one is concerned with identification. The framework couples the types of stakeholders: primary, secondary, external and extended to the necessity of their participation as a stakeholder. These are categorized as mandatory, optional or nice-to-have. The second stage is concerned with filtering, where the classification of the necessity of the previous stage has to be taken into account. Stage three is the prioritization of the stakeholders. In stages two and three a certain degree of subjectiveness cannot be avoided. Therefore in the classification and prioritization, reasoning and choices must be elaborated upon. Saunders et al (2019) suggest random- or purposive sampling as possible methods for sampling a selection of stakeholders.

Abbott et al (2020) state that stakeholders can be classified based on two different dimensions. Stakeholders can either be internal or external relative to the organization. Another dimension is the role of the stakeholder, which can be differentiated between: catalyst, facilitator or impacted.

Mitchell et al (1997) make a differentiation based on three dimensions: Power, Legitimacy and Urgency. These can be interpreted respectively as the amount of influence the stakeholder has to enforce changes, the legitimacy the stakeholder has regarding the to be researched domain and those who are impacted by the action in the to be researched domain. Based on these three dimensions, potential stakeholders are classified using a score to determine of how much importance they are. These scores can be seen in figure 13.

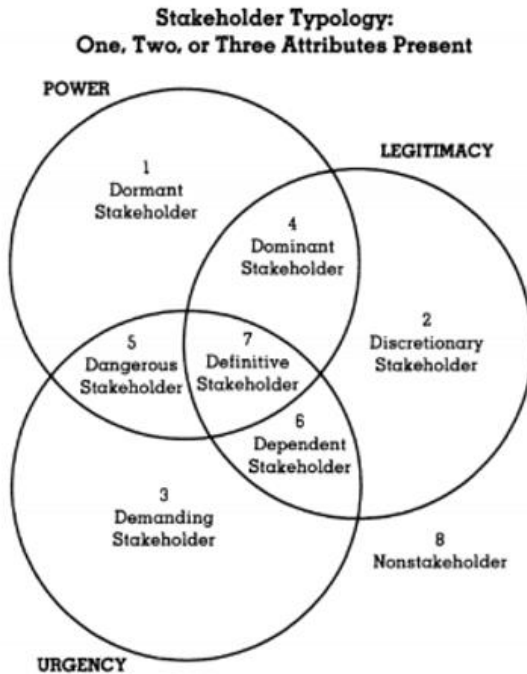


Figure 13: Stakeholder classification based on Power, Legitimacy and Urgency.

2.5: Conclusion Literature Research

The purpose of the literature study is to identify, evaluate and interpret existing relevant literature in order to answer the research question: *“Can Enterprise Architecture be infused into capabilities required for an Information Technology Outsourcing vendor?”*. In order to do so, the research question was decomposed in several theoretical research questions. These theoretical research questions address the different research domains relevant to the main research question.

The first theoretical research question aimed at explaining what Enterprise Architecture is and what benefits can be achieved by implementing EA. The answer to this theoretical research questions shows that there is not one agreed upon definition of EA. Definitions vary from describing the inherent structure of the organization, in the form of EA artifacts, to prescribing how EA can be developed (Rahimi et al. 2017).

A point of critique regarding EA is that although literature agrees that it provides organizational benefits, it is hard to pinpoint from which EA practices these are realized (Niemi and Pekkola, 2020). Additionally sources were often found to be based on non empirical research (Kotusev, 2019). The organizational benefits identified by the previous theoretical research question can be realized through the practice of EAM. Various methods are proposed, such as the division in EAM products, EAM infrastructure and EAM services (Lange et al, 2016) or EA deployment practices (Van de Wetering, 2020). Kotusev (2018) states that EA artifacts are the product of practicing EA.

The first two theoretical research questions were chosen to answer the ‘what’ and the ‘how’ regarding EA(M). The third was designed for the identification of which capabilities are relevant for an Information

Technology Outsourcing vendor. This is the research domain where EA(M) is to be applied. Liang et al (2016) have found that the ITO research domain is relatively saturated due to consensus regarding the literature. The most cited article identified the required capabilities for ITO vendors to be the: personnel capability, methodology development and dissemination capability and the customer relationship management capability (Levina and Ross, 2003).

To understand the domain of the development and/or improvement of capabilities, the fourth theoretical research question was chosen to address this. The dominant theories regarding capabilities are: the Resource Based View by Barney (1991) and the Dynamic Capability View by Teece et al (1997). The RBV is based on the classification of resources as either value, rare, inimitable or non substitutable (VRIN). How these resources are configured into processes lead to the formation of capabilities (Amit and Schoemaker, 1993). As a critique on the RBV, which was found to be too static in changing environments, the DCV was proposed as an extension on the RBV. The key difference lies in reconfiguring resources to meet continuously changing demands of the business environment. Van de Wetering (2020) proposed another extension related to the DCV in the form of Dynamic Enterprise Architecture Capabilities (DEAC). This extension links the EA research domain to capability theory research domain.

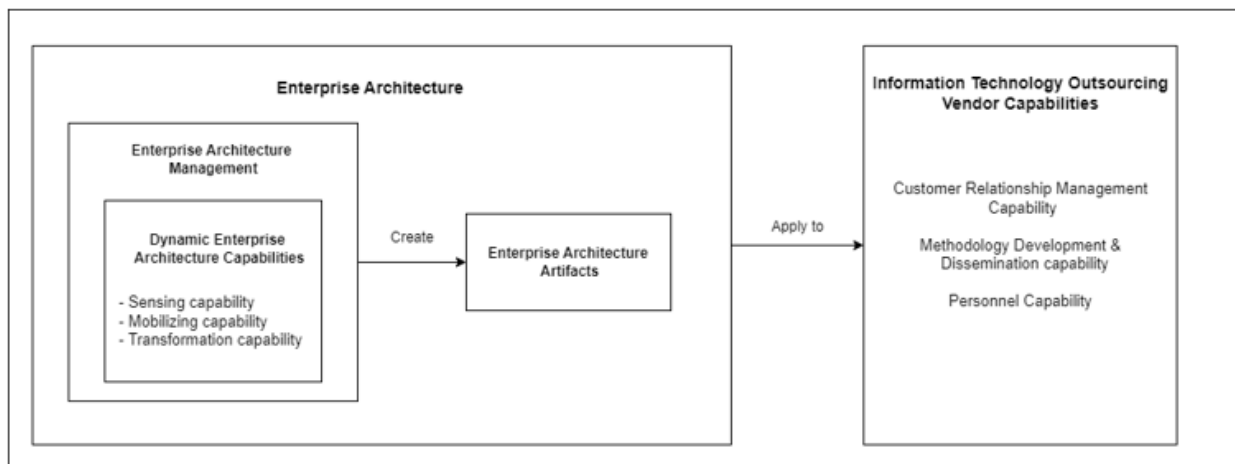


Figure 14: Research model

Figure 14 displays the conceptual model resulting from the SLR in order to answer the main research question. The 'Enterprise Architecture' square displays how different concepts relate to each other. Following the definition of Ahleman et al. (2012) for EAM: "Management practices that establish, maintain and uses a coherent set of guidelines, architecture principles and governance regimes that provide direction and practical help in the design and development of an enterprise's architecture to achieve its' vision and strategy". The quality of how EAM is practiced is expressed as a capability. Furthermore the DCV states that the the DCV capabilities are applied to ordinary capabilities. Therefore the DEAC is chosen as a suitable granularity to gain insight into the use of EA. The DEAC are split up in the sensing-, mobilizing- and transformation capability. Additionally EA artifacts are the product of practicing EA(M), displayed by the arrow in the form of a cause-effect relationship. The second cause-effect relationship exists between EA and ITO Vendor Capabilities identified by Levina and Ross (2003). Using the DEAC as the granularity for EA relative to the ITO vendor capabilities leads to the formulation of the following sub-research questions:

1. Does the DEAC sensing capability apply to the ITO - CRM capability?
2. Does the DEAC mobilizing capability apply to the ITO - CRM capability?
3. Does the DEAC transformation capability apply to the ITO - CRM capability?
4. Does the DEAC sensing capability apply to the ITO - MD&D capability?
5. Does the DEAC mobilizing capability apply to the ITO - MD&D capability?
6. Does the DEAC transformation capability apply to the ITO - MD&D capability?
7. Does the DEAC sensing capability apply to the ITO personnel capability?
8. Does the DEAC mobilizing capability apply to the ITO personnel capability?
9. Does the DEAC transformation capability apply to the ITO personnel capability?

3: Methodology

3.1: Research Strategy:

The research is designed in two stages. The first stage is in the form of a Systematic Literature Review (SLR). The SLR aims at identifying, evaluating and interpreting available research to create an accurate construct regarding Enterprise Architecture (EA). This is created in the form of figure 14 with resulting sub-research questions. This chapter is concerned with the methodology how these questions enable the answering of the empirical research questions formulated in chapter one.

Saunders et al (2019) distinguish two categories within research designs: quantitative and qualitative. Within these categories several different research strategies exist. Figure 15 shows the research strategy, whether the strategy is quantitative or qualitative and whether the approach is inductive or deductive.

Research Strategy	Quantitative / Qualitative	Approach
Experiment	Quantitative	Inductive
Survey	Quantitative	Deductive
Document research	Qualitative	Inductive/Deductive
Case study	Qualitative	Inductive/Deductive
Ethnography	Qualitative	Inductive
Action research	Qualitative	Inductive
Grounded theory	Qualitative	Inductive
Narrative inquiry	Qualitative	Inductive

Figure 15: Research strategies from Saunders et al. (2019)

The research strategy is chosen based on which strategy is most suitable in order to answer the empirical research questions. As noted by Kotusev (2019) and Niemi and Pekkola (2020), the research domain of Enterprise Architecture (EA) requires more empirical research regarding the relationship between EA and organizational benefits. The research by Van de Wetering (2020) has addressed this by using a quantitative approach by using a survey as the main data collection method. To complement this

research, a qualitative approach is chosen. Yin (2018) describes a case study as an in depth insight into a topic or phenomenon within its real life setting. Therefore a case study is chosen in order to gain in depth insights in to the relationship between EA and ITO vendor capabilities. Due to the time constraints for the execution of the research, a single case organization is selected. Saunders et al (2019) differentiate between a holistic and embedded case study approach. Holistic entails that the organization is treated as a whole while embedded differentiates between different units of analysis such as departments within the organization. Since Rahimi et al (2017) describe EA as a blueprint of an enterprise in its' various facets, the case organization is treated as a holistic case study.

Data collection will be primarily performed by conducting semi-structured interviews. Semi-structured interviews offer more freedom to gain a deeper insight in the case organization compared to structured interviews. Semi-structured interviews will be conducted based on the research design from chapter two. The sub research questions are formulated so that the answers can be used to deductively answer the empirical research question. Therefore the research uses as deductive approach. Furthermore, EA artifacts as the product of practicing EA(M), offer an opportunity to validate whether EA is applied and are therefore collected. Additionally a survey is sent to ensure face validity. This offers multiple data sources for triangulation purposes.

3.2: Technical Design:

By means of a Systematic Literature Review (SLR) the goal is set out to define a construct to be able to define EA practices and how these can be used into ITO capabilities. The SLR was designed to gain insight in multiple facets needed to answer the main research question. Using a SLR, existing literature is used as a basis to build on for further research. Therefore the defense why certain choices in the research design have been made results from the SLR conducted in chapter two.

To achieve this, the technical design is compromised out of several subchapters. In the stakeholder analysis, the frameworks identified in chapter two are executed. This results in a list of potential roles inside the case organization that can be selected for the interviews.

For the operationalization of the interview questions, the prior research by Van de Wetering (2020) regarding Dynamic Enterprise Architecture Capabilities (DEAC) is used. This study was conducted quantitatively by using a questionnaire where statements were classified based on a seven point Likert scale. In the research by Van de Wetering, capabilities are divided into the DEAC sensing capability, DEAC mobilizing capability and the DEAC transformation capability. The affirmative statements are rewritten so that statements are open questions. The questions are concerned with answering how the EA is used relative to the ITO vendor capabilities. The choice for the measurement items by Van de Wetering (2020) is made due to the DCV perspective incorporated in the questioning. The SLR found that this is currently one of the dominant frameworks used to approach capabilities.

In the conceptual model the argument for semi-structured interviews has been made. Rahimi et al (2017) have researched the different definitions used for EA in the existing literature. This makes it apparent that there is not yet consent on one precise definition for EA. Since EA is the main research domain it is important that in the semi-structured interviews, the interviewees interpret EA correctly. In

order to achieve this understanding, interviewees received an explanation regarding what is understood under EA. Additionally the interviewees are sent a copy of the interview questions prior to the interview. This offers the opportunity to be able to prepare for the interview. The goal is to conduct the interview in a time span of around one and a half hours. The findings of the interview will be reflected back to the interviewee for an opportunity to validate if everything was understood correctly.

3.2.1: Stakeholder analysis:

Prior to the interviews a selection has to be made concerning which stakeholders are relevant in order to answer the research question. The stakeholder analysis is conducted by using multiple frameworks identified in the SLR.

Razali and Anwar (2011) decomposed the process of a stakeholder analysis into three stages: Identification, filtering and prioritization. For the identification the different roles inside the case organization are used. Using the frameworks by Mitchell et al. (1997) and Abbott et al. (2020) these are classified. Based on the definition of Lapkin et al (2008): *“EA is the process of translating business vision and strategy into effective enterprise change by creating, communicating, and improving the key principles and models that describe an enterprise’s future state and enable its evolution”*, only internal stakeholders will be chosen inside the case study. This choice is made since only internal stakeholders have the task to translate the business vision and strategy into enterprise change. The identified stakeholder and the filtering/classification is displayed in figure 16.

Stakeholder	Type (Abbott)	Power	Legitimacy	Urgency	Mitchell
Chief Executive Officer	1 - Internal Catalyst	x	x	x	7 - Definitive
Chief Technical Officer	1 - Internal Catalyst	x	x	x	7 - Definitive
Managing Director	1 - Internal Catalyst	x	x	x	7 - Definitive
Strategy Lead	1 - Internal Catalyst	x	x	x	7 - Definitive
Technical Strategy Lead	1 - Internal Catalyst	x	x	x	7 - Definitive
Chief Security Officer	1 - Internal Catalyst	x	x	x	7 - Definitive
Managing Director Customer Team	2 - Internal Facilitator	x	x	x	7 - Definitive
Managing Director Quality & Assurance	1 - Internal Catalyst	x	x	x	7 - Definitive
Managing Director Platform Team	2 - Internal Facilitator	x	x	x	7 - Definitive
Managing Director Onboarding	2 - Internal Facilitator	x	x	x	7 - Definitive
Managing Director Customer Care Center	2 - Internal Facilitator	x	x	x	7 - Definitive
Platform Owner	2 - Internal Facilitator	x	x		4 - Dominant
Platform Architect	2 - Internal Facilitator	x	x		4 - Dominant
Platform Engineer	3 - Internal Impacted		x	x	6 - Dependent
Customer Owner	2 - Internal Facilitator	x	x		4 - Dominant
Customer Engineer	2 - Internal Facilitator		x	x	6 - Dependent
Customer Architect	2 - Internal Facilitator		x		2 - Discretionary
Scrum Master	3 - Internal Impacted			x	3 - Demanding
Service Manager Customer	4 - External Catalyst	x	x	x	7 - Core

Figure 16: Stakeholder analysis

From the potential stakeholders in figure 16, the prioritization is created with the ideal stakeholders for the interviews. As Saunders (2019) suggests, purposive sampling is used to create a representable sample. This is based on the follow criteria:

- The role the stakeholder has in relation to the DEAC capabilities. The subset should have a distribution so that all DEAC are represented.

- The role the stakeholder has in relation to the ITO vendor capabilities. The subset should be distributed in a manner so that all ITO vendor capabilities are represented.

Based on above criteria, a selection is made and displayed in figure 17.

Role / Function	Relevance
CEO	This role is responsible for the entire organization. Operating on a highly strategic level, the CEO has expertise regarding multiple facets in terms of the ITO vendor capabilities and DEAC. The difference between the COO is that the CEO is more customer (acquisition) focused
COO	This role inside the organization is responsible for the day-to-day operations. Operating on a more strategic level compared to the division specific managing directors. This role requires an all-around knowledge regarding the organization in both the DEAC and ITO vendor capabilities.
Managing Director CCC	As a managing director of the platform team CCC, the role focuses on the DEAC sensing- and mobilizing capability. The CCC is involved with customer contact and is the largest platform team in terms of personnel.
Platform Owner CCC	This role reports to the managing director of the CCC and thus relevant for all ITO vendor capabilities, while being a sparring partner and thus involved in the sensing capability, the platform owner role is strongly focused on the mobilizing and transformation capability.
Platform Owner Workspace	Like the Platform Owner CCC in tasks and responsibilities. Workspace is a different platform focused more on product development. Selected based on their strong involvement in all three DEAC, with a strong focus on the mobilizing- and sensing. As a platform, all capabilities of the ITO vendor are involved.

Figure 17: Stakeholder sample from purposive sampling method.

3.3: Operationalization:

The measurement items used by Van de Wetering (2020), formulated as open questions instead of affirmative statements, regarding the DEAC are displayed in figure 19. This shifts the focus from a quantitative- to a qualitative form. The figure shows the DEAC the question applies to, the number of the sub-research question, the question to be asked during the interview and the link to the ITO vendor capability. Based on the stakeholder involvement regarding the ITO vendor capability, each questions that is relevant to the stakeholder is asked. The sub-research questions and related number are displayed below:

1. Does the DEAC sensing capability apply to the ITO - CRM capability?
2. Does the DEAC mobilizing capability apply to the ITO - CRM capability?
3. Does the DEAC transformation capability apply to the ITO - CRM capability?
4. Does the DEAC sensing capability apply to the ITO - MD&D capability?
5. Does the DEAC mobilizing capability apply to the ITO - MD&D capability?
6. Does the DEAC transformation capability apply to the ITO - MD&D capability?
7. Does the DEAC sensing capability apply to the ITO personnel capability?
8. Does the DEAC mobilizing capability apply to the ITO personnel capability?
9. Does the DEAC transformation capability apply to the ITO personnel capability?

A seven point Likert scale survey is created with the purpose to validate whether the findings from the interview are accurate. The selected interviewees are requested to complete the survey prior to the interview. The ITO vendor capabilities are represented by multiple statements regarding each individual ITO vendor capability. The statements are based on the research by Levina and Ross (2003). The results of the survey aim to give insight into the subjective performance regarding the ITO vendor capabilities by the interviewees. The results are compared relative to the findings of the interview. This creates the possibility to identify a relationship between the use of EA through the interview results and the subjective performance regarding the ITO vendor capabilities from the survey. The survey statements per ITO vendor capability are displayed in figure 18.

ITO Vendor Capability	Survey Statement
Customer Relationship Management	Customers are generally happy about the provided service of the organization.
	The status of work in progress and priorities is communicated towards the client organization.
	The organization is a partner when it comes to managing clients IT goals, needs and priorities
	The organization engages in knowledge sharing with the client organization.
Methodology Development & Dissemination	The organization is able to consistently deliver the same value towards multiple customers.
	The organization adopts known frameworks and methodologies for quality assurance.
	The organization invests time in identifying best practices and standardizing processes.
	The organization documents processes and work tasks.
Personnel	Personnel is generally promoted from within the organization.
	Personnel is generally happy and motivated in their work.
	The organization is able to keep their best performing employees within the organization.
	The organization invests in their employees and the development of their professional skills

Figure 18: Survey statements regarding ITO vendor capabilities.

Sensing Capability	1	How is EA used to identify new business opportunities or potential threats regarding the...	Customer Relationship Management Capability?
	2		Methodology Development and Dissemination Capability?
	3		Personnel Capability?
	1	What steps are taken to ensure that the EA is in line with key stakeholders wishes regarding the...	Customer Relationship Management Capability?
	2		Methodology Development and Dissemination Capability?
	3		Personnel Capability?
	1	How are the effect of changes evaluated in the baseline and target EA of the organization regarding the...	Customer Relationship Management Capability?
	2		Methodology Development and Dissemination Capability?
	3		Personnel Capability?
Mobilizing Capability	4	How is EA used to draft potential solutions when business opportunities or threats are detected regarding the...	Customer Relationship Management Capability?
	5		Methodology Development and Dissemination Capability?
	6		Personnel Capability?
	4	How is EA used to evaluate, prioritize and select potential solutions when business opportunities or threats are detected regarding the...	Customer Relationship Management Capability?
	5		Methodology Development and Dissemination Capability?
	6		Personnel Capability?
	4	How is EA used to draw up a detailed plan to carry out a potential solution when business opportunities or threats are detected regarding the...	Customer Relationship Management Capability?
	5		Methodology Development and Dissemination Capability?
	6		Personnel Capability?
	4	How is EA used to review and update used practices in line with renowned business and IT best practices when business opportunities and threats are detected regarding the...	Customer Relationship Management Capability?
	5		Methodology Development and Dissemination Capability?
	6		Personnel Capability?
Transformation Capability	7	How is EA used to adjust business processes and the technology landscape in response to competitive strategic moves or market opportunities regarding the...	Customer Relationship Management Capability?
	8		Methodology Development and Dissemination Capability?
	9		Personnel Capability?
	7	How is EA used to engage in resource recombination to match product market areas and assets better regarding the...	Customer Relationship Management Capability?
	8		Methodology Development and Dissemination Capability?
	9		Personnel Capability?
	7	How is EA used to create new or substantially changed ways of achieving targets and objectives regarding the...	Customer Relationship Management Capability?
	8		Methodology Development and Dissemination Capability?
	9		Personnel Capability?

Figure 19: Measurement items used by Van de Wetering (2020) regarding the sensing-, mobilizing- and transformation DEAC, formulated as open questions.

3.4: Analysis:

For analysis the approach by Van der Zee (2020) is used. This is built up in various stages:

1. The conducted interviews are transcribed in order to gain qualitative insights from the collected data. Software is used to aid in the transcribing process. For interviews that are taken through Microsoft Teams, the built-in transcribing feature is used.
2. Transcriptions are edited manually to correct any errors. This creates a final version for readability purposes.
3. The output of the previous step is split up in fragments. Each fragment cover exactly one subject. Longer sentences can be divided up into several smaller sentences to only cover one subject each.
4. Each fragment is labeled based on key words. Key words are extracted as much as possible from the text to ensure objectivity in the labeling phase.
5. Once all fragments are labeled, the labels are ordered into a logical groupings. If several labels exist that are similar these can be grouped under one main label. For the coding/labeling process ATLAS.ti is used. ATLAS.ti also offers the opportunity to visualize gained insights from coding.
6. The created fragments are placed under the corresponding label. This ensures a collection of fragments of different interviewees under a created label.
7. Fragments from different interviewees are analyzed relative to each other. This step makes clear where interviewees agree or disagree with one another.

Above steps aim to answer the formulated empirical research questions how the case organization deploy EA relative to ITO vendor capabilities. Additionally the results are referenced to existing literature regarding the subject. This ensures triangulation by using existing literature relative to found results.

3.5: Expert Review:

To ensure validity in the research design and scientific content, the methodology is offered to be reviewed by an expert in the field of Enterprise Architecture. Rogier van de Wetering from the Open University will be contacted for this purpose. The research design is largely based on research regarding dynamic enterprise architecture capabilities by Van de Wetering (Van de Wetering, 2020). Any feedback received will be reviewed and applied within the research design.

3.6: Reflection regarding validity, trustworthiness and ethical aspects:

3.6.1: Internal validity:

Saunders et al (2019) describe internal validation as the extent to which results of the research are attributed to scientifically sound practices instead of flaws in the research design. Saunders et al (2019) discuss two validation techniques to ensure a higher quality research: triangulation and participant validation. Triangulation is concerned with using multiple types of data sources to validate the findings of the research. As mentioned the research will be conducted in the form of semi-structured interviews which will form one of the data sources. Other sources include the survey that is to be conducted to add a quantitative data collection method. Zachman (1997) describes EA as: "EA is a set of descriptive representations that are relevant for describing an enterprise". These representations, often called EA artifacts, are used to validate findings from the interviews. EA artifacts that are mentioned during interviews will be validated based on their existence.

Participant validation is concerned with validating findings from research by offering the participant the opportunity to review the collected data and comment on its accuracy (Saunders et al, 2019). For EA this is important due to various definitions given to EA. Rahimi et al (2017) have conducted research in the taxonomy of EA and have distinguished different definitions given to EA. To ensure that the interviewer and the interviewee interpret EA in the same manner, participant validation is an important step to ensure validity. This is achieved by reviewing the interview with the interviewee once the transcripts are created, together with potential interpretations/assumptions made from the collected data. This ensures that the results of the interviews are credible. Another method ensuring internal validity is the participation sampling of the interviewees. Based on proven frameworks as a product of the literature review a stakeholder analysis was performed to create a long list of potential interviewees. Through purposive sampling interviewees are shortlisted based on characteristics related to the research design. In this case the role of the interviewee regarding the ITO vendor capabilities and DEAC are selected as the criteria to be sampled.

3.6.2: External validity:

Saunders et al (2019) describe external validity as the extent to which the research is applicable outside the researched context. This is often called the generalizability of the research. In the research design, the chosen research form is a case study. Where the sample size in a multiple case study is higher, and thus the generalizability higher, this poses a challenge in a single case study. The choice is made for a single case study due to the time constraints in which the research has to be completed. Yet the research design is built to be reproducible. As Yin (2018) states that case study research is often used when the boundaries between the phenomenon being studied and the context within which it is being studied are not always apparent. Even a research design that is reproducible may not yield the same results within a different context since the outcome is dependent on the context. The lack of generalizability is weighted against the advantages a case study offers.

3.6.3: Construct Validity & Face Validity:

Construct validity is concerned with whether the chosen research design is suitable for the to be researched phenomenon. Face validity is concerned with whether a defined approach is capable of measuring what it is supposed to measure. To ensure these types of validity, the following measures are taken:

- The research design is based on a SLR that aims at answering theoretical research questions that are decomposed out of the main research question. Therefore the chosen methodology is based on available scientific literature and frameworks.
- The research design shall be proposed to an expert within the EA domain to validate the research design. Any feedback given shall be incorporated in the research design.
- A survey is sent to the interviewees prior to conducting the interviews regarding the subjective performance of the ITO vendor capabilities. Two methods of analysis enable a comparison between the results of the survey and interviews.

Additionally interviewees will be introduced to the EA subject prior to interviews. A handout is created explaining EA together with the interview questions. This is done to increase understanding regarding EA to ensure questions are interpreted as the interviewer intended.

3.6.4: Ethical Aspects:

In the formulation of the research strategy ethical aspects are taken into consideration. Ethical aspects mentioned in Saunders et al (2019) that are relevant to this research are:

- Privacy of those taking part. Respect is given to participant by ensuring the informed consent in participating in the interview. A participant is free to withdraw from the research at any time. Additionally participant are offered to remain anonymous if the participant wishes to do so.
- Responsibility in the analysis of data and reporting of the findings. Collected data from interviews are portrayed in a manner to honestly represent the views of the participant.

4: Results

4.1: Stakeholder Analysis

In the period that the research was conducted, some selected stakeholders in the prior stakeholder analysis from chapter three left the case organization. Specifically the CEO and COO. Replacements for the same functions were new to the organization and lacked knowledge regarding the organization's history in relation to the EA. Therefore other suitable stakeholders needed to be identified. As replacements the technical strategy lead and strategy lead were chosen. These roles work together to set out the strategy of the organization. The strategy lead focuses on 'the what' regarding customer demand while the technical strategy lead focuses on 'the how' in terms of methodology.

4.2: Transcribing, Coding and Analysis Interviews

For the processing of the interview data, different methods were used in different stages:

1. **Transcribing:** Each interview was transcribed automatically using the transcribe function in Microsoft Teams. Any mistakes in the transcription were edited manually. Additionally the transcription was edited to create logical sentences for readability purposes.
2. **Open Coding:** Open coding was used to create text fragments and label them into different categories. One based on DEAC and one based on the ITO vendor capability. This ensures a relationship is made regarding the question used to answer the empirical research question how EA is used relative to ITO capabilities. Additionally the text fragments were labeled a sentiment to display a positive or negative relationship.
3. **Axial coding:** Resulting text fragments were classified into a suitable category that describes the nature of how EA is used regarding the ITO vendor capabilities.

4.3: Customer Relationship Management Capability

The survey results regarding the CRM capability ranges from a min of 63 % to a max of 80 %. On average, the CRM capability scores a 72 % by sampled stakeholders. This creates an overall positive perception of the performance regarding the CRM capability by the stakeholders. Statements regarding specific actions (engaging in knowledge sharing activities and communicating work in progress) were found to score lower regarding statements that are formulated in a more abstract manner. Statements and accompanying score are displayed in figure 20.

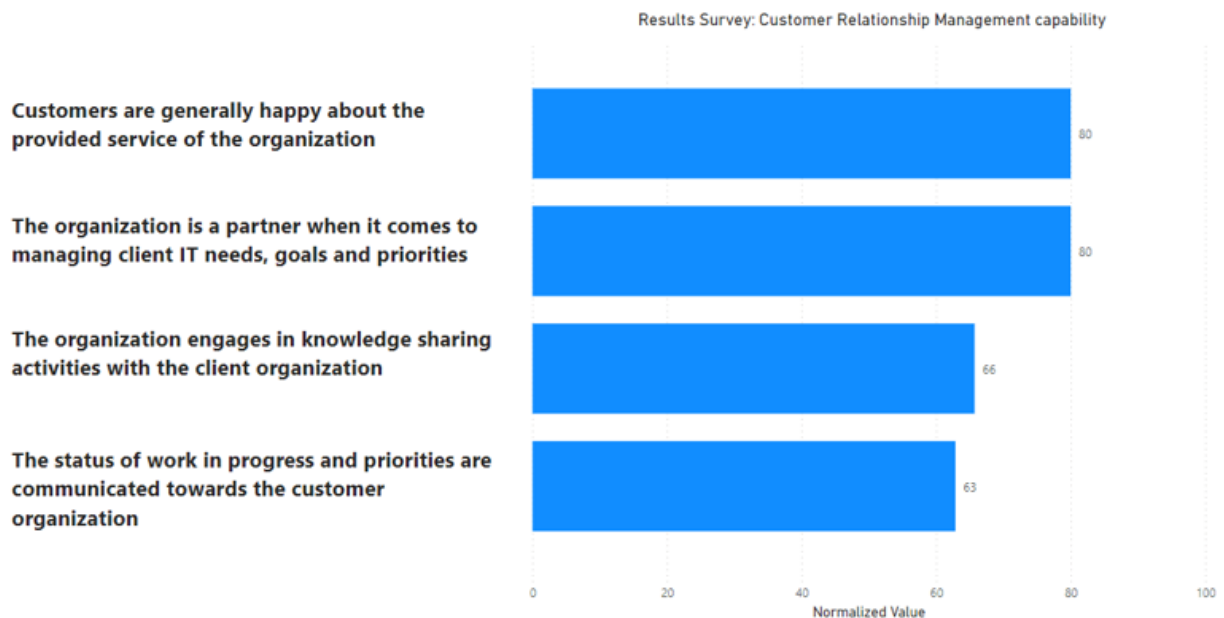


Figure 20: Results survey regarding CRM capability

4.3.1: Does the DEAC sensing capability apply to the ITO customer relationship management capability?

A query regarding the combination of the dynamic EA sensing capability and the customer relationship management capability entails a total of thirty-three coded fragments. In the sentiment analysis of the queried fragments, twenty-four fragments were found to be positive and the remaining nine were negative. This totals a 73% positivity score.

Key findings from positive fragments between the two variables are displayed within figure 21.

Theme	Key Finding
Portfolio management	Portfolio management results in an EA artifact in the form of a product service catalogue (PSC).
	Portfolio management takes into consideration the mission and vision of the organization to ensure Business & IT alignment.
	The PSC is constructed in a modular architecture with loosely coupled and strongly cohesive modules.
	Each module in the PSC falls under the ownership of a platform team, responsible for the lifecycle management and development of the module. This results in a technology roadmap.
Demand management	Demand management is constructed in the form of a customer team. This platform team is responsible for understanding the customer ecosystem and how this relates to the PSC.
	The customer team shares the customer roadmap with the customer together with a longlist of solution proposals suitable for the customer roadmap.
	The organization has developed a service to measure user satisfaction of the customer. This forms data-driven input for solution proposals.
Risk management	PSC modules are elaborated upon in the form of an Operational Level Agreement (OLA). This EA artifact documents identifies relationships necessary for delivering the service. Other related EA artifacts with similar purposes can be found in the form of a Reference Architecture and SWOTs. These artifacts are used to evaluate changes in the baseline and thereby identify risks.
	Supplier roadmaps are used to identify changes in the used technology that suppliers provide. These are used to evaluate changes in the baseline of the (customer) organization.
	The customer team is responsible for translating identified risks in PSC modules to the customer ecosystem.

Figure 21: Findings DEAC sensing capability for the CRM capability.

Conclusion:

The DEAC sensing capability was found relative to the CRM capability inside the case organization. Answers to questions were found to have positive answers regarding the presence of EA 73% of the time. This relative to the survey results regarding the CRM capability of 72%, creates a positive correlation. Based on the findings of figure 21, the main conclusions are:

- EA is used to reflect the customer demand by offering standardized service offerings to create a greater proactive strength in the ITO domain.
- EA is used to create insight into dependencies of products and services to help identify threats and evaluate changes in the baseline of the customer organization.
- EA is continuously enhanced by understanding and influencing the customer needs and validating whether current services meet those demands.

4.3.2: Does the DEAC mobilizing capability apply to the ITO customer relationship management capability?

A query regarding the combination of the dynamic EA mobilizing capability and the customer relationship management capability entails a total of thirty-nine coded fragments. In the sentiment analysis of the queried fragments, twenty-eight fragments were found to be positive and ten were negative. This totals a 72% positivity score.

Key findings from positive fragments between the two variables are displayed within figure 22.

Theme	Key Finding
Portfolio management	In designing a new service for a customer, an evaluation is made from multiple dimensions by using the OLA template: What other PSC modules are related and may affected? What maintenance activities are involved? How do the required skills for the service relate to personnel?
	Using the mission, vision and strategy as an evaluation method to validate whether a sensed opportunity / service should be developed to seek synergy within the targeted market segment.
	The Strategy Office works together with the Technology Office to provide Business & IT alignment to evaluate sensed opportunities in terms of the mission and vision of the organization.
	A PSC module is elaborated upon by defining service levels agreements (SLA) in a service matrix (SMX).
	A PSC module is elaborated upon in a OLA. The OLA adopts a RACI model to identify stakeholders and what their role is within the module. This helps in creating a structured approach to involve the right stakeholders to evaluate, prioritize and implement drafted solutions.
	A supplier roadmap is linked to a PSC module to categorize which platform team has to take ownership of reacting to a sensed risk. Upon change each module has a reference to the platform teams technology roadmap and the customer roadmaps.
Change management	In constructing a detailed plan for implementing solution overviews in the customer roadmap, a platform architect responsible for the module of the PSC, helps in formalizing the customer specific configuration.
	A customer architect of a platform team collaborates with external customer stakeholders in evaluating the details / impact of a digital transformation project within the ecosystem of the customer.
	The Technology Office is responsible for the service to a customer when digital transformation reach a complexity that multiple platform teams are involved and more detailed planning is needed.
Release and deployment management	After a digital transformation is completed for a customer, the ecosystem is closely monitored with stakeholders inside the customer organization to validate the effectiveness and efficiency of the solution.
Demand management	The customer team shares the customer roadmap with the customer together with a longlist of solution proposals suitable for the customer roadmap. Stakeholders in the customer organization are invited to help in the drafting of potential solutions based on the defined borders within PSC modules.

Figure 22: Findings DEAC mobilizing capability for the CRM capability

Conclusion:

The DEAC mobilizing capability was found relative to the CRM capability inside the case organization. Answers to questions were found to have positive answers regarding the presence of EA 72% of the time. This relative to the survey results regarding the CRM capability of 72%, creates a positive correlation. Based on the findings of figure 22, the main conclusions are:

- EA is used to evaluate customer customizations based on the alignment with the mission and vision of the organization. Based on all customers, the common denominator forms the standard with the possibility for variants for specific customer clusters.
- EA is used to create a detailed plan to implement the service offering. Correct evaluation, prioritization and timeline are ensured by involving the right internal- and external stakeholders.

4.3.3: Does the DEAC transformation capability apply to the ITO customer relationship management capability?

A query regarding the combination of the dynamic EA transformation capability and the customer relationship management capability entails a total of twenty-three coded fragments. In the sentiment analysis of the queried fragments, nineteen fragments were found to be positive and four were negative. This totals a 83% positivity score.

Key findings from positive fragments between the two variables are displayed within figure 23.

Theme	Key Finding
Portfolio management	Using loosely coupled and strongly cohesive PSC modules enables ease of transformation of the relevant module with minimal risk of affecting other modules.
	A PSC module exists partly out of a standard and partly a customer specific configuration. Customer specific configurations enable the reconfiguration of the standard to fit market demand better.
	A PSC module creates the possibility to adjust or respond to unexpected changes due to the flexibility in adapting a module.
	A PSC module is elaborated upon in terms of <i>service levels agreements (SLA)</i> in a <i>service matrix (SMX)</i> .
	Gaining new personnel and services due to the acquisition of new customers. In the acquisition of new customers, the organization adopts the services provided by the previous ITO vendor.
Change management	Customer specific As-Is teams are created to transform to the To-Be situation as defined in the PSC modules. After the digital transformation is completed, the customer configuration of the PSC module is maintained by the To-Be team.

Figure 23: Findings DEAC transformation capability for the CRM capability

Conclusion:

The DEAC transformation capability was found relative to the CRM capability inside the case organization. Answers to questions were found to have positive answers regarding the presence of EA 83% of the time. This relative to the survey results regarding the CRM capability of 72%, creates a positive correlation. Based on the findings of figure 23, the main conclusions are:

- EA enables the organization to easily reconfigure the technology landscape by using a modular architecture.
- EA enables the flexible adaption of human resources by distinguishing the workforce based on freelance personnel for transforming the As-Is technology from customers and regular personnel for To-Be situation.

4.4: Methodology Development & Dissemination Capability

The results of the survey regarding the MD&D capability are all positive. With a min ranging from 69% to a max of 86%, the average regarding this capability was found to be 76%. What can be seen is that the statement that is closely related to the problem statement: Being able to consistently deliver the same value towards multiple customers, is ranked last. Despite the positive scores regarding the other statements, the link to the CRM capability is ranked lowest in the MD&D capability. All statements relative to their scores can be found in figure 24 and were answered by all the stakeholders.

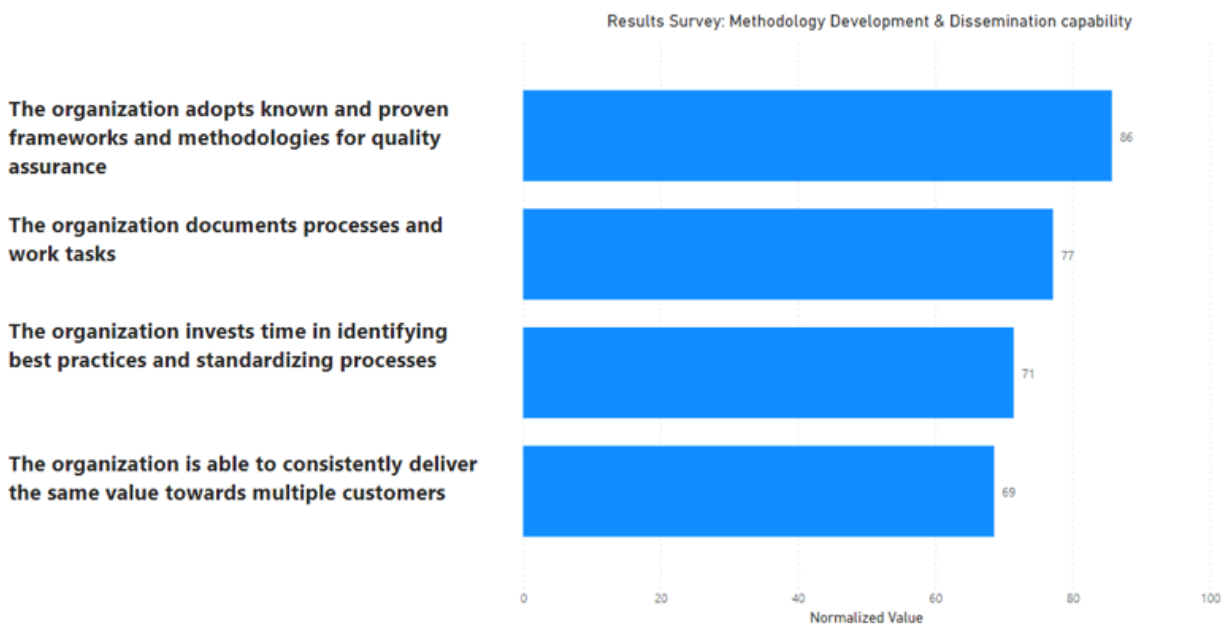


Figure 24: Findings survey regarding the MD&D capability

4.4.1: Does the DEAC sensing capability apply to the ITO methodology development & dissemination capability?

A query regarding the combination of the dynamic EA sensing capability and the MD&D entails a total of twenty-four coded fragments. In the sentiment analysis of the queried fragments, seventeen fragments were found to be positive and six were negative. This totals a 71% positivity score.

Key findings from positive fragments between the two variables are displayed within figure 25.

Theme	Key Finding
Continual service improvement	Creation of a <i>Center of Excellence</i> inside a platform team that is held responsible for identifying opportunities & risks, creation of best practices and standardization.
	Scheduling time in a constant format to reflect on operations with relevant stakeholders to identify improvement points.
	Monitoring changes to proven frameworks and methodologies and evaluating the benefits in relation to the baseline of the organization.
Demand management	Plotting current methodologies against feedback loops from end users / customers to identify improvement opportunities. Feedback loops are coupled to PSC modules to define ownership which platform team has the responsibility to mobilize the opportunity.
	Using a SWOT analysis to sense opportunities and threats regarding methodologies.
Risk management	Plotting current methodologies against technology components needed to execute the methodology. Used as a form of risk management to identify bottlenecks in the availability of the service.
	Monitoring operations in terms of processes and SLA's to signal outliers relative to the standard as a trigger for further investigation into how the outlier has come to be.
Change management	Plotting related technologies, processes and other resources relative to the to be transformed element when relationships exist. Helps in identifying risks how related resources are affected by the transformation.
Portfolio management	Using supplier roadmaps to sense changes in the adopted methodologies related to the products / services in the PSC.

Figure 25: Findings DEAC sensing capability regarding the MD&D capability

Conclusion:

The DEAC sensing capability was found relative to the MD&D capability inside the case organization. Answers to questions were found to have positive answers regarding the presence of EA 71% of the time. This relative to the survey results regarding the MD&D capability of 76%, creates a positive correlation. Based on the findings of figure 25, the main conclusions are:

- EA is used to monitor changes to dependencies, customer feedback and third party suppliers to help identify threats and opportunities to create a greater proactive and reactive strength.

4.4.2: Does the DEAC mobilizing capability apply to the ITO methodology development & dissemination capability?

A query regarding the combination of the dynamic EA mobilizing capability and the methodology development & dissemination capability entails a total of sixty-six coded fragments. In the sentiment analysis of the queried fragments, forty-one fragments were found to be positive and twenty-four were negative. This totals a 62% positivity score.

Key findings from positive fragments between the two variables are displayed within figure 26.

Theme	Key Finding
Portfolio management	Constructing a centralized method over the decentralized platforms to evaluate, include the right stakeholders, develop, test and monitor new products / services that are to be created in the PSC.
	Organizational unit that holds the responsibility to evaluate new initiatives in terms of Business & IT alignment and coordinate the development of the new initiatives and monitor adherence to selected methods.
	Centralized organizational unit that is responsible to collect, integrate and periodically review all the <i>technology roadmaps</i> of the decentralized platform teams to create an <i>organizational roadmap</i> .
	Using sensed opportunities and threats from the <i>supplier roadmap</i> and linking them to PSC modules to evaluate the possible impact on customers that have incorporated the module within the customer ecosystem.
	Using architect roles in development teams of PSC modules to create <i>design guidelines and principles</i> and ensure compliance to the mission / vision of the organization.
	Centralized (multi disciplinary) organizational unit that consists of diverse architects to create a well rounded perspective on organizational issues. Creating <i>longlists</i> and <i>shortlists</i> for drafted solutions to help prioritize drafted solutions.
	The PSC is constructed in a <i>modular architecture with loosely coupled and strongly cohesive</i> modules. PSC modules are elaborated upon in the form of an Operational Level Agreement (OLA). This EA artifact documents identified relationships necessary for delivering the service. These artifacts are used to evaluate changes in the baseline of the organization.
Continual service improvement	Incorporating triggers and monitoring to continually reflect on own methodologies for improvement opportunities using <i>PDCA / Deming cycle</i> . Defining SLA's / KPI's relative to the methodology to monitor the execution in a data driven manner.
	Evaluating updates to adopted proven frameworks and incorporating these in the current methodology.
Change management	Using a defined change management process based on proven frameworks to structurally and consistently provide results.
	Having a collection of descriptive EA artifacts to gain insight into the baseline of an organization and incorporating such artifacts in the evaluation process of a transformation.
	Having a RACI model relative to PSC modules to provide a stakeholder analysis within each module to document which stakeholders need to be involved.

Figure 26: Findings DEAC mobilizing capability regarding the MD&D capability

Conclusion:

The DEAC mobilizing capability was found relative to the MD&D capability inside the case organization. Answers to questions were found to have positive answers regarding the presence of EA 62% of the time. This relative to the survey results regarding the MD&D capability of 76%, creates a positive correlation. Based on the findings of figure 26, the main conclusions are:

- EA enables the quick and thorough evaluation of affected products and services by predefined analysis' regarding minimal requirements, relevant stakeholders and relationships regarding other products & business processes.
- EA enables the evaluation of prior chosen solutions by monitoring the effect based on KPI's and reflecting on these.
- EA enables the organization to guide the bottom-up innovation of decentralized platform teams by incorporating checks and balances to ensure alignment with the mission and vision of the organization.

4.4.3: Does the DEAC transformation capability apply to the ITO methodology development & dissemination capability?

A query regarding the combination of the dynamic EA transformation capability and the methodology development & dissemination capability entails a total of twenty-nine coded fragments. In the sentiment analysis of the queried fragments, twenty-one fragments were found to be positive and eight were negative. This totals a 72% positivity score.

Key findings from positive fragments between the two variables are displayed within figure 27.

Theme	Key Finding
Change management	Documentation regarding PSC modules how business processes are configured and which resource dependencies exist regarding the PSC module. Helps in understanding the logic for reconfiguring when needed. Documenting standard work tasks to consistently deliver the same results and to prevent fragmentation in the execution of business processes.
Continual service improvement	Planning a set amount of time to optimize operational activities. Offering freedom in the form of decentralized platforms with a high degree of autonomy to determine new features, products and services within the expertise of the platform team.
Portfolio management	Using loosely coupled and strongly cohesive PSC modules to quickly and easily reconfigure products / services. Involving personnel in the vision & mission of the organization and how these relate to products and services in order to create Business & IT alignment. Acquiring new customers together with products and services As-Is that are in line with the mission and vision of the organization. Centralized organizational unit that monitors the development of the decentralized platforms of the PSC modules. Tests whether development is in line with the mission and vision, design guidelines and principles, and demand of the customers. Ensures transformation in the right direction. Using PSC modules as an identification method to identify the nearest neighbor of new products and services to help in the recombination of resources.
Demand management	Closely collaborating with the customer in the development of new adjustments, new products and services to ensure transformation has Business & IT alignment.

Figure 27: Findings DEAC transformation capability for the MD&D capability

Conclusion:

The DEAC transformation capability was found relative to the MD&D capability inside the case organization. Answers to questions were found to have positive answers regarding the presence of EA 72% of the time. This relative to the survey results regarding the MD&D capability of 76%, creates a positive correlation. Based on the findings of figure 27, the main conclusions are:

- EA enables the organization to easily reconfigure technology and supporting business processes by documenting rationale behind configurations and work tasks that support the configuration.
- EA enables the organization to offer a high degree of decentralization, offering bottom-up initiatives to react quickly to gain a possible competitive advantage. At the same time keeping a top-down overview to guide organizational change in accordance to the organizational strategy.

4.5: Personnel Capability

On average the survey results regarding the personnel capability were all found to be positive. The statements aim to create insight in the organization's performance regarding their personnel. All statements received answers by the stakeholders. A discrepancy can be seen between the outcomes between the highest scoring statements and the lowest scoring statement regarding being able to keep the best performing employees inside the organization. These normalized outcomes to these statements are combined to form an average of 73%, the min being 54% and the max being 89%.

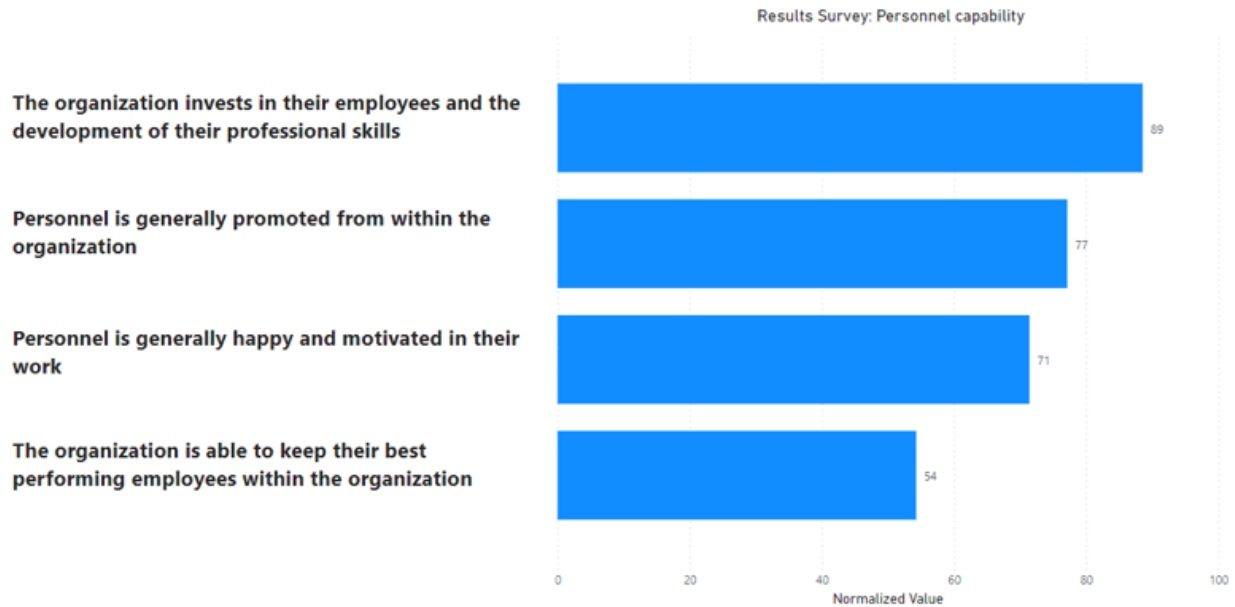


Figure 28: Findings survey regarding the personnel capability

4.5.1: Does the DEAC sensing capability apply to the ITO personnel capability?

A query regarding the combination of the dynamic EA sensing capability and the personnel capability entails a total of eighteen coded fragments. In the sentiment analysis of the queried fragments, fourteen fragments were found to be positive and four were negative. This totals a 78% positivity score.

Key findings from positive fragments between the two variables are displayed within figure 29.

Theme	Key Finding
Continual service improvement	Planning time in the operation to reflect on issues regarding personnel to identify risks and opportunities.
	Using <i>SWOT analysis</i> to structurally sense strengths, weaknesses, opportunities and threats on subjects regarding personnel.
Risk management	Taking into account the risks of new personnel strategies into the baseline of the organization. Using personnel as a crucial stakeholder in the design of the organization.
	Defining a baseline process with manual tasks and sensing outliers in the execution of the process. Defining ownership to investigate how such an outlier has come to be. Used to identify threats in current methodology.
	Translating changes in the adopted technology from <i>supplier roadmaps</i> as a trigger to sense the impact of the change on the current workforce of the organization.
Portfolio management	Defining ownership within a <i>product owner</i> role inside a development team that is held responsible for sensing new opportunities and mitigating risks within the scope of the team's products and services. The same role has the responsibility to ensure that the design choices made are in line with the wishes of relevant stakeholders.
	Distinguishing personnel based on their role in digital transformations from the As-Is to the To-Be situation. Externally hired personnel focus on transforming the As-Is situation while internal personnel develop the standard To-Be PSC module.
Human resource management	Defining ownership within an organizational unit that is held responsible for translating the mission and vision of the organization to attracting qualified personnel and developing the skills of the personnel.
	The organization has developed a service to measure personnel satisfaction. This forms <i>data-driven</i> input for solution proposals.
Change management	Defining a relationship between processes and subprocesses to identify effects of changes made. Used to identify how personnel is affected by changes to technology / processes.

Figure 29: Findings DEAC sensing capability regarding the personnel capability

Conclusion:

The DEAC sensing capability was found relative to the personnel capability inside the case organization. Answers to questions were found to have positive answers regarding the presence of EA 78% of the time. This relative to the survey results regarding the personnel capability of 73%, creates a positive correlation. Based on the findings of figure 29, the main conclusions are:

- EA helps create insight into the role personnel has inside adopted technologies and business processes. This creates a scope where threats can be identified relative to service offerings.
- EA is used to sense the personnel satisfaction and evaluate changes in the organization based on the perceived effect on the personnel satisfaction.

4.5.2: Does the DEAC mobilizing capability apply to the ITO personnel capability?

A query regarding the combination of the dynamic EA mobilizing capability and the personnel capability entails a total of forty-two coded fragments. In the sentiment analysis of the queried fragments, thirty-five fragments were found to be positive and seven were negative. This totals a 83% positivity score.

Key findings from positive fragments between the two variables are displayed within figure 30.

Theme	Key Finding
Portfolio management	Evaluating the development of a PSC module in terms of the skills needed from personnel to develop and maintain the PSC module and any gap that exists compared to the baseline.
	Evaluating drafted solutions in terms skills needed from personnel to execute the long term strategy of the organization. Used to determine which technical skills align with the mission and vision of the organization versus temporary skills needed to transform from an As-Is situation.
	A PSC module falls under the ownership of a platformteam. This creates transparency in relevant stakeholders for drafting, evaluating and prioritizing solutions.
	Defining ownership within a <i>product owner</i> role inside a development team that is held responsible for product development. Evaluates and prioritizes drafted solutions and monitors if the development team adheres to <i>design principles</i> are <i>guidelines</i> .
	Involving <i>architect</i> roles within Agile development teams that take into account standards, design guidelines and principles.
	Evaluating the skills needed for the development and maintenance of a to be developed PSC module. Creating <i>personnel roadmaps</i> to develop the needed skills to create a timeline in which the personnel capability is ready to deliver the PSC module based on desired service levels.
Human resource management	Using the method the organization has developed to measure personnel satisfaction. The outcome is used to help evaluate drafted solutions and reflect back on past evaluations.
	Taking into account the development plan of personnel in large projects as an evaluation method which personnel is selected for the project.
	A centralized organizational unit in the form of a HR department that sets borders for personnel compensation and personnel evaluation processes. Decentralized platforms hold the responsibility to determine the technical skills needed and conduct interviews with potential candidates.
	Reserving time to reflect on adopted human resource processes and adjusting the process accordingly. Used to create <i>best practices</i> , <i>design guidelines</i> etc. Also used to evaluate whether defined roadmaps are still realistic.
	Creating <i>acceptance criteria</i> in the form of technical certificates required for admission into a platform team. Creating <i>personnel roadmaps</i> based on these acceptance criteria.
Change management	In the process of any substantial changes to existing-, or in the development of a new PSC module, a simulated test environment is created to deploy the module. This offers the opportunity to test any maintenance activities personnel is required to execute.
	Defining a relationship between processes and subprocesses. Any change made to a process requires the effects to be calculated on any related subprocess.
Demand management	An OLA elaborates on the time needed to implement a PSC module. Used in the roadmap to calculate whether sufficient personnel resources are available to implement the PSC module.

Figure 30: Findings DEAC mobilizing capability regarding the personnel capability

Conclusion:

The DEAC mobilizing capability was found relative to the personnel capability inside the case organization. Answers to questions were found to have positive answers regarding the presence of EA 83% of the time. This relative to the survey results regarding the personnel capability of 73%, creates a positive correlation. Based on the findings of figure 30, the main conclusions are:

- EA aids in evaluating and prioritizing skills needed by seeking alignment between necessary skills for personnel to possess and the long term mission and vision of the organization.
- EA is used to incorporate checks and balances in the form of roles with the responsibility to ensure adherence to the defined EA.
- EA is used to create a detailed planning for the development of personnel, incorporating goals driven by organizational need and personal preferences.

4.5.3: Does the DEAC transformation capability apply to the ITO personnel capability?

A query regarding the combination of the dynamic EA transformation capability and the personnel capability entails a total of twenty-eight coded fragments. In the sentiment analysis of the queried fragments, twenty-one fragments were found to be positive and seven were negative. This totals a 75% positivity score.

Key findings from positive fragments between the two variables are displayed within figure 31.

Theme	Key Finding
Change management	Using proven frameworks in the form of the Agile framework to transform the organization. Using Agile to reconfigure the resource base into scrum teams to quickly deliver increments of products.
	Documenting routine work tasks to create a standardized and consistent output. Creates the possibility to flexibility adapt personnel due to high degree of documentation.
	Coupling internal and external personnel together to guide external personnel in design guidelines, standards and principles.
	Involving architects in Agile development teams to identify opportunities for standardization and best practices during development.
Continual service improvement	Reserving a set amount of time for personnel to optimize current practices or identify substantially different approach to deliver the same result. Used to identify best practices, document work tasks and innovate.
	Integrating elements of gamification in the operation to optimize current practices. Created in the form of competitive games and reward systems.
Human resource management	Offering a variety of expertise's in the form of platform teams and enabling personnel to switch to offer variety in work.
	Offering sessions to personnel to explain the benefits of design guidelines and standards. Used to help improve adoption. Offering training programs to personnel whenever business processes or technology are substantially changed.
Portfolio management	Involving external personnel in roadmap planning and presentations and linking them to the mission and vision of the organization to help align personnel and organizational goals.
	Timely sensing and mobilizing of solutions creates the opportunity to create a structured and timely approach to prepare for the transformation of personnel. Required skills and documentation needed can be developed parallel to the development of products.
	Innovating <i>bottom-up</i> from the operation to create new or substantially changed ways of delivering products and services. Using a product owner as a role to validate whether proposed changes are in line with the mission and vision of the organization.
Demand management	Involving development personnel in customer contact to understand customer demand and create Business & IT alignment.

Figure 31: Findings DEAC transformation capability regarding the personnel capability

Conclusion:

The DEAC transformation capability was found relative to the personnel capability inside the case organization. Answers to questions were found to have positive answers regarding the presence of EA 75% of the time. This relative to the survey results regarding the personnel capability of 73%, creates a positive correlation. Based on the findings of figure 31, the main conclusions are:

- EA enables the organization to adjust business processes and the technology landscape by declaring the responsibility within a role to maintain and create new EA.
- EA enables the organization to create new or substantially changes ways of achieving targets by increasing the support base for EA by involving personnel in the mobilizing phase.

4.6: EA Artifact Findings

During the interviews extra attention was given to EA artifacts as an additional method for data collection. Whenever an EA artifact related to a question seemed relevant, the question was asked if this was documented in a tangible manner. This is based on the finding of Kotusev (2018) who states that EA artifacts are the product of practicing EA(M). This concurs to the research design following the literature review in figure 14. This way the presence of EA artifacts can contribute to proving the existence of EA in the ITO vendor capabilities. This aids in answering the research question. After the interviews, all mentioned EA artifacts during the interviews were sought out to validate their existence. Additionally the purpose of each EA artifact is elaborated upon. An overview of these EA artifacts can be found in figure 32.

EA Artifact	Description / function inside the organization	Validated
Product service catalogue	Collection and description of all products and services the organization offers.	Yes
Mission & vision statement	Description of mission and vision of the organization.	Yes
Service matrix	Elaboration of KPI's / Service level agreements related to a PSC module.	Yes
Operational Level Agreement	Elaboration of PSC modules with regard to relationships needed to provide the product / service.	Yes
Supplier roadmap	Planning of digital transformations of a third party supplier.	Yes
Technology roadmap	Planning of digital transformation of a platform team regarding the PSC modules the platform team has ownership over.	Yes
Customer roadmap	Planning of all activities planned in regard to the customer ecosystem by the ITO vendor.	Yes
Longlist / shortlist	Method to prioritize multiple solutions or options.	Yes
Solution proposal	Description of a drafted solution constructed for customers.	Yes
Reference architecture	Recommended structure / solution / pattern for identified challenges within an organizational context.	Yes
SWOT analysis	Proven framework to identify Strengths, Weaknesses, Opportunities and Threats of a potential solution.	No
RACI model	A classification method for stakeholders based on: Responsible, Accountable, Consulted or Informed.	Yes
Organizational roadmap	Integration of all technology roadmaps from the platform teams.	No
Acceptance criteria	Minimum criteria needed to be able to deliver the PSC module according to service levels.	No
Design guidelines & principles	Recommendations and best practices regarding the development of product / services.	Yes
Personnel development roadmap	Career development plan of an employee with regard to adopted technologies of the organization.	Yes

Figure 32: EA artifacts found within the case organization

4.7: Summary Results

Figures 33 to 35 display a summary of the results for the investigated ITO vendor capabilities. Each ITO vendor capability is reflected by the sensing-, mobilizing- and transformation capability and if a positive correlation was found respectively. The correlation is tested based on the survey results and the degree of positive answers regarding the findings of EA in the DEAC.

ITO Vendor Capability	DEAC	Positive correlation	Conclusions
Customer Relationship Management	Sensing	Yes	EA is used to reflect the customer demand by offering standardized service offerings to create a greater proactive strength in the ITO domain.
			EA is used to create insight into dependencies of products and services to help identify threats and evaluate changes in the baseline of the customer organization.
			EA is continuously enhanced by understanding and influencing the customer needs and validating whether current services meet those demands.
Customer Relationship Management	Mobilizing	Yes	EA is used to evaluate customer customizations based on the alignment with the mission and vision of the organization. Based on all customers, the common denominator forms the standard with the possibility for variants for specific customer clusters.
			EA is used to create a detailed plan to implement the service offering. Correct evaluation, prioritization and timeline are ensured by involving the right internal- and external stakeholders.
Customer Relationship Management	Transformation	Yes	EA enables the organization to easily reconfigure the technology landscape by using a modular architecture. EA enables the flexible adaption of human resources by distinguishing the workforce based on freelance personnel for transforming the As-Is technology from customers and regular personnel for To-Be situation.

Figure 33: Conclusions CRM capability

ITO Vendor Capability	DEAC	Positive correlation	Conclusions
Methodology Development & Dissemination	Sensing	Yes	EA is used to monitor changes to dependencies, customer feedback and third party suppliers to help identify threats and opportunities to create a greater proactive and reactive strength.
			EA enables the quick and thorough evaluation of affected products and services by predefined analysis' regarding minimal requirements, relevant stakeholders and relationships regarding other products & business processes.
	Mobilizing	Yes	EA enables the organization to centralize and coordinate the planning of decentralized organizational units.
			EA enables the organization to guide the bottom-up innovation of decentralized platform teams by incorporating checks and balances to ensure alignment with the mission and vision of the organization.
	Transformation	Yes	EA enables the organization to easily reconfigure technology and supporting business processes by documenting rationale behind configurations and work tasks that support the configuration.
EA enables the organization to offer a high degree of decentralization, offering bottom-up initiatives to react quickly to gain a possible competitive advantage. At the same time keeping a top-down overview to guide organizational change in accordance to the organizational strategy.			

Figure 34: Conclusions MD&D capability

ITO Vendor Capability	DEAC	Positive correlation	Conclusions
Personnel	Sensing	Yes	EA helps create insight into the role personnel has inside adopted technologies and business processes. This creates a scope where threats can be identified relative to service offerings. EA is used to sense the personnel satisfaction and evaluate changes in the organization based on the perceived effect on the personnel satisfaction.
	Mobilizing	Yes	EA aids in evaluating and prioritizing skills needed by seeking alignment between necessary skills for personnel to possess and the long term mission and vision of the organization. EA is used to incorporate checks and balances in the form of roles with the responsibility to ensure adherence to the defined EA. EA is used to create a detailed planning for the development of personnel, incorporating goals driven by organizational need and personal preferences.
	Transformation	Yes	EA enables the organization to adjust business processes and the technology landscape by declaring the responsibility within a role to maintain and create new EA. EA enables the organization to create new or substantially changes ways of achieving targets by increasing the support base for EA by involving personnel in the mobilizing phase.

Figure 35: Conclusion personnel capability

5: Discussion & Conclusion

5.1: Discussion

As mentioned in the results of chapter four, during the conduction of the research several stakeholders that were selected by means of purposive sampling left the case organization. How this is handled together with other noteworthy aspects is described below.

5.1.1: Interval Validity

To increase the internal validity of the research, several steps were undertaken. The stakeholder analysis aimed at gaining insight into possible stakeholders for the research model. From the purposive sample, the CEO and COO left the case organization. Replacements for the same positions were not found suitable due to a lack of knowledge regarding the history of the EA of the organization. Instead other functions were sought out that had similar functions. This led to the choice of the Technical Strategy Lead and the Strategy Lead. Both operate on a highly strategic level, filling in the gap left by replaced roles. In terms of ITO vendor capabilities, this left a gap for the personnel capability which falls outside the scope of these functions. The personnel capability is represented well by the other stakeholders so that this decision seemed acceptable. Furthermore, in each interview the opportunity was offered to review gathered transcriptions, interpretations and results. Only one interviewee accepted this offer but no remarks were made concerning the findings.

To create forms of triangulation between data sources, multiple methods were used. EA artifacts were identified during the interviews as tangible proof for the existence of EA regarding the ITO capabilities.

These were collected after the interviews and validated based on their existence. Another method was the use of a survey to add a quantitative data collection method. The last method consists of relating the collected results to existing literature. This is discussed in the conclusion of this research.

5.1.2: External Validity

The research approach was conducted in the form of a single case study. In chapter three the external validity was identified as a risk for overall validity of the research. The research was designed with reproducibility in mind, yet the specific context of the case organization does not ensure results will be the same within a different case organization. This was regarded as an acceptable consequence relative towards the advantages a single case study offers in terms of rich insights in to a specific context.

5.1.3: Construct- and Face Validity

Prior to executing the research methodology, the research proposal was offered to an EA expert with numerous publications within the research domain. Additionally this was the same author that this research is partly based on (Van de Wetering, 2020). Feedback was offered in the form of the right scoping of the research design. Due to time constraints the choice was made to focus on only the sensing and mobilizing DEAC. Due to the fact that the three DEAC are all in relationship with each other, focusing on solely two offered only a incomplete insight into DEAC. Therefore the choice was made to focus on all three with less questions per DEAC.

Another method to offer face validity was the conduction of a survey based on the ITO vendor capabilities. The sentiment analysis of de relationship between the DEAC- and ITO vendor capabilities, relative to the subjective scoring of the ITO vendor capabilities from the survey offer insight into a possible correlation. This correlation is displayed within the summary of the results.

To ensure that interviewees understood the concept of EA an introduction was given into the research domain, together with the research design and goal the research aimed to achieve. Selected stakeholders were generally familiar with EA. The time reserved for the interview was one and a half hours, interviewees that had a good understanding of EA tended to be able to answer the questions quicker than participants who had more trouble linking the questions to EA. The extra time offered the opportunity to elaborate more on the definition of EA.

5.1.4 Reliability

A threat identified for the reliability of the research was one singular researcher conducting the study. This creates an increased risk for potential biases to influence results such as in analysis. To address this risk, the research method was described in detail and followed for all interviewees. Additionally any

interpretations were offered to the interviewees to validate if the interpretation was correct. One interviewee was interested in this but required no adjustments.

5.1.5 Ethical Aspects

To ensure the research was conducted in an ethical manner, the steps described 3.6.4 were executed. In practice this resulted in the anonymous handling of the data including removing any names of people and organizations within the transcriptions. Additionally data is not shared within the case organization.

5.2: Conclusion

5.2.1: Conclusion Research

To answer the main research question: *“Can Enterprise Architecture be infused into capabilities required for an Information Technology Outsourcing vendor?”*, several empirical research questions were formulated. The results in chapter four display per DEAC, examples of how the case organization deploy EA regarding the identified ITO vendor capabilities and thus proving whether EA can be infused into the ITO vendor capabilities. This answers the empirical research question how the case organization deploys EA relative to the ITO vendor capabilities. The outcomes to the sub-research questions are shown in figure 36.

Question No.	Question	Applicable
1	Does the DEAC Sensing capability apply to the CRM capability?	Yes
2	Does the DEAC Mobilizing capability apply to the CRM capability?	Yes
3	Does the DEAC Transformation capability apply to the CRM capability?	Yes
4	Does the DEAC Sensing capability apply to the MD&D capability?	Yes
5	Does the DEAC Mobilizing capability apply to the MD&D capability?	Yes
6	Does the DEAC Transformation capability apply to the MD&D capability?	Yes
7	Does the DEAC Sensing capability apply to the personnel capability?	Yes
8	Does the DEAC Mobilizing capability apply to the personnel capability?	Yes
9	Does the DEAC Transformation capability apply to the personnel capability?	Yes

Figure 36: Concluding answers to sub-research questions

Customer Relationship Management Capability:

EA is found to be infused into the CRM capability. EA is used to reflect customer demand by offering standardized service offerings and creating insight into dependencies of products and services to identify threats and evaluate changes in the customer's baseline. EA is continuously enhanced by understanding and influencing customer needs and validating current services against those demands. It is also used to evaluate customer customizations based on alignment with the organization's mission and vision, with a focus on creating a standard offering with variants for specific customer clusters. Furthermore, EA is used to create a detailed plan for implementing the service offering, enabled by an easily reconfigurable technology landscape made possible by a modular architecture. Digital transformations are made possible by flexible adaptation of human resources by distinguishing between freelance personnel and regular personnel for the As-Is and To-Be situation respectively.

Methodology Development & Dissemination Capability:

EA is found to be infused into the MD&D capability. EA is used to monitor changes in dependencies, customer feedback, and third-party suppliers to identify threats and opportunities and thereby creating a greater proactive and reactive strength. EA enables quick and thorough evaluation of affected products and services by predefined analyses, using: minimal requirements, relevant stakeholders and relationships with other products and business processes. It also enables the evaluation of prior chosen solutions by monitoring the effect based on key performance indicators (KPIs) and reflecting on these. EA guides bottom-up innovation of decentralized platform teams by incorporating checks and balances to ensure alignment with the mission and vision of the organization. It also enables the organization to easily reconfigure technology and supporting business processes by documenting the rationale behind configurations and supporting work tasks. Therefore EA enables the organization to offer a high degree of decentralization, offering bottom-up initiatives to react quickly to gain a possible competitive advantage while keeping a top-down overview to guide organizational change in accordance with the organizational strategy.

Personnel Capability:

EA is found to be infused into the personnel capability. EA provides insight into how personnel fit into adopted technologies and business processes, allowing for the identification of potential threats to service offerings. It also helps to gauge personnel satisfaction and evaluate changes within the organization through the perceived effect on personnel satisfaction. Furthermore, EA aids in evaluating and prioritizing necessary skills for personnel by aligning them with the organization's long-term mission and vision and accompanying technology landscape. To ensure adherence to the defined EA, checks and balances are incorporated through the assignment of roles with specific responsibilities. Detailed planning for personnel development is created by incorporating both organizational needs and individual preferences. By involving personnel in the implementation phase, the support base for the usage of EA is increased, allowing the creation of new or substantially altered methods of achieving targets. Furthermore, it enables the adjustment of business processes and technology through the allocation of roles with the responsibility to maintain and create new EA.

5.2.2: Conclusion in Relation to Existing Literature

Zachman (1997) describes EA as a set of descriptive representations that are relevant for describing an enterprise. Kotusev (2018) names these EA artifacts and states that the EA artifacts are created through practicing EA. This is in line with the findings from this study where multiple EA artifacts have been discovered within the case organization. Otto (2012) and Soomro et al (2016) expand on this by stating that although EA is necessary, it only creates value if used appropriately. This was found to be true within this study in the sense that although EA existed, it was not used to its' full potential or not at all. This was apparent in having multiple decentralized platform teams with different levels of maturity in their capability to utilize EA. Additionally the findings comply to prior research of Kotusev (2017) regarding the relationship of different types of EA artifacts. This relates to the use of different EA artifacts in different stages of the DEAC relative to the ITO vendor capabilities. Grave et al (2021) researched which EA artifacts are used in the context of the strategic planning process, of which the following were found to be true in this research: SWOT analysis, strategic plan, operating model (OLA in this research), enterprise portfolio (PSC), principles and guidelines, stakeholder communication plan and technology standards list (both part of the OLA).

Levina and Ross (2003) state that the ITO vendor capabilities cannot be seen in silos but influence each other. This research confirms that finding by identifying numerous examples of how personnel, customer relationship management and methodology are intertwined within the EA of the organization. The same is true for the sensing-, mobilizing- and transformation DEAC. Van de Wetering (2020) classifies these DEAC as related, but distinct capabilities. This concurs with this research, the starting point of one DEAC is often found to be the product of a different DEAC. For example a sensed threat is mitigated by the mobilization and then the transformation of the threat before it becomes a problem.

Kim et al (2014) found that a decentralized organizational structure encourages a bottom-up structure relative to a more centralized structure. Additionally a bottom-up approach is found to be more fitting to pursue diverse improvement opportunities beyond the management's strategic focus. The findings from this research find that although bottom-up innovation is encouraged, EA is a guiding mechanism to align bottom-up innovation with the managements strategic focus through control mechanisms.

5.2.3: Future Research

This research focusses on how EA is used regarding the ITO vendor capabilities and therefore has a bias to look for the existence of EA in an organization. During the interviews the interviewees also had a tendency to answer what problems arise when EA is not used. Additionally the organizational structure in the form of decentralized platform teams offers the opportunity the conduct a single case study in an embedded form instead of holistic. Platform teams can be compared with one another in a relative controlled environment in the form of the same organization. These findings can offer an opportunity for further research to address the problem identified by Niemi and Pekkola (2020), that the benefits of

EA(M) are difficult to dissect since there are few empirical studies that show a relationship between EA activities and resulting benefits.

6: Reflection

In the period that this study was conducted numerous changes happened within the case organization. Due to winning multiple large clients, the organization grew rapidly in all aspects. This created an interesting opportunity to test how the EA of the organization was able to scale. Inefficiencies within the organization arose needing to deliver the services on a much larger scale. This created a strengthened interest by the organization in EA. In turn this made the execution of the research easier due to the familiarity with EA. In addition interviewees within the organization were happy to help by participating in the research for which a special thanks.

During the design of the research methodology the right scoping of the research posed a problem. One factor being the limited time to execute the research and the other the desire for relevance of the research. This resulted in several pivots in the research approach.

Another educational experience was the ability to conduct semi-structured interviews through a natural flowing conversation. Progressing through the interviews the answers to the formulated questions were integrated more naturally within the interview. This offered more flexibility in integrating EA subjects within examples interviewees gave and continuing to build on previous examples given. This created a rich insight into the organizational context.

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Appendix A

Interview Protocol

Phase 0: Preparation of the Interview (Pre- Interview)

- Introduction to Enterprise Architecture within the scope of the research to ensure face validity to interviewees.
- Send a copy of the interview questions to interviewees to ensure participants are familiar with the questions.
- Send survey regarding the research.

Phase 1: Introduction – The interviewer

- Thanking the interviewee for participating in the research.
- Interviewer introduces himself and personal motivation for conducting the research.
- Interviewer explains the goal of the research and research questions and relevant context.
- Interviewee explains the ethical aspects of the interview. How data is handled anonymously, how the interview is not part of employment within the company and that the interviewee can stop at any moment.
- Interviewer offers the opportunity to gain insight in the product of the data to be gathered in the interview. Additionally the interviewee is granted an opportunity to make any changes in interpretations made from the interview.
- The interviewer asks if the interviewee has any questions about phase 0 or any other questions.

Phase 2: Introduction of the interviewee

- Introduction of the interviewee: role inside the organization and any other fulfilled roles in the past relevant to EA.
- Question how familiar the interviewee is with EA.

Phase 3: The Interview

- The interview is conducted based on the formulated questions.

Phase 4: Closing the interview

- The interviewer explains the following process steps for the research and what role the interviewee has in these steps.
- The interviewer thanks the interviewee for participating.

Phase 5: Post-Interview

- Interviewer transcribes the interview and shares it with the interviewee.
- Interviewer shares analysis of the interview and any made assumptions to validate if these are correct.

Appendix B

Transcription Interviews

This section was deleted.

Appendix C

Results Survey

This section was deleted.