MASTER'S THESIS

Dynamic enterprise architecture capabilities, digital platform capabilities and operational digital ambidexterity

Examining the impact of DEAC on organizational performance through digital platform capabilities and operational digital ambidexterity.

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Abstract

Dynamic enterprise architecture capabilities (DEAC) being the firm's ability to integrate, build and reconfigure internal and external resources to address and shape changing business environments play an important role for organizations. However, there is still limited empirical evidence of how DEAC can enhance the performance of organizations.
The conceptual model built on literature review proposes a positive impact of DEAC on organizational performance through digital platform capabilities and running and reinventing operational tactic of personnel and tools named operational digital ambidexterity. In addition, the moderation effect of market and technological turbulence is examined.
To collect data, an online survey is conducted among professionals in the information technology/business field such as enterprise architects, chief information officers, and information technology managers. The survey items are derived from empirical validated literature. Partial least squares structural equation modelling is used to analyze the dataset (n=148) which means that the results of the hypothesis testing support the conceptual model. This study concludes that DEAC have a positive impact on organizational performance. This impact is mediated through digital platform capabilities and operational digital ambidexterity. Furthermore, no evidence has been found that market and technological turbulence moderate the positive effect of operational digital ambidexterity on organizational performance.

Key terms

Dynamic enterprise architecture capabilities, dynamic capabilities, digital platform capabilities, operational digital ambidexterity, organizational performance, market and technological turbulence.

Summary

Today's digital era forces organizations to develop dynamic capabilities in order to respond rapidly to changes. In recent years, the notion of dynamic enterprise architecture capabilities (DEAC) has been regarded as the firm's ability to integrate, build and reconfigure internal and external resources to address and shape changing business environments to remain competitive and yield organizational benefits (Van de Wetering, 2020). While it is important that firms should have DEAC, there is limited empirical evidence about the antecedents of these capabilities. Recent literature argues that dynamic capabilities can raise value through digital platforms. Digital platforms are technologies that enable organizations to integrate, edit, and distribute data on a large scale (Javier Cenamor et al., 2019).
In addition, the relationship between dynamic capabilities and running and reinventing tactic named operational digital ambidexterity has not been sufficiently examined. Moreover, it is not clear how market and technological turbulence affect these impacts.

Substantial gaps remain in the literature between dynamic capabilities, ambidexterity, and digital platform capabilities as concepts of dynamic capability view (DCV). Therefore, the purpose of this study is to examine the impact of DEAC on organizational performance though digital platform capabilities and operational digital ambidexterity and to examine how market and technological turbulence affect these impacts.

The following research question and sub-question were formulated with a view to achieving the above objective:
What are the impacts of dynamic enterprise architecture capabilities (DEAC) on organizational performance through digital platform capabilities and operational digital ambidexterity? AND How do market and technological turbulence moderate this impact?"

A systematic literature review was conducted with a view to answering these questions. The purpose of the literature review was to identify what is already known in the extant literature about the supposed relationships between the concepts mentioned above. Furthermore, on the basis of explanations a conceptual model with a number of testable hypotheses was formulated.

The chosen research design was a cross-sectional field survey with the use of a questionnaire. This method is less time-consuming than an interview survey, and better suited to analyzing quantitative data than a longitudinal or interview survey. The data collection was done by the non-probability method. The chosen methods of sampling were convenience sampling and respondent-driven sampling (RDS). The advantage of these types of sampling is that the population is readily available. Another advantage is the effective reach of hidden populations. The survey is focused on people that most likely understand the strategic role of enterprise architecture (EA) within organizations; for example, chief information officers (CIOs), senior information technology (IT) managers, and enterprise architects. The survey was undertaken in accordance with the following ethical aspects: anonymity was guaranteed, participation was voluntary, and results could not be traced back to individuals or organizations. Furthermore, this study complies with the Dutch Code of Conduct for Academic Practice.

The data were gathered by using the network of researchers and social media platforms such as LinkedIn and Facebook. A total of 392 responses were collected, 162 of which were complete.

The data analysis was done by means of SPSS statistical tools and partial least squares structural equation modelling (PLS-SEM). PSL-SEM is a suited method for understanding the relationships between concepts. The hypothesis testing was done by a PLS method called bootstrapping.

The findings reveal a positive direct impact of DEAC on digital platform capabilities and on operational digital ambidexterity. In addition, the findings demonstrate a positive direct impact of digital platform capabilities on organizational performance. The impact of operational digital ambidexterity on organizational performance is also positive. By contrast, no evidence was found of the moderation effect of market and technological turbulence on the positive impact of operational digital ambidexterity on organizational performance.
Furthermore, the results indicate that digital platform capabilities and operational digital ambidexterity mediate the impact of DEAC on organizational performance. These empirical insights support the formulated hypotheses and are in line with the expectations of the extant literature. This study empirically enhances the concept of DEAC by providing evidence of the mediating role of digital platform capabilities and operational digital ambidexterity on organizational performance.

This research has several limitations. First, a non-probability sampling method was used. Therefore, possible sample bias might exist. In addition, the focus was primarily on organizations in the Netherlands. Thus, one must be careful in generalizing the results outside of Netherlands. Future research in other countries could enhance the generalizability of the findings. In addition, future research could focus on examining the relationship between digital platform capabilities and ambidexterity. Finding empirical and theoretical evidence for this relationship could further enhance the understanding of these concepts and their value for firms.

Contents

Introduction

1.1 Background of the research topic and concepts

Nowadays, the success of an organization depends on the capability to deal with change under complex environmental business conditions (Vanpoucke, Vereecke, & Wetzels, 2014). Organizations can employ or develop several capabilities to sustain or enhance their success. Lately, researchers seek to understand how dynamic capabilities, digital platforms and operational digital ambidexterity could create sustainable benefits for organizations (Javier Cenamor et al., 2019; Lee, Sambamurthy, Lim, & Wei, 2015). These notions are elaborated below.

Dynamic enterprise architecture capabilities

According to D. J. Teece, Pisano, and Shuen (1997) dynamic capabilities are "the firm's ability to integrate, build and reconfigure internal and external resources to address and shape changing business environments". Moreover, Teece (2007) categorizes dynamic capabilities into, "sensing and shaping opportunities and threats, seizing opportunities, and maintaining competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets".

Organizations with strong dynamic capabilities are able to quickly anticipate to changes and modify their activities to new realities in competitive environments (Hazen, Bradley, Bell, In, & Byrd, 2017).

There are numerous types of dynamic capabilities found in the literature, for instance, dynamic integration, learning, and reconfiguration capabilities (Lin & Wu, 2014). Recently, enterprise architecture (EA) based capabilities are subject of discussion (Hazen et al., 2017; van de Wetering, 2019a). These EA-based capabilities can be seen as sustainable organization-specific capabilities that can bring competitive advantage (Hazen et al., 2017). Moreover, van de Wetering (2019a) conceptualized EA-based capabilities (EA sensing, EA mobilizing, EA transforming) as dynamic enterprise architecture capabilities (DEAC) on the claim that the extent to which EA is successfully leveraged depends on dynamic capabilities. According to van de Wetering (2019a) DEAC are "an organization's ability to leverage its (EA) for asset sharing and recomposing and renewal of organizational resources, together with guidance to proactively address the rapidly changing internal and external business environment and achieve the organization's desirable state". This study draws on the concept of DEAC.

Digital platforms

Digital platforms are technologies that enable organizations to integrate, edit, and distribute data on a large scale (Javier Cenamor et al., 2019). Examples of digital platforms are network standards, application software platforms, and digital media platforms such as Facebook (Javier Cenamor et al., 2019). Digital platforms are used by organizations to leverage their business strategy in response to competitive pressure (Javier Cenamor et al., 2019; W. Li, Liu, Belitski, Ghobadian, & O'Regan, 2016). Digital platforms play an important role in organizations' value proposals (Javier Cenamor et al., 2019; J. Cenamor et al., 2017). On the other hand, dynamic capabilities play a role in the management of platforms by foreseeing change, modifying business models, and aligning complementarities (D. J. Teece, 2017).

Operational digital ambidexterity

According to Lee et al. (2015) operational digital ambidexterity refers to the firm's ability to "improve current operations" (exploitation) and "invent new operational techniques or operational processes" (exploration) using digital technology. Exploitation is about efficiency and short-term success, while exploration is focused on discovering new capabilities, innovation, and long term-results (Javier Cenamor et al., 2019; O'Reilly & Tushman, 2008). Lee et al. (2015) distinguish two types of ambidexterity, namely IT ambidexterity and operational ambidexterity. Alongside dynamic capabilities, ambidexterity is another theoretical perspective that seeks to explain how organizations achieve and sustain competitive advantages in turbulent environments (Lee et al., 2015; Popadiuk, Luz, & Kretschmer, 2018)

Market and technological turbulence
Market turbulence refers to "the extent to which the composition and preferences of an organization's customers tended to change over time"(Jaworski & Kohli, 1993). Technological turbulence refers to "the extent to which technology in an industry was in a state of flux" (Jaworski & Kohli, 1993). More concrete, this means the rate of technological change in an industry. In highly market and technologically turbulent environments, organizations need to pursue ambidexterity to build diverse and adjustable operational activities (Lee et al., 2015).

Organizational performance
Organizational performance "refers to the concept in which organizations successfully (in contrast to competitors) increase market share, profit, customer satisfaction, and enhance customer loyalty and business brand and image (Chen & Tsou, 2012).

1.2 Exploration of the research topic and problem statement

Lately, the literature has argued that dynamic capabilities can enable and create value through digital platforms (Helfat & Raubitschek, 2018; D. J. Teece, 2017). Enabling value happens through design and redesign of the business models and value creation happens through lowering the transaction costs of outsourcing (Helfat & Raubitschek, 2018). Although dynamic capabilities are critical for firms with digital platforms to have, it is not clear how these capabilities enhance organizational performance and what the antecedents are. Limited empirical evidence is available in the extant literature (Xiao, Tian, & Mao, 2020). The literature also recommends developing the dynamic capabilities view (DCV) by examining relationships among concepts such as dynamic capabilities and digital platform capabilities (Schilke, Hu, & Helfat, 2018; Xiao et al., 2020).
In addition, the literature has argued that the relationship between dynamic capabilities and ambidexterity has not been sufficiently examined (Jurksiene & Pundziene, 2016). Moreover, the literature emphasizes finding empiric evidence of the interrelationships between various types of organizational ambidexterity and dynamic capabilities (Popadiuk et al., 2018).

1.3 Research objective and questions

Based on the gaps found in the literature, the objective of this study is to examine the impact of dynamic enterprise architecture capabilities (DEAC) on organizational performance through digital platform capabilities and operational digital ambidexterity. In doing so, the second aim is it to examine this impact in market and technologically turbulent environments.

In order to achieve the objectives above, the following research question and sub question must be answered.

Main question: *What are the impacts of dynamic enterprise architecture capabilities (DEAC) on organizational performance through digital platform capabilities and operational digital ambidexterity? AND*
Sub question: *How does market and technological turbulence moderate this impact?*

1.4 Contribution to the body of knowledge

This research contributes to the existing body of knowledge by empirically enhancing the concept of DEAC introduced by van de Wetering (2019a). This evidence also extends the DCV. This is done by examining the relationship of DEAC and digital platform capabilities. In addition, this study empirically

advances the relationship between dynamic capabilities and ambidexterity. This is done by examining the impact of DEAC through operational digital ambidexterity on organizational performance.
The results may also be useful in practice. Practitioners can use insights from this research to enhance innovation and properly allocate the available resources.

1.5 Definitions of concepts

In this section, the concepts used in this study are defined. See Table 1 for the definitions.

Table 1: definition of concepts

Concepts	Definition
Dynamic enterprise architecture capabilities (DEAC)	"an organization's ability to leverage its (EA) for asset sharing and recomposing and renewal of organizational resources, together with guidance to proactively address the rapidly changing internal and external business environment and achieve the organization's desirable state" (van de Wetering, 2019a).
EA-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, Gloet, Asadi Someh, Frampton, & Tamm, 2018; Toppenberg, Henningsson, & Shanks, 2015; Van de Wetering, 2020)
EA-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, Bharadwaj, & Sambamurthy, 2006; Sambamurthy, Bharadwaj, & Grover, 2003; Shanks et al., 2018; Van de Wetering, 2020)
EA-transforming capability	"an EA transforming capability can be considered as 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; Van de Wetering, 2020)
Digital platform capabilities	The ability to achieve platform integration "through the timely and idiosyncratic exchange of information with its partners" and the ability to reconfigure platform resources "through modular designs and standardized interfaces in applications and processes" (Javier Cenamor et al., 2019).
Operational ambidexterity	"firm's ability to simultaneously pursue operational exploration and exploitation" (Lee et al., 2015).
Operational digital exploration capability	Operational digital exploration capability: "An ability to fundamentally change or invent new business operations (e.g., product/service development and production, supply chain management, customer delivery, and employee management) to create new ways of performing daily tasks using digital technology" (Lee et al., 2015).
Operational digital exploitation capability	Operational digital exploitation capability: "The ability to enhance operational productivity by improving the efficiency and cycle time of current operations and reducing their cost using digital technology" (Lee et al., 2015).
Market turbulence	"the extent to which the composition and preferences of an organization's customers tended to change over time"(Jaworski & Kohli, 1993).
Technological turbulence	"the extent to which technology in an industry was in a state of flux" (Jaworski & Kohli, 1993).
Organizational performance	"refers to the concept in which organizations successfully (in contrast to competitors) increase market share, profit, customer satisfaction, and enhance customer loyalty and business brand and image (Chen & Tsou, 2012).

1.6 Main lines of approach

The research will proceed as follows. In the next section, the theoretical framework and literature review are elaborated. Subsequently, the methodology is described. After that, the results of the measurement model, structural model, and hypothesis testing are presented. The study ends, with the discussion of the results, conclusion, reflection, limitations, implications for theory and practice, and suggestions for further research.

Theoretical framework

This chapter provides the theoretical framework.

2.1 Objective of the literature review

The objective of this literature review is threefold. The first objective is to find out what is already known in the current literature about the impact of dynamic capabilities on organizational performance through digital platform capabilities and operational digital ambidexterity. The second aim involves what is already known in literature about the moderating effects of market and technological turbulence. Finally, on the basis of the found insights, a conceptual model is formulated in the form of hypotheses, which contribute to answering the research question and sub question.

2.1.1 Research approach

The literature review is developed by means of a systematic literature review. Saunders, Lewis, and Thornhill (2019) describe such a review as "a comprehensive preplanned strategy for locating, critically appraising, analyzing and synthesizing existing research that is pertinent to a clearly formulated research question to allow conclusions to be reached about what is known". Due to time constraints, a simplified version of systematic literature review was conducted. Hereby, all criteria that apply to the method of the systematic literature review were considered.

To find relevant information about the research topic, a number of search strategies were conducted.

- **Base literature:** First of all, the base literature given by the provisioner was examined.
- **Online search:** Thereafter, an online search was done to find scientific articles in Google Scholar and the OU online library. This search was primarily conducted through a set of keywords.
- **Snowball method:** Snowballing methods were applied to find relevant topic information. This includes both backward snowballing (searching in the bibliography of an article) and forward snowballing (finding more recent studies that cite the article).
- **Building blocks method:** Finally, queries were used to find relevant studies about the concepts.

To guarantee the quality of this research, a variety of selection criteria were applied. The selection criteria were derived from (Saunders et al., 2019, pp. 84-91). These selection criteria are listed below.

- **Refereed academic journals:** Refereed journals are assessed on quality and suitability by academic peers before publication (Saunders et al., 2019). Therefore, these journals are considered reliable. An example of refereed journals is the "basket of eight" in the discipline of information systems.
- **English:** The articles used are written in English.
- **Publication period:** There is no limitation on the publication period. However, more recent articles are preferred because they include recent knowledge about the examined concepts.

2.1.2 Implementation

The literature search was conducted by using both the online engine Google Scholar and the OU online library. A number of queries were defined. The queries were deduced from the base literature given by

the provisioner. Queries are used to limit or widen the number of articles. Saunders et al. (2019) call such queries "search strings".
The articles found were examined based on their relevance to the subject. This was done by reading the abstract and, in cases of relevant information, the full-text was downloaded for further exploration. The reference of collected relevant articles was imported in the software program Endnote. The used queries, number of hits, number of articles reviewed, and relevant articles are displayed in Table 2.

Table 2: queries, hits, number of reviewed articles, and relevant

Queries	Search engine	Number of hits	Number of articles reviewed	Number of relevant articles
Dynamic capabilities AND digital platform capabilities *(peer reviewed)*	OU online library	41,496	15	6
Digital platforms capabilities AND organizational performance (*peer reviewed)*	OU online library	9,955	8	3
Dynamic capabilities AND ambidexterity (*peer reviewed)*	OU online library	1,924	8	2
Ambidexterity AND firm performance (*peer reviewed)*	OU online library	2,511	12	4
Ambidexterity AND environmental dynamism AND performance	OU online library	454	7	2
Backward Snowballing	OU online library/ Google Scholar	-	23	7
Base literature	OU online library/ Google Scholar	-	-	9
Total reviewed and relevant articles			**73**	**33**

Besides the articles found in the literature review, both the base literature and articles found through backward snowballing were used to elaborate the theoretical framework. The full list of examined articles is found in the Appendix 1 – Literature Overview.

2.2 Dynamic Enterprise Architecture Capabilities

Trends and market forces, such as the increasing regulatory pressure, growing need for integration within and between organizations, and business-driven and IT-driven change opportunities, drive the adoption of enterprise architecture (EA);(van de Wetering, 2019a). The benefits of deploying EA range very abstract, such as business-IT alignment and improved decision-making, to concrete, measurable benefits, such as reduced costs (Niemi & Pekkola, 2019). Organizations that do not invest in valuable, rare, inimitable, and non-substitutable (VRIN) IT resources risk losing value from both resources and capabilities (van de Wetering, 2018). Recently, the literature has provided evidence that EA-induced capabilities play significant roles in achieving value from EA for both projects and the entire organization (Foorthuis, van Steenbergen, Brinkkemper, & Bruls, 2016). In addition, prior work found evidence that EA based capabilities enhance organizational agility and indirectly enhance organizational performance (Hazen et al., 2017). Prior literature also found evidence that DEAC are an important antecedent of business/IT alignment and process innovation (van de Wetering, Kurnia, & Kotusev, 2020). Moreover, there is empirical evidence that DEAC have a positive indirect effect on organizational benefits (Van de Wetering, 2020).

Previous work on EA Based capabilities clearly provides evidence that robust EA based capabilities lead to a coherent collection of knowledge and skills and can allow an enterprise to generate superior profits and thus provide the underpinnings of sustainable competitive advantage (Schoemaker, Heaton, & Teece, 2018; D. Teece, Peteraf, & Leih, 2016; D. J. Teece, 2012). While the need and benefits of deploying EA and having strong dynamic capabilities are evident, the empirical evidence of DEAC is still limited. Literature suggests further investigating the influence of DEAC on organizational benefits (van de Wetering, 2019a). Therefore, this research examines the impact of DEAC on organizational performance. This is done on the basis of the DCV theory and the conceptualisation of DEAC by van de Wetering (2019a).

2.2.1 Dynamic Enterprise Architecture Capabilities and digital platform capabilities

Digital platforms have proliferated (de Reuver, Sørensen, & Basole, 2018; Spagnoletti, Resca, & Lee, 2015). Digital platforms, as the primary components of modern IT infrastructure, are increasingly recognized as the foundation of services, products, and operations of modern firms (T. Li & Chan, 2019). The basic types of digital platforms are transaction platforms and innovation platforms (D. J. Teece, 2017). Transaction platforms make the exchange between customers and/or organizations possible, and innovation platforms provide a system or technology whereby other firms can add their innovations (D. J. Teece, 2017).

However, merely having a digital platform is not enough for an organization to increase performance (Javier Cenamor et al., 2019). The need to have digital platform capabilities is crucial because it represents the capability to employ ICT-based resources together with other internal and external means (Javier Cenamor et al., 2019). Prior literature, found evidence that digital platform capabilities positively affect dynamic capabilities (Xiao et al., 2020). Moreover, digital platform capabilities are vital for the performance and innovation of organizations and enable IT units to obtain value from IT infrastructural components (T. Li & Chan, 2019; Xiao et al., 2020).

The above empirical findings demonstrate the importance of having strong digital platform capabilities to raise performance. However, the understanding of the antecedents and implications of digital platform capabilities is limited, as are the business strategies associated with it (Frishammar, Cenamor, Cavalli-Björkman, Hernell, & Carlsson, 2018). To fill the gap, this research investigates what impact DEAC have on digital platform capabilities.

In line with the extant literature, the current study expects a positive impact of DEAC on digital platform capabilities.

H1: *DEAC have a positive impact on the digital platform capabilities of an organization*

2.2.2 Digital platform capabilities and organizational performance

The emergence of digital platform capabilities provides organizations with many opportunities to adapt to constant changes (Javier Cenamor et al., 2019; L. Li, Su, Zhang, & Mao, 2018). An example of these opportunities is the ability to integrate key shared knowledge so as to leverage and reconfigure internal and external resources (Javier Cenamor et al., 2019). Recently, the literature has provided evidence that higher digital platform capabilities enhance and extend organizations' primary products and services (Karimi & Walter, 2015). Prior literature also provided evidence that digital platform capabilities both enhance organizational performance through network capabilities and enable improvements in innovations and efficiency (Javier Cenamor et al., 2019; Sedera, Lokuge, Grover, Sarker, & Sarker, 2016). The above findings demonstrate that organizations benefit from having strong digital platform capabilities. Based on these insights, the current study posits that digital platform capabilities have a positive impact on organizational performance.

H2: *Digital platform capabilities have a positive impact on organizational performance*

2.2.3 Dynamic Enterprise Architecture Capabilities and operational digital ambidexterity

The concept of organizational ambidexterity has been greatly studied over the past 15 years, producing substantial explanations for how organizations deal with two more or less competing objectives (O'Reilly & Tushman, 2013; Vahlne et al., 2017). Ambidexterity provides insight into how organizations explore new opportunities while continuing to exploit existing markets and resources (Birkinshaw, Zimmermann, & Raisch, 2016). Lee et al. (2015) found empirical evidence that IT ambidexterity enhances organizational agility though operational ambidexterity. Lee et al. (2015) consider IT ambidexterity (a lower-order functional capability) as an antecedent of organizational agility (a higher-order dynamic capability). This means that having strong operational ambidexterity is important for achieving organizational agility. Popadiuk et al. (2018) found a relationship between the micro foundations of dynamic capabilities (sensing, seizing and reconfiguring) and ambidexterity (exploration and exploitation capabilities). This means that, exploration capability is perceived through the sensing phase by seeking for innovation, opportunities, and knowledge. On the other hand, exploitation capability is perceived in the seizing phase where company’s capability to sustain efficiency and evolve is reflected by constant realignment of resources (Popadiuk et al., 2018).

Recently, the literature argues that dynamic capabilities play a vital role in the ability of organizations to be ambidextrous, improve, and change (O’Reilly & Tushman, 2008; D. J. Teece, 2007). Moreover, literature has argued that the relationship between dynamic capabilities and ambidexterity has still not been sufficiently examined (Jurksiene & Pundziene, 2016). To fill this gap, the current study examines the impact of DEAC on operational digital ambidexterity. In line with the previous findings, current study posits that DEAC have a positive impact on operational digital ambidexterity.

***H3:** DEAC have a positive impact on operational digital ambidexterity*

2.2.4 Operational digital ambidexterity and organizational performance

Recently, Barkema and Drogendijk (2007) found evidence that a balanced strategy of exploitative and explorative activities can effectively sustain the performance of direct foreign investments. In addition, ambidexterity has a positive relation with greater firm performance, increased firm innovation, sales growth, increased survival rates, and market valuation (O'Reilly & Tushman, 2013; Popadiuk et al., 2018).

Based on the positive evidence found in the prior literature, the current study posits that operational digital ambidexterity (operational exploitation and exploration) has a positive impact on organizational performance.

***H4:** Operational digital ambidexterity has a positive impact on organizational performance*

2.2.5 Market and technological turbulence

A large amount of complexity and change in industries’ environments force organizations to adapt quickly in order to survive (Kipley, Lewis, & Jewe, 2012). Recently, (Tamayo-Torres, Roehrich, & Lewis, 2017) found evidence that dynamic environments positively influence the relationship between ambidexterity and performance. This means that, in dynamic environments, organizations that develop higher ambidexterity (exploration and exploitation capabilities) can more effectively deploy resources and thereby develop higher operational flexibility (Peng & Lin, 2019; Zhan & Chen, 2013). Based on this evidence, the current study expects that market and technological turbulence positively moderates the effects between operational digital ambidexterity and organizational performance.

***H5:** Market and technological turbulence positively moderates the effect of operational digital ambidexterity on organizational performance*

2.3 Conceptual model

The conducted literature review and hypothesis development resulted in a conceptual model. The proposed conceptual model is shown in Figure 1. The model consists of five supposed relationships. First, this research posits that DEAC have a positive impact on digital platform capabilities. Second, digital platform capabilities have a positive impact on organizational performance. Third, DEAC have a positive impact on operational digital ambidexterity. Fourth, operational digital ambidexterity has a positive impact on organizational performance. Finally, this research aims to demonstrate that the effect of operational digital ambidexterity on organizational performance is positively moderated by market and technological turbulence.

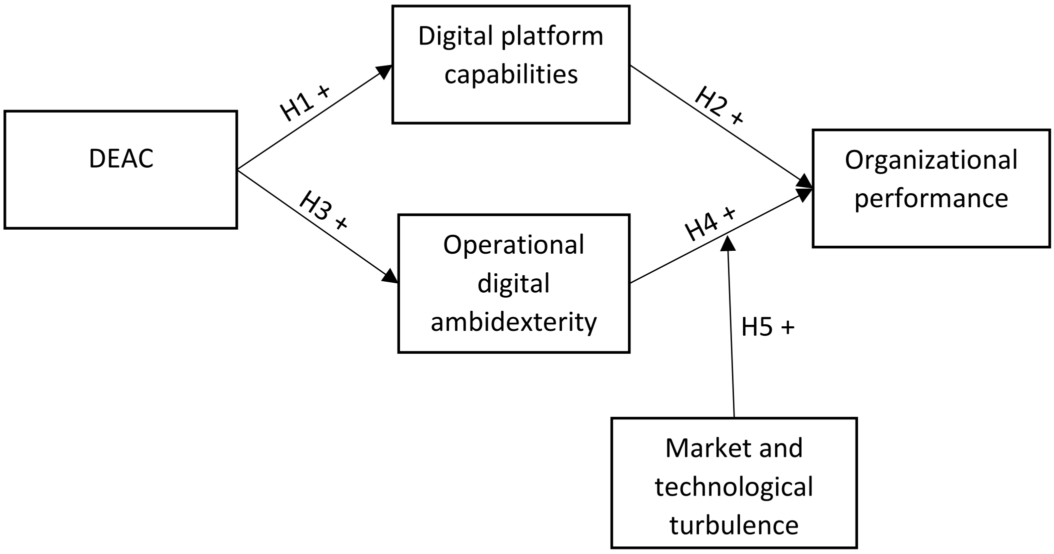

Figure 1: Conceptual model

Methodology

In the previous chapter of the research, the conceptual model was substantiated, and a number of hypotheses were formulated. The objective of this chapter is to describe the methodology and explain how the hypotheses will be tested empirically.

3.1 Conceptual design: research method selection

A positivistic management philosophy was chosen to explain the impact of DEAC thorough digital platform capabilities and digital operational ambidexterity on organizational performance. Positivism entails the verification of a theory through observations and seeks to answer why- and how-type questions (Bhattacherjee, 2012). In addition, positivistic philosophy is value free and independent, and it works with measurable facts to produce law-like generalizations (Saunders et al., 2019). This approach is suitable because the objective of the study is to find positive impact between constructs based on theory. The method is highly structured and suitable for large samples, the operationalization of concepts, and quantitative analysis (Saunders et al., 2019).
Philosophies such as interpretivism are less suitable because they are focused on creating rich understandings and interpretations of social context rather than finding causal relationships (Saunders et al., 2019). For its part, the induction method is less suitable for large samples and theory testing.

3.2 Technical design: elaboration of the method

3.2.1 Research design

The chosen research design is a cross-sectional field survey where the descriptive and operationalized constructs (see Table 3) are measured at one point in time. A questionnaire is used to gather information in a field setting. Subsequently, the gathered information is empirically tested by using statistical methods (Bhattacherjee, 2012). For several reasons, a cross-sectional questionnaire survey was chosen over a longitudinal or interview survey. First, a cross-sectional survey is less time consuming. Given the fixed amount of time given, this method was more suitable. Second, questionnaires are more flexible and allow an economic collection of standardized data from a large sample of respondents (Saunders et al., 2019). Other methods are more expensive and require more effort to gather data from respondents. Finally, questionnaires allow a comparison and quantitative analysis of data through the use of descriptive and inferential statistics (Saunders et al., 2019). Such a data analysis is harder to achieve through, for example, an interview. A disadvantage of survey research is the possible sampling bias if the wrong population is targeted (Bhattacherjee, 2012). This bias can be prevented by setting clear criteria for the target population.

3.2.2 Questionnaire design

The questionnaire that was used to collect data consists of concepts that are either descriptive or operationalized constructs. Descriptive items have nominal or ratio scales. The operationalized items have interval scale statements and are measured by means of a seven-point Likert scale (to what extent do you agree 1 – strongly disagree 7 – strongly agree). The last question is an open question about the adequate understanding of the concepts. For the complete list of descriptive and operationalized items, see Appendix 2 – Survey. The operationalized constructs are derived from conceptual and empirical validated literature. The measurement of these constructs is shown in the next Section.

3.3 Measurement of constructs items

Dynamic enterprise architecture capabilities were operationalized as a second order formative construct and consists of three first-order reflective constructs, namely EA-sensing capability, EA-mobilizing capability, and EA-transforming capability. This measure is derived from empirically tested and validated literature (van de Wetering, 2019a, 2019b).
Digital platform capabilities were also operationalized as a second-order formative construct with two underlying items, namely platform configuration and platform reconfiguration. This measure was derived from extant literature (Javier Cenamor et al., 2019).
Operational digital ambidexterity consists of two items, namely digital exploitation capability and digital exploration capability. The construct was measured by multiplying the underlying three items of digital exploitation capability and digital exploration capability. Consequently, nine reflective items were created for the operational digital ambidexterity construct. This is in line with the existing literature (Im & Rai, 2008; Lee et al., 2015).
Organizational performance was measured as a first-order reflective construct with five underlying items. This is in line with the empirical work of Chen and Tsou (2012).
Market and technological turbulence were measured as a first-order reflective construct with eight underlying items: four for market turbulence and four for technological turbulence. This operationalization is in line with the work of Jaworski and Kohli (1993).

Table 3: Operationalization of construct items

Construct	Measurement items
EA Sensing capability	We use our EA to identify new business opportunities or potential threats
	We review our EA services (e.g., providing content, EA standards, skills and knowledge) on a regular basis to ensure that they are in line with what our key (internal and external) stakeholders want
	We adequately evaluate the effect of changes in the baseline and target EA on the organization
	We devote sufficiently time enhancing our EA to improve business processes
	We develop greater reactive and proactive strength in the business domain using our EA
EA Mobilizing capability	We use our EA to draft potential solutions when we sense business opportunities or potential threats
	We use our EA to evaluate, prioritize and select potential solutions when we sense business opportunities or potential threats
	We use our EA to mobilize resources in line with a potential solution when we sense business opportunities or potential threats
	We use our EA to draw up a detailed plan to carry out a potential solution when we sense business opportunities or potential threats
	We use our EA to review and update our practices in line with renowned business and IT best practices when we sense business opportunities or potential threats
EA Transforming capability	Our EA enables us to successfully reconfigure business processes and the technology landscape to come up with new or more productive assets
	We successfully use our EA to adjust our business processes and the technology landscape in response to competitive strategic moves or market opportunities
	We successfully use our EA to engage in resource recombination to match our product-market areas and our assets better
	Our EA enables flexible adaptation of human resources, processes, or the technology landscape that leads to competitive advantage
	We successfully use our EA to create new or substantially changed ways of achieving our targets and objectives
	Our EA facilitates us to adjust for and respond to unexpected changes
Platform configuration	Our platform easily accesses data from our partners' IT systems
	Our platform provides seamless connection between our partners' IT systems and our IT systems (e.g., forecasting, production, manufacturing, shipment etc.)

	Our platform has the capability to exchange real-time information with our partners
	Our platform easily aggregates relevant information from our partners' databases (e.g., operating information, business customer performance, cost information etc.)
Platform reconfiguration	Our platform is easily adapted to include new partners
	Our platform can be easily extended to accommodate new IT applications or functions
	Our platform employs standards that are accepted by most current and potential partners
	Our platform consists of modular software components, most of which can be reused in other business applications
Operational digital exploitation capability	Reduce the cost of existing business operations using innovative digital technologies (e.g., analytics, big data, cloud, social media, mobile)
	Improve the cycle time of existing business operations using innovative digital technologies
	Improve the efficiency of existing business operations using innovative digital technologies
Operational digital exploration capability	Implement extensive innovative digital technologies (e.g., analytics, big data, cloud, social media, mobile) in business operations (e.g., product/service development and production, supply chain management, customer delivery, employee management)
	Implement radical innovative digital technologies in business operations
	Implement operational innovative digital technologies that are difficult to replicate by other firms
Operational digital exploitation capability	Reduce the cost of existing business operations using innovative digital technologies (e.g., analytics, big data, cloud, social media, mobile)
	Improve the cycle time of existing business operations using innovative digital technologies
	Improve the efficiency of existing business operations using innovative digital technologies
Market turbulence	Customer needs and preferences change rapidly
	Product demands and preferences are uncertain
	It is easy to predict change in customer needs and preferences
	Market competitive conditions are unpredictable
Technological turbulence	It is difficult to forecast technology developments in our industry
	The technology environment is uncertain
	Technological development is predictable
	The technology environment is complex
Organizational performance	Increase market share
	Increase customer satisfaction
	Increase profit
	Enhance business brand and image
	Enhance customer loyalty

3.3.1 Data collection

The sampling was carried out by a non-probability method. This means that units were selected in a non-random way based on predefined criteria (Bhattacherjee, 2012). The chosen type of non-probability method is convenience sampling and respondent driven sampling (RDS). Convenience sampling has the advantage that the population is readily available and close at hand (Bhattacherjee, 2012). The disadvantage of this approach is the limited scientific generalizability (Bhattacherjee, 2012). RDS combines snowball sampling with statistical modelling, and it is an approach effective in reaching hidden populations (Heckathorn, 1997). In addition, RDS uses statistical modelling to compensate for collecting data in a non-random way (Bhattacherjee, 2012).

This survey focused mainly on people that most likely understand the strategic role of EA within an organization (Van de Wetering, 2020). For example, chief information officers (CIOs), senior IT managers, and enterprise architects. To increase reliability, pilot testing of the survey was conducted. The target audience was approached through email and social media platforms, such as LinkedIn. In addition, the researcher's network was contacted. To maintain reliability, a minimum of 100 respondents needed to complete the questionnaire.

3.3.2 Ethical aspects

Ethics are important because in the past, people have manipulated science in unethical ways (Bhattacherjee, 2012). This research follows several ethical principles. The ethical principles were derived from (Saunders et al., 2019, pp. 257-259). First of all, the data and findings are treated with fairness and integrity. Participation in this study is voluntary and participants can withdraw from the participation at any time. All participants are respected and no harm will be done. Obtained data is anonymous and used only for research purposes. The results cannot be traced back to individuals or organizations. Data is only accessible by the researchers and will not be distributed to third parties. Finally, this study complies with the European General Data Protection Regulation (GDPR) law and with the Dutch Code of Conduct for Academic Practice.

3.4 Data analysis

The data was analyzed by means of SPSS statistical tools and partial least squares structural equation modelling (PLS-SEM). SPPS software was used to analyze the descriptive statistics, and SmartPLS version 3.3.2 software was used to analyze the operationalized constructs.

PLS-SEM is a variance-based multivariate analysis method (do Valle & Assaker, 2016; Joseph F Hair Jr, Hult, Ringle, & Sarstedt, 2017). The PLS-SEM method has several benefits. First, SEM can investigate cause-effect relationships between latent (hidden) constructs (Astrachan, Patel, & Wanzenried, 2014). Second, SEM can simultaneously assess the relationships between multi-item constructs (Astrachan et al., 2014). Third, PLS-SEM can work with small sample sizes (Joe F Hair Jr, Sarstedt, Hopkins, & Kuppelwieser, 2014). Last, PLS-SEM is flexible and suitable for estimating complex models (Akter, Fosso Wamba, & Dewan, 2017; do Valle & Assaker, 2016). A constraint of the PLS-SEM method is the so-called PLS-SEM bias. This bias means that the measurement model results are overestimated and the structural model results are underestimated (Joseph F Hair Jr et al., 2017). Normally, this is a small and non-significant inconsistency (Joseph F Hair Jr et al., 2017).

Results

This chapter presents the results and analysis from the data that were collected through the survey. First, the survey undertaking and preparation of the collected data are discussed. Second, the results of the descriptive statistics are presented. Subsequently, the results of the measurement model and structural model are elaborated. Lastly, the results of the hypothesis testing are revealed.

4.1 Survey undertaking

The survey was prepared together with three other students from the master's course. To increase the content validity of the survey, a pretesting procedure was conducted. The pretesting was done by four professionals from various industries such as finance and transportation. The professionals came from the researcher's network. They were asked to complete the survey and to indicate their level of understanding of the questions and items. This resulted in comments on the comprehensibility of the questions. Based on these comments, a question was adjusted. After the adjustment, the final version of the survey went online.

The data collection commenced on 9 October 2020 and lasted until 8 December 2020. First, the researchers' network was targeted. Thereafter, requests were sent through social media platforms. Over 2,000 mainly enterprise architects were contacted through direct messaging on LinkedIn. In addition, messages were posted in Facebook groups, and emails were sent to organizations such as the Nederlands Architectuur Forum (NAF). For every respondent that fully completed the survey an amount of €1.50 was donated to the Wereld Natuur Fonds (WWF) charity organization.

4.1.1 Preparation of data for further analysis

The above efforts resulted in a total of 392 responses. After the collection of data, several issues needed to be addressed (Joseph F Hair Jr et al., 2017). The data set was examined with respect to sample size, missing values, suspicious response patterns, outliers, adequate understanding of the topic, the right target audience, and data distribution. For more details about the data preparation see Appendix 3 – Examination of the dataset.

In addition, a t-test was conducted in SPSS between the early and the late respondents. This test was performed to examine the possible non-response bias. The results revealed that there is no statistical significance between the early and the late respondents. This means that no response bias was identified. For more details about the T-test see Appendix 4 – T-test.

Although PLS-SEM is a non-parametric method, it is still important to check whether the data is not too far from a normal distribution (Joseph F Hair Jr et al., 2017). Data distribution was examined on the basis of skewness and kurtosis measures in SPSS. Any value between +1 and -1 indicates an approximately normal distribution of data. The majority of the operationalized constructs were indeed normally distributed. Some were either slightly above or below the threshold of +1 or -1.

After the examination of data, a total of 148 responses were taken for further analysis.

4.2 Analysis of the descriptive statistics

An analysis of the descriptive statistics and results is presented below.

The respondents worked in a wide variety of organizations such as Achmea, Capgemini, Nationale Nederlanden, and Oracle. More than 50% of the respondents worked in a company with over 3,000 employees. Over 70% of the respondents worked in the private sector. The best represented industry was Finance and Insurance (more than 20%) followed by Technology (14.2%), and Consulting Services (12.2%). The majority of the organizations (65.5%) had existed for more than 25 years, while 38.5% of the respondents had more than 25 years of work experience. Finally, more than 45% of the respondents worked as a business or enterprise architect. Further statistics such mean, standard deviation, and histograms can be found in Appendix 5 - Descriptive Statistics.

4.3 Evaluation of the measurement model

The measurement model is assessed through criteria for internal consistency of the constructs, convergent validity, discriminant validity and multicollinearity (Joseph F Hair Jr et al., 2017).

Convergent validity

Convergent validity is the extent to which a measure is positively correlated with other measures of the same construct (Joseph F Hair Jr et al., 2017). Convergent validity is evaluated by assessing indicator reliability and averaged variance extracted (AVE). Indicator reliability of 0.708 or higher and AVE of 0.5 of higher are considered good (Joseph F Hair Jr et al., 2017).

Internal consistency reliability

Internal consistency reliability refers to the extent of which a measure is consistent (Bhattacherjee, 2012). The internal consistency reliability of constructs was measured in SmartPLS version 3.3.2 with composite reliability and Cronbach's alpha. Composite reliability and Cronbach's alpha between 0.7 and 0.9 are considered reliable (Joseph F Hair Jr et al., 2017).

Discriminant validity

Discriminant validity refers to the extent of which a measure measures what it supposed to measures and does not measure other constructs (Bhattacherjee, 2012). Discriminant validity can be evaluated through cross-loadings, Fornell-Larcker criterion, and the heterotrait-monotrait ratio (HTMT) of correlations (Joseph F Hair Jr et al., 2017). In case of the assessment by cross-loadings, discriminant validity is established when the outer loadings of the corresponding constructs are greater than any cross-loadings on the other constructs (Joseph F Hair Jr et al., 2017). In case of the assessment by the Fornell-Larcker criterion, the square root of each construct AVE need to be higher than the highest correlation with any other constructs (Joseph F Hair Jr et al., 2017). Recently, Henseler, Ringle, and Sarstedt (2015) proposed a new criteria to assess discriminant validity, the HTMT. Henseler et al. (2015) argue that cross-loadings and Fornell-Larcker criterion are not reliable for assessing discriminant validity and therefore recommend using HTMT. According to (Joseph F Hair Jr et al., 2017), HTMT is an "approach estimate of what the true correlation between two constructs would be, if they are perfectly measured". Discriminant validity is achieved when the HTMT value between two constructs is below 0.90.

Multicollinearity

The second-order constructs – DEAC and digital platform capabilities – were examined through testing on multicollinearity. This is the case when two independent variables are strongly correlated with each other. Multicollinearity was assessed by examining the variance inflation factor (VIF), which should be smaller than 5 (Joseph F Hair Jr et al., 2017).

4.3.1 Measurement model results

First, the reliability indicator was examined. The results revealed that almost all item loadings were above 0.708 with the exception of the construct market and technological turbulence items. The items *it is easy to predict change in customer needs and preferences (0.016)*, *technological development is predictable (0.334)*, and *the technology environment is complex (0.471)* were omitted because they had very low loadings. On the other hand, the items *market competitive conditions are unpredictable (0.689)* and *technology environment is uncertain (0.676)* admittedly had loadings lower than 0.708 but were still acceptable for further analysis.

Next, the composite reliability – Cronbach's alpha and Average Variance Extracted AVE – were examined. The results are presented in Table 4.

Table 4: Cronbach's alpha, composite reliability, average variance extracted

	Cronbach's Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Digital platform capabilities	0.945	0.954	0.723
Exploitation capability	0.926	0.953	0.870
Exploration capability	0.931	0.956	0.878
Market and technological turbulence	0.833	0.878	0.591
Mobilizing capability	0.890	0.919	0.695
Organizational performance	0.895	0.922	0.704
Sensing capability	0.870	0.906	0.658
Transforming capability	0.905	0.927	0.679

All items had a composite reliability and Cronbach's alpha above 0.7, and the AVE is higher than 0.5 for all items. In addition, the results demonstrated that the composite reliability of the digital platform capabilities, exploration capability, and exploitation capability constructs was above the threshold of 0.95. Values of 0.95 and above indicate that the items are redundant (Hair, Risher, Sarstedt, & Ringle, 2019). However, the composite reliability measure is viewed as too liberal while the Cronbach's alpha is viewed as too conservative (Hair et al., 2019). This means that the indicator reliability lies somewhere between these two values. Hence, the average of these two values was examined and the results revealed that all values were under the threshold of 0.95. While values higher than 0.90 are not desirable, they are still acceptable as they demonstrate unidimensionality between items (Hair et al., 2019).

Lastly, the cross-loadings, the Fornell-Larcker criterion, the heterotrait-monotrait ratio (HTMT) of correlations, and VIF values were examined.

Table 5: Fornell-Lacker criterion

	DPC	EXPLOIT	EXPLORE	MTT	EAM	OP	EAS	EAT
Digital platform capabilities (DPC)	**0.8505**							
Exploitation capability (EXPLOIT)	0.7277	**0.9328**						
Exploration capability (EXPLORE)	0.6421	0.8205	**0.9370**					
Market and technological turbulence (MTT)	0.3388	0.4023	0.3930	**0.7687**				
Mobilizing capability (EAM)	0.4742	0.3725	0.3449	0.1802	**0.8338**			
Organizational performance (OP)	0.4989	0.5872	0.5803	0.4187	0.3344	**0.8388**		
Sensing capability (EAS)	0.5356	0.4772	0.4289	0.3097	0.6915	0.3456	**0.8112**	
Transforming capability (EAT)	0.5406	0.4703	0.4339	0.3563	0.7349	0.4523	0.6851	**0.8242**
Cronbach's Alpha (CA)	0.9452	0.9255	0.9306	0.8326	0.8900	0.8945	0.8699	0.9054
Composite Reliability (CR)	0.9543	0.9526	0.9557	0.8777	0.9193	0.9223	0.9058	0.9270
Average Variance Extracted (AVE)	0.7233	0.8702	0.8780	0.5909	0.6952	0.7037	0.6581	0.6793

The cross-loadings reveal higher loadings on the intended constructs and lower loadings on other constructs. The Fornell-Larcker criterion is displayed in Table 5 (bold) and indicates that the square root of AVE is higher in all intended constructs. In addition, the HTMT correlations of all constructs were below the threshold of 0.90. Lastly, all VIF values of the formative constructs were below the threshold of 5. This means that no multicollinearity was found.
For all cross-loadings, HTMT correlations, and VIF values see Appendix 6 - Discriminant Validity.

4.4 Evaluation of the structural model

The criteria used to evaluate the structural model were path coefficients, the coefficient of determination (R^2 value), the effect size (f^2), and Q^2 value.

Path coefficients

Path coefficients show the hypothesized relationships between constructs, and they range from 1 to -1 (Joe F Hair Jr et al., 2014). A path coefficient of 1 means that there is a strong relationship between constructs, of -1 that there is a strong negative relationship.

Coefficient of determination (R^2 value)

R^2 is a measure for predicting the model's accuracy (Joe F Hair Jr et al., 2014). R^2 can range from 0 to 1, where 1 means the model is perfectly accurate.

The effect size (f^2)

The effect size can be used to evaluate whether the eliminated constructs have a significant impact on endogenous constructs (Joseph F Hair Jr et al., 2017). A value of 0.02 means small effects, 0.15 medium effects, and 0.35 large effects (Cohen, 1988; Joseph F Hair Jr et al., 2017).

Q^2 value

Q^2 value is an indicator for predictive relevance and values larger than 0 indicate that there is some kind of the predictive relevance between the variables (Joseph F Hair Jr et al., 2017).

The results of are shown in Table 6.

Table 6: path coefficients, R^2 value, and the effect size (f^2)

Construct	Path coefficients	R^2 value	The effect size (f^2)
Dynamic enterprise architecture capabilities → digital platform capabilities	0.542	0.294	0.416
Dynamic enterprise architecture capabilities → operational digital ambidexterity	0.385	0.148	0.173
Operational digital ambidexterity → organizational performance	0.498	0.375	0.158
Digital platform capabilities → organizational performance	0.501	-	0.335
Dynamic enterprise architecture capabilities → organizational performance	0.003	-	0.000

4.4.1 Structural model results

The performed tests revealed that dynamic enterprise architecture capabilities have significant path coefficients with digital platform capabilities (0.542) and operational digital ambidexterity (0.385). Moreover, the effect size f^2 of (0.416) and (0.173) indicate significant impacts. In addition, R^2 values of (0.294) and (0.148) indicate a significant model accuracy. By contrast, the direct relationship between

dynamic enterprise architecture capabilities and organizational performance is very weak and not significant (0.003). This means that there is likely no direct effect on organizational performance. Furthermore, the results indicate a positive direct relationship between operational digital ambidexterity and organizational performance (0.498) with an R^2 of (0.375). In addition, digital platform capabilities have a significant path coefficient (0.501) and effect size f^2 (0.335) with organizational performance.
Lastly, the test performed on Q^2 revealed values larger than 0. This means that the structural model had predictive relevance.

4.5 Hypothesis Testing

The hypothesis testing was done through a PLS method called bootstrapping. The bootstrapping procedure involved a two-tailed test, 5,000 iterations, and a significance level of 5% for the p-values. In order to have significance, t-values should be higher than 1.96 and p-values lower than 0,1 at a significance level of 5% (Joseph F Hair Jr et al., 2017). In addition, the confidence interval should not include 1.
Table 7 presents the results of the bootstrapping procedure.

Table 7: path coefficients, t-value, p-value, and confidence interval

Effects between constructs	Path coefficients	*t*-value	*p*-value	Confidence interval (bias corrected)	
Direct effects				**2,5%**	**97,5%**
DEAC → DPL	0.542	8.866	0.000	0.428	0.686
DEAC → ODA	0.385	6.717	0.000	0.269	0.577
ODA → OR	0.498	7.198	0.000	0.373	0.650
DPL → OR	0.501	2.949	0.003	0.072	0.431
DEAC → OR	0.003	1.941	0.052	0.254	0.598
Mediation effects					
DEAC → ODA → OR	-	5.709	0.000	0.259	0.553
DEAC → DPL → OR	-	2.696	0.007	0.181	0.394
Moderation effects					
ODA → MTT → OR	-0.013	1.708	0.088	-0.037	-0.074

DEAC; dynamic enterprise architecture capabilities; DPL; digital platform capabilities, ODA; operational digital ambidexterity, MTT; market and technological turbulence, OR; organizational performance

Direct effects

The hypothesis testing revealed a significant direct relationship between dynamic enterprise architecture capabilities and digital platform capabilities *(t=8.866, p=0.000).* This can also be said about, the relationship's dynamic enterprise architecture capabilities and operational digital ambidexterity *(t=6.717, p=0.000),* operational digital ambidexterity and organizational performance *(t=7.198, p=0.000).* The relationship between digital platform capabilities and organizational performance is also significant *(t=2.949, p=0.003).*
Furthermore, testing found no significant direct effect of the relationship between dynamic enterprise architecture capabilities and organizational performance *(t=1.941, p=0,052).*

Mediation effects

Testing on mediation revealed a significant indirect effect on organizational performance through operational digital ambidexterity *(t=5.709, p=0.000).* There is no significant direct effect between dynamic enterprise architecture capabilities and organizational performance. This means that operational digital ambidexterity almost fully mediates the impact on organizational performance.

In addition, testing found a significant indirect effect on organizational performance of digital platform capabilities *(t=2.696, p=0.007)*. As already mentioned, there is no direct effect between organizational performance and dynamic enterprise architecture capabilities. Thus, digital platform capabilities mediate the relationship between dynamic enterprise architecture capabilities and organizational performance.

Moderation effects

The evidence on moderating effects revealed that market and technological turbulence had a negative effect *(β=-0.013)* on the relationship between operational digital ambidexterity and organizational performance. However, the negative effect is not significant *(t=1.708, p=0.088)*.

Discussion

This chapter first discusses the outcomes identified in the previous chapter. Subsequently, the implications for theory and practice, as well as the limitations of the research are elaborated. The chapter concludes with the conclusions and reflection on the outcomes and process.

5.1 Discussion of results

In today's world, firms need to be capable of sustaining and raising performance in constantly changing environments. The literature argues that is not clear how performance can be enhanced through digital platforms and operational digital ambidexterity. Thus, the aim of this study was to examine this problem. The main research question and sub-question were therefore formulated as follows: *What are the impacts of dynamic enterprise architecture capabilities on organizational performance through digital platform capabilities and operational digital ambidexterity?* and *How do market and technological turbulence affect this impact?* To answer these questions, a conceptual model was formulated and a number hypotheses were set up.

The results on hypothesis testing indicate that there is a positive and significant direct effect between dynamic enterprise architecture capabilities and digital platform capabilities. These results support the existing theory that dynamic capabilities play an important role in the management of digital platforms (Helfat & Raubitschek, 2018; D. J. Teece, 2017). The first hypothesis (H1) is therefore confirmed. The current study also found a direct effect of digital platforms capabilities on organizational performance. Therefore, these findings support the claim of the literature that digital platform capabilities are vital for the performance of firms (T. Li & Chan, 2019; Xiao et al., 2020). Hypothesis (H2) is therefore confirmed. The findings also reveal that digital platform capabilities mediate the relationship between dynamic enterprise architecture capabilities and organizational performance. This relationship is significant and is consistent with the theory of Helfat and Raubitschek (2018) and D. J. Teece (2017) that dynamic capabilities can enable value through digital platforms.

Furthermore, the results identify a significant positive relationship between dynamic capabilities and operational digital ambidexterity. These findings are consistent with the theory that dynamic capabilities are important for organizations that pursue ambidexterity (O'Reilly & Tushman, 2008; D. J. Teece, 2007). In addition, operational digital ambidexterity has a significant positive impact on organizational performance. This result confirms that ambidexterity has a positive relationship with improved firm performance (O'Reilly & Tushman, 2013; Popadiuk et al., 2018). Both hypothesis (H3) and hypothesis (H4) are confirmed. The findings further demonstrate that operational digital ambidexterity almost fully mediates the relationship between dynamic enterprise architecture capabilities and organizational performance. This evidence is consistent with the theory that dynamic capabilities enhance organizational performance indirectly through other capabilities (Hazen et al., 2017).

Finally, no evidence was found of the positive moderating effect of market and technological turbulence on the effect of operational digital ambidexterity on organizational performance. The moderating effect is negative. Consequently, this finding contradicts the literature that highly dynamic environments positively moderate the effect between ambidexterity and performance (Tamayo-Torres et al., 2017; Wilden & Gudergan, 2015). As a result, hypothesis (H5) is rejected. A possible explanation for this negative moderation is that market and technological turbulence do not affect organizations that are ambidextrous. Ambidextrous firms already explore innovative digital technologies that are on the market. By doing this, organizations adapt to new market and technological conditions. Therefore, market and technological turbulation is incorporated in the exploration capabilities of firms.

5.2 Implications for theory and practice

This study contributes to the theory in several ways. First, it strengthens the evidence of the positive direct, and mediating role of operational digital ambidexterity on organizational performance. Second, this research bridges the gap in the literature Helfat and Raubitschek (2018) and D. J. Teece (2017) by providing evidence of the direct and mediating role of digital platform capabilities. Third, this study demonstrates how important the moderating role of market and technological turbulence is in the context of operational digital ambidexterity. Lastly, this study expands the DCV by examining how dynamic enterprise architecture capabilities can help enhance organizational performance.
The insights of this study are also relevant for practice. Digital platform capabilities should be deployed to share key knowledge within an organization. As a result, firms will be able to leverage and reconfigure their internal and external resources. Furthermore, organizations should pursue operational digital ambidexterity. This means, on the one hand, implementing innovative digital technologies such as big data, analytics etc. while at the same time improving efficiency and reducing the cost of business operations that use these digital technologies.

5.3 Limitations and suggestions for further research

Like all studies, this research also has certain limitations. First, use was made of the respondent-driven sampling (RDS) approach to collect data. This is a non-probability sampling method. The disadvantage of this type of method is that self-selection of respondents increases the chance of having outliers (Etikan, Musa, & Alkassim, 2016). Therefore, sampling bias may exist and results should be interpreted with caution. Another disadvantage of the RDS approach is the generalizability of the results. This is because the selection of each case is unknown (Saunders et al., 2019). Therefore, it is not possible to generalize the results to the whole population.
The second limitation is the relatively small sample size (n=148) in comparison to similar studies (Van de Wetering, 2019b, 2020). Smaller samples are less reliable and generalizable than larger samples (Saunders et al., 2019). Lastly, this study targeted IT professionals most of whom operate in the Netherlands. Therefore, it is not possible to generalize the findings to organizations in other areas. Future research could focus on IT professionals in other countries to enhance external validity. Using a probability sampling method and a larger sample size could also enhance the external validity.

In addition, this research suggests the need for further investigation of the concepts of digital platform capabilities and operational digital ambidexterity. Consequently, digital platform capabilities should be seen as an antecedent of operational digital ambidexterity (Xiao et al., 2020). Finding empirical and theoretical evidence for this relationship could further enhance the understanding of these concepts and their value for firms. Finally, this study suggests that longitudinal research should be done on the impact of dynamic enterprise architecture capabilities on organizational performance. This suggestion is in line with the study by (van de Wetering et al., 2020).

5.4 Conclusion

This research has examined the impact of DEAC on organizational performance through digital platform capabilities and operational digital ambidexterity in turbulent environments. To determine this impact, a literature review was conducted, a conceptual model formulated, and hypothesis development and testing undertaken. Empirical evidence revealed that digital operational ambidexterity had a direct and mediating impact on organizational performance. Subsequently, empirical insights shed light on the direct and mediating role of digital platform capabilities. These insights found evidence of a significant impact on organizational performance. However, no evidence was found on the positive moderating role of market and technological turbulence.

5.5 Reflection on the outcomes and chosen methods

Prior to the findings, research questions were formulated, the theoretical framework established, and data collection and analysis conducted.
The theoretical framework was elaborated by means of a simplified systematic literature review. All criteria that apply to a systematic literature review were considered. This enhanced the quality of the review. The literature review constituted the basis for formulating a conceptual model with hypotheses. By building on the existing body of knowledge, the conceptual model made it possible to answer the research questions. In retrospect, the systematic literature review proved to be effective in a short time span.
The chosen research design was a cross-sectional field survey. Surveys are flexible, economical, and allow comparison and quantitative analysis of data (Saunders et al., 2019). In retrospect, the cross-sectional method was the most logical one to choose, as other methods such as interview do not have these benefits. However, the disadvantage of surveys is possible sampling bias (Bhattacherjee, 2012). The bias was limited by setting criteria for the target population. The constructs used in the survey were operationalized according to empirically tested and validated literature. This enhanced the quality of the survey.
Data were collected by means of RDS. The advantage of RDS is a population that is readily available and close at hand (Bhattacherjee, 2012). This type of sampling method made it possible to gather a large amount of data within a short time span. However, the disadvantage of this sampling method is limited scientific generalizability (Bhattacherjee, 2012). Therefore, the results of this study cannot be generalized to a larger population outside the Netherlands.
All collected data were processed according to the predetermined ethical aspects. The names of organizations are mentioned but cannot be traced back to the respondents. Anonymity was guaranteed. The prepared dataset was analyzed using SPSS and SmartPLS software. Descriptive statistics were analyzed by means of SPSS software. This software is one of the most popular tools for conducting quantitative analysis and was chosen because of prior experience with this software. The operationalized constructs were analyzed through SmartPLS because PLS-SEM can work with small sample sizes (Joe F Hair Jr et al., 2014). Another benefit is that PLS-SEM is able to simultaneously assess the relationships between multi-item constructs (Astrachan et al., 2014).

The dataset was first evaluated on indicator reliability, convergent validity, discriminant validity, and multicollinearity. In this process, three items of the market and technological turbulence construct were omitted because they had loadings lower than 0.4. This is acceptable because it is a first-order reflective construct. Furthermore, the evaluation indicated that the digital platform capabilities, operational digital exploration ambidexterity, and operational digital exploitation ambidexterity constructs had a composite reliability slightly higher than 0.95. On the other hand, the Cronbach Alfa was lower than the threshold of 0.95. Usually, the true reliability lies between the Cronbach's Alfa and composite reliability (Hair et al., 2019). Therefore, the outcomes were acceptable. Furthermore, the constructs proved to be discriminant and no multicollinearity was found.

The evaluation of the structural model demonstrated significant path coefficients, R^2 values, and predictive relevance. Lastly, the hypothesis testing was performed by means of a procedure called bootstrapping. The bootstrapping procedure involved a two-tailed test, 5,000 iterations, and a confidence level of 95%.
The results of the hypothesis testing almost fully met expectations. The analysis of data provided support for four out of five formulated hypotheses. However, no evidence was found of the moderating role of market and technological turbulence. Therefore, hypothesis (H5) was rejected.

In retrospect, the results were satisfactory because they proved the main objective of this research, namely the mediating role of digital platform capabilities and operational digital ambidexterity on organizational performance. This outcome contributes new insights to the extant literature.

5.6 Reflection on the process

When I first heard about the topic of DEAC, I thought it would be an interesting and challenging research topic. I was already familiar with the notion of enterprise architecture due to the EA course. On the EA course I learned that EA can be a valuable tool in supporting the strategic objectives of organizations. By contrast, the concept of dynamic capabilities was new to me. By reading the provided literature by my supervisor, I increasingly understood what dynamic capabilities were and why they are important for organizations.

In the beginning, I struggled with identifying the problem definition of the research because I did not see a problem in the first place. However, as my knowledge about the concepts increased, I was able to examine the problem definition from a theoretical perspective and thereby identify the gaps in the literature. This insight helped me formulate a research question.
The next step in the research process was to formulate a conceptual model and conduct a literature review. This phase was a challenging one because it was hard to find relevant papers on DEAC in relation to other examined concepts. Therefore, I had to be creative in using keywords and queries. I tried different combinations of words. The more I searched, the better I became at scanning and finding information. However, it was still difficult to substantiate hypotheses and build on previous work. Fortunately, my supervisor guided me in the process of formulating the conceptual model and hypotheses. In addition, the feedback provided by the second assessor made me realize that the literature review should be more focused on explaining the results found in the literature. This part of the research increased my understanding of the importance of conducting a literature review in scientific research.

After the literature review, the next step was the elaboration of the methodology. Looking back, I do not remember having much difficulty with this part. The books by Bhattacherjee (2012), Saunders et al. (2019), and Joseph F Hair Jr et al. (2017) helped me a lot in this regard. With the assistance of those books, I gained solid knowledge about the importance of ethical aspects, reliability, validity, measurement, and structural models.

After the summer break it was time for the data collection. I experienced the data collection as an exciting and time-consuming phase. We agreed that the first step would be to contact our own network. This resulted in approximately 11 fully completed surveys being received within a span of three weeks. Many of the respondents contacted did not complete the survey fully and stopped half way. This was frustrating because the goal was to collect at least 150 responses. Looking back, I think I could have more actively approach my contacts by sending remainders.
At some point, we decided to send direct requests to enterprise architects on LinkedIn. This strategy turned out to work very well. I tried to send at least 50 requests daily. Moreover, the reaction of the respondents was surprisingly good, although some of them thought the survey was rather long.

Nevertheless, I managed to collect between 50 and 60 fully completed responses. Looking back, I think the LinkedIn strategy was the best strategy to adopt, as the goal of 150 responses was surpassed very quickly.

The next part of the research was to analyze the collected data. This was done with SPSS Statistics and SmartPLS software. I enjoyed this part of the research, which was both interesting and fun. I already had some experience with SPSS from the Premaster course; therefore, analyzing descriptive statistics was not a problem. The SmartPLS software turned out to be very comprehensive and user-friendly. Moreover, the workshop conducted by the supervisor and assistance from the book by (Joseph F Hair Jr et al., 2017) greatly enhanced my understanding of procedures such as bootstrapping and the analysis of data in general.

Having completed the data analysis, the final step was to present the results and draw conclusions. On the one hand, it was rather straight forward to present the significance of the hypotheses; on the other hand, it was somewhat difficult to link the findings to the extant literature. For example, I had to delve into the literature to find arguments on why the hypothesis was not supported.

Looking back on the research process as a whole, I believe I learned a lot. I am happy with my understanding of the research process and think that the outcomes are relevant for the existing body of knowledge.

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Appendix 1 - Literature overview

Search method	Number of articles found
Query	17
Backward Snowballing	7
Base literature	9
Total number of relevant articles	33

Name of the relevant articles	**Author**	**Year**	**Search engine**	**Method**
Dynamic Enterprise Architecture Capabilities: Conceptualization and Validation	Van de Wetering	2019a	Google Scholar	Base literature
The Benefits of Enterprise Architecture in Organizational Transformation	Niemi, E., & Pekkola, S.	2019	OU online library	Backward Snowballing
IT-Enabled Clinical Decision Support: An Empirical Study on Antecedents and Mechanisms	Van de Wetering	2018	OU online library	Backward Snowballing
A theory building study of enterprise architecture practices and benefits	Foorthuis, R., van Steenbergen, M., Brinkkemper, S., & Bruls, W. A. G.	2016	OU online library	Query
Enterprise architecture: A competence-based approach to achieving agility and firm performance	Hazen, B. T., Bradley, R. V., Bell, J. E., In, J., & Byrd, T. A	2017	OU online library	Base literature
Innovation, Dynamic Capabilities, and Leadership.	Schoemaker, P. J. H., Heaton, S., & Teece, D.	2018	OU online library	Query
Dynamic capabilities: Routines versus entrepreneurial action	Teece, D. J.	2012	Google Scholar	Backward Snowballing
Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy	Teece, D., Peteraf, M., & Leih, S.	2016	OU online library	Backward Snowballing
The digital platform: a research agenda	de Reuver, M., Sørensen, C., & Basole, R. C.	2018	OU online library	Backward Snowballing
A design theory for digital platforms supporting online communities: a multiple case study	Spagnoletti, P., Resca, A., & Lee, G.	2015	Google Scholar	Backward Snowballing
Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance.	Teece, D.J.	2007	OU online library	Base literature
Dynamic capabilities and (digital) platform lifecycles. Entrepreneurship, innovation, and platforms	Teece, D. J.	2017	OU online library	Base literature
How entrepreneurial SMEs compete through digital platforms: The roles of digital platform capability, network capability and ambidexterity	Cenamor, J., Parida, V., & Wincent, J.	2019	OU online library	Base literature

How the Interaction of Big Data Analytics Capabilities and Digital Platform Capabilities Affects Service Innovation: A Dynamic Capabilities View	Xiao, X., Tian, Q., & Mao, H.	2020	OU online library	Query
Digital strategies for two-sided markets: A case study of shopping malls	Frishammar, J., Cenamor, J., Cavalli-Björkman, H., Hernell, E., & Carlsson, J.	2018	OU online library	Base literature
Organizational ambidexterity: Past, Present, and Future	O'Reilly, C. A., & Tushman, M. L	2013	OU online library	Query
Ambidexterity as a dynamic capability in the globalization of the multinational business enterprise (MBE): Case studies of AB Volvo and IKEA.	Vahlne, J. & E., Jonsson	2017	OU online library	Query
How Do Firms Adapt to Discontinuous Change? Bridging the Dynamic Capabilities and Ambidexterity Perspectives	Birkinshaw, J., Zimmermann, A., & Raisch, S.	2016	OU online library	Query
Ambidexterity as a dynamic capability: Resolving the innovator's dilemma	O’Reilly, C. A., & Tushman, M. L.	2008	OU online library	Query
Dynamic Capabilities and Ambidexterity: How are These Concepts Related?	Popadiuk, S., Luz, A. R. S., & Kretschmer, C.	2018	OU online library	Query
How Does IT Ambidexterity Impact Organizational Agility?	Lee, O. K., Sambamurthy, V., Lim, K. H., & Wei, K. K.	2015	OU online library	Base literature
The relationship between dynamic capabilities and firm competitive advantage: The mediating role of organizational ambidexterity	Jurksiene, L., & Pundziene, A.	2016	OU online library	Query
Digital transformation by SME entrepreneurs: A capability perspective	Li, L., Su, F., Zhang, W., & Mao, J. Y.	2018	OU online library	Query
The Role of Dynamic Capabilities in Responding to Digital Disruption: A Factor-Based Study of the Newspaper Industry	Karimi, J., & Walter, Z.	2015	OU online library	Query
Innovating with enterprise systems and digital platforms: A contingent resource-based theory view	Sedera, D., Lokuge, S., Grover, V., Sarker, S., & Sarker, S.	2016	OU online library	Query
Impact of Ambidexterity and Environmental Dynamism on Dynamic Capability Development Trade-Offs	Peng, M. Y.-P., & Lin, K.-H..	2019	OU online library	Query
Dynamic capability and IJV performance: The effect of exploitation and exploration capabilities	Zhan, W., & Chen, R. R.	2013	OU online library	Query
Internationalising in Small, Incremental or Larger Steps?	Barkema, H. G., & Drogendijk, R.	2007	OU online library	Backward Snowballing
Entropy–disrupting Ansoff's five levels of environmental turbulence	Kipley, D., Lewis, A., & Jewe, R.	2012	OU online library	Query
Ambidexterity, performance and environmental dynamism	Tamayo-Torres, J., Roehrich, J.K., & Lewis, M.A.	2017	OU online library	Query

Dynamic Enterprise Architecture Capabilities and Organizational Benefits: An empirical mediation study	Van de Wetering	2020	Google Scholar	Base literature
Dynamic information technology capability: Concept definition and framework development	Li, T., & Chan, Y. E	2019	OU online library	Query
The Effect of Enterprise Architecture Deployment Practices on Organizational Benefits: A Dynamic Capability Perspective	Van de Wetering, R., Kurnia, S., & Kotusev, S.	2020	Google Scholar	Base literature

Appendix 2 - Survey

Constructs	**Sources**
1. Please indicate the size-class of your company. (Number of employees)	Less than 100 employees 101–300 employees 301–1000 1001–3000 Over 3000 employees
2. Please select the category under which your organization falls under	Private Sector Public Sector Private-Public Partnerships (PPP) Non-Governmental Organization (NGO) Non-Profit Organization (NPO)
3. In which industry does your organization operate (considering only the core-business of your organization)?	Manufacturing Wholesale/retail Energy and utilities Telecommunications Finance and insurance Publishing/news Technology Consumer business/goods Basic Materials (Chemicals, paper, industrial metals & mining) Industrials (Construction & industrial goods) Oil & Gas Auto/car industry Pharmaceutical Legal Restaurants Transportation Agriculture Health Care Education Hotel industry National government Municipal governments Real estate Police Consulting Services Other:
4. Please indicate the age of your company.	0–5 years 6–10 years 11–20 years 20–25 years Over 25 years
5. Please indicate the amount of your working experience	0–5 years 6–10 years 11–20 years 20–25 years Over 25 years
6. Please indicate what part of the total budget does the IT budget represent:	Less than 1% Between 1% and 3% Between 3.1% and 5% More than 5%
7. Please indicate your current function within the organization:	Chief executive officer (CEO) Chief information officer (CIO) Chief digital officer (CDO) Business manager IT manager

	Operations manager Innovation manager Business or enterprise architect IT architect Internal business / IT consultant External business / IT consultant Other:
Dynamic Enterprise Architecture Capabilities *To what extent do you agree with the following statements? (1 – strongly disagree 7 – strongly agree)*	
EA-sensing capability	
We use our EA to identify new business opportunities or potential threats	
We review our EA services (e.g., providing content, EA standards, skills and knowledge) on a regular basis to ensure that they are in line with what our key (internal and external) stakeholders want	
We adequately evaluate the effect of changes in the baseline and target EA on the organization	
We devote sufficiently time enhancing our EA to improve business processes	
We develop greater reactive and proactive strength in the business domain using our EA	
EA-mobilizing capability	
We use our EA to draft potential solutions when we sense business opportunities or potential threats	
We use our EA to evaluate, prioritize and select potential solutions when we sense business opportunities or potential threats	
We use our EA to mobilize resources in line with a potential solution when we sense business opportunities or potential threats	
We use our EA to draw up a detailed plan to carry out a potential solution when we sense business opportunities or potential threats	
We use our EA to review and update our practices in line with renowned business and IT best practices when we sense business opportunities or potential threats	
EA-transforming capability	
Our EA enables us to successfully reconfigure business processes and the technology landscape to come up with new or more productive assets	
We successfully use our EA to adjust our business processes and the technology landscape in response to competitive strategic moves or market opportunities	
We successfully use our EA to engage in resource recombination to match our product-market areas and our assets better	
Our EA enables flexible adaptation of human resources, processes, or the technology landscape that leads to competitive advantage	
We successfully use our EA to create new or substantially changed ways of achieving our targets and objectives	
Our EA facilitates us to adjust for and respond to unexpected changes	
Digital platform capabilities	
To what extent do you agree with the following statements? (1 – strongly disagree 7 – strongly agree)	
Our platform easily accesses data from our partners' IT systems	
Our platform provides seamless connection between our partners' IT systems and our IT systems (e.g., forecasting, production, manufacturing, shipment etc.)	
Our platform has the capability to exchange real-time information with our partners	
Our platform easily aggregates relevant information from our partners' databases (e.g., operating information, business customer performance, cost information etc.)	
Our platform is easily adapted to include new partners	
Our platform can be easily extended to accommodate new IT applications or functions	
Our platform employs standards that are accepted by most current and potential partners	

Our platform consists of modular software components, most of which can be reused in other business applications	
Operational digital exploration capability	
Implement extensive innovative digital technologies (e.g., analytics, big data, cloud, social media, mobile) in business operations (e.g., product/service development and production, supply chain management, customer delivery, employee management)	
Implement radical innovative digital technologies in business operations	
Implement operational innovative digital technologies that are difficult to replicate by other firms	
Operational digital exploitation capability	
Reduce the cost of existing business operations using innovative digital technologies (e.g., analytics, big data, cloud, social media, mobile)	
Improve the cycle time of existing business operations using innovative digital technologies	
Improve the efficiency of existing business operations using innovative digital technologies	
Technological turbulence *Please choose the appropriate response for each item* *(1 – strongly disagree 7 – strongly agree)*	
It is difficult to forecast technology developments in our industry	
The technology environment is uncertain	
Technological development is predictable (reversed)	
The technology environment is complex	
Market turbulence *Please choose the appropriate response for each item* *(1 – strongly disagree 7 – strongly agree)*	
Customer needs and preferences change rapidly	
Product demands and preferences are uncertain	
It is easy to predict change in Customer needs and preferences (reversed)	
Market competitive conditions are unpredictable	
Organizational performance *During the last 2 or 3 years we relatively perform much better than our main competitors in the same industry (for non-competing governmental agencies, you could also read competitors as 'other ministries or departments') in:* *For the past few years, our company has been able to . . .* *(1 – strongly disagree 7 – strongly agree)*	
Increase market share	
Increase customer satisfaction	
Increase profit	
Enhance business brand and image.	
Enhance customer loyalty.	
Q: Were you able to fill in this survey with an adequate understanding of all the concepts and questions?	

Appendix 3 - Examination of the dataset

The following criteria were taken into account for the dataset;

	Set criteria	**Data set**	**Total responses (amount)**
Sample size	Minimum of 100 responses	A total of 392 responses have been collected	392
Missing values	Not completed surveys are not taken into the account	230 respondents have not fully completed the surveys	230
Suspicious response patterns	For example, only 1s or only 7s are filled in	2 responses have been deleted because they had suspicious patterns	4
Outliers	Extreme responses (analyzed in SPSS)	No outliers have been detected in the data set	2
Adequate understanding of the topic	Respondent must have an understanding of the topic	4 responses have been deleted because the respondents have indicated that they do not understand the topic (1 absolutely disagree and 2 disagree)	4
Target audience	The right target audience should complete the survey	4 surveys have been deleted because the respondents were not the target audience	4
Pretesting	Pretesting respondents are not taken for further analysis of the data set	4 respondents have been deleted because they completed the surveys in the pre-test phase	
Reponses taken for further analysis			**148**

Skewness and kurtosis

Mean, Median, Std, D, Skewness and Kurtosis																
	EAS1	EAS2	EAS3	EAS4	EAS5	EAM1	EAM2	EAM3	EAM4	EAM5	EAT1	EAT2	EAT3	EAT4	EAT5	EAT6
Mean	4,75	5,26	4,86	4,56	4,90	5,31	5,26	4,78	4,77	4,80	4,97	5,03	4,49	4,64	4,75	4,81
Median	5,00	6,00	5,00	5,00	5,00	6,00	6,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00
Std. Deviation	1,645	1,522	1,611	1,646	1,581	1,538	1,439	1,524	1,552	1,466	1,516	1,466	1,656	1,552	1,560	1,421
Skewness	-,828	-1,007	-,738	-,531	-,752	-1,161	-1,002	-,632	-,716	-,496	-,904	-,914	-,491	-,621	-,687	-,656
Std. Error of Skewness	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199
Kurtosis	-,253	,224	-,416	-,534	-,146	,581	,633	-,269	-,234	-,300	-,038	,399	-,556	-,349	-,193	-,064
Std. Error of Kurtosis	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7

EAS; Sensing capability, EAM; Mobilizing capability, EAT; Transforming capability

Mean, Median, Std, D, Skewness and Kurtosis														
	DIGPL1	DIGPL2	DIGPL3	DIGPL4	DIGPL5	DIGPL6	DIGPL7	DIGPL8	AMBX1	AMBX2	AMBX3	AMBT1	AMBT2	AMBT3

Mean	4,57	4,46	4,64	4,34	4,57	4,82	5,18	4,69	4,88	4,36	4,17	4,45	4,46	4,63
Median	5,00	5,00	5,00	5,00	5,00	5,00	6,00	5,00	5,00	5,00	4,00	5,00	5,00	5,00
Std. Deviation	1,658	1,618	1,769	1,760	1,679	1,572	1,517	1,714	1,616	1,682	1,668	1,699	1,597	1,583
Skewness	-,392	-,337	-,526	-,243	-,438	-,801	-,931	-,615	-,516	-,250	-,209	-,336	-,286	-,515
Std. Error of Skewness	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199
Kurtosis	-,990	,876	-,954	-1,031	-,907	-,174	,050	-,591	-,723	-,833	-,714	-,629	-,542	-,303
Std. Error of Kurtosis	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	7	7	7	7	7	7	7	7	7	7	7	7	7	7

DIGPL; Digital platform capability, AMBX; Exploration capability, AMBT; Exploitation capability

Mean, Median, Std, D, Skewness and Kurtosis													
	MARKET1	MARKET2	MARKET3	MARKET4	TECH1	TECH2	TECH3	TECH4	PERF1	PERF2	PERF3	PERF4	PERF5
Mean	4,80	4,28	4,39	4,50	3,90	3,89	4,53	5,37	4,87	5,07	4,86	5,17	4,94
Median	5,00	5,00	5,00	5,00	4,00	4,00	5,00	6,00	5,00	5,00	4,00	5,00	5,00
Std. Deviation	1,709	1,706	1,417	1,601	1,607	1,623	1,392	1,495	1,241	1,262	1,251	1,226	1,185
Skewness	-,527	-,169	-,331	-,232	,157	,227	-,624	-,856	-,510	-,779	-,531	-,890	-,428
Std. Error of Skewness	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199	,199
Kurtosis	-,928	-1,028	-,830	-,844	-1,072	-,986	-,515	-,006	-,237	-,609	,062	,706	,075
Std. Error of Kurtosis	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396	,396
Minimum	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum	7	7	7	7	7	7	7	7	7	7	7	7	7

MARKET; Market turbulence, TECH; Technological turbulence, PERF; Organizational performance

Appendix 4 – T-test

Early respondents	First two weeks of the survey undertaking
Late respondents	Last two weeks of the survey undertaking
Significance level (2-tailed)	0,05
Confidence interval	95%

E - Early respondents; L - Late respondents	**Paired Differences**		**t**	**Sig. (2-tailed)**
	Mean	Std. Deviation		
EAS1_E - EAS1_L	,61538	2,17397	1,443	,161
EAS2_E - EAS2_L	-,19231	2,22745	-,440	,664
EAS3_E - EAS3_L	,19231	2,34980	,417	,680
EAS4_E - EAS4_L	,80769	2,34980	1,753	,092
EAS5_E - EAS5_L	,69231	2,37940	1,484	,150
EAM1_E - EAM1_L	-,23077	1,65669	-,710	,484
EAM2_E - EAM2_L	-,26923	2,08917	-,657	,517
EAM3_E - EAM3_L	,61538	2,46701	1,272	,215
EAM4_E - EAM4_L	,23077	2,40512	,489	,629
EAM5_E - EAM5_L	,34615	2,26172	,780	,442
EAT1_E - EAT1_L	,03846	2,35764	,083	,934
EAT2_E - EAT2_L	,07692	1,97834	,198	,844
EAT3_E - EAT3_L	,53846	2,70157	1,016	,319
EAT4_E - EAT4_L	,34615	2,31417	,763	,453
EAT5_E - EAT5_L	-,03846	1,86506	-,105	,917
EAT6_E - EAT6_L	,19231	2,38360	,411	,684
DPL1_E - DPL1_L	,23077	2,51885	,467	,644
DPL2_E - DPL2_L	,23077	2,23263	,527	,603
DPL3_E - DPL3_L	-,03846	2,58427	-,076	,940
DPL4_E - DPL4_L	,46154	2,59585	,907	,373
DPL5_E - DPL5_L	-,42308	2,13866	-1,009	,323
DPL6_E - DPL6_L	-,11538	1,65715	-,355	,726
DPL7_E - DPL7_L	-,38462	2,21046	-,887	,383
DPL8_E - DPL8_L	-,23077	2,76127	-,426	,674
EXPLOIT1_E - EXPLOIT1_L	0,00000	2,22711	0,000	1,000
EXPLOIT2_E - EXPLOIT2_L	,07692	2,29649	,171	,866
EXPLOIT3_E - EXPLOIT3_L	,07692	2,05763	,191	,850
EXPLORE1_E - EXPLORE1_L	,50000	2,46982	1,032	,312
EXPLORE2_E - EXPLORE2_L	,23077	2,15977	,545	,591
EXPLORE3_E - EXPLORE3_L	,11538	2,19685	,268	,791
MARKT1_E - MARKT1_L	,38462	2,11805	,926	,363

MARKT2_E - MARKT2_L	-,07692	2,43184	-,161	,873
MARKT3_E - MARKT3_L	-,65385	2,09652	-1,590	,124
MARKT4_E - MARKT4_L	-,03846	2,28877	-,086	,932
TECH1_E - TECH1_L	,26923	2,20105	,624	,538
TECH2_E - TECH2_L	,19231	2,29816	,427	,673
TECH3_E - TECH3_L	,15385	2,09174	,375	,711
TECH4_E - TECH4_L	-,03846	2,06844	-,095	,925
PERF1_E - PERF1_L	,07692	1,67148	,235	,816
PERF2_E - PERF2_L	,03846	1,94896	,101	,921
PERF3_E - PERF3_L	,19231	1,85514	,529	,602
PERF4_E - PERF4_L	,15385	2,01380	,390	,700
PERF5_E - PERF5_L	,03846	1,48272	,132	,896

EAS; Sensing capability, EAM; Mobilizing capability, EAT; Transforming capability; DPL; Digital platform capability, EXPLOIT; Exploration capability, EXPLORE; Exploitation capability; MARKT; Market turbulence, TECH; Technological turbulence, PERF; Organizational performance

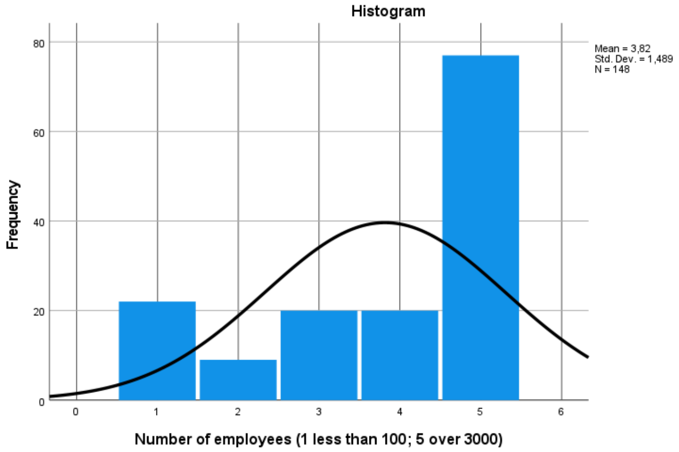
Appendix 5 – Descriptive Statistics

5.1 List of organizations

ABN AMRO	De Volksbank	LeasePlan	Schimsalabim
ABN Amro - (hired as a consultant from Lean Data)	De Wilde Consulting BV	Love Carpe Diem	Schiphol Group
ABN Amro Asset Based Finance	Department of National Defence	Mason IT	Slachtofferhulp Nederland
Achmea	DHL	Medtronic	Softtek
Ahold	Eneco	MN	Sogeti Nederland
AKS Consulting	Enexis	MSFT	Sopra Steria Benelux
Amazon Web Services	Erlebnisberg Kappe	MTP Services	Sthree
AppSolution Now	Europol	Myreas (Colruyt Group)	SunnyClouds
AsIsToBe	EY	Nationale Nederlanden	The Future Group, freelance consultants
Asr	Finalist	NLMK Group	OU
ASR Asset Managment	Fluor b	NN Group	Timp-iT
Athlon International	Fujitsu	Normec Group	Ubachs Business Consultancy
Atos	Gemeente Rotterdam	Nyenrode universiteit	University of Applied Sciences Windesheim
BCT	Gemeente Tilburg	OpenInc	ValueBlue
Bol.com	Geodis	Oracle	Vermaat groep
Booz Allen Hamilton	GGN	PaIS/Centric	Wahl clipper
Brabant Water	Imperial Brands	Port of Antwerp	Worldline Group
Brink's Solutions Nederland	Imperial Brands/ Fontem	Portbase B.V.	Zensung Pte Ktd
BSPBSP	ING	Private	Zorgdoc
Bunzl	Into Control	Profacit	
Capgemini	KBC	Prospex	
Cegeka	KLM	Raad voor Rechtsbijstand	
Cellpoint Digital	Koninklijke BAM Groep	Rabobank	
Daraz.pk	KPN	Rijkswaterstaat	
DUO (Dienst Uitvoering Onderwijs	Krish InfoCom B.V.	Royal DSM NV	
De Nederlandsche Bank	L'Oréal	SAP SE	

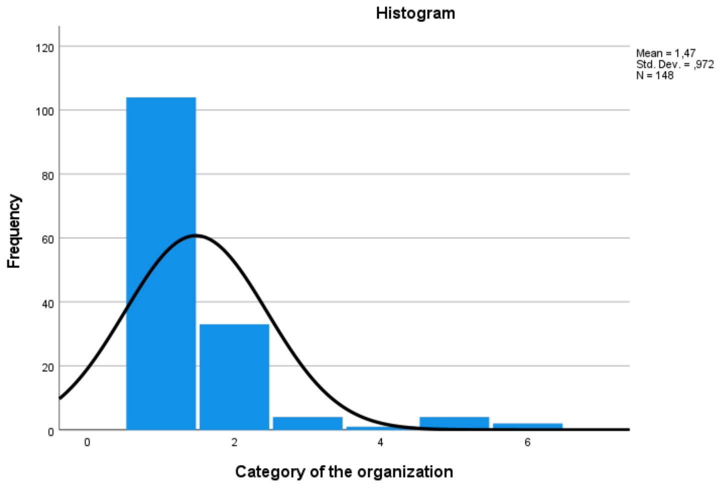
5.2 Number of employees

	Frequency	Percent	Valid percent	Cumulative percent
Less than 100 employees	22	14,9	14,9	14,9
101-300 employees	9	6,1	6,1	20,9
301-1000 employees	20	13,5	13,5	34,5
1001-3000 employees	20	13,5	13,5	48,0
Over 3000 employees	77	52,0	52,0	100,0
Total	148	100,0	100,0	



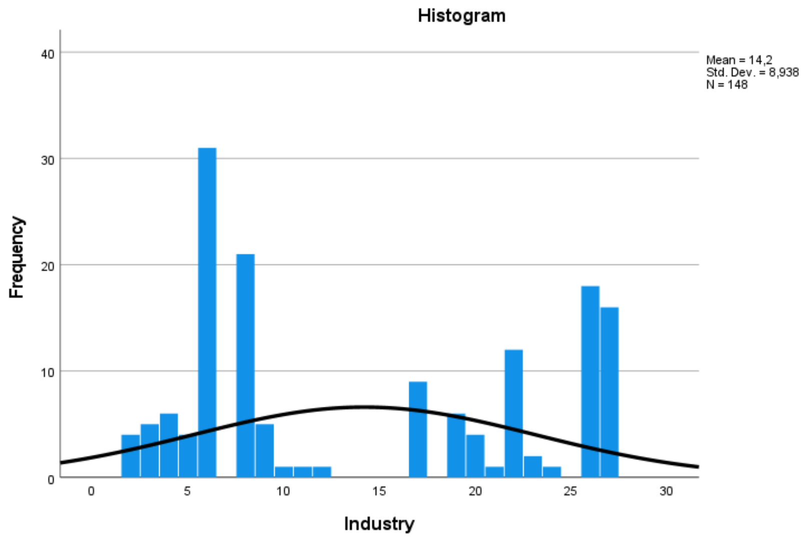
5.3 Category of the organization

	Frequency	Percent	Valid percent	Cumulative percent
Private Sector	104	70,3	70,3	70,3
Public Sector	33	22,3	22,3	92,6
Private-Public Partnerships (PPP)	4	2,7	2,7	95,3
Non-Governmental Organization (NGO)	1	,7	,7	95,9
Non-Profit Organization (NPO)	4	2,7	2,7	98,6
Other	2	1,4	1,4	100,0
Total	148	100,0	100,0	



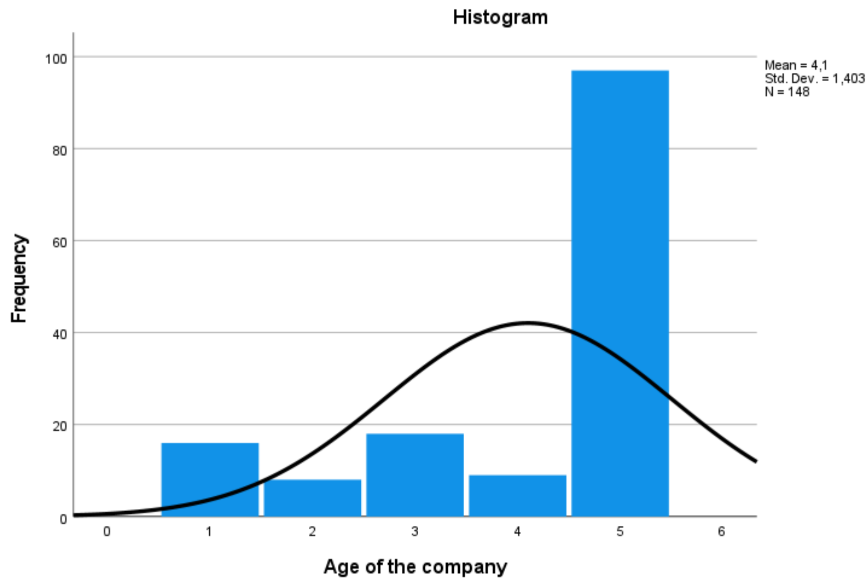
5.4 Industry

	Frequency	Percent	Valid percent	Cumulative percent
Manufacturing	4	2,7	2,7	2,7
Wholesale/retail	5	3,4	3,4	6,1
Energy and utilities	6	4,1	4,1	10,1
Telecommunications	4	2,7	2,7	12,8
Finance and insurance	31	20,9	20,9	33,8
Technology	21	14,2	14,2	48,0
Consumer business/goods	5	3,4	3,4	51,4
Basic materials	1	,7	,7	52,0
Industrials	1	,7	,7	52,7
Oil & Gas	1	,7	,7	53,4
Transportation	9	6,1	6,1	59,5
Health Care	6	4,1	4,1	63,5
Education	4	2,7	2,7	66,2
Hotel Industry	1	,7	,7	66,9
National Government	12	8,1	8,1	75,0
Municipal Governments	2	1,4	1,4	76,4
Real estate	1	,7	,7	77,0
Consulting Services	18	12,2	12,2	89,2
Other	16	10,8	10,8	100,0
Total	148	100,0	100,0	



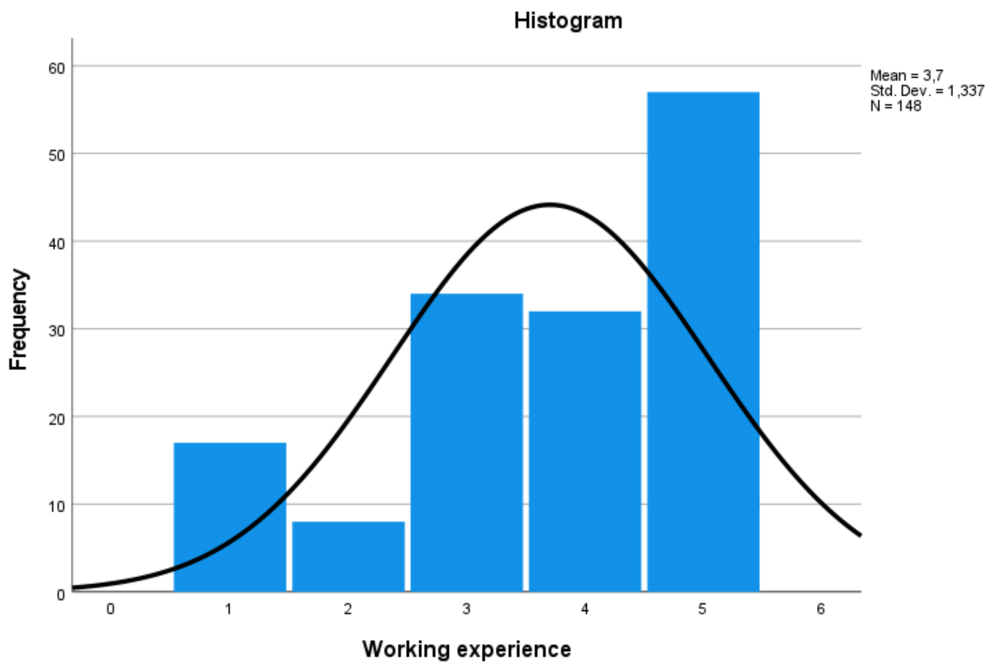
5.5 Age of the company

	Frequency	Percent	Valid percent	Cumulative percent
0-5 years	16	10,8	10,8	10,8
6-10 years	8	5,4	5,4	16,2
11-20 years	18	12,2	12,2	28,4
20-25 years	9	6,1	6,1	34,5
Over 25 years	97	65,5	65,5	100,0
Total	148	100,0	100,0	



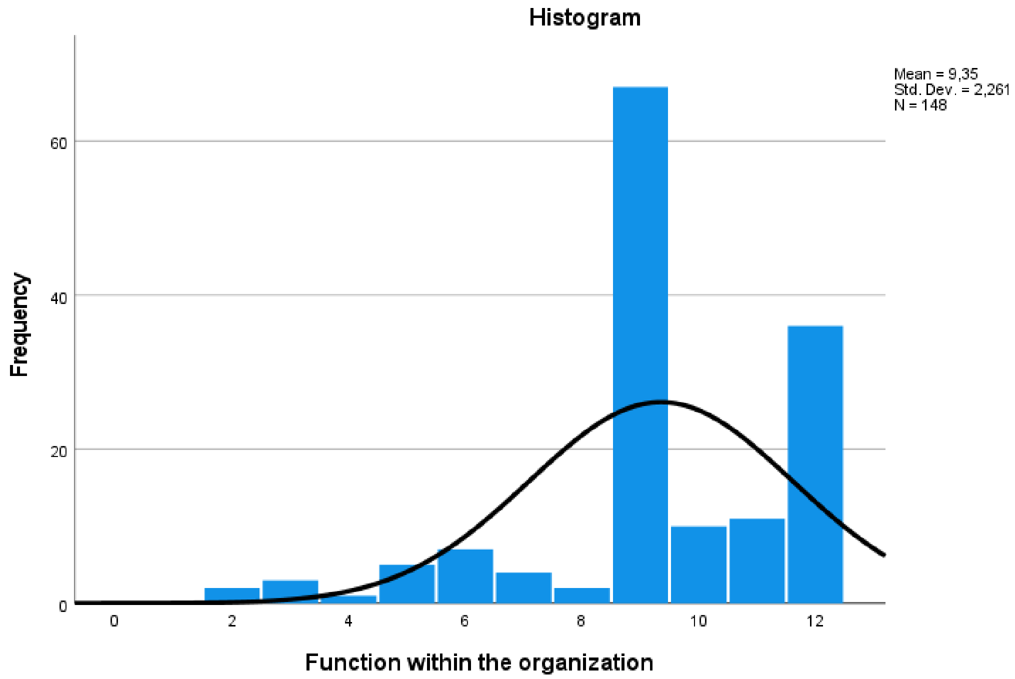
5.6 Working experience

	Frequency	Percent	Valid Percent	Cumulative percent
0-5 years	17	11,5	11,5	11,5
6-10 years	8	5,4	5,4	16,9
11-20 years	34	23,0	23,0	39,9
20-25 years	32	21,6	21,6	61,5
Over 25 years	57	38,5	38,5	100,0
Total	148	100,0	100,0	



5.7 Function within the organization

	Frequency	Percent	Valid percent	Cumulative percent
Chief executive officer (CEO)	2	1,4	1,4	1,4
Chief information officer (CIO)	3	2,0	2,0	3,4
Chief digital officer (CDO)	1	,7	,7	4,1
Business manager	5	3,4	3,4	7,4
IT Manager	7	4,7	4,7	12,2
Operations manager	4	2,7	2,7	14,9
Innovation manager	2	1,4	1,4	16,2
Business or enterprise architect	67	45,3	45,3	61,5
Internal business/ IT consultant	10	6,8	6,8	68,2
External business/ IT consultant	11	7,4	7,4	75,7
Other	36	24,3	24,3	100,0
Total	148	100,0	100,0	



Appendix 6 - Discriminant validity

6.1 Cross loadings

	DPC	AMBT	AMBTX	MARKET and TECHTURB	EAM	PERF	EAS	EAT
AMBT1	0.6288	0.9260	0.7038	0.3937	0.3271	0.5888	0.4293	0.4211
AMBT2	0.7434	0.9407	0.7956	0.3788	0.3489	0.5326	0.4649	0.4709
AMBT3	0.6688	0.9317	0.8039	0.3505	0.3690	0.5163	0.4426	0.4254
AMBX1	0.5654	0.7904	0.9247	0.3393	0.3193	0.5197	0.3642	0.3848
AMBX2	0.6068	0.7855	0.9521	0.3627	0.3344	0.5810	0.4284	0.4129
AMBX3	0.6327	0.7306	0.9341	0.4036	0.3153	0.5275	0.4105	0.4217
DPC1	0.8904	0.6543	0.5618	0.3180	0.4436	0.4888	0.4770	0.4846
DPC2	0.8696	0.6295	0.5910	0.3208	0.4470	0.4859	0.4780	0.5507
DPC3	0.8379	0.5812	0.5495	0.2847	0.3780	0.3478	0.4192	0.4546
DPC4	0.8426	0.6042	0.5433	0.3096	0.3766	0.4445	0.4545	0.4574
DPC5	0.8909	0.6527	0.5650	0.2540	0.3678	0.4382	0.4525	0.4576
DPC6	0.8593	0.6459	0.5605	0.1929	0.4543	0.3877	0.5096	0.4751
DPC7	0.7911	0.5368	0.4717	0.2375	0.3948	0.3364	0.3584	0.3668
DPC8	0.8169	0.6339	0.5135	0.3790	0.3547	0.4348	0.4765	0.4057
EAM1	0.4028	0.2539	0.2120	0.0440	0.8436	0.2340	0.5897	0.5737
EAM2	0.4176	0.3047	0.3174	0.1015	0.8777	0.2930	0.5919	0.6237
EAM3	0.4335	0.3744	0.3675	0.2134	0.8340	0.3459	0.5955	0.6407
EAM4	0.2988	0.2675	0.2008	0.1645	0.7732	0.2170	0.4652	0.5156
EAM5	0.4114	0.3447	0.3245	0.2248	0.8370	0.2943	0.6257	0.6944
EAS1	0.4287	0.4142	0.3782	0.3129	0.6452	0.3757	0.7859	0.6062
EAS2	0.4037	0.2771	0.2932	0.2188	0.5300	0.2119	0.8074	0.5426
EAS3	0.4594	0.3529	0.3453	0.2120	0.5390	0.3421	0.7896	0.5620
EAS4	0.3981	0.4039	0.3182	0.2609	0.5395	0.2199	0.8373	0.5335
EAS5	0.4813	0.4825	0.4005	0.2454	0.5424	0.2434	0.8344	0.5285
EAT1	0.4000	0.3249	0.2406	0.2613	0.6323	0.3012	0.5979	0.8274
EAT2	0.4444	0.3833	0.3152	0.2009	0.6558	0.3439	0.5332	0.8531
EAT3	0.4671	0.4613	0.4594	0.3597	0.6033	0.4113	0.5614	0.8046
EAT4	0.4379	0.3847	0.4026	0.3272	0.6057	0.4482	0.5731	0.8355
EAT5	0.4385	0.3794	0.3573	0.2999	0.5900	0.4314	0.5056	0.8389
EAT6	0.4883	0.3953	0.3765	0.3177	0.5428	0.3028	0.6165	0.7838
MARKET1	0.3543	0.4398	0.3994	0.8084	0.1482	0.4468	0.2291	0.3431
MARKET2	0.2464	0.2758	0.2381	0.8607	0.1880	0.3282	0.2348	0.3309
MARKET4	0.1833	0.2443	0.2149	0.7148	0.1082	0.2365	0.2187	0.2400
PERF1	0.3901	0.4475	0.4514	0.4281	0.2455	0.8290	0.2652	0.3143
PERF2	0.4638	0.5337	0.4962	0.3974	0.2848	0.8769	0.3359	0.4079
PERF3	0.3711	0.4578	0.5335	0.3499	0.2373	0.8490	0.2393	0.3683
PERF4	0.4184	0.5278	0.5410	0.2377	0.3177	0.8077	0.2913	0.3753
PERF5	0.4459	0.4917	0.4088	0.3429	0.3169	0.8300	0.3140	0.4297
TECHTURB1	0.2629	0.3159	0.3493	0.7579	0.1140	0.3040	0.2871	0.2300
TECHTURB2	0.1852	0.1644	0.2517	0.6892	0.1234	0.1876	0.2383	0.1555

EAS; Sensing capability, EAM; Mobilizing capability, EAT; Transforming capability; DPC; Digital platform capability, AMBX; Exploration capability, AMBT; Exploitation capability; MARKET; Market turbulence, TECHTURB; Technological turbulence, PERF; Organizational performance

6.2 HTMT correlations (threshold below 0.9)

	DPC	AMBT	AMBX	Market and TECH	EAM	PERF	EAS	EAT
DPC								
AMBT	0.7781							
AMBX	0.6831	0.8867						
Market and TECH	0.3577	0.4228	0.4269					
EAM	0.5128	0.4095	0.3748	0.2046				
PERF	0.5373	0.6421	0.6342	0.4498	0.3724			
EAS	0.5878	0.5311	0.4747	0.3654	0.7800	0.3885		
EAT	0.5815	0.5150	0.4741	0.3882	0.8143	0.5030	0.7708	

EAS; Sensing capability, EAM; Mobilizing capability, EAT; Transforming capability; DPC; Digital platform capability, AMBX; Exploration capability, AMBT; Exploitation capability; MARKET; Market turbulence, TECHTURB; Technological turbulence, PERF; Organizational performance

6.3 Multicollinearity

VIF values in relation to DEAC		**VIF values in relation to digital platform capabilities**	
EAS; Sensing capability	Values	DPC; Platform configuration	Values
EAS1	2.18	DPC1	3.173
EAS2	2.27	DPC2	3.538
EAS3	2.22	DPC3	2.731
EAS4	2.89	DPC4	2.873
EAS5	2.80		
		DPC; Platform reconfiguration	
EAM; Mobilizing capability		DPC5	3.645
EAM1	3.26	DPC6	3.999
EAM2	3.84	DPC7	2.226
EAM3	3.17	DPC8	2.194
EAM4	2.27		
EAM5	3.06		
EAT; Transforming capability			
EAT1	2.63		
EAT2	2.97		
EAT3	2.78		
EAT4	2.64		
EAT5	2.76		
EAT6	2.21		

EAS; Sensing capability, EAM; Mobilizing capability, EAT; Transforming capability; DPC; Platform configuration and reconfiguration