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Adopting the Paradox Theory Perspective to Enterprise Architecture in a Digital Transformation: A Case Study Approach

Master Thesis Information Management

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Management Summary

Organizations need to become agile and flexible in the current dynamic and rapidly changing environment. Organizations are required to digitally transform to keep up. To successfully transform, organizations need to have structure and agility built into the organization. Enterprise Architecture (EA) provides this structure and agility for organizations. EA plays a crucial role in Digital Transformation (DT). Engaging in a DT leads to paradoxical tensions. Paradoxical tensions are contradicting propositions that are interconnected and mutually dependent. With the crucial role of EA in a DT, one wonders if EA practitioners have to deal with paradoxical tensions as well? And if these differ from the paradoxes in extant DT literature? This research adopts the Paradox Theory perspective to uncover paradoxical tensions in EA within a DT context.

A single-case study was conducted with semi-structured interviews to uncover paradoxical tensions EA practitioners have to deal with in a DT context. The identified paradoxes are then compared with paradoxes from extant DT literature, to check for similarities or differences.

The results revealed four paradoxical tensions: (1) Short-Term Targets and Long-Term Strategic Goals; (2) System Renewal and Changing Systems; (3) Bottom-Up Autonomy and Top-Down Structure and Guidelines; and (4) Customized Solutions and Compliance with Guidelines and Principles. When comparing the paradoxical tensions, it was found that these are reflections of paradoxical tensions from extant DT literature. EA practitioners in a DT deal with the paradoxical tensions inherent to a DT. Thus further proving the crucial role of EA in a DT.

This study proves the existence of paradoxes for EA in a DT context. Combining the Paradox Theory with the field of EA. Furthermore, it shows the overlap with paradoxes inherent to a DT. Further cementing the role of EA in a DT. Helping EA practitioners to identify paradoxical tensions and emphasize their role in a DT. The results impact on a theoretical and managerial level. Lastly, future research directions are given to further increase the knowledge on this topic, emphasizing the importance of more empirical evidence on managing paradoxes.

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1. Introduction

In the current dynamic and rapidly changing environments organizations need to be agile and digitally transform to keep up (Vial, 2019; Zhu et al., 2021). To become agile and move with the market digital transformations are becoming more and more prevalent. The field of Digital Transformation (DT) has seen a rapid increase in popularity since 2018 (Zhu et al., 2021). But even with every consulting firm actively working on DTs, approximately 70%, of DTs fail (Block, 2022; Saldanha, 2019). There are numerous reasons for this, these differ with each case. One of the main reasons is a lack of structure and agility built in an organization (Saldanha, 2019). Something that can be solved by having good Enterprise Architecture (EA) built into your organization (Ross et al., 2006).

EA can be defined as a "*structured and aligned collection of plans for the integrated representation of a given business and IT landscape, in past, current, and future states*" (Zhang et al., 2018). As can be taken from the definition, EA connects business and IT within organizations (Kappelman & Zachman, 2013; Ross et al., 2006; Zhang et al., 2018), and helps achieve future states, such as those formulated in DT strategies (Zhu et al., 2021). Furthermore, EA gives a collection of plans, adding structure to an organization. By having a clear structure and strategy, agility is created to move quickly based on existing plans and to make changes in these plans (Bizzdesign, 2021; Ross et al., 2006). These are the core objectives of EA. The core objectives of EA closely align with what organizations place under the heading of business-IT alignment and are a requirement for reaching the goals of a DT. The challenges and goals have remained the same throughout the years, as research from Bizzdesign on the state of EA shows. The top goals of EA are becoming agile in a dynamic environment, together with stepping out of the IT limelight, and involving business unit managers more actively in EA (Bizzdesign, 2021). EA, DT, and achieving Business-IT Alignment can thus be seen as intertwined. Where DT is the context and active on different levels and units of an organization, including EA departments.

Actions taken to actively transform an organization, as is the case in a DT, have been shown to lead to tensions within organizations (Vial, 2019; Yeow et al., 2018). Actions taken to achieve business-IT alignment and EA actions have also been shown to lead to tensions (Aier, 2014; Kristin et al., 2021; Ross et al., 2006; Yeow et al., 2018). These tensions need to be identified, managed, and solved. Not recognizing and solving tensions means an organization is standing still and failing at achieving DT and EA goals (Luscher & Lewis, 2008; P. Smith & Beretta, 2021). Research in the field of DT on tensions has shown that these tensions are

often paradoxical in nature (Gregory et al., 2015; Johansson et al., 2022; P. Smith & Beretta, 2021; Soh et al., 2019; Svahn et al., 2017; Wimelius et al., 2021; Yeow et al., 2018). Meaning that there are no clear-cut solutions, and involves two propositions that contradict one another, yet are interconnected and mutually dependent. Especially in an organizational context, a decision is difficult or even impossible (Gaim & Wåhlin, 2016). These paradoxical tensions are becoming more prevalent within the current dynamic and changing environments (Lewis, 2000).

Building on extant EA and DT literature and the early evidence proposed in them (Aier, 2014; Kristin et al., 2021; P. Smith & Beretta, 2021; Vial, 2019; Yeow et al., 2018), we know that EA plays a crucial role in enacting a DT. As a DT leads to paradoxical tensions, we propose that EA is possibly facing paradoxical tensions during DT execution. We adopt the Paradox Theory perspective, with this perspective we aim to uncover paradoxes that EA practitioners have to deal with in a DT context. The Paradox Theory was first introduced by Lewis (2000). Stating that with the increasing globalization, organizational environments are more dynamic and competitive. Leading to an increase in contradicting demands and paradoxical tensions becoming more pertinent.

The Paradox Theory perspective offers EA practitioners a novel lens for viewing tensions and how to manage them. Furthermore, it is interesting to understand if these are unique to EA or inherent to DT. If the tensions are inherent in a DT, they are a challenge for EA practitioners through the crucial role of EA in a DT.

With this study, we aim to combine the Paradox Theory with EA and contribute to the body of work investigating the paradoxical tensions of a DT (Gregory et al., 2015; Johansson et al., 2022; P. Smith & Beretta, 2021; Soh et al., 2019; Svahn et al., 2017; Wimelius et al., 2021; Yeow et al., 2018). Further establishing the relevance of Paradox Theory for investigating organizational tensions. Through the means of an empirical single-case study of a large Dutch bank (pseudonym Bank Inc.), paradoxical tensions are identified. Together with the categorization of W. K. Smith & Lewis (2011) (see Appendix A). Learning, Belonging, Organizing, and Performing tensions can be identified. Using this categorization enables the identification of paradoxical tensions found in the case study of Bank Inc., and compares the paradoxical tensions with those from extant DT literature. Finding out if EA deals with unique paradoxical tensions, or with the paradoxical tensions inherent to a DT.

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1.1. Research Question

The introduction and problems stated, have led to the following research question:

"What key paradoxical tensions arise during a Digital Transformation for Enterprise Architecture practitioners? How do these paradoxical tensions differ or are similar compared to paradoxical tensions in a Digital Transformation?"

1.2. Contributions

1.2.1. Academic Contribution

By adopting a novel theoretical perspective for EA, the Paradox Theory, this study aims to reveal paradoxical tensions affecting EA. It is the first study using the Paradox Theory perspective in the EA field. Thus providing an empirical connection in academic literature. Giving EA researchers the possibility to adopt the Paradox Theory perspective in future research.

Furthermore, by doing a comparative study with extant DT literature, found paradoxical tensions are checked on their uniqueness or similarities. Proving that EA either faces unique paradoxes in a DT context or proving that EA faces similar paradoxical tensions as are inherent to DT. This would further cement the crucial role that EA plays in a DT, dealing with the paradoxes that emerge during a DT in an organizational context (Gregory et al., 2015; Johansson et al., 2022; P. Smith & Beretta, 2021; Soh et al., 2019; Svahn et al., 2017; Wimelius et al., 2021; Yeow et al., 2018). Moreover, it would show how paradoxical tensions inherent to a DT are active at different levels throughout an organization.

Lastly, by contributing to the body of knowledge of paradoxical tensions within an organizational context. The relevance of the Paradox Theory is established for investigating organizational tensions.

1.2.2. Managerial Contribution

There are three practical implications. First, this study will assist EA practitioners facing a DT to identify paradoxical tensions. This will help them reach their goals and reach a status of business-IT alignment.

Secondly, business unit managers or managers outside of EA that a DT will be able to use this research to identify paradoxical tensions. For both, solving these paradoxes will help them reach moments of peak performance to further overall organizational success (W. K. Smith &

Lewis, 2011). Third, the specific case study can use this study to give them a new perspective on their DT activities and the role of EA.

1.3. Structure

The research is divided into different sections explained here.

Section 2 gives the complete theoretical background. The theoretical background gives the definitions of Digital Transformation, Enterprise Architecture, Business IT-Alignment, and Paradox Theory. Combining them to serve as the fundament of the research. Section 3 explains the research design, data collection, and data analysis methods used to get results. Furthermore, section 3.2.4 gives the details of the case used. In section 4 the findings of the research are presented in two stages, exploratory (identifying paradoxes) and confirmatory (comparing identified paradoxes). In section 5 the results are discussed. In section 6 a conclusion is given, as well as a way forward. Academic, and managerial recommendations are given. Showing how the results can be used, and pave the way for future research.

2. Theoretical Background

There are three theoretical topics of interest in this study. These are (1) Digital Transformation (DT), (2) Enterprise Architecture (EA) and Business-IT Alignment (BITA), and (3) Paradox Theory. In this section, we will explore each of these topics in-depth in sections 2.1, 2.2, and 2.3. Section 2.4 is aimed to connect the theory on DT, EA, and BITA with the Paradox Theory. Section 2.5 gives a summary of the chapter.

2.1. Digital Transformation (DT)

Vial (2019) gives a clear conceptual definition of DT. DT is "*a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies".* This definition is widely accepted within the field (Anthony Jnr, 2021; Saldanha, 2019; Zhu et al., 2021). It combines extant definitions with the rules for building conceptual definitions (Wacker, 2004). Thus giving a complete description of the concept.

In a recent literature review, Zhu et al. (2021) found three distinct levels that DT research focuses on. Namely, strategy, operation, and industry. To start, strategy is fundamental to DT, because DT is about strategy and not technology. Technologies are only the building blocks to enacting the DT (Warner & Wäger, 2019). Second, is the operational level. The operational level has three building blocks, driving forces, internal structural transformations, and value

creation. Here the driving force, digital technologies (e.g., Cloud Computing, Mobile Technology, Internet of Things), drives forward internal structural transformations, and the need for a value creation approach. This enables enterprise agility (Zhu et al., 2021). Lastly the industry level. The industry level looks at DT from a manufacturing and consulting view. The industry level focuses on the concrete implementation within supply chains and factories, for example, the implementation of Industry 4.0 (Luz Martín-Peña et al., 2018; Zhu et al., 2021).

For this study, we limit ourselves to the strategic and operational levels. The strategic level because we have a case with a formulated DT strategy, a 'blueprint' that is being followed (Bharadwaj et al., 2013; Matt et al., 2015). The operational implementation looks only at the activities within the internal structural transformation. This is where EA plays a key role (Vial, 2019; Zhu et al., 2021). Performing a DT calls for organizations to be structured, ambidextrous, and agile (Bharadwaj et al., 2013; Matt et al., 2015; Vial, 2019; Warner & Wäger, 2019; Yeow et al., 2018; Zhu et al., 2021), otherwise, a DT will likely fail (Block, 2022; Saldanha, 2019).

2.2. Enterprise Architecture (EA) and Business-IT Alignment (BITA)

EA was first introduced in 1987, with the introduction of the Zachmann framework (Kappelman & Zachman, 2013). Zachmann created a framework to describe the entire organization, business, and IT combined. Since this introduction, EA has grown from a single framework to several frameworks and methodologies (Urbaczewski & Mrdalj, 2006). Overall EA has become a structured, aligned, and strategic collection of plans to *"represent the business and IT landscape, in past, current, and future states"* (Kappelman & Zachman, 2013; Kristin et al., 2021; Ross et al., 2006; Zhang et al., 2018).

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Business-IT Alignment (BITA) was first introduced because of the ever-increasing strategic role of IT within organizations. First introduced by Henderson & Venkatraman (1999), with the introduction of the Strategic Alignment Model (SAM) (see fig. 1). SAM looks at the entire organization encompassing business strategy, IT strategy, organizational infrastructure and processes, and the IT infrastructure and processes. It shows the linkages and alignment needed to achieve the best possible results, meaning better agility and flexibility within an organization (Kappelman & Zachman, 2013; Luftman, 2000; Ross et al., 2006).
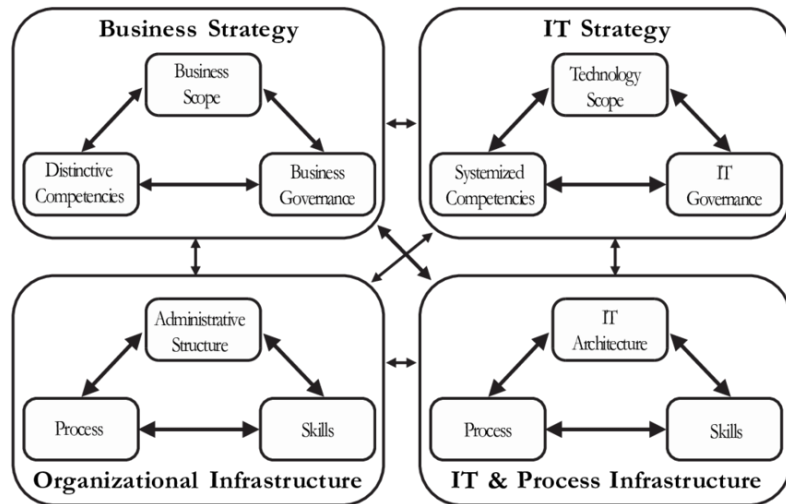
Figure 1: Strategic Alignment Model (Henderson & Venkatraman (1999)

As stated before, the current business environment is dynamic and calls for agility from an organization. Both BITA and EA aim to give this agility. Achieving BITA is one of the main goals of EA, and EA is most prominently seen as the way to achieve BITA (Kappelman & Zachman, 2013; Ross et al., 2006; Zhang et al., 2018). Both are in between the IT and business sides. We take these two research fields together, throughout the paper the goal of EA is BITA, and BITA is achieved through EA.

2.3. The Paradox Theory

As stated in section 2.1, with increasing globalization, organizational environments have become more dynamic and competitive. This development increasingly causes the need for organizations to change the way they work and manage their organization. Leading to paradoxical tensions (Lewis, 2000; P. Smith & Beretta, 2021; W. K. Smith & Lewis, 2011).

A paradox is defined as "*contradictory yet interrelated elements that exist simultaneously and persist over time. Such elements seem logical when considered in isolation but irrational, inconsistent, and even absurd when juxtaposed*" (W. K. Smith & Lewis, 2011). In other words, two propositions contradict one another, yet are interconnected and mutually dependent (W. K. Smith & Lewis, 2011). This makes making a decision difficult or even impossible, especially in an organizational context (Gaim & Wåhlin, 2016).

Research towards the creation of a theory of paradox was first introduced by Lewis (2000). With increasing globalization, organizational environments have become more dynamic and competitive. This development leads to an increase in contradicting demands and paradoxical tensions becoming more pertinent. Tensions are the root of all paradoxes (Lewis, 2000), however not all tensions are necessarily paradoxes (Lewis, 2000; P. Smith & Beretta, 2021; W. K. Smith & Lewis, 2011). Defining what is, and what is not a paradox remains a challenge in research (W. K. Smith & Lewis, 2011). To define paradoxes, one must look at the core aspects of a paradox as defined above.

To better understand tensions, W. K. Smith & Lewis (2011) made a categorization. Tensions can be categorized into four sections, these represent *"core activities and elements of organizations: learning (knowledge), belonging (identity/interpersonal relationships), organizing (processes), and performing (goals)."* (W. K. Smith & Lewis, 2011). This categorization is anchored in literature (Lewis, 2000; Luscher & Lewis, 2008; Quinn, 1988), and gives a framework to categorize found tensions.

- *Learning tensions* arise as organizations change and innovate and thus consume the past to create a future. E.g., digitally transforming, thus changing the way employees work.
- *Belonging tensions* arise as individuals in the organization have competing interests, with the organization or other individuals. E.g., board members have other interests than employees.
- *Organizing tensions* arise as the organization creates conflicting processes to achieve an outcome. E.g., routinizing tasks, or changing them.
- *Performing tensions* arise as goals are competing with one another, e.g., financial versus social goals (W. K. Smith & Lewis, 2011).

For this study, the distinction is made between the tensions. Helping to better understand what tensions arise, and being able to compare to tensions found in extant literature. In appendix A, the complete framework can be found.

2.4. Paradox Theory, Digital Transformation, and Enterprise Architecture

When looking at the definitions given in sections 2.1, 2.2, and 2.3. Connections can already be seen. Below these are further explained and explored.

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As stated in section 2.1, digital transformations call for an organization to be ambidextrous and agile (Bharadwaj et al., 2013; Matt et al., 2015; Vial, 2019; Warner & Wäger, 2019; Yeow et al., 2018; Zhu et al., 2021). To achieve this, structure is needed. Structure enables the enactment of a DT strategy (Bharadwaj et al., 2013; Matt et al., 2015).

Practicing EA is widely acknowledged as a method to achieve structure within an organization, thus enabling agility (Kappelman & Zachman, 2013; Ross et al., 2006; Zhang et al., 2018). A DT strategy is closely correlated to the *"future state of the business and IT landscape"* (Kappelman & Zachman, 2013; Kristin et al., 2021; Ross et al., 2006; Zhang et al., 2018). With this in mind, the crucial role of EA in the process of a DT can be stated. They influence one another. This is empirically validated in multiple studies (Anthony Jnr, 2021; Julia et al., 2018; Masuda et al., 2021).

Research has shown that DT, EA, and alignment actions lead to tensions in organizations (Aier, 2014; Kristin et al., 2021; P. Smith & Beretta, 2021; Vial, 2019; Yeow et al., 2018). Empirical research on DT with the Paradox Theory perspective has found that these tensions are often paradoxical (Gregory et al., 2015; Johansson et al., 2022; P. Smith & Beretta, 2021; Soh et al., 2019; Svahn et al., 2017; Wimelius et al., 2021; Yeow et al., 2018). With EA playing a crucial role in a DT, it is interesting to find out if EA has to deal with paradoxical tensions in practice. Furthermore, whether these tensions differ from paradoxical tensions from the extant DT literature, or are similar to the inherent paradoxical tensions in a DT. Since EA plays a crucial role in a DT, it can be expected that EA deals with paradoxical tensions inherent to a DT.

Furthermore, by using the Paradox Theory perspective it is possible to find paradoxical tensions, categorize them and evaluate the differences with similar paradoxical tensions (Luscher & Lewis, 2008). The Paradox Theory perspective offers a different mindset when facing tensions. Specifically for managerial strategies that support contrasting statements simultaneously. Other than earlier organizational theories that ask which statement is more effective, or under what conditions A or B is effective. The Paradox Theory perspective asks how practitioners can adequately address A and B simultaneously (W. K. Smith & Lewis, 2011). This further instigates that even if choices have to be made in the short term, whether to choose A or B. With the Paradox Theory perspective practitioners can move beyond just one decision. As W.K. Smith & Lewis (2011) put it: *"Even as managerial responses might involve splitting in the short term—leveraging insights from contingency theory to guide choices that align the firm with its current context—they also move beyond to seek integration*

and iterative decision making and attend to temporality that is both episodic and quantitative, as well as continuous and qualitative (Huy, 2001; Weick & Quinn, 1999).". For practitioners, this means engaging in practices involving more complexity, ambiguity, and uncertainty.

2.5. Conclusion

This chapter gives an overview of the relevant literature for this study. Namely, Digital Transformations, Enterprise Architecture, Business-IT Alignment, and Paradox Theory. DT, EA, and BITA give us the background and perspective on the case study. The Paradox Theory perspective enables a fresh look at tensions to identify paradoxical tensions. With a clear categorization, comparisons can be made between the paradoxical tensions found and those from the extant literature.

3. Methodology

In the methodology chapter the setup of this study, the way data was collected, and the data analysis methods are explained. In section 3.1 the research design is given, explaining the type of research and how it is set up. Section 3.2 will give the data collection methods, explaining how data was collected through interviews and a case description is given. Lastly, in section 3.3 the data analysis method is given.

3.1. Research Design

This study is designed to find and analyze paradoxical tensions present in a digital transformation context. It is aimed to do so from the perspective of EA practitioners. To give an in-depth view of the dealings within an EA department, and the paradoxical tensions that arise in the enactment of a DT strategy. The study looks at multiple business units within one organization as the unit of analysis, thus giving an embedded case design with multiple units of analysis (Yin, 2009). The study was called for by the missing literature on the Paradox Theory perspective in the EA field, and the growing need for understanding paradoxical tensions in a DT.

The research design chosen is a qualitative research approach. Using a single-case study. Within the single-case study, semi-structured interviews were used to gather primary data. The reason for a qualitative research approach was because of the descriptive and exploratory nature of the study. The goal of finding paradoxical tensions required primary qualitative data (Miles & Huberman, 1994). This data was required to capture the full effects of a DT. The use of semi-structured interviews created an overview with open-ended data, giving the freedom

to dive into specific subjects. These deep dives were crucial to finding sensitive paradoxical tensions. Moreover, control was necessary to ensure focus is put on what is researched, calling for a semi-structured way of working (Gioia et al., 2013). In this single-case study, a multi-level approach is used. The multi-level approach is used to show the dynamics and perspectives present within a single-case study.

The strength of a single-case study is that it can provide a more fine-grained look at a unique case. Furthermore, it allows the investigation of phenomena that are more sensitive in nature, as well as phenomena that are more subjective to a certain case (Eisenhardt, 1989; Yin, 2009). Paradoxes are specific to a certain case, and can be sensitive and subjective (Lewis, 2000; Luscher & Lewis, 2008). Meaning that a single-case study was the appropriate research design.

The study was conducted in three stages, these are further explained in figure 2.

1. Sample Selection
- Selection of an organization in a digital transformation, with an active architecture.
- First stage interviews are done to further investigate the DT and frame the research.
- Purposive sampling is used. Selecting business unit managers and business unit architects involved and experiencing the transformation.

2. Data Collection
- Secondary data is collected. Literature is used to gain information on DT, EA and Paradox Theory.
- Primary data is collected in the form of semi-structured interviews.

3. Case Study Analysis
- Focus on the different paradoxical tensions existing within the case on multiple levels (exploratory stage).
- Aim to find the paradoxical tensions that developed (exploratory stage).
- The paradoxical tensions identified are compared to those in extant DT literature (confirmatory stage).

Figure 2: Single-Case Study Research Design

3.2. Data Collection

To gain a thorough understanding of the main concepts of this study (DT, EA, BITA, and Paradox Theory), a case has been chosen fitting specific criteria. The case needed to be active in a DT, with an EA department striving for BITA. The case chosen is a large Dutch bank (pseudonym Bank Inc.) that fits the criteria. The case allowed looking at the inner workings of an EA department in a DT context. With the usage of the Paradox Theory perspective, paradoxical tensions could be identified.

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An extensive literature review was done to explain the main concepts and show the connections between the main concepts of this study (Miles & Huberman, 1994). This was done to complement the primary data. The literature review gives the fundament to build the study, giving the tools to conduct it. Moreover, several studies in the field of DT and the Paradox Theory are used for the confirmatory analysis. Allowing for a comparison between paradoxical tensions found in the primary data, and those from extant DT literature (Gregory et al., 2015; Johansson et al., 2022; P. Smith & Beretta, 2021; Soh et al., 2019; Svahn et al., 2017; Wimelius et al., 2021; Yeow et al., 2018).

The study is exploratory in nature, examining a single case. To determine the direction of the study, first-stage interviews have been conducted. The outcomes of these interviews helped determine the direction of the study. Furthermore, the first stage interviews are used to further structure the interview protocol for the semi-structured interviews (Eisenhardt, 1989). The semi-structured interviews are the primary data source of this study. The first stage interviews combined with the literature review gave the fundament for the semi-structured interviews (see Appendix C). The interview protocol is tested with a proxy interview to ensure all details are added (Gioia et al., 2013; Jacob & Furgerson, 2015). All interviews were done face-to-face, recorded, and transcribed. The interviews lasted an average of 45 minutes.

3.2.1. First-stage interviews

Because of the exploratory nature of the study, first-stage interviews were conducted. These interviews were done for multiple reasons. First, to get an overview of the DT. Second, to get an overview of the role of the EA department. Lastly, the interviews indicated possible paradoxical tensions and responses to be checked in the semi-structured interviews (Miles & Huberman, 1994).

Two first-stage interviews were conducted. With the management of the architecture team, namely the chief architect, and the lead architect. The chief architect has direct links with the directive of Bank Inc., the lead architect with the business unit architects. Together they were able to give a clear overview of the role of the architecture team within the digital transformation and give structure to the semi-structured interviews (see Appendix C).

Number	Interviewee
1.	Chief Architecture
2.	Lead Architect

Table 1: List of Interviewees' Exploratory Interviews

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3.2.2. Semi-structured Interviews

By combining the literature review with the information gained in the exploratory interviews, the topics and questions for the semi-structured interviews were created (see Appendix C). The interview protocol covers all the different categories of paradoxical tensions that can be found (see Section 2.3). The interviews are semi-structured allowing for follow-up questions and more elaborate answers. The multi-level approach to choosing the interviewees prevents seeing only one perspective. Allowing for more dynamics within the case.

3.2.3. Sampling Selection

The interviewees are selected based on their functions within Bank Inc. A purposive sampling method is used (Miles & Huberman, 1994). By using purposive sampling only a selection of people is chosen based on criteria (the function within Bank Inc.). This is done because only this selection has the knowledge to provide the desired information. For this study, only a select number of employees could give the information required. Namely the business unit architects and the business unit managers. Purposive sampling allowed the gaining of expert information, shrinking the margin of error, and eliminating unnecessary information.

In total 6 business unit architects and 6 business unit managers were interviewed (see Table 2).

Number	Interviewee	Department
1.	Business Unit Architect 1	Finance, Data & Reporting
2.	Business Unit Architect 2	Client Interface
3.	Business Unit Architect 3	Platforms
4.	Business Unit Architect 4	New Products
5.	Business Unit Architect 5	Client Interface
6.	Business Unit Architect 6	Living
7.	Business Unit Manager 1	Client Interface
8.	Business Unit Manager 2	Finance Data & Reporting
9.	Business Unit Manager 3	New Products
10.	Business Unit Manager 4	Clients
11.	Business Unit Manager 5	Financial Care
12.	Business Unit Manager 6	Brand Manager

Table 2: Interviewee List Semi-Structured Interviews

3.2.4. Case Description

Bank Inc. is a large Dutch bank, with more than 3.000 employees and 3.34 million customers. Bank Inc. is one of the top four banks in the Netherlands. The services offered cover a wide range of activities related to the financial industry. Such as banking, savings, investing, insurance, and mortgages. Bank Inc. has four different brands under its wings. They recently published a new strategy, aimed at making Bank Inc. futureproof. Moving the bank from a

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more product-oriented organization to a more client-centric bank. Implementing this new strategy requires changes in the organization and IT structure. Moving towards an agile way of working, integrating systems, and departments. The DT strategy related to this new strategy was initiated in March 2022.

The architecture team of Bank Inc. is responsible for the entire IT architecture landscape. Making sure everything is fitted to the strategic goals. Making sure that it is understood what Bank Inc. wants to do, how to do it, and with what IT processes, data, systems, and infrastructure. Furthermore, it is the EA team's responsibility to make sure the IT strategy is understood throughout the entire organization, business, and IT side (see Appendix C).

The case was chosen because of the prevalence of a DT, with an active EA team. The EA team needed to be responsible for the translation of strategic goals to the right IT solutions and striving for business-IT alignment. The existence of these criteria made the case ideal for the analysis of paradoxical tensions within EA in a DT context.

The study was performed after the first seven months of the digital transformation. Analyzing the period between March 2022 and October 2022.

3.3. Data Analysis

With the usage of the purposive sampling method, it was possible to give all participants an introduction. Stating clearly how the information given by them is used, and their rights. This ensured that all data collected was authorized (see Appendix B & D).

All interviews were recorded and transcribed. This allowed for the analysis of the interviews. The analysis of the interviews was done using the Goia method for analyzing interview data (Gioia et al., 2013). The Goia method was chosen because of its proven record to get quality results.

The Goia method for analyzing interviews means that the data analysis was done iteratively. It followed three stages. In the first stage, the interview transcripts were identified for first-order codes. Special attention was made to language indicators that indicate possible paradoxical tensions (Andriopoulos & Lewis, 2009). The focus was put on the identified paradoxical tensions by asking more in-depth questions about them. In the second stage, the first-order codes were aggregated into second-order themes based on identifying links and patterns among them (Gioia et al., 2013; Miles & Huberman, 1994). The results are several aggregated dimensions, or paradoxical tensions, with several minor tensions beneath them (see Table 3).

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In the third stage, the aggregated dimensions and first-order codes give the basis to answer the sub-questions, research question, and draw a conclusion.

4. Results

This study revolves around answering the research question, divided into two parts. (1) What paradoxical tensions arose during the DT for EA practitioners and (2) how these paradoxical tensions differ or are similar to paradoxical tensions in extant DT literature. Therefore there are two stages to the analysis. The exploratory stage focuses on finding the paradoxical tensions active within Bank Inc., presenting the findings of the interviews (see Table 3). Each paradoxical tension is divided into several smaller tensions that build up toward the paradoxical tension, these are explained in detail in section 4.1. The second stage is confirmatory. Here the paradoxical tensions are further explained and compared to other paradoxical tensions found in the literature (see Table 5). The uniqueness or similarity of the paradoxical tensions is discussed compared to paradoxical tensions from extant DT literature (Gaim & Wåhlin, 2016; Luscher & Lewis, 2008; P. Smith & Beretta, 2021; W. K. Smith & Lewis, 2011; Yeow et al., 2018).

The following section presents the findings of the interviews through analysis and quotes associated with the paradoxical tensions. The discussions presented stem from the discussions of the first and second rounds of analysis, either through the interviews or in comparison to extant literature. In the exploratory stage, the paradoxical tensions were found through questioning in the semi-structured interviews. In the confirmatory stage, the paradoxical tensions are tested against paradoxical tensions from extant DT literature. Showing their uniqueness or similarity to those found in this study.

Times mentioned	Paradoxical Tension	Smaller tensions
30	Short-Term Targets and Long Term Strategic Goals	• Short-term agile sprints and long-term architecture goals; • Delivering immediate business value and building a better IT landscape; • Delivering your business unit targets and seeing the bigger picture.
24	System Renewal and Changing Systems	• Keep everything running and change the systems; • Stay in line with regulatory requirements and innovate to keep up with regulations.
39	Bottom-Up Autonomy and Top-Down Structures and Guidelines	• Mandate for product owners and the architects;

		• Build autonomously and in overarching teams; • Create room for creativity and limit the options with guidelines.
22	Customized Solutions and Compliance with Guidelines and Principles	• Be client-centric and deliver generic solutions; • Ensure good communication across business units and work on your own projects; • Deliver omnichannel solutions and deliver brand-specific solutions.

Table 3: Identified Paradoxical Tensions for Bank Inc.

4.1. Exploratory Analysis (Stage 1)

4.1.1.   Short-Term Targets and Long-Term Strategic Goals

With the introduction of a new digital strategy, new long-term strategic goals were formulated. All architects and business unit managers noted that they had to balance these long-term goals with short-term targets. The DT introduced a new way of structuring the organization moving towards an agile matrix organization. The different teams in Bank Inc. started moving in sprints, and quarters, less on long-term strategic goals. This is emphasized by **Architect 3**: *"All business units are working agile, which is good. But this means they are more focused on the next sprint and quarter than before. Meanwhile, we are active in the business units to make sure they also look at the bigger picture."*.

For the EA department, this meant a constant battle with short-term solutions proposed to deliver on the targets, by relaying the focus towards the long-term target architecture formulated. *"The short-term targets are constantly in the business heads. Who are also working within their own context. We have to make sure that not just short-term decisions are made, but we look ahead and ensure that it fits within the strategy and target architecture."* (**Architect 1**). This shows the constant battle in business and IT goals within Bank Inc., further explained by **Manager 1**: *"It can be difficult, because some teams are more focused on short-term business goals, and take the IT goals less seriously. We then have to balance that, or they need to have clear argumentation."*.

Other than just business goals, the short-term impact and long-term impact are constantly balanced against each other. *"I am responsible for keeping everything in line with our strategic goals. That is for the short term, what are we going to do in the next quarter. But on the other hand, how does this relate to the long-term strategy."* (**Architect 6**). This balancing role is evident in the difficult decisions that have to be made. As **Manager 3** states: *"Something can deliver value in the short term. But if it impacts us on the long term too*

much, we will not do it. That is something that happens, if that happens over our business unit, it is very difficult to manage that.".

Added to this the architects do not just deal with their business units, but have to watch the activities and wishes of other business units to facilitate integration. *"As an architect, I need to keep an eye on integration across the company. In the end to make it easier for the client as well as ourselves. We need to constantly communicate this to make sure they work that way as well."* (**Architect 3**). Further emphasized by **Architect 6**: *"Architecturally we can work over hubs. But when we want something done, and we have dependencies on other business units. We really have to fight for a place in their backlog on the short term. This means showing value for the short term, as well as how it fits strategically towards the future.".*

All respondents agree that short-term and long-term goals call for a constant balancing act. This can be seen in the different smaller tensions that can be derived from the quotes. The short-term sprints of agile working and long-term architecture goals; delivering immediate business value and working towards a better IT architecture; and working within your business unit as well as seeing the bigger picture and working towards it.

4.1.2. System Renewal and Changing Systems

With the move towards the target architecture, architects are increasingly pushing for the removal of old legacy systems and moving towards new technologies, thus changing systems. **Architect 1** briefly states the duality of focus within Bank Inc. *"There are a lot of systems that we just need to run. But for our target architecture, some of these systems need to change. This requires a dual focus from certain teams, which is sometimes not possible.".* This is further emphasized by **Manager 3**: *"We need time to get everything in place and start changing things faster. The downside is that at the same time, we must continue to provide our services.".*

This duality is further seen in the forced rules and regulations that are put onto the financial services sector. *"Because of having to follow rules and regulations, it can be difficult to clean up legacy systems. These are often pushed forward while investing now would mean not only less problems in the future but would save them time as well. Sort of the case as sharpening your axe to chop wood, it costs time but makes the process of chopping wood more efficient."* (**Architect 4**). Further emphasized by **Architect 1**: *"The rules and regulations are a very prohibiting factor. Sometimes we need to run things, in order to fulfill the guidelines of the supervisors, which is logical for a bank. But it means we cannot use that time and money to*

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change these systems.". Simultaneously changing and innovating are often required to stay compliant as well. *"At risk and compliance, we have a lot of regulation and supervisors demanding certain reporting. This costs lots of time, which we have to balance with the need to change to other systems to ensure we can do this more effectively, and in some cases stay in line with other data rules for example."* (**Architect 4**).

To make these changes possible, the different teams need to divert time and resources. But these are limited. *"We are full, but we want to change. That is constant tension. We have to make difficult choices all the time, and those hurt. Because things that we really want to do and have priority are being delayed."*(**Manager 4)**. Further emphasized by **Architect 1**: *"We want to transform to a modular IT environment. But from our finance department, we limit this. Because we need to fix certain things before being able to do this. This is also the case because of a lack of an end-to-end chain.".* These choices are all impacted by the rules and regulations within the financial industry.

All respondents agreed that the System Renewal and Changing Systems tension is a constant balancing act. This can again be seen in several smaller tensions. The duality of working with limited time and resources; delivering on rules and regulations, both in innovations and with running legacy systems be able to do the proper reporting.

4.1.3. Bottom-Up Autonomy and Top-Down Structure and Guidelines

Giving autonomy to the bottom layers, while holding structure is the most mentioned tension in the interviews. With the agile structure, freedom, and mandate are given to the lower layers of the organization, especially the product owners. As **Manager 1** puts it: *"For me, the product owners are in charge of their own backlog. They have the power over them, but we do discuss them in our weekly meetings of course.".* At the same time, the architecture department has been given more mandate to ensure that a certain structure is held, and that freedom is not misused. As **Architect 1** states: *"... not everyone is used to the new guidelines and structures. We gave autonomy to the product owners, who were doing their own thing within their teams. But now I am here with more structure and guidelines. This limits their freedom, something they do not like, limiting creativity perhaps. But we are able to scale up more efficiently later.".* Further emphasized by **Architect 2**: *"We gave the product owners more freedom, but this leads to them making decisions that look less at the bigger picture. Something we hit our head against frequently. Which is also why we as architects are given more mandate, to guide them in their decisions and say no every once in a while. But of course, this is frustrating for them, as well as for us.".*

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More specifically, one of the main pain points for the architecture department is the impact across the business unit the autonomy has. *"We gave the product owners more freedom, but this leads to them making decisions that look less at the bigger picture. Something we hit our head against frequently. Which is also why we as architects are given more mandate, to guide them in their decisions and say no every once in a while. But of course, this is frustrating for them, as well as for us."* (**Architect 2**). Further emphasized by **Manager 2**: *"Everyone is siloed in their own business unit. So in terms of organization, this is something that calls for more work. Architecture definitely plays a role in this."*. Manager 2 also names the EA department as the linking pin between the teams. But the specific role of the EA department is best explained by **Architect 4**: *"You can give some autonomy of course. But you also need to keep some things in a more central location, simply because they impact all business units for example. Like architecture."*.

The EA department wants to leave room for creativity, while at the same time getting the different business units to understand the rules and guidelines for developing new solutions, or updating existing ones. *"You see that the client teams are involved in a lot of creative processes, but we need to make sure that these new solutions do follow our guidelines. Otherwise, we cannot allow it, or have to make exceptions, which we want to limit."* (**Architect 4**). *"As an architecture team, we can give them some roads to walk on. But they always have the freedom to divert from our given paths. What decision do you make then, because you also do not want to limit creativity."* (**Architect 5**). Clearly stating what the role of architecture is, and how autonomy and structure are balanced. Further emphasized by **Architect 6**: *"What things do we do, what don't we do. Then when we see things that I say I think are important. And a product owner deviates from that. Then that is possible because it is up to them to prioritize. Then that can lead to discussion. That is how we guarantee it. We are transparent about that."*.

Bottom-Up Autonomy and Top-Down Structure and Guidelines is the most evident paradoxical tension within Bank Inc. It can again be divided into several smaller tensions. The mandate for both product owners and architects; building an autonomous structure and working together; and creating room for creativity, while limiting the options through the guidelines and structures in place.

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4.1.4.   Customized Solutions and Compliance with Guidelines and Principles

The architecture department has a specific target architecture formulated with the new strategy. With principles and guidelines for solutions and systems, they aim to prevent a blanket of loose solutions and move towards an integrated architectural structure. As **Manager 3** puts it: *"We make decisions based on our strategic goals. One which is that we want to be a client-centric bank, and at the same time one is that we hold our architectural values in high regard. A constant balancing act."*. Where diversion is possible if properly explained: *"For architecture, I see a very clear role in setting the principles. If we build something is it according to how we see architecture. And if we divert, do we divert correctly and why?"* (**Manager 5**). The architects have to constantly balance these two worlds, as **Architect 5** puts it: *"There is a gap in the two worlds we both want to give in to. We want to be a client-centric bank, set everything in motion to service the clients as best as possible. At the same time, in order to do this effectively we want to develop omnichannel solutions, so more generic not best-of-breed. Which is it then, and what do we as architects or as a company value more?"*. Stating that prioritization also seems to be an issue.

Missing communication across different business units further emphasizes this even further. *"It is funny because the business units often want very specific solutions, but the other teams might want something similar. Then it is a better choice to go for a more generic solution. But then the focus is on that final 10% specificity that is missing, is that then really necessary or not?"* (**Architect 3**). According to **Architect 2**, this means that communication lines need to go to the architects directly. *"In my eyes, we need to make sure that everyone knows to consult us first. Before doing work, and come to us with a use-case or solution intent as we call it. This, in my eyes, calls for a more clear and changed governance structure."*.

Inherently the four brands that are active within Bank Inc. fuel this paradox further. Especially in the omnichannel architectural principle: *"We want to deliver omnichannel solutions for our four brands. But at the same time, the stakeholders cannot find each other and propose more client-specific solutions. Meaning we have to police, deny, or give in. Changing our strategy and goals as well."* (**Architect 2**). Further emphasized by **Architect 5**: *"Before we had 4 brands, all developing their own solutions. They are used to still doing this, but we want and expect them to do this more broadly. Think in the bigger picture, but they have their own ways of working, and the clients are also used to these ways. Making it difficult to change it further."*. Highlighting the struggle this brings to the EA department.

Although the least mentioned paradoxical tension, especially due to the four brands the EA department has to keep this in mind at all times. The paradoxical tension can again be divided into several smaller tensions. Being client-centric and delivering generic solutions; ensuring constant communication and control and giving freedom for creativity and innovation; building omnichannel solutions and delivering brand specificity.

4.2. Confirmatory Analysis (Stage 2)

In the confirmatory analysis the paradoxical tensions are compared to those from extant DT literature, to find unique or similar qualities (Gregory et al., 2015; Johansson et al., 2022; P. Smith & Beretta, 2021; Soh et al., 2019; Svahn et al., 2017; Wimelius et al., 2021; Yeow et al., 2018). The paradoxical tensions are categorized according to the categorization framework of Smith & Lewis (2011) (See Appendix A). By categorizing the paradoxical tensions, it is possible to compare the different paradoxical tensions and their uniqueness to EA or whether they are inherent in a DT. The categorization of the paradoxical tensions found in this study is shown in Table 4. A comparison is made by looking at tensions from a similar category and their explanation (see Table 5).

Paradoxical Tension	Categorization
Short-Term Targets and Long-term Strategic Goals	Performing
System Renewal and Changing Systems	Learning::Performing
Bottom-Up Autonomy and Top-Down Structure and Guidelines	Organizing
Customized Solutions and Compliance with Guidelines and Principles	Performing::Organizing

Table 4: Categorization of Found Paradoxical Tensions Bank Inc.

The first paradoxical tension 'Short-Term Targets and Long-Term Strategic Goals', is categorized as performing. The paradoxical tension has multiple competing goals, with stakeholders having different opinions of success. In this case, the architects seek long-term architectural goals, and the business seeks short-term success. 'System Renewal and Changing Systems' is categorized as Learning::Performing. The paradoxical tension has both efforts trying to renew and change, as well as ensuring success in the present. In this case, running systems to ensure success in the present and changing to renew systems and move forward. 'Bottom-Up Autonomy and Top-Down Structure and Guidelines' is categorized in Organizing. The paradoxical tension promotes both control and flexibility. In this case, autonomy to make your own choices, and architectural guidelines you are forced to follow.

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'Delivering Client Specific Solutions and Following Architectural Guidelines and Principles' is categorized as Performing::Organizing. The paradoxical tension fits here because of the interplay between different means and ends. In this case business value is asked for by business units and architectural guidelines. The paradoxical tensions from extant DT literature, their categorization, and with which paradoxical tension from Bank Inc. they are compared can be found in Table 5. The comparison is explained in detail in sections 4.2.1. through 4.2.4.

Paradoxical Tension in Literature	Categorization	Paradoxical Tension in Bank Inc.	Reference
Prioritization of the B2C customers and the B2B customers	Performing	Short-Term Targets and Long-term Strategic Goals	Yeow et al., 2018
Paradox of attention: Narrow focus VS holistic focus	Organizing::Performing		P. Smith & Beretta, 2021
Competing demands between past, present, and future needs.	Performing		Johansson et al., 2022
Inner and outer renewal contexts	Performing	Systems Renewal and Changing Systems	Wimelius et al., 2021
Deliberate and emergent renewal practices	Performing		Wimelius et al., 2021)
Established and renewed technology usage	Learning		Wimelius et al., 2021)
Innovation capability: existing vs requisite	Learning		Svahn et al., 2017
IT Program agility VS IT project stability (planning)	Performing		Gregory et al., 2015

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IT Integration VS IT replacement (Architecture)	Learning		Gregory et al., 2015
Sticking with existing knowledge of current B2B competencies VS learning new B2C knowledge.	Learning		Yeow et al., 2018
Paradox of organizing: Give autonomy VS keep control	Organizing	Bottom-Up Autonomy and Top-Down Structure and Guidelines	P. Smith & Beretta, 2021
Divergence at different organizational levels	Organizing		Johansson et al., 2022
IT Program control VS IT Program autonomy (governance)	Organizing		Gregory et al., 2015
IT program coordination and IT program isolation (delivery)	Organizing		Gregory et al., 2015
Innovation governance: control VS flexibility	Organizing: :Belonging		Svahn et al., 2017
IT Efficiency and IT innovation (portfolio)	Organizing	Delivering Client Specific Solutions and Following Architectural Guidelines and Principles	Gregory et al., 2015
IT standardization and IT differentiation (platform)	Organizing		Gregory et al., 2015
Innovation focus: product vs process	Performing		Svahn et al., 2017
Being a B2B company and omnichannel company	Organizing: :Belonging		Soh et al., 2019

Table 5: Comparing Paradoxical Tensions From the Literature to Those Found Within Bank Inc.

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4.2.1.   Short-Term Targets VS Long-Term Strategic Goals

For Bank Inc. and the architecture team, the paradoxical tension 'Short-Term Targets and Long-Term Strategic Goals' – culminated into three smaller tensions (see Table 3). They had to keep the focus on long-term architectural goals, whilst working with short-term targets through agile sprints. Delivering constant business value as soon as possible, while needing to build a better IT landscape. Lastly, the separate business units needed to deliver on their targets, while the architecture team needed to view all developments in the bigger picture of the entire organization.

When looking at the literature on paradoxical tensions, three paradoxical tensions are found, that closely align with the paradoxical tension active within Bank Inc. (see Table 5). Yeow et al., (2018) found that while analyzing a longitudinal case study of Umbro in a digital transformation, several paradoxical tensions were found. One was focused on prioritization, whether to first address the new B2C clients or the B2B clients. Stating that the new strategy was B2C, but in the long term, both needed to be addressed. P. Smith & Beretta, (2021) found a paradox of attention. A more narrow focus and a more holistic focus. They found a constant battle was to focus on the short-term (narrow focus) while keeping the long-term strategic goals in mind (holistic focus). Lastly, Johansson et al., (2022) while studying digital transformation in the healthcare industry found competing demands between past, present, and future needs.

All three paradoxical tensions have immediate connections with the digital transformations in the case studies. The found paradoxical tension for Bank Inc. is linked to the architecture team specifically. However, balancing short-term and long-term is not something unique to EA. The found paradox for Bank Inc. is a reflection of a common paradoxical tension in DT literature. The paradoxical tensions from the extant DT literature examined all face this challenge. The EA department of Bank Inc. just deals with this problem within the DT context of Bank Inc. Further proving the role of EA in a DT.

4.2.2.   System Renewal and Changing Systems

For Bank Inc. and the EA department, the 'System Renewal and Changing Systems' – paradoxical tension culminated into two smaller tensions (See Table 3). Keeping systems running, while making the changes necessary. Staying in line with regulations, whilst innovating to keep up with innovations.

From the literature, we can find several papers with paradoxical tensions closely related to Bank Inc. (see Table 5). Gregory et al., (2015) in their longitudinal study at a commercial bank analyzed the ambidextrous nature of several decisions that required balancing, ending up with a formulation of several paradoxical tensions. Two of which are related to run and change activities (see Table 5). The first is related to IT integration and IT replacement, specifically related to the IT architectural landscape of the case. Where the decision needed to be made whether to integrate all existing systems or replace these systems. The second is related to IT program agility and IT program stability. Where both being responsive to changes, and ensuring a stable IT foundation were both prioritized. Svahn et al., in their 2017 study analyzed several common paradoxical tensions in DTs. One of which is related to system renewal and changing systems. They found evidence, by using a case study analyzing the Volvo Cars Connected Initiative a new digital strategy of Volvo, of a paradoxical tension where existing capabilities and systems were in battle with requisite new capabilities and systems. Stating that firms must develop new capabilities and systems without jeopardizing existing capabilities and systems in place. Lastly, Wimelius et al., (2021) looked at technology renewal or change practices and their ambidextrous nature. They found evidence through a longitudinal case study that technology renewal is inherently paradoxical in a DT process. Finding three ways that renewal or change activities are paradoxical, in the usage, practice, and contexts of technology renewal.

From the literature, it is evident that 'System Renewal and Changing Systems' is not a paradoxical tension unique to Bank Inc. and the EA department. Wimelius et al. in their 2021 study even found evidence of technology renewal being inherently paradoxical in nature. Whilst Gregory et al. (2015) found within IT architecture integration and replacement are both active. It is clear that in a DT, the EA department has to deal with this paradoxical tension, as well as the organization as a whole. Svahn et al. (2017) found this to be a common paradoxical tension in DT initiatives. This means that EA is facing a reflection of a common paradoxical theme from extant DT literature. Again the EA department deals with the paradoxical tension for Bank Inc. in their DT context. Further proving the role of EA in a DT.

4.2.3. Bottom-Up Autonomy and Top-Down Structure and Guidelines

For Bank Inc. and the EA department, the 'Bottom-Up Autonomy and Top-Down Structure and Guidelines'– paradoxical tension culminated into three smaller tensions. There is a mandate for the product owners, as well as the architects. Business unit teams build

autonomously with teams' overarching departments. Lastly, room was created for creativity, while limiting options with guidelines.

From the literature, we can find five similar paradoxical tensions as the one Bank Inc. experiences (see Table 5). In their 2015 paper, Gregory et al. found two tensions related to giving autonomy and holding structure. First, keeping IT program control and giving IT program autonomy. The commercial bank from their case study needed to keep control of the programs to ensure alignment with the strategy and goals, whilst giving autonomy to ensure sufficient leeway to address local requirements. Second, IT program coordination and IT program isolation. They wanted to achieve synchronization on releases and continuous IT deliveries while enabling teams to work in isolation and deliver on their IT projects on their own time. Svahn et al., (2017) analyzed several common paradoxical tensions with the Volvo case study. One of them is innovation governance, keeping control whilst giving flexibility. Firms need to balance control and flexibility. To recognize creativity and give freedom for differentiation and innovation, while keeping control and ensuring innovation can be integrated. P. Smith & Beretta (2021) found a paradox in organizing, giving autonomy, and keeping control at the same time. Their research found this in several smaller tensions, such as a free agile way of working and working according to all agile rules. The free choice of platforms, and working on one shared platform. Johansson et al. (2022) analyzed a DT in the healthcare industry. They found a divergence at different organizational levels. Stating that all the organizational levels look at a specific solution or problem in different ways. Which can both be good and deliver creativity, as well as result in systems that cannot be integrated. Saying the balance needed is constant.

From the literature, it is evident that the paradoxical tension of Bank Inc. is not unique to them or EA. Managerial teams initiating a DT will have to deal with keeping control and giving autonomy. Bank Inc. and the EA department are no different. The paradoxical tension active for the EA department of Bank Inc. is a reflection of common paradoxical tensions from extant DT literature. However, again the EA department of Bank Inc. has to deal with the paradoxical tension in the DT context of Bank Inc. This further proves the crucial role of EA in a DT.

4.2.4. Customized Solutions and Compliance with Guidelines and Principles

For Bank Inc. and the EA department the 'Customized Solutions and Compliance with Guidelines and Principles' – paradoxical tension culminated into three smaller tensions. Being client-centric, while delivering generic solutions. Ensuring good communication across

business units, and working on your own projects. Lastly, delivering omnichannel solutions, and brand-specific solutions.

Four similar paradoxical tensions can be found in existing literature (see Table 5). Gregory et al., (2015) in their case study at a large commercial bank, they found two similar tensions. First, IT efficiency and IT innovation. They found that IT portfolio decisions had to be made, either going for more efficiency or innovation and specificity. Second, IT standardization and IT differentiation. In designing their IT platform (or architecture) they had to choose for standardization, putting all systems in one platform or going for differentiation, making the IT landscape more difficult but increasing potential options. Svahn et al. (2017) found a common paradoxical tension in their case study research at Volvo. The innovation focus, products, and processes. They state that organizations must find a balance between developing new technologies and leveraging them. For managers, the challenge is to balance different time horizons and resource distribution. Having to choose a new product or technology can impact the processes, meaning they would have to change as well. Soh et al. (2019) did a longitudinal study of a global sportswear company. The company went through a DT, changing its strategy as well. Going from only B2B to B2B and B2C. This change impacted the employees, who were conflicted about if they were truly a B2B company or an omnichannel company. It also impacted the technological choices they had to make, and implement for B2B or B2C, or omnichannel.

From the literature comparison, it is again evident that the paradoxical tension of Bank Inc. is not unique, but is similar to those found in extant literature. The paradoxical tension is not unique to EA, but rather a reflection of common paradoxical tensions of extant DT literature. Implementing a new digital strategy and transforming involves decisions on the type of solutions an organization will use, as is the case with Bank Inc. These decisions are made by the EA department, they again deal with the paradoxical tension for Bank Inc. in their DT context. Again proving the role of EA in a DT.

4.3. Combining the Results

The EA practitioners at Bank Inc. have to deal with paradoxical tensions, four clear paradoxes are identified through the interviews (see Table 3). In comparing these paradoxes with paradoxes from extant DT literature (see Table 5), the paradoxical tensions found are not unique to the case. They are reflections of common paradoxical tensions found in extant DT literature. But all found paradoxical tensions are dealt with by the EA department of Bank

Inc., this shows the role that EA departments play in a DT through the paradoxical tensions that they deal with. This further cements the crucial role that EA plays in a DT, as has been shown in earlier research (Anthony Jnr, 2021; Julia et al., 2018; Masuda et al., 2021). EA deals with and is influential in the biggest paradoxical tension inherent to a DT.

5. Discussion

In the current dynamic and rapidly changing environments, organizations need to become agile and transform (Vial, 2019; Zhu et al., 2021). The topic of DT, therefore, has seen an increase in popularity since 2018. However, companies still face big challenges when it comes to implementing a DT strategy (Vial, 2019; Zhu et al., 2021). One of which is that DT strategies lead to paradoxical tensions (Gregory et al., 2015; Johansson et al., 2022; P. Smith & Beretta, 2021; Soh et al., 2019; Svahn et al., 2017; Wimelius et al., 2021; Yeow et al., 2018).

The nature of a paradox means that there is no clear-cut solution for it. A paradox consists of two propositions contradicting one another, while being interconnected and mutually dependent (W. K. Smith & Lewis, 2011). For organizations, this makes these decisions difficult or even impossible (Gaim & Wåhlin, 2016).

The role of EA has been established within DT and plays a crucial role. EA practitioners are responsible for the future states of an organization. These future states are formulated in DT strategies, connecting EA and DT (Kappelman & Zachman, 2013; Kristin et al., 2021; Ross et al., 2006; Zhang et al., 2018). EA is seen as integral to a DT, playing a crucial role in them (Anthony Jnr, 2021; Julia et al., 2018; Masuda et al., 2021). Yet the relation between Paradox Theory and EA has not been established in extant literature.

In this study, four paradoxical tensions were found through qualitative research. (1) Short-Term Targets and Long-Term Strategic Goals; (2) System Renewal and Changing Systems; (3) Bottom-Up Autonomy and Top-Down Structure and Guidelines; and (4) Customized Solutions and Compliance with Guidelines and Principles. These paradoxical tensions relate to EA in a DT context. Providing empirical proof that EA practitioners have to deal with paradoxical tensions.

In comparing the found paradoxical tensions of Bank Inc. with common paradoxical tensions from extant DT literature, similarities are found. The paradoxical tensions for EA are reflections of the common paradoxical themes (Gregory et al., 2015; Johansson et al., 2022; P.

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Smith & Beretta, 2021; Soh et al., 2019; Svahn et al., 2017; Wimelius et al., 2021; Yeow et al., 2018). This shows that EA practitioners have to deal with paradoxical tensions inherent to a DT. Further cementing the crucial role that EA plays in a DT, as was shown in extant EA and DT literature (Anthony Jnr, 2021; Julia et al., 2018; Masuda et al., 2021).

5.1. Theoretical Contributions

This study adds to the theoretical fields of EA, DT, and Paradox Theory.

By providing empirical evidence of paradoxical tensions for EA practitioners, this study addresses the research gap in the connection between EA and the Paradox Theory. It has already been proven that practicing EA leads to tensions (Aier, 2014; Kristin et al., 2021; Ross et al., 2006; Yeow et al., 2018). This study adds empirical evidence that these can be paradoxical, and EA practitioners have to deal with paradoxical tensions in a DT context.

Furthermore, this study uncovers that the paradoxical tensions that EA deals with are not unique to EA. The paradoxical tensions identified are reflections of common paradoxical tensions from extant DT literature (Gregory et al., 2015; Johansson et al., 2022; P. Smith & Beretta, 2021; Soh et al., 2019; Svahn et al., 2017; Wimelius et al., 2021; Yeow et al., 2018). The results show how EA practitioners deal with the paradoxical tensions inherent to DT. Thus further emphasizing the crucial role of EA in a DT context.

Lastly, by providing an empirical body of knowledge using the novel perspective of Paradox Theory in an organizational context. This study further establishes the relevance of Paradox Theory for investigating organizational tensions and their increasing importance.

5.2. Managerial Implications

From a managerial perspective, as the current market dynamics demand agile and flexible organizations, many companies will undergo, or are undergoing a DT. This study can help in identifying the paradoxical tensions that arise. Specifically, it can help EA practitioners to better understand paradoxical tensions. Giving tools to deal with them.

Furthermore, EA practitioners can use this study to show the importance of their role in a DT. Since they can show that several important paradoxical tensions in a DT are dealt with by EA practitioners.

6. Conclusion and Way Forward

This study was based on the literature on DT, EA, and the Paradox Theory. It looks at the impact of a DT on EA and their interrelation. Adopting the Paradox Theory perspective, this study proves the existence of paradoxical tensions for EA practitioners in a DT context. Furthermore, by providing a comparing analysis with common paradoxical tensions in extant DT literature, this study shows how EA practitioners deal with paradoxical tensions inherent to DT. Cementing the crucial role of EA in DT (Anthony Jnr, 2021; Julia et al., 2018; Masuda et al., 2021). Lastly, the study establishes the importance of Paradox Theory when investigating tensions in an organizational context.

A limitation of this study is the relatively small sample size for the case study and interviews. However, with extensive planning, saturation was achieved. Due to the research being a single-case study, the results have limited generalizability. But by comparing it with other single-case studies a comparison between the different paradoxical tensions can be made (Gaim & Wåhlin, 2016; Luscher & Lewis, 2008; P. Smith & Beretta, 2021; W. K. Smith & Lewis, 2011; Yeow et al., 2018). But specifically for tensions active to EA, this could be an exception. However, as Yin (2009) suggests this research generalizes from case study findings to theory. Therefore, this research informs the Paradox Theory by providing an alternative view, that of EA to the Paradox Theory. This means that this study needs to be judged on the validity of the reasoning used when drawing conclusions based on it.

The qualitative nature of the study exposed two biases: interviewer bias and confirmation bias. Interviewer bias was prevented by doing a proxy interview, as well as using first-stage interviews as input. Ensuring that all themes that needed to be explored were explored (Jacob & Furgerson, 2015; Miles & Huberman, 1994). The confirmation bias was tackled by using the multi-level approach, using input from different departments with different goals and perspectives (Miles & Huberman, 1994). The highest degree of internal and external validity was reached with the usage of triangulation. Using existing literature to fundament the study, and compare the study. Adding primary data through interviews, with the multi-level approach and semi-structured interviews. Allowing for a broad view and the opportunity to explore all explanations (Miles & Huberman, 1994).

There are several future research directions. First, future research could use multiple case studies in different contexts to study paradoxical tensions related to EA in a DT context. This expands this study and verifies the findings of this study in other contexts. Other future

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research could elaborate on the impact of the paradoxical tensions on practicing EA, and emphasize the management of paradoxical tensions. The research on paradoxical tension management is still limited in a DT context. There are some models and frameworks (Luscher & Lewis, 2008; W. K. Smith & Lewis, 2011; W. K. Smith & Tushman, 2005), however empirical evidence for them is still limited.
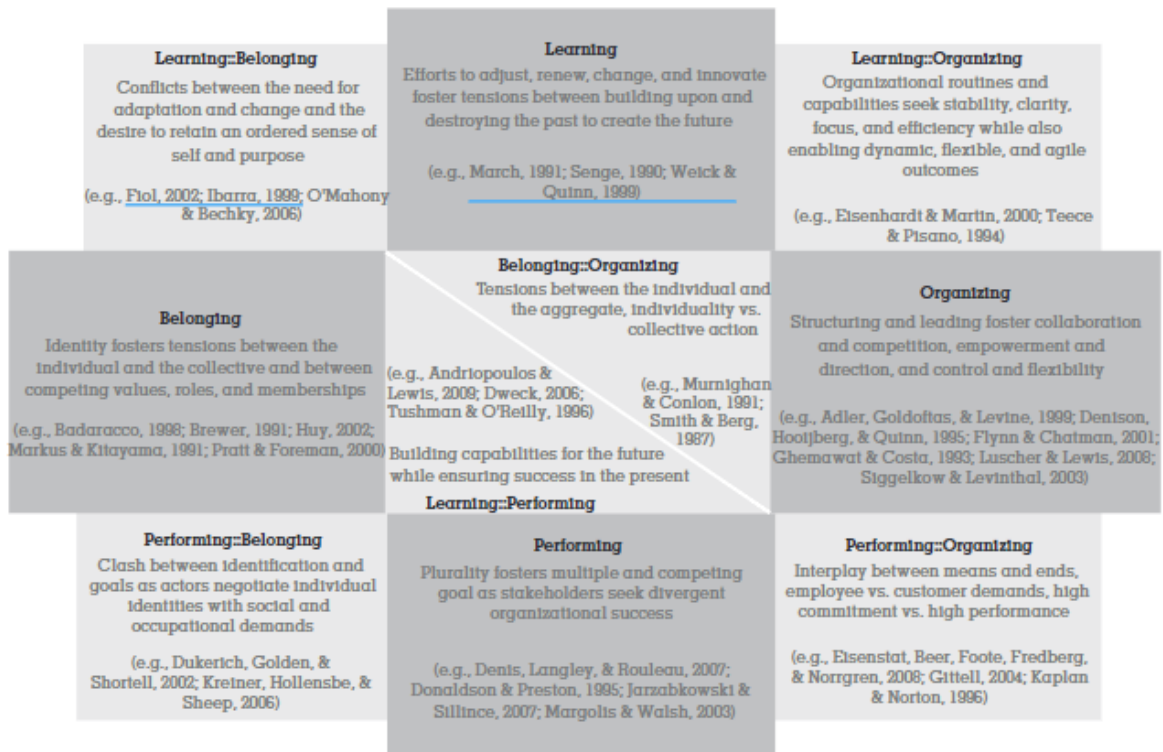
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Appendix A: Categorization of Organizational Tensions (W. K. Smith & Lewis, 2011)

Learning::Belonging	Learning	Learning::Organizing
Conflicts between the need for adaptation and change and the desire to retain an ordered sense of self and purpose	Efforts to adjust, renew, change, and innovate foster tensions between building upon and destroying the past to create the future	Organizational routines and capabilities seek stability, clarity, focus, and efficiency while also enabling dynamic, flexible, and agile outcomes
(e.g., Fiol, 2002; Ibarra, 1999; O'Mahony & Bechky, 2006)	(e.g., March, 1991; Senge, 1990; Weick & Quinn, 1999)	(e.g., Eisenhardt & Martin, 2000; Teece & Pisano, 1994)

Belonging::Organizing
Tensions between the individual and the aggregate, individuality vs. collective action

Belonging		Organizing
Identity fosters tensions between the individual and the collective and between competing values, roles, and memberships	(e.g., Andriopoulos & Lewis, 2009; Dweck, 2006; Tushman & O'Reilly, 1996)	Structuring and leading foster collaboration and competition, empowerment and direction, and control and flexibility
(e.g., Badaracco, 1998; Brewer, 1991; Huy, 2002; Markus & Kitayama, 1991; Pratt & Foreman, 2000)	(e.g., Murnighan & Conlon, 1991; Smith & Berg, 1987)	(e.g., Adler, Goldoftas, & Levine, 1999; Denison, Hooijberg, & Quinn, 1995; Flynn & Chatman, 2001; Ghemawat & Costa, 1993; Luscher & Lewis, 2008; Siggelkow & Levinthal, 2003)

Building capabilities for the future while ensuring success in the present

Learning::Performing

Performing::Belonging	Performing	Performing::Organizing
Clash between identification and goals as actors negotiate individual identities with social and occupational demands	Plurality fosters multiple and competing goal as stakeholders seek divergent organizational success	Interplay between means and ends, employee vs. customer demands, high commitment vs. high performance
(e.g., Dukerich, Golden, & Shortell, 2002; Kreiner, Hollensbe, & Sheep, 2006)	(e.g., Denis, Langley, & Rouleau, 2007; Donaldson & Preston, 1995; Jarzabkowski & Stillnce, 2007; Margolis & Walsh, 2003)	(e.g., Eisenstat, Beer, Foote, Fredberg, & Norrgren, 2008; Gittell, 2004; Kaplan & Norton, 1996)

Appendix B: Interview Protocol Exploratory Interviews

Introduction

Thank you for taking the time to do this interview with me. The reason for this interview is to learn more about the organization, the organization of the digital transformation, any problems that arose during the digital transformation, and lastly whether there were any tensions that you feel had to be dealt with. Or are still being dealt with. The purpose of this interview and of the study is to help the organization achieve better business-IT alignment, this to improve the transition and changes currently happening and that are going to happen in the future. By improving the organization's agility and flexibility.

The interview will take approximately 30 minutes, the interview will be transcribed and analyzed. The results are completely anonymized and will only be seen by me and the supervisor of the university. To do this effectively I would like your permission to record this interview. The recording will only be listened to by me, to transcribe the interview. The transcribed interview will be sent back to you if you want certain aspects taken out, I will do so.

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Protocol

Topic	Questions
General questions	- What specific business unit do you work in? - What is your function title? - What does your function entail? What kind of goals do you have within your function? - How are goals set within the organization? - How do you strive to reach goals, is there an incentive plan or anything?
Introduction to the Digital transformation	- When and why did the DT start? When for you? - What is the deadline for conducting the DT? - What is the end goal of the DT? - What is the role of the architecture team in the DT?
Problems during the digital transformation	- What challenges are you experiencing in the DT? - What is preventing you from reaching the goals of the DT?
Finding tensions	- Are you experiencing challenges in getting the organization to change? - Are you experiencing employees battling in their interests and where the organization is heading? - Are you experiencing challenges in processes to reach an outcome? - Are you experiencing challenges with competing goals within your team?

Outro

Thank you again for taking the time out of your day to help me with my study. As stated before the results and anything you said will be anonymized, the recording will only be listened to by me and you will receive the transcription for any redactions within ten working days in your mail. If for some reason you no longer want to participate or want everything deleted, I will do so.

Appendix C: Interview Protocol Semi-Structured Interviews

Introduction:

Thank you for taking the time to do this interview with me. The reason for this interview is to learn more about the organization, the organization of the digital transformation, any problems that arose during the digital transformation, and lastly whether there were any tensions that you feel had to be dealt with. Or are still being dealt with. The purpose of this interview and of the study is to help the organization achieve better business-IT alignment, and to improve the transition and changes currently happening and that are going to happen in the future. By improving the organization's agility and flexibility.

The interview will take approximately 30 minutes, the interview will be transcribed and analyzed. The results are completely anonymized and will only be seen by me and the

supervisor of the university. To do this effectively I would like your permission to record this interview. The recording will only be listened to by me, to transcribe the interview. The transcribed interview will be sent back to you if you want certain aspects taken out, I will do so.

Protocol

Topic	Questions
General Questions	- What specific business unit do you work in? - What is your function title? - What does your function entail?
General Questions about the Digital Transformation	- What work do you do related to the DT? - How have you experienced the DT so far?
Learning tensions	- How do you feel the DT changed your relationship with the business/IT side? - Do you experience challenges with the changes that are being made? In working with business/IT? - Do you feel like the innovations you propose or initiate generate friction? - How do you respond to these tensions? - How do you try to tackle these challenges? - What are the consequences of your work for these challenges?
Belonging tensions	- Do you experience challenges with the interests of co-workers that are not aligned? Between business/IT? - Do you experience challenges with your interests and that of the DT? Or that of the business/IT side? - Do you feel like your work causes friction or competing interests within your teams? - How do you respond to these tensions? - How do you try to tackle these challenges? - What are the consequences of your work for these challenges?
Organizing tensions	- Do you experience challenges related to processes that cross each other? For example between business and IT? - What are they? - Do you feel your work causes friction in processes? - How do you respond to these tensions? - How do you try to tackle these challenges? - What are the consequences of your work for these challenges?
Performing tensions	- Are the goals for you and your team clearly defined? - Do you feel these goals conflict or cause tension within your teams? For example business goals and IT goals not aligning? - How do you respond to these tensions? - How do you try to tackle these challenges? - What are the consequences of your work for these challenges?

Possible solutions and final remarks	- So far you have given an overview of some challenges in your work. What could be possible solutions in your opinion? - In terms of change, how could they best handle that within the context of the DT in your opinion? - In terms of interests within the organization and individuals, how could that best be managed? - In terms of processes, do you feel like processes could work differently to avoid conflict? - In terms of goals, how could they better be introduced to avoid conflict?

Outro

Thank you again for taking the time out of your day to help me with my study. As stated before the results and anything you said will be anonymized, the recording will only be listened to by me and you will receive the transcription for any redactions within ten working days in your mail. If for some reason you no longer want to participate or want everything deleted, I will do so.