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Socio-economic management theory related to BPM: A case study of dysfunctions in digital transformation strategy

Yanfei Zhang [1], *Emmanuel Monod* [2], *Gerard Beenen* [3], *Jiang Yeuwei* [4], *Chris Willis* [5],

[1] *Ecole des Ponts and UCMT, China, yanfeizhang@aliyun.com*
[2] *Paris-Dauphine University and UCMT, China, monod@ucmt.com*
[3] *California State University at Fullerton, USA, gbeenen@fullerton.edu*
[4] *UCMT, China, jiangyuewei@ucmt.com*
[5] *Old Dominion University, USA, chwillis@odu.edu*

Abstract: This research claims that dynamic strategies demanded by today's digital environment exacerbate inconsistency between an organization's digital transformation efforts and its enterprise architecture (EA) planning process. This phenomenon leads to redundant investments, delayed implementation, and frequent failures in digital transformation projects. In order to investigate this inconsistency, we apply the socio-economic approach to management (SEAM) theory. Through critical analysis of four case studies in a large manufacturing organization, we clarify the relationship between digital transformation and EA and reveal the dysfunction in strategic implementation from a SEAM and business process management (BPM) perspective. In practice, this research integrates digital transformation and EA to provide a context-specific approach for planning and designing enterprise digital transformation strategies.

Keywords : Business Process Management, Digital Transformation, Dysfunction, Enterprise Architecture

La théorie socio-économique et la gestion des processus d'affaires : une étude de cas de dysfonctions reliée à la stratégie de transformation numérique

Résumé: Une inconsistance entre les efforts de transformation numérique des organisations et leur architecture d'entreprise (AE) est mise en relief par la recherche actuelle. Ce phénomène a pour conséquence des redondances d'investissements, des retards de mise en œuvre, et de fréquents échecs de projets de transformation numérique. Afin de mieux comprendre une telle inconsistance, nous avons recours à la théorie du management socio-économique (SEAM). Une analyse critique de quatre études de cas au sein d'une entreprise industrielle permet une clarification du le lien entre la transformation numérique et l'AE ainsi qu'une mise en lumière des dysfonctions dans une perspective fondée sur le management socio-économique et sur la gestion des processus d'affaires (BPM). Du point de vue pratique, cette recherche intègre la transformation numérique et l'AE afin de proposer une approche contextuelle permettant la planification et la conception d'une stratégie de transformation numérique.

Mots clés : Gestion Des Processus D'Affaires, Transformation NumErique, Dysfonctions, Architecture d'Entreprise

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1. INTRODUCTION

Digital transformation is often considered a new epoch that dramatically changes how organizations develop, compete, and create value (Kotusev et al., 2020). Indeed, digital transformation not only strongly affects how people work (Sahut & Lissillour, 2023) and how organizations innovate (Lissillour & Sahut, 2022), but also emphasizes how all partners need to apply digital transformation at all levels and processes in supply chain management (Derrouiche et al., 2022). For example, the supply chain operation needs to make process and organizational changes with the implementation of technology (Benhayoun & Saikouk, 2022; Lesueur-Cazé et al., 2022; Dumoutier et al., 2022). Organizations can only realize digital transformation's potential in facilitating business by optimizing their operations and decision-making processes and developing new strategic business models—in other words, by developing and implementing a digital transformation strategy (Hinkelmann & Pasquini, 2014). Many organizations use the enterprise architecture (EA) method as a tool for digital transformation (Brown et al., 2010). EA can be used as a planning and governance method to manage business-driven and value-oriented organizational transformations with the complexity of daily operations across an enterprise-wide organization (van de Wetering et al., 2021).

EA-driven dynamic capability can support enterprise-wide organizational innovation (Korhonen & Halen, 2017; van de Wetering et al., 2021) and digital transformation programs. EA can actively support decision-making in the rapidly changing business and IT environment (van de Wetering et al., 2021) to address digital transformation requirements. For many organizations, EA is used as a planning and governance method to manage complexity and continuous changes, promote consistency between the organization's strategic business unit objectives and IT, and support sustainable growth and effectiveness (Cameron & McMillan, 2013; Essien, 2019). Furthermore, EA helps manage organizational complexity by aligning business strategies and processes with IT (Banaeianjahromi, 2018a). Adopting EA in practice, however, remains challenging (Banaeianjahromi, 2018b). This challenge is only compounded in the era of digital transformation. Therefore, business strategy must be the starting point for determining IT strategies. Enterprise architecture planning integrates EA with business strategies. Digital transformation involves a change implementation roadmap, portfolio management, and constant corrections of dynamic business strategies to ensure consistency with IT strategies. Any uncertainty in the organization itself, especially with the coordination of its actions, shows that the traditional planning mechanism is out of control (Paraponaris, 1995).

Thus, the challenge of EA planning concerns how to maintain a high degree of consistency between business strategies and digital transformation.

The lack of consistency across the organization in business strategy is one of the main reasons why many organizations cannot create value from digital transformation (Hinkelmann & Pasquini, 2014). This dysfunction can cause a considerable loss of value for organizations of any size and in any industry (Savall & Zardet, 2008). Although employees and managers intuitively feel these daily losses, they often underestimate the cost.

Therefore, the biggest problem for managers is how to evaluate these substantial hidden costs and turn them into tangible performance. The socio-economic approach method (SEAM) offers a way to solve such problems by accounting for hidden costs (Cappelletti et al., 2018). SEAM posits that, due to dynamic frictions between organizational structure and employee behaviors, inherent organizational conflicts result in dysfunction and subsequent hidden costs, thus impeding sustainable socio-economic performance. The reasons behind such conflict include imperfect information, the complexity of the organizational component structure, department-specific logics, simplistic mental models, and the instability of the external environment, which exacerbates the negative consequences of the prior factors (Cappelletti et al., 2018).

According to business process management theory, the unreasonable design and integration

of EA and digital transformation planning processes lead to duplication and waste in strategy implementation. Business process management refers to the design of technical solutions and regulation of organizational personnel. In this regard, business process management and organizational dysfunction can jointly explain the inconsistency between both EA and digital transformation planning process within the organization.

Therefore, this research aims to understand the inconsistencies within the digital transformation planning and EA planning processes, thereby allowing for a more effective integration of digital transformation and EA strategy planning processes. Our specific research questions are:

RQ1: What drives inconsistent processes between digital transformation and enterprise architecture planning?

RQ2: How can organizations integrate the planning processes of digital transformation and enterprise architecture more effectively?

2. BUSINESS STRATEGY AND EA

Chandler (1959) defined business strategy as determining an enterprise's primary long-term objectives, which entails setting action policies and allocating the resources required to achieve these objectives. From this perspective, a business strategy is a formal and systematic planning process. The business' strategic functions can break down into into strategic planning, implementation, and evaluation.

The concept of business strategy plays a vital role in EA discussions. Business strategy is widely regarded as the starting point or basis for developing EA artifacts, which defines the future structure of the information system required by organizations. In practice, all mainstream EA approaches recommend developing EA artifacts in some form, starting directly from the organization's business strategies, such as tasks, visions, drivers, goals, objectives, and key performance indicators. EA is especially essential in helping organizations manage the rapidly changing technology and business environment (van de Wetering et al., 2021), entailing design, management, and transformation of modern organizations as complex systems to ensure the value of critical stakeholders (Lankhorst, 2016). EA takes business objectives, the value chain, and business capabilities as management elements. In addition, EA pays increasing attention to enterprise-wide organizational transformation and strategic management (Kudryavtsev & Kubelskiy, 2018). EA aims to bridge the gap between these two elements, from strategy to operation, and to adjust, integrate, optimize, and coordinate the whole organization (Kappelman & Zachman, 2013).

In sum, in the existing EA literature, business strategy is widely regarded as a necessary and foundational aspect of EA (Kotusev et al., 2020).

Kudryavtsev & Kubelskiy (2018) identified the benefits of using EA to support strategic management. Their research pointed out that a driving factor for the application of EA is the need for continuous changes in business transformation. The relationship between business transformation and EA has been receiving increasing attention; that is, the gap between the goal and the current state will be transformed into the development of an organizational initiative. The target architecture is the embodiment of organizational strategies and vision, while designing future architecture as a part of strategic planning. Since EA is integrative, its application includes exploiting the overlap between the organization's assets and business capabilities. It provides integrity and consistency at all levels of the organization and can create a competitive advantage by coordinating and ensuring the consistent operation of elements (Kudryavtsev & Kubelskiy, 2018). Proper (2014) regarded the practice of EA as capability-based planning, a technology for planning capability investment that helps achieve the business results in specified in the strategy. At the same time, Proper (2014) further posited that EA-based capability planning refers to using organization-specific resources to align strategic objectives with technology. It is a powerful mechanism to ensure that the strategic plan is promoted from top to bottom. In other words, EA-based capabilities facilitate decisions about standardized processes, integrated data,

applications, and IT infrastructure (Kudryavtsev & Kubelskiy, 2018).

3. THEORETICAL FRAMEWORK

3.1 SEAM and Dysfunction

Henri Savall developed SEAM in 1973 as a management method to coordinate organizational performance's economic and social aspects. SEAM is based on a set of values and a management belief system that differs from traditional management approaches. Traditional management conducts scattered analyses of the organization that are based on incomplete financial data and insufficient attention to personnel. By contrast, SEAM includes both human and financial factors in its analysis (Saab, 2017). Based on the implicit cost method, it evaluates the economic consequences of organizational dysfunction, which is usually ignored by the traditional accounting information system (Saab, 2017; Cappelletti et al., 2018). This theory has been developed by the ISEOR Research Lab of the University of Lyon (France). ISEOR stands for Institute of Socio-Economics and Organization Research.

"Dysfunction" refers to problems or difficulties which constantly interfere with organizational operations. Dysfunction prevents an organization from fully achieving its goals and effectively using its human and material resources (Savall & Zardet, 2008). Savall & Zardet (2008) identified six types of dysfunctions: working conditions; work organization; communication, coordination, and cooperation; time management; comprehensive training; and strategy implementation. More precisely, dysfunctions generate hidden costs related to monitoring and management (see Table 1), and these hidden costs decrease organizational performance (Savall & Zardet, 2008). This research focuses on the particular dysfunction of strategy implementation along with associated hidden costs and financial consequences.

Table 1: Dysfunctions, hidden costs, and financial consequences

Dimensions	Indicators
Dysfunctions	1 Coordination between departments
	2 Work Organization
	3 Time Management
	4 Strategy Implementation
	5 Integrated Training
	6 Working Conditions
Hidden costs	1 Absenteeism
	2 Occupational injuries and disease
	3 Staff turnover
	4 Low-quality work
	5 Direct production gaps
Financial consequences of dysfunctions	1 Excess salary
	2 Wasted time and/or overtime
	3 Overconsumption
	4 Non-production
	5 Non-creation of potential risks

SEAM is formulated through an intervention research process using observations of specific management practices. It is based on the assumption that an organization's sustainable performance depends on both its social performance (i.e., the satisfaction of employees and stakeholders) and its economic performance (Cappelletti et al., 2018). SEAM is based, therefore, on three axes: (a) political and strategic decision-making, (b) change processes, and (c) management tools (Cappelletti et al., 2018). SEAM starts by having the organization's leaders assess which functions are abnormal or disordered. Then, corrective interventions combine diagnosis and correction with the introduction of management tools, the assessment of hidden costs, and the use of political and strategic aspects of the change process (Saab, 2017).

3.2 Business Process Management （BPM）

In the mid-1990s, as interest in business process reengineering surged, the importance of business process management grew and attracted widespread attention from various companies (Hammer, 1990). As a result, business process

management has become a generally accepted approach for studying organizational processes (Denner et al., 2018). Business processes are a set of dynamically coordinated activities controlled by a number of socially dependent participants designed to achieve a specific operational objective (Davenport, 1993). It is a management concept used to control, adjust, and optimize business processes. Each business process follows a lifecycle approach, including identification, definition, modeling, implementation and execution, monitoring and control, and process improvements. Each stage of the lifecycle emphasizes core activities performed by business process managers (Dumas et al., 2013; Zhang, 2021).

Importantly, business process management supports effective organization management and improvement practices by explicitly modeling organization-based processes. Business process management aims to improve organizational performance by optimizing and managing the business processes (Paschek et al., 2018) by focusing on improving enterprise-wide organizational operational processes through process designing, implementation, and monitoring. Business processes should be aligned with business strategies, customer needs, and business objectives to measure and control the realization of process objectives. In short, business process management aims to achieve strategic and operational enterprise-wide organizational goals and improve effectiveness and efficiency (Paschek et al., 2018). Business process improvement is made by overseeing the process of performing work and identifying gaps and inconsistencies to discover improvement opportunities to ensure consistency of results and expectations (Dumas et al., 2013). Business process improvement goals include cost reduction, efficiency improvement, quality improvement, and error rate reduction. The improvement of business processes focuses on improving organizational capabilities, rather than improving the way individuals move, ultimately adding value to the organization and its customers (Denner et al., 2018).

4. RESEARCH METHOD

4.1 Methods and Data

This work relies on case study research. More precisely, using multiple case studies improves external validity by allowing for intra-case and cross-case analyses (Yin, 2017).

We selected four cases from a multi-department for-profit organization in China, with each department responsible for different functions and subsidiary roles. Each department also adopts different EA methods in different contexts. Through research observation, we can understand the scope of different EA projects and determine the driving forces, situational factors, and results.

We collected case data between March 2018 and September 2021 and conducted semi-structured interviews with 106 organizational members, including CEOs, CIOs, IT managers, and heads of relevant departments (see Table 2). Interviews were transcribed and supplemented with archival data.

Two researchers conducted each interview, with an average interview time of 40 minutes. Empirical data were summarized into a consistent whole to ensure a cross-case comparison between unique cases. Cross-case analysis refers to a detailed search for the similarities and differences between cases (Eisenhardt, 1989).

Due to the complexity of EA practice, semi-structured interviews are considered suitable for data collection (Myers & Newman, 2007). In this way, the interviewer ensures that all pre-planned questions from the interview guide are covered, and respondents can think about and reflect on the topic to connect their experiences and views with the discussion. The main questions in the interview involved the motivation, objectives, tasks, obstacles, and benefits of the EA projects so as to observe the relationship between the EA project and digital transformation. The data saturation point was reached after the researchers conducted 106 interviews, whereby interview data repeated prior views and therefore did not add new meaningful observations (Yin, 2017).

Interpretive research methods were used in our data analysis (Klein & Myers, 1999; Walsham, 1995). The interview topic was first searched as the initial coding category. Then, the data and these categories were iteratively reanalyzed to determine all attributes and interrelationships related to EA barriers, benefits, and relationships with digital transformation. Through this process, we examined our cross-case analysis and literature data to identify further obstacles and benefits of EA projects in different contexts. We used this information as the essential data input for the EA integration strategy planning process framework.

Table 2: Number of interviews by case, job title, and organizational position

Case	CEO	CIO	COO	VP	Business Director	Business Employee	IT Employee	Business Process and IT Director	Total
Case 1	/	/	/	1	7	10	2	/	20
Case 2	/	/	/	1	5	4	3	/	13
Case 3	/	/	/	3	1	11	10	/	25
Case 4	1	/	/	5	11	23	3	/	43
Case 1 Case 2 Case 3 Case 4		1	1					3	5
Total	1	1	1	10	24	48	18	3	106

Case	Sponsor	Project Manager	Core Member	General Member	Total
Case 1	1	1	8	10	20
Case 2	1	1	7	4	13
Case 3	1	2	10	12	25
Case 4	1	2	17	23	43
Case 1 Case 2 Case 3 Case 4	2	2	1		5
Total	6	8	43	49	106

4.2 Field Cases

Case 1 (Supply Chain): The supply chain department is responsible for manufacturing, procurement, and business logistics. The department has over 10,000 employees and maintains four production bases worldwide. For relevant IT applications, all business areas have been covered by an information system, including planning, procurement, manufacturing, logistics, and other areas. The IT team includes over 60 people responsible for maintaining the information system and implementing IT projects. The IT teams mainly consist of business analytics engineers and development engineers. The EA method has been introduced into the organization, but there is currently only one architect-engineer on staff.

Case 2 (Internal Control and Risk): The internal control and risk department is responsible for the organization's exposure to risks, internal control, auditing, and compliance management. This organization establishes an internal control system and implements annual financial and management audits. Nevertheless, the internal control business audits have not been conducted throughout the entire organization, and with the overseas expansion of the department's business, it is increasingly critical to meet the requirements of external supervision and internal control requirements. For instance, over 200 audit projects each year are done manually (offline) without any information system support. The organization plans to digitally transform the audit processes to improve efficiency.

Case 3 (ESVIZE): The ESVIZE department was established in 2015 as an organizational subsidiary focused on smart home services. It has independent functional unit-level departments, such as marketing, sales, research and development, supply chain, and finance, with over 2,000 personnel. The organization's primary customers are smart home end-users. The organization hopes to use digital technology to improve customer experience, so it has launched an IT architecture project, especially for the front and back office. Over 100 IT employees focus on daily IT requirements and project development. The planning and implementation of change projects are under the management of the organization's strategy department.

Case 4 (ROBOT): The ROBOT department was established in 2015 as an organizational subsidiary

focused on the automated guided vehicle business with over 2,000 employees. It has independent functional unit-level departments, such as marketing, sales, research and development, supply chain, and finance. The organization is just starting to become profitable, and its primary customers are enterprise customers. In terms of IT, the organization's research and development and supply chain systems are shared with headquarters. However, the headquarters' marketing and sales systems have not been used, even though their information technologies have supported them. The delivery business is unique and gets separate from headquarters, and currently only scattered functions have information technology support. Despite the sharing of the department's information systems, many situations remain unsupported due to the incompatibility of the shared IT resources with the (Case 3) ESVIZE department needs. Consequently, the organizational subsidiary has almost no internal management methods and systems. Senior management hopes to introduce the EA project and establish a management planning system.

Table 3 summarizes each case.

The research framework of this paper is shown in Figure 1.

Table 3: Field study setting

NO	Type of Case	Business Function	Background Information	Scale	IT Planning and Implementation	EA Planning and Implementation	Digital Transformation Planning and Implementation	IT and EA Sources
Case 1	Sub areas directly managed by HQ	Supply chain manufacturing, procurement, logistics	Responsible for supporting HQ and all branches to delivery; the employees' number is 10,000+; there are four production bases worldwide.	large	Mature	Frequently	Frequently	HQ
Case 2	Sub areas directly managed by HQ	Internal control and risk management	Responsible for establishing the whole HQ's risk internal control system and implementing the financial and management audit, and there are more than 200 audit projects every year. Nevertheless, the internal control business has not been carried out.	Small	Almost immature	First time	Rarely	HQ
Case 3	Subsidiary of HQ	Marketing, R&D, sales, supply chain, manufacturing, procurement, logistics, service, finance	Focusing on smart home services, primary customers are end-users（2C）, and the employees' number is 2000+. The business covers China and overseas.	Middle	Mature	Moderate	Frequently	independent HQ
Case 4	Subsidiary of HQ	Marketing, R&D, sales, supply chain, manufacturing, procurement, logistics, service, finance	Focusing on the automated guided vehicle（AGV） business, the employees' number is 2,000+. The company is just beginning to make profits, and its primary customers are enterprise customers（2B）.	Middle	Almost mature	First time	Rarely	Reuse HQ

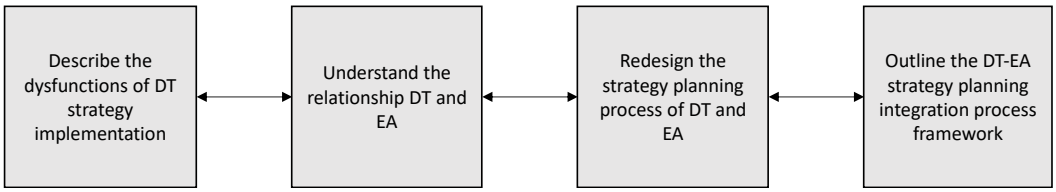

Figure 1: Research Framework

5. FINDINGS AND DISCUSSION

5.1 Findings

The concept of dysfunction refers to problems or difficulties that consistently interfere with an organization's routine operations (Savall & Zardet, 2008). Our findings reveal that the "strategy implementation" dysfunction appears more than others in each case.

Table 4 summarizes these insights for each case. The EA project sponsors of the four cases came from different roles. The sponsors of Cases 1 and 2 were the process owners, and the sponsors of Cases 3 and 4 were the business leader and CEO. Different sponsors have a distinct degree of influence on each EA project. IT department personnel oversaw the four EA projects. The motivation for implementing the EA project was different in each case. The motivation for Case 1 was that due to the requirements of external competitive pressure, business transformation needed to be achieved and

supported by architectural tools. For Case 2, due to the requirements of the enterprise system and external supervision, it was necessary to implement overall planning for the business and have specific maturity requirements. Case 3 was driven by the organization's digital transformation, and the hope to improve the digital experience model and improve the customer experience. The motivation of Case 4 was also strongly related to digital transformation. Due to the rapid growth of the business, IT requirements were becoming increasingly complex. The organization urgently needed a method and tools to facilitate the top-down planning of the enterprise-wide organizational structure and point out the direction and suggestions for business implementation. In Case 4, therefore, EA was considered for the entire organization and developed with a unified vision.

In the process of EA implementation, the motivation for Case 1 was that the IT Department hoped to guide the business transformation. However, even for the projects planned by EA to guide the business transformation, the effects needed to be more evident because of the conflicts of existing best practices in Case 1. In the vertical IT planning, some projects were consistent with the EA transformation planning project. In Case 2, the motivation was driven by regulatory authorities enforcing EA implementation, and the additional planned projects were not completed after the EA project. As a result, some digital transformation projects were realized separately and sporadically, not by EA planning. In essence, Case 2 digital transformation had nothing to do with EA planning. Cases 3 and 4 also faced business-driven motivation, and there was a strong demand for digital transformation in Case 3. Furthermore , Case 3 planned to adjust and implement the EA planning project according to the annual strategy. In Case 4, after the EA project was implemented, the management department was appointed to support it, so EA planning and implementation were kept relatively consistent. However, a few planning projects were not carried out due to department business capacity and IT resource constraints. In Case 4, the EA planning did not reflect the digital transformation planning because the business presently has no demands for digitization.

Table 4: Insights of each Digital Transformation (DT) project and its relationship with Enterprise Architecture (EA)

Basic Information	Case 1	Case 2	Case 3	Case 4
Sponsor	VP	Business director	CEO	CEO
Project Manager	IT	IT	IT	IT
EA motivation	Change planning	IT planning	DT strategy	Business strategy
If have clear strategy	Yes	NO	Yes	NO
If alignment EA planning with business strategy	Yes	Not involved	Most of Yes	Most of Yes
If have EA implementation	NO	NO	Yes after adjust	Yes
If have EA implementation base EA planning	Yes	Yes	Yes	Yes
If implementation DT project	Yes	Yes	Yes	Yes
If have relationship EA planning and DT	NO	NO	Yes	NO
How to activate the DT project	IT planning	Only sigle project	EA planning	Not involved

5.1.1 EA and Digital Transformation

Many EA methods are based on the motivation to express knowledge about information, processes, and technology in a concise and easily understood way. Therefore, understanding business motivation is essential to achieving business objectives, ensuring the successful implementation of EA plans, managing business processes, and adapting to the changing business environment (Essien, 2019). As shown in Case 4, EA planning can be a good support for digital transformation planning. Due to digital transformation's complexity and its need for complex IT systems to support it, it is an excellent way to use EA for overall IT planning and change planning. Cases 1 and 2 show that the organization can also carry out digital transformation in a point-to-point manner because digital transformation's scope and influences are much larger than those of EA. If the business takes the motivation of EA as its tool or method of digital transformation, the relationship between EA and digital transformation is strong, as in Case 4. On the other hand, due to IT personnel's insufficient understanding of the core business, business personnel need a stronger understanding of EA, which impairs the linkage between EA and digital transformation.

5.1.2 EA and Digital Transformation Planning

Developments in information science have been successfully applied to many management fields, such as finance, operations, and supply chain management. However, in the field of strategic management, IT-based methods and technologies have yet to be widely explored. In today's information-based economy, the amount of data that needs to be processed to help managers make the most effective strategic decisions has increased significantly. In addition, given the highly volatile external environment, the increasing diversification of business strategies, and the acceleration of scientific and technological progress, strategic decision-making have become increasingly complex. All the issue converge makes modern strategic management an arduous task: to maintain the organization's competitiveness, and senior managers to adapt to and modify strategies quickly. This problem can be solved by increasing the IT department's participation in the strategic decision-making process (Kudryavtsev & Kubelskiy, 2018). Enterprise-wide organizational changes may be planned in various ways, including from the top down, or it may be spontaneous, self-organized, and bottom driven. This change is driven as a proactive response to opportunities to create value or a reactive response to crises that destroy value. Further, the change may be limited in scope and implemented rapidly, or it may be significant in scale and implemented slowly. These changes may involve restructuring work, reengineering business processes, innovating new products or services, or rethinking the whole business model. However, all these may be inadequate in the face of unpredictable changes, which require customer pull rather than planning and production promotion (Korhonen & Halen, 2017). Embracing EA planning can provide systematic, top-down, predictive change and deal with dynamic and reactive change. In addition, dynamic and reactive change is needed by IT support, which is reflected in the change planning of the business context.

5.1.3 Inconsistent Alignment of EA and Digital Transformation Planning

While digital transformation itself drives more and greater change, implementation of digital transformation relies on key business and expensive IT transformation projects (Nowakowski et al., 2018). EA is considered a blueprint and solution to deal with change, reduce IT implementation failures, improve profitability, and enhance IT coordination with business (Jusuf & Kurnia, 2017). The challenges businesses face regarding EA involve the formulation of a change implementation roadmap, IT portfolio management, and agile dynamic business strategy correction. EA provides the necessary information to realize business strategies and objectives for companies operating in a turbulent business environment. It achieves this goal by arousing strategic and operational benefits and promoting competitive performance (van de Wetering et al., 2021). Korhonen & Halen (2017) proposed that, in a highly volatile environment, a sustainable competitive advantage requires inherent organizational flexibility, and EA planning and EA management also need to meet this requirement.

Since EA implementation and digital transformation are not strongly bound together, success depends on EA motivation and understanding. Our cases offer insight into the relationship between EA and digital transformation project implementation. The funnel of projects driven by business strategy and digital transformation projects is only part of EA planning (see Figure 2). Suppose an organization is ready to use EA to facilitate its digital transformation planning. In that case, it needs to consider potential value leakages to ensure that EA planning can provide the greatest value for digital transformation. These value leakages need to consider the maturity of the organization and the resolution of obstacles to EA implementation.

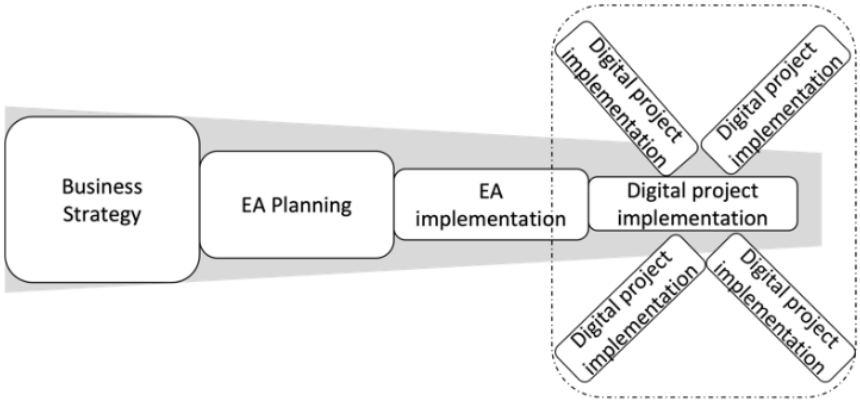

Figure 2: Project Funnel Driven by Business Strategy

5.2 Discussion

5.2.1 Digital Transformation and EA Planning Process Redesign

Through these case studies, we conclude that EA planning can be used as an effective method of digital transformation planning. However, EA encounters various obstacles to implementation, resulting in value leakages. Therefore, we propose a digital transformation and EA strategy planning process framework based on the strategic alignment model proposed by Henderson & Venkatraman (1989) to alleviate these EA obstacles. Furthermore, through its dual verification of business strategy, the digital transformation and EA planning framework integrates dynamic and situational elements by configuring EA planning in different digital transformation situations.

Evolutionism and contingency theory are the two main viewpoints of EA adaptation. The evolutionary perspective describes the single path adopted by EA, which is usually associated with a maturity level. The contingency view holds that there is no best way to adopt EA, and that the adoption of EA depends on different contextual factors (Haki et al., 2012).

(1) Dynamics and the Evolutionary Perspective

Dynamics are related to maturity, including EA and strategy dynamics. Dynamic evolutionary methods are widespread in information system research, especially in EA. These methods assume step-by-step EA management implementation, reflected by mature EA management frameworks (such as the Open Group Architecture Framework and the Department of Defense Architecture Framework). These frameworks define specific phases, usually centered on the EA lifecycle. The dynamic evolutionary approach means that the explicit maturity levels adopted by EA management can be distinguished. However, the dynamic evolutionary view has been criticized for its limited potential to explain complex organizational phenomena.

The dynamic strategy is strongly related to the business environment. In the 1990s, there was a deep-rooted view that strategy could vary greatly depending on the environment. The development of this concept is a framework called the “strategic palette.” According to this framework, and dependent upon contextual and environmental factors, five strategic formation methods arise: “classical, adaptive, renewal, visionary and shaping” (Kudryavtsev & Kubelskiy, 2018, p. 4). According to this taxonomy, different types of strategies should use different types of strategic analysis tools to confirm the five possible roles of EA external environments and contexts (Blosch & Burton, 2016). Different strategic types correspond to different EA roles. EA roles represent the maturity of EA in the organization to a certain degree and further reflect the maturity of the organization and process. The maturity analysis of the 4 cases is shown in Table 5.

Table 5: Maturity Factors Analysis

Dynamic	Case 1	Case 2	Case 3	Case 4
Strategy environment	Orchestrate	Grow	Adapt	Experience
EA role	Connector	Analyst	Conductor	Innovator
Organization and process maturity	H	M	M	L
Organization and process complexity	H	L	M	H

(2) Context and the Contingency Perspective

Previous studies have emphasized the relevance of contextual factors when using EA management and explained them through contingency theory (Haki et al., 2012). They concluded with the construction process of the context approach but did not identify any EA management design related to specific contextual factors. In short, although some researchers have tried to use the concept of contingency theory, they usually adopt EA management through a process and evolution-oriented proposition. Haki, Legner, and Ahlemann (2012) proposed that the primary context factors in EA management are: 1) organizational structure, with three main corporate governance modes: a centralized, decentralized, and federal structure; 2) IT management structure, which is usually a function of the organizational structure and has a similar model: centralized, decentralized, and joint; 3) size; 4) commercial and industry type; and 5) IT penetration, considering the technology and management IT infrastructure in the organization. These contextual factors affect the willingness, motivation, organization and operation form, obstacles, and benefits of EA implementation. Table 6 summarizes an analysis of contextual factors in the four case studies.

5.2.2 Digital Transformation and EA Planning: Strategic Double Verification

In the strategic alignment model, the dual verification includes, first, the verification of the alignment of business strategy and organization process-driven EA planning and, second, the verification of the alignment of business strategy and technology-driven digital planning, as shown in Figure 3.

(1) The first verification: Integration with business strategy and organization process-driven EA planning

Business strategy is the goal and direction that organizations need to establish. Based on business strategies, we use traditional EA planning to identify business capability planning and align it with business planning. This verification aligns business processes and organizational planning with business strategies. Process and organizational planning are strongly related to business maturity. Organizations with different maturity levels will formulate different processes and organizational planning. Process and organizational planning can systematically design business change initiatives. This first verification will align the business strategies, organizational and process strategies, and IT strategies to reduce value leakages.

Table 6: Context Factors Analysis

Context	Case 1	Case 2	Case 3	Case 4
Organization structure	Centralized	Decentralized	Centralized	Federation
IT management structure	Centralized	Centralized	Federation	Decentralized
Size	Large	Small	Middle	Middle
Business model	Product	Function management	R&D, Product, Sale	R&D, Product, Sale
Business complexity	High	Low	Middle	Middle

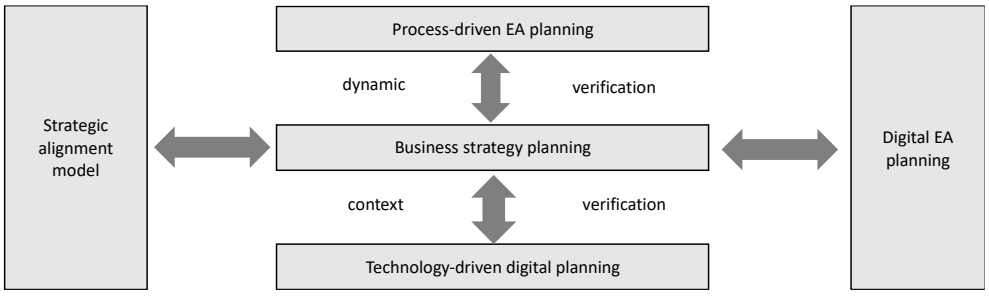

Figure 3: Double Verification of Digital Transformation Planning (Source: Author

(2) The second verification: Integration with business strategy and technology-driven digital planning

IT can dynamically identify the needs of business digital scenarios and align them with business strategies driven by digital technology. This integration introduces technology-driven change into business strategy and, in so doing, aligns business, technology, and IT strategies. As digital transformation is complex, using the scenarios of digital opportunities can enhance the possibility of successful change implementation and reduce the complexity of technology implementation.

5.2.3 Digital Transformation—EA Strategy Planning Integration Process Framework

Based on the dynamics and scenarios, we propose a digital transformation and EA planning process framework, divided into a four-quadrant chart, as shown in Figure 4.

The first quadrant has higher levels of dynamic needs and includes more scenarios. Therefore, the business strategy needs to be aligned with the change planning of the process and organization to achieve consistency. Furthermore, the strategy needs to be aligned with the digital change of scenarios to meet the EA planning of complex dynamic scenarios.

The second quadrant is more dynamic and contains fewer scenarios; business strategy, process-driven, and organization planning activities are aligned. The suggested approach is the traditional EA planning method for the change planning of process organization.

The third quadrant is less dynamic and contains fewer scenarios; business strategy and process and organization planning are aligned. The change planning of process and organization can be realized by traditional EA planning or sporadic, passive, single-change planning.

The fourth quadrant Is less dynamic and contains more scenarios; business strategy and IT planning are aligned. The IT planning here can be identified through the scenario business requirements and characteristics, identifying the digital opportunity of business organizations by EA, and selecting appropriate opportunities to align with business strategies.

The first research question for this study is “What drives inconsistent process between digital transformation and EA planning?” This research shows that the binding between EA and digital transformation is not strong but depends on the promotion and understanding of EA. EA planning can provide systematic or contextual methods for digital transformation planning by reducing inconsistent or non-aligned processes due to interaction dysfunction.

The second research question is “How can organizations integrate the planning processes of digital transformation and enterprise architecture more effectively?” This research supports a digital transformation and EA planning process redesign. These solutions are based on different scenarios, each supporting the consistency of digital transformation strategy and an EA planning strategy integration process framework.

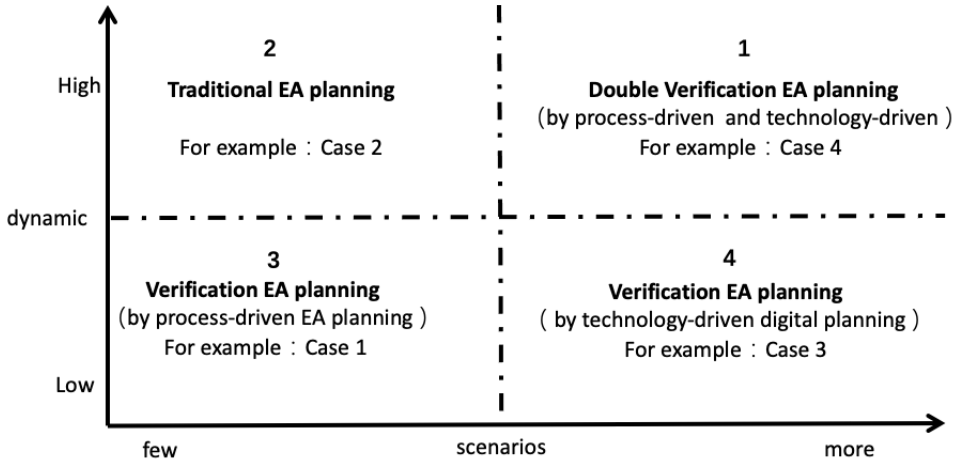

Figure 4: Digital Transformation—EA Strategy Planning Integration Process Framework

6. THEORETICAL AND PRACTICAL IMPLICATIONS

6.1 Theoretical Implications

The theoretical contribution of this research applies SEAM and business process management theory to explain the phenomenon of dysfunction in digital transformation strategies. Comparing the case analyses demonstrates that this research outlines a new theoretical construction on the digital transformation strategic planning model, a model based on the process operation perspective. Furthermore, this approach provides an integration method for digital transformation strategic planning and EA planning. Although the research only provides a strategy implementation dysfunction perspective about the integration of EA and digital transformation, this research represents a small step forward in better understanding the role of EA in digital transformation and its evolution.

6.2 Practical Implications

The practical contribution of this research is to provide an integrated practice for organizations that implement digital transformation and EA simultaneously and to provide ideas for organizations allowing detailed consideration of the practical value of EA. Digital transformation is a complex process. Different organizations have different contexts, and EA integration cannot be simply one-size-fits-all. At the same time, according to different types of case analysis, this study provides ideas and reference points for organizations of different maturity and types to implement EA and digital transformation.

7. CONCLUSION

This research uses SEAM and business process management theories to show the connection between SEAM and EA. Findings include that in practice, EA implementation is not strongly bundled with digital transformation and depends on the motivation for and understanding of EA. Future studies may employ a practice-based perspective (Monod et al., 2022; Lissillour, 2021) to better understand the tensions and conflicts caused by the implementation of an EA. Indeed, the EA will likely be interpreted differently within the company depending on the beliefs, values, and assumptions shared amongst groups of employees (Lissillour & Wang, 2021; Lissillour & Rodríguez-Escobar, 2020). As a method of overall system planning, EA can be used as an input for an organization's digital transformation planning. However, it is easy to leak value in the actual implementation, leading to digital transformation projects only being a part of EA planning. Our research proposes an EA and digital transformation planning framework for digital transformation. According to the EA dynamics and context viewpoints, different verification methods are adopted for the strategic integration process framework to meet the needs of different digital planning scenarios. This research contributes to theory and practice. In terms of theory, it developed the strategic consistency model integrated with digital transformation. In practice, it provided a roadmap for EA and digital transformation integration for different types of organizations. Since large high-tech companies often use corporate universities to facilitate their digital transformation strategy (Lissillour & Rodriguez-Escobar, 2022; Lissillour et al., 2020), future studies may look at their role in establishing and facilitating the development of the EA.

This research also has limitations. Multiple case studies are explored in this research; however, the selection of multiple cases spanned different fields or branches within a single multi-national enterprise organization, rather than across different companies. Since the cases were selected from the same broader organization, it might impact the conclusions. Digital transformation is also a complex process. This research only found a relationship between EA planning and digital transformation. Other aspects, such as EA implementation, EA management, EA control, EA artifacts, and EA digital technology might serve as a direction of future research.

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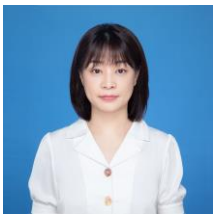

Yanfei Zhang is the DBA Candidate of ENPC (École des Ponts) and serves as a business process and change consultant in the industry. Her main research directions are business process management, change management, IT management, and innovation. She is also a professional industry-certified holder in these business management domains.

Emmanuel Monod, PhD, is currently professor at Paris-Dauphine University and UCMT Shanghai. Emmanuel is also vice-president of U2, the Universal University, and of the EMSS society. He was previously professor at the Antai College of Economics and Management, Shanghai Jiao Tong University. He holds a PhD from Paris Tech-Telecom. He is the President of the SIG of the AIS on Philosophy and IS, the Vice-President of the AIS SIG Culture and IS and the international relations representative for the Management Education and Development division of the AIS.

Gerard Beenen is a Professor of Management at California State University, Fullerton, and an Adjunct Professor in the MBA programs at both the University of California, Irvine and Carnegie Mellon University. His research focuses on workplace motivation and leadership. A recipient of numerous research grants and awards, he teaches courses in organizational behavior, organizational change, team leadership and negotiation. He completed his Ph.D. in Organizational Behavior and Theory at Carnegie Mellon University, his MBA at Northwestern University, and his MA at Fuller Seminary in Pasadena, CA. Prior to his academic career, he was a technology entrepreneur, and a management consultant with both Bain & Company and Ernst & Young.

Dr. Jiang Yuewei, PhD, is currently the Chairman of CPMC and of UCMT. He is also the President of Asian Region of CMA - World Committee on Lifelong Learning Founder affiliated to UNESCO. In addition, he is the President of the Engaged Management Scholars Society (EMSS), the Chairman of the Global DBA Association and the Vice-Chairman of Shanghai Management Science Society (SMS).

Chris H. Willis is a Ph.D. Candidate in the Department of Management at the Strome College of Business, Old Dominion University. His research interests center on the intersection of entrepreneurship, international governance, and research methods.

[1] ***Yanfei Zhang,*** *Ecole des Ponts and UCMT,China,* yanfeizhang@aliyun.com ,
: https://orcid.org/0009-0004-4725-4929

[2] ***Emmanuel Monod,*** *Paris-Dauphine University and UCMT, China,* monod@ucmt.com
: https://orcid.org/0000-0002-1290-2277

[3] ***Gerard Beenen,*** *California State University at Fullerton, USA,* gbeenen@fullerton.edu
: https://orcid.org/0000-0002-4503-3688

[4] ***Yuewei Jiang,*** *UCMT, China,* jiangyuewei@ucmt.com ,

[5] ***Chris Willis,*** *Old Dominion University, USA,* chwillis@odu.edu
: https://orcid.org/0000-0002-4937-5888