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Digital Transformation Adoption: An Extended Step-by-Step Framework

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Abstract. Studies have shown that digital transformation has a positive impact on business performance, yet more than 80% of implementations fail due to organizations failing to understand its true nature as a business transformation. Existing references to digital transformation do not clearly differentiate it from digitalization or technology adoption, and existing models and frameworks are often abstract, making it difficult for organizations to find practical implementation guidelines. This paper utilizes a systematic literature review to identify the unique characteristics of successful digital transformation adoption and proposes an extended framework for its implementation. The result of the review leads to the conclusion that three key characteristics of successful digital transformation are business capabilities transformation, data management capabilities transformation, and IT roles transformation. Additionally, the paper provides a practical step-by-step framework and a summary of good practices related to the implementation of digital transformation. The contributions of this paper are that it explicitly defines the unique characteristics for successful digital transformation implementation and provides an extended step-by-step framework. Both practically and theoretically, this paper serves as a guide for organizations in implementing digital transformation.

Keywords: Digital transformation, adoption, extended framework, step-by-step framework

1. Introduction

Studies show that successful digital transformation organizations have better business performance than their competitors (Satell et al., 2021). Digital transformation also enables organizations to offer new products or services that are unique value propositions compared to their competitors (Van Alstyne & Parker, 2021). Despite the ongoing Covid-19 pandemic, the weakening of the economy, and the potential for a global economic recession, the adoption of digital transformation is not slowing down; on the contrary, it is accelerating. According to IDC, total global investment for digital transformation is projected to reach US$2.8 trillion by 2025 (Back End News, 2021).

Interestingly, other studies have shown a high failure rate for digital transformation adoption (above 80%) (Tabrizi et al., 2019; Frankiewicz & Chamorro-Premuzic, 2020). These results suggest that failure often occurs as digital transformation is simplified to the adoption of technology (Tabrizi et al., 2019; Frankiewicz & Chamorro-Premuzic, 2020). As a result, investments are often made following the hype or trend, and the digital transformation process is left to the organization's IT team to dominate (Mueller, 2022). A study conducted by Deloitte further emphasizes that transformation must be prioritized over technology when it comes to digital transformation (Deloitte, 2020).

Other studies also suggest that transformation must be initiated from the top-down, and that leadership factors are of utmost importance (Kane et al., 2015; Brock & von Wangenheim, 2019). It is argued that the root of the problem lies with the top management's failure to understand that the essence of digital transformation is business transformation (Kane et al., 2015; AlNuaimi et al., 2022; Matsunaga, 2021). Top management must have a vision, strategy, or reference for how the organization can leverage technology to transform. Furthermore, top management involvement is minimal; there is no continuous monitoring and intervention, resulting in a status quo with regards to leadership (Deloitte, 2020).

Although existing studies demonstrate a positive relationship between digital transformation and organizational business performance, they need to specify the success criteria of digital transformation explicitly. Research conducted by various authors (Larsen et al., 2018; Nylén & Holmström, 2015; Konopik et al., 2022; Guenzi & Habel, 2020; Correani et al., 2020; Siachou et al., 2021; Zaoui & Souissi, 2020; Tungpantong et al., 2021; Ershova & Hohlov, 2018; Lammers et al., 2019; Baker et al., 2021; Palfreyman & Morton, 2022; Siachou et al., 2021; Chanias et al., 2019; Mergel et al., 2019) focuses more on elaborating domains, components, or main elements of digital transformation. The following findings were revealed with regards to the digital transformation framework:

- More models than frameworks are present.
- The dominant framework leads to conceptual rather than step-by-step, practical guidance.
- The framework is tailored to a particular industry or technology.
- The framework is partial.
- The framework needs to explain the relationship between domains.

There is a fundamental difference between a model and a framework. Models are more specific, referring to a particular context depending on the discussion or study they are associated with. Frameworks, on the other hand, are more flexible and broader in scope as they combine several theories, models, and other frameworks (Passey, 2020).

Based on the findings, there are three things that will be explored within the context of this paper. First, identify the unique key characteristics of a successful digital transformation implementation. Second, identify a digital transformation framework that will be used as a baseline framework for further development into an extended framework that is practical and step-by-step. Third, this paper also summarizes some lessons learned which can then become good practices from various studies of successful digital transformation implementation experiences.

2. Literature Review

2.1. Digital Transformation Framework

The framework can provide a holistic picture of the composition of components, sub-components, and their interactions; this paper looks to raise several frameworks to be used as references, then an identification process is carried out to examine the relationship between the frameworks to obtain a complete picture of digital transformation.

The first framework (Larsen et al., 2018) focuses on the step's organizations must take when adopting digital transformation. This framework consists of four building blocks that represent the following four stages: (1) Where should you take your business? (2) How does this relate to what your business does? (3) How to get there, and what do you need? (4) How will you handle change to get where you are going? Each building block has elements or components that are required for the focus of the stages of the building block. Figure 1 shows the relationship between the four building blocks in question.

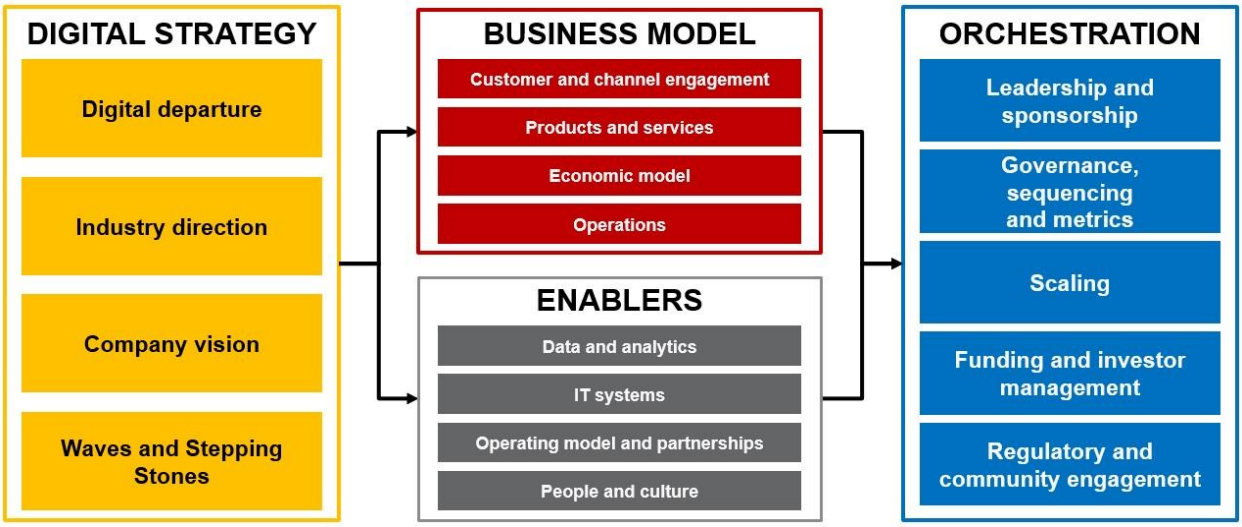

Fig. 1: Digital transformation framework (step-by-step adoption) (Larsen et al., 2018)

The second framework (Nylén & Holmström, 2015) focuses on the dimensions and areas that should be taken into consideration with digital product and service innovation. There are three dimensions (product, environment, and organization) and five areas (user experience, value proposition, digital evolution scanning, skills, and improvisation).

The third framework (Konopik et al., 2022) has a similar approach to the first framework, which focuses on the stages of adopting digital transformation. There are three stages: sensing, seizing, and transforming. Furthermore, these three stages are applied to each component of a total of seven components: strategy & ecosystem, innovation thinking, technologies, data, operations, organizational design, and leadership.

The fourth framework (Guenzi & Habel, 2020) proposes a digital transformation framework focusing on sales. This framework consists of two domains (Strategy development and strategy implementation). For strategy development, the focus is on formulating a business strategy (why and what aspects) as the first step for adoption. This is followed by the 6S approach (substitute, supplement, service, simplify, support, and share). The strategy implementation domain focuses on implementation (digitalization of information, digitalization of internal processes, and digitalization of customer interaction processes). The framework also suggests monitoring and evaluation indicators based on KPIs (bottom line, cost, process,

customer, learning & motivation).

The fifth framework (Correani et al., 2020) also focuses on digital transformation implementation strategies. This framework outlines the main components that need to be taken into account when implementing digital transformation: scope (Vision, value creation, strategic goals); data sources (external and internal); platform data; people; partners; AI / Artificial Intelligence; information and knowledge; processes and procedures; transformed activities, tasks, and services; customers.

The five frameworks that serve as references provide a comprehensive perspective. The first framework, with its four building blocks, focuses on step-by-step strategic questions organizations must answer when they start their digital transformation journey. The fourth framework provides a perspective by dividing digital transformation adoption activities into two major domains: strategy development and execution. Furthermore, the second, third and fifth frameworks provide perspectives from component aspects that need to be taken into consideration in connection with digital transformation. We can see overlap/compatibility between one frame and another from the components side. This paper uses the first framework proposed by the World Economic Forum as the main framework. Figure 2 is the conceptual development of the first framework expanded based-on references from other frameworks.

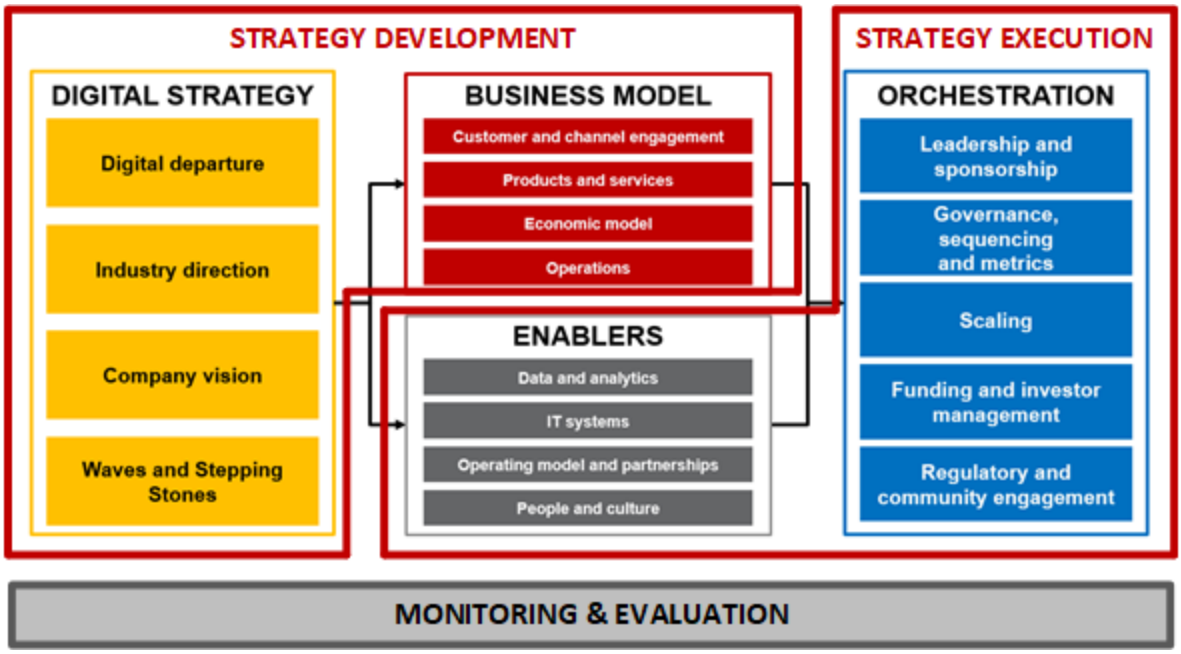

Fig. 2: Conceptual framework based-on World Economic Forum's digital transformation framework. (Grouping the current four domains into two big categories: Strategy Development, and Strategy Execution)

2.2. IT Governance and Service Management Framework

Studies have shown that there is a connection between IT governance, IT service management, and digital transformation. The main point emphasized by IT governance is aligning business and IT strategies. (Pacheco & Sanchez, 2020) (Mulyana et al., 2021) (Mulyana et al., 2022) (Lacombe & Jarboui, 2022) From an IT service management perspective, digital transformation is related to the concept of IT-as-a-service, which views IT not as hardware or software, but as a unified solution providing business services (itSMF UK, 2013) (Verhoef et al., 2021). Despite technology sometimes serving as an enabler or driver, the focus remains on business goals that dictate the scope and priorities for value creation and IT strategy (Aguiar et al., 2021). COBIT framework is still relevant for digital transformation initiatives, helping organizations

identify objectives and processes to consider (Aguiar et al., 2021) (Aqel, 2019) (Ojo, 2019). ITIL framework is widely accepted as the de facto framework for IT service management. The COBIT 2019 and ITIL framework serve as references for the governance and service management framework in this paper.

COBIT 2019 encompasses 5 domains and 40 objectives. Studies have found 9 objectives from COBIT 2019 that are relevant to digital transformation implementation, including managed innovation, human resources, service agreements, vendors, security, data, projects, security services, and business process controls (Pearce, 2021) (Salman, 2020). The paper adopts two models from the ITIL framework: the service assets model for resources and capabilities and the seven-step process improvement model for continual service improvement (itSMF UK, 2013) (Verhoef et al., 2021).

2.3. Business and IT Framework

OBASHI is a framework used to describe relationships and dependencies between business and IT assets within a business context. OBASHI is an acronym for Organization, Business (Process), (Software) Application, (Operating) System, Hardware, and Infrastructure. The relationship between the six elements of OBASHI not only describes dependencies but also informs how changes to one element will impact other elements connected to it. In the context of business transformation, OBASHI can make it easier for management to see how changes to business processes will become a driver of change for IT asset elements (IT as an enabler), and vice versa, how IT assets impact business processes (IT as a driver). (Marcel, 2018)

3. Methodology

This paper uses the SLR (Systematic Literature Review) approach. The SLR approach collects study results from various sources for digital transformation topics to be further synthesized in the framework of extraction and summarization (Figure 3).

Fig. 3: The methodology.

1) Problem Formulation

Table 1 contains a list of research questions which are the subject of this paper.

Table 1: Research Questions.

No	Research Questions	Motivations
RQ1	How can we define that our digital transformation is successful?	To identify what are the criteria that characterize a successful digital transformation.
RQ2	How can we extend the existing framework to make it more practical and implementable?	To propose an extended framework that can be a guide for organizations with a step-by-step approach to implementing digital transformation.
RQ3	What lessons learned can we use as a reference from successful digital transformation?	To identify lessons learned that can be used as a reference from successful digital transformation implementation experience.

2) Literature Search

This stage focuses on conducting a literature search based on keywords in trusted research databases and articles. A total of 6 databases were used as search sources: IEEE Xplore (https://ieeexplore.ieee.org), Sage (https://journals.sagepub.com/), ScienceDirect (https://www.sciencedirect.com/), Emerald (https://www.emerald.com/insight/), AIS (https://aisel.aisnet.org/), ISACA (https://www.isaca.org/resources), HBR (https http://hbr.org/). For keywords used: "Digital Transformation"; "Digital Transformation" AND (“Framework” OR "Adoption" OR "Implementation"); “IT Governance” AND “Digital Transformation”. Table 2 shows the keywords used for each literature database.

Table 2: Keyword used for each of literature databases.

Source	Keywords
IEEEXplore	"Digital Transformation" AND ("Framework" OR "Adoption" OR "Implementation")
Sage	"Digital Transformation" AND ("Framework" OR "Adoption" OR "Implementation")
ScienceDirect	"Digital Transformation" AND ("Framework" OR "Adoption" OR "Implementation")
Emerald	"Digital Transformation" AND ("Framework" OR "Adoption" OR "Implementation")
AIS	"IT Governance" AND "Digital Transformation"
ISACA	"Digital Transformation"
HBR	"Digital Transformation"

3) Literature Filtering

Table 3 shows the inclusion and exclusion criteria which are the basis for performing the initial filtering.

Table 3: Inclusion and exclusion criteria.

Inclusion Criteria	Exclusion Criteria
Papers published in the 2018-2022 range in journals or proceedings.	Inaccessible and incomplete (abstract only) paper.
The results of the study are in the form of articles from trusted consulting agencies or other institutions with a range of 2018-2022.	Inaccessible and incomplete article.
Paper / article is written in English.	There is no clear information for the name of the scientific journal or conference or publisher of the article.
The paper or article must be a complete writing.	The title of the paper or abstract or article summary does not relevant with the search keywords.

Table 4 displays the results of the literature search from various databases. The "found" column represents the total number of literature pieces found based on the applied keywords and inclusion/exclusion criteria filters. The "candidate" column is the number of selected literature pieces based on their relevance to the context of the paper's discussion. The "selected" column represents the final number of selected literature pieces used as reference, selected based on their abstracts, conclusions, and relevant sections that support the context of the paper's discussion.

Table 4: Search Results.

Source	Found	Candidate	Selected
IEEEXplore	551	9	5
Sage	865	21	10
ScienceDirect	4970	30	11
Emerald	2410	13	5
AIS	223	6	3
ISACA	592	8	5
HBR	245	31	16
Total	**9856**	**118**	**55**

4) Literature Extraction

This stage focuses on studying selected literature (Table 4, column selected), activities include synthetizing, summarizing to answer the research questions raised.

5) Extending The Framework

This stage involves identifying the baseline framework. A literature review was conducted on existing frameworks related to digital transformation implementation. The frameworks were compared to determine the connections between them and the most representative framework was selected based on two criteria:

- The framework has a step-by-step approach,
- The framework thoroughly describes the elements of each stage.

An analysis of the compared frameworks can be found in section 2.1 (Digital Transformation Framework). This paper uses the World Economic Forum's digital transformation framework (Figure 1) as the baseline framework.

Combining frameworks. After identifying the baseline framework, the selected framework is used as the baseline. This stage involves combining components from the compared frameworks to fill any gaps in the baseline framework. The combined framework is shown in Figure 2.

Extending the Framework. The completed baseline framework (Figure 2) is further extended. The implementation stages are divided into four building blocks. This extension focuses on mapping practical models and frameworks to each building block and defining the flow and connections between the building blocks (Figure 8).

4. Results and Discussion

4.1. Defining Unique Characteristics of Successful Digital Transformation

Organizations need to be aware of the success criteria of digital transformation initiatives to set appropriate expectations (Konopik et al., 2022; Guenzi & Habel, 2020; Correani et al., 2020; Cennamo et al., 2020). Studies suggest that digital transformation is not merely about technology; its core lies in the process of transformation (Tabrizi et al., 2019; Frankiewicz & Chamorro-Premuzic, 2020). This transformation, which is enabled by technology, refers to business transformation (Tabrizi et al., 2019; Frankiewicz & Chamorro-Premuzic, 2020; Furr et al., 2019). Furthermore, it has been observed that the greatest effort required is in the form of cultural transformation (Chamorro-Premuzic, 2021). Additionally, organizations should be aware of the wrong assumption that investing in the latest technology is enough for transformation (Anthony & Cobban, 2021; Chamorro-Premuzic, 2021; Subramaniam, 2021b). To this end, it is essential for organizations to recognize the types of business transformation and determine which one applies to them (Pedersen & Ritter, 2022). Figure 4 presents four types of business transformation (Pedersen & Ritter, 2022).

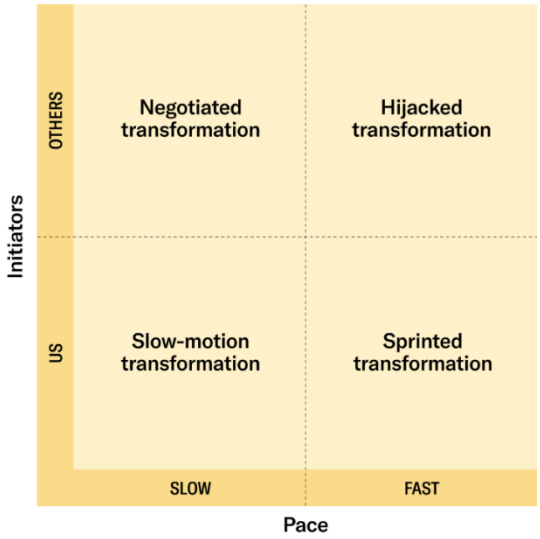

Fig. 4: Four types of business transformation. (Pedersen & Ritter, 2022)

Determining the type of business transformation an organization is in requires reflection on two factors: (1) the origin of the transformation trigger: internal or external, and (2) the pace of transformation: quick or gradual (Pedersen & Ritter, 2022). Internal triggers can stem from business development plans, new opportunities, or pain points, while external triggers often result from competition or regulatory changes. In some cases, both internal and external triggers may contribute, in which the dominant trigger should be determined. The speed of transformation is relative and varies based on factors like industry, organizational size, and competition level. Organizations can benchmark with similar industries to gauge what constitutes fast and slow transformation.

Why is it important for an organization to understand the type of transformation they are undergoing? Firstly, they must be aware of what prompts the process (Konopik et al., 2022; Guenzi & Habel, 2020; Correani et al., 2020; Cennamo et al., 2020). Secondly, the type of transition will determine the resources and capabilities the organization needs to develop (Ates & Acur, 2022; AlNuaimi et al., 2022). Finally, they must have the right mindset and understanding of the transformation they are experiencing (Solberg et al., 2020; Ates & Acur, 2022; AlNuaimi et al., 2022; Peschl & Schüth, 2022). Furthermore, organizations may switch between types, so it is recommended that they regularly assess their situation.

The strategic goal of digital transformation is to create a data-driven organization (Blanka et al., 2022; Cennamo et al., 2020; Subramaniam, 2021b; Bonnet, 2022). This is characterized by data-driven strategy formulation, decision-making, execution, and continuous improvement, rather than relying on intuition or assumptions (Subramaniam, 2021b; Furr et al., 2022). For this, a holistic change is necessary, requiring a shift in mindset, working practices, and culture (Bonnet, 2022). These factors are key to the success of digital transformation. Figure 5 illustrates the four tiers of digital transformation, which represent the four phases an organization must go through to become a data-driven organization. Each tier represents a unique capability that serves as the foundation for the next. They also describe the nature of data, which changes from episodic (data generated by discrete events) to interactive (data generated continuously by sensors); the further to the right (the higher the tier level), the more interactive the data becomes. Other studies underscore the importance of using a phased approach to digital transformation (Siachou et al., 2021; Chanias et al., 2019; Guinan et al., 2019). Moreover, tier 1-3 focuses on the production ecosystem, and tier 4 focuses on the consumption ecosystem. (Subramaniam, 2021b)

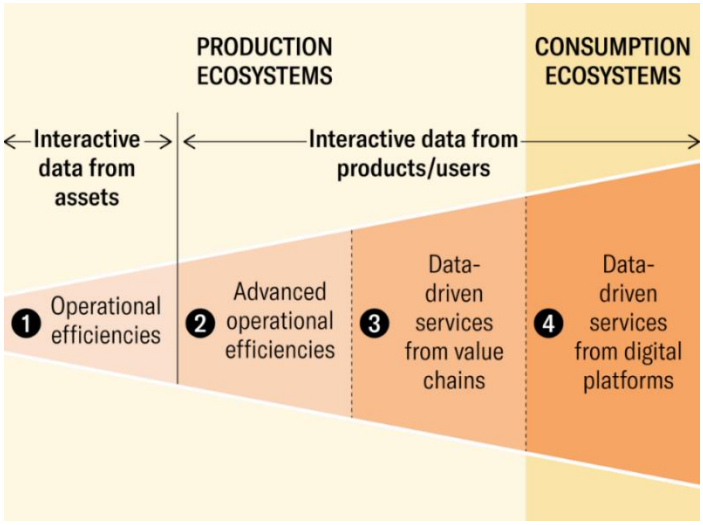

Fig. 5: Four tiers of digital transformation. (Subramaniam, 2021b)

Furthermore, Figure 6 provides a comprehensive illustration of the characteristics of the four-tier supports in Figure 2 from the perspective of resources and capabilities. The first three pillars (IT uplift, Digitizing operations, and Digital marketing) are seen as the supporting pillars for Tiers 1-3 in Figure 2. Additionally, the pillars of Digital Marketing and New Ventures support Tier 4.

The literature study results in this paper suggest that there are three key characteristics of successful digital transformation. First is business capabilities transformation, from operational efficiencies to experience economy. Second is data management capabilities transformation, from historical to real-time analytics. And the third is IT roles transformation, from enabler, to driver then transformer. Studies indicate that digital transformation leads to new business models and products/services, but the difference between organizations that make intuitive decisions and those that use data insights to make decisions is fundamental. The organization gains new capabilities not because of the technology, but due to the knowledge gained from processing data and using insights for strategic actions.

	IT uplift	Digitizing operations	Digital marketing	New ventures
What it entails	Modernizing existing IT	Optimizing existing business	Digital tools for marketing. e-commerce, customer acquisition	New business models and products
Benefits	Flexible platforms Ecosystem of tools	Cost reduction Efficiency Optimization	Upselling/ cross-selling Market/wallet share Brand value	Growth opportunities
Capabilities required	IT architects DevOps teams Change management	Business process knowledge; change management	Data analytics Digital marketing	Business creation Innovation processes Innovation leaders
C-suite sponsor	CTO/CIO	CFO/COO	CMO	CEO/CSO
KPIs	New tools, reduced costs, improved capabilities, employee satisfaction	Savings in time, people, and money; improved customer satisfaction	Return on marketing, leads, client acquisition	New products, access to markets

Fig. 6: The four pillars of digital transformation. (Furr et al., 2022)

4.2. Extending the Framework for Step-by-Step Digital Transformation Adoption

This paper aims to expand the World Economic Forum' digital transformation adoption framework (Figure 2) by substituting components in each building-block with practical models and frameworks, this substitution aims to clarify the relationship between components in each building block and at the same time clarifying the relationship between building blocks.

Building Block #1 (Digital Strategy) (Larsen et al., 2018)

The first building block of the digital transformation adoption framework (Figure 2) focuses on the future vision of the organization and its repositioning to deliver value. This stage emphasizes business transformation, as noted by Larsen et al. (2018) and Chanias et al. (2019). The challenge is to take a holistic view of the organization and determine transformation goals. Existing frameworks may be conceptual, but a study by Mueller (2022) proposes using the BMC/Business Model Canvas to create a strategic, holistic picture of an organization's current conditions.

Figure 7 displays the Business Model Canvas, which has 9 elements. Organizations must focus on the 'Value Propositions' column as it is the core of the canvas (Mueller, 2022). They should also consider how the other elements relate and affect the 'Value Propositions.' These propositions describe the unique and competitive values the organization offers.

By referring to the baseline Business Model Canvas, organizations can reflect on the limitations of their current elements, including the value propositions, competitiveness with competitors, product/service challenges, and customer experience-related issues. This will then form the foundation for determining the organization's 'next value propositions.

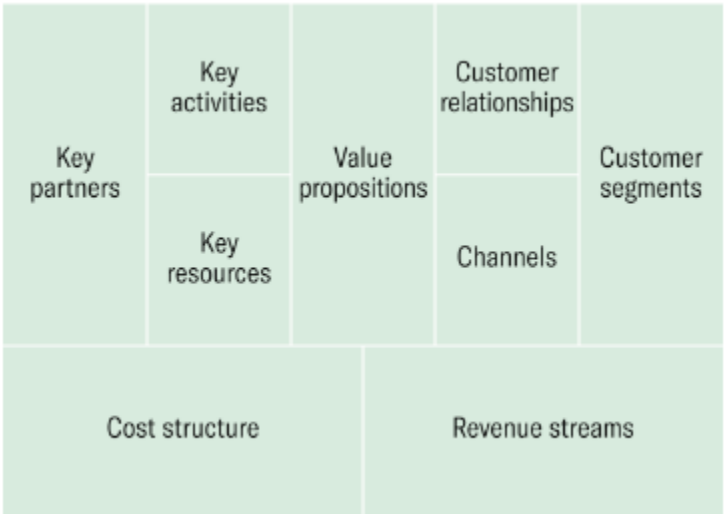

Fig. 7: The Business Model Canvas. (Mueller, 2022)

Building Block #2 (Business Model) (Larsen et al., 2018)

The Business Model Canvas (BMC) tools are relevant for both Business Strategy and Business Model, as they help organizations to diagnose their current business condition and identify external and internal trigger variables. The trigger variables then become the basis for the organization to determine the scope of transformation from the current condition to the future condition (as-is VS to-be). The relationship between the elements of a total of 9 elements of the BMC applies the ripple effect analogy; changes to one element will impact other elements (Mueller, 2022).

This paper also identifies several relevant IT governance objectives concerning the 2019 COBIT framework, such as Managed innovation, Managed business process controls, and Managed service agreements (Salman, 2020; Information Systems Audit and Control Association (ISACA), 2018).

Building Block #3 (Enablers) (Larsen et al., 2018)

Building block enablers focus on resources owned by the organization to realize new business scopes (Larsen et al., 2018). This paper extends this concept, not only considering resources, but also capabilities, referring to the resources and capabilities of the ITIL framework (itSMF UK, 2013), which focuses on IT service management (Figure 6). It also improves the relationship between enablers and business models, described through the OBASHI framework with a vertical layering model (Marcel, 2018). The vertical layer approach of the OBASHI framework makes it easier for stakeholders to see the relationship between digital components and how changes to one component may impact other components on the top layer (Figure 7). This framework is usually used to explain the information value chain from the infrastructure layer (technical domain) to ownership (business domain).

Building Block #4 (Orchestration) (Larsen et al., 2018)
Building block orchestration focuses on operational activities to manage the main processes that support digital transformation (Larsen et al., 2018). To clarify the scope of the main process and the metrics of the processes, this paper extends the orchestration with COBIT 2019 objectives; from studies that have been conducted, objectives related to orchestration include: Managed human resources, Managed projects, Managed vendors, Managed security, Managed security services, and Managed data (Salman, 2020; Information Systems Audit and Control Association (ISACA), 2018).

Monitoring and Evaluation
Monitoring and evaluation are additional modules resulting from a combination of other frameworks used as references in this paper's discussion. This module emphasizes the continual improvement function of the digital transformation adoption cycle. Monitoring and evaluation activities must be data-driven and require the continual involvement of top management. For these activities, the extended framework adopts the seven-step improvement process (Verhoef et al., 2021) belonging to the ITIL (IT service management) framework for continual service improvement.

Interconnection between Building-Blocks
The two-way arrow of the 'Digital Strategy' building block with the 'Business Model' illustrates the relationship between the organization's business strategy transformation. The arrow to the right depicts the transformation from the existing condition to the future using the BMC model. The nine elements of the BMC model ensure organizations can holistically see the dependencies between elements, where changes to one element can affect other elements. Meanwhile, the arrow to the left reflects that the future and existing conditions are interrelated; the existing conditions become the baseline.

The arrow from the "Digital Strategy" building block to "Enabler" indicates that an organization's resources and capabilities depend on the existing business strategy. Resources are anything that can be bought and easily imitated by competitors, but capabilities are built over time and are unique in each organization; it is capabilities that ensure whether the technology invested in by the organization can be utilized for business benefits. Furthermore, the OBASHI framework (abbreviation for Ownership, Business Process, Application, System, Hardware, Infrastructure) describes the information technology architecture owned by the organization.

The two-way arrow between the "Business Model" and "Enabler" building blocks, where the arrow pointing down represents the resource and capability development plan derived from the new business model. The OBASHI framework, in this case, also describes the target scope of IT architecture development (existing to the future). The up arrow illustrates how the new resources, capabilities, and architecture contribute as enablers to the new business model.

The two-way arrow connects the "Business Model," "Enabler," and "Orchestration" building blocks.

The arrow to the right points to "Orchestration," depicting that the processes and activities covered by "Orchestration" are driven by new strategies and new business models, while the arrow from "Enabler" describes how the resources, capabilities, and IT architecture also support the smooth execution of the processes and activities covered by "Orchestration." The arrow to the left explains that the processes and activities of "Orchestration" can provide feedback for strategic adjustments and new business models, including providing feedback to "Enablers" in terms of configuration and composition.

The four building blocks and one additional module for monitoring and evaluation are then rearranged concerning the extended activities that have been carried out. Figure 8 shows the extended framework with a step-by-step approach to digital transformation adoption.

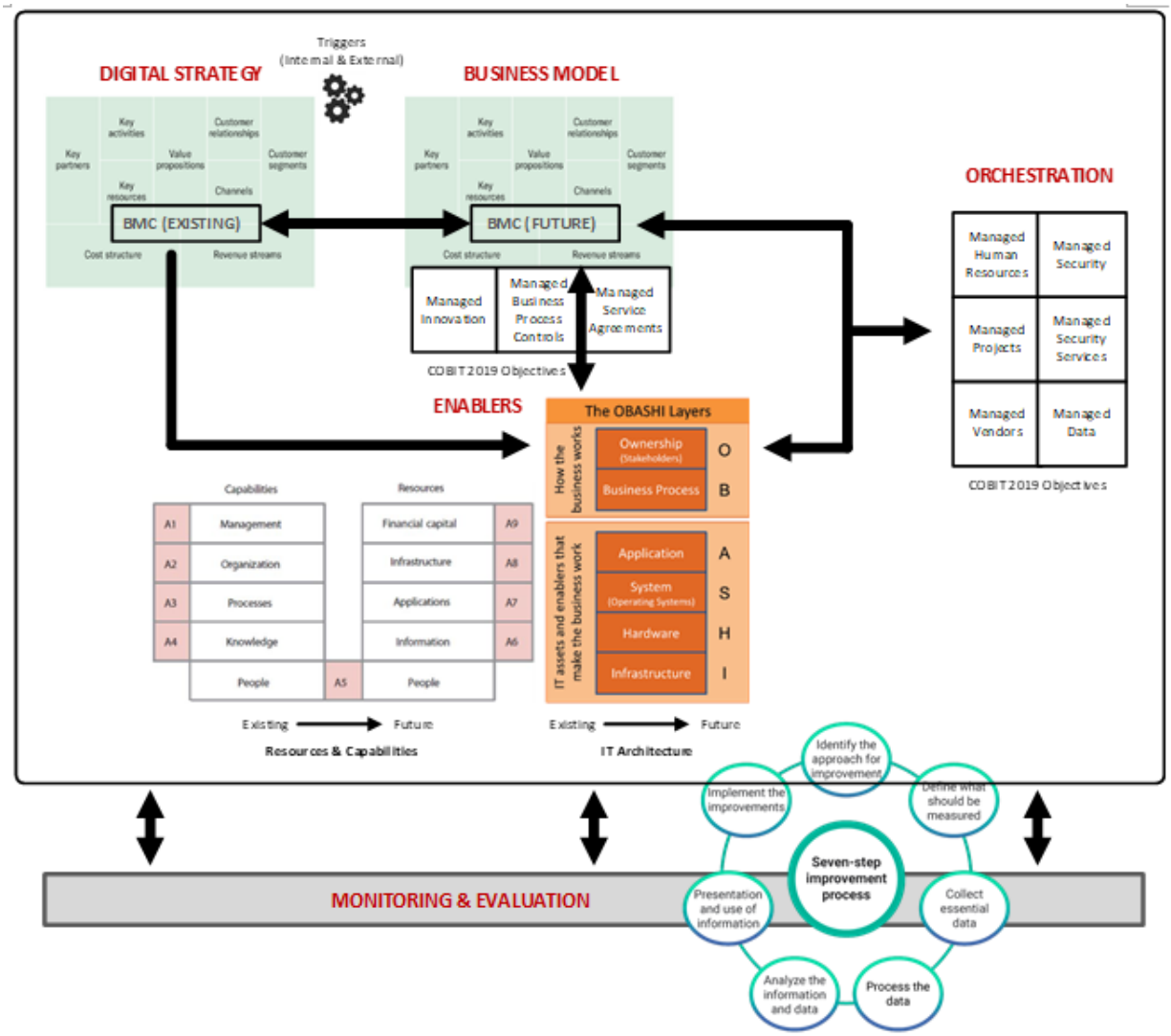

Fig. 8: The extended framework for step-by-step digital transformation adoption.

4.3. Lesson Learned from Successful Digital Transformation Adoption

The following are lessons learned to support the successful adoption of digital transformation, summarized from various studies:

Focus on HR (Human Resources)

The biggest challenge of digital transformation lies in the human factor (Singh, 2022; Anthony & Cobban, 2021). People, not technology, are the main asset of digital transformation (Frankiewicz & Chamorro-Premuzic, 2020). Organizations may invest heavily in the latest technology, but it is ultimately the human factor that utilizes the technology (Anthony & Cobban, 2021; Chamorro-Premuzic, 2021; Subramaniam, 2021b; Frankiewicz & Chamorro-Premuzic, 2020). Such investment, however, cannot automatically change the mindset, way of working, behaviour, and organizational culture (Satell et al., 2021; Chamorro-Premuzic, 2021; Subramaniam, 2021b; Frankiewicz & Chamorro-Premuzic, 2020). Thus, digital transformation should focus on HR development through reskilling and upskilling (Frankiewicz & Chamorro-Premuzic, 2020; Singh, 2022; Chamorro-Premuzic, 2021; Walsh, 2021).

Focus on Soft skills

Digital transformation does not only emphasize hard skills, but also soft skills; in fact, soft skills can be prioritized over hard skills. While both hard and soft skills are equally important, soft skills are crucial to the transformation process. Hard skills, such as technical competence, are specific and temporary as they are constantly changing with technological advances. Thus, it is essential to have the motivation and awareness to keep learning and developing oneself, which can only be accomplished if soft skills are supported (Frankiewicz & Chamorro-Premuzic, 2020; Furr et al., 2019).

Starting from a business strategy

Digital transformation is about a fundamental transformation of an organization; it cannot be viewed from the perspective of just one or two technologies; rather, digital transformation involves combining several technologies in accordance with the organization's business strategy. Additionally, transformation is a journey that must begin with reflection on the current state and the organization's future vision for its sustainability (Guenzi & Habel, 2020; Cennamo et al., 2020; Satell et al., 2021; Mueller, 2022; Sia et al., 2021; Kretschmer & Khashabi, 2020).

Change starts from the top (Top-down approach)

Digital transformation necessitates a transformation of mindset, behavior, way of working, and culture. Such a fundamental transformation can only be achieved if it is initiated from the top. It requires a consistent and inspiring leadership role to supervise the organizational transformation cycle. Additionally, leadership plays a critical part in reducing turmoil and resistance during the transformation process (Frankiewicz & Chamorro-Premuzic, 2020; Tabrizi et al., 2019; Li et al., 2016; AlNuaimi et al., 2022).

Data-driven Organization

Digital transformation encourages organizations to become data-driven. It is not just about investing in technology, but also about undergoing a cultural transformation. Any organization can adopt data technology and gather vast amounts of data; the differentiating factor lies in the organization's ability to convert that data into insights (Correani et al., 2020; Chamorro-Premuzic, 2021; Subramaniam, 2021b; Frankiewicz & Chamorro-Premuzic, 2020; Singh, 2022; Subramaniam, 2021a).

5. Limitations

The proposed extended framework needs to be further tested and validated to ascertain its relevance to organizational needs and challenges associated with digital transformation. Further research could be

conducted to empirically examine the framework at an organizational level.

6. Conclusions

The literature study results show that several criteria reflect the unique characteristics of successful digital transformation and the accrued business benefits from their investment. However, there are three characteristics that make digital transformation is unique, first is business capabilities transformation, from operational efficiencies to experience economy. Second is data management capabilities transformation, from historical to real-time analytics. And the third is IT roles transformation, from enabler, to driver then transformer. Therefore, digital transformation necessitates a transformation of processes, business models, domains, and the culture of the organization. This transformation is essential for the organization to become data-driven, as it leads to a culture of decision-making, strategic execution, and continuous improvement based on data-driven insights, rather than intuition or assumptions. The greatest challenge for digital transformation is in the cultural aspect; thus, it is recommended to be implemented with a gradual approach. It is also important to have strong leadership to oversee the transformation process from the beginning to the end.

The proposed extended framework is designed to enhance existing frameworks with a practical, implementable step-by-step approach, thus addressing the limitations of existing frameworks. It is based on the World Economic Forum's digital transformation implementation framework, which is generic and not restricted to specific business sectors or technologies. However, it lacks the practicality and integration aspects of its components. This extended framework is strengthened by incorporating other models and frameworks to be substituted with the existing components of each building block, models and frameworks clarify interactions between components in each building blocks and interactions between building blocks, also at the same time extending the baseline framework so that it is practical. It is expected that the extended framework will guide organizations in beginning their digital transformation journey. The proposed extended framework combines several models and frameworks that are practical based-on empirical research (BMC, ITIL, OBASHI, COBIT), but this proposed extended framework still requires further validation to ensure the combination of models and frameworks used is the best- fit and proven to be more effective than existing frameworks.

After obtaining clear characteristics of digital transformation, it is followed by an extended framework for step-by-step digital transformation adoption, this paper also summarizes lessons learned that can become good practices based on the successful experiences of other organizations in digital transformation implementation. The lessons learned include focus on human resources, focus on soft skills, starting from a business strategy, top-down approach, data-driven organization. It is important to note that digital transformation is not the end goal; rather, the essence of digital transformation is business transformation. Transformation implies change, and it is essential for an organization to modify itself to respond to its competitive environment and ensure the sustainability of its business.

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