

Digital Transformation Planning and Frameworks

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Abstract

Purpose :The Purpose of this paper is to explain the nature and process of digital transformation.

Methodology :Its methodology is based on a structured literature review (SLR) and searching scientific sites and specialized resources. One roadmap model, six maturity assessment models, three digital business model transformation approaches and eight digital transformation frameworks are explained interpretively.

Findings: Digital transformation is a strategy and an operating model change, in which technological advancements are leveraged to improve human experiences and operating efficiencies and to evolve the products and services to which customers will remain loyal. A review of research in this field shows that the nature of digital transformation depends on knowledge and knowledge is formed as a valuable asset in people's minds. Therefore, the role of human resources in creating and achieving the transformation is important and fundamental. Findings show that no digital transformation is only technological, it is organizational and requires its own planning, resources and rules. It is clear that we need a model in this kind of transformation journey. Staff capital and its empowerment by knowledge and fundamental requirements are important for success in the digital transformation program. Transformation in culture, in

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structure, in processes and methods, along with the benefits of the frontier technologies, will lead to a dramatic transformation in the field of business. The environment of organizations is changing faster and has become more volatile, uncertain and complex than in the past. Rapid changes in competition, demand, technology and regulations make it more important than ever for organizations to be able to respond and adapt to their environment .In this context, the pressure on firms to align their business strategy with the technological changes in the environment has significantly increased with the emergence and growing importance of new digital technologies, such as Social Media, Cloud Computing, Big Data and Analytics, Embedded Devices, 3D-Printing, the Internet of Things and Artificial Intelligence. They are profoundly transforming the strategic context of organizations: changing the structure of competition, the behavior and expectations of customers, the way business is conducted, the way products are manufactured and services are delivered, the way of working and, ultimately, entire industries .The growth of technology, in addition to transforming organizational boundaries, has also improved knowledge sharing .As the results indicate, the digital age refers to a time in history when the use of digital technology was generalized throughout the world. We are on the verge of a technological revolution that will fundamentally change the way we live, work and communicate with each other. In terms of scale, scope, and complexity, this transformation will be different from what mankind has already experienced.

Conclusion: Digital transformation has affected the work processes of individuals in organizational environments. New methods in combining digital innovations and intensifying inter-organizational collaboration are among the key features of success. Because the goal of digital transformation is a business transformation, it requires different organizational elements, which are explained in the frameworks, to work together like a piece of music in a concert with different instruments played harmoniously and simultaneously.

Keywords: Digital Transformation, Frontier Technologies, Digital Transformation Roadmap, Digital Transformation Maturity Models, Digital Business Models, Digital Transformation Frameworks.

Introduction

The digital age refers to a time in history when the use of digital technology became commonplace throughout the world. Human use of these technologies has reached its highest point. In this age, technology is no longer just a part of the project, it is the whole thing. The digital age is divided into two periods: electronic and digitization. The era of electronics began in the 1990s with the advent of the Internet and . companies, creating a virtual world as opposed to the real world. The first generation of digital technologies of that era transformed analog businesses into e-businesses. These technologies include the Internet, GPS, wireless networks, RFID, etc., which today have become the essential technologies, or in other words, standard technologies. Today, the existence of these technologies is an uncompetitive advantage for an organization, but their absence will cause significant problems for organizations. Second-generation technologies, or transformational technologies, are a motive force for management, and their presence is satisfying. The actual digital world began when transformational technologies emerged. These technologies include social networks, the Internet of Things, cloud computing, artificial intelligence, blockchain, 5G, quantum computing, and the like. In this world, the discussion is beyond the electronic, there is talk of turning over or changing (Shami Zanjani, 2019).

We are on the verge of a technological revolution that will fundamentally change the way we live, work and communicate with each other. In terms of scale, scope, and complexity, this transformation will be different from what humans have already experienced. We do not yet know how this change will manifest itself. Still, one thing is clear: the response must be comprehensive and inclusive, involving all stakeholders in global politics, from the public and private sector to universities and civil society (Gartner, 2021).

In the digital age, the environment of organizations is changing faster and has become more volatile, uncertain and complex than in the past. Rapid changes in competition, demand, technology and regulations make it more important than ever for organizations to be able to respond and adapt to their environment .In this context, the pressure on firms for aligning their business strategy with the technological changes in the environment has significantly increased with the emergence and growing importance of new digital

technologies, such as Social Media, Cloud Computing, Big Data and Analytics, Embedded Devices, 3D-Printing, the Internet of Things and Artificial Intelligence. They are profoundly transforming the strategic context of organizations: changing the structure of competition, the behavior and expectations of customers, the way business is conducted, the way products are manufactured and services are delivered, the way of working and, ultimately, entire industries. Consequently, the phenomenon of digital transformation, notably the levers crucial for success and the hurdles critical to transformation efforts, has gained a lot of attention and interest from practitioners and researchers recently. (Teichert, 2019).

Digital Transformation is fundamentally a strategy and an operating model change, in which technological advancements are leveraged to improve human experiences and operating efficiencies and to evolve the products and services to which customers will remain loyal (Hornford, Sabesan, Sriram, & Street, 2017; Digital Practitioner Body of Knowledge™ Standard Open Group, 2021).

Companies often assume that if they embrace digital technology in any way, they are digitally transforming their business. As a result, they often make only ad hoc changes and investments in the digital arena, with ineffectual results (Subramaniam, 2021).

It is easy to acknowledge the game-changing role that digital technologies play in the modern economy. The challenge, to which most companies have yet to rise, is figuring out how to fully capture the different kinds of value that these technologies offer. Developing a strategy for the digital transformation that fully leverages this value is also not easy. Without a comprehensive assessment of what digital technologies can offer, firms tend to assume that any application of modern digital technologies will lead to a digital transformation. Consequently, many of them make ad hoc business decisions about using digital technology and end up struggling even to maintain competitive parity, despite substantial investments (Subramaniam, 2021).

What are the nature and approach of digital transformation planning and digital transformation implementation frameworks? What are the essential and fundamental roles in the comprehensive development of digital transformation? These are what will discuss in this paper.

Research background

To access the research background, databases and external sites such as Google Scholar, Emerald, Science Direct, Springer, ProQuest, etc.; Also, internal databases such as the National Library of Iran, Noormags, Magiran, Comprehensive Humanities Portal, Irandoc, Digital Library of Allameh Tabatabaei University, etc., were searched. The search results showed that few studies have been conducted on the topic in question and there is an obvious research gap in the field of digital transformation frameworks and planning for implementation in organizations around the country. Some related researches are mentioned below:

Table 1: Research background in a view

Writer/Writers	Year	Research topic	Objectives	Method	Results
Amini, Hassanzadeh, Morshedi,	2022	An Improved Methodology for Digital Transformation of Business Model1	Improvement of the five steps of Schallmo's methodology for digital transformation of business models, using Schumacher's digital maturity assessment model, three approaches to business model transformation based on Heikkilä's recommendations and improve digital innovation approach. The business model changes are based on	This research has a combined methodology consisting of a validity review study method and action research method in a manufacturing SME. This improved methodology has been used in strategic planning for the digital transformation of the business model of one of Iran's manufacturing companies	Since the proposed model of this research, in addition to improving the Schallmo model, has been implemented in a real company, so it seems that it can be used by Digital transformation planning and digital operating models as well as change managers and consultants.

Writer/Writers	Year	Research topic	Objectives	Method	Results
			Stampfl's recommendations.		
Nouri, Shah hoseini , Shami zanjani, Abedin	2019	Designing A Conceptual Framework for Leading Digital Transformation in Iranian Companies	Proposing conceptual framework in digital transformation	A combination of systematic literature review and the Delphi survey was employed with a mixed design of systematic literature review and data collection through 33 papers. Findings were formulated within the initial research framework and employed as the input to three rounds of Delphi survey which was based on the opinions of 14 experts.	278 conceptual elements in 4 dimensions, 13 categories, and 261 elements, were developed as the main research achievement. The 4 main dimensions of this framework are: "Digital roadmap", "Digital governance", "Digital organizing" "Digital resources". Therefore, digital transformation leadership can be defined as a set of management decisions, actions, and requirements including roadmap design, resource allocation, organizing, selecting and implementing an appropriate governance framework in order to maximize the benefits of adopting disruptive technologies in an organization
GhelichKh	2021	Identifyin	Dimensions of	The finding was	The main

Writer/Writers	Year	Research topic	Objectives	Method	Results
Ani, Samadi Moghadam ,Fathi Hafashjani		g Main Dimensions of Digital Transformation Maturity at Industrial Organizations through Systematic Literature Review	digital transformation maturity	coded and analyzed using the grounded theory approach and with the assistance of MAXQDA software.	dimensions of digital transformation maturity are classified in the form of a paradigm model consisting of 5 main dimensions and 13 categories.
Asad Amraji ,Mohammadian,Rajab Zadeh Ghatari,Shoar	2020	A Digital Transformation Maturity Model Based on Mixed Method: Case Study of Pharmaceutical Companies	Developing a maturity model for digital transformation and determining its phases.	The Meta-synthesis method is used to conduct this study. 28 papers are selected from 228 searched articles from various scientific databases on the Internet	The maturity model presented in this study consists of five phases and 10 dimensions: Leadership, Information Technology, Employees, Operations and Processes, Culture, Organizational Structure, Innovation and Change, Strategy, Intelligent Products and Services, and Customer. Finally, the maturity level of 20 pharmaceutical companies is measured by using the maturity model presented in the current study and the results showed

Writer/Writers	Year	Research topic	Objectives	Method	Results
					that most of the pharmaceutical companies include level 2 to level 3 of the maturity model
TrenerryC hng, Wang, Suhaila, Lim, Lu	2021	Preparing Workplaces for Digital Transformation: An Integrative Review and Framework of Multi-Level Factors	Identifying and consolidating key factors important for an organization's overarching digital transformation	Systematic review. Reviewed studies across multiple disciplines and integrating the findings into a multi-level framework	<p>Proposing factors in 3 level:</p> <p>At the individual level 5 factors are related to effective digital transformation among employees: technology adoption; perceptions and attitudes toward technological change; skills and training; workplace resilience and adaptability; work-related wellbeing.</p> <p>At the group level 3 factors are necessary for digital transformation: team communication and collaboration; workplace relationships and team identification; team adaptability and resilience.</p> <p>At the organizational-level, 3 factors for digital</p>

Writer/Writers	Year	Research topic	Objectives	Method	Results
					transformation: leadership; human resources, and organizational culture/climate. review of the literature confirms that multi-level factors are important when planning for and embarking on digital transformation
Teichert	2019	Digital Transformation Maturity: A Systematic Review of Literature	Presenting contemporary developments in the field of digital maturity models	By conducting a systematic literature review finally 24 relevant studies including 22 different models were identified and various characteristics of different digital maturity models were extracted.	This review finally reveals that most of the existing models give an incomplete picture of digital maturity, that cultural attributes reflecting a digital culture are not integrated systematically, and that digital maturity model specific to the domain of services is clearly under-represented. It also clearly demonstrates that research into digital transformation maturity as a holistic concept is scarce and needs more attention of future research
Iivonen, M anhart, Th	2018	Reconciling digital perspectives of	Integrating the perspectives of	Literature review	Five avenues for future research on

Writer/Writers	Year	Research topic	Objectives	Method	Results
almann ,Sillaber		transformation and knowledge protection: a research agenda	the base domains of knowledge, strategy, innovation, and information security management with the goal of identifying knowledge protection requirements in the era of digital transformation		knowledge protection to support organizations coping with challenges imposed by digital transformation are presented
Alvarenga, Matos, Godina, Matias	2020	Digital Transformation and Knowledge Management in the Public Sector	Analyzing the evolution of the digital official literature to describe the aspects of digital transformation in the public sector and how it is related to knowledge management	The methodology is quantitative, based on articles found on the Scopus database and it addresses the role that digital government research plays in the theory and practice of knowledge management.	The success of digital government is related to the quality of the organizations' knowledge management, complementing each other for significant improvements in the public sector and their relation with the implementation of knowledge management practices.



Method

This paper is based on the structured literature review (SLR). For information collection, specialized databases including Emerald, Google Scholar, Harvard Business, Research Gate and the latest published books and specialized databases in the field of digital transformation, websites of domestic and international institutions such as the United Nations, national reports, and Transnational have explored this field. The extracted texts are explained and interpreted. To remove the ambiguity from the literature in Persian texts, first, the definitions were developed on the basis of good standard sources, and then the various dimensions of digital transformation, including scientific and logical steps of this type of transformation, were explained based on the above-specialized texts: To obtain transformation, knowledge-based digital, one roadmap model, six maturity assessment models, three digital business model transformation approaches, eight digital transformation frameworks were analyzed in this research.

Theoretical foundations and research findings

The idea is to do the digital transformation. We need a model. however, only for the planning phase, we must use a combination of three categories of models: 1. roadmap models 2. maturity assessment models 3. digital business models (Morshedi, 2021).

Following Morshedi (2021), we researched through expert documents to maintain the digital transformation. The conducted research lasting from 2018 to 2022 shows that the introduction of the concept of digital transformation in all businesses is inevitable and to implement it accurately and comprehensively in an organization, successful experiences in this field should be used. What was investigated and analyzed in this research was digital transformation

and planning for its establishment in an organization based on the frameworks introduced by successful and reliable companies. As Amini, Hassanzadeh and Morshed (2022) have emphasized in their research, the roadmap presented by Schallmo & Williams (2018) is the first step. Maturity assessment models, digital business model transformation approaches, which are described below, respectively, are the next steps of planning. In conclusion, we analyzed and examined the digital transformation frameworks of the world's most prestigious companies as presented below:

Digital transformation Roadmap

Figure 1 illustrates the roadmap to the digital transformation of the business model with its various phases and activities. The steps were explained further below.

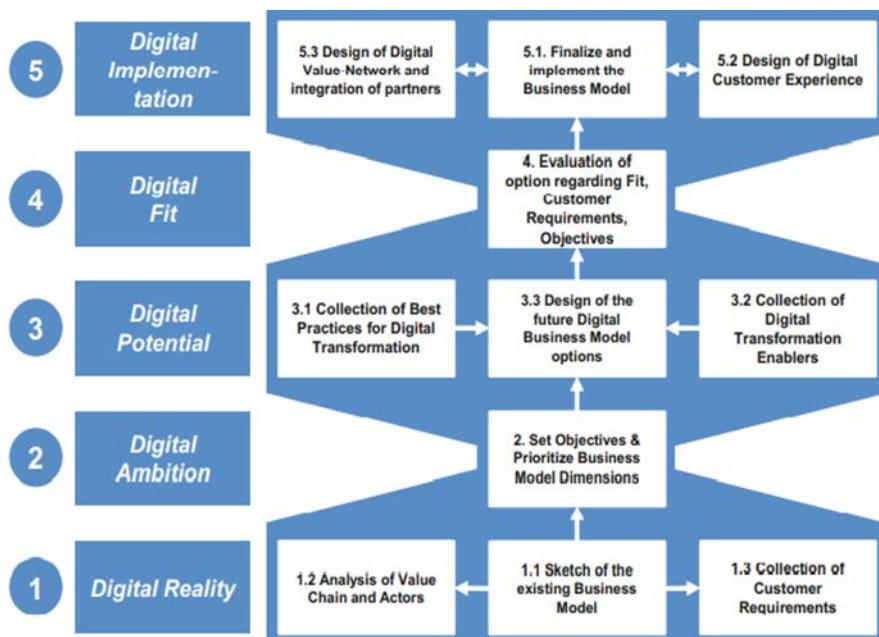


Figure 1: Roadmap to the digital transformation of business models (Schallmo & Williams, 2018)

5.1. Finalization and implementation

2. Setting

Digital Reality

In this phase, Digital Reality, the company's existing business model is outlined, along with a value-added analysis related to stakeholders and a survey of customer requirements. This provides an understanding of the Digital Reality for this company along with different parameters.

Digital Ambition

Based on Digital Reality, objectives were defined for the digital transformation. These goals relate to time, finances, space, and quality. Digital Ambition determines which objectives should be considered for a business model and its elements. The objectives and business model dimensions were subsequently prioritized.

Digital Potential

During the Digital Potential phase, best practices and enablers of the digital transformation have been established. This serves as a starting point in terms of Digital Potential and the design of a future digital business model. For this purpose, different options emerge for each future business model element and these options are then combined, and connected logically.

Digital Fit

The Digital Fit phase looks at options for designing the digital business model. These options were evaluated to determine Digital Fit with the existing business model. This ensures that customer requirements are met, and that business objectives are achieved. The options were assessed and then prioritized.

Digital Implementation

Digital Implementation includes the finalization and implementation of the new digital business model. The various options are further pursued within a digital implementation framework. The Digital Implementation also consists of the design of a digital customer experience and a digital value-creation network, describing the integration of the new business model with partners. Resources and capabilities are also identified in this phase.

Digital maturity assessment models

To develop a roadmap and strategy for their digital transformation, organizations must first reach a comprehensive understanding of the current state of their digital level. To this end, digital maturity can be considered the first step in developing a roadmap for the digital transformation of a firm and organization. Using a comprehensive and standardized maturity assessment model, organizations can identify the digital strengths and weaknesses by planning an approach and understanding the current digital state, planning for their growth and development in the field of digital transformation, and developing a strategy (Atardian, 2020).

Digital transformation directs diverse organizations toward different and changing goals. Both researchers and research institutions have come up with several digital maturity models. Their common goal is to assess the digital maturity level of an organization and provide an indication of activities needed to increase this level, and all of these models are based on the hypothesis that the digital transformation toward industry 4.0 is an evolutionary journey (Kagermann et al., 2013). In other words, as a first key principle, they build on a cumulative capability perspective (Miller et al., 1994). As a second key principle, the digital transformation process is considered to involve some activities within multiple decision areas. Although different digital maturity models vary in terms of digital stages, the number of dimensions covers the different organizations.

1. Digital Maturity Model (DMM)

TM Forum's Digital Maturity Model offers a practical approach to the transformation. As master-minds of industry had been working on it for many months. CSP¹s, technology companies, and global advisory firms have pooled their knowledge and experience to create a model that can be used to identify possible investment priorities and manage the journey itself, step-by-step (Boasman-Patel, 2021).

¹ Communication Service Providers

The model is split into six dimensions:



Figure 2: Digital Maturity Assessment Model (Boasman-Patel, 2021)

- **Customer** – Provides an experience where customers view the organization as their digital partners using their preferred interaction channels to control their connected future on and offline.
- **Strategy** – Focuses on how the business transforms or how the business operates to increase its competitive advantage through digital initiatives.
- **Technology** – Underpins the success of digital strategies by helping to create, process, store, secure, and exchange data in order to meet customers' needs at low cost and overheads.
- **Operations** – Executing and evolving processes and tasks by using digital technologies to drive strategic management and enhance business efficiency and effectiveness.
- **Culture**, People, and Organization define and develop an organizational culture with governance and talent processes to support progress along the digital maturity curve and the flexibility to achieve its growth and innovation objectives.
- **Data** – Evaluates the organization's ability both strategically and operationally to ethically and effectively use data and information assets to maximize business value.

2. McKinsey Maturity Model

Today, organizations in the vanguard use the power of digital influence to maintain competitiveness, grow their businesses, and

evaluate high-impact transformation initiatives. This data-driven diagnostic approach helps the chief experience officer (CXO.¹) and performance leadership teams align around a shared vision and strategy in key digital dimensions. Digital 20/20 Online Diagnosis uses expert-developed questions to evaluate an organization's current capabilities, benchmark answers against peer results, and best practices (Digital 20/20, 2021). Dimensions of the digital maturity assessment of this model include:

- **Strategy:** Measure the organization's digital maturity, evaluate management practices, and test your digital disability readiness.
- **Analysis:** Assess the analytical maturity of an organization in terms of the critical dimensions that drive its financial performance.
- **Technology:** Optimize technology operations, information, and modernizing technology to reinvest in digital growth projects
- **Operations:** Evaluate your technology organization's agility and DevOps capabilities to increase emission frequency and improve output quality.
- **Marketing:** Evaluate your organization's digital marketing maturity and improve critical capabilities to accelerate growth and enhance the customer experience.
- **Individuals:** Strengthen the right digital organizational culture and protect the breadth and depth of talent needed to achieve strategic ideals.
- **Automation:** Identify and eliminate gaps that create barriers to automation.

3. Deloitte Digital Maturity Model

DMM is Deloitte's maturity assessment model, which evaluates the digital capacities of organizations in the form of 5 dimensions that are

1. A chief experience officer (CXO) is an executive in the C-suite who ensures positive interactions with an organization's customers. The CXO typically reports to the chief executive officer (CEO), chief operating officer (COO), or chief marketing officer (CMO) (Mixon & Lebeaux, 2021).

explicitly presented in the business to create a comprehensive view of digital maturity throughout the organization. Using the digital maturity model empowers firms at every stage of their transformation journey. The DMM takes a pan-organization snapshot of the current digital capability of an organization at the outset. The DMM removes the ambiguity that can result from using multiple digital assessment tools and provides a firm basis to set a path to reach the desired outcomes simultaneously across the business (Deloitte, 2018).

The five core dimensions are divided into 28 sub-dimensions, which in turn are broken down into 179 individual criteria based on which digital maturity is assessed:



Figure 3: Digital maturity assessment model (Deloitte, 2018)

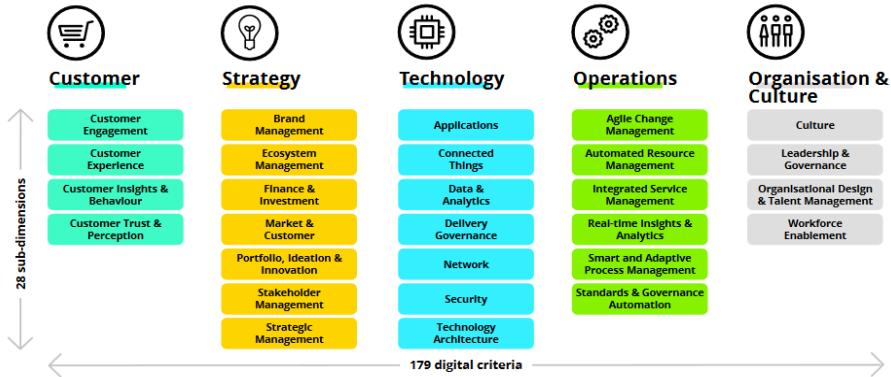
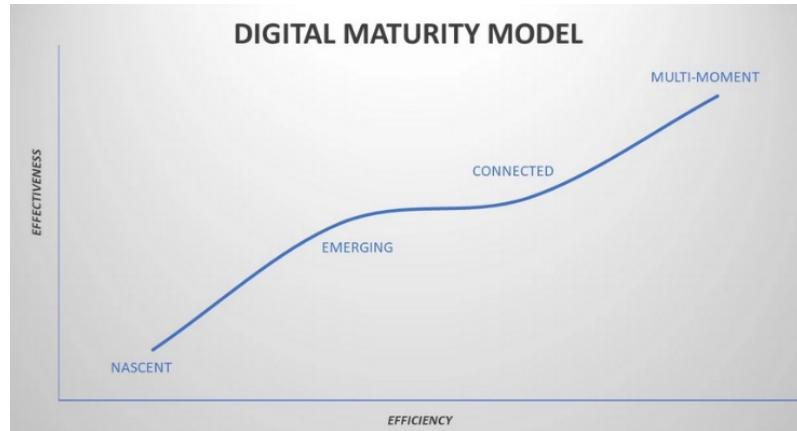


Figure 4: 5 Dimensions of DMM (Deloitte, 2018)

4. Google and Boston digital maturity model

Google's digital maturity model consists of four primary stages (Optimizely Team, 2021):

- **Nascent**, what some call the *crawling* stage, is where the organization is just getting started with digital transformation. In this stage, the company does not yet trust relying on data and has difficulty getting different departments to collaborate.
- **Emerging**, is also known as the *walking* stage. The organization is more comfortable collecting and using quality data, while focusing on improving technology-driven processes and connecting the previously siloed departments.
- **Connected**, often called the *running* stage. In this stage, data transformation is well underway, with data-driven business practices integrated across multiple departments and channels. The organization can now connect and use both online and offline data and recognize a measurable benefit from the digital transformation process.
- **Multi-Moment**, referred to as the *flying* stage. This final stage sees the digital transformation, focusing on individual customer transactions and business outcomes. The organization can now use data-driven insights to pursue incremental efficiencies across multiple channels and functions.



**Figure 5: Google and Boston digital maturity model
(Optimizely Team, 2021)**

5. Digital maturity matrix

Digital maturity as a classic 2x2 ,highlights four different types of approaches to driving digital transformation (MIT Sloan Management, 2011):

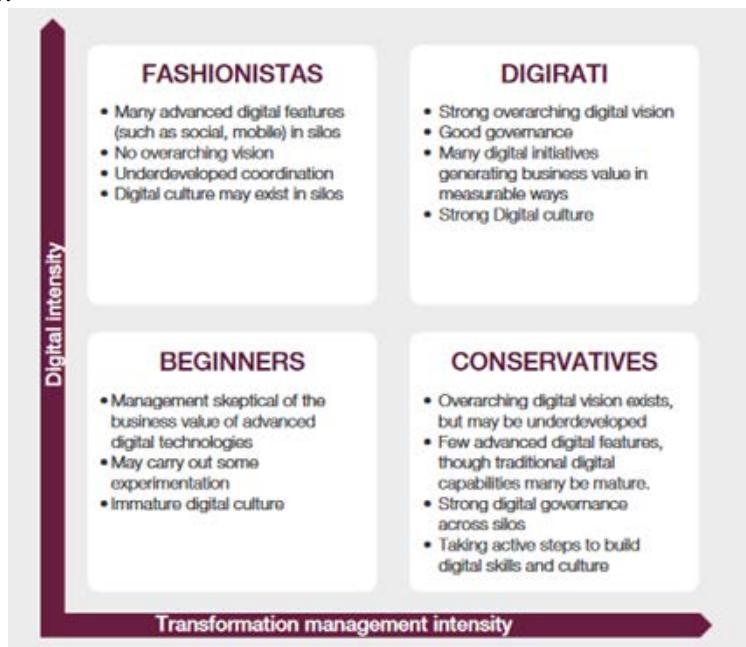


Figure 6: Digital maturity matrix (MIT Sloan Management, 2011)

- Firms in the lower left are **Digital Beginners**. They are doing very little with advanced digital capabilities, although they have more traditional digital capabilities such as ERP.¹, internet, or e-mail.
- Firms at the top left are **Digital Fashionistas**. They have implemented a large amount of sexy digital *stuff*. Some of these items may be creating value, but some may not. While the digital fashion items may look good together, they may clash with other things, rarely generating synergies. Digital fashionistas are motivated to bring on digitally-powered change, but their digital transformation strategy is unfounded on actual knowledge of how to proceed.
- Firms at the bottom right are the **Digital Conservatives**. These represent the wise older men and women of the digital world. They understand the need for a robust unifying vision and governance and internal engagement activities to ensure prudent investment management. However, they are typically skeptical of the value of new trends, sometimes to their detriment. Digital conservatives understand where the company should be going and how to master digital challenges, but they cannot always build organizational momentum to perform an ambitious program. As a result, though aiming to spend wisely, their careful approach may cause them to miss valuable opportunities upon which their more stylish competitors will pounce.
- Firms at the top right are **Digerati**.² These firms genuinely understand how to drive value from the digital transformation. They combine a strong shared vision for change, careful governance and engagement, and sufficient investment in new opportunities, through managing the *how* carefully, they develop a digital culture that can envision further changes and implement them wisely. By working the *what* sufficiently, they continuously advance their competitive advantage, that they draw from implementing digital transformation.

1. It is a business process management software that manages. It integrates a company's financials, supply chain, operations, commerce, reporting, manufacturing, and human resource activities (What is ERP, and why do you need it?).

2. People know about digital technologies such as computer programming and design (digerati).

Business models

Strategy, not technology, drives digital transformation. Your business model is the most important strategic asset of your company. The truth is that many of the world's leading companies are not designed for the digital world. Their systems are outdated, their operations are complex, their processes are inefficient, their business knowledge is fragmented, and their value proposition quickly loses its luster. Without a complete overhaul of their business model, no digital technology will save them (Gartner, 2021).

A business model is essential, underlying logic of a company that describes what benefits are provided to customers and partners. A business model answers the question of how the benefits provided by the company also flow back into the company in the form of revenue. The value created enables differentiation from competitors, the consolidation of customer relationships, and the formation of competitive advantage. A business model involves the following dimensions and elements (Schallmo & Williams, 2018):

- The customer dimension contains the customer segments, customer channels, and customer relationships.
- The benefit dimension includes products, services, and values.
- The value-added dimension includes the resources, skills, and processes.
- The partner dimension includes partners, partner channels, and partner relations.
- The economic dimension includes revenues and expenses.

The objective is to combine the business model elements so that they mutually reinforce each other. Thus, it is possible to achieve difficult growth for competitors to imitate.

In the area of business model innovation, numerous approaches have already been analyzed in the literature and consolidated as procedure models:¹

1. Esser's Approach

Esser (2014) defines five phases that outline the development plan for a digital transformation strategy and its implementation (Schallmo & Williams, 2018).

1. (Bucherer 2011, Schallmo 2013, Schallmo 2015, Wirtz and Thomas 2014).

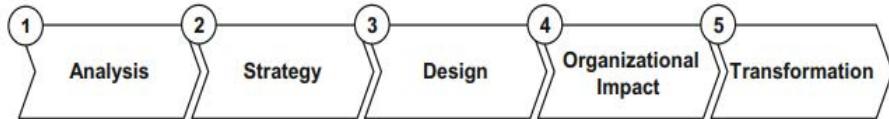


Figure 7: Essers's Approach (Schallmo & Williams, 2018)

Analysis

The analysis focuses on four areas: customers, competitors, markets, and business capabilities. Customer needs and values are analyzed and segmented. Competitors are described and measured based on their current (market) performance and market positioning. Also, newcomers to the market are considered. The market is analyzed according to its size, potential, limitations, and future developments. Finally, available business capabilities were gathered.

Strategy

Secondly, the strategy phase includes defining the market position, deciding how the business wants to differentiate itself, and selecting the customer target group.

Design

Design is based on three areas: an idea for the customer experience, value proposition, and the identification of opportunities. The vision for the customer experience includes a statement about what the business wants to achieve. The value proposition answers how and with what services one will excite customers. Finally, the identification of opportunities assesses existing and new design ideas.

Organizational Impact

Organizational impact refers to the people, the structure, and the culture within the business. Additionally, processes and systems are examined, and finally, governance and control are defined.

Transformation

This transformation ultimately dictates the roadmap and program management. Additionally, internal communication, as well as change management are planned. And finally, branding and external communications are defined.

2. PricewaterhouseCoopers' Approach

PricewaterhouseCoopers (PwC) defines six phases for the digital transformation within a framework (Schallmo & Williams, 2018).

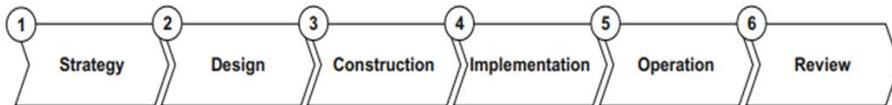


Figure 8: PricewaterhouseCoopers' Approach (Schallmo & Williams, 2018)

Strategy

A strategy is developed within the framework of the first phase, and the effects of digital dynamics should be understood here. The company's current position is determined, and a new business model designed. Additionally, a safety assessment, a value-creation analysis, and legal and tax ramifications were considered. Finally, corporate culture and human capital were analyzed.

Design

The second phase is the design of the Transformation Roadmap. To this end, the collaboration model, the value-creation network, and the operating model are defined. Additionally, the target architecture, the transformation plan, and the target model for corporate culture are determined. Lastly, the tax and legal aspects are modeled.

Construction

The third phase is the construction, completing the development of a digital business platform. Governance was introduced, and a medium or application developed. The operating model and business/IT services are adapted based on this construction. Digital security and skill management are also defined.

Implementation

The implementation phase initiates the previously developed business platform. Quality assurance and employee training rolled out to ensure a successful transition.

Operation

In this phase, new business models considered operating as running systems. Here, governance, the platform, and application management and reporting play a vital role.

Review

The last phase is the review, which includes performance monitoring and optimization. For this purpose, service-level adjustments were made, and operational optimizations, as well as optimizations to the business model, were carried out.

Together, these six phases account for several aspects of digital transformation.

3. Boué and Schaible's Approach

Boué and Schaible describe a digital transformation master plan specifically designed to address a digital future (Schallmo & Williams, 2018).

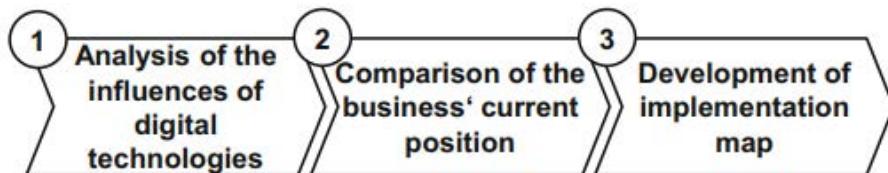


Figure 9: Boué and Schaible's approach (Schallmo & Williams, 2018)

Analysis of the Influence of Digital Technology

On the industry within the framework of this phase, different distinct future scenarios are forecast, and potential changes in value chains are analyzed. Additionally, technologies categorized and relevant market participants were evaluated. As a result, several changes were frequently identified in this phase.

Comparison with Current Position

In the Company the second phase involves an analysis of opportunities and risks for the existing business. Furthermore, affected products, customers, and regions are analyzed. Additionally, digital capabilities such as human resources or partnerships are defined, and the digital business strategy is established. The resulting implementation and competence gaps were identified.

Implementation of the Roadmap

In the final phase, relevant options for future scenarios are defined. For example, digital skills needing further development were identified, and cooperative market participants discussed.

Digital transformation frameworks

After explaining the steps of digital transformation planning, in this section, we examine the best frameworks for digital transformation:

1. Christian Matt Framework

It is one of the main frameworks of digital transformation. The financial aspect, the use of technology, the restriction of the business, and the change in value creation patterns are the four main aspects of this strategy. Managers should know that the use of technology and information technology achievements alone is not enough to achieve digital transformation; they should also change the way they do things. In other words, according to Matt's model, an organization can only claim to have taken a step toward digital transformation when the use of information technology tools has changed the business structure and value creation patterns have undergone changes too (Chakad Digital Innovation Studio, 2021).

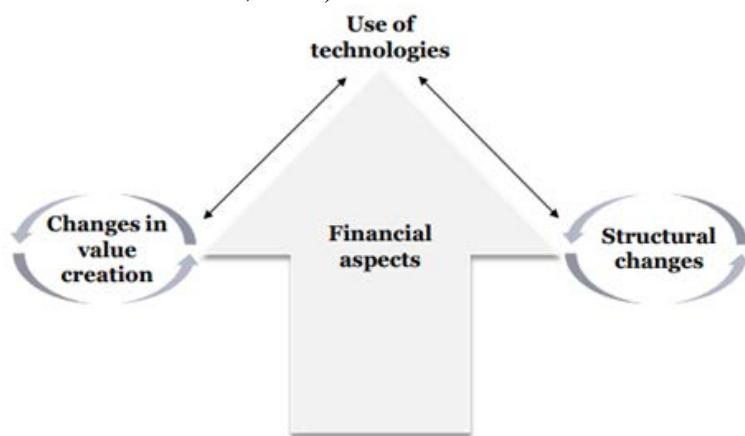


Figure 10: Digital Transformation Framework by Christine Matt and Thomas Hess (2015) (Matt, Hess, & Benlian, 2015)

2. PwC digital transformation framework

PwC tells us that digital change should be rooted in Industry 4.0. Industry 4.0 refers to the fourth industrial revolution. The outer ring-

labeled data and analytics are clever. This framework will provide a more accurate intel for business leaders to make decisions in stages 1–3. Digitization of product and service offerings (stage 2) are precise (Coundouris, 2021).

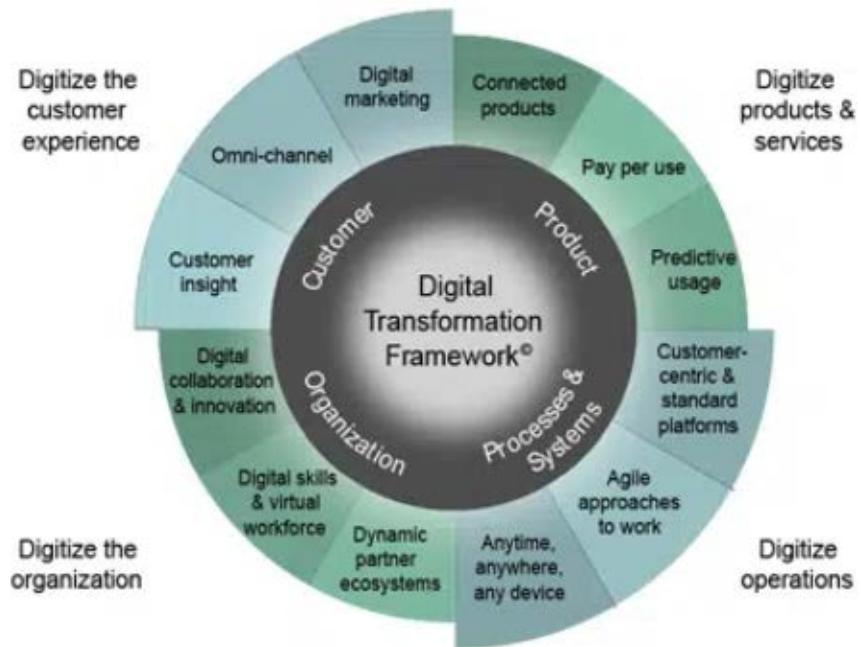


Figure 1: PwC Digital Transformation Framework (Coundouris, 2021)

3. Cognizant digital transformation framework

Cognizant has found four common elements that apply to most companies making a digital change in both the B2C¹ and B2B² markets. Cognizant has an entire piece devoted to digitize the customer experience. This piece includes customer insights. In making digital change, Cognizant's DX framework recognizes that new pricing models are essential. The framework is relatively easy-to-use (Coundouris, 2021).

-
- 1. Business to Customers
 - 2. Business to Business



**Figure 12: COGNIZANT digital transformation framework
(Coundouris, 2021)**

4. Gartner digital transformation framework

Gartner developed a six-step digital transformation framework, enabling CIOs and other business leaders to build a successful digital enterprise .Gartner put shared beliefs first. They call this stage one of their DX frameworks for shared understanding .Step 2 of the Gartner digital transformation framework suggests putting in place the exemplary leadership. This decision is backed by research that suggests skill gaps are one reason digital change fails .Shared understanding or shared belief is essential. Technology transformation is useless unless people transform. The staff should understand and share the same belief as the CEO about the digital change making sense. It is inside-out .Step 3 is decisive. While other DX frameworks touch on shared ideas and culture, Gartner goes further, suggesting the organization supported by a digital excellence team. Think of these people as coaches and mentors (Coundouris, 2021).



**Figure 13: Gartner Digital Transformation Framework
(Coundouris, 2021)**

5. McKinsey digital transformation framework

McKinsey has a proprietary DX framework called the 4Ds. According to the McKinsey framework, the 4Ds of digital transformation are Discovery, Design, Deliver, and De-risk. McKinsey 4Ds are on fire. It is the first DX framework I have reviewed where the customer is first, repeatedly. McKinsey puts the customer first in the Discovery phase — looking at customer behavior trends. In the second phase — Design — the customer gets another hug. This time McKinsey talks specifically about designing and building customer journeys. Customer journeys are an essential driver of customer experience. Customer journeys form one of McKinsey's six building blocks for creating a high-performing digital enterprise. DXC's DX framework uses customer journeys to identify new opportunities. The last phase encourages the organization to reinvest profits from quick wins to de-risk the business against change fatigue (Coundouris, 2021).



**Figure 14: McKinsey Digital Transformation Framework
(Coundouris, 2021)**

6. CapGemini digital transformation framework

CapGemini's DX¹ framework digitally transforms three critical areas of an enterprise: customer experience, operational processes, and business models. Within each of the three pillars, different elements are changing. These nine elements form a set of building blocks for digital transformation. Stage one customer experience, about understanding the customer and thinking about new customer journeys precisely – the ingredients are prescribed by McKinsey. Start with the customer experience and move to more significant issues of complexity. CapGemini places digital technology at the bottom, suggesting that it supports rather than leads (Coundouris, 2021).

¹ Developer Experience



**Figure 15: CapGemini Digital Transformation Framework
(Coundouris, 2021)**

7. MIT digital transformation framework

MIT's five building blocks to digital transformation framework is more like a stack of building blocks. There is a lot of emphasis on customers. Like PwC data and analytics core competency ring, MIT point organizations to develop a reservoir of intelligence about both customer problems and solutions. The accountability block tries breaking down organizational barriers as a means of transforming. Creating a startup culture where it is possible to make mistakes and succeed (Coundouris, 2021).



Figure 15: MIT Digital Transformation Framework (Coundouris, 2021)

8. DXC Technology digital transformation framework

In the digital world, according to DXC, the consumer is in charge and will define your next move. Asymmetric competition from unexpected sources will be the norm. Winners maintain control while they minimize their asset base. DXC knows how to put the customer first. Their Digital Customer Experience piece is comprehensive. DXC claims these journeys need to be intelligent, digital-first, and omnichannel. Their business model innovation is incredible. It helps anticipate asymmetric competition (Coundouris, 2021).

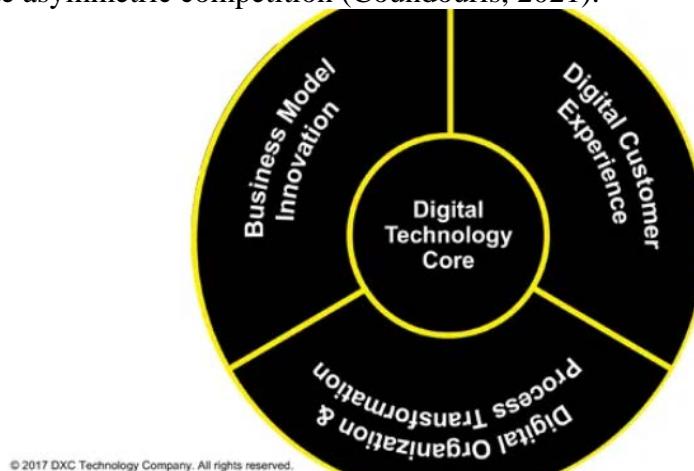


Figure 16: DXC Technology digital transformation framework (Coundouris, 2021)

Discussion & Conclusion

Digital transformation as an organizational transformation requiring its own planning, resources and rules. The Digital Transformation Roadmap, which we interpreted in this study (Amini, Hassanzadeh, Morshedi (2022)), is a good guide as the first step in this field, which can be developed according to the nature and knowledge capital of each organization, as it was also explained by Nouri, Shah hoseini, Shami zanjani, Abedin (2019). Staff capital and its empowerment by knowledge and fundamental requirements are important for success in the digital transformation program. No digital transformation is only a technological transformation. Transformation in culture, in structure, in processes and methods, along with the benefits of the frontier technologies, will lead to a dramatic transformation in the field of business. This subject has been mentioned by Asad Amraji, Mohammadian, Rajab Zadeh Ghatari, Shoar (2019). A review of research in this field shows that the nature of digital transformation depends on knowledge and knowledge is formed as a valuable asset in people's minds. Therefore, the role of human resources in creating and achieving the transformation is important and fundamental. Ilvonen, Manhart, Thalmann, Sillaber (2018) and Alvarenga, Matos, Godina, Matias (2020) have emphasized the role of knowledge in the digital transformation. Planning for transformation requires the readiness of the organization in various dimensions of business. These dimensions were interpreted in different frameworks of digital transformation. GhelichKhani, Samadi Moghadam, Fathi Hafashjani (2021) have proposed 10 dimensions in their research. Also, Asad Amraji, Mohammadian, Rajab Zadeh Ghatari, Shoar (2020) have explained the essential elements for digital transformation in individual, group and organizational levels. But TrencerryChng, Wang, Suhaila, Lim and Lu (2021) have concluded that most of the existing maturity models of digital transformation are not complete and it is necessary to mention digital culture. Organizational culture was examined as an empowerment of digital transformation efforts and a specific dimension of digital maturity in maturity assessment models, which indicates its increasing importance. Digital transformation has affected the work processes of individuals in organizational environments, including office environments and physical work environments. New methods in combining digital innovations and intensifying inter-organizational collaboration are among the key features of success in

the digital transformation program of organizations, which is achieved through knowledge sharing among organizations. The growth of technology, in addition to transforming organizational boundaries, has also improved knowledge sharing. The discussion of security and protection of inter-organizational knowledge in the digital transformation program is of great importance, and has been considered in the design of digital transformation frameworks. Existing digital transformation frameworks have demarcated the various dimensions of this type of transformation and provided criteria for each dimension to integrate and converge them. Because the goal of digital transformation is a business transformation, and just like a musical performance in a concert with full orchestration, digital business transformation also requires different organizational elements to work together, so that It can be performed concurrently and harmoniously.

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