

Key activities of digital business transformation process

Bogdan Ubiparipović

Nova Banka AD, Banja Luka, Republic of Srpska, BiH

<https://orcid.org/0000-0002-2462-610X>

Predrag Matković

University of Novi Sad, Faculty of Economics in Subotica, Subotica, Serbia

<https://orcid.org/0000-0002-9956-0088>

Veselin Pavličević

University of Novi Sad, Faculty of Economics in Subotica, Subotica, Serbia

<https://orcid.org/0000-0002-4690-3040>

Abstract

Background: Digital transformation is by itself a fragmented area, due to different perspectives encountered in the literature. The research problem addressed in this paper is a general lack of consent on the content of digital transformation and the lack of a comprehensive framework for implementing digital transformation initiatives.

Purpose: The aim of this paper is to identify distinct key activities of digital transformation through a systematic literature review, and in doing so contribute to defining the scope of digital transformation and the structure of digital transformation as a process.

Study design/methodology/approach: This research was conducted by means of a systematic literature review, with the aim to ascertain the general structure of the digital transformation process through identification of its key activities.

Finding/conclusions: A total of 19 items were identified as activities of digital transformation, which were subsequently distributed among the 6 distinct stages of the digital transformation process, in an effort to advance the understanding of the notion and the scope of digital transformation through clarification of its content.

Limitations/future research: The results of this research should be instrumental for the future research aimed towards developing generic, universal guidelines for companies seeking to embark on digital business transformation journeys.

Keywords

digital business transformation, digital transformation process, key activities

Introduction

Rapid technological advances in this digital age are now further accelerated by the 4th industrial revolution, and we are witnessing an increased impact of digital technologies on all segments of life. The new digital ecosystem has extremely shortened product life cycles and made consumer behaviour increasingly demanding and unpredictable. Faced with this reality, companies are forced to continuously adapt and transform their businesses. The extent and contents of the transformation are dictated by a company's

industry, as well as the level of involvement of digital technologies into its business processes.

Digitalization is the main cause behind more than half companies vanishing from the "Fortune 500" list after 2000 (von Leipzig et al., 2017). According to Leipzig et al. (2017), digitalization is a part of the major global trend of the fourth industrial revolution (Industry 4.0), offering great possibilities transforming existing business models, but at the same time, threatening to render entire business models obsolete.

Digitalization has completely transformed consumer behaviour and their expectations, which

implicitly compelled companies to redesign their businesses on order to win new or retain existing customers. Customers no longer expect companies to just respond to their articulated needs, but also expect them to anticipate and address their future needs even before they become aware of these needs themselves.

Even though most companies today experiment with digital transformation, recent case studies examining successful transformation show that the improvement of competitive positioning is less dependent on the technology being adopted, and more by the applied strategic approach to implementation. There is still a large gap between companies' intentions to transform their businesses digitally and the ultimate success of such initiatives (Ismail, Khater & Zaki, 2017).

To ensure that digital transformation will create additional business value, a company should first carefully formulate a digital transformation strategy, aimed at coordinating many independent threads of digital transformation and assist in solving problems arising from internal complexity and ambiguities in identifying advantages applications of digital technology (Hess, Benlian, Matt, & Wiesböck, 2016). According to Hess et al. (2016), such a digital agenda should be in alignment with other operational and functional strategies, and if so, may serve as a unifying concept for integrating all efforts on coordination, prioritization, and implementation in a digital transformation.

Despite the need for a comprehensive and systematic approach to digital transformation, one that would encompass all its elements, from prioritization of initiatives, through mechanisms of coordination, identified risks, to implementation steps, researchers have not yet presented a coherent framework for digital transformation (Hess et al., 2016; Matt, Hess, & Benlian, 2015).

1. Background

The scope of the concept of digital transformation is still unclear, due to different perspectives encountered in the literature. Ismail et al. (2017) noted that "unrefined search for academic publications using the keyword 'digital transformation' yields thousands of articles, which examine the phenomenon from various perspectives" (Era, Network, Company, Institutional, Individual, Industry/ Ecosystem, Social/ Economic), which sometimes overlap.

The research problem addressed in this paper is a general lack of consent on the content of digital

transformation and the lack of a comprehensive framework for implementing digital transformation initiatives.

The aim of this paper is to identify distinct key activities of digital transformation through a systematic literature review, and in doing so contribute to defining the scope of digital transformation and the structure of digital transformation as a process.

2. Method

This research was conducted by means of a systematic literature review, in alignment with the recommendations provided by Barbara Kitchenhand (2004). The aim of the literature review was to identify, evaluate and synthesize dominant attitudes related to the research topic of this paper. The literature review comprised three distinct stages: planning, conducting the review and reporting. The aim of the planning stage is to clearly define the research protocol for the purpose of mitigating the risk of arbitrary selection of research materials for analysis. Detailing the research protocol comprises the following activities (Kitchenham, 2004):

- Articulation of the of the research aim
- Wording of the research questions the literature review should answer
- Definition of the strategy to be used for the primary search for the research material, including the search terms and sources
- Definition of selection criteria for research materials, i.e., inclusion or exclusion of particular studies from the literature review
- Definition of quality assessment criteria for research materials
- Definition of the data extraction strategy
- Definition of the data synthesis strategy

The aim of this research was to ascertain the general structure of the digital transformation process through identification of its key activities. For this to be achieved, the research should answer the following research questions:

- RQ1: What are the key activities of digital business transformation?
- RQ2: What distinct phases can the key activities of digital business transformation be grouped into?

The strategy for the primary search for research material within the protocol developed for this literature review encompassed the following databases: Web of Science, Scopus, and the AIS

eLibrary. In addition to evaluation of the primary research materials, the developed research protocol also involved a secondary search, i.e., review of research materials referenced by the works identified in the primary search. After the selection of sources for the primary search, we defined the following search terms: “digital business transformation” AND (“activity” OR “activities”).

The inclusion/exclusion criteria defined for this research were as follows:

- Inclusion criteria: only works - papers in academic or professional journals and conference/workshop proceedings - published between 2011 and 2018 in English and matching the search terms in the title or the abstract were included in the literature review.
- Exclusion criteria: all works related to the key words, albeit predominantly focused on technical aspects of digital transformation and with little attention on different business aspects of digital transformation were excluded from the research. In addition to that, papers not based on empirical research and papers based on the authors’ unfounded personal opinions and perspectives were also excluded.

The criteria for evaluation of research materials conforming to the previously described inclusion and exclusion criteria are listed in table 1-1, in

accordance with recommendations by Dybå & Dingsøy (2008) and Kofod-Petersen (2014). According to by Dybå & Dingsøy (2008), quality criteria should serve to evaluate papers from three key aspects: credibility, methodological strictness, and significance. Each paper is assessed in terms of each evaluation criterion, with assessments ranging from “Yes”, through “Partially”, to “No”, which were quantified as 1, ½, and 0, respectively (Kitchenham et al., 2009).

Table 1 Criteria for evaluating research materials

QC Nr.	Quality criterion	Possible rating
QC1.	Is the research aim clearly defined and articulated?	Yes/Partially/No
QC2.	Is the research put into adequate context?	Yes/Partially/No
QC3.	Are research methods clearly defined?	Yes/Partially/No
QC4.	Does the study reference empirical findings?	Yes/Partially/No
QC5.	Are research results clear and thoroughly analysed?	Yes/Partially/No
QC6.	Do results have practical significance?	Yes/Partially/No

Source: adapted from Dybå & Dingsøy, 2008; Kofod-Petersen, 2014

Extraction strategy for data necessary to answer the research questions involved repeated reading of all selected works, with text coding, discovery of topics grouping them into appropriate concepts and categories. The data synthesis strategy relied on comparing and cross-referencing the identified categories, themes, and concepts.

Table 2 Results of the primary search for research materials

Source	Papers matching key words	Papers included in further analysis	Papers included in further analysis, after removal of duplicates	Number of papers excluded
Web of Science	225	18	17	199
Scopus	209	14	9	192
AIS eLibrary	451	13	11	435
Total:	885	45	37	826

Source: the authors

As per the defined research protocol, the systematic literature review was initiated with a search for research material in the specified databases, using the search terms listed above. Results of the initial search, in terms of numbers of matches per each database, are given in table 1-1. The preliminary selection of research material against the exclusion criteria was primarily based on analysis of titles and abstracts, and, where necessary, the entire text. After removing duplicate matches (8), a total of 37 papers were included in further analysis and subject to detailed examination - repeated reading and evaluation against the

criteria for evaluation of research materials. The evaluation had led to the exclusion of additional 26 papers, which resulted in 11 relevant papers selected for further analysis. A secondary search was conducted in parallel with the detailed analysis and evaluation of primarily selected papers, based on references included in them. The secondary search resulted in additional 4 papers being selected for detailed analysis and evaluation, 2 of which were finally deemed relevant to this research after the application of the same evaluation criteria.

3. Results

The idea of using business process management concepts for addressing problems in digital business transformation is not new. This particular idea is central to the research by Imgrund, Fischer, Janiesch, & Winkelmann (2018), in which the authors tried to identify characteristic demands related to digital transformation and sought possibilities for applying principles of business process management to address the identified requests. The authors highlighted the interdependence between digital business transformation and business process management and pointed to the possibilities for applying principles based on business process management in digital business transformation initiatives. A summary of their findings on how business process management may assist digital business transformation is presented in Table 3. Just like in business process management, to overcome the challenges of digital business transformation, organizations must develop additional capabilities, define and execute a digital strategy, increase digital awareness, adapt their attitudes, and define security guidelines.

Table 3 Capabilities of BPM to Address the Requirements of Digitalization

Requirement	Facilitation of digital transformation through business process management
Expertise	Cross-functional knowledge spill-overs facilitate collaboration and co-creation. Process models enable knowledge management and information exchange.
Flexibility	Improved coordination and communication increase agility and flexibility.
Involvement	Process orientation connects all part of an organization
Digital strategy	Process models facilitate focusing on core competencies and foster innovation. ...supports the awareness and acceptance towards change.
IT strategy	- uses IT for process automation, digitization, and data integration. - aligns technological and business structures.
Collaboration	- uses production models to facilitate collaboration. - facilitates modularization through process building blocks.
Security	entails the formulation of rules and guidelines.
Culture	creates a cross-functional culture and defines roles.

Source: Imgrund et al., 2018

Digital transformation is a necessity for most companies today. However, just the initiation of digital transformation is usually a challenging endeavour, coupled with numerous challenges. In an endeavour to identify these challenges, von Leipzig et al. (2017) analysed digital

transformation along its several phases - initiation, execution, and coordination. The authors identify challenges organisations must face throughout digital transformation, such as: inadequate IT infrastructure, lack of technical skills, inadequate business processes, high risks and implementation costs, cultural barriers that is often underestimated and remains unrecognised, as well as people's resilience towards changes and their indifference towards a radical change as digital transformation.

In their analysis, von Leipzig et al. (2017) offer suggestions for initiating digital transformation. As digital transformation has the potential for major organizational changes, these changes should be initiated from a strategic level within the company and disseminated throughout the entire company. Such changes may undoubtedly enact changes to business processes, improve customer satisfaction, and reduce operational costs. However, initiation of changes without setting prior strategic directives is a common problem for companies. As a solution to this problem, the authors (Leipzig et al., 2017) proposed a model aimed at assisting companies to successfully initiate digital transformation. The model was developed along Deming's PDCA (Plan Do Check Act) cycle, it is iterative, and ultimately aimed at correct initiation of digital transformation based on a developed digital strategy, facilitation of cultural changes, and encouragement of digital mindset. Along with the presented model, Leipzig et al. (2017) provided guidelines for stimulating innovation to be used in the initiation of digital transformation: using multiple alternative perspectives, seeking for potentially new technologies, paying attention to signals from the market for early discovery of new trends, development of ideas in line with external perspectives and encouragement of experiments.

According to their model, Leipzig et al. (2017) suggest that the initiation of digital transformation should be carried out with respect to the industry in question. Based on the type of industry, a digital transformation may be initiated with an analysis of operational business processes, analysis of the business model, or analysis of customer contact points. The model suggests that a company should identify its potential for digital business transformation through repeated analyses of its clients, the market, competitors, as well and other industries. The authors particularly emphasize the significance of analysing other industries, as customers who become accustomed to certain digital services expect similar experience regardless of the industry. In addition to that, the

model suggests using benchmarking for assessing the company’s position compared to its competitors, allowing it to become aware of its strengths and weaknesses, as well as new ideas on how to improve its operations. Ideas may be generated both from internal and external sources. Although internal sources are invaluable, the authors particularly emphasize the value of external sources for innovative ideas, as they have greater potential for providing provide new perspectives on innovation and improvement. Generated ideas are latter subject to classification and assessment. The aim of assessment is to identify costs that that the implementation of the idea may incur, as well as the revenue the potential change may generate and its overall impact on business. Selection is followed by the preparation of implementation and the implementation itself, while the feedback mechanism is used for subsequent assessment of the improvement, as well as comparison of the company’s progress with the progress of its competitors. Overall results serve as

input for the next iteration of the model implementation. With each following iteration, the company should elevate its capabilities for innovative thinking, further incorporate digital thinking into its digital strategy, and improve its willingness for further changes to the digital strategy.

As was previously stated, digital transformation has the potential to induce the most complex changes to a company’s business model. In their research, Schallmo and Williams (2017) argued that the literature present at that time did not have all the necessary answers. Their research resulted in a framework for digital transformation of business models (Fig. 1.), which factually represents a roadmap for digital transformation. This roadmap consists of 5 phases: digital reality, digital ambition, digital potential, digital fit, and digital implementation (Schallmo & Williams, 2017), each of the phases incorporates several activities, detailed in Fig. 1.

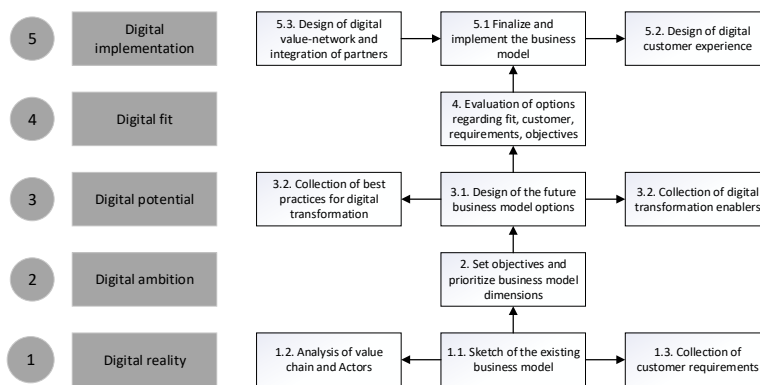


Figure 1 Roadmap for DT
 Source: Schallmo (2016) as cited in Schallmo and Williams (2017).

Technological advances provided companies with capabilities for synthesizing information from raw data in an effortless manner and use the revealed information to track and discover new trends and gain competitive advantage. The abundance of information may encourage companies to change their approaches from modifying their business models to innovating them. Schallmo and Williams (2017) proposed a balanced approach, combining digitalization of processes and operations with advancement of user experience, i.e., balance between focus on internal and external factors. Such a balanced approach should result in new, successful business models and effective digital businesses.

Sathanathan, Hoetker, Gamrad, Katterbach,

and Myrzik (2017) proposed a methodology for designing a digital business model based on a BMI (Business Model Innovation) framework, which should assist in understanding and assessing present business models, developing new ideas for digital transformation, and drafting novel business models based on improved understanding of market developments. The model proposes using the BMI framework in an iterative manner, from as-is analysis to the specification of a new business model. The first step proposed in the methodology involves describing the present business model. The second step involves analysing internal and external factors, preferably by means of a SWOT matrix. The third step includes development and assessment of ideas for possible improvements of

the existing business model. As this step may yield numerous ideas, they should be evaluated with the aim to select those that may best improve the existing business model through application of digital technologies. The following stage involves detailed analysis of selected ideas and projection of their impact on the business model, i.e., envisioning the structure of the new business model if the selected ideas are implemented. Evaluation is the final stage proposed in this methodology, where the new business model is assessed against the data gathered during its implementation.

Companies may initiate business transformation based solely on internal motivations, such as identified organizational problems. This approach requires drafting use cases and solution specifications. Defined use cases are subsequently assessed in terms of technical feasibility and cost-effectiveness. In such settings, profound understanding with the company's business processes and its technology is paramount to successful prioritization of digital initiatives. However, as key actors of digital transformation initiatives often lack this level of understanding, such approaches devoid of a strategic view of the organization often result in failures. Therefore, several authors recommend combining "top-down" and "bottom-up" approach, so that individual digital initiatives be integrated into the strategic vision of the organization. Pflaum and Michahelles (2018) proposed an iterative four-step process to guide companies in doing so.

The first step in the process is the development of a business strategy, i.e. establishment of a strategic vision, followed by its breakdown into individual business initiatives. Ideas for individual digital business initiatives are then translated into use cases, which are later subject to assessment, prioritization, and finally, implemented. The second step proposed in the process is knowledge creation, and the first task in this step is to develop a data model based that would facilitate collection of information necessary for solving the problems identified in use cases. In the following step, knowledge application, companies should use analytical tools and models to discover new knowledge and insights. The final step involves deciding how the developed solution should be integrated the current process landscape. Adoption of each digital initiative advances the company to its strategic vision, and often requires that the vision and plans be revised (Pflaum & Michahelles, 2018).

Current literature recognizes traditionalism as an important obstacle to digital transformation, especially among large companies. Abandonment of traditional practices is often a difficult endeavour for such companies. Sebastian, Ross, and Beath (2017) proposed a roadmap for digital transformation for large, traditional (or, in the authors' original wording, "big old") companies. They recommend that companies do the following (Sebastian et al., 2017):

1. define a digital strategy
2. invest in operational backbone
3. architect a digital services platform
4. design digital services with partners in mind
5. adopt a services culture

Having examined frameworks available in the literature and elucidated their natures, Ismail et al. (2017) concluded that each of framework involves most of the content associated with digital strategy, and that all are divided into phases that follow each other. This is the origin of the idea that digital transformation is a process, which advances along stages, and not a set of individual events. The authors (Ismail et al., 2017) identified 6 common phases (listed in Table 4.) that can be recognized in all the frameworks.

Table 4 Phases common to all digital transformation frameworks

Phase	Description
Initiation	Understanding digitalization opportunities, threats, and impact
Ideation	Imagining transformation dimensions as options for the business
Assessment	Evaluating digital readiness levels and identifying gaps
Engagement	Communicating the vision and integrating the necessary people
Implementation	Proceeding with the action plan in various domains
Sustainability	Validating and optimizing the action plan continuously

Source: Ismail et al. (2017)

The authors (Ismail et al., 2017) further noted that, despite the fact that there seems to be an abundance of available strategic frameworks, individual frameworks are usually constricted to an individual aspect of digital transformation or a particular industry. In relation to these findings, the authors finally highlight the necessity for "additional frameworks indifferent contexts to allow us to comprehend the DT phenomenon in more depth" (Ismail et al., 2017).

A total of 19 items were identified as activities of digital transformation, which were subsequently distributed among the 6 distinct stages of the digital transformation process:

1. Initiation (as-is analysis)
2. Ideation
3. Assessment

4. Transformation planning
5. Implementation
6. Ensuring Sustainability

The comprehensive list of key activities of digital transformation, grouped by stages, is provided in Table 5.

Table 5 Key activities of digital business transformation identified in the literature review

Nr.	Stage / Activity	Source(s)
S1.	Initiation (as-is analysis)	
1.	Exploration of opportunities, threats, and effects of digital transformation (SWOT analysis)	Imgrund et al., 2018; von Leipzig et al., 2017; Ismail et al., 2017; Schallmo & Williams, 2017; Sathananthan et al., 2017
2.	Analysis of competition (Benchmarking)	
3.	Analysis of client requests	
4.	Mapping and analysis of the present business model	
S2.	Ideation	
1.	Research on the best practices of digital transformation	von Leipzig et al., 2017; Schallmo & Williams, 2017; Ismail et al., 2017; Sathananthan et al., 2017
2.	Generation and assessment of ideas (initiatives) that alter different aspects of the present business model through the introduction of digital technologies	
3.	Design of options of the future (transformed) business model	
S3.	Assessment	
1.	Assessment of digital readiness and identification of gaps	Imgrund et al., 2018; von Leipzig et al., 2017; Schallmo & Williams, 2017; Sebastian et al., 2017; Pflaum & Michahelles, 2018
2.	Analysis and estimation of potential costs and benefits of implementation	
3.	Prioritization and final selection of the idea (initiative) to be implemented	
S5.	Implementation	
1.	Execution of the action plan	von Leipzig et al., 2017; Ismail et al., 2017; Schallmo & Williams, 2017
2.	Continuous validation and optimization of the action plan	
3.	Finalization and implementation of the new/modified business model	
S6.	Sustainability	
1.	Evaluation and analysis of data extracted from the new business model for continuous innovation	von Leipzig et al., 2017; Ismail et al., 2017; Sathananthan et al., 2017

Source: the authors

Conclusion

The diverse nature of digital technologies, rapid pace of their development and diffusion, and numerous transformational effects on businesses have led to different notions and interpretations of digital business transformation in the present literature on this matter. It can also be concluded that most of currently available works only deal with individual aspects of digital business transformation or are narrowly focused on a particular industry or type of organization, and that the present literature lacks universal and comprehensive approaches to all important aspects of systematic planning and implementation of digital transformation. As the complexity of digital business transformation exceeds that of ordinary, technology-induced transformation, study of its theoretical and practical aspects necessitates a thorough and holistic approach.

The aim of this research was to advance the understanding of the notion and the scope of digital transformation through clarification of its content, i.e., key activities of digital transformation initiatives. Extraction and synthesis of different

authors' perspectives on this topic from the presently available literature resulted in an overview of key activities of digital transformation and distinct stages of the digital transformation as an organizational process.

The results of this research should be instrumental for the future research aimed towards developing generic, universal guidelines for companies seeking to embark on digital business transformation journeys.

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✉ Correspondence

Predrag Matković

University of Novi Sad, Faculty of Economics in Subotica
 Segedinski put 9-11, Subotica, Serbia
 E-mail: predrag.matkovic@ef.uns.ac.rs