



Transformation Management Capabilities for Digital Transformation Initiatives: A Construct Conceptualization in Alignment with the Dynamic Capabilities Framework

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Abstract

Organizations all over the world are transforming digitally. However, the success rate of such transformations is minimal. To increase the chance of a successful transformation, the leaders of organizations going for digital transformation must have transformation management capabilities (TMCs). The current studies surrounding this topic rarely discuss these capabilities as the main issue. Most papers only discuss the capabilities that are relevant to their research. To the best of our knowledge, this paper is the first to present a comprehensive review synthesizing the conceptualization of TMCs. We begin the paper with the idea that TMCs are the capabilities that leaders of organizations should develop that will enable them to lead the organization away from failure and drive it to embrace the critical success factors, thus achieving the digital transformation objectives. From the 67 works reviewed in our research, we found 64 failure reasons and 223 critical success factors for digital transformation. We used grounded theory to review the literature rigorously and developed a conceptual construct for TMCs, which we then aligned with the dynamic capabilities framework. Our finding shows that TMC is a two-order construct with 8 dimensions and 35 indicators. Among the 8 dimensions, 5 dimensions belong to dynamic capabilities class, while the rest belong to ordinary capabilities class. Our findings contribute to the body of knowledge by developing a structural construct of TMCs. They also benefit practitioners by giving a more complete understanding of the management capabilities organizations' leaders need to acquire to have successful digital transformations.

Keywords: Digital transformation, transformation management capabilities, failure reasons, critical success factors, dynamic capabilities

Introduction

Many organizations, especially business organizations, are trying to transform themselves digitally. COVID-19 has increased people's familiarity with using digital technology. This condition has driven up the urgency of transforming organizations digitally. Companies need to respond quickly to their customers' changing digital behavior. However, the success rate in organizations' digital transformations is surprisingly low despite the vast and rapid flow of information in the current digital era. Even among digitally savvy industries, the success rate has not exceeded 26% (De la Boutetière et al., 2018). In more traditional industries, such as automotive, oil and gas, pharmaceuticals, and infrastructure, digital transformations are even more challenging: success rates are between 4% and 11% (Shooter, 2020). Digital transformation is in a very different paradigm than traditional organizational change. Another study involving hundreds of companies executing significant changes found that digital transformation efforts are significantly more challenging. While in conventional transformation, only 12% of the companies reported that expectations were achieved or exceeded, in the cases of digital transformation, it was only 5% (Baculard et al., 2017). This survey's results showed that even though conventional transformations also concerned new technology-driven change, the concept was taken to another level in digital transformation. Kohnke (2017) proposed the following six theses regarding digitization:

Thesis 1: Digitization changes the way of working

Thesis 2: Digitization increases the dynamic of change

Thesis 3: Digitization requires new skills and competencies

Thesis 4: Digitization requires new forms of leadership

Thesis 5: Digitization requires new organizational capabilities

Thesis 6: Digitization changes the organizational culture

These six theses indicate that organizational factors undoubtedly play an essential role in the transformation. Therefore, management activities have become crucial (Ylijoki & Porras, 2018). Among the various reasons for digital transformation failure, organizational leaders' lack of management capabilities rises above the others. Pouring more money into technology does not automatically create more or better technological assets. Digital transformation requires an updated management capability through the modernization of its process (Mihardjo & Rukmana, 2019).

Many researchers argue that management capabilities are lacking in organizations that are unsuccessful in their digital transformations (Jayawardena et al., 2020; Mielli & Bulanda, 2019; Van Looy, 2018). Researchers have conducted many studies to discover the reasons for digital transformation failures and to propose their critical success factors. However, most of those studies are scattered. Many studies involve only a particular capability of the management. Few involve any effort to develop a comprehensive understanding regarding the complete management capabilities necessary to drive digital transformation successfully. Having only a partial knowledge of these capabilities still puts organization leaders at a great risk of failing the digital transformation. Only by recognizing the complete picture of the management capabilities that are crucial for digital transformation will organizations leaders be able to create plans to avoid failure and to develop the required critical success factors. In this study, such capabilities are called *transformation management capabilities* (TMCs). The present study has addressed the research question: "which capabilities construct TMCs?"

Literature Review

TMCs in Digital Transformation

Vial (2019) performed a literature review on digital transformation. Strategy formulation and changes in organizational structure, culture, and leadership are topics

of interest in much of the literature. In their literature review, Osmundsen et al. (2018) found 8 success factors for digital transformation. Those factors are a supportive organizational culture, well-managed transformation activities, leverage of external and internal knowledge, engaging managers and employees, growing information system (IS) capabilities, developing dynamic capabilities, developing a digital business strategy, and aligning business and IS. These two reviews of the literature seem somewhat similar; however, the results are still not saturated. The literature review of Nadeem et al. (2018) shows the need for a more technology-oriented capabilities. For example, digital leadership, agile and scalable operations, digitally enabled cross functional activities, digital artefacts, flexible and scalable digital platforms, internal and managerial capabilities, external collaboration of ecosystems of digital platforms, dynamic capabilities, plug and play capabilities, and operational capabilities, are all necessary. From these three reviews, one can see that there are some similarities and many differences in the factors due to the boundaries of each study. To realize the desired results regarding those factors, the organization's leaders need the appropriate capabilities.

The differences between the findings of these reviews are understandable. However, many papers with partial results are troublesome for many practitioners. Having an incomplete understanding of TMCs exposes the organization's leaders to the danger of developing a faulty digitalization strategy. There is still a need for another literature review that can show a more complete picture of the management capabilities necessary for a successful digital transformation. The objective of this paper is to meet that need.

Dynamic Capabilities Framework in Digital Transformation

The dynamic capabilities framework analyses the what and how that enable private enterprises to create and capture wealth in a rapid technological change environment (Teece et al., 1997). Due to the

nature of the framework, it is used by many researchers trying to explain the role of certain capabilities in a digital transformation environment (Carcary et al., 2016). For example, the capability to utilize digital technologies to improve the collection of relevant market intelligence information is considered a crucial capability within sensing capability (Matarazzo et al., 2021). The capability to use Internet of Things, big data, and artificial intelligence is considered in alignment with seizing capability from dynamic capabilities framework (Mendonça & Andrade, 2018). For reconfiguring capability, IS capacity is considered a fit within digital transformation context (Osmundsen et al., 2018). Following the steps of these previous researchers, we also identified which of the TMCs fit with certain stages of transformation within the dynamic capabilities framework.

The Research Framework

In the first part of the study, the authors develop a conceptual construct for digital transformation failure reasons. In the second part of the study, they develop a conceptual construct of the critical success factors in digital transformation. Finally, in the third part of the study, they build the conceptual construct of TMCs based on the findings of the first and second parts of the study.

Methodology

This study uses the grounded theory method. As a qualitative method, grounded theory enables researchers to study a certain phenomenon and to discover new theories that are based on the review and analysis of actual data. This method is considered more suitable for this study, which is developing a new concept. It serves a different purpose than a systematic literature review, which collects relevant evidence that fits the pre-specified eligibility criteria on a given topic. The grounded theory method also performs better than a meta-analysis due to the lack of previous studies of the concept.

We used Wolfswinkel et al. (2013) guidance to review the literature rigorously using

grounded theory. Wolfswinkel et al. proposed five stages, namely (1) define, (2) search, (3) select, (4) analyze, and (5) present. In the first, define stage, researchers identify the most relevant data set for the study. Only in the second, search stage, do the researchers perform the search for the studies. The third stage, select, refines the sample of studies for review by removing unsuitable works or adding new works. The fourth stage, analyze, shows how qualitative research methods, rooted in grounded theory, extract genuine value from the selected studies. Our analysis in this stage used open coding, axial coding, and selective coding method. The fifth stage, present, contains the two critical steps in writing a coherent overview paper, showing the findings and insights obtained and the critical decisions made during the review process (Wolfswinkel et al., 2013). In this stage, how the findings fit the dynamic capabilities framework is shown.

Analysis

Stage 1: Define - Framing the Scope of the Review

For the current study, the authors chose to select and review only peer-reviewed works. Therefore, the authors browsed for peer-reviewed journal articles and conference proceedings within the Scopus online database. The authors chose the Scopus online database because it is one of the largest abstract and citation databases of peer-reviewed literature available to the authors (Scopus, 2020).

The concept of TMCs in this paper was built on the idea that a set of management capabilities is crucial for organizations to succeed in digital transformation. These capabilities should be effective at avoiding failures and developing required critical success factors. The authors needed to obtain a more comprehensive understanding of factors that contribute to digital transformation failures and success to identify such capabilities.

The authors initiated a search for works mentioning failure reasons for digital transformation. It returned 96 documents.

Out of these 96 works, 4 works were duplicates returned by both searches. In the end, the authors needed to retrieve 92 works.

Stage 2: Search - Retrieving Results

The next step was to retrieve the documents. Most can be downloaded directly from Scopus, open access journals, and other free or paid membership-based sources. From 92 documents in the list, only 79 documents could be found, resulting in an 86% retrieval rate. The other 13 were misplaced (the link for one document opened an entirely different document), incomplete, or supposedly needed another paid membership beyond what the authors had at the time.

Stage 3: Select - Finalizing the Review Sample

The initial list contained 96 works. Removing duplicate search results yielded a sample of 92 works, of which only 79 works could be retrieved. We then tried to find out whether the works discussed failures and success factors in the setting of digital transformation or not. As we suspected, only 67 works were fit to be reviewed for the current study.

Stage 4: Analyze - Gaining Insight from Sources

The authors borrowed and adaptatively applied the techniques from grounded theory to help build a thorough understanding of the TMCs. Three main techniques were used: open coding, axial coding, and selective coding. Open coding means that researchers engage in conceptualizing and articulating the often-hidden aspects of a set of excerpts that they noted earlier as relevant during their close reading of a set of single studies (Wolfswinkel et al., 2013). The authors did not go into the research with a blank slate to understand what TMCs really are and to determine their construct. One basic assumption was used as a general comparison. TMCs are management capabilities that are crucial for organizations' leaders to avoid failures and

to develop the *required critical success factors for a successful digital transformation*. Without this basic assumption, it would be challenging to call out the often-hidden aspects of TMCs in the reviewed works. This assumption was set in concrete terms such as failure and success to focus the search while coding.

The authors assumed that either failure or success factors could be found in any of the works retrieved. Therefore, the works were analyzed just as one group. From the 79 works analyzed, 67 works contained phrases or sentences that might answer the research question. From the 67 works, 31 were found stating failure reasons. All 67 works included phrases or sentences showing critical success factors for digital transformation.

Analysis of the Digital Transformation Failure Reasons

In the open coding step, the authors found 64 reasons that are barriers or challenges and that can lead to digital transformation failure. Through axial coding, the 64 reasons were then grouped into categories based on similar meanings or serving similar purposes, resulting in a total of 29 categories. Not every group contained more than one failure reason. For example, the authors decided that *lack of personnel knowledge* should not be grouped with other failure reasons, despite only being mentioned in one work.

In naming an axially coded group, the authors mainly used a word or phrase representing the group's purpose. This word or phrase could be a new word or phrase or one of the terms in the group. For example, a group that consisted of the terms *a low level of data security and data protection* and *cyber security risks* was named *poor cybersecurity*, because this phrase captured the group's purpose.

Selective coding was used to integrate and refine the 29 identified categories. A main category in the literature-review method was either the subject of the review or directly concerned one or more specific research questions (Wolfswinkel et al.,

2013). The present study is about the construct of TMCs, which were built on the failure reasons and critical success factors of digital transformation. The 29 categories were carefully analyzed for possible higher-order groupings. As the nature of this research is reviewing management capabilities in digital transformation, it is considered a fit to use the dynamic capabilities framework for guidance in the selective coding process. The three major categories in dynamic capabilities are sensing (and shaping) opportunities and threats, seizing opportunities, and managing threats and reconfiguration (Teece, 2007). In selective coding, the authors grouped the 29 categories by looking at their nature, whether each of them fitted better in the sensing, seizing, or transformation/reconfiguration group. The selective coding process resulted in 8 main categories: *digital ignorance, poor strategy, organization-strategy mismatch, poor investment decisions, people unrest, poor selection of partners, poor execution, and growth indifference*. The complete coding results are in the first column of Table 1.

Analysis of the Critical Success Factors in Digital Transformation

The same steps used to analyze the digital transformation failure reasons were performed to create the construct of critical success factors in digital transformation. In the open coding step, the authors found 223 critical success factors for digital transformation. These factors were then grouped into higher categories based on similar meanings or serving similar purposes through axial coding, resulting in 35 categories.

Selective coding was used to integrate and refine the 35 categories that were identified. The 35 categories were carefully analyzed for a possible higher-order grouping. The dynamic capabilities framework was also used as guidance in the current selective coding process. The authors grouped the 35 categories by looking at their nature, whether each of them better fits in the sensing, seizing, or transformation/reconfiguration group. The selective coding process resulted in 8 main

categories: *digital forces awareness, comprehensive strategy, new organizational architecture, properly financed project, support of people, good strategic partners, excellence execution, and sustainable transformation.* The complete coding results are in the second column of Table 1.

Identifying TMCs: Avoiding Failures and Influencing Critical Success Factors

The next step was to match the contradicting failure reasons and critical success factors of digital transformation. Analysis was performed to identify the management capabilities that can avoid failure and at the same time positively influence the presence of critical success factors. The analysis was performed at the

level of axial coding. The grouping of main categories was pretty much done in the previous process when analyzing failure reasons and critical success factors. Therefore, the selective coding process of TMCs was mainly the naming of the main categories. TMCs are a set of management capabilities that include: *digital opportunities detection capability, digitalization strategy formulation capability, organizational architecture design capability, transformation resources investment capability, people unifying capability, strategic partners assessment capability, execution assurance capability, and continuity assurance capability.* The results of the analysis are in Table 1. Table 2 gives more clarity about the construct by stating the description of each indicator of TMCs.

Table 1: Identifying TMCs from failure reasons and critical success factors

FAILURE REASONS	CRITICAL SUCCESS FACTORS	TRANSFORMATION MANAGEMENT CAPABILITIES
<i>Digital Ignorance</i>	<i>Digital Forces Awareness</i>	<i>Digital Opportunities Detection Capability</i>
-	Customer focus (Bautista et al., 2019; Büyüközkan et al., 2019; Chatfield & Reddick, 2020; Correani et al., 2020; Garcia & Jerez, 2019; Güler et al., 2019; Khuntia et al., 2017; Met et al., 2020; Mihardjo et al., 2018; Mihardjo & Rukmana, 2019; Pleger et al., 2020; Priambodo et al., 2019; Romberg, 2018; Schumacher et al., 2019; Yehuala, 2017)	Customer perceptive
Unfamiliarity with digital technology (Andre et al., 2018)	Technology awareness (Bautista et al., 2019; Caluri et al., 2019; Phang et al., 2020; Wolf et al., 2018)	Technology insight
-	Internal and external analysis (Haddud & McAllen, 2018; vom Brocke et al., 2017)	Improvable areas

<i>Poor Strategy</i>	<i>Comprehensive Strategy</i>	<i>Digitalization Strategy Formulation Capability</i>
No clear vision (Mielli & Bulanda, 2019)	Clearly defined transformative vision (Carrasqueiro et al., 2018; Cichosz et al., 2020; Correani et al., 2020; Fischer et al., 2018; Jayawardena et al., 2020; Jneid et al., 2019; Jonathan, 2019; Kupp et al., 2017; Met et al., 2020; Mielli & Bulanda, 2019; Vásquez & La Paz, 2019; vom Brocke et al., 2017; Winkelhake et al., 2018; Wokurka et al., 2017; Wolf et al., 2018)	Transformative vision articulation
Unclear strategy (Banaeianjahromi, 2018; Fischer et al., 2018; Khuntia et al., 2017; Pereira et al., 2020; Van Looy, 2018)	New digital business model (Büyükožkan et al., 2019; Correani et al., 2020; Fischer et al., 2018; Haddud & McAllen, 2018; Jayawardena et al., 2020; Kupp et al., 2017; Met et al., 2020; Schumacher et al., 2019; Van Looy, 2018; vom Brocke et al., 2017)	New business modelling
Digital transformation as a standalone strategy (Jayawardena et al., 2020; Mielli & Bulanda, 2019; Van Looy, 2018)	Integrated IT-business (Algarni et al., 2019; Büyükožkan et al., 2019; Caluri et al., 2019; Fischer et al., 2018; Güler et al., 2019; Haddud & McAllen, 2018); Jayawardena et al. (2020); (Jonathan, 2019; Kirchmer & Franz, 2019; Kolasa, 2017; Mielli & Bulanda, 2019; Mihardjo et al., 2018; Phang et al., 2020; Priambodo et al., 2019; Riesener et al., 2019; Schumacher et al., 2019; Yoo & Kim, 2019)	IT-business alignment
<ul style="list-style-type: none"> • Unclear long-term objectives (Mielli & Bulanda, 2019) • Unclear short-term goals (Vásquez & La Paz, 2019; Wolf et al., 2018) 	Digitalization roadmap (Büyükožkan et al., 2019; Riesener et al., 2019; Winkelhake et al., 2018)	Digitalization action planning

<i>Organization-Strategy Mismatch</i>	<i>New Organizational Architecture</i>	<i>Organizational Architecture Design Capability</i>
Structure deficiencies (Banaeianjahromi, 2018)	New structure (Andre et al., 2018; Bauer et al., 2017; Carrasqueiro et al., 2018; Jneid et al., 2019; Meske, 2019; Van Looy, 2017; vom Brocke et al., 2017; Winkelhake et al., 2018; Yoo & Kim, 2019)	Structure design
<ul style="list-style-type: none"> • Restrictive regulations and frameworks (Allen, 2019; Banaeianjahromi, 2018; Jonathan, 2019; Rojo Abollado et al., 2017) • Unable to define complex processes (Cichosz et al., 2020; Jneid et al., 2019; Rojo Abollado et al., 2017) 	New operational management system (Priambodo et al., 2019; Riesener et al., 2019)	Operational management system design
Unfit culture (Pereira et al., 2020; Wokurka et al., 2017); Ylijoki dan Porras (2018)	New digital culture (Alos-Simo et al., 2017; Bautista et al., 2019; Büyüközkan et al., 2019; Cichosz et al., 2020; Dekker & Thakkar, 2018; Eden et al., 2019; Fischer et al., 2018; Jayawardena et al., 2020; Jneid et al., 2019; Jonathan, 2019; Pereira et al., 2020; Simpson et al., 2016; vom Brocke et al., 2017; Winkelhake et al., 2018; Wokurka et al., 2017; Wolf et al., 2018)	Digital culture design

Lack of personnel knowledge (Banaeianjahromi, 2018)	New people management system (Büyüközkan et al., 2019; Correani et al., 2020; Eden et al., 2019; Pereira et al., 2020; Priambodo et al., 2019; Yoo & Kim, 2019) (Andre et al., 2018; Bautista et al., 2019; Bensberg et al., 2019; Bettoni et al., 2018; Caluri et al., 2019; Correani et al., 2020; Dekker & Thakkar, 2018; Güler et al., 2019; Jneid et al., 2019; Jonathan, 2019; Kettunen & Mäkitalo, 2019; Meske, 2019; Met et al., 2020; Mielli & Bulanda, 2019; Pereira et al., 2020; Priambodo et al., 2019; Schumacher et al., 2019)	People management system design
-	New behavior control system (Chatfield & Reddick, 2020; Haddud & McAllen, 2018; Jneid et al., 2019; Kohnke, 2017; Phang et al., 2020; Priambodo et al., 2019; Rojo Abollado et al., 2017)	Control system design

<ul style="list-style-type: none"> • Incompatible technology (Jneid et al., 2019; Romberg, 2018; Ylijoki & Porras, 2018) • Poor technology management (Mielli & Bulanda, 2019) • Poor cyber security (Eckhart et al., 2019; Pleger et al., 2020) 	<p>New technology management system</p> <ul style="list-style-type: none"> • Requirements (Andre et al., 2018; Ebrahimi et al., 2019; Haddud & McAllen, 2018; Rojo Abollado et al., 2017) • Management (Argento, 2020; Bauer et al., 2017; Bautista et al., 2019; Bettoni et al., 2018; Correani et al., 2020; Eden et al., 2019; Güler et al., 2019; Haddud & McAllen, 2018; Jayawardena et al., 2020; Jneid et al., 2019; Karimi & Walter, 2015; Kirchmer & Franz, 2019; Kolasa, 2017; Masuda et al., 2017; Met et al., 2020; Mielli & Bulanda, 2019; Mihardjo & Rukmana, 2019; Phang et al., 2020; Riesener et al., 2019; Schumacher et al., 2019; vom Brocke et al., 2017; Wolf et al., 2018; Ylijoki & Porras, 2018; Yoo & Kim, 2019) • Security (Büyüközkan et al., 2019; Eckhart et al., 2019; Fischer et al., 2018; Güler et al., 2019; Mir et al., 2020; Pleger et al., 2020) 	<p>Technology management system design</p>
<p>Poor Investment Decisions</p>	<p>Properly Financed Project</p>	<p>Transformation Resources Investment Capability</p>
<p>Lack of funding for technology investment (Banaeianjahromi, 2018; Jonathan, 2019; Pereira et al., 2020; Rojo Abollado et al., 2017)</p>	<p>Adequate budget for technology (Andre et al., 2018; Jneid et al., 2019; Met et al., 2020; Pereira et al., 2020; Priambodo et al., 2019; Wolf et al., 2018; Yoo & Kim, 2019)</p>	<p>Digital investment</p>
<p>Lack of funding in digitalization capabilities (Banaeianjahromi, 2018)</p>	<p>-</p>	<p>Capabilities investment</p>
<p>Not ROI-oriented investment (Mielli & Bulanda, 2019)</p>	<p>Profitable investment (Mielli & Bulanda, 2019; Mihardjo & Rukmana, 2019; Priambodo et al., 2019)</p>	<p>ROI-based investment</p>

	Commitment to technology adoption (Phang et al., 2020)	Investment commitment
<i>People Unrest</i>	<i>Support of People</i>	<i>People Unifying Capability</i>
Resistance to change (Alos-Simo et al., 2017; Banaeianjahromi, 2018; Jneid et al., 2019; Jonathan, 2019; Mielli & Bulanda, 2019; Pereira et al., 2020; Rojo Abollado et al., 2017; Van Looy, 2018; Wolf et al., 2018)	Acceptance of change (Ebrahimi et al., 2019)	Influence
Ignorant leaders (Banaeianjahromi, 2018; Ngereja et al., 2020; Rojo Abollado et al., 2017)	Involvement of people (Alos-Simo et al., 2017; Bettoni et al., 2018; Büyüközkan et al., 2019; Caluri et al., 2019; Dekker & Thakkar, 2018; Fischer et al., 2018; Haddud & McAllen, 2018; Henning, 2018; Jayawardena et al., 2020; Jonathan, 2019; Kohnke, 2017; Kolasa, 2017; Kupp et al., 2017; Ngereja et al., 2020; Priambodo et al., 2019; Rojo Abollado et al., 2017; Schumacher et al., 2019; Van Looy, 2018; Wokurka et al., 2017)	Supportive engagement
Political issues (Allen, 2019; Banaeianjahromi, 2018; Jneid et al., 2019; Wolf et al., 2018; Ylijoki & Porras, 2018)	Cross-functional teams (Allen, 2019; Bettoni et al., 2018; Büyüközkan et al., 2019; Fischer et al., 2018; Kirchmer & Franz, 2019; Van Looy, 2018; Wolf et al., 2018)	Collaboration
-	Accountability (Caluri et al., 2019; Dekker & Thakkar, 2018; Jneid et al., 2019; Meske, 2019; Priambodo et al., 2019; Rojo Abollado et al., 2017)	Ownership
Job dissatisfaction (Elacio et al., 2020)	High retention rate (Elacio et al., 2020)	Retention
<i>Poor Selection of Partners</i>	<i>Good Strategic Partners</i>	<i>Strategic Partners Assessment Capability</i>
-	Trustworthy (Aghimien et al., 2020; Chatfield & Reddick, 2020; Haddud & McAllen, 2018; Schumacher et al., 2019)	Character

-	Co-evolutionary (Chatfield & Reddick, 2020; Simpson et al., 2016)	Commitment
Poor selection of suppliers (Banaeianjahromi, 2018; Mielli & Bulanda, 2019)	Have adequate competence (Chatfield & Reddick, 2020; Conlon, 2020; Kupp et al., 2017; Mielli & Bulanda, 2019; Priambodo et al., 2019; Wolf et al., 2018)	Competency
Poor Execution	Excellent Execution	Execution Assurance Capability
Lack of socialization (Banaeianjahromi, 2018; Bettoni et al., 2018; Pereira et al., 2020)	Socialization (Elacio et al., 2020; Kohnke, 2017; Priambodo et al., 2019) (Büyüközkan et al., 2019; Güler et al., 2019; Romberg, 2018)	Preparation
Ineffective deployment (Argento, 2020; Cichosz et al., 2020; Conlon, 2020; Correani et al., 2020; Mielli & Bulanda, 2019; Wolf et al., 2018; Ylijoki & Porras, 2018)	Effective deployment (Algarni et al., 2019; Cichosz et al., 2020; Haddud & McAllen, 2018; Van Looy, 2017)	Set in motion
Poor execution (Correani et al., 2020; Mihardjo & Rukmana, 2019; Rojo Abollado et al., 2017)	Agile methodology (Argento, 2020; Fechtelpeter et al., 2017; Henning, 2018; Riesener et al., 2019; Rojo Abollado et al., 2017)	Execution tracking
Unable to overcome challenges (Correani et al., 2020)	Tackling challenges (Chatfield & Reddick, 2020; Masuda et al., 2017) (Büyüközkan et al., 2019; Haddud & McAllen, 2018; Kolasa, 2017; Masuda et al., 2017; Priambodo et al., 2019; Riesener et al., 2019; Van Looy, 2018)	Accountability
Incompatible facilities (Haddud & McAllen, 2018)	Supporting teams and facilities (Büyüközkan et al., 2019; Kupp et al., 2017; Masuda et al., 2017; Phang et al., 2020) (Kolasa, 2017; Priambodo et al., 2019; Yoo & Kim, 2019)	People supporting ecosystem
-	Digital marketing (Güler et al., 2019; Met et al., 2020)	Digital relationships

<i>Growth Indifference</i>	<i>Sustainable Transformation</i>	<i>Continuity Assurance Capability</i>
-	Management long term support (Bautista et al., 2019; Jneid et al., 2019; Kupp et al., 2017; Ngereja et al., 2020; Van Looy, 2017)	Coaching and counselling
Unable to learn from activities (Ylijoki & Porras, 2018)	Continuous improvement (Bautista et al., 2019; Haddud & McAllen, 2018)	Management review
No digital growth (Wolf et al., 2018)	Learning (Bettoni et al., 2018; Büyüközkan et al., 2019; Fischer et al., 2018; Haddud & McAllen, 2018; Jneid et al., 2019; Kohnke, 2017; Masuda et al., 2017; Sarantis et al., 2019; Van Looy, 2017) (Wokurka et al., 2017)	Digital capabilities development
-	Capabilities exchange (Karimi & Walter, 2015)	Future capabilities identification

Table 2. The description of TMCs' indicators

Indicator	Definition
<i>Dimension 1: Digital Opportunities Detection Capability</i>	
1. Customer perception	Perception toward customer's changing digital behavior
2. Technology insight	Insightful about recently available technology
3. Improvable areas	Identify the organization's digitally improvable areas
<i>Dimension 2: Digitalization Strategy Formulation Capability</i>	
1. Transformative vision articulation	Formulating a well-defined and easily understood digital transformation vision
2. New business modelling	Crafting a strategic business model based on the new digital opportunity
3. IT-business alignment	Use IT to support business objectives, not as a standalone strategy
4. Digitalization action planning	Establish clearly defined, long and short-term digitalization objectives
<i>Dimension 3: Organizational Architecture Design Capability</i>	
1. Structure design	Flexible and decentralized structure
2. Operational management system design	Agile management system
3. Digital culture design	Supportive digital organizational culture
4. People management system design	Reconfiguration of human resources
5. Control system design	Aligning behavior control design with technology adoption

6. Technology management system design	Establishing rules and guidelines on how to manage the technology
<i>Dimension 4: Transformation Resources Investment Capability</i>	
1. Digital investment	Prepare an adequate budget for technology investment
2. Capabilities investment	Prepare an adequate budget for digital capabilities investment
3. ROI-based investment	Prioritize investments that are beneficial for business
4. Investment commitment	Commitment to technology adoption. Not stopping the investment halfway
<i>Dimension 5: People Unifying Capability</i>	
1. Influence	Influence people to accept change
2. Supportive engagement	Being supportive and engaging people to get actively involved in the transformation
3. Collaboration	Creating high-level challenges that only cross-functional teams can solve
4. Ownership	Promoting a feeling of ownership on the digital transformation
5. Retention	Lowering turnover intention
<i>Dimension 6: Strategic Partners Assessment Capability</i>	
1. Character	Select partners who can be trusted to deliver their promises
2. Commitment	Select partners who are committed to the success of the organization's digital transformation
3. Competency	Select partners who are suitable and competent in the area in which they support the organization's digital transformation
<i>Dimension 7: Execution Assurance Capability</i>	
1. Preparation	Making sure people are ready to start the transformation
2. Set in motion	Deploying the technology effectively
3. Execution tracking	Track the status of execution
4. Accountability	The urge to tackle challenges and appetite for success. Rapid decision making when faced with challenges
5. People supporting ecosystem	Providing a complete and adequate development environment and other supporting facilities, including supporting teams
6. Digital relationships	Digital engagements that enable customers, partners, and others to have easy and fast interactions with the organization
<i>Dimension 8: Continuity Assurance Capability</i>	
1. Coaching and counselling	Continuously engaging in supporting the people
2. Management review	Continuous improvement, learn from mistakes, and take corrective and preventive actions
3. Digital capabilities development	Growing digital knowledge and digital capabilities within the organization
4. Future capabilities identification	Knowing when the organization needs a different set of capabilities and preparing for it

Findings and Discussion

Following the guidelines for conducting a rigorous literature review has proven fruitful. Using open coding, axial coding, and selective coding, the authors found the answer to the research question “*which capabilities construct TMCs?*”.

It was becoming clear that TMC is a higher-order construct. It has 35 indicators, which are categorized into 8 dimensions: *digital opportunity detection capability, digitalization strategy formulation capability, organizational architecture design capability, transformation resources investment capability, people unifying capability, strategic partners assessment capability, execution assurance capability, continuity assurance capability,*

and *continuity assurance capability*. Fig 1 shows the second-order construct of TMCs.

Fig 2 shows how the dimensions of TMCs fit within the dynamic capabilities framework. It gives clarity about which capabilities are needed in a particular stage.

There are two different classes of capability: ordinary and dynamic. Ordinary capabilities refer to the capabilities to perform administrative, operational, and governance-related functions. These capabilities are necessary to accomplish tasks. Dynamic capabilities refer to the capabilities to perform higher-level activities, which enable an organization to direct its ordinary activities toward high payoff ones (Teece, 2014).

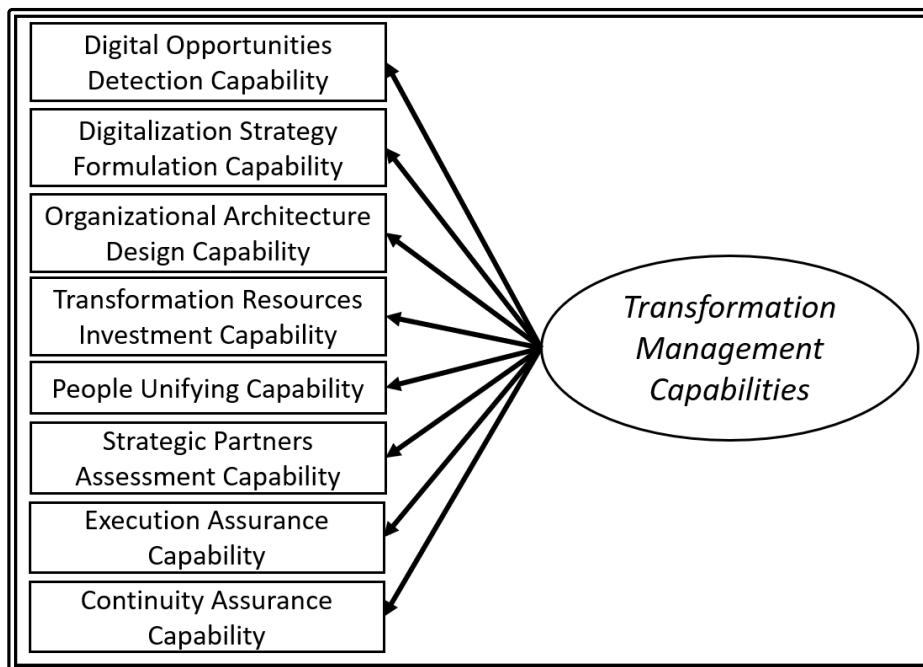


Fig 1. Conceptual construct of TMCs

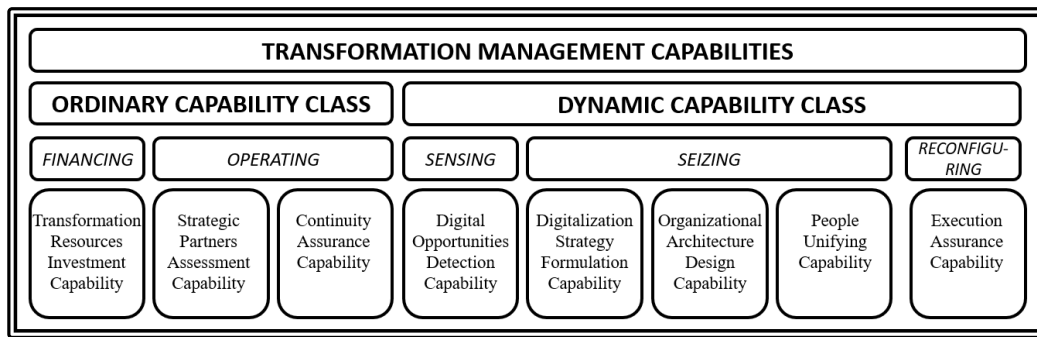


Fig 2. TMCs' alignment with the dynamic capabilities framework

Among the 8 dimensions of the TMCs, there are 3 dimensions that most likely belong to ordinary capability class. These 3 dimensions are transformation resources investment capability, strategic partner assessment capability, and continuity assurance capability.

Transformation resources investment capability requires the organization's leaders to be able to allocate adequate funding for technology and capabilities investment. They should prioritize the investment based on the Return on Investment (ROI). No investment should be made when it does not yield a return. It also demands the commitment of the leaders to continue funding the investment as planned and not holding back in the middle of the project.

Strategic partners assessment capability requires the leaders of the organization to possess the capability to select suitable partners. The leaders must assess whether the future partners have good character, commit to the success of the organization, and, most importantly, be competent in the respected field.

Continuity assurance capability requires the leaders to make sure that the organization keeps moving. The leaders must be ready and able to give coaching and counselling to the people who need it. Periodical review of the execution result is required to see how well people do their jobs and whether there are changes or improvements needed in the management system. The leaders must also be able to develop the new capabilities of the organization. Promoting knowledge

sharing within the organization and learning from other organizations' transformation journeys are good ways to do this. The leaders also need to be cautious of the possibility that the organization might need a different set of capabilities and be ready for it in the future.

As we can see from the indicators of the 3 dimensions, they all are the capabilities an organization needs to have a good operational performance. These capabilities are needed even when the organization does not run digital transformation initiatives. The other 5 dimensions without doubt belong to dynamic capability class

Digital opportunity detection capability, within the dynamic capability framework, belongs to the sensing capability. It requires the leaders of the organization to be aware of and capable of detecting ongoing changes early. The changes are usually triggered by new digital technology. They may affect those who use the technology, force the market to change, and/or impact how the organization must transform digitally.

Digitalization strategy formulation capability, within the dynamic capability framework, belongs to the seizing capability. It requires the organization's leaders to create a vision of the digital transformation and to make it easy to understand. It also requires the leaders to generate a new digital strategy or business model that describes how the organization wants to do its business in more detail. The formulated strategy needs to show that the digital technology introduced to the organization is in alignment with the

business itself, not a standalone project. This capability also requires the leaders to draft short- and long-term objectives or action plans in line with the strategy.

Organizational architecture design capability, within the dynamic capability framework, belongs to the seizing capability. This capability demands the organization's leaders to reconfigure the organizational architecture to support the digital transformation described in the strategy and action plan. The leaders should redesign the management system of structure, operation, culture, people, behavior control, and technology.

People unifying capability, within the dynamic capability framework, belongs to the seizing capability. It requires leaders to possess the skills to drive the organization's people to support the digital transformation. It requires the ability to influence people to accept change and to get to know what they think and how they feel to support the people involved in digital transformation. Leaders need to show that they care to help the people to achieve success in their jobs. They need to dissolve silos by designing work that requires cross-functional teams. They need to make people feel they are the owners of the project, as happy people mean a high people retention rate.

Execution assurance capability, within the dynamic capability framework, belongs to the transforming/reconfiguration capability. This capability is necessary where the transformation happens. The leaders must prepare people before the new technology is implemented, give feedback when it is set in motion, and continuously track the day-to-day execution. The leaders must be ready and able to make rapid decisions when a challenge or threat appears. They also need to create an ecosystem to support the people involved in digital transformation, from workplace facilities to forming support teams. They must maintain relationships between the organization and customers, partners, and others using digital technology for fast and easy interactions.

Westerman et al. (2012) mentioned the term *strong transformation management capabilities*. The four key management practices enable the transformation process: transformative vision, digital governance, engagement, and IT-business relationships. A comparison of those four key management practices with the findings of this study makes it clear that the present study provides a more comprehensive construct of the concept than the existing literature.

Conclusions

The authors managed to develop a conceptual construct of TMCs. This is a two-order construct with 8 dimensions and 35 indicators. The findings contribute to the body of knowledge within the field of management on digital transformation. They also benefit practitioners, who may understand more completely which management capabilities they need to develop for a successful digital transformation. In finding the components of TMCs, the study also develops the conceptual construct of digital transformational failure reasons and critical success factors. This brings more clarity of the respective concepts, and it may be helpful for future research. The study also shows where each capability of TMCs fits within the dynamic capabilities framework.

Limitations and Recommendations for Future Research

Due to the lack of access, this study only used a single source database for the peer-reviewed works. Consequently, the present study only reviewed a small number of works regarding failure reasons and critical success factors in digital transformation. A future study might include more databases of peer-reviewed works. The newly developed construct of TMCs opens a path for a scale development that will be useful for quantitative studies. Research considering the impact of TMCs on other latent variables such as cultural transformation, the new business model's effectiveness, or people's readiness to transform, will benefit practitioners.

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