Digital transformation preparedness: an exploratory study

Anil Kumar
Department of Marketing and Business Analytics, Texas A&M University Commerce, Commerce, Texas, USA
Michelle Salmona
Faculty of Education, University of Canberra, Canberra, Australia
Robert Berry
Department of Business Information System, Central Michigan University, Mt. Pleasant, Michigan, USA, and
Sara Grummert
Academic, Institute for Mixed Methods Research, Los Angeles, California, USA

Received 5 July 2023
Revised 18 September 2023
30 September 2023
Accepted 3 October 2023

Abstract

Purpose – Digital transformation (DT) harnessing the potential of emerging technology creates opportunities and challenges for organizations worldwide. Senior executives view DT as a key initiative for future competitiveness, a view shared by academic researchers. What may challenge the organization is that the vision may be present while preparedness may be lacking. Organizational preparedness depends on managers and employees charged with implementing DT and their perceptions on preparedness are often not aligned with senior executives.

Design/methodology/approach – In this research, the authors explore the perceptions of managers and employees on DT preparedness in an organization by gathering data from 579 participants. This study uses an innovative approach to qualitative data analysis using interactive topic modeling.

Findings – Findings in this qualitative study provide valuable insights on the perceptions of these individuals and helps understand (a) how they view DT preparedness and (b) may behave in this context. In general DT is well understood, however managers are not keen to change work processes to take advantage of the new digital tools and there appears that generational gap is a barrier to successful DT.

Originality/value – Senior executives play a central role communicating the DT vision necessary to inspire managers and employees. As organizations continue to invest large sums of money to explore value creation for customers and stakeholders by leveraging digital technologies, the information systems (IS) discipline can take the lead by asking the question, what can be done to improve the understanding of DT implementation in an organization?

Keywords Digital transformation, Topic modeling, Culture, Change, Generational gap

Paper type Research paper

1. Introduction

Digital transformation (DT) harnessing the potential created by emerging technology creates opportunities and challenges for organizations worldwide. Senior executives view DT as a key initiative for being competitive in the future, a view that is shared by academic researchers. A recent study conducted by Gartner emphasized that 67% of executives believed that DT is critical to being competitive (Baker, 2018). This belief is evident from the

Digital Transformation and Society
Vol. 3 No. 2, 2024
pp. 127-144
Emerald Publishing Limited
e-ISSN: 2755-077X
p-ISSN: 2755-0761
DOI 10.1108/DTS-07-2023-0051

spending on DT initiatives. Investments in DT initiatives are expected to reach 50% in 2023, up from 36% in 2019, of an organizations information and communications technology (ITC) budget, according to IDC research (Combs, 2019). This investment adds up to $7.4 trillion spending from 2020 to 2023, a compound annual growth rate of 17.5%. Investment in DT initiatives is on the rise though success is patchy and may not translate to expected benefits. Kitani (2019) reports that last year of the $1.3 trillion dollars spent, $900 billion dollars were lost out on failed DT initiatives at GE, Ford and P&G. Similarly, McKinsey research finds that the success rate of DT has remained below 30% over the past several years (Boutetière, Montagner, & Reich, 2018). Kraus *et al.* (2022) point out that digital transformation is organizational change and prior research as identified by their study indicates that "up to 70% of large organizational change fails." We need to explore why this is happening and suggest what can be done to address this organizational challenge.

Recognizing its significance academic research in DT has blossomed. However, the research is both fragmented and, in its infancy (Kraus *et al.*, 2022; Ismail, Khater, & Zaki, 2017). The fragmentation of research results from the diversity of topics, which can be explained by the fact that technology may be leading the disruption and is of interest to information systems (IS) researchers (Kutzner, Schoormann, & Knackstedt, 2018) but how it is perceived (Vukšić, Ivančić, & Vugec, 2018), and its impact on organizations is of interest to scholars in other disciplines (Schwarzmüller, Brosi, Duman, & Welpe, 2018). This may also explain the gradual development of the research as scholars are still trying to reach a consensus on definitions and interpretations of the DT phenomenon. While some researchers and organizations may view DT as a technical challenge that necessitates a modernization of technology, others may be influenced by organizational design (Kraus *et al.*, 2022; Kretschmer & Khashabi, 2020) or strategy challenges (Kane, Palmer, Phillips, Kiron, & Buckley, 2015). The viewpoint of DT proposed by Westerman, Bonnet, and McAfee (2014) that "transforming the customer experience is at the heart of the digital transformation (p. 29)" inspires this research. This transformation will necessitate a "radical rethinking of how an organization uses technology, people and processes to fundamentally change business performance (Westerman *et al.* in Boulton, 2019)". We define DT as the organizational endeavor of generating new value to elevate the customer experience. This new value, spurred by a business need such as a change in strategy, can be generated leveraging technology, people, processes or a synergistic blend of the three.

Since this viewpoint of DT involves technology, people and processes in an organization, there needs to be a positional alignment between the views of senior executives and managers or employees. The senior executives fuel the motivation in the organization, and managers and employees share the commitment to the DT initiative. What may challenge the organization is that the vision may be present while preparedness may be lacking. We define organizational preparedness to include both the institutional capabilities encompassing skills needed for DT and a meticulously detailed execution strategy. This strategy should delineate roles and responsibilities to ensure accountability, milestones that help ensure consistent progress tracking and highlight specific achievements to maintain employee motivation. Given that DT is a prolonged endeavor, it is critical for organizations to sustain employee motivation by celebrating incremental victories along the way. It could be argued that while the CEO or senior leadership may possess a clear vision for DT, they might be deficient in the necessary knowledge or capability to execute it effectively. In such instances, being adequately prepared becomes paramount. This preparedness is heavily dependent on managers and employees, who understand the culture and politics (Tangi, Janssen, Benedetti, & Noci, 2021; Andriole, 2020) that drives the organization and requires an intimate understanding of a company's language, ways of working, culture and the politics that explains what is possible.

As such, this study focused on entry and mid-management level organizational preparedness. It explores entry and mid-level managers' and employees' perceptions of DT preparedness in terms of skills, competencies and courage to lead a DT in an organization.

This paper is structured as follows: in the next section, we review the literature on this subject. In section 3, we describe the study method, data collection and analysis. In the following section, we present the findings. The final section focuses on the discussion and conclusions.

2. Background

Our economy is undergoing deep transformation due in part to the new ubiquity of digital technology, which is transforming and reconstructing business strategies, processes and operating tasks. It is not unreasonable to think that all business is digital business no matter the industry. The implications of this DT are profound and reach across all industries, launching not only waves of disruption and dislocation but also opportunity. In just a few years, digital technology has connected an ever-growing number of people, created new business and social networks and ecosystems and transformed our economy (Lansiti & Karim, 2017). Globally, digital technology is reshaping business and social interactions. Companies are increasingly launching digital initiatives to expand or build digital capabilities to deliver business efficiency or top-line revenue growth; sometimes referred to as DT initiatives. The broad deployment of digital technology requires rethinking both business and operating models. A business model defines the direction taken by your organization – how it creates and captures value. An operating model defines how your organization makes it happen – delivers the value promised by its business model. In combination, business and operating models define and rank the range of options available to operating managers in making their daily business decisions (Lansiti & Karim, 2017).

There have been numerous studies and articles published that offer theories and strategies concerning DT (Baiyere, Salmela, & Tapanainen, 2020; Carson, 2017; Venkatraman, 2017). In particular, the MIT Sloan Management Review and Deloitte's 2017 Digital Business Global Executive Study and research project, which surveyed more than 3,500 business executives, managers and analysts from organizations around the world, identified five key practices important in DT (Kane, Palmer, Phillips, Kiron, & Buckley, 2017). Among them were implementing systemic changes to organize and spur workplace innovation to create digitally minded cultures; creating long-form plans for DT in the future; investing in smaller innovations that turn into organization-wide innovations; providing opportunities to develop employees' digital skills; and securing leaders who have vision to lead DT and investing resources to achieve them (Kane *et al.*, 2017).

Though DT is widely accepted as a fundamental component of contemporary business, how and/or why digital transformations succeed is of utmost importance and is increasingly determined by organizational culture and interpersonal interactions. For instance, research has found that one of the biggest challenges faced by companies today is unlearning old business practices and processes as the workplace becomes more driven by technology (Carson, 2017). Since front-line employees are increasingly responsible for implementing digital tools and strategies, success is largely determined by communication between front-line employees and organizational leaders (Leonardi, 2020). The disconnection between leaders and employees was exemplified in the Digital Business Global Executive Study in which 47% of respondents agreed that their organization's reporting relationships and decision-making processes interfered with the ability to successfully engage digital business (Kane *et al.*, 2017).

While extant research has explored the importance of DT (Verhoef *et al.*, 2021; Vial, 2019; Wessel, Baiyere, Ologeanu-Taddei, Cha, & Blegind-Jensen, 2020; Kutzner *et al.*, 2018), senior executives' perceptions of DT (Brock & von Wangenheim, 2019) and employees' perceptions of DT in their organizations (Cetindamar, Abedin, & Shirahada, 2021; Solberg, Traavik, & Wong, 2020), there lacks a thorough understanding of the disconnect in the perceptions of senior executives and managers or employees on the preparedness of an organization. Given

the disconnect between the perceptions of front-line employees and entry and mid-level managers with those of senior executives (Buvat *et al.*, 2017) that continues to create challenges for successfully implementing DT initiatives, it is important that research try to understand what entry and mid-level managers and front-line employees believe in the context of DT preparedness of an organization. Prior research on the role of employees in successful implementation of DT (Solberg *et al.*, 2020; Kane, 2017) is limited and this research aims to fill this gap by asking students, aspiring and entry level managers, to provide their perceptions on DT preparedness in an organization. These students, digital natives, offer unique qualitative insights into specific challenges and opportunities to successful DT adoption and implementation.

3. Methods and results

To gain a better understanding of student perceptions of DT, we qualitatively examined student discussion responses to the question: "Digital transformation is therefore a key managerial imperative for today's business leaders. So, are managers equipped – in terms of skills, competencies, and courage to lead a digital transformation? Why or why not?" In total, 579 students responded to the question. Students were primarily working young adults in beginning management or professional positions and thus had early-career experience in the field. Preparedness of these individuals is critical as they are responsible for implementation of the CEO's and/or top management DT vision.

To analyze such a large corpus, we employed interactive topic modeling over manual coding (Debortoli, Müller, Junglas, & vom Brocke, 2016). Topic modeling is a popular method for learning thematic structure from large collections of documents, with limited human supervision. As stated by Eickhoff and Neuss (2017), when discussions from documents are analyzed, topic modeling can be used as a strategy to extract key themes. Prior research in information systems has used topic modeling for studying evolution of IS research in the discipline based on keywords provided by authors (Jeyaraj & Zadeh, 2020).

The model is the following: documents are modeled as mixtures of topics; topics are in turn modeled as distributions over the vocabulary of words that are present in the corpus. The most common way to summarize a topic model is with a list of their most probable words, and topic models are then evaluated according to how well these lists align with a user's intuition, domain knowledge or understanding of the corpus. In this sense, a user expects to interpret and also evaluate a topic model via a small collection of words. However, traditional topic models may include poor quality topics or can be misaligned with the understanding of the corpus. For instance, while examining the most probable words under learned topics a user may complain that two topics seem to be the same; or that they seem conflated; or that they seem random. Interactive topic modeling (Dasgupta, Poulis, & Tosh, 2019; Hu, Boyd-Graber, Satinoff, & Smith, 2014) aims to solve these problems by allowing a user to directly interact with the learned model and iteratively refine it.

An example of interaction with a topic model would be a user examining topics that are represented with a list of five most probable words. First, consider the challenge of granularity where there are different topics for "football" and "tennis" or is a single topic more appropriate such as "sports" sufficient? Evidently more topics will be able to describe the corpus more easily, but a particular user may not care to make the distinction between sports-related topics. Additionally, there may be several topics that are difficult to interpret, and it may be unclear how these topics must be treated. Clearly, supervision at this level of the method is essential as no modeling can be expected to always make the correct choice. Hence, the need for some kind of user interaction.

For this reason, interactive topic modeling with researcher supervision and interaction was used for the data analysis in this study. This iterative approach to qualitative data analysis allows the researcher to refine topics to best fit the research questions in reliable,

interpretable and actionable ways. As text data involves the variety, complexity and the context of natural language, the researcher must have control and input into the process. Fundamental to this approach is recognizing and capitalizing on the researcher's expertise, contextual knowledge and sense of nuance in their data alongside the power and value of the modeling process itself. Interactive topic modeling incorporates the researchers' knowledge into the synergistic process. It allows several operations for the researcher to refine the model through a series of test, evaluate and refine rounds until a desired result is achieved. This approach gives researchers a voice by allowing untrained users to introduce their feedback easily, iteratively and transparently into the entire process. See a more detailed discussion of the steps taken during the interactive topic modeling process in the analysis section.

3.1 Data collection

The data for this research was collected from students enrolled in 18 sections in an MBA course titled *Managing Information Systems in a Global Economy* between Fall 2017 and Summer 2019. This course is offered in 2 or 3 sections, three times per year and the dataset was collected from 579 students. Compeau, Marcolin, Kelley and Higgins (2012) in their review of academic studies published in *Information Systems Research* and *MIS Quarterly* from 1990-2010 find that student subjects have been used extensively in information systems research. Compeau *et al.* (2012) caution that studies using student samples should be careful in generalizing and discuss the choice to use student samples in the methodology. We believe that perceptions of students enrolled in an online MBA course focused on technology development, usage and management, provides them a good understanding of the issues involved. Approximately 79.35% of the study's participants belonged to the millennial or Gen Y demographic. Given that this generation is composed of digital natives who regularly incorporate technology into their work routines, they serve as an ideal sample for this research. Out of the participants, 23% were employed in the automotive industry, 13% were in the health care industry, 9% worked in manufacturing other than automotive, 7% in education, 6% in energy, 5% in financials, while the remaining were in government-military (3%), information technology (3%), retail (2%) and construction (2%).

During the first week of the course, students were asked to respond to the following question:

> In chapter 2 of the textbook, the authors discussed the alignment of IT strategy with the business strategy. In the assigned article "With Transformation Comes Disruption", Carson (2017) writes "The digital business transformation has brought about a massive shift encompassing business activities, processes, and competencies affecting every aspect of how we connect, communicate, and get work done. However, the digital business transformation is not just about technology. It's about speed, efficiency, data, and knowing more, faster. The pace at which the business integrates digital technology now formulates its competitive advantage; leveraging digital technologies to drive productivity, efficiency, and innovation has become the number one business imperative".
>
> Digital technology is the biggest change agent of the business world today. Mobile technology, social media, cloud computing, embedded devices, big data, and analytics have radically changed the nature of work and competition. And digital innovations will continue to do so for the foreseeable future. Technology has tremendous potential to be the engine of increasing human, organizational, and economic prosperity. However, digital technology is not the true story. Digital transformation is. Fulfilling technology's potential will require leaders to re-think their business strategy.
>
> Digital transformation is therefore a key managerial imperative for today's business leaders. So, are managers equipped – in terms of skills, competencies, and courage to lead a digital transformation? Why or why not?

Student responses to the above discussion question were collected through Blackboard, saved and downloaded as 18 separate PDF documents.

3.2 Analysis

To analyze the data, all text was copied and pasted into a single Word document as text only. This Word document contained 558 pages made up of 973,671 words and all identifying markers were removed from the files. The full dataset of 18 sections was moved into Excel for faster processing and parsed by spaces to separate each word into its own cell. The cells were consolidated into one column, and then inserted into a PivotTable which counted and sorted them by their frequency based on text string. The stop words were manually hidden with the Hide Selected Items function (Appendix 1). The Keep Only Selected Items function was used on the top 30 words to hide the remaining words (Appendix 2).

The top ten words by frequency in the data set were unsurprising given the prompt: digital; managers; business; information; transformation; technology; systems; new; company and strategy. Such terms would be commonly used by students in this course. However, the frequency and relevance to DT is noteworthy. This indicates that strategy, IS and managers are in some way considered by the students as important for digital transformation.

We removed all words that were in the list of stop words attached as Appendix 1. We then performed *stemming* on each of the remaining words. Next, we fitted a topic model with 25 topics to the dataset. The topic modeling algorithm that was chosen for this modeling task was Latent Dirichlet allocation (Blei, Ng, & Jordan, 2003; Eickhoff & Wieneke, 2018). Analyzing textual data in natural language form using the Latent Dirichlet allocation, a text mining technique, has been recommended for IS researchers by multiple scholars (Debortoli *et al.*, 2016; Eickhoff & Neuss, 2017; Chen & Zhao, 2015).

After initial examination of the resulting topics, we removed some additional non-informative words and fitted a new model. The interactive process of manipulating topics then started. The different interactive operations (topic splitting, topic merging and topic removal) allow the researcher to form topics that align with the focus of the study.

(1) *Topic splitting*. After examining the initial 25 topics, we found that no topic seemed to be conflating one or more themes; hence, no topic splitting was performed.

(2) *Topic merging*. Several topics have been merged. A topic correlation heat map guided the process of merging topics and prompted further examining whether two or more correlated topics could be merged. Figure 1 below shows the topic correlation matrix that we consulted in this process. This reduced the topic set down to 11 topics.

(3) Topic *removal*. About 3 out of the 11 topics that resulted from merging were too generic and uninterpretable. Hence, we removed them from the final topic set.

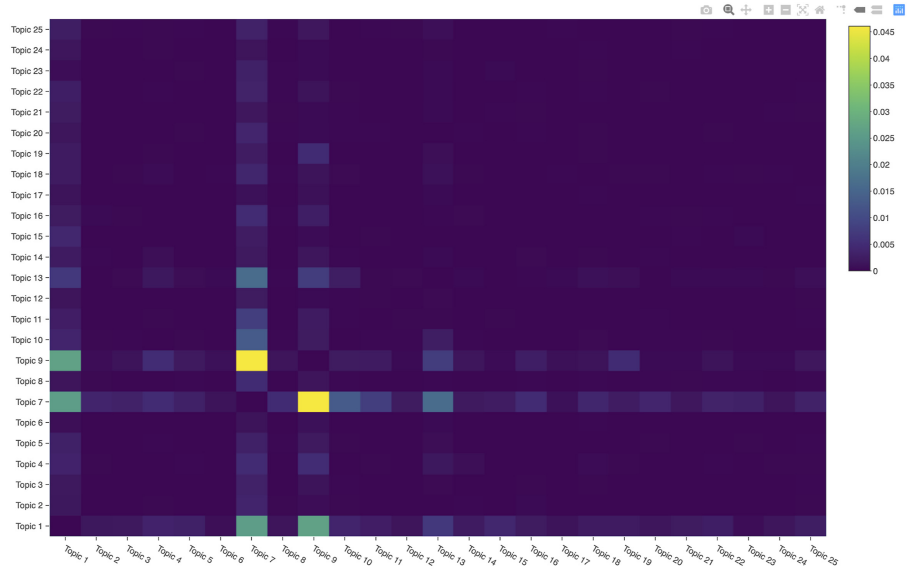
Finally, we assigned labels and meanings to each topic by looking at the most probable words under each topic (Table 1) and by looking at the occurrence of each topic in documents.

The final set of eight topics that emerged from the analysis is described in the following Table 2. It includes the topics of: Managers leading change, Early technology adopters, CEO role, Differentiation, Importance of communicating values, Good practices, Generational gap and Adopting change. Early technology adopters were deleted as a theme as it was less relevant to our research question.

Below, we present findings in more depth by highlighting participant quotes and their contextualized responses before discussing our findings in relation to extant literature.

4. Findings

In general, students seemed to indicate that DT as a business strategy was well understood, but that in many cases the managers they reported to were not open to changing work processes to take advantage of the new digital tools. Participant responses highlighted the



Source(s): Figure by the authors

Figure 1.
Topic correlation matrix

importance of organizational culture, intra-company communication and values as well as external influences. In particular, several participants shared the need for managers' guidance, support and investment toward DT in the company/workplace. For example, one participant noted:

> It is their responsibility as a learning leader to be open to navigating the shift to the digital transformation. Technology is advancing at a rapid pace and in order to keep competitive advantage, leaders must be constantly learning and open to adapting to the technological culture.

Another participant shared that it is not just the responsibility of managers to learn to adapt and change in accordance with technology, but that managers need to better communicate the "why" behind digital changes:

> I think that in addition to introducing change throughout the process instead of just at the end, managers also need to focus on teaching employees why the change is happening.

Similarly, numerous respondents spoke about the CEO's role in DT, from the importance of having CEO support for technological innovation and the CEO's ability to communicate that vision long-term. For example, two participants shared their experience with managers who were well equipped to lead DTs, but that CEO understanding and support were significant barriers toward success:

> I have worked for companies that had managers with the skills, knowledge, and willingness to take outdated slow procedures and make them digital but didn't have the backing of the owners.

> The manager may be equipped. They may have the right skills, mindset, and courage to lead a digital transformation. But at the end of the day, I believe that the managers are going to take a cue from their CEO. The CEO needs to be involved.

As both participants suggest, leadership from the top down is key to sustain organization change. If there is a lack of clarity and understanding from the CEO, employees are likely to fall back on the habitual way of conducting business instead of investing in new changes.

Table 1.
Trained topic model results on full data set showing topics and stems of top 10 words

Managers leading change	Early technology adopters	CEO role	Differentiation	Importance of communicating values	Good practices	Generational gap	Adopting change
manag	netflix	ceo	custom	employe	mortgag	generat	insur
compani	blockbust	avail	power	valu	cultur	owner	digit
technolog	stream	explain	market	function	quicken	older	signatur
digit	data	director	competit	vision	member	gap	time
transform	softwar	top	servic	purpos	team	often	custom
chang	show	prioriti	video	understand	loan	younger	file
busi	look	involv	focus	articl	experi	age	paperless
can	middl	inform	philip	statement	client	updat	servic
new	movi	someon	watch	meet	harvard	old	user
work	abil	fail	bargain	help	get	custom	paper

Source(s): Table by the authors

Theme	Description
Managers leading change	Managers' guidance, support and investment toward digital transformation in the company/workplace
CEO role	Role of the CEO in digital transformation. Importance of supporting technological innovation
Differentiation	Importance in paying attention to trends, competition, examples of success stories
Importance of communicating values	Importance of communicating vision and bolstering corporate culture during times of change
Good practices	Examples of good practices shared by the participants
Generational gap	Difficulties adapting for millennials vs baby boomers
Adopting change	Examples of how technological innovations were adopted in the workplace

Source(s): Table by the authors

Table 2. Final topical themes and descriptions

Implicit in each of the previous two themes was the importance of managers and CEO's communicating values. Communicating vision and bolstering corporate culture during times of change is imperative when adopting and sustaining DT. As stated by one participant, "*Managers are so busy just trying to just sustain their workload, tasks such as communicating strategic vision plans often go by the wayside*." The vision for the digital transformation needs to be clearly communicated by senior executives for the DT to succeed in an organization. This helps clarify where an organization is heading and more importantly why. McKinsey (2018) findings suggest using a *change story* that helps managers understand why DT is needed. Elements of the *change story* can include what the end goal is and how the organization will measure success of the transformation. If the communication from the leadership is clear, managers will be better positioned to share the *change story* with employees. This communication can be enhanced by engaging younger managers who are better positioned as digital natives to talk about DT.

Relatedly, some participants noted the generational gap between CEOs and early-career employees as a barrier to communication and successful DT. One respondent cited this barrier as "*very obstructive to the workflow*," and another described the disconnect they felt in their workplace between generations:

> I hate to generalize managers based on age, but much of this huge shift is affected by how managers have learned and grown into their position overtime. Many struggle with accepting the idea that they need to be open to change, learning, training and communicating with their team.

Other participants shared similar insights in which employees were equipped to embrace change, but it was ultimately thwarted by existing managers:

> In some organizations there is a reversal where employees want to embrace the digital transformation, but managers or the business are unwilling to adjust. Oddly enough, I think this goes back to leadership being afraid of change and not having the proper training/education as well as a viable strategy in place.

In response, some participants suggested that organizations embrace knowledge from digital natives and provide structured opportunities for older CEOs and managers in leadership positions to learn from younger employees. For instance, one participant posed key questions about bridging generational gaps in the workplace:

> How does an organization continue to suit the technological need of its current employees while also catering to its new, often younger employees? And better yet, how can an organization foster collaboration between all generations in order to successfully implement new technologies?

A separate participant shared a similar view that a strong organizational culture that fostered collaboration could help bridge the generational gap, stating, "*I believe that older people can be taught just like younger people can be taught as long as the culture is one that supports an environment of change and learning*."

Participants shared other examples of good practices in the workplace to foster collaboration and embracing of DT. Core to these were the concepts of differentiation and adopting change. Students noted the importance of paying attention to trends, competition, how to leverage digital technology throughout the whole organization. As one participant stated:

> The notion that firms must move from traditional methods of viewing competition to more contemporary models. IT is definitely not limited to the tech support team. Instead, information systems can be used to produce advantages in manufacturing, logistics, distribution, and sales/marketing. The tremendous value of consumer data I believe is understood by many.

Along with incorporating digital technology throughout the organization, participant noted some "best practices" to leverage technology in relation to their competition and adopting change throughout the whole organization. One participant shared that successful managers and companies are those in *"which can utilize technological innovations, along with organizational adaptations, to exploit efficiencies not possible under previous practices."* When discussing ways to adopt changes in the workplace, many participants again came back to the core concept of organizational culture and fostering an environment that is accepting of digital technology. For example, one participant shared, "*. . .companies are determining how to innovate digitally from three perspectives: culture, talent and technology. Companies will need to have the ability to embrace change in order to change the culture in an organization."* Another respondent elaborated on embracing change, citing an example that could help spur lasting change in an organization, stating: "*One key to transformation success is establishing practices related to working in new ways. This includes continuous learning or open work environments, as part of the change efforts."*

Across responses, students were clear that to compete more effectively in the digital environment, addressing organizational culture and interpersonal communication are just as important as a set strategy. A good digital strategy without clear goals for communication and implementation will ultimately fail.

5. Discussion and conclusions

In this research, we share perceptions of aspiring and current managers that help better understand how they view DT preparedness in an organization. It is important to understand the perceptions of these managers to achieve success in DT initiatives. The findings described in the previous section are an important contribution that can inform both future researchers and practitioners.

Digital transformation, if done right, creates tremendous opportunities for organizations. However, findings in recent years suggest that most organizations have not been able to achieve the benefits from DT. These findings primarily reported in industry reports and articles focus on views and perceptions of CEOs and senior executives. DT is a collective organizational journey which necessitates alignment of views of senior executives with managers and employees. Senior executives bring in the bird's eye perspective, which needs to be supplemented by the worm's eye perspective that managers and employees bring. Failure to do so may result in senior executives assuming that they are prepared for the transformational journey, while managers and employees may be struggling to understand why DT is needed. Arora, Dahlström, Groover, and Wunderlich (2017) point out that often there may be confusion about the meaning of the term DT in an organization and they recommend that it is the job of the leaders to *communicate* the meaning and scope of DT in the

context of an organization. We suspect this confusion is one of the key factors that has led to discouraging results in implementing DT in different organizations.

When communicating the meaning and the "why" that drives DT in an organization, generational differences need to be taken into consideration. The *generational gap* in an organization will impact the interest and acceptance of the DT initiative in the organization (Taylor, 2018). What may appeal to a generation and gain ready acceptance by them may not the same for members from another generation? However, how the message is framed and communicated by leaders in an organization may change this perception.

Respondents of this study identify the *role of the CEO* as a key theme, both in terms of supporting the DT initiative and communicating their vision. A CEO can inspire managers and employees by ensuring that the vision of DT they share are relatable at all levels in the organization. This helps create a shared vision in an organization. For example, a senior IT executive at Maersk (Hollinger, 2021) recently commented that they are "now a technology company where we have some physical devices we need to move around." A Maersk sea captain, who also serves as the employee representative on the company board, corrected the IT executive by pointing out that a majority of the revenue of the company is generated by the shipping unit. Social media postings indicate that this view was supported by employees in Maersk. This misalignment of perceptions creates the possibility that Maersk will experience challenges in their transformation efforts. Similar challenges were experienced by GE when they tried to "reestablish themselves as a technology company" in the last decade. Kazim (2019) points out that "a clear vision, commitment and support" from senior executives improves the preparedness of "operational performance leaders" in an organization.

The DT journey in an organization is a marathon rather than a sprint. In this context, it is important that quick wins, however small, are identified and celebrated. Celebrating quick wins alleviate the possibilities for misalignment of interests of the two groups. This helps senior executives *lead change* and impacts the preparedness of the organization in terms of skills, competencies and courage, which is the focus of this research.

Similarly, failures should be used as a learning experience to motivate employees and avoid frustration. An organization needs to consider creating centralized systems and repositories for capturing and sharing lessons learned from each failure. These lessons can then be reframed to create compelling change stories that appeal to managers and employees (Dewer & Keller, 2009). Both traditional and digital channels should be used to share the change stories (Boutetière, Montagner, & Reich, 2018). This *good practice* approach when institutionalized in an organization will inspire managers and employees to take risks that they would normally avoid. Further, it creates the possibility of cross-functional learning as employees across the organization are encouraged to share their experiences. It is important to realize that these changes often take time and there is a risk of change fatigue, which makes becoming a learning organization a challenging task. Once accepted by employees it helps an organization *differentiate* itself and, in the process, become a learning organization that uses failure to improve and sustain the DT effort for the long run.

Senior executives play a central role in communicating the DT vision necessary to inspire managers and employees. Senior executives need to ensure there is no disconnect between the two groups. A Capgemini study titled *The Digital Culture Challenge: Closing the Employee-Leadership Gap* (Buvat *et al.*, 2017), highlights the gap that exists between senior executives and employees in the context of DT. The study emphasizes that unless the gap is reduced, "it will be extremely difficult to make any meaningful progress on digital transformations". While it is evident that managers and employees contribute significantly to a DT effort in an organization (Tangi *et al.*, 2021), it is not something that has been studied adequately in the information systems discipline. Findings in this qualitative study provide valuable insights on the perceptions of both early career and aspiring managers and helps understand how they view DT preparedness. Participant responses highlighted the importance of social

processes that often are ignored when implementing DT, such as organizational culture, intra-company communication and outlining the strategic vision of DT within the organization. This is of heightened importance as the industry seeks to understand why and how DT fails or succeeds.

5.1 Limitations

Though most students in the course surveyed were working in the industry at the time of data collection, we did not collect this information and as such cannot draw conclusions based on level of experience and/or position. However, students' insights provide much needed clarity on the qualitative reasons behind DT success and failure. Participants in this study demonstrate that even if a company has a flawless technological innovation strategy, it cannot be implemented and sustained without attending to the organization culture and communication between employees, managers and senior executives and the CEO. Without a cohesive strategy for bridging these interpersonal gaps, companies will miss out on the benefits and rewards of adopting new technology.

5.2 Future research

IS researchers need to view the limited research on the disconnect between senior executives and managers or employees as an opportunity to inform practitioners on achieving success in their DT efforts. As organizations continue to invest large sums of money to explore value creation for customers and stakeholders by leveraging digital technologies, the IS discipline can take the lead by asking the question, what can we do to improve the understanding of DT implementation in an organization?

Digital transformation in an organization transcends organizational boundaries and requires ongoing involvement of executives, managers and employees from all functional areas in an organization to succeed. Academic research examining DT has been viewed from a disciplinary rather than a multidisciplinary focus (Verhoef *et al.*, 2021), technical rather than the managerial aspect of DT (Soluk & Kammerlander, 2020) and strategic significance perspective (Wessel *et al.*, 2020; Chanias, Myers, & Hess, 2019). Findings in this paper are from a multidisciplinary and managerial perspective as the respondents are mostly aspiring or middle level managers from different functional areas in their organizations. Future research can focus on capturing the perceptions of senior executives, managers and employees from across an organization to study the differences in perceptions. Moreover, it is important to exercise caution when interpreting the results across diverse industries, as respondents predominantly came from a limited number of sectors.

To conclude we believe that digital transformation as a topic of research will continue to attract the interest of IS researchers around the world in the future. As organizations and societies are challenged by harnessing the potential created by digital technologies to add value for their stakeholders, the IS discipline can play a critical role in helping practitioners understand how DT can be successfully implemented.

References

Andriole, S. J. (2020). Innovation, emerging technology, and digital transformation. *IT Professional*, *22*(4), 69–72. doi: 10.1109/MITP.2020.2985491.

Arora, A., Dahlström, P., Groover, P., & Wunderlich, F. (2017). A CEO guide for avoiding the ten traps that derail digital transformations. Available from: https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/a-ceo-guide-for-avoiding-the-ten-traps-that-derail-digital-transformations (accessed 16 January 2022).

Baiyere, A., Salmela, H., & Tapanainen, T. (2020). Digital transformation and the new logics of business process management. *European Journal of Information Systems*, *29*(3), 238–259.

Baker, M. (2018). Chief human resource officers will need to tackle 5 HR priorities to lead digitalization in their organization. Available from: https://www.gartner.com/smarterwithgartner/5-business-strategies-for-chros-to-lead-digital-transformation/ (accessed 30 October 2022).

Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent dirichlet allocation. *Journal of Machine Learning Research*, *3*(Jan), 993–1022.

Boulton, C. (2019). What is digital transformation? A necessary transformation. Available from: https://www.cio.com/article/3211428/what-is-digital-transformation-a-necessary-disruption.html (accessed 10 October 2019).

Boutetière, H., Montagner, A., & Reich, A. (2018). Unlocking success in digital transformation. Available from: https://www.mckinsey.com/business-functions/organization/our-insights/unlocking-success-in-digital-transformations (accessed 10 October 2019).

Brock, J. K. U., & von Wangenheim, F. (2019). Demystifying AI: What digital transformation leaders can teach you about realistic artificial intelligence. *California Management Review*, *61*(4), 110–134. doi: 10.1177/1536504219865226.

Buvat, J., Solis, B., Crummeneri, C., Abound, C., Kar, K., Aoufi, H. E., & Sengupta, A. (2017). The digital culture challenge: Closing the employee-leadership gap. Available from: https://www.capgemini.com/consulting/wp-content/uploads/sites/30/2017/07/dti_digitalculture_report.pdf (accessed 18 December 2021).

Carson, B. (2017). With transformation comes disruption, *TD Magazine*. Available from: https://www.td.org/magazines/td-magazine/with-transformation-comes-disruption

Cetindamar, D., Abedin, B., & Shirahada, K. (2021). The role of employees in digital transformation: A preliminary study on how employees' digital literacy impacts use of digital technologies. *IEEE Transactions on Engineering Management*, *68*, 1–12.

Chanias, S., Myers, M. D., & Hess, T. (2019). Digital transformation strategy making in pre-digital organizations: The case of a financial services provider. *The Journal of Strategic Information Systems*, *28*(1), 17–33.

Chen, H., & Zhao, J. L. (2015). ISTopic: Understanding information systems research through topic models. *ICIS 2015 Proceedings*, *6*. Available from: https://aisel.aisnet.org/icis2015/proceedings/GeneralIS/6

Combs, V. (2019). IDC: Digital transformation spending will eat up 50% of IT budgets by 2023. Available from: https://www.techrepublic.com/article/idc-digital-transformation-spending-will-eat-up-50-of-it-budgets-by-2023/ (accessed 4 November).

Compeau, D., Marcolin, B., Kelley, H., & Higgins, C. (2012). Research commentary—generalizability of information systems research using student subjects—a reflection on our practices and recommendations for future research. *Information Systems Research*, *23*(4), 1093–1109. doi: 10.1287/isre.1120.0423.

Dasgupta, S., Poulis, S., & Tosh, C. (2019). Interactive topic modeling with anchor words. ArXiv, abs/1907.04919.

Debortoli, S., Müller, O., Junglas, I., & vom Brocke, J. (2016). Text mining for information systems researchers: An annotated topic modeling tutorial. *Communications of the Association for Information Systems*, *39*, doi: 10.17705/1CAIS.03907.

Dewer, C., & Keller, S. (2009). The irrational Side of change management. Available from: https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/the-irrational-side-of-change-management (accessed 28 December).

Eickhoff, M., & Neuss, N. (2017). Topic Modeling Methodology: Its use in information systems and other managerial disciplines. *Proceedings of the 25th European Conference on Information Systems (ECIS)*, Guimarães, Portugal, June 5-10, 2017 (pp. 1327–1347), ISBN 978-989-20-7655-3. Research Papers. Available from: http://aisel.aisnet.org/ecis2017_rp/86

Eickhoff, M., & Wieneke, R. (2018). Understanding topic models in context: A mixed-methods approach to the meaningful analysis of large document collections. *Proceedings of the 51st Hawaii International Conference on System Sciences*, Waikoloa Village, HI.

Hollinger, P. (2021). *Maersk runs into cultural storms en route to digital destination*. London: Financial Times.

Hu, Y., Boyd-Graber, J., Satinoff, B., & Smith, A. (2014). Interactive topic modeling. *Machine Learning*, *95*(3), 423–469.

Ismail, M. H., Khater, M., & Zaki, M. (2017). Digital business transformation and strategy: What do we know so far?. Available from: https://pdfs.semanticscholar.org/35b2/bd95aeb8e6ca0ea0652d0d7fc697eda3362a.pdf (accessed 10 November 2019).

Jeyaraj, A., & Zadeh, A. H. (2020). Evolution of information systems research: Insights from topic modeling. *Information and Management*, *57*(4). doi: 10.1016/j.im.2019.103207.

Kane, G. C. (2017). Are you taking the wrong approach to digital transformation?. *MIT Sloan Management Review*. Available from: https://sloanreview.mit.edu/article/are-you-taking-the-wrong-approach-to-digital-transformation/

Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). *Strategy, not technology, drives digital transformation: Becoming a digitally mature enterprise*. New York: MIT Sloan Management Review and Deloitte University Press.

Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2017). *Achieving digital maturity: Adapting your company to a changing world*. New York: MIT Sloan Management Review and Deloitte University Press.

Kazim, F. A. B. (2019). Digital transformation and leadership style: A multiple case study. *The ISM Journal of International Business*, *3*(1), 24–33.

Kitani, K. (2019). The $900 billion reason GE, Ford and P&G failed at digital transformation. Available from: https://www.cnbc.com/2019/10/30/heres-why-ge-fords-digital-transformation-programs-failed-last-year.html (accessed 31 October).

Kraus, S., Durst, S., Ferreira, J. J., Veiga, P., Kailer, N., & Wienmann, A. (2022). Digital transformation in business and management research: An overview of the current status quo. *International Journal of Information Management*. doi: 10.1016/j.ijinfomgt.2021.102466.

Kretschmer, T., & Khashabi, P. (2020). Digital transformation and organization design: An integrated approach. *California Management Review*, *62*(4), 86–104. doi: 10.1177/0008125620940296.

Kutzner, K., Schoormann, T., & Knackstedt, R. (2018). Digital transformation in information systems research: A taxonomy-based approach to structure the field. In *Proceedings of the European Conference of Information Systems*, Research papers, 56. Available from: https://aisel.aisnet.org/ecis2018_rp/56

Lansiti, M., & Karim, R. L (2017). Managing our hub economy: strategy, ethics, and network competition in the age of digital superpowers. *Harvard Business Review*, *95*(5), 84–92.

Leonardi, P. (2020). You're Going Digital – Now What? *MIT Sloan Management Review*, *61*(2), 28–35.

McKinsey (2018). Unlocking success in digital transformations. Available from: https://www.mckinsey.com/business-functions/organization/our-insights/unlocking-success-in-digital-transformations (accessed 10 June 2020).

Schwarzmüller, T., Brosi, P., Duman, D., & Welpe, I. M. (2018). How does the digital transformation affect organizations? Key themes of change in work design and leadership. *Management Revue*, *29*(2), 114–138.

Solberg, E., Traavik, L. E. M., & Wong, S. I. (2020). Digital mindsets: Recognizing and leveraging individual beliefs for digital transformation. *California Management Review*, *62*(4), 105–124.

Soluk, J., & Kammerlander, N. (2020). Digital transformation in family-owned Mittelstand firms: A dynamic capabilities perspective. *European Journal of Information Systems*, *30*(6), 676–711. doi:10.1080/0960085X.2020.1857666.

Tangi, L., Janssen, M., Benedetti, M., & Noci, G. (2021). Digital government transformation: A structural equation modeling of driving and impeding factors. *International Journal of Information Management*. doi: 10.1016/j.ijinfomgt.2021.102356.

Taylor, J. (2018). From boomers to gen Z: How different generations adapt and react to new trends and technologies. Available from: https://www.epsilon.com/apac/insights/blog/from-boomers-to-gen-z (accessed 3 January 2022).

Venkatraman, V. (2017). *The digital matrix: New rules for business transformation through technology*. Vancouver: Greystone Books.

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., QiDong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, *122*(C), 889–901. doi: 10.1016/j.jbusres.2019.09.02.

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, *28*(2019), 118–144. doi: 10.1016/j.jsis.2019.01.003.

Vukšić, V. B., Ivančić, L., & Vugec, D. S. (2018). A preliminary literature review of digital transformation case studies (version 10009516). *International Journal of Information, Control and Computer Sciences*, *11*(9). doi: 10.5281/zenodo.1474581.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind-Jensen, T. (2020). Unpacking the difference between digital transformation and IT-enabled organizational transformation. *Journal of the Association for Information Systems*, *22*(1). doi: 10.17705/1jais.00655.

Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. Boston, MA: Harvard Business Review Press.

Further reading

Dedoose Version 8.0.35, web application for managing, analyzing, and presenting qualitative and mixed method research data (2018), Los Angeles, CA: SocioCultural Research Consultants, LLC. Available from: www.dedoose.com

Iansiti, M., Marco, & Lakhani, K. (2018). The digital business divide. Available from: https://www.cio.com/feature/?nsdr=true

Kapoor, S. (2020). Who led the digital transformation of your company? [Twitter moment]. Available from: https://twitter.com/SonyKapoor/status/1244580300094570498

Lindsay, T. (2020). The disease that could topple higher education. *Forbes*. Available from: https://www.forbes.com/sites/tomlindsay/2020/03/26/the-disease-that-could-topple-traditional-higher-education/#1534ca885cb7 (accessed 29 March 2020).

Miles, M. B., Huberman, A. M., & Saldana, J. (2013). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Appendix 1
Complete list of stop words (case-sensitive)

[a]
[of]
[is]
[to]
[for]
[this]
[that]
[by]
[be]
[and]
[are]
[in]
[I]
[not]
[with]
[it]
[have]
[they]
[their]
[as]
[will]
[on]
[can]
[or]
[how]
[the]
[you]
[we]
[an]
[do]
[at]
[but]
[my]
[The]
[was]
[all]
[our]
[has]
[your]
[In]
[there]
[would]
[what]
[must]
[when]
[who]
[these]
[Post]
[Author]
[Thread]
[Read]
[Week]
[Discussion]
[Question]

[Date]
[Posted]
[Status]
[Published]
[from]
[PM]
[about]
[This]
[if]
[RE]
[It]
[some]
[As]
[were]
[see]
[well]
[into]
[also]
[because]
[make]
[where]
[so]
[had]
[other]
[like]
[which]
[them]
[most]
[One]
[up]
[out]
[many]
[one]
[September]

Appendix 2

Count	Word	Occurrences
1	digital	7,651
2	managers	6,067
3	business	5,416
4	Information	5,135
5	Transformation	4,554
6	technology	4,538
7	systems	4,128
8	new	3,992
9	company	3,358
10	strategy	2,975
11	Managing	2,934
12	more	2,859
13	lead	2,402
14	think	2,315
15	change	2,045
16	need	2,032
17	Work	2,010
18	companies	2,005
19	competitive	1,924
20	manager	1,775
21	organization	1,595
22	must	1,558
23	employees	1,540
24	management	1,386
25	equipped	1,380
26	Strategic	1,332
27	skills	1,300
28	system	1,236
29	people	1,217
30	culture	1,217

Table A1.
Top 30 words by frequency: complete dataset

Note(s): We acknowledge that the frequency of words is not significant to the study and are subject to sampling bias because the questions students were asked included them; the words were significant in that they are used as key markers to begin building the topic modeling program
Source(s): Appendix by the authors

Corresponding author
Michelle Salmona can be contacted at: msalmona@immrglobal.org