Identifying key leadership competencies for digital transformation: evidence from a cross-sectoral Delphi study of global managers

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Abstract

Purpose – Even with the recognized impact organizational leaders have on the outcome of digital transformation (DT), a comprehensive scholarly understanding of the competencies that leaders must possess to lead a DT to success is lacking.

Design/methodology/approach – To derive and list the competencies considered by experts as necessary for managing DT, the authors recruited 18 international senior managers with relevant experience and applied the Delphi method to survey the managers. Upon the completion of three survey rounds and the authors modifying the response list until consensus was reached, 39 items were shortlisted as constituting key competencies for managing DT. Furthermore, the authors engaged in inductive theorizing to derive propositional statements using these findings.

Findings – The practitioners agreed on visionary thinking, agility, understanding the value of data, data-driven decision-making, knowledge of strategy and accepting change as the most important requirements for managing DT. Through inductive theorizing, the authors further derived that the seven discovered clusters fell into two broader competencies – behavioral and strategic – and that each behavioral competency would have varying importance depending on the country and industry that the organization operates in.

Research limitations/implications – As is typical for Delphi studies that involve multiple survey rounds, the study participant response rate was moderate. The implications of this study, in finding that a variety of leadership competencies are needed to ensure successful DT, validate prior research that people, not technology, drive DT.

Practical implications – This study helps mitigate assumptions that successful DT processes are only possible by hiring technological experts, as doing so highlights the importance of behavioral leadership competencies.

Originality/value – The study is one of the first to interlink digital leadership with DT by inductively theorizing behavioral and strategic competencies. The authors also establish that contexts are vital in determining which aspects of leadership competencies are deemed most important in driving DT.

Keywords Digital transformation, Leadership competencies, Digital leadership, Delphi method, Inductive theorizing

Paper type Research paper

Introduction

Rapid developments in digital technology, marked by uncertainties and disruption, are heralding a new era in today's workplaces. The accelerating pace of technological change – coupled with the coronavirus disease 2019 (COVID-19) pandemic's impact involving remote work and learning, layoffs and supply chain interruptions – has shifted the operational reality for organizations drastically (Anderson *et al.*, 2021) and challenged business continuity for firms in various industries (Bennett and McWhorter, 2021). Consequently, organizations worldwide are struggling to develop and coordinate their capabilities to meet the current challenges in a post-pandemic digital business environment.

As an encompassing and rapid driver of organizational change, digital transformation (DT) in the fourth industrial revolution is characterized by comprehensive transformation of processes, business models and organizational structures using new technologies like artificial intelligence and Internet of Things (Vial, 2019). However, even in the post-pandemic Industry 4.0 world, many DTs fail because organizations succumb to competition from fast-moving digital successors or due to lack of desired return on investments (Denning, 2021; Wade and Shan, 2020). Whether we consider the pre-pandemic instance of Kodak utterly failing to understand evolving customer requirements because of its overconfidence on consumer brand loyalty (Sainger, 2018) or student dissatisfaction of taking fully online classes in higher education during COVID-19, the challenges around DT will continue to prevail if the focus is entirely on technology (Philip, 2021). Other reasons for failure are unrealistic expectations, a limited scope of the project, poor governance and action plans and cultural barriers (Wade and Shan, 2020). Failure is frequently attributed to the lack of leadership skills without adequately considering the specific digital competencies lacking in leaders (Jones *et al.*, 2021). Moreover, contextual factors relevant for a firm's performance also play a role in DT success. Two such contexts are that of country and industry in which the firm operates. As Tuleja (2017) notes that national culture and intercultural communication are foundational for global business leadership, we contend that the skills and competencies perceived as crucial for DT in various countries would depend on the cultural contexts. Similarly, industry-specific DT research has shown that while areas like manufacturing impress on strategic and agile skills to effectively manage complexity and people (Jones *et al.*, 2021), management consulting firms still rely heavily on human skills and effective talent acquisition for DT projects (Tavoletti *et al.*, 2021).

Accordingly, business leaders in different countries and industry sectors driving digital change during Industry 4.0 need specific skills to alleviate contextual challenges. Not surprisingly, emerging DT research integrating the Information and communication technologies (ICT) revolution underscores the relevance of optimal business processes, collaboration among social communities (internal or external to the firm) with a shared purpose and leaders developing digital competencies (Bodrožić and Adler, 2022; Vial, 2019). Change management literature acknowledges leadership as a top enabler of DT that helps organizations achieve positive performance outcomes (Imran *et al.*, 2021) and leadership development research recognizes that organizations must possess out-of-the-box strategic thinking for understanding and utilizing new technologies for effective leaders to emerge in unusual circumstances (Elkington, 2021).

However, the often-unanswered question that remains is – which specific competencies should leaders possess to lead successful DT? Studies have examined required skills by focusing on specific leader profiles like chief digital officers or chief technical officers (Singh and Hess, 2017; Wade and Obwegeser, 2019), by analyzing small (Sousa and Rocha, 2019) or national samples (Porfírio *et al.*, 2021) and by using qualitative approaches (Porfírio *et al.*, 2021). Still, a comprehensive understanding of the competencies that leaders must possess to lead a DT to success is lacking. Furthermore, identifying competencies needed for changing environments in specific contexts is useful because it allows researchers to compare leader behaviors during such situations against prescribed competencies to offer insights (Yusko and Goldstein, 1997).

Hence, following calls for providing empirical evidence from international samples (Sousa and Rocha, 2019), we applied the Delphi method to derive the competencies for leaders deemed necessary by experts in driving DT. Specifically, we recruited eighteen international senior managers with relevant experience and adopted the Delphi method, within the Lockean inquiry system (IS), to survey them. The current analysis is an extension of a previous study finding (see Gilli *et al.*, 2023), which identified leadership competencies for managing DT by means of a content analysis of job advertisements. In the current study, we applied the Delphi technique to a different data source – managers with DT experience – to understand whether competencies emphasized in job advertisements for DT positions are similar to those deemed important by practicing managers. Furthermore, this research inductively theorizes the empirically derived behavioral and strategic components of DT competencies through the lens of digital leadership.

Literature review
Digital leadership
Industry 4.0 and the digitalization of organizations necessitated the emergence of digital leadership, which encompasses capabilities needed for leading in uncertain and constantly changing digital work environments (Klein, 2020). Digital leadership is most comprehensively defined in terms of the skills, competencies and leadership styles of the leader at the organizational and individual levels to achieve a customer-centric digitally enabled business model (Eberl and Drews, 2021). Empirical studies on digital leadership have also generated competency and skill lists needed for DT (Kane *et al.*, 2019; Philip and Gavrilova Aguilar, 2022). Further, the importance of leader-follower relationship is emphasized when detailing the abilities of a digital leader (Schiuma *et al.*, 2021), particularly that the leader must act as a guide and visionary role model to their employees without demanding disciplinary power (Wade and Obwegeser, 2019). Theoretically, digital leadership contains essence of several conventional leadership styles including transactional, transformational and authentic leadership (Prince, 2018), which manifest in the digital leader's vision, governance, decision-making and people management (Eberl and Drews, 2021).

Digital transformation in a global context
Emerging DT literature from different countries and industries has highlighted the intersection of leadership and context. In Europe, large global companies have the upper hand in the DT consulting space due to advanced digital knowledge gained from international clients (Tavoletti *et al.*, 2021). Even then, human skills are still seen as critically important by these companies as they emphasize hiring the best talent for DT projects. A comparative analysis of trends during the pandemic lockdown in retail purchasing in Canada, China, and France also revealed the importance of contexts like socio-cultural and economic factors in each country (Nicolaï and Grange, 2021). Specifically, while Canada showed DT innovations in brick-and-mortar stores based on customer preferences, retail giants like Alibaba in China and Amazon in France transformed to popularize online stores and cashless payments. Similarly, Elkington (2020, 2021) derived that there were similarities in challenges in higher education leadership to business challenges like globalization and the need to incorporate collaborative e-leadership but also contextual variations unique to higher education like funding and curriculum relevance based on the needs of the future generations. Hence, leading DT can be highly contextual as cultural, social, financial and political elements play key roles.

The Delphi method
The Lockean IS guides the traditional Delphi method and involves a series of surveys distributed to a selected group of experts from a given domain with the aim of reaching

consensus within that group (Linstone and Turoff, 2002). Lockean IS is premised on raw observational data driving factual propositions, supposing that data inductively define related theory. The Lockean IS and Delphi method were deemed a suitable approach to explore an ongoing phenomenon like DT due to several reasons. First, they are advantageous when inquiring research problems not tied to a specific theory (Hsu and Sandford, 2007) like DT (Cortellazzo *et al.*, 2019) or phenomena that are subject to change in short spans of time, which might be the case for digital technologies. Second, Lockean-led Delphi technique could help narrow down competencies for DT because it results in expert consensus which, in this case, is needed due to the absence of a comprehensive understanding of this research subject (Fonseca and Picoto, 2020). Third, researchers have used it to draw future scenarios for specific contexts (Van der Gracht and Darkow, 2010), like Elkington (2020) who employed it to answer a research question in evolving leadership in higher education and Fonseca and Picoto (2020) who derived digital competencies for DT at the individual level.

The Delphi method is divided into three rounds involving data collection, relevance voting and ranking (Haqaf and Koyuncu, 2018). Beginning with a list of criteria, participants anonymously complete the survey questionnaire and continue to eliminate items that do not satisfy the required consensus until these items comprise of just 30% of the entire list (Helmy *et al.*, 2017). Completed questionnaires are analyzed by the study investigators in order to prepare the questionnaire for the following round. The new questionnaire is once again sent to the experts and this process continues until consensus is reached (Skulmoski *et al.*, 2007). Consensus building is the Delphi technique's decisive characteristic because expert consensus is considered more accurate than an individual forecast (Gordon, 1994). In addition, participant anonymity encourages them to express opinions more freely.

Methodology
Selection of experts
The practicing managers chosen for our study were identified based on their current position and previous professional experience. We selected practitioners in leading positions in various companies across the globe and across industries that were driving DT in their respective organizations and researchers in the field of leadership and/or DT, who were able to reflect on several years of professional experience. To ensure that all study participants had international experience, special attention was given to the country in which these experts were currently working, received their education and where they had gained professional experience. Participants were either recruited through the authors' personal networks or were contacted through snowball sampling on LinkedIn. Table 1 lists the job position, branch and countries of the selected experts. Specifically, the participant pool represented countries in Europe, North America, Asia and Australia and industries including consulting, information technology, higher education and retail.

Implementation of the Delphi technique
Having situated Delphi in Lockean IS, three survey rounds were implemented in the current study. The first round was aimed at collecting data from the experts. The initial item list was prepared through secondary data using the results from Gilli *et al.* (2023). The initial set of skills and traits, which were compiled from that study and classified into several categories, had a total of 34 items. We listed the items in an online questionnaire and asked the experts to propose modifications by adding new items or deleting existing ones. To encourage creativity and diversity of thought, the following additional open-ended question was included: "*Think about a 'Digital Mindset' of a leader. Is there anything else constituting a digital mindset on an individual level besides these skills and traits?*"

Table 1.
Overview of experts

No.	Position	Branch	Country of Current position	Country of Previous experience
1	Managing Partner DACH	ICT Consulting	Germany	Italy
2	Senior Partner	Strategy Consulting	Sweden	Germany
3	Global innovation and Digitalization Manager	IT Solutions	Germany	USA
4	Lead Service Designer	Service Design	United Kingdom	Italy
5	CEO	Apparel	Spain	USA
6	CEO and Founder	IT Solutions	Italy	Italy
7	Researcher and Business Development	University	Australia	Australia
8	Managing Director DACH	ICT Consulting	Austria	Austria
9	Director International Marketing	Consumer Goods	Germany	Mexico, USA
10	Researcher and Consultant	Business School	Switzerland	USA, China
11	CEO	Telecommunications	Germany	Germany
12	Global Vice President	Consumer Goods	China	China
13	Chief Digital Officer	Consumer Goods	Germany	Sweden, Netherlands
14	International HR Management	Winter Technologies	Italy	Germany
15	Executive Director, Global Head of Service Design	Financial Services	United Kingdom	Germany
16	Corporate Communications	Telecommunications	Germany	Germany
17	Global Director IT Operations	Automotive	Italy	Germany
18	Vice Director, Unit Head of Solution and Innovation	ICT Consulting	Italy	Austria

In the first round, 13 out of 18 experts completed the online questionnaire, resulting in a 72% response rate. The answers from the open-ended question were analyzed by means of a content analysis using MAXQDA software and merged with the results from the item list to generate 82 total items. After that round, the authors reviewed the results and after eliminating synonyms and merging items with the same meaning, 47 items remained. In the second round, 12 [1] out of 18 experts (response rate of 67%) rated these 47 items on a 5-point Likert scale and 39 items were identified as being *very important* or *absolute essential* (the top two rating values on the scale) by at least 70% of the participants, which was considered sufficient (Hsu and Sandford, 2007).

The third round used a ranking-order exercise to set the priorities between the shortlisted items. As recommended by Habibi *et al.* (2014), we eliminated items with mean scores lower than 4 for the current 5-point Likert scale. To do so, the 39 items resulting from round two were sent to the 18 experts and 11 of them answered the questionnaire in the third round, resulting in a 61% response rate. They voted on the importance of *items* within the categories. These results are presented in Table 2. Additionally, a further ranking process was included to rank the importance order between the broader categories (henceforth, *clusters*), as shown in Table 3.

Results

Top leadership competency items for managing DT

Overall, the experts rated the items visionary thinking, agility, understanding the value of data, data-driven decision making, knowledge of strategy, and accepting change as the top six requirements, respectively, for managing DT. Following Delphi protocol, these items were ranked based on their sum score and their cluster rank. As shown in Table 2, the item with the

Cluster	Item	Rank(Count)*	Weighted sum**
Leadership	Instilling Trust	1(3) 2(4) 3(3) 4(1)	24
	Creating Purpose	1(4) 2(3) 3(1) 4(2) 5(1)	26
	Leading in Uncertain Times	1(2) 3(1) 4(2) 5(4) 6(2)	35
	Enabling People	2(3) 3(4) 4(3) 6(1)	36
	Listening	1(2) 2(1) 3(2) 4(1) 5(5)	39
	Influencing	4(2) 5(1) 6(8)	61
Strategy	Visionary Thinking	1(7) 2(4)	15
	Knowledge about Strategy	1(4) 2(7)	18
Collaboration	Knowledge Sharing	1(3) 2(5) 4(2) 6(1)	27
	Customer Centricity	1(4) 2(2) 3(2) 4(2) 5(1)	27
	Co-Creation with Customer	1(1) 2(1) 4(3) 5(4) 6(2)	47
	Team Orientation	1(2) 2(1) 3(1) 4(2) 5(5)	40
	Enjoy Collaboration	1(1) 2(2) 3(2) 5(1) 6(5)	46
	Relationship-Building with Customer	3(6) 4(2) 6(3)	44
Personality Traits	Honesty	1(3) 2(2) 4(2) 7(1) 8(1) 9(1)	39
	Passion	1(4) 2(2) 3(1) 6(1) 9(1) 10(1) 11(1)	47
	Openness	2(1) 3(5) 4(1) 6(3) 7(1)	46
	Resilience	1(2) 2(2) 3(1) 5(1) 6(1) 10(3)	50
	Empathy	2(1) 3(2) 4(3) 5(2) 6(1) 7(1) 8(1)	51
	Curiosity	2(1) 4(1) 5(4) 6(1) 7(1) 8(1) 9(1) 11(1)	67
	Proactiveness	1(1) 2(1) 4(2) 6(1) 7(2) 8(1) 10(1) 11(2)	71
	Courage	4(1) 5(1) 6(2) 7(2) 8(1) 9(1) 10(1) 11(2)	84
	Flexibility	2(1) 3(1) 7(2) 8(4) 10(1) 11(2)	83
	Self-Awareness	3(1) 5(2) 6(1) 8(2) 9(2) 10(3)	83
	Social Competence	1(1) 4(1) 5(1) 7(1) 9(4) 10(1) 11(2)	85
Chang Management	Agility	1(7) 2(4)	15
	Accept Change	1(4) 2(7)	18
Data Management	Understand Value of Data	1(7) 2(4)	15
	Data-Driven Decision-Making	1(4) 2(6)	16
Skills	Holistic Thinking	1(3) 2(3) 3(3) 4(1) 6(1)	28
	Understanding the Business Model	1(3) 3(4) 5(2) 6(2)	37
	Communication	1(4) 3(1) 4(3) 6(1) 7(2)	39
	Critical Thinking	2(2) 3(1) 4(2) 5(2) 6(3)	43
	Problem Solving	1(1) 2(2) 3(1) 4(2) 5(3) 6(1) 8(1)	45
	Systems Thinking	2(3) 4(2) 7(2) 8(4)	60
	Presentation	2(1) 3(1) 4(1) 5(2) 6(1) 7(3) 8(2)	62
	Project Management	5(2) 6(2) 7(4) 8(2)	76

Note(s): *Rank (Count) represents how the experts set the priorities among items. For example, 1(3) in the first item indicates that three experts deemed instilling trust the topmost requirement; 2(4) indicates that four experts deemed this item the second most important requirement and so on
**Weighted Sum was calculated using the ranks and counts. Accordingly, instilling trust was ranked first three times, second four times, third three times and fourth once. Thus, $(3 \times 1) + (2 \times 4) + (3 \times 3) + (4 \times 1) = 24$. Hence, the lower the sum, the more important the item

Table 2.
Overview of derived clusters

lowest weighted sum in a top ranked cluster, *Visionary Thinking* (weighted sum = 15; Strategy cluster), was deemed the number one requirement and the next two items with the same weighted sum value but in the next highest clusters, *Agility* (Change Management cluster) and *Understanding the Value of Data* (Data Management cluster) were deemed

the second and third most important requirements, respectively, for managing DT. Following these, *Data-Driven Decision-Making* (weighted sum = 16; Data Management cluster), *Knowledge of Strategy* (weighted sum = 18; Strategy cluster) and *Accepting Change* (weighted sum = 18; Change Management cluster) were ranked as the fourth, fifth, and sixth most important items, respectively. We also note that the experts gave each item a different rating in each of the three survey rounds. For instance, *Visionary Thinking* was rated by 42.9% participants as *very important* and by 57.1% as *absolute essential* in the first round of the survey, but in the third round, 7 out of 11 experts (64%) agreed on the item as having the first priority (*absolute essential*) and 4 out of 11 experts (36%) ranked the item as second priority (*very important*).

Top two competency clusters for managing DT
In the third Delphi round, participants categorized the derived items into the following clusters – strategy, leadership, collaboration, personality, change management, data management and skills – depending on their perceived importance for managing DT. As shown in Table 3, the experts attached the highest importance/rank (lowest weighted sum score of 13) to the *Leadership* cluster with its 6 items (instilling trust, creating purpose, leading in uncertain times, enabling people, listening and influencing) and the second highest importance (second lowest weighted sum score of 31) to the *Strategy* cluster with its 2 items (visionary thinking and knowledge about strategy). While there was a clear agreement on the highest importance of leadership, participants had differing opinions about the strategy cluster. Specifically, only 1% rated strategy as first priority (*absolute essential*), 27% rated it as second priority (*very important*), 36% as third priority and 27% as fourth priority. As strategy's weighted sum score was lower than the remaining clusters, it was ranked second. Then, based on their ascending weighted sum scores, collaboration, personality traits, change management, data management and skills clusters were ranked subsequently.

Contextual distinctions in managing DT – expert comments
As the sample pool consisted of global managers from various industries and countries (Table 1), we noticed the presence of some contextual variations in their recognition of DT leadership competencies in their qualitative feedback comments. Even though we are limited in precisely matching these comments based on their country/industry as these responses were captured anonymously, we present a few selected reflections that offer valuable insights. Pertaining to industry, one participant offered the following for healthcare versus technology.

> I'm not sure if a digital mindset is relevant in a hospital operating theatre. However, a digital mindset is relevant in a disruptive technology start up.

Competency	Cluster	Rank(Count)	Weighted sum
Behavioral	Leadership	1(9) 2(2)	13
Strategic	Strategy	1(1) 2(3) 3(4) 4(3)	31
Behavioral	Collaboration	1(1) 3(3) 3(2) 4(4) 6(1)	38
Behavioral	Personality Traits	2(2) 3(2) 4(1) 5(3) 6(2) 7(1)	48
Strategic	Change Management	3(3) 4(3) 5(2) 6(2) 7(1)	50
Strategic	Data Management	5(5) 6(1) 7(4)	59
Behavioral	Skills	2(1) 5(1) 6(4) 7(5)	66
Note(s): Rank(Count) and Weighted Sum are represented similar to Table 2			

Table 3.
Overall rankings
of clusters and
corresponding
competencies

The expert asserts that while digital mindset is critical in firms where technology is key (which includes the healthcare industry), yet they do not believe it is important for a specific hospital situation like the operating room. This feedback is insightful because it informs us how even within a specific organization, managers might rate the value of DT differently for business units or specific organizational routines.

A second expert offered comments on how systems thinking as a skill is currently understood from an academic perspective and less from a practice standpoint.

> Systems thinking - understanding how to approach and change complex systems. Currently still a very academic understanding but to successfully address complex problems, change management & digital transformation is more successful if you can bring in systems thinking.

Like Elkington (2020) identified several complex issues prevalent in higher education like gender/racial equity, it would be interesting to see if leaders in academia use their own advanced understanding of systems thinking to address these challenges in their field through systemic policy changes.

Next, one expert reflected on the need to account for cultural bias and personality traits when assuming digital mindset for leaders.

> . . . somewhat missing is a correction for the bias favoring extroverted traits (openness, enthusiasm, collaboration, flexibility, communication etc.) that are harder for introverts (natural introverts or culture based ones such as Asian cultures with strong cultural bias towards authority deferral) . . .

The expert's observation about authority deferral in Asian cultures (i.e. Hofstede's (2011) power distance cultural dimension) is highly relevant and aligns with prior DT research showing that countries that differ on cultural dimensions adopted and implemented new technologies differently (Meske *et al.*, 2018).

Inductive theorizing and propositions

Based on the Delphi results and aligning with Lockean IS premise about data driving theory, we perform inductive theorizing and derive propositions to contribute to leadership and DT literature. Contrary to the commonly employed deductive approach, wherein predictive statements are derived from theory, the inductive method uses empirical evidence and data to generalize and create knowledge (Samuels, 2000). In theory building, induction uses a bottom-up approach, where particular details found in the data are then used to derive higher order generalizations. We are guided by this approach in our study as we perform *inductive bottom-up theorizing* to offer propositions. Scholars have recommended that the inductive bottom-up approach should be used to build theory when the focal literature is limited and narrow in scope (Shepherd and Sutliffe, 2011). When literature is limited, researchers should use collected data on the phenomenon of interest, code them, classify the data into concepts and make connections among these concepts, thereby allowing theory to emerge through these data. In this regard, we deem inductive bottom-up theorizing as appropriate for our study as scholarly literature connecting leadership and DT is fairly new and still evolving. Hence, we utilized an appropriate Delphi method for our qualitative data to create clusters. As a next step, we now make connections among these clusters and a theoretical framework of digital leadership to create proposition statements and attest to bottom-up theorizing.

The expert-rated quantitative clusters in the current study can be broadly categorized as behavioral components and non-behavioral or strategic competencies. The derived clusters ranked in Tables 2 and 3 align with prior research which qualifies leadership, collaboration, personality traits and skills as behavioral competencies (see Gruden and Stare, 2018; IPMA, 2006). Similarly, strategic competencies for DT are shown to include strategy, change management and data management (By, 2005; DalleMule and Davenport, 2017). Furthermore, the microfoundations of "technological frames" (i.e. the assumptions and

expectations) of actors when dealing with the uncertainties of implementing and complexities of interpreting digital technologies are shaped by various behavioral and strategic antecedents including one's personal attitude, leader's influence, perceived value of the technology and industry influence (Spieth *et al.*, 2022). Hence, such a refined conceptualization of competencies into behavioral and strategic components advances the theoretical framing of leadership for DT.

Even the experts' qualitative comments emphasized the behavioral aspects of being a good digital leader:

> . . . listening skills are often not emphasized enough . . . listen, learn and adapt

> I would add empathy to the list, often lacking, been driven out of people through outdated focus on results, technology, process etc.

> Honesty and Compassion

> Emotional Intelligence - Understand potential fears or barriers of people that avoid Digital Transformation

Some experts noted that behavioral competencies are also important for the leaders themselves and even offered some tips.

> leaders (should) try to add balance through meditation and yoga as it trains mindfulness

> Leading in uncertain or so called VUCA times also requires a high level of self-awareness and self-care as you are constantly under stress and need to make sure you nurture yourself otherwise you risk burning out. This is a topic that comes up amongst informal meetings of leaders, it's not something published or advertised . . . but essential to be successful.

Here, the expert states that the importance of self-care is discussed within closed doors among DT managers but is not outwardly vocalized or validated. There seems to be limited scholarly or popular press literature that advocates for leaders practicing self-care during DT. Scholarly literature is, however, now emphasizing that in the post COVID-19 volatility, uncertainty, complexity and ambiguity (VUCA) ecosystem, leaders need a different mindset and should focus on building rapport and gaining credibility with followers (Van Tulder *et al.*, 2020; Lang and Sutton, 2022).

Given that strategic and technical competencies are widely credited as essential for successful DT, our experts revealed (both in their quantitative ratings and qualitative comments) how critical the human aspects of leading are in DT. Thus, we inductively derive that:

> *Proposition 1.* Organizational leaders driving DT should possess a combination of behavioral and strategic competencies.

Scholars agree that leadership is the most important behavioral competency for project managers (Starkweather and Stevenson, 2011; Gruden and Stare, 2018) and a key enabler for DT (Imran *et al.*, 2021). When employees are cynical about organizational change, digital leadership can have a longitudinal positive effect on their attitudes and lower such cynicism (Bommer *et al.*, 2005). Strategic competencies like visionary thinking and knowledge of strategy should manifest in digital leadership. A leader's idealized influence behavior enabling followers to model the leader's vision and intellectual stimulation that encourages creative ideas during DT (Berson and Avolio, 2004; Philip, 2021). Digital leadership also plays a critical role in our enlisted strategic competencies like agility, accepting change, understanding the value of data and data-driven decision making. When heading transformation efforts, being agile and possessing a change-oriented mindset that encourages more day-to-day innovation (reflective of inspirational motivation and intellectual stimulation) were rated among the top five skills necessary for organizational leaders in a digital workplace (Kane *et al.*, 2019). Of similar

importance is digital literacy, which allows organizational leaders to comprehend the business value of digital technologies to make data-informed decisions in uncertain situations.

Consistent with Kane's (2019) assertion that "people are the key to DT" (pp. 44), this research recognizes that the behavioral components of digital leadership outweigh strategic competencies in driving the DT process. The same is revealed in Table 3, which shows that a behavioral competency (*Leadership* cluster) ranked #1 and also lists a higher number of behavioral competency clusters (4: *Leadership, Collaboration, Personality traits* and *Skills*) than strategic competency clusters (3: *Strategy, Change management* and *Data management*).

Interestingly, even the comments relating to strategic competencies contained a flavor of behavioral aspects. Comments pertaining to change management highlighted the value of diverse perspectives and challenging the status quo.

> It is not about change in the own organization but about change in the world around us

> You have to be able to see things from different perspectives and embrace diversity

> Healthy dissatisfaction with the status quo . . .

In asserting that managers need to adapt to new ways of leading, Elkington and Tuleja (2017) show how western leadership could benefit from communal and non-dyadic African and Confucian leadership approaches.

Similarity, comments related to the strategy cluster included telling a good story to gain employee trust in DT strategy (Kane *et al.*, 2015).

> Storytelling is part of this to convince people to work on new ideas, get funding or allocation of resources

Lastly, having established that behavioral competencies are as, if not, more important than strategic competencies, it is further posited that the importance of each behavioral competency cluster (i.e. *Leadership, Collaboration, Personality traits* and *Skills*) would vary depending on the country and industry that the firm operates in. For example, whereas management consulting firms may value human *skills* as their topmost behavioral competency for DT projects (Tavoletti *et al.*, 2021), firms in Africa or China – driven by a communal mindset – may perceive interdependence or *collaboration* as most important (Elkington and Tuleja, 2017).

> *Proposition 2.* Displaying behavioral competencies of digital leadership is collectively more important than displaying strategic competencies when driving DT. Furthermore, contextual variations in national culture and industry sector will dictate the prioritization of these behavioral competencies.

Discussion
The objective of this study was to derive and generate a rated list of leadership competencies considered by experts as necessary for managing DT in the post-pandemic industry 4.0 environment. We applied a Lockean-led Delphi survey approach with 18 international DT experts, who upon completing three rounds of the survey agreed on leadership, strategy and collaboration as the top three most important competency clusters. Through inductive theorizing, we further derived that the 7 discovered clusters fell into 2 broader competencies – behavioral and strategic – and that each behavioral aspect would have varying importance depending on the country and industry that the organization operates in. Prior research would lead our claim that behavioral competencies are particularly important in certain industries like consulting and in Western countries, where Hofstede's (2011) individualism cultural dimension is high. Hence, a clear contribution of our study is that contexts are vital in determining which aspects of leadership competences are most important in driving DT.

Furthermore, the findings of this study are consistent with prior empirical and theoretical literature (e.g. Kane *et al.*, 2019; Klein, 2020). According to Gilli *et al.* (2023), collaboration, strategic thinking and team leadership skills are the top three leadership competencies to manage DT. Our study revealed the same results in regard to the ranking of the competency clusters, with the experts rating leadership, strategy and collaboration the highest. Independent of clusters, visionary thinking, agility and understanding the value of data emerging as the most important competencies were tangentially consistent with Gilli *et al.* (2023) results. Hence, the Delphi results revealed that the competencies that are considered important by practicing managers are indeed similar to those emphasized in job advertisement contents for DT positions. Hence, a certain generalizability of the results can be assumed for global managers with similar experiences. Having found that a variety of leadership competencies are needed to ensure successful DT, our research aligns with other authors claiming that people, not technology, drive DT and that organizations require leaders and not necessarily technological specialists to manage complex changes (Furr *et al.*, 2019; Vial, 2019; Philip, 2021).

Theoretical implications

A particular theoretical contribution of this research lies in inductive theorizing. Situating the Delphi method in the empirically driven Lockean philosophy allowed us to place data before theory development, rank-order expert agreed-competencies and offer granulized findings from contextual perspectives. Not only did we enhance digital leadership literature by deriving propositional statements using Delphi results, but we also did so while evading a common criticism of the inductive bottom-up theorizing approach. Scholars have noted that such theorizing was often initiated without keeping the data close to the phenomenon of interest, which limited the data's ability to inform the theorists (Shepherd and Sutliffe, 2011; Glaser, 1999). We overcame this criticism by beginning our theorizing with the data and results. The phenomenon of concern being DT, we collected data on the necessary competencies. Subsequently, we proposed how leader behaviors were tied to competencies. Then, upon reviewing the data clusters, we discovered the inherent presence of digital leadership in our resulting clusters. Moreover, as suggested by Shepherd and Sutliffe (2011), we theorized the relationships among the extracted competencies and digital leadership, thereby expanding on this leadership's relevance in the DT phenomenon. Moreover, the congruence of behavioral competencies in DT with similar behavioral aspects found to be important for digital leadership is a clear path forward for further theory building.

Practical and policy implications

The study also yields important practice and policy implications. Our study helps mitigate assumptions that successful DT processes are only possible by hiring technological experts, as it highlights the importance of behavioral competencies. As leaders play a crucial role in anchoring DT in organizations, their educational qualifications and expertise have often been the focus for companies. Moreover, the behavioral competencies that emerged from our study would be useful to human resource managers in recruitment and career development of (future) leaders managing DT of their organization.

Such research findings even bear significance for international, national and regional policy frameworks. Our study sample included countries from Germanic/Nordic Europe (Germany, Sweden, Switzerland and Austria), Latin Europe (Spain and Italy), Anglo (UK, Australia) and Confucian Asia (China). From Hofstede's (2011) uncertainty avoidance cultural dimension (how strongly national cultures avoid or accept unplanned circumstances), we might further investigate how government policies for digitalization in corporations differ in countries with high and low uncertainty avoidance.

Limitations, future directions and conclusion

Like with most empirical research, our study consists of three limitations. As is typical for Delphi studies, gathering several experts and motivating them to complete each round could be difficult (Focht and Ponton, 2015). Hence, the first limitation concerns the moderate response rate of the study. Despite having sent out friendly reminders to fill the questionnaire and extending the deadline, several experts declined to participate in the first round due to busy schedules. Although some participants expressed interest in the study, others did not. Perhaps our messaging regarding the relevance of these findings for participants in their companies was not convincing, and hence, future researchers should consider offering stronger incentives to ensure high response rates in all rounds.

Second, we acknowledge that the generalizability in the Delphi method is limited to the selected panel of experts (Sandrey and Bulger, 2008). To overcome this limitation, future research should consider incorporating more experts with diverse backgrounds, experiences and perceptions. That said, as our sample was international, it is possible that cultural differences may have played a role. Therefore, it is crucial to control for such biases.

In conclusion, the present Delphi study surveyed expert senior managers from various countries to offer an inductively theorized understanding of key behavioral competencies for DT. We recognize that there may be contextual distinctions in the way DT occurs in any two countries (especially, ones that are diametrically opposed culturally). The present research on DT, a highly relevant and timely topic for leadership practice, caters to both leadership researchers as well as practitioners by combining strong empirics and leadership theory.

Note

1. These 12 experts were part of the 13 who participated in the first round.

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