



## Leadership in the Era of Digital Transformation: The Digital Leadership Approaches

Nicole Elizabeth Graham<sup>1</sup> 

<sup>1</sup>University of Regina, Wascana Parkway, Regina, Saskatchewan, Canada

\*Corresponding Author: [lizziebetee@gmail.com](mailto:lizziebetee@gmail.com)

### ABSTRACT

The digital era has heralded changes in the business environment that consequently transformed the understanding of leadership because technological advancement and digitalization place extra demands on organizational leaders. In exploring the concept of leadership in the digital age, this study employed an integrative literature review method. The article establishes that successful digital leadership depends on the transformational leadership approach. Successful digital leadership is contingent on the leader's ability to inspire, motivate, build relationships, collaborate, generate ideas, and model requisite behaviours toward the attainment of organization goals. The findings from this review indicate that digital leadership is crucial to the outcomes of an organization such as innovation, problem-solving, digital transformation, organizational performance, growth, and sustainability. At the same time, the effectiveness of digital leadership depends on the success of digital transformation, innovation, organizational performance, and growth. Achieving effective digital leadership necessitates that leaders employ a combination of approaches, which this article described under the concept of the digital leadership system. This article proposes the digital leadership system (DLS) which encompasses the ideas that successfully leading digital enterprises, digital transformation, and digital or technological innovations require a future-oriented approach and timely positioning of the business, navigating self and people, tracking performance, and mapping data, and driving growth and innovation to achieve the three-dimensional sustainability outcomes. The article highlights the critical expectations for leadership under each approach and broadened the knowledge about leadership in the digital era by presenting the definitions of digital leadership. In addition, valuable ideas are discussed for supporting successful real-world practice of digital leadership and areas of further research useful in advancing knowledge about digital leadership are outlined.

**Keywords:** Big Data, Bridge-Building, Digitalization, Digital Leadership, Innovation, Organizational Learning, Organizational Performance, Vision

### Publication Timeline

|          |            |
|----------|------------|
| Received | 2025.01.28 |
| Revised  | 2025.11.11 |
| Accepted | 2025.12.01 |



## INTRODUCTION

The context of leadership has changed due to digital transformation. In the digital age, exploiting digital technologies and supporting capabilities to build a strong digital model results in digital business transformation. Transitioning to the digital age, either through digitization or digitalization is associated with changes regarded as digital transformation (Gartner, 2019). Digitalization is the process of changing to a digital business by leveraging digital technologies to transform the business model and create new revenue streams and value-generating opportunities. Digitization or digital enablement refers to converting a process from analog to digital without changing the process itself (Gartner, 2019). Digital transformation is inevitable for all businesses and industries and entails the implementation of different technologies and innovations (Antonopoulou, Halkiopoulou, Barlou, & Beligiannis, 2021). Expressly, digital technologies are constantly evolving, and new digital technologies are continuously emerging (Brunner, Gonzalez-Castañé, & Ravesteijn, 2021). Thus, leaders require different ways of thinking, acting, reacting, and directing the organization to enable organizational success in a business world that is undergoing rapid digital transformation (Artüz & Bayraktar, 2021). Seals (2022) indicated that the leader's actions (what they do) and the leader's cognition are two important elements of digital leadership. Thus, what does digital leadership entail? What are the requirements for leading in the digital age? This study investigates the approaches that are necessary for leadership to achieve success in a business environment that is changing due to digital disruption.

It is pertinent to understand the leadership skills, traits, and approaches that are essential in the era of digital transformation, as Hensellek (2020) indicated that technological advancement or digitalization places extra demands on organizational leaders, and even the employees and the environment. Magesa and Jonathan (2021) established that the adoption of digital technologies causes changes in communication, relationship building, business models, key service

delivery, business processes or operations such as production, organizational structures, design of work, and business management which impact firms' efficiency, effectiveness, survival, and competitive advantage. Digitalization has brought three-fold changes which are changes in the roles of customers in terms of communication and consumer behaviors, increasing competition due to lower entry barriers to businesses, shorter innovation cycles, and changes to the world of work such as workplace designs, job designs, etc., (Hensellek, 2020). Digitalization changes the business environment rapidly and brings about complexities that require leaders to adapt their approaches. Specifically, deliberate leadership approaches are required in handling the changes occurring in organizations due to the adoption of digital technologies. Leading the current trend of disruption that is powered by digital tools and technologies, such as artificial intelligence, machine learning, Internet of Things (IoT), circular economy platforms, virtual reality, blockchain, cloud computing, and big data analytics may require reinventing the mindset about leadership and competencies for successfully driving digital transformation (Neubauer, Tarling, & Wad, 2017).

In the digital era, leadership is a significant innovative process that essentially occurs across diverse levels within a firm (Bolatan et al., 2022). Leadership is not restricted to a job or position but includes the ability to solve problems and achieve results by bringing people, resources, and tools together, and exhibiting behaviors that influence others and engender success (Fahmi et al., 2020). Moreover, leadership is considered a fundamental element of organizational values and belief systems because when organizations change over time, leadership must also change and adapt (Alnuaimi, Singh, Ren, Budhwar, & Vorobyev, 2022). Therefore, as organizations are changing due to the disruption that is steered by innovations in digital tools and technologies, it is crucial to understand what digital leaders are doing in this dispensation, what digital leadership signifies, and the approaches, knowledge, skills, and traits that are important for their performance. In addition, it is important to

comprehend the why's and what's of digital leadership through a theory that explains leadership approaches in the era of digital transformation, and which may guide the analysis and reasoning about digital leadership.

## METHOD

This study employed an integrative literature review technique in examining leadership in the digital age. The publications analyzed in this review were obtained through database searches that include Emerald Insight, Taylor and Francis Online, Google Scholar, Springer Link, Science Direct, and Oxford Academic. The search terms used in identifying publications include digital leadership, digital transformation and leadership competencies, digital leadership, digital economy, digital leadership in business organizations, and digital leadership in organizations. The terms above also served as the inclusion criteria and in addition other inclusion criteria used in selecting the reviewed literature were AI and leadership, industry 4.0 and leadership 4.0, digital leadership in the high-tech economy, health 4.0 leadership, agile leadership, and an indication that the organizations studied were using digital infrastructures intensively and maintained digitalization as a competitive strategy. The exclusion criteria include informal digital leadership on social media, teachers' instructional and educational leadership, digital city governance, digital teaching materials, society 5.0 and leadership, e-tourism leadership, e-leadership, virtual leadership, and political/state leadership.

The publications that were incorporated in the review based on the aforementioned strategy were 66 articles. In addition, 14 publications about important concepts that were sought separately were also integrated in this study and 4 web-based publications about digitalization, digital leadership, and framing concepts were also included in the study (See Appendix A). The findings from the selected publications were extracted and summarized. The summarized findings were analyzed to identify central ideas and patterns from the selected literature. The synthesis involves

grouping identified concepts into themes. The ideas were synthesized to create new knowledge about digital leadership by following the integrative literature review method suggested by Torraco (2005). The integrative literature review guidelines emphasized the use of existing literature and organizing theory in generating new knowledge. Precisely, the assumptions gleaned from the Global Positioning System and the transformational leadership theory served as the guiding theories. The ideas from the Global Positioning System provided the conceptual structuring for the article. The study used the concepts from the global positioning system in a metaphoric way in constructing new knowledge from the findings synthesized from literature about digital leadership. This article presents a new formulation about digital leadership, which is the digital leadership system (DLS), and in addition offers new definitions of digital leadership.

## THE CONCEPTUALIZATIONS OF DIGITAL LEADERSHIP

Digital leadership has been defined as “doing the right things for the strategic success of digitalization for the enterprise and its business ecosystem” (El Sawy, Kræmmergaard, Amsinck, & Vinther, 2016, p. 142). Digital leadership is the discipline of navigating an organization towards digital transformation to stay competitive and agile in a rapidly evolving digital and social media landscape. Digital leadership is “a complex construct aiming for a customer-centered, digitally enabled, leading-edge business model by transforming the roles, skills, and styles of the digital leader, realizing a digital organization, including governance, vision, values, structure, culture, and decision processes, and adjusting people management, virtual teams, knowledge, and communication and collaboration on the individual level” (Eberl & Drews, 2021, p. 5). Leadership 4.0 or digital leadership is about ideas, innovations, collaborative networking and decision-making, leading digital business transformation, using digital assets to achieve business goals, and having a global and

multicultural mindset (Fahmi et al., 2020). Leadership is an innovative process that is frequently initiated by people with integrity, confidence, inspiration, conviction, devotion, and the ability for creativity and empowerment (Bolatan et al., 2022). Therefore, drawing from the current descriptions of digital leadership and assumptions in the reviewed literature, this article proposes four definitions of digital leadership. The first definition of digital leadership presented by this article is as follows. Digital leadership is a process of influencing, facilitating, activating, and pioneering continuous, ongoing, and timely digital or technological-based innovations and changes (transformations) through the creation or modification of products, services, and processes by employing digital knowledge and other behavioral technical competencies to achieve organizational goals/objectives and a sustainable business or digital ecosystem. For example, successful disruptive innovation that is groundbreaking depends on digital leadership with entrepreneurial orientation which is the ability for proactivity, innovativeness, and willingness to take risks (Kraus, Vonmetz, Orlandi, Zardini, & Rossignoli, 2023). Digital leadership with problem-solving abilities facilitates the development of new technologies and goals (Baglama et al., 2022). Digital leadership shows a positive influence on economic, social, and governance management in firms from various sectors (Niu, Park, & Jung, 2022).

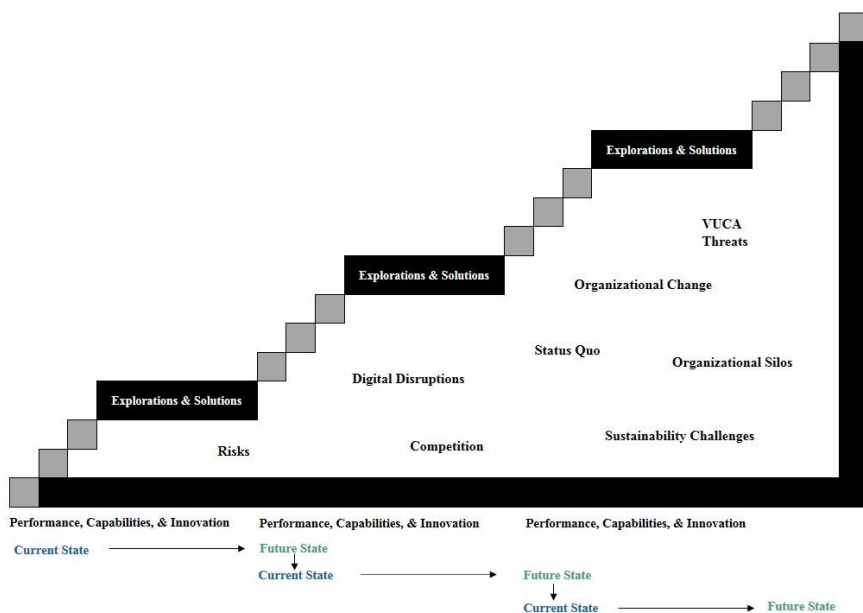
In addition, this article presents a second definition of digital leadership. Digital leadership is a bridge-building process between the current state of digital or technological innovation and the futuristic novel innovation. Digital leadership involves bridging the innovation, capabilities, and growth gaps. Digital leadership is a bridge-building process between the current state of digital or technological know-how or capabilities or business performance and the desired or futuristic state of digital or technological know-how or capabilities or business performance. Figure one and Appendix B portray the visual representations

of the definition of digital leadership. This definition of digital leadership is justified as follows. Bridges expedite travel, freedom of movement, and communication. Skrefsrud (2020) stated that bridges connote an opportunity to explore what lies on the other side of the expanse and to journey into new areas. Bridges create a safe connection to places that might have been unknown because they were inaccessible. Thus, this article indicates that bridges are important in exploring opportunities and possibilities in the business world, and digital leaders are bridge builders. For instance, Skrefsrud (2020) indicated that in educational settings, teachers' work involves bridge building, and teachers are bridge builders who facilitate communication, bridge differences, and build relationships across cultures. Likewise, digital leadership requires that leaders act as bridge builders who are not confined to the known or the tried and tested but explore new possibilities, engage in experimentation, and seek new ideas and approaches. Digital leadership involves a continuous bridge-building process that encompasses explorations and solutions in the navigation of self, people, and business. In the age of digitalization, leadership requirements include identifying new problems, avoiding complacency or satisfaction with the current status quo, and possessing the drive to improve self, people, and the entire organization (Schmidt, van Dierendonck, & Weber, 2023).

This article describes digital leadership as a bridge-building process. Digital leadership involves building a bridge to overcome obstacles. As bridges are means of enabling movements and exchanges and are common means of overcoming barriers such as rivers, cliffs, deep fjords, etc., (Skrefsrud, 2020). Thus, digital leadership involves bridge building over VUCA threats, rapidly changing technological landscape, and subsequently bringing employees along the bridge to overcome the obstacles. For instance, enterprises are facing the challenges of digitalization due to the exponential rate of transformations in the global digital environment and the volatile, uncertain,

complex, and ambiguous (VUCA) environment (Wang, Lin, & Sheng, 2022). Specifically, this article proposes that digital leadership is required for continuous environmental scanning and analysis regarding the VUCA environment dimensions in the digital era as indicated by Băeșu and Bejinaru (2020). Digital leadership involves building bridges to overcome the volatility, uncertainty, complexity, and ambiguity (VUCA) threats, known and anticipated risks, and other internal and external forces in the business environment to achieve or enlarge organizational digital or technological know-how, capabilities, innovation, and business performance. According to Bach and Sulíková (2021), digital leadership is pivotal to digital

transformation, because industry 4.0, smart factory, and the VUCA threats, represent changes in the internal and external environment of companies that necessitate a new way of leading. For example, in the digital era, top executives of large manufacturing companies have the responsibilities for handling different forms of disruption such as disruptive technologies and innovations, market demand and supply disruptions, and institutional disruptions and systemic shifts (Wallin, Pihlajamaa, & Malmelin, 2022), and which are VUCA conditions of the digital era that make digital leadership very crucial (Jäckli & Meier, 2020).



**Figure 1:** Digital Leadership

*Source:* created by the author (Graham, 2025)

## THE DIGITAL LEADERSHIP APPROACHES

Digital leadership focuses on business strategy, value-producing opportunities, business models, enterprise platforms, technology, the corporate IT function, digital customer engagement, people's mindset and

skill set, and a humanized workplace (El Sawy et al., 2016). The digital leadership approaches determine the leadership outcomes (Antonopoulou et al., 2021). Based on these ideas, this article establishes that the digital leadership approaches are entrenched in the tenets of the transformational leadership theory. Transformational leadership theory

indicates that leadership approaches involve employing behaviors, actions, and communications that inspire followers or teams to perform beyond their perceived capabilities (Bass, 1985). Literature indicates that the digital leadership approach bestows on the leader unique characteristics and performance that influence a leader's behavior and decisions, and in turn firm-level variables (Wang et al., 2022). Hence, digital leaders are transformational leaders who play a proactive role in achieving organizational goals and objectives by focusing on employees' innovative work behavior and encouraging innovative and creative ideas and free expressions of opinions about work processes (Erhan, Uzunbacak, & Aydin, 2022). According to Bass (1985), transformational leaders are change agents who identify changes required in a system and guide followers in instituting the change through energizing vision, and supportive cum empowering work environment that enables enhanced motivation, performance, and goal achievement (Bass, 1985). Transformational leaders develop future-oriented goals, and strategies that move the institution in the direction of the goals (Hawkins, 2009). Concurrently, a digital leader should inspire and help organizational members to adapt and adopt digital changes (Magesa & Jonathan, 2021). The digital leaders' creativity is positively connected to the ability to cope with numerous digitalization-related challenges, handle digital change, and formulate suitable business strategies (Klus & Müller, 2021).

The four components of transformational leadership which are idealized influence, inspirational motivation, individualized consideration, and intellectual stimulation are crucial in enhancing motivation and job performance and are relevant to the digital leadership approaches. Idealized influence is about acting as role models or examples to followers (Bass, 1990). In a constantly changing business environment, transformational leaders perform the roles of visionaries, role models, and facilitators (Hawkins, 2009). Thus, a leader's ability to create a clear and meaningful vision for the

digitization process is vital for digital leadership (Niu et al., 2022). Inspirational motivation involves inspiring and motivating followers through a compelling vision (Bass, 1990). Similarly, digital leadership entails an inspirational role that requires behaviors or skills such as convincing, influencing and motivating, enthusiasm, and trustworthiness (Magesa & Jonathan, 2021). Individualized consideration entails building relationships with followers, showing concern for the needs of followers, and acting as supportive resource through coaching, mentoring, etc., (Bass, 1990). Transformational leaders use collaborative and supervisory processes in eliciting employee engagement toward the institution's vision (Hawkins, 2009). For instance, digital leaders build expertise and collaborations in their teams, and support teams in adhering to a data-driven operating model which involves using data for generating insights for business improvements (Schmidt et al., 2023). Intellectual stimulation is a dimension that involves challenging the status quo by enabling followers' creativity, innovativeness, and openness to new ideas (Bass, 1990). Precisely, digital leadership is positively and significantly associated with innovative work behaviors such as idea exploration, idea generation, idea championing, and idea implementation, which are the major sources of organizational sustainability and competitiveness (Erhan et al., 2022). Based on the argument above, this article proposes a third description of digital leadership by underlining what a digital leader does. Digital leaders are digital visionaries, role models, and change agents who inspire, motivate, build relationships, collaborate, lead ideas generation, and develop human resources' capabilities toward innovation, digital transformation, and business performance. In addition, this article specifies the fourth delineation of digital leadership which encompasses ideas from the transformational leadership theory and the synthesized literature. Digital leadership is a leadership approach that entails behaviors, actions, and communications for developing or driving digital strategies, digital change,

and innovative work behaviors/capabilities for achieving organizational goals and objectives that include innovation, digital transformation, and business performance.

Furthermore, in portraying the digital leadership approaches, this article used a metaphor to extend thoughts about digital leadership and in elaborating the concept of digital leadership. Based on the analysis of literature and the categorization and integration of predominant and significant themes found in literature about digital leadership, this article posits that the digital leadership approaches are synonymous with the functions of a Global Positioning System (GPS). The global positioning system is a good metaphor for describing the approaches of digital leadership. Metaphors are useful for creating realities and facilitating understanding about subjects. Metaphors help in understanding one thing in terms of another or describing one thing with the qualities of another thing (Skrefsrud, 2020). Similarly, this article describes the approaches of digital leadership through the functions of a global positioning system. Metaphors help in drawing on concrete and familiar domains in reasoning about abstract concepts and developing new abstract representations to understand new situations (Jamrozik, McQuire, Cardillo, & Chatterjee, 2016). Thus, this article draws from the domains of aerospace, communications, and transportation in reasoning about the concept of digital leadership. For instance, a global positioning system satellites transmit data about current location and time to users and synchronizes operations to transmit repeating signals concurrently (Atabudhi, 2017). A global positioning system is used for location, navigation, tracking, mapping, and timing (Kyes, 2023).

The location function involves determining a position. Navigation entails getting from one location to another. Tracking involves monitoring the movement of objects or people. Mapping functions involve creating maps. Timing entails taking precise time measurements (Kyes, 2023). To understand the concept of digital leadership, this article

used the concepts of a global positioning system to develop illustrations about digital leadership. Therefore, this article proposes that the digital leadership approaches include positioning, navigating, tracking, mapping, timing, and driving, within the business environment. Specifically, digital leadership involves positioning the firm, self, and others. According to Cravens and Piercy (2009), positioning implies deciding the desired perception or association of an organization you want the stakeholders to have about the organization. Based on the views of Kotler and Keller (2009) positioning is locating the business in the minds of the customers to enable an organization to achieve maximum benefits (Kotler & Keller, 2009). Positioning means taking up a position and showing leadership and vision. Thompson (2003) indicated that positioning is having a credible and profitable place in the minds of customers. In educational settings, positioning means “the discursive process whereby people are located in conversations as observably and subjectively coherent participants in jointly produced storylines” (Davies & Harré, 1999, p. 37). Moreover, individuals can position themselves or can be positioned by another. Similarly, firms position themselves and their products and position their employees and the leaders in the business environment. Navigation is defined as the route and means to a destination, whereby the destination could be a goal (Dettmer, 2003). Strategic navigation is navigating the way to a goal, and navigating is moving something or someone from where they are to where they want to be or ought to be (Dettmer, 2003). Likewise, digital leadership entails moving the business, moving the digital transformation projects, innovation, etc., and moving self and people to reach the goals or desired expectations for the firm.

Tracking is monitoring the progress of a thing by recording and observing it (American Psychology Association [APA], 2018).

Essentially, digital leaders monitor the business progress, digitalization progress, digital transformation outcomes, and other key KPIs. Digital leaders use data to make decisions, and map the data; visualization. Digital leaders provide and use data in a comprehensible format which can be referred to as mapping. According to Trochim (1989), mapping is making a graphic or pictorial product that shows all major ideas and their interrelationships. Digital leadership encompasses a time orientation, making timely decisions, and demonstrating a future orientation approach to the business. Nurmi (2006) described future orientation as thinking about and acting upon the future which involves the deployment of processes such as goal setting, planning, values, optimism, etc.. Essentially, this article used the guiding vehicle of the global positioning system in the development of the concepts and assumptions about the digital leadership approaches. Therefore, this article proposes that digital leaders lead the business, innovation, digital transformation, digital enterprises, etc., through an all-encompassing approach that entails a combination of elements which are positioning, navigation, tracking, mapping, driving, and timing cum future orientation. Furthermore, based on the integration of ideas from the global positioning system and the transformational leadership theory, this article proposes the Digital Leadership System Theory (DLS) which encompasses ideas about the roles of a digital leader and digital leadership. This article presents the first theoretical statement about the digital leadership approaches. The Digital Leadership System Theory (DLS) states that digital leaders are digital visionaries, role models, and change agents with a futuristic mindset who perform positioning, navigation, tracking, mapping, driving, and timing roles within digital and non-digital enterprises and employ inspirational, motivational, relationship building, collaborative, and ideas generating/championing competencies

toward innovation, digital transformation, and business performance. The evidence from literature regarding these elements; positioning, navigation, tracking, mapping, driving and timing/future orientation, are discussed in detail in the following sections and the second theoretical statement about digital leadership is discussed under the theoretical implications section.

### **Positioning the Business, People, and Self**

This article assumes that the timely positioning of the business, people, self (leader), and other resources is a critical starting point for successfully leading digital enterprises, digital transformation, and digital or technological innovation. Positioning involves portraying or promoting a business or defining where a business or product stands in comparison to other similar businesses or products. Positioning is what makes an organization or brand occupy a distinct position in the industry, market, and in the minds of customers and competitors. Positioning distinguishes the organization in the business ecosystem. Digital leadership involves engaging in activities and actions that promote the business offerings and situate the organization in a distinct segment of the economy. This article established from literature that the positioning elements for successful digital leadership are visioning, goal setting, formulating strategies, putting in place structures and processes, and making decisions based on data.

### **Vision, Strategy, and Goal-Setting**

Digital leadership involves giving direction or vision which helps in absorbing uncertainty. A digital leader has a visionary role that encompasses having a vision and encouraging or instilling confidence, which has a positive influence on the leaders' ability to lead successful digital transformation (Magesa & Jonathan, 2021). Developing and communicating a digital transformation vision by the leader is essential in achieving successful digital transformation (Cichosz, Wallenburg, & Knemeyer, 2020). A clear vision of digital transformation processes and

the aptitudes to use and actualize digital strategies pave the way for successful digital transformation (Zeike, Bradbury, Lindert, & Pfaff, 2019). For example, leaders who are perceived as digital pioneers, conceptualize a distinct digital vision and strategy, understand the drivers of digital transformation, and detect early digital trends that significantly impact the business and influence the degree of transformation of an organization's digital processes, digital talent engagement, digital business models, and organizations' digital maturity (Weber, Krehl, & Büttgen, 2022).

The ability to build strategies to realize the vision is a core component of digital leadership (Niu et al., 2022). Digital leadership has a positive correlation with digital strategy (Kieser, 2017). For example, the managers in large manufacturing companies in Finland employ both exploitation (exploit business opportunities to the fullest while protecting the business from disruption) and exploration (explore radical innovations and initiate change) strategies in managing disruptions (Wallin et al., 2022). One of the digital practices that make leaders excel and impact performance in B2B companies is the commitment to digital at a strategic level (Catlin, Harrison, Plotkin, & Stanley, 2016). Boards of directors with capabilities for directing and governing technology-enabled strategy and planning maximize technological advantages and enhance organizational performance at all levels (Valentine & Stewart, 2015). Organizational strategic priorities that include prioritizing new business models, building competitive advantages, and cost management are positively related to effective leadership in digital enterprises (Karippur & Balaramachandran, 2022). Planning practices such as digital goal setting fully mediate the relationship between leadership digital acuity and digital transformation success (Seals, 2022).

### **Structure, Processes, and Governance**

Leaders with the capabilities to meticulously attend to structure, business outcomes, and relevant key performance indicators

considerably impact the degree of transformation of an organization's digital processes (Weber et al., 2022). Digital transformation leaders who excel and impact performance create an organizational structure that supports their digital transformation (Catlin et al., 2016). Organizations with digital leadership competencies of architecture design and business plan development competencies are likely more successful in the adoption of digital technologies and digital transformation because of the highly positive effect of architecture design and business plan development on digital transformation (Brunner et al., 2021).

A leadership priority involves achieving creative organization operations and restructuring internal systems and procedures (Antonopoulou et al., 2021). Ensuring alignment and dynamic synchronization of business/IT strategies and resources and building an agile organization for fast adaptation to changing environments are important leadership practices for digital transformation (Cichosz et al., 2020). Essentially, digital leadership accounts for process effectiveness; digital leadership positively moderates the effect of cloud-based accounting effectiveness on decision-making quality (Hung, Hoa, Hoai, & Nguyen, 2023). Digital leadership demonstrates a strong positive relationship with digital insights which entails the incorporation of modern architectures, digital tools, customer insights, and lessons learned into the digital business strategy, and the measurement of the success of digital design and development (Kieser, 2017).

Board governance that is digitally focused with established digital governance structures which are steering mechanisms for coordinating digitization efforts and implementing agile working methods and processes for digital management appropriately places the organization in the business environment and helps in realizing the desired outcomes from digital strategies. Specifically, digital governance impacts digitization progress and is essential in the

VUCA-conditions of the digital era. Digital governance concerning data protection, privacy, and the handling of big data facilitates successful leadership in the digital age (Jäckli & Meier, 2020).

Proposition 1: If the digital leadership approach of positioning the business, people, self, etc., through vision, strategies, goal setting, structures, processes, and governance is positively related to organizational performance regarding digital transformation or innovation then, increased organizational performance symbolizes successful digital leadership.

### **The Navigating Approach of Digital Leadership**

A thriving digital leadership is about navigating self and people toward the vision, strategies, goals, and processes. Navigation entails dealing with complexities and moving through the complexity of the constantly changing digital business environment. Digital leaders' capacity to navigate successfully toward the vision, strategies, goals, etc., requires some behavioral and non-behavioral competencies. Digital leaders deal with complexities such as change, cultural change, risk management, knowledge management, learning, etc.

### **Skills, Knowledge, Abilities, Traits, and Behaviours**

#### **Knowledge and Abilities**

Digital leadership cognition that includes a comprehensive view of the environment, knowledge about business trends, and making decisions about digital investment and strategy contributes significantly to digital transformation success that entails improved value proposition and competitiveness (Seals, 2022). Digital leadership has positive impacts on employees' digital capabilities (Shin, Mollah, & Choi, 2023) while increased capabilities directly influence a firm's productivity and account for 57% of the variance under industry 4.0 (Dabic, Maley, Cresnar, & Nedelko, 2023). Managers with more of the entire dynamic managerial

capabilities: human capital, social capital, and cognition, promote digital firms' innovativeness in the industry 4.0 sector in Germany (Heubeck & Meckl, 2022).

Digital leadership has a strong positive correlation with organizational digital competence such as digital skills and resources, and the effectiveness of the planning and execution processes of digital transformation (Kieser, 2017). Digital leadership has a positive and significant effect on workers' digital skills such as digital technical skills, digital communication, digital analysis, and digital thinking (Tulungen, Tewal, & Pandowo, 2022). Digital leadership has a positive relationship with IT capabilities while the digital leaders' IT-proactive stance fully mediated the relationship between digital leadership and sustainable organizational performance (Mollah, Choi, Hwang, & Shin, 2023).

Digital literacy enables managers to gain an adequate understanding of the transformation process and prepare for addressing its challenges (Jafari-Sadeghi, Mahdiraji, Alam, & Mazzoleni, 2023). A high level of digital literacy is the main driver of digitization progress because organizations with a high level of digitally literate employees have more digital initiatives and promote a digital culture, whereas a dearth of digitally educated employees hinders digital transformation, while the know-how concerning digital tools and software and competence in analyzing data is important for digital leadership (Jäckli & Meier, 2020). Digital skills such as data analytic skills, digital tools/systems knowledge, and technical skills are essential for digital leadership (Munsamy, 2012). Digital leadership competencies that include information technologies capabilities such as IT business spanning; ability to create, transfer, and retain knowledge, and IT proactive stance, have the highest impact on the market competitiveness and implementation of digital technologies in different companies and industries in Europe (Brunner et al., 2021). IT skills, e.g., analyzing data appropriately and making sense of it, help in coping with several

digitization-related challenges and managing digital change (Klus & Müller, 2021).

### **Skills and Behaviors**

The digital competitive intelligence required for digital leadership includes systemic thinking, networking, mitigating risks in the digital approach, and market/business intelligence (Munsamy, 2012). Leaders need strong communication skills for reducing the complexity of data analysis to a core message articulating findings easily and conceivably, and for communicating internally and externally (Schmidt et al., 2023; Muniroh, Hamidah, & Abdullah, 2022). Moreover, leaders influence, motivate, and encourage people to accomplish goals to achieve organizational success in the digital world (Artüz & Bayraktar, 2021). The digital leaders' competence to motivate others engenders the ability to handle numerous digitalization-related problems (Klus & Müller, 2021). A digital leader that is capable of influencing others activates employee innovativeness (Muniroh et al., 2022). Employees who perceived their leaders as digital mentors (who provide individual support, mentoring, and feedback to encourage and motivate employees to achieve their individual goals) reported higher levels of knowledge sharing (Weber et al., 2022). The success factor for digital transformation is leadership that can empower employees, cascade digital transformation decisions down, and inspire or motivate employees to be an active part of the digital transformation (Cichosz et al., 2020).

Agility helps organizational leaders in driving digital transformation (Karippur & Balaramachandran, 2022). Digital transformational leadership positively influences organizational agility, which is the organization's capacity to identify unanticipated changes in the environment and respond quickly and proficiently by using and reconfiguring internal resources toward gaining a competitive advantage (Alnuaimi et al., 2022). Agile leaders are adaptable (adapt quickly to current contextual business situations), adept at dealing with complexities, and engage in fast execution to

successfully thrive in disruptive environments (Neubauer et al., 2017). A high degree of flexibility; the ability of the leader to react to different requirements quickly and cope with different challenges, is positively connected to managing digital change (Klus & Müller, 2021). Flexible and adaptable leaders facilitate innovation (Muniroh et al., 2022). The leaders of digitally mature companies engage in open innovation by generating new ideas through timely and open communications with clients, suppliers, and business partners (Abbu, Gudergan, & Kwiatkowski, 2020).

Digital leadership, which includes the dimensions of creativity, thinking, inquisition, curiosity, etc., has a positive impact on exploratory innovation (Wang et al., 2022). The capacity toward creativity and innovativeness is a contributor to the digital transformation decision of SME entrepreneurs (Jafari-Sadeghi et al., 2023). Innovativeness and proactiveness which are components of digital entrepreneurial orientation mediate the positive relationship between digital leadership and exploratory innovation, i.e., the acquisition and application of new knowledge in developing new products or services, processes, and models (Wang et al., 2022). Innovation-oriented leadership fosters digital transformation by encouraging innovation-oriented values through the promotion of creative ideas and engagement in collaborations with internal and external stakeholders (Moschko & Blazevic, 2023). Employees who perceived their leaders as innovators (who drive and implement change processes through innovative and creative ideas, engage in creative problem-solving approaches, and take innovative initiatives in increasing innovation) indicated higher levels of innovative job performance (Weber et al., 2022).

### **Traits for Digital Leadership**

Leadership performance depends on leadership values that influence productivity and contribute ultimately to business effectiveness and sustainability. Individual values impact a firm's productivity under

industry 4.0; soft and hard personal values significantly impact digital capabilities through a 33% variance, and in turn, digital capabilities have significant effects on productivity under industry 4.0 (Dabic et al., 2023). In the digital era, leadership that is based on kindness, caring, gentleness, and graciousness towards colleagues is effective for innovativeness in the technology sector (Aranega, Montesinos, & del Val Núñez, 2023). Digital leadership involves a trust-based approach to managing enterprises and staying abreast of digital developments (Erhan et al., 2022). The leaders of digitally mature companies in America, Europe, Asia, Africa, and Oceania demonstrate integrity, act as promoters, and role models of the digital transformation process, and are trustworthy (Abbu et al., 2020). For instance, trust builds a competitive advantage for Non-Fungible Tokens (NFT) business models such as NFT creator, NFT marketplace, etc., because the reliability and transparency of the transactions build trust among everyone involved (Zarifis & Cheng, 2022). Calmness under pressure is a personal trait that is positively connected to the ability to cope with many challenges due to digitalization and digital change management (Klus & Müller, 2021). Humility (i.e., accepting feedback), respecting the ideas and knowledge of others, and acknowledging that a single person cannot know everything that is required in making a decision, promote agility in leaders (Neubauer et al., 2017).

### **Change Management and Cultural Change**

Navigation involves understanding and dealing with the complexities of driving change, change management, and cultural change, in the disruptive digital and business ecosystem. Specifically, digital leaders are agents of change and exhibit human agency that enables a firm to digitally transform its processes, services, and operations (Magesa & Jonathan, 2021). A leader of digital transformation must be an orchestrator of change; and create the conditions for change (Cichosz et al., 2020). Digital leadership strongly and positively correlates with organizational digital competence needed for steering digital change programs (Kieser,

2017). In the digital era, change management is a competency relevant to digital leadership (Munsamy, 2012). Digital leadership competencies such as innovating and business change management drive digital transformation (Brunner et al., 2021). Technology leadership in the C-suite fosters organizational change and increases a firm's relative orientation toward the exploration of novel knowledge domains, lessens adaptation pressure, and eventually produces organizational alignment with the environment (Bendig, Wagner, Jung, & Nüesch, 2022).

Organizational culture is assumed to be a means of acquiring sustainable competitive advantage and organizational effectiveness and is deemed a critical success factor for projects involving organizational change (Wang et al., 2022). The leaders' ability to foster a supportive organizational culture determines the success of digital transformation (Cichosz et al., 2020). Digital leadership's impact on exploratory innovation is positively mediated by digital organizational culture, which is a set of shared assumptions and understanding regarding organization functioning in a digital context (Wang et al., 2022). Digital leadership is positively related to digital culture and digital culture plays a positive mediating role between digital leadership and organizational performance (Shin et al., 2023). Digital leadership positively and strongly correlates with digital organization and culture, e.g., a culture of effective communication that supports collaboration and allocation of resources which enables innovation (Kieser, 2017). A supportive organizational culture leads (e.g., communicating and sharing the company's norms, values, and beliefs, questioning the attitude of employees, and accepting mistakes) to successful digital transformation (Cichosz et al., 2020). Digital leadership and digital culture positively/significantly influenced digital competencies that are regarded as world-class psycho-social work habits, e.g., continuous improvement, proactivity, integrity, innovation, professionalism, collaboration, service orientation, and digital skills (N.

Saputra & A. Saputra, 2020). The association between digital leadership and exploratory innovation is strongly moderated by digital organizational culture, especially in an organization with a high level of big data analytics capabilities (Wang et al., 2022).

The hallmark of top-performing digital transformation leaders is the ability to create a culture anchored on innovation and execution through the deployment of agile development practices, rapid experimentation, and a fast-paced test-and-learn system that teaches the right innovation behaviors (Catlin et al., 2016). Leadership that cultivates a supportive culture which embraces collaboration, risk-taking, and experimentation enables organizations to compete effectively in an increasingly digital environment (Kane, Palmer, Phillips, Kiron, & Buckley, 2017). Leaders that support a 'fail fast culture', promote an entrepreneurial mindset to employees, cross-functional collaboration with business counterparts, and achieve organizational digital maturity (Abbu et al., 2020). Leadership that fosters a very high experimental environment and an agile culture generates a high innovation culture and an experiment-driven culture that positively and significantly impact digital transformation performance perception (Leso, Cortimiglia, & Ghezzi, 2023). A digitally oriented board culture and leadership promote digital innovation and organizational use of technology or information in creating and sustaining business values (Valentine & Stewart, 2015).

### **Collaborations and Partnerships**

The navigation of the business through the complexities and ambiguities of the digital business environment requires digital leadership with a people-oriented focus that builds collaboration and partnerships. Leadership that makes employees feel that they are an essential part of the organization achieves organizational goals and objectives (Erhan et al., 2022). Leaders who engage, listen, interact, and communicate with internal and external stakeholders, possess a keen sense of interest and curiosity in emerging trends, and explore, discover, learn,

and discuss with others are effective (Neubauer et al., 2017). Leaders who are capable of breaking down functional silos and focusing on cross-functional collaboration accomplish success in digital environments (Kane et al., 2017). The leader's ability to leverage internal and external knowledge through collaboration with technological suppliers leads to a successful organization's digital transformation (Cichosz et al., 2020). Innovation-oriented leadership drives internal and external collaborations which increase digitization contribution to innovation activities such as process optimization and business model innovation during digital transformation (Moschko & Blazevic, 2023).

In the digital era, diversifying business models through creative partnerships results in effective leadership (Karippur & Balaramachandran, 2022). Leaders that engage with employees and partners, and foster cross-boundaries collaboration, communication, and collaboration with clients engender successful digital transformation (Cichosz et al., 2020). Leaders who develop and maintain interdisciplinary connections inside and outside the organization and build an information network that facilitates consultation from many different sources in solving emerging issues reported higher levels of knowledge sharing among employees (Weber et al., 2022). In addition, data-driven leaders demonstrate team leader competence which entails contingent rewarding, resource allocation, empathy, and delegation (Schmidt et al., 2023). Leadership with teamwork competence fosters direct and significant effectiveness in innovative SMEs and multinational organizations (Aranega et al., 2023).

### **Learning Orientation, Knowledge Sharing, and Experimentation**

Digital leadership directs the path and course of self and people through learning, knowledge sharing, and experimentation toward innovation or digitalization goals. Digital leaders create an environment where employees are motivated to continuously learn, acquire digital experiences, and grow.

Learning orientation has a significant impact on digitalization, as it provides a mental mindset that enables business owners to evaluate and recalibrate inputs, outcomes, processes, and policies required for adopting technologies (Ismail, 2023). Facilitating rapid learning throughout the company enables companies to be future-ready because being adaptive and responsive to an uncertain future requires adopting test-and-learn approaches to explore ideas, create value, and scale learning across the company (Leavy, 2023). The main enablers of innovation in data-driven companies are learning culture, active knowledge exchange, skills enhancement, and human resources empowerment (Visvizi, Troisi, Grimaldi, & Loia, 2022). Organizational learning fully mediated the relationship between digital leadership and sustainable organizational performance (Mollah et al., 2023). Digitalization mediates the relationship between learning orientations and sustainable competitive advantage (Ismail, 2023).

Digital leadership is positively associated with organizational learning (Mollah et al., 2023). Leadership that promotes employee training and skills development by building digital awareness, enhancing digital skills, and creating an environment for on-the-job learning is important for effective digital transformation (Cichosz et al., 2020). Specifically, a learning organization develops its continuous capacity for adaptation, survival, and change in constantly changing conditions, and supports the strategic role of learning. The relationship between employees' perception of digital leadership practice and learning organization impacts their performance perception scores (Artüz & Bayraktar, 2021).

Digital leadership involves the promotion and development of new knowledge and organizational abilities to create innovation through knowledge sharing (Kho et al., 2020). Leaders need the competence of a knowledge facilitator, which encompasses role-modeling, facilitating collective learning about the data-driven approach and big-data analytics, and encouraging knowledge-

sharing between peers, subordinates, and external stakeholders to build trust and enable employees to learn from each other (Schmidt et al., 2023). Employees who perceived their leaders as enablers indicated higher levels of knowledge sharing; sharing ideas, information, and suggestions with colleagues to facilitate innovation and performance (Weber et al., 2022). Digital transformational leadership has positive effects on organizational innovativeness through knowledge-based empowering interactions which is an organizational approach that includes initiating and supporting organizational members' knowledge sharing for goal-oriented practices, intra-team knowledge exchanges, and on-going interactive engagements (Kho et al., 2020). Knowledge transfer moderates the relationship between organizational agility and business model innovation (Ramadan et al., 2023). Basically, in Industries 4.0 knowledge-oriented approaches, e.g., consulting, supporting, stimulating knowledge diffusion, delegating, mentoring, encouraging, recognizing, innovative role-modeling, formulating vision, rewarding, intellectual stimulation, and expanding knowledge transfer, have direct effects on sustainable competitive advantage such as organizational excellence, effectiveness, and responsiveness (Banmairuoy, Kritjaroen, & Homsombat, 2022). In Industries 4.0 knowledge-oriented approaches and human resource development indirectly lead to a climate of innovation, innovative work behavior, and organizational innovation and subsequently impact sustainable competitive advantage (Banmairuoy et al., 2022).

Digital leaders drive both small and iterative experiments and enterprise-wide initiatives (Kane et al., 2017). Leading digital transformation has a positive and significant effect on cultivating an experimental environment (Leso et al., 2023). Leadership support in improving research and development capabilities in digital technologies and IT helps SMEs sustain their supply chain management and consequently improves performance (Chatterjee, Chaudhuri, Shah, & Maheshwari, 2022).

Leaders who are perceived by employees as enablers who create agile, flexible, and empowering work settings, foster a culture of learning, trial and error, trying out new ideas, etc., can stimulate higher levels of innovative job performance in employees, e.g., the generation, promotion, and realization of new ideas that engender innovative change (Weber et al., 2022).

### **Risk Management**

Digital transformation success is related to digital risk management (Seals, 2022). Leaders with the ability to identify business opportunities and risks arising from digital transformation build digital maturity and significantly impact the degree of transformation of an organization's digital processes (Weber et al., 2022). Digital leadership positively steers exploratory innovation through the risk-taking component of digital entrepreneurial orientation (Wang et al., 2022). A digital leader has a risk-taking role and risk-taking is a leadership competence that has a direct and significant impact on the effectiveness of innovative SMEs and multinational organizations (Magesa & Jonathan, 2021; Aranega et al., 2023). In digital enterprises in Singapore, Australia, India, and the UAE, risk-taking is an attribute that is positively connected with effective leadership (Karippur & Balaramachandran, 2022). The governance board's digital leadership considerations which include leading, monitoring, and governing business technology investment and risk, impact an enterprise's future orientation and business model evolution (Valentine & Stewart, 2015).

Proposition 2a: If the digital leadership approach of navigating self and people through knowledge, skills, abilities, traits, and behaviors is positively related to organizational performance regarding digital transformation or innovation, then, increased organizational performance indicates successful digital leadership.

Proposition 2b: If the digital leadership approach of navigating complexities such as change, cultural change, risk management,

collaborations, and partnerships is positively related to organizational performance regarding digital transformation or innovation, then, increased organizational performance signifies successful digital leadership.

### **Driving Business Growth and Innovation: A Focus on the Integrated Sustainability Dimensions**

Digital leadership involves igniting others to action, being the dynamo for change, and the driving force behind technological innovations. A digital leader has the responsibility of guiding (i.e., enabling progress and preventing complacency) the business in the right direction toward growth and innovation. Porter (2007) indicated that leaders energize their organizations to meet competitive challenges and to continue progressing, and do not accept constraints. Munsamy (2012) emphasized that leaders harness and stimulate pressures for change and search for ways of overcoming barriers to information and innovation. Leading and facilitating digital drives, e.g., value-creation and solution-based approaches, are relevant for digital leadership in industry 4.0 and the digital era. Specifically, leading in the digital era involves focusing on three-dimensional sustainability goals. Niu et al. (2022) established that digital leadership positively influences organizational sustainability; organizational sustainability encompasses business models and strategies that consider economic, social, and environmental benefits. Economic, social, and governance management influences the capability of a company to execute its strategy and enhance corporate values. Digital leadership impacts organizational innovation through a partial positive mediating effect from economic, social, and governance management (Niu et al., 2022). Excellent digital leadership is a prerequisite for achieving digital development outcomes that comprise economic, social, and human development (Magesa & Jonathan, 2021).

### **Economic Dimension**

Digital leadership with a global vision, deep knowledge, and the capacity for thinking, creativity, and inquisitiveness, has a positive and significant effect on organizational performance in terms of productivity, quality, and employee satisfaction (Tulungen et al., 2022). The digital transformation leadership roles that include digital pioneering, innovating, enabling, and networking, impact organizational transformation outcomes such as innovative job performance (Weber et al., 2022). Digital leadership has a positive association with organizational performance relevant to achieving sustainability (Shin et al., 2023). Digital leadership has a positive impact on organizational sustainability via organizational innovation (Niu et al., 2022). Digital leadership is significantly and directly related to sustainable organizational performance in service and manufacturing companies (Mollah et al., 2023). Leaders of digitalization who wholeheartedly embark on sustainability initiatives and improve their competencies (e.g., innovation capabilities) positively and significantly influence sustainable performance (Sarfraz, Ivascu, Abdullah, Ozturk, & Tariq, 2022). For example, digitalization and artificial intelligence in a hospital enable higher economic and financial outcomes, and in addition, the revenue stream positively impacts the hospital's competitive position (Mohamad, Bastone, Bernhard, & Schiavone, 2023).

Digital leadership positively influences employees' digital capabilities and in turn organizational performance (Shin et al., 2023). Leadership support in developing and deploying big data-based applications, cloud computing optimization, and Internet of Things-enabled technologies resulted in sustainable and resilient supply chain management and improved performance for SMEs (Chatterjee et al., 2022). Digital leadership capability in digital workplaces moderates the relationship between employee performance, employee work-life balance, and organization performance (Chatterjee, Chaudhuri, Vrontis, & Giovando, 2023).

### **Environmental Dimension**

Innovative digital leadership helps firms to achieve environmental sustainability, thus, preventing environmental deterioration from hindering business functioning and consequently enhancing business success and digital sustainability (Sarfraz et al., 2022). Digital leadership moderates the relationship between green product innovation and sustainable performance in manufacturing companies. A high level of digital leadership strengthens the relationship between green product innovation, e.g., designing or improving environmentally-friendly production processes, products, packaging, and services, and sustainable performance (Sarfraz et al., 2022). Digital leadership in combination with servant leadership which entails convincing followers, leading by example, treating employees with respect, showing appreciation, and serving others, and green leadership which focuses on ecological sustainability, positively and significantly impact market performance (Fahmi et al., 2020). In small and medium manufacturing sector enterprises, green transformational leadership is significantly related to green product innovation. While at a 10% significance level, green transformational leadership exhibits a significant relationship with SMEs' performance and green product innovation significantly mediated the relationship between green transformational leadership and the performance of SMEs (Majali, Alkaraki, Asad, Aladwan, & Aledeinat, 2022).

### **Social Dimension**

The socially responsible digital leader acts responsibly regarding security, privacy, and the application and management of digital disruption by navigating people toward a socially acceptable solution (Volschenk, 2019). In the digital world, leaders shape their communities to achieve organizational success (Artüz & Bayraktar, 2021). Socially responsible digital leadership integrates people, processes, technology, and information into a sustainable ecosystem (Volschenk, 2019). Leaders in Industry 4.0 prioritize community and ethical use of power

(Fahmi et al., 2020). Digital leaders integrate digital and societal forces into the company's strategy in a way that balances social justice and digital transformation for the greater good of humankind (Volschenk, 2019). Digital leadership with the ability for problem-solving focuses on community responsibilities (Baglama et al., 2022).

**Proposition 3:** If the digital leadership approach of driving business growth with an integrated sustainability focus on economic, social, and environmental dimensions is positively associated with organizational performance regarding digital transformation or innovation, then, an increase in organizational performance indicates successful digital leadership.

### Tracking

The tracking of goals, business performance, etc., is fundamental to successful digital leadership. Tracking is the act of following the business goals, strategies, etc., to determine their effectiveness, identify areas of improvement, and make informed decisions. Thus, leadership in the age of digitalization that conducts tracking, continuous internal and external environmental scanning, monitoring and evaluation, risk assessment, etc., improves business processes and performance. For instance, Schmidt et al. (2023), indicated that leadership competencies must include problem-spotting and monitoring skills that are valuable in screening the organization, processes, people, and external environment. Concurrently, hyperawareness is a behavior (constantly scanning the internal and external environments for opportunities and threats) that builds agility in leaders and helps in successfully navigating disruptive environments. Hyperawareness includes following digital technology trends, becoming technically proficient, and spotting emerging digital opportunities or competitive threats (Neubauer et al., 2017).

In essence, digital leaders who improve their understanding of metrics, and think strategically about the types of measures and incentives are outstanding and achieve

targeted outcomes. Digital leaders who consider how the company measures progress can develop useful metrics that support digital aspirations (Catlin et al., 2016). Leadership that monitors market trends, seizes technological opportunities, and translates them into business opportunities ensures successful digital transformation of the business (Cichosz et al., 2020). Digital leadership skills and an organization's digital capabilities enable SME retailers with high digital maturity to display a higher level of situational awareness, e.g., monitoring, reporting, and recovery capacities after a crisis than SME retailers with lower digital maturity (Robertson, Botha, Walker, Wordsworth, & Balzarova, 2022). Managerial capabilities associated with digital business strategy influence real-time performance measurement and management that support a company's digital transformation and competitiveness (Holopainen, Saunila, & Ukko, 2023). Leadership digital acuity which entails vision, strategy, and championing, positively impacts digital transformation success, e.g., digital KPIs and financial controls, through performance management (Seals, 2022).

Leading organizational digital transformation requires that digital experts build process standardization and data integration that entails establishing KPIs and real-time data applications integration (Cichosz et al., 2020). The mindset of a problem spotter is essential for digital leadership, i.e., anticipating business challenges by analyzing data, using metrics such as financial, customer, and overall performance data, evaluating the company's performance, detecting potential derailers quickly, making the appropriate adjustments, and modeling potential solutions (Schmidt et al., 2023). In digital enterprises, effective leadership positively depends on facilitating data analytics (Karippur & Balaramachandran, 2022), for example, the leaders of digitally mature companies in America, Europe, Asia, Africa, and Oceania utilize a high degree of analytics (Abbu et al., 2020). Big data-driven capabilities and processes significantly influence product and process innovation which consequently leads

to a competitive advantage (Chatterjee et al., 2022).

Proposition 4: If the digital leadership approach of tracking of performance metrics is positively associated with organizational performance regarding digital transformation or innovation, then, increased organizational performance indicates successful digital leadership.

### **Mapping: Data**

The mapping of processes, data, relationships, etc., enables stakeholders to gain business insight, make informed decisions, gauge, align, and calibrate entities, strengthen connections, and drive organization growth. Mapping is a process of visual illustration of the interconnectedness among entities such as data, processes, and relationships. Specifically, leaders positively influence through data visualization skills, and thus need to prepare data and visualizations in a way that the audience understands and best supports effective decision-making. Data-driven leaders must look at the data-gathering process holistically, and understand how it is produced to have a data-driven conversation with others. (Schmidt et al., 2023).

### **Data-Driven Decision Making**

A foundational capability needed to become a future-ready company is treating data as a strategic asset that is used for making evidence-based decisions and developing new offerings (Leavy, 2023). Leading a successful organization's digital transformation requires leveraging internal and external (technological) knowledge by using big data repositories as a source of knowledge (Cichosz et al., 2020). Positively influencing people using data-based facts that inform others' decisions is a vital competence for leadership (Schmidt et al., 2023). Agile leaders engage in informed decision-making or evidence-based decisions by using data and information to flourish in disruptive environments (Neubauer et al., 2017). Companies that generate product innovation, process innovation, social innovation, and

business model innovation are data-driven (Visvizi et al., 2022).

The data-driven leader requires analytical skills that encompass both interpretation skills and pattern recognition. These analytical skills help the leader in meaning-making, understanding results, drawing conclusions from the data, and evaluating business impacts (Schmidt et al., 2023). Data self-efficacy competency that includes KPI development skills, experimental design skills, skills for big data tools and software, statistical skills, and technical infrastructure management skills help data-driven leaders engage confidently with stakeholders about big data analytics and in gaining trust and buy-in regarding the leaders' decisions (Schmidt et al., 2023). Using advanced analytics is a vital capability in a competitive market because it is valuable in expanding leaders' insights-generation capabilities and deploying tools that support marketing, sales, and meaningful relationships. For example, digital leaders in B2B companies that excel and impact performance use data to enable and empower the sales force (Catlin et al., 2016). Big data analytics capabilities; the big data skills necessary for making decisions concerning organizational operation strategies positively moderate the relationship between digital organizational culture and exploratory innovation which is a path to gaining competitive advantage (Wang et al., 2022). In companies with higher levels of big data analytics capabilities, the association between digital leadership and exploratory innovation is strongly/indirectly moderated by digital entrepreneurial orientation (Wang et al., 2022).

Proposition 5: If the digital leadership approach of data mapping and data-driven decision-making is positively associated with organizational performance regarding digital transformation or innovation, then, increased organizational performance indicates successful digital leadership.

### **Future-Oriented and Timing**

Digital leadership encompasses a time perspective that is focused on the future.

Being future-oriented involves considering long-term perspectives, goals, and the future, and it involves anticipating and preparing for future trends, challenges, and opportunities. Besides, for organizations to be competitive and drive business growth, the timing of business activities and decisions is crucial. Timing is a particular point or period in time when something happens. Being timely implies making things (e.g., the launch of products) happen at the correct, useful, suitable, favorable, opportune, and advantageous time. A digital leader has control over when things should be done and thus, needs the skills of judging the right timing to execute projects, explore new possibilities, etc., According to Magesa and Jonathan (2021), a digital leader's roles include the ability to anticipate, forecast, and contemplate possible future events. Leaders with a future-oriented perspective have a clear vision and rational strategy and can grasp digital trends (Niu et al., 2022).

Future orientation is about where an entity wants to get to or outcomes an entity fears to reach, the ways the entity ought to go, and routes to avoid when aiming for the destination or outcomes (Seginer, 2009). Therefore, the future-ready pathways companies undergoing digital transformation should be aiming for are continuously innovating and reducing cost through digital tools and processes, value creation for customers by solving customers' problems, and providing a great customer experience. Organizations that are future-ready engage in value creation from digitally-enabled and partner-based business models cum ecosystems. The future-ready company use modular, agile, and data-driven methods and approaches, and participate in dynamic partnering to achieve full future readiness (Leavy, 2023).

In addition, to become future-ready, business leaders must be able to develop and retain the right talents and empower them to work collaboratively to solve complex problems as digital technologies are changing the business dynamics. In addition, future-ready leaders link individual and team behaviors to

company goals to support data-driven decision-making about employees and ensure accountability (Leavy, 2023). The complete transformation to future readiness typically necessitates handling crucial change management challenges which include finding the right people to lead key decisions (e.g., prioritizing the spending about digital investments), changing collective work habits, embracing new ways of working due to digital technologies, transforming the culture, changing traditional platforms into digital platform for digital services, connecting organizational silos, sharing data, standardizing processes, performing organization (structural) surgery that can result in better customer experience and greater operational efficiency (Leavy, 2023).

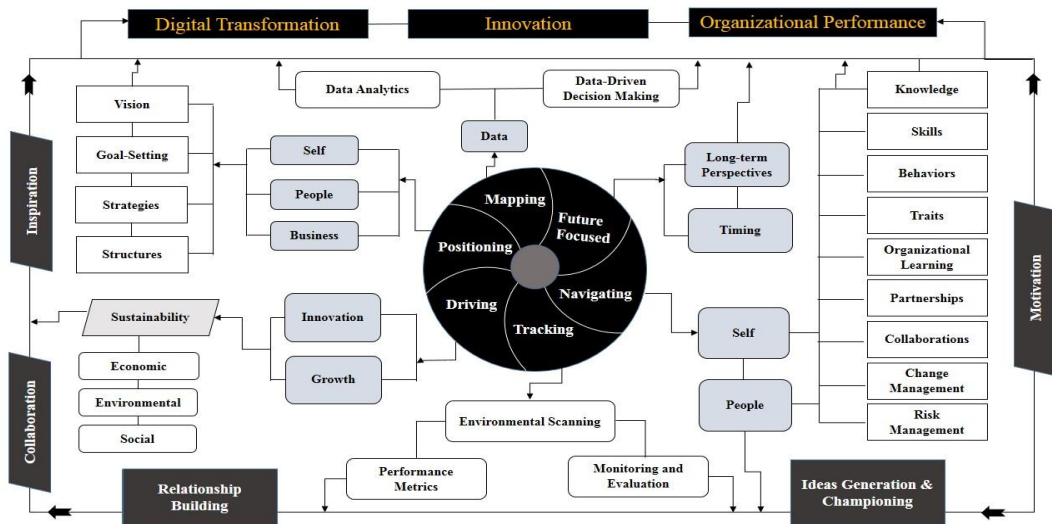
Proposition 6: If the digital leadership approach of future orientation and timing, is positively related to organizational performance regarding digital transformation or innovation, then, increased organizational performance symbolizes successful digital leadership.

## DISCUSSION

### Theoretical Implications

The article presents new knowledge about the concept of digital leadership. Ideas emerge from interweaving existing knowledge from literature and emerging knowledge (Shepherd & Suddaby, 2017) and a method of interpreting and creating new models for the presentation of data is through the use of metaphors (Rodríguez, 2018). Likewise, this article metaphorically interprets the concepts of digital leadership through the functions of the Global Positioning System. Thus, this article proposes the Digital Leadership System (DLS) and is portrayed in figure two, and Appendix C and D. Metaphors are productive means of getting ideas across and explaining how certain elements work. Metaphors are a means of framing concepts and providing models for analysis (Rodríguez, 2018). Similarly, this article framed the concepts of the Digital Leadership System (DLS) and the model based on

assumptions about the functions of the global positioning system.



**Figure 2:** The digital leadership system  
*Source: created by the author (Graham, 2025)*

This article draws ideas from the uses of a global positioning system in explaining digital leadership approaches in the digital age. The Digital Leadership System Theory indicates that digital leadership involves a combination of approaches, which include positioning, navigation, driving, tracking, mapping, future orientation, and timing. This article presents a second theoretical statement about the Digital Leadership System (DLS). The digital leadership system states that digital leadership is a future-oriented leadership approach that requires timely positioning of the business, people, and self (leader), through vision, strategy, goal-setting, structures, governance, and navigation of complexities that include change, risk, experimentation, collaborations, partnerships, etc., by employing knowledge, behaviors, skills, and traits, while tracking performance, mapping data, making data-driven decision, and driving business growth and innovation with a sustainability focus directed toward economic, environmental, and social dimensions. This article specifies

that digital leadership is a leadership approach that entails behaviors, actions, and communications for developing or driving digital strategies, digital change, and innovative work behaviors/capabilities for achieving organizational goals and objectives that include innovation, digital transformation, and business performance. In addition, according to the ideas from the transformational leadership theory and the assumptions built based on the metaphorical understanding of the Global Positioning System, this article proposes a theoretical statement about what a digital leader does. The Digital Leadership System Theory (DLS) states that digital leaders are digital visionaries, role models, and change agents with a futuristic mindset who perform positioning, navigation, tracking, mapping, driving, and timing roles within digital and non-digital enterprises and employ inspirational, motivational, relationship building, collaborative, and ideas generating/championing competencies toward innovation, digital transformation, and

business performance. This Digital Leadership System Theory (DLS) encompasses ideas about the roles of a digital leader and can be justified based on the transformational leadership theory. For instance, in firms that are experiencing disruption from digital innovation, the leaders' digital acuity which includes digital vision, digital literacy, and digital championing contribute significantly to digital transformation success (Seals, 2022). According to Dubin's (1978) approach, this article specifies that the building blocks or units of the Digital Leadership System (DLS) Theory include positioning, navigation, tracking, mapping, future orientation, and timing. There are systems of ideas underpinning the Digital Leadership System Theory which explains the approaches of digital leadership in the era of digital transformation. For instance, positioning enables firms to decide the desired perception they want the stakeholders to have about the organization. Digital leaders employ vision, strategies, goal-setting, etc., in positioning the firm. Digital leadership involves leading with a vision. Digital leaders position themselves, employees, partners, and collaborators in the business environment. Digital leadership make decisions about the entities that associate with their firms. The positioning that is done by digital leaders enables firms to have a credible and profitable place in the minds of stakeholders. Digital leadership through the development of technologies locates the business in the minds of the customers and helps organizations maximize benefits. Navigation involves directing the path or course of self, people, projects, innovations, ideas, partnerships, etc., Navigation is essential to digital leadership because firms have a destination according to their vision and mission. Firms have goals that they intend to achieve and digital leadership involves navigating the way to a goal or destination such as digital transformation, innovation, etc., Digital leadership enables firms to move from where they are in terms of innovation, technologies, technical capabilities, and performance to the desired state they want to be. Digital leaders build

bridges between the current state of innovation or performance or capabilities and the desired/futuristic state of innovation or business performance or capabilities.

Digital leadership monitors business performance or the performance of innovations, products, and outcomes of the digital transformation. Tracking is essential because tracking is a means of capturing and reporting on key data points and monitoring progress against specific targets to accomplish business objectives. Data mapping is important for digital leadership because it is a way of homogenizing data to make it accessible to stakeholders for decision-making. Data mapping helps leaders in the digital age to effectively manage data. Future orientation involves the mindset and activities that can make an organization become future-ready, which include leading by innovating continuously, process improvement, encouraging reusing, reducing, and recycling, identifying productivity enhancements, developing employee capabilities, etc., Timing is a particular point or period in time when something happens and the appropriate timing of business activities and decisions is key to positioning the organization and driving business growth. Driving is a leadership approach of steering the business (goals, strategies, etc.). Digital leadership drives performance, innovation, and growth, and considers the economic, environmental, and social dimensions of all business initiatives while driving business growth. Digital leaders consider various economic, environmental, and social factors when making business decisions. A digital leader drives the business intending to do good by solving problems while ensuring business decisions do not cause social or environmental problems which may have a direct impact on companies' performance or reputation. Essentially, the Digital Leadership System (DLS) is valuable in contexts that require understanding the uniqueness of leadership as organizations are being transformed by digital technologies and innovations.

In addition, this article contributes to knowledge by presenting new ideas about the definition of digital leadership. This article proposes many perspectives about the conceptualization of digital leadership (See Appendix D). The first definition of digital leadership states that digital leadership is a process of influencing, facilitating, activating, and pioneering continuous, ongoing, and timely digital or technological-based innovations and changes (transformations) through the creation or modification of products, services, and processes by employing digital knowledge or literacy and other behavioral cum technical competencies to achieve organizational goals/objectives and a sustainable business or digital ecosystem. This definition underpins what a digital leader does and why they are done. For example, digital leadership drives innovation or digital disruption via products, processes, and mental models framing business activities through global vision, creativity, thinking, deep knowledge, and inquisitiveness, to achieve sustainable competitive advantage in telecommunication companies (Wasono & Furinto, 2018). The second definition of digital leadership proposed in this article emphasizes that digital leadership includes the attributes of bridging gaps such as innovation, performance, capabilities, and growth gaps. The definition states that digital leadership is a bridge-building process between the current state of digital/technological innovation or technological know-how and capabilities or business performance and the desired/futuristic novel innovation or digital/technological know-how and capabilities or business performance. Digital leadership involves a continuous bridge-building process that encompasses explorations and solutions in the navigation of self, people, and business.

### **Practical Implications**

Digitalization has prompted new ways of working and approaches to leadership. Digitalization requires that leaders navigate their organization and make changes at all levels of the organization (Hensellek, 2020).

This article has highlighted that leadership success in the digital era depends on what digital leadership does and who the leaders are in terms of behavioral and non-behavioral competencies. The leader's ability to position the organization through vision, competitive strategies, structures, goals, and data-driven decision-making would help the organization gain an advantageous position in the market. Leaders in the era of digital transformation require the ability to navigate the organization by communicating effectively, influencing employees towards a positive course, and building an ethical culture that includes continuous learning, experimentation, creativity, innovation, and the capacity for embracing change. For example, Robertson et al. (2022) indicated that digital leadership skills and digital capabilities enable proficient management of keystone vulnerabilities such as planning, strategies, internal and external resource capabilities, and employee engagement.

In countering the volatility and complexity of the ever evolving business environment in the dispensation of digital disruptions, leaders require the competence for facilitating bridge building over obstacles and threats from the business environment so as to achieve business growth and innovation. For example, digital leadership that is capable of creating a vision for the future, communicating the vision, and influencing people directly impacts innovation. While digital leadership's capabilities for building technological leadership skills and implementing new technologies generate value creation and broaden organizational network which result in innovation and consequently increases a firm's competitiveness (Muniroh et al., 2022).

Moreover, in the disruptive environment, leaders need critical competencies, traits, and strategies to achieve successful digital transformation, innovation, and organizational performance. These competencies and traits include digital literacy, agility, flexibility, adaptability, change management, risk management, collaboration, and trustworthiness. Fahmi et al. (2020) underscored that digital leaders

need to think and act faster than the occurring changes; which would require employing analytical skills, problem-solving skills, risk-taking abilities, etc., Behaviors such as self-organization, transformational, authentic, and less controlling and shared approaches are extremely important in the digitized environment. In addition, learning is crucial to innovation, digital transformation, and business performance. Hence, digital leadership has the duties of enhancing employees' knowledge and skill sets, and developing capabilities and innovation competencies toward improving organizational performance (Chatterjee et al., 2023).

Digital leadership that will thrive in the continuously changing digital landscape must conduct continuous tracking of performance metrics. Specifically, valuing and using data, and data analytics help in managing and improving performance. Leaders need to monitor digital trends and lead the organization through sustainable digital transformation because digital transformations that are compatible with business needs and processes directly affect the individual performance of employees, because individual performance and group performance make up the whole organizational performance (Artüz & Bayraktar, 2021).

Leading a digital enterprise, digital transformation of the business, and digital innovations requires a future-oriented, people-oriented, and solution-oriented (problem-solving) mindset. Leaders of digital and non-digital enterprises should endeavor to drive growth with an integrated sustainability focus. In essence, digital leadership must be engaged in positioning, navigating, tracking, mapping, timing, and driving business activities. Successful digital leadership depends on the leaders' ability to show continuous commitment toward building sustainable growth for their organization by combining financially, socially, and environmentally responsible mindsets, goals, and strategies toward the advancement of overall organizational goals and objectives.

## Recommendations for Future Research

This article calls for research regarding the concepts of the digital leadership system (DLS). Upcoming research may be used to explore how digital leadership's effectiveness in positioning the organization improves organizational outcomes such as innovation, digital transformation, and organizational performance. How digital leadership's drive for learning, knowledge sharing, and experimentation influences organizational outcomes. How the leaders' knowledge of digital tools and technologies impact the leadership success? How is the digital leadership's understanding of data and data-driven decision-making related to organizational outcomes? How might the leader's timing of business activities, processes, decisions, etc., impact business outcomes such as innovation, business performance, and digital leadership? How is the leader's future orientation in building innovation relevant to organization performance? There is a gap in literature about the association between digital leadership and the mapping of data, processes, and relationships. The concept of mapping in relation to digital leadership is not yet widely researched in literature. Moreover, future research could expand the knowledge about digital leadership by examining digital leadership in digital enterprises without including organizations undergoing digital transformation. Researchers may also investigate digital leadership in firms that are not into digital goods and services, perhaps there could be some differences.

## Limitations of the Study

This article is based on the publications available during the time the study is conducted. The models and definitions are developed based on the themes identified from the synthesized literature, however, there may be other variables the study did not take into consideration in building the digital leadership system theory and in constructing the definitions of digital leadership. Moreover, there is limited data about some of the concepts showcased in the Digital

Leadership System, for example, mapping and future orientation.

## CONCLUSION

This study has developed a new perspective about digital leadership. This include the digital leadership system (DLS) Theory and definitions of digital leadership. The theoretical statements provide a logical explanation about the leadership of digital enterprises, digital transformation, and digital innovations. The digital leadership system (DLS) emphasizes that digital leadership involves positioning, navigating, tracking, mapping, timing, and driving vital elements of the business to achieve growth and innovations. The critical components for positioning the organization are vision, strategy, goal-setting, etc., Leadership navigation of self and people depends on behaviors, knowledge, skills, traits, learning, change management, etc., Digital leadership should focus on tracking (e.g., business goals) and using data analytics for insightful decision-making, while monitoring the progress of the business, projects, people, and partnerships help in risk management, continuous improvement, and increasing firm's performance. Making data-driven decisions and tracking performance metrics are essential for successful digital leadership. The timing of all business activities determines the outcomes of business initiatives. Specifically, successful digital leadership is future-oriented, people-oriented, and solution-oriented, and involves building bridges over obstacles and running with a mindset and an agenda of integrated sustainability. Moreover, digital leaders' acuity for supporting the leadership approaches of positioning, navigation, driving, tracking, mapping, and future-orientation with the capabilities for inspiring, motivating, influencing, communicating, supportive supervision, ideas generation/championing, role modeling behaviors, and developing personnel's digital competencies is crucial in enabling successful digital transformation, innovation, and organizational performance. In sum, building, enlarging, maintaining, and driving

organizational growth and innovation require focusing on all the constructs of the digital leadership system without any exclusion.

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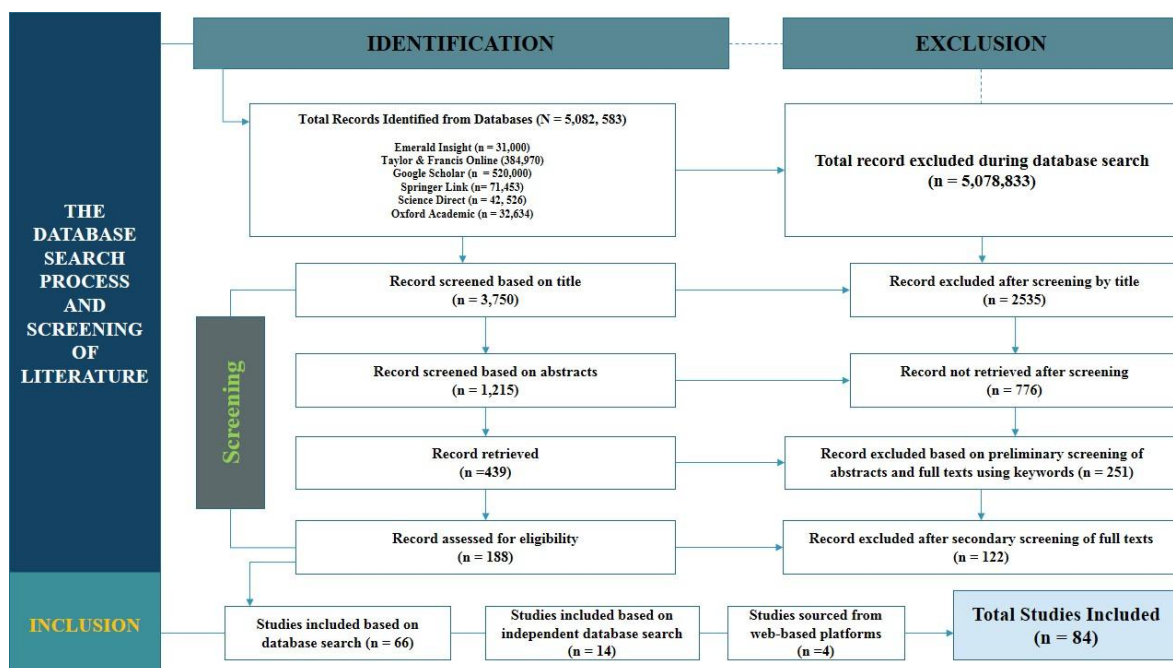
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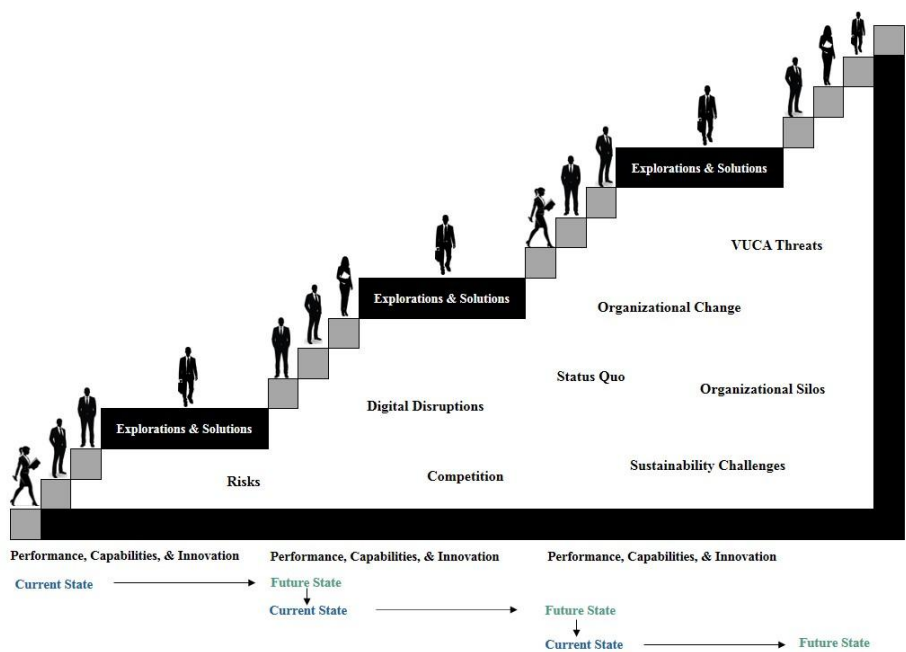
## Appendix A

### The Search Strategy



Appendix B

Digital Leadership Definition



Source: created by the author (Graham, 2025)

## Appendix C

### The Digital Leadership System

| <b>Digital Leadership System (DLS) Concepts</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> Positioning                            | Positioning involves portraying or promoting the business or defining where a business or product stands in comparison to other similar businesses or products.<br>Positioning elements for successful digital leadership are visioning, formulating strategies, goal-setting, putting in place structures and processes, and making decisions based on data.                                                                                                            |
| <b>2</b> Navigation                             | Digital leadership involves navigating self and people toward the vision, strategies, goals, and processes. Navigation entails dealing with complexities and moving through the complexity of the constantly changing digital business environment.<br>Digital leaders deal with complexities such as change, cultural change, risk, knowledge management, learning, etc.,                                                                                               |
| <b>3</b> Driving                                | Digital leaders drive business growth by igniting others to action, by being the dynamo for change, and the driving force behind technological innovations. A digital leader has the responsibility of guiding (i.e., enabling progress and preventing complacency) the business in the right direction, e.g., toward growth and innovation.                                                                                                                             |
| <b>4</b> Tracking                               | Leadership in the age of digitalization must track goals, strategies, processes, and business performance. Firms' performance improvement depends on conducting continuous internal and external environmental scanning, monitoring and evaluation, risk assessment, etc.,                                                                                                                                                                                               |
| <b>5</b> Mapping                                | Mapping of processes, data, and relationships is a prerequisite for improving performance in the era of digitalization. Mapping enables digital leaders to gain business insights, make informed decisions, gauge, align, and calibrate entities, strengthen connections, and drive organization growth.                                                                                                                                                                 |
| <b>6</b> Future Orientation and Timing          | Digital leadership involves a future-oriented mindset which entails considering long-term perspectives, goals, and the future. A digital leader's roles include the ability to contemplate possible future events. Digital leadership depends on the capacity to anticipate, forecast, and prepare for future trends, challenges, and opportunities.<br>Timing involves making things happen at the appropriate, correct, or useful time, e.g., the launch of a product. |

*Source: created by the author (Graham, 2025)*

## Appendix D

### The Definitions and Theories of Digital Leadership

| <b>Definitions of Digital Leadership (Source: Graham, 2025)</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b>                                                           | Digital leadership is a process of influencing, facilitating, activating, and pioneering continuous, ongoing, and timely digital or technological-based innovations and changes (transformations) through the creation or modification of products, services, and processes by employing digital knowledge and other behavioral cum technical competencies to achieve organizational goals/objectives and a sustainable business or digital ecosystem.                                                                                                                                                                                        |
| <b>2</b>                                                           | Digital leadership is a bridge-building process between the current state of digital or technological know-how or capabilities or business performance and the desired or futuristic state of digital or technological know-how or capabilities or business performance.<br>Digital leadership involves a continuous bridge-building process that encompasses explorations and solutions in the navigation of self, people, and business.                                                                                                                                                                                                     |
| <b>3</b>                                                           | Digital leaders are digital visionaries, role models, and change agents who inspire, motivate, build relationships, collaborate, lead ideas generation, and develop human resources' capabilities toward innovation, digital transformation, and business performance.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>4</b>                                                           | Digital leadership is a leadership approach that entails behaviors, actions, and communications for developing or driving digital strategies, digital change, and innovative work behaviors/capabilities for achieving organizational goals and objectives that include innovation, digital transformation, and business performance.                                                                                                                                                                                                                                                                                                         |
| <b>The Digital Leadership System Theory (Source: Graham, 2025)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>1</b>                                                           | The digital leadership system theory states that digital leadership is a future-oriented leadership approach that requires timely positioning of the business, people, and self (leader), through vision, strategy, goal-setting, structures, governance, and navigation of complexities that include change, risk, experimentation, collaborations, partnerships, etc., by employing knowledge, behaviors, skills, and traits, while tracking performance, mapping data, making data-driven decision, and driving business growth and innovation with a sustainability focus directed toward economic, environmental, and social dimensions. |
| <b>2</b>                                                           | The Digital Leadership System Theory (DLS) states that digital leaders are digital visionaries, role models, and change agents with a futuristic mindset who perform positioning, navigation, tracking, mapping, driving, and timing roles within digital and non-digital enterprises and employ inspirational, motivational, relationship building, collaborative, and ideas generating/championing competencies toward innovation, digital transformation, and business performance.                                                                                                                                                        |