Journal of Infrastructure, Policy and Development 2024, 8(15), 9550.
https://doi.org/10.24294/jipd9550

Article

The effectiveness of digital leadership in promoting organisational sustainability: A mediating role of digital leadership capability

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CITATION

Lu Z, Ma M, Yang Y, et al. (2024). The effectiveness of digital leadership in promoting organisational sustainability: A mediating role of digital leadership capability. Journal of Infrastructure, Policy and Development. 8(15): 9550. https://doi.org/10.24294/jipd9550

ARTICLE INFO

Received: 11 October 2024
Accepted: 8 November 2024
Available online: 10 December 2024

Abstract: This study investigates the effectiveness of digital leadership in promoting organizational sustainability, with a specific focus on the mediating role of digital leadership capability. The research explores how digital leadership impacts sustainable performance within Chinese construction organizations. Using structural equation modeling (SEM), the study analyzes data collected from 529 respondents across various organizations. The findings reveal that digital leadership significantly enhances organizational sustainability both directly and indirectly, through digital leadership capability. These results underscore the importance of digital leadership as a critical factor in guiding digital transformation and achieving long-term sustainable outcomes. The study contributes to the literature by highlighting digital leadership's role in fostering organizational adaptability and sustainability in rapidly evolving digital environments.

Keywords: digital leadership; organizational sustainability; leadership capability; digital transformation

1. Introduction

Digital management is essential for organizations aiming to survive and thrive in a rapidly changing world. Enterprises that successfully integrate digital management into their operations will be better equipped to address the challenges brought by market shifts and technological advancements (Peng, 2022). Furthermore, following the global outbreak of COVID-19, organizations actively sought technology-driven management frameworks to ensure lasting organizational efficiency (Yoga and Yudiarta, 2021). Today, sustainable enterprises present promising opportunities to address unemployment issues and promote innovative economic growth in urban areas (Crittenden et al., 2019; Yu et al., 2020). However, in the context of contemporary urban environments (Nawaz et al., 2020), digital leadership is crucial for building sustainable enterprises. It is closely tied to developing innovative approaches that enhance business intelligence (Fritsch and Kublina, 2018; Nawaz et al., 2022b).

According to a study by Bughin et al. (2017), most enterprises have already faced significant technological changes and are expected to encounter more challenges in the near future. However, digitalization is only beginning to impact financial performance, with less than 40% of industries having undergone digital transformation on average. El Sawy et al. (2020) argue that substantial organizational transformation is needed to adapt to the digital environment, and this transformation requires effective digital leadership for traditional organizations to succeed in such dynamic settings. Brenner (2018) adds that leaders in the construction industry are essential for driving internal digital transformation. While digital technologies are reshaping the business landscape, traditional business models are deemed unsuitable for driving digital transformation. To address this, a digital leadership framework was developed, covering four key areas: human resource management and leadership, architectural design, digital ecosystems, and collaborative environments. As leadership takes many forms, further research on digital leadership in the construction industry would be valuable (Zulu and Khosrowshahi, 2021).

As Amelda et al. (2021) state, digital leadership involves integrating digital leadership capabilities to expand the advantages of digital technologies in enhancing organizational performance. In Germany, digital leadership has led to a growth of up to 60% in the operation of digital technologies (Hensellek et al., 2020). Additionally, many other countries have implemented smart technologies, such as robots, in factories, while artificial intelligence (AI) tools like Chat GPT and Bard are increasingly prevalent in various organizations. Moreover, digital leaders must devise strategies suited to the workforce, a task that can be accomplished by leveraging IT capabilities and fostering a supportive culture. In this regard, leaders with a digital mindset tend to be more inclined toward technological innovations to achieve sustainable performance. In today's era, digital transformation requires the presence of digitally supported management. Furthermore, digital leaders must employ digital technologies to enhance customer service and ensure long-term success (Weill et al., 2002).

Investment in such digital technologies can also improve business performance (Lu and Ramamurthy, 2011; Wade and Hulland, 2004). This perspective evaluates advancements in IT, continuously exploring novel IT solutions to enhance efficiency and cultivating a supportive technological culture that encourages innovation. The application of digitalization is aimed at achieving sustainable outcomes (Galleries et al., 2007; Raudeliuniene et al., 2020; Tran and Pham, 2019; Wade and Hulland, 2004). Digital leaders also appear to be experts in establishing organizational learning and supportive cultures to achieve sustainable organizational performance (Akram et al., 2018). Sustainability involves the integration of digital technology expertise within organizations by establishing advanced learning and supporting environments to achieve optimal outcomes (Athayde et al., 2017). Therefore, sustainability entails adopting effective knowledge management strategies and efficient business process tools through digital proficiency and ensuring the long-term viability of organizations in a supportive environment (Akram et al., 2018). As Erhan et al. (2022) assert, digital guidance aims to enhance organizational performance capabilities. This study addresses identified research

gaps by examining the mediating role of digital leadership and its impact on sustainable organizational performance. Hence, this study forms the following hypotheses, the research model is presented in **Figure 1**.

H1: There are positive associations between organizational sustainability and digital leadership of the educational industry in China.

H2: There are positive associations between organizational sustainability and digital leadership capability of the educational industry in China.

H3: There are positive associations between digital leadership and digital leadership capability of the educational industry in China.

H4: There is a positive mediating relationship between the digital leadership capability between organizational sustainability and digital leadership of the educational industry in China.

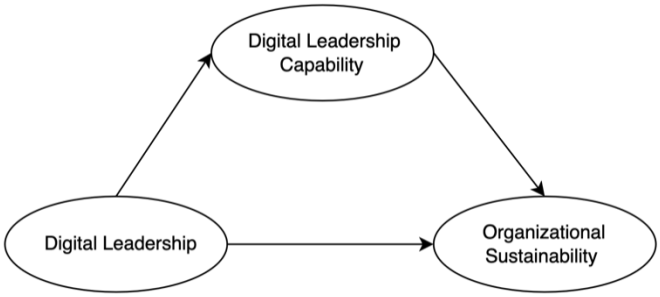

Figure 1. Research model.

2. Literature review

2.1. Digital leadership

Hutagalung et al. (2020) define digital leadership as the ability to lead in the fundamental sectors of the information society, including communications, the press, and certain media. This definition indicates that digital leadership pertains to leadership within information sectors, including communications, practices, and diverse media. In this instance, digital leadership is the application of leadership within diverse technology frameworks. This leadership is responsible for the coordination, facilitation, and direction of digital work and knowledge processes within the organisation. Digital leadership necessitates not only an understanding of the potential of information and communication technologies to support business leadership, but also an acknowledgement of their limitations and the potential applications. Employed to establish leadership throughout the organisation. According to Tanniru, digital leadership is a critical process that involves the rapid realisation of ideas through the use of agile IT and business architecture, thereby fostering and sustaining a culture of innovation. Digital transformation necessitates organisational change from the top down, necessitating leaders who are capable and willing to leverage digital technology to innovate, rapidly fail, and generate value. The digital era is a term that denotes the emergence of the digital internet, particularly computer information technology. New media is frequently employed to characterise

digital technology in the digital era, as per Fayzhall et al. (2020). Leadership as a critical mechanism for enhancing corporate excellence. In a world that is becoming increasingly dominated by digital technology, the duty of leaders is to ensure that organisations succeed. It is evident that leaders must possess unique skills in order to effectively navigate the rapid pace of technological advancement. A successful approach to maintain a competitive edge is to digitally transform employees.A leadership style that is capable of preparing employees for transformation, or digital leadership, is required in the digitally transforming of employees, as per Nugroho et al. (2020) and Purwanto et al. (2023). Digital leadership capabilities are a combination of visionary leadership and transformational leadership, as well as digital attitude capabilities, which are comprised of digital knowledge and digital experience.

2.2. Organisational sustainability

Sustainability is seen as a primary catalyst for transformation in contemporary company operations (Shibin et al., 2018). The literature discusses several drivers of sustainability change, including stricter government regulations and certification requirements (Marshall et al., 2015), heightened global consumer demands (López-Torres et al., 2019), and competitive market pressures (Caiado et al., 2019). Organisations are experiencing increasing pressure from various stakeholder groups, consumer advocacy organisations, and regulatory agencies to reevaluate their business models and enhance sustainability (Dubey et al., 2017; López-Torres et al., 2019). Despite organisations enhancing efficiency in production and operational processes and improving financial performance through various innovative systems, technical tools, techniques, and management practices, the prevailing mode of production continues to face criticism for its detrimental effects on the environment and society (López-Torres et al., 2019). Researchers contend that the long-term viability of organisations relies not alone on profitability within a competitive economic landscape, but also on fulfilling their responsibilities to the environment and society (Caiado et al., 2019).

Corporate sustainability is a multifaceted yet intricate term that is characterised in several manners. Bansal (2005) posits that sustainability can be attained solely at the convergence of three principles: environmental integrity, economic prosperity, and social equity (Bansal, 2005), collectively referred to as the 'triple-bottom-line' (Elkington, 1998). Theoretically, these elements are equally important and essential for achieving sustainability (Hahn et al., 2018). Nevertheless, existing literature offers scant empirical evidence on how organisations might attain equilibrium among three interconnected yet competing objectives: social, environmental, and economic (Van der Byl and Slawinski, 2015).

Numerous empirical studies have investigated the correlations between social/environmental performance and economic (or financial) performance during the past four decades (Peloza, 2009). The research findings are ambiguous and inconsistent. Although most studies offer evidence supporting the assertion that social and environmental performance enhances organisational financial performance, other studies

indicate negative correlations between social/environmental and financial performance. While these research illuminate the impacts of social and environmental performance, their inconsistent empirical results do not seem to address the persistent sustainability dilemma of reconciling social, environmental, and economic performance.

In their extensive review of previous sustainability research, Van der Byl and Slawinski (2015) analyse the management of sustainability tensions and delineate four distinct approaches proposed by researchers to address conflicting sustainability objectives: win-win (or business case), trade-offs, integrative, and paradox. The win-win perspective posits that social, environmental, and economic objectives are aligned, such that advancements in one aspect of sustainability are anticipated to enhance the other dimensions (Porter and Kramer, 2006). The trade-off strategy mitigates tension by offering a compelled selection among three components of sustainability. The integrative method seeks to harmonise all three dimensions—social, environmental, and economic—without prioritising any single aspect. The paradox theory elucidates the various methodologies for addressing conflicts intrinsic to conflicting sustainability objectives (Hahn et al., 2018). Although previous research reveal various forms of sustainability tensions and offer significant insights into how organisations might employ diverse strategies to reconcile their competing responsibilities to shareholders, the environment, and society, the majority of these studies are conceptual in nature. Consequently, there is a demand for additional empirical research on business sustainability (Van der Byl and Slawinski, 2015).

To mitigate the adverse effects of their unsustainable operational and production practices (López-Torres et al., 2019) and address the growing demand from global stakeholders for sustainable products and services, numerous organisations and their leaders adopt various sustainability strategies, management innovations, and technological solutions, while also adhering to enhanced reporting guidelines and practices. Recent studies (Caiado et al., 2019; López-Torres et al., 2019) indicate that organisations cannot attain sustainability merely by adopting practices like lean manufacturing or Six Sigma; instead, they must possess a comprehensive understanding of the 'why and how' of integrating sustainability practices. Evidence indicates that concurrently balancing all three components of business sustainability is practically tough. For instance, 'Wal-Mart possesses some of the most rigorous and sophisticated sustainability supply chain protocols and processes, yet faces criticism about the treatment of individuals inside its supply chain' (Marshall et al., 2015). This prompts a critical inquiry into whether the implementation of optimal sustainability strategies, guidelines, policies, and practices is adequate to attain the objective of sustainable business operations.

2.3. Digital leadership and organisational performance

Digital leadership is the utilisation of a company's digital assets to advance its organisational and individual objectives (Belias et al., 2013; Thomson et al., 2016). In the current digital era, firms are confronted with the challenge of maintaining sustainable development and uncertainty as a result of organisational digitalisation and transformation. Digital leaders must possess specific competencies that can facilitate sustainable

organisational performance and improve management in order to resolve these issues and assist firms in making the necessary changes (Frank et al., 2019; Somerville et al., 2013). The organisational and competitive landscapes, as well as employment positions in numerous businesses, have been significantly impacted by recent developments in digital technology (De Araojo et al., 2021). Digital leadership, an extension of transformational leadership theory, has been developed to facilitate the management of digital organisations, thereby facilitating the attainment of a company's sustainable objectives. A few of the organisational aspects that must evolve include the roles of employees, digital workplace culture, and technological advancements. Organisational performance is significantly influenced by the transformation of these aspects, as leaders are significant influencers. Consequently, digital leadership is anticipated to have a more positive effect on sustainable performance than transformational leadership. Transformational leadership has been demonstrated to enhance the innovativeness of a company's products and the performance of its employees based on empirical findings (Matzler et al., 2008). Conversely, digital leadership integrates technology with transformational leadership. Consequently, we anticipate that organisational performance will be influenced by digital leadership in both direct and indirect ways. Critical thinking, adaptability, resilience, and an openness to new technologies and ideas are essential qualities of digital leaders, according to Somerville (2013). Consequently, digital leaders have a substantial influence due to the necessity of acquiring new skills in order to effectively lead sustainable organisations in a dynamic digital environment. A digital business strategy is defined by an exceptional digital leader, which leads to superior business performance. Furthermore, administrators in organisations with digital histories are more inclined to promote digital transformation throughout the organisation, thereby enhancing their organisations' performance (Dijkstra et al., 2021) and accomplishing sustainable objectives.

2.4. The moderating role of digital leadership capability

When the relationship between two variables is not stable, a third one influences this relationship by either enhancing, hindering, or potentially reversing its direction. The third component concerning that relationship is regarded as the moderating variable.

Digital leadership capability (DLC) is linked to guiding an organisation towards digital leadership to enhance sustainability within the swiftly evolving social and digital environments (Nagel, 2020; Sreenivasulu, 2019). DLC must assist organisations in implementing changes and ensuring that no employee is excluded from the digital transformation process (Kar, 2018). Leadership ought to promote digital literacy among employees by providing adequate training and should intrinsically motivate people to engage in the digital process and adapt to the digital workplace (Islam et al., 2022). Leaders must prioritise tasks to ensure that people, despite having greater autonomy at work, do not neglect the most critical responsibilities (Wentrup et al., 2019).

The digital revolution of the workplace should afford people increased time to engage with friends and family, thereby preserving their work-life balance (Boiarintseva et al., 2022). Given that the digital transformation of the workplace is a relatively recent

occurrence, leaders must possess the capability to make sound decisions despite ambiguous information. Consequently, the leadership capacity of organisations is regarded as influencing the correlation between organisational performance and its outcomes.

3. Methodology

This study collected data from Chinese construction organizations. The survey was conducted using a questionnaire tool, and the authors employed convenience sampling to gather data (Nawaz et al., 2022a), the questionnaire is attached in the Appendix. Convenience sampling was used due to the unknown population size (Nawaz et al., 2022a). To minimize common method bias during data collection, the authors followed the approach outlined by Min et al. (2016). In this regard, data were collected from multiple sources. Information on digital leadership and digital technology support was collected from lower management in the construction industry, while data on organizational sustainable performance were gathered from senior management.

The data collection procedure adhered to the ethical guidelines provided by Fontana et al. (2003). For instance, precautions were taken during data collection to minimize any psychological or emotional discomfort experienced by respondents. A total of 890 questionnaires were distributed across different organizations, with 529 responses received, resulting in a response rate of 59.0%. The survey also collected demographic information from respondents. Most of the respondents (79%) were male, and a substantial portion (56%) were between 26 and 40 years old. Additionally, 63% of respondents were university graduates, and a significant proportion (53%) had accumulated more than five years of professional experience. This indicates that the respondents were mature, educated, and experienced enough to understand the items in the questionnaire.

The measurement of digital leadership was based on a six-item scale developed by Shin et al. (2023), with items assessed using a Likert scale ranging from (1) strongly disagree to (5) strongly agree. An example item is, “Supervisors/leaders enhance awareness of technologies that can be used to improve organizational processes.” Digital leadership capability was measured using a four-item scale developed by Benitez et al. (2022), also assessed on a Likert scale ranging from (1) strongly disagree to (5) strongly agree. An example item is, “Does your company’s digital transformation strategy enhance operational efficiency and performance?” Organizational sustainable performance was measured using a six-item scale (Mollah et al., 2023), with items rated on a Likert scale from strongly disagree (1) to strongly agree (5). An example item is, “The organization provides high-quality services.”

4. Results

4.1. Evaluation of measurement tests

Parameters for assessing validity and reliability include the following measurements:

- Cronbach’s alpha with a minimum threshold of 0.7, assessing reliability.

- Composite reliability must meet a minimum level of 0.7.
- Average variance extracted (AVE) should exceed 0.5.

Alternative metrics may be employed to evaluate discriminant validity by determining if the correlation with the desired construct exceeds that of any other construct, as well as to examine convergent validity by verifying that the loading factor for all latent variables and dimensions is more than 0.7. The findings are displayed in **Table 1**. **Table 1** indicates that the values for all latent variables and dimensions are legitimate, exhibiting strong reliability. The findings on discriminant validity are presented in **Table 2**. **Table 2** illustrates that the values of the intended constructs (on the diagonal) exceed the corresponding figures to the left, demonstrating robust discriminant validity for each latent variable.

Table 1. Construct reliability test.

	Cronbach's Alpha	**Composite Reliability**	**AVE**
Digital leadership	0.912	0.939	0.798
DL1	0.913	0.912	0.723
DL2	0.915	0.946	0.845
DL3	0.945	0.960	0.858
DL4	0.931	0.951	0.830
DL5	0.917	0.939	0.794
DL6	0.851	0.923	0.738
Digital leadership capability	0.879	0.964	0.772
DLC1	0.906	0.900	0.797
DLC2	0.941	0.940	0.695
DLC3	0.817	0.892	0.858
DLC4	0.851	0.948	0.737
Organizational sustainability	0.885	0.953	0.881
OS1	0.855	0.924	0.859
OS2	0.906	0.971	0.914
OS3	0.931	0.955	0.872
OS4	0.817	0.932	0.944
OS5	0.872	0.972	0.914
OS6	0.931	0.963	0.783

Table 2. Discriminant validity.

No	**Latent Variable**	**1**	**2**	**3**
1	Digital Leadership	0.823		
2	Digital Leadership Capability	0.800	0.811	
3	Organizational Sustainability	0.729	0.898	0.914

4.2. Hypotheses testing

Structural equation modelling (SEM) was employed to analyse the influence of the independent variable on the dependent variables, as illustrated in **Table 3**. The research identified substantial beneficial impacts of digital leadership on digital leadership

capability ($\beta = 0.3304$, $p < 0.01$), and digital leadership on organizational sustainability ($\beta = 0.0983$, $p < 0.01$). Additionally, digital leadership capability was found to positively influence organizational sustainability ($\beta = 0.1347$, $p < 0.01$), demonstrating the significant role that both digital leadership and its capabilities play in enhancing organizational sustainability. The results of the study confirm the acceptance of all three hypotheses, demonstrating significant relationships between digital leadership, digital leadership capability, and organizational sustainability.

The mediating hypotheses were examined using hierarchical regression analysis with bootstrapping to estimate the lower limit (LL) and upper limit (UL) of the confidence intervals, as shown in **Table 4**. The hypothesis that digital leadership influences organizational sustainability through digital leadership capability was tested for both direct and indirect effects. The direct effect of digital leadership on organizational sustainability was significant ($\beta = 0.483$, $p < 0.01$). Additionally, the indirect effect of digital leadership through digital leadership capability on organizational sustainability was also significant ($\beta = 0.130$, $p < 0.01$), with a confidence interval ranging from LL = 0.0578 to UL = 0.562, indicating a significant mediating effect. As a result, H4 was accepted, confirming that digital leadership capability mediates the relationship between digital leadership and organizational sustainability.

Table 3. Hypotheses testing through hierarchical regression.

Relationships	***β***	**CR**	***T* values**	***P* values**	**Hypotheses**
Digital leadership → Digital leadership capability	0.3304	0.918	0.0578	**	H1 is accepted
Digital leadership → Organizational sustainability	0.0983	0.917	0.0363	**	H2 is accepted
Digital leadership capability → Organizational sustainability	0.1347	0.909	0.0711	**	H3 is accepted

Table 4. Mediation analysis.

Relationships			**LL**	**UL**	**Hypotheses**
Digital leadership → Digital leadership capability → Organizational sustainability					
Direct effect	0.483	**	0.0578	0.562	H4 is accepted
Indirect effect	0.130	**			

5. Discussion

The rapid advancement of digital technologies has revolutionized the business landscape, particularly within the educational industry. However, merely adopting digital tools is not sufficient to achieve organizational sustainability. Digital transformation requires effective leadership to guide this process and leverage technological innovations for sustainable outcomes (Martínez-Peláez et al., 2023). This study sought to explore the mediating role of digital leadership capability in driving organizational sustainability through digital leadership, extending the existing body of research in this domain. The findings indicate that both digital leadership and its capability significantly contribute to

sustainability outcomes, highlighting the importance of leadership in orchestrating the digital transformation process.

This study aligns with previous research, which emphasized the importance of leadership in driving successful digital transformation. For instance, Türk (2023) argued that digital leadership plays a critical role in guiding organisations through large-scale digital changes, particularly in industries such as education, where traditional methods may no longer suffice. As the findings suggest, leadership goes beyond merely managing technological tools; it also involves strategically guiding organizations toward adopting and benefiting from digital innovations. Leaders in digitally transforming organizations must facilitate not only the technical aspects of change but also the cultural shift required for sustainable performance.

Moreover, the study highlights that digital leadership involves more than just implementing technological tools—it also entails fostering an environment in which digital innovations are fully integrated into the organizational culture. This supports the idea that leaders must embody a vision that merges technological advancement with the broader goals of sustainability. In line with Khan et al. (2021), who emphasized the importance of digital strategy in enhancing organizational performance, the current study underscores that digital leadership fosters an alignment between technological innovation and long-term organizational goals, particularly in achieving sustainability.

The concept of digital leadership capability has emerged as a crucial dimension in understanding how organizations navigate the complexities of digital transformation. Previous studies, such as those by Rachinger et al. (2018), have primarily focused on the role of platform digitization in driving innovation. However, the current study extends this perspective by examining how digital leadership capability facilitates human efforts, specifically through inter-team coordination and knowledge integration, which are essential for driving IT innovation.

This expansion of digital leadership capability adds a human-centered approach to understanding how leadership influences organizational outcomes. While technological proficiency remains vital, our findings suggest that digital leadership capability also encompasses the ability to coordinate and collaborate effectively across teams. This shift from a purely technical focus to one that includes human factors underscores the importance of leadership in cultivating an environment where digital transformation thrives.

Moreover, the findings indicate that digital leadership capability promotes not only innovation but also organizational cohesion. Leaders who possess strong digital leadership capability are better equipped to guide their teams through the complexities of digital transformation, ensuring that all employees are aligned with the organization's technological goals. This aligns with the work of Asif (2024), who noted that digital leadership capability plays a pivotal role in shaping organizational culture and driving long-term sustainability.

The moderated-mediation model applied in this research revealed significant insights into how digital leadership capability functions as a bridge between leadership and

sustainability outcomes. The model tested the direct and indirect effects of digital leadership on organizational sustainability through digital leadership capability. Our findings confirmed that digital leadership capability mediates this relationship, meaning that organizations with strong digital leadership capabilities are more likely to achieve sustainability through effective leadership.

The findings of this study highlight the critical role of digital leadership in fostering sustainable outcomes. However, for leaders and decision-makers aiming to translate these insights into actionable strategies, a targeted approach is essential. A primary recommendation is for organizations to establish comprehensive digital leadership development programs. These programs should emphasize strategic skills in digital technology, adaptability, and a proactive approach to innovation. By continually updating their knowledge of emerging trends and tools, leaders can stay ahead of the rapid shifts in digital transformation, positioning their organizations to respond effectively to new challenges.

Building a culture of continuous learning and innovation further reinforces sustainable digital transformation. As indicated by the study, fostering cohesion and knowledge-sharing across teams enhances organizational adaptability. Leaders can champion initiatives that promote inter-team collaboration and facilitate knowledge transfer, such as regular workshops, cross-departmental projects, and digital knowledge-sharing platforms. These initiatives not only nurture digital leadership capabilities but also create a supportive environment where employees feel aligned with the organization's digital and sustainable goals.

Sustainable digital transformation requires a digitally literate workforce at all organizational levels. Leaders play a pivotal role in fostering digital literacy by supporting and advocating for training programs that equip all employees with essential digital skills. Such programs ensure that everyone within the organization, regardless of their role, is aligned with the strategic objectives of digital transformation and sustainability. This alignment creates a cohesive approach to adopting new technologies and integrating them effectively into day-to-day operations.

Incorporating sustainability metrics into digital leadership assessments can strengthen this alignment between digital strategy and long-term sustainable goals. By embedding key performance indicators (KPIs) focused on sustainability—such as tracking improvements in energy efficiency, employee engagement with sustainable practices, or reductions in waste through digital solutions—organizations ensure that their digital transformation efforts are not only effective but also environmentally and socially responsible.

Lastly, creating a digital leadership network within and beyond the organization fosters ongoing growth and collaboration. This network can include mentorship programs, digital leadership communities, or partnerships with external sustainability experts. Such networks provide valuable spaces for leaders to exchange experiences, discuss challenges, and share innovative solutions, creating a resilient support structure that benefits both individual leaders and the organization as a whole.

5.1. Theoretical implications

This study contributes to the growing body of literature on digital leadership and organizational sustainability by extending the theoretical understanding of how leadership capabilities mediate the relationship between digital leadership and organizational outcomes. By drawing from the dynamic capabilities view (Teece et al., 1997) and complex adaptive systems theory (Holland, 1996), the study provides valuable insights into how digital leadership capability functions as a dynamic capability that enables organizations to adapt and thrive in rapidly changing digital environments.

First, this study expands on the concept of digital leadership capability by introducing it as a mediating factor that links leadership efforts with sustainability outcomes. Prior studies (Benitez et al., 2022) primarily focused on digital leadership's impact on innovation, but this research adds nuance by showing that digital leadership capability plays a vital role in facilitating organizational adaptability, particularly in the education sector. By emphasizing the role of inter-team coordination and knowledge integration, this study introduces new theoretical elements that explain how leadership capability impacts IT innovation and broader organizational sustainability.

Second, the study builds on the dynamic capabilities view by positioning digital leadership capability as a critical enabler of organizational resilience and agility. Organizations in today's volatile digital environment must continuously reconfigure their processes and strategies to maintain competitiveness. This study theoretically reinforces the idea that leadership must go beyond technical expertise and focus on building capabilities that foster collaboration and innovation. The findings suggest that leadership capability enhances the organization's capacity to sense, seize, and reconfigure resources in response to digital challenges, contributing to the existing literature on dynamic capabilities.

Third, the application of complex adaptive systems theory in this context offers a novel lens through which to view digital leadership. By framing organizations as complex systems that must continuously adapt to external changes, this study underscores the importance of leadership in managing the complexities associated with digital transformation. Digital leadership capability, as a mediator, functions to align individual and team-level actions with broader organizational goals, helping organizations navigate the uncertainties and ambiguities of the digital environment. This adds to the theoretical understanding of how leadership influences organizational adaptability and long-term sustainability.

This study highlights the role of inter-team coordination as a mechanism through which digital leadership capability enhances organizational outcomes. By focusing on how leadership capability facilitates collaboration and knowledge-sharing among teams, this research adds depth to existing theories that link leadership with organizational performance. It demonstrates that digital leadership capability is not merely about individual leadership skills but about fostering a culture of collaboration that drives IT innovation and sustainability.

5.2. Practical implications for organizations

For practitioners, the implications of this study are significant. Organizations seeking to thrive in digitally dynamic environments should prioritize the development of digital leadership capability. This capability not only ensures smooth digital transitions but also fosters agile behavior within teams. Leaders with a comprehensive understanding of both business strategy and digital technology are better equipped to navigate the complexities of digital transformation, thereby securing organizational sustainability in competitive markets.

One practical implication is the importance of fostering a culture of collaboration and knowledge sharing within organizations. The findings suggest that digital leadership capability is closely tied to inter-team coordination, which is essential for driving IT innovation. Organizations that invest in developing digital leadership capability can create an environment where teams work together effectively, sharing knowledge and expertise to drive innovation. This is particularly important in industries such as education, where digital transformation is rapidly changing the way organizations operate.

Furthermore, digital leadership capability can serve as a preventive mechanism against the potential pitfalls of unevenly distributed digital skills within teams. As the findings suggest, leaders who possess strong digital leadership capability are better equipped to identify and address knowledge gaps within their teams, ensuring that all employees are prepared to contribute to the organization's digital transformation efforts.

5.3. Limitations

This study, while contributing valuable insights, is subject to certain limitations. First, the reliance on convenience sampling constrains the generalizability of the findings, as this sampling method may not capture the diversity of organizational types or regions, thereby potentially introducing sampling bias. The potential for common method bias presents a limitation, given that data were collected from a single source. Although measures were implemented to mitigate this bias, future research could gain from multi-level data collection across various organizational roles to provide a more comprehensive perspective. The exclusion of moderating variables, such as organizational size and digital tool types, also restricts the analysis, as these variables could influence the relationship between digital leadership and sustainability outcomes. Future research addressing these factors would provide a more nuanced understanding of digital leadership's impact, offering greater clarity and depth to this area of inquiry.

Author contributions: Conceptualization, ZL and MM; methodology, MM; software, YY; validation, ML and YX; formal analysis, YX; investigation, RY; resources, RY and CZ; data curation, CZ and SL; writing—original draft preparation, WW and LS; writing—review and editing, ZL; visualization, ML; supervision, ZL; project administration, RY. All authors have read and agreed to the published version of the manuscript.

Conflict of interest: The authors declare no conflict of interest.

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Appendix

Table A1. Instrumentation.

Variables	Items
Digital leadership	DL1: Supervisor/leader raises the awareness of the employees of the institution about the risks/ benefits of information technologies DL2: Supervisor/leader raises awareness of the technologies that can be used to improve organizational processes DL3: Supervisors/leaders determine the ethical behaviors required for informatics practices together with all stakeholders DL4: The supervisor plays an informative role in reducing resistance to innovations brought by information technologies DL5: Leaders share his/her own experiences about technological possibilities that will increase the contribution of their colleagues to the learning of organizational DL6: In order to increase participation in the corporate vision, a digital leader guides the employees of the institution about the technological tools that can be used
Digital leadership capability	DLC1: Is your leadership clearly articulates a vision and strategy for adopting digital technologies to enhance organizational performance DLC2: Are your leaders have a strong understanding of current and emerging digital technologies and their potential impact on our business DLC3: The leadership encourages a culture of innovation and agility, promoting the adoption of new digital tools and practices DLC4: Your leaders effectively use digital communication platforms to foster collaboration and streamline digital operations across teams
Organizational sustainability	OS1: The organization provides high-quality services OS2: The organization can adopt new manufacturing & services opportunities OS3: The organization performs well in improving the effectiveness of services delivered OS4: The organization adapts quickly to unanticipated changes OS5: The organization can compete in the current market OS6: The organization is considered profitable in the industry