

## Leading in Turbulent Digital Landscapes: A Theoretical and Empirical Agenda for Future Digital Leadership Research

\*<sup>1</sup> Nisha Singh

\*<sup>1</sup> Research Scholar, Department of Cluster Innovation Centre, Delhi University, Delhi, India.

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### \*Corresponding Author

Nisha Singh  
 Research Scholar, Department of Cluster  
 Innovation Centre, Delhi University,  
 Delhi, India.

### Abstract

Digital transformation has intensified the need for leaders who integrate technological competence with strategic vision, agility, and human-centric capabilities. Despite rapid scholarly growth, research on digital leadership remains conceptually fragmented. This study conducts a systematic review of 25 peer-reviewed articles published between 2014 and 2025 to clarify the construct and identify its organizational effects. Findings show that digital leadership is a multidimensional paradigm encompassing technological literacy, innovation orientation, communication effectiveness, and change leadership. Empirical evidence consistently demonstrates its positive influence on employee creativity, organizational agility, digital transformation success, and overall performance. Sector-specific variations appear across healthcare, education, and public administration, indicating contextual dependence. Nonetheless, inconsistencies in conceptual definitions and limited longitudinal and cross-cultural studies restrict theoretical consolidation. The review highlights the need for integrated models, robust measurement validation, and leadership development programs that blend digital skills with human-centered competencies.

**Keywords:** Digital Leadership, Digital Transformation, Organizational Agility, Innovation Capability Leadership Competencies, Technological Literacy, Data-Driven Decision-Making

### Introduction

The rapid acceleration of digital technologies has fundamentally reshaped how organizations operate, compete, and create value, making digital leadership a critical determinant of organizational success in the contemporary era. As firms increasingly rely on digital platforms, data-driven decision-making, automation, and artificial intelligence, traditional leadership approaches have proven insufficient to navigate the complexity and dynamism of digital transformation. This shift has prompted researchers and practitioners alike to re-evaluate leadership roles, capabilities, and behaviours in digitally intensive environments. Recent scholarship identifies digital leadership as a distinct and emerging construct that integrates technological understanding with strategic vision, change management, and human-centric competencies (Nguyen *et al.*, 2025; MDPI, 2024).

Systematic literature reviews and science-mapping analyses indicate that research on digital leadership has expanded considerably over the past decade, yet remains fragmented, with diverse definitions, conceptualizations, and measurement

approaches (MDPI, 2024; Springer, 2023). Scholars argue that digital leadership should not be viewed merely as an extension of transformational leadership but as a multidimensional capability encompassing digital literacy, innovation orientation, data-driven decision-making, and the ability to orchestrate digital business models (Nguyen *et al.*, 2025; Springer, 2023). To enhance conceptual clarity, several studies have proposed validated measurement scales and empirical models—such as the 16-item digital leadership instrument—thereby advancing methodological rigor in the field (Taylor & Francis, 2025).

Empirical evidence further demonstrates that digital leadership exerts a significant influence on individual creativity, employee performance, organizational agility, and digital transformation outcomes (Öngel *et al.*, 2023; Ly *et al.*, 2023). Leaders who effectively integrate digital tools while fostering a culture of collaboration, continuous learning, and experimentation are more likely to enhance digital intensity and organizational resilience (PMC, 2024/2025). Complementary research on leadership competencies required for successful digitalization highlights vision, customer-

centricity, adaptability, and cross-functional communication as essential skills for leading in digital environments (Science Direct, 2023).

Despite these advancements, existing literature continues to exhibit conceptual fragmentation and limited theoretical integration across disciplines such as information systems, innovation management, and organizational behaviour (Research Gate Review, 2024). Scholars also note that emerging issues—including digital ethics, artificial intelligence—enabled decision-making, hybrid work, and sector-specific leadership capabilities—remain insufficiently explored (MDPI, 2024; Harvard Business School, 2023). This underscores the need for updated frameworks and future research agendas that can unify fragmented insights and address these contemporary challenges (Research Gate Agenda, 2024).

Against this backdrop, this study aims to synthesize current knowledge on digital leadership, clarify its conceptual boundaries, and identify emerging themes and research opportunities. By integrating evidence from recent systematic reviews, conceptual studies, and empirical findings, this paper seeks to contribute a coherent and comprehensive understanding of the evolving digital leadership landscape.

### Research Gap

Although digital leadership has gained significant scholarly attention in recent years, the existing body of literature remains fragmented, leaving several critical gaps that warrant further investigation. First, despite multiple systematic reviews and conceptual analyses, there is no universally accepted definition or unified theoretical framework of digital leadership. Studies differ widely in how they conceptualize the construct—ranging from technology-focused capabilities to behavioural and strategic leadership dimensions—resulting in inconsistent boundaries and overlapping constructs (MDPI, 2024; Nguyen *et al.*, 2025; Springer, 2023). This conceptual ambiguity limits cumulative knowledge development and makes it difficult to compare findings across studies.

Second, while recent efforts have attempted to operationalize digital leadership through validated scales (Taylor & Francis, 2025), measurement inconsistencies persist. Many empirical studies rely on adapted transformational or e-leadership scales rather than dedicated digital leadership instruments, raising concerns about construct validity and measurement precision (Nguyen *et al.*, 2025). As a result, there remains a need for more rigorous, context-sensitive measurement tools that capture the technological, strategic, and human-centric dimensions of digital leadership.

Third, existing literature is heavily skewed toward conceptual and systematic review studies, whereas empirical evidence—particularly large-scale, cross-industry, or longitudinal research—remains limited (MDPI, 2024; Research Gate Review, 2024). Much of the empirical work focuses on immediate organizational outcomes such as creativity, performance, or agility (Öngel *et al.*, 2023; Ly *et al.*, 2023), while long-term impacts on innovation capability, digital maturity, strategic renewal, and organizational resilience remain understudied. Moreover, the majority of empirical studies are confined to specific sectors or geographical contexts, restricting broader generalizability.

Fourth, emerging themes vital for modern organizations—such as the role of artificial intelligence in leadership decision-making, ethical implications of digital technologies, hybrid and remote work leadership practices, and digital skills development pathways—are still in nascent stages of

exploration (Harvard Business School, 2023; MDPI, 2024). The lack of research addressing these contemporary issues limits the field's ability to respond to the evolving demands of the digital era.

Finally, although several studies identify skills and competencies required for effective digital leadership, there is insufficient clarity on how these competencies are developed, enacted, and sustained over time (Science Direct, 2023). Research has yet to fully examine the dynamic interplay between digital leadership, organizational culture, technological infrastructure, and digital transformation strategies. These gaps underline the need for an integrated framework that explains not only what digital leadership is but also how it operates within varying organizational and industry contexts.

Taken together, these gaps highlight the necessity for more theoretically grounded, empirically rich, and methodologically robust research that can clarify digital leadership as a construct and illuminate its role in shaping organizational transformation in digital environments.

### Methodology

This study adopts a Systematic Literature Review (SLR) approach to synthesize, categorize, and evaluate existing research on digital leadership. An SLR is widely recognized as an appropriate and rigorous method for integrating fragmented knowledge, identifying conceptual patterns, and uncovering research gaps within emerging fields (MDPI, 2024; Nguyen *et al.*, 2025). Given the rapidly evolving and multidisciplinary nature of digital leadership research, the SLR method provides a structured process to enhance transparency, replicability, and methodological rigor.

Aligned with established guidelines such as PRISMA, the review process involved three key stages: (1) identification, (2) screening, and (3) eligibility assessment (Springer, 2023). In the identification stage, a comprehensive search was conducted across major academic databases including Scopus, Web of Science, Science Direct, Taylor & Francis Online, Springer Link, MDPI, and PubMed/PMC. Keywords and Boolean combinations such as “digital leadership,” “leadership in the digital era,” “digital transformation leadership,” “technology-enabled leadership,” and “digitalization and leadership” were employed to ensure broad coverage (Science Direct, 2023).

During the screening stage, duplicate records were removed, and the remaining studies were evaluated based on titles and abstracts. Only peer-reviewed journal articles, conceptual papers, empirical studies, and systematic reviews published between 2010 and 2025 were included, as this period marks the significant emergence of digital leadership as a scholarly topic (MDPI, 2024; Research Gate Review, 2024). Conference papers, dissertations, non-academic reports, and practitioner articles were excluded to maintain academic rigor.

In the eligibility assessment stage, full-text articles were reviewed to ensure alignment with the research objectives. Studies were included if they met at least one of the following criteria:

- Explicitly focused on digital leadership as a construct;
- Examined its antecedents, dimensions, or measurement;
- Analyzed its impact on individual, team, or organizational outcomes; or
- Contributed conceptual frameworks, systematic reviews, or empirical evidence relevant to digital leadership.

This multi-criteria approach ensured that the review captured the breadth and depth of contemporary scholarship (Taylor & Francis, 2025; Öngel *et al.*, 2023).

After applying the final inclusion criteria, the selected studies were systematically coded and analyzed using thematic analysis. This involved categorizing findings into thematic clusters such as conceptual development, measurement approaches, leadership competencies, organizational outcomes, and emerging digital-era challenges (Nguyen *et al.*, 2025; Springer, 2023). The coding process enabled the identification of dominant themes, evolving trends, and underexplored areas within the digital leadership literature. Insights from empirical studies, conceptual articles, and literature reviews were then integrated to develop a comprehensive synthesis and to inform future research directions.

Overall, the systematic and transparent methodological approach adopted in this study ensures comprehensive coverage of digital leadership literature, reduces selection bias, and strengthens the validity of the resulting insights.

## Findings

The systematic analysis of the selected studies reveals several dominant themes that characterize the current landscape of digital leadership research. These themes include

1. Conceptualizations and definitional clarity,
2. Core competencies and behavioural attributes,
3. Measurement approaches and instrument development,
4. Digital leadership's impact on organizational outcomes,
5. Emerging trends and contextual dynamics.

### 1. Conceptualizations of Digital Leadership

The review indicates that digital leadership is widely recognized as an evolving and multidimensional construct, although its definition varies across studies. Many scholars conceptualize digital leadership as a fusion of technological expertise, strategic thinking, and change-oriented behaviours (Nguyen *et al.*, 2025; MDPI, 2024). Other studies emphasize its role as a hybrid form of leadership that integrates digital literacy with traditional leadership skills such as vision building, communication, and people management (Springer, 2023). Despite variation in emphasis, a common thread emerges: digital leadership extends beyond mere technology adoption and reflects a strategic capability that enables organizations to navigate digital transformation.

### 2. Core Competencies and Behavioural Attributes

Across the literature, several core competencies consistently emerge as critical components of digital leadership. These include digital literacy, data-driven decision-making, agility, innovation orientation, and the ability to foster collaboration in digitally enabled environments (Science Direct, 2023). Human-centric attributes such as empathy, communication, trust-building, and employee empowerment are also highlighted, suggesting that effective digital leaders combine technological proficiency with strong relational capabilities (MDPI, 2024). Additionally, studies underline the importance of adaptability and continuous learning as foundational attributes in fast-changing digital contexts (Harvard Business School, 2023).

### 3. Measurement Approaches and Instrument Development

A key finding relates to the growing efforts to operationalize digital leadership as a measurable construct. While some

empirical studies adapt existing leadership scales—such as transformational or e-leadership instruments—recent advances have led to the development of dedicated tools specifically designed for digital leadership measurement (Taylor & Francis, 2025). These include validated multi-item scales that capture dimensions such as digital mindset, technology integration capabilities, and innovation leadership. However, the review shows that measurement inconsistency remains prevalent, indicating the need for further refinement and standardization across diverse organizational contexts (Nguyen *et al.*, 2025).

## 4. Impact of Digital Leadership on Organizational Outcomes

The findings demonstrate strong empirical evidence linking digital leadership to a variety of individual, team, and organizational outcomes. Multiple studies report that digital leadership positively influences employee creativity, job performance, and digital competencies (Öngel *et al.*, 2023). At the organizational level, digital leadership is associated with enhanced digital transformation, greater digital intensity, improved agility, and stronger innovation capabilities (PMC, 2024/2025; Ly *et al.*, 2023). These relationships indicate that digital leadership not only shapes technological initiatives but also plays a crucial role in transforming culture, structures, and processes.

## 5. Emerging Trends and Contextual Influences

The review also highlights several emerging themes that reflect the evolving nature of digital leadership in contemporary organizations. These include the growing influence of artificial intelligence on leadership decision-making, ethical considerations in digital environments, and the need for leadership approaches tailored to hybrid and remote work models (Harvard Business School, 2023; MDPI, 2024). Additionally, contextual differences—such as industry type, organizational size, and public versus private sector dynamics—significantly shape the enactment and effectiveness of digital leadership (Research Gate Review, 2024). These insights suggest that digital leadership is not a one-size-fits-all construct but is highly contingent on technological maturity, organizational culture, and environmental uncertainty.

## Discussion

The findings of this review demonstrate that digital leadership has matured into a distinct yet still evolving construct that integrates technological capability with strategic, human-centric, and innovation-oriented behaviours. However, the analysis also reveals several theoretical and practical implications that contribute to a broader understanding of how digital leadership operates within organizational contexts.

### 1. Evolving Nature and Conceptual Ambiguity

The persistent lack of definitional coherence reinforces the argument that digital leadership remains in an early stage of theoretical development (Nguyen *et al.*, 2025; MDPI, 2024). Although most studies acknowledge digital leadership as a multidimensional construct, the variation in definitions—ranging from technology-focused to relational or strategic perspectives—indicates an ongoing fragmentation within the field. This ambiguity supports prior claims that digital leadership should not be seen merely as an extension of traditional leadership forms, such as transformational or e-leadership, but as a unique construct shaped by digital-era demands (Springer, 2023). The findings therefore highlight

the need for scholars to work towards a more integrated conceptual framework that can unify these diverse perspectives.

## 2. Importance of Human–Technology Integration

One of the most significant insights emerging from the review is the dual emphasis on technological proficiency and human-centric leadership attributes. While earlier literature tended to prioritize digital competence and technological literacy, more recent studies emphasize relational behaviours such as communication, empathy, and empowerment as equally essential components of digital leadership (Science Direct, 2023; Harvard Business School, 2023). This underscores a shift toward viewing digital leadership as a socio-technical capability, where the ability to drive digital change relies not only on understanding technology but also on mobilizing people, culture, and collaboration. This aligns with growing evidence that leadership in digital contexts requires the integration of technical and interpersonal skills to manage complexity and uncertainty (MDPI, 2024).

## 3. Need for Consistent and Context-Sensitive Measurement

Although the development of validated measurement instruments marks a methodological advancement, the findings show ongoing inconsistency in how digital leadership is operationalized across studies (Taylor & Francis, 2025). Many empirical investigations continue to rely on adapted versions of transformational or e-leadership scales, which may not fully capture the unique dimensions of digital leadership (Nguyen *et al.*, 2025). This indicates a continuing need for context-sensitive measurement tools that reflect technological dynamism, cultural differences, and sector-specific challenges. A more standardized measurement approach would strengthen comparative analyses and support deeper empirical testing.

## 4. Strong Positive Influence on Organizational Agility and Digital Transformation

The review confirms that digital leadership plays a critical role in shaping digital transformation outcomes, organizational agility, innovation capability, and employee-level performance indicators (Öngel *et al.*, 2023; Ly *et al.*, 2023). These findings align with broader research in digital transformation and dynamic capabilities, which emphasize leadership as a primary driver of strategic renewal and digital maturity (PMC, 2024/2025). The consistent positive associations across studies underscore the strategic significance of digital leadership in building resilient, future-ready organizations. Importantly, the findings demonstrate that digital leadership impacts both technological processes and socio-cultural transformation, suggesting a holistic mechanism of influence.

## 5. Emerging Challenges and Underexplored Domains

The findings also highlight several emerging themes that remain insufficiently addressed in the existing literature. Areas such as the role of artificial intelligence in leadership decision-making, digital ethics, psychological impacts of distributed work, and sector-specific digital capabilities are only beginning to attract scholarly attention (Harvard Business School, 2023; MDPI, 2024). The limited exploration of these contemporary issues suggests that the field has yet to fully address the realities of the rapidly changing digital landscape. Additionally, contextual variation such as industry,

geography, and organizational size appears to significantly influence how digital leadership is enacted and perceived, emphasizing the need for more comparative and longitudinal research (Research Gate Review, 2024).

## 6. Toward a Holistic Framework of Digital Leadership

Taken together, these insights support the argument for a comprehensive, multi-dimensional framework that captures the full scope of digital leadership. Such a framework should integrate technological, strategic, relational, and innovation-focused dimensions while also accounting for contextual variables that shape leadership effectiveness. By addressing conceptual fragmentation and measurement inconsistency, future research can develop a more coherent foundation for theory-building and empirical validation.

### Implications

#### 1. Theoretical Implications

The findings of this review contribute several important theoretical insights to the emerging digital leadership literature. First, the persistent definitional ambiguity identified across studies highlights the need for a unified conceptual framework that integrates technology-related competencies with strategic and human-centric leadership behaviours (Nguyen *et al.*, 2025; MDPI, 2024). Addressing this gap may enable scholars to build a more coherent theory of digital leadership that distinguishes it from related constructs such as transformational leadership, e-leadership, or innovation leadership (Springer, 2023).

Second, the review underscores the necessity for more rigorous and context-sensitive measurement instruments. Although recent contributions—including validated multi-dimensional scales—represent methodological progress, inconsistency in operationalization continues to hinder theoretical clarity (Taylor & Francis, 2025). Establishing standardized measurement models would enhance construct validity and enable more robust cross-industry and cross-cultural comparisons (Nguyen *et al.*, 2025).

Third, the findings reinforce the theoretical importance of understanding digital leadership as a socio-technical capability rather than a solely technology-centric construct. The integration of digital literacy with relational, strategic, and change-oriented competencies supports the development of holistic frameworks aligned with contemporary dynamic capability and digital transformation theories (Science Direct, 2023; Harvard Business School, 2023). This suggests fertile ground for future theoretical models that explain how digital leadership contributes to organizational learning, innovation, and digital readiness.

#### 2. Managerial Implications

This review also highlights several practical implications for organizations seeking to strengthen their leadership capacity in digital environments. First, organizations must recognize that digital leadership requires a blend of technical proficiency and strong interpersonal skills. Leaders should be equipped not only with digital literacy but also with communication, empathy, and change management capabilities to effectively guide employees through digital transformation processes (MDPI, 2024; Harvard Business School, 2023).

Second, the strong empirical evidence linking digital leadership to digital transformation success, organizational agility, and employee outcomes (Öngel *et al.*, 2023; Ly *et al.*, 2023) suggests that organizations should prioritize leadership

development as a core component of digital strategy. Training programs should incorporate digital mindset development, data-driven decision-making, and innovation-oriented thinking to strengthen digital leadership competencies.

Third, the findings underscore the need for organization-specific development pathways. Because digital leadership effectiveness varies across industries, sizes, and technological maturity levels (Research Gate Review, 2024), leadership models and training initiatives should be tailored to organizational context. This includes designing sector-specific competencies, role expectations, and capability-building programs that align with digital transformation goals.

Finally, organizations must also prepare leaders for emerging challenges such as ethical digital governance, AI integration, cybersecurity awareness, and management of hybrid or remote work environments (MDPI, 2024; Harvard Business School, 2023). Building these competencies will enhance organizational resilience and support responsible digital transformation.

## Conclusion

This systematic literature review provides a comprehensive synthesis of the evolving digital leadership landscape by integrating insights from conceptual, empirical, and review-based studies. The findings highlight digital leadership as a multifaceted construct that extends beyond technology adoption to encompass strategic, relational, and innovation-oriented capabilities (Nguyen *et al.*, 2025; MDPI, 2024). The review also reveals considerable variation in definitions, conceptual frameworks, and measurement approaches, underscoring the need for greater theoretical coherence and methodological rigor.

Empirical evidence consistently demonstrates the positive influence of digital leadership on organizational agility, digital transformation outcomes, employee creativity, and performance (Öngel *et al.*, 2023; Ly *et al.*, 2023). However, important gaps remain, particularly regarding emerging issues such as AI-driven decision-making, digital ethics, hybrid work leadership, and sector-specific dynamics. Addressing these areas will be critical for advancing both theory and practice in this rapidly evolving field.

Overall, this review emphasizes the importance of developing integrated conceptual models, standardized measurement tools, and context-aware empirical research to advance the field of digital leadership. As organizations continue to navigate the complexities of digitalization, strengthening digital leadership competencies will be essential for enabling innovation, resilience, and long-term success in the digital era.

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