

Developing an Integrated Conceptual Framework of Digital Leadership, Digital Organizational Culture, and School Digitalization: A Literature Review

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Abstract: Digital transformation has reshaped the governance of educational organizations and heightened the demand for leadership capable of steering technology-driven change. However, studies examining the relationship between digital leadership, digital organizational culture, and school digitalization remain fragmented, lacking an integrated conceptual framework. This study aims to analyze the conceptual development of digital leadership in educational leadership literature, identify the role of digital organizational culture in supporting school digitalization, and synthesize the interrelationships among these constructs into an integrated conceptual framework. Employing a conceptual literature review approach across four stages literature identification, selection, qualitative coding and thematic synthesis, and conceptual framework development the research analyzed 46 articles meeting inclusion criteria. Qualitative content analysis using open, axial, and selective coding was conducted. Key findings indicate that digital leadership has evolved as a multidimensional construct encompassing digital vision, change management, digital competence, and organizational innovation. Furthermore, digital organizational culture functions as a strategic mechanism fostering values of innovation, collaboration, adaptability, and continuous learning to support school digitalization implementation. The synthesis yields the Digital Leadership, Digital Organizational Culture, and School Digitalization (LD-C-DS) Conceptual Framework, positing school digitalization as an outcome shaped by digital organizational culture, which is itself influenced by digital leadership practices. This study contributes to educational management and leadership scholarship by providing a conceptual foundation for future empirical research and digital transformation policy development in school settings.

Keywords: Digital Leadership; Digital Organizational Culture; School Digitalization; Digital Transformation; Educational Leadership.

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Introduction

Digital transformation has emerged as a strategic agenda that is reshaping how organizations design workflows, manage resources, build communication, and generate added value in the face of an increasingly dynamic environment. In the education sector, this transformation is no longer understood merely as the utilization of technological devices in learning activities, but rather as an organizational change process that touches upon aspects of leadership, governance, organizational culture, decision-

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making, and the quality of educational services. The development of digital technology compels schools to adapt to more flexible, data-driven, collaborative, and innovation-oriented management models to meet the demands of 21st-century education. Various studies indicate that the success of digital transformation is not solely determined by the availability of technological infrastructure but is also influenced by the organization's ability to manage change systematically through visionary leadership and an adaptive organizational culture (Westerman et al., 2014; Kane et al., 2015). This perspective indicates a paradigm shift from a technology-centered approach to one that positions people, leadership, and organizational culture as strategic factors for successful digital transformation. Therefore, school digitalization is an organizational transformation process that requires the integration of leadership capabilities, organizational culture readiness, and the sustainable utilization of digital technology. This condition highlights the increasing importance of studying the relationship between digital leadership, digital organizational culture, and school digitalization to strengthen both theoretical development and practical management in education during the digital transformation era.

This paradigm shift has given rise to the concept of digital leadership as an evolution of leadership theory adapted to the characteristics of organizations in the digital age. Conceptually, digital leadership is rooted in transformational leadership theory, which emphasizes a leader's ability to build a vision, inspire organizational members, drive innovation, and manage change effectively (Bass & Riggio, 2006). This perspective is further developed through modern leadership concepts that position leaders as change agents capable of integrating organizational strategy, innovation, and culture to achieve long-term goals (Yukl, 2013; Robbins & Judge, 2014). In the context of digital transformation, a leader is required not only to possess managerial competencies but also digital literacy, the ability to leverage technology, skills in building a digital vision, and the capacity to create an organizational environment that supports innovation and continuous learning. Previous research shows that digital leadership contributes to enhancing an organization's ability to manage change, strengthening the digital competencies of its members, and accelerating the implementation of digital transformation (Westerman et al., 2014; Suswardji et al., 2020; Wulandari et al., 2021). However, a synthesis of the literature reveals that the conceptualization of digital leadership is still evolving dynamically, and no consensus has been reached regarding the core dimensions that constitute this construct. These conceptual perspective differences have resulted in an incomplete explanation of the relationship between digital leadership, organizational culture, and school digitalization within an integrated conceptual framework. Thus, a literature review is needed to map the development of the digital leadership concept while explaining its contribution to the transformation of educational organizations.

In addition to digital leadership, digital organizational culture is viewed as a strategic mechanism determining the successful implementation of digital transformation in educational organizations. Organizational culture is understood as a pattern of underlying assumptions, values, beliefs, and norms developed through collective learning processes, serving as a guide for organizational members in thinking, acting, and solving various organizational problems (Schein & Schein, 2017). From the perspective of the Competing Values Framework, organizational culture can develop in various forms, such as clan culture, adhocracy culture, market culture, and hierarchy culture, each with distinct characteristics in supporting organizational change (Cameron & Quinn, 2006). Several studies indicate that organizational cultures emphasizing innovation, collaboration, flexibility, adaptability, and continuous learning are more effective in supporting technology implementation compared to bureaucratic cultures that are resistant to change (Faried et al., 2025; Nasution et al., 2025; Wati et al., 2021). In an educational context, organizational culture not only functions as an institutional identity but also as a mechanism influencing the behavior of teachers, educational staff, and school leaders in accepting, developing, and optimizing the use of digital

technology. Therefore, digital organizational culture can be seen as a bridge connecting the vision of digital leadership with the success of school digitalization. Although this relationship has been widely discussed in various studies, most research still treats organizational culture as an independent variable, failing to explain how digital organizational culture is formed as a consequence of digital leadership practices within educational organizations.

In the context of schools, digitalization is a far more complex organizational transformation process than merely implementing learning technologies. School digitalization encompasses changes in administrative governance, data management, learning processes, communication with stakeholders, and data-driven decision-making. The success of this process is heavily influenced by the school principal's ability to build organizational capacity, develop a collaborative culture, and steer change continuously (Fullan, 2014). Recent developments also show that school principals in the digital era are required to act as digital leaders capable of leveraging digital technology, data analytics, and artificial intelligence to enhance school management effectiveness (Lavranos, 2025). Consequently, school digitalization cannot be understood solely as the outcome of technological investment but as a consequence of the interaction between digital leadership, digital organizational culture, and the organization's capacity to manage change. However, a review of prior research reveals that most studies on digital transformation are still dominated by business, industry, public organization, and service sector contexts, while research specifically integrating these three constructs within educational organizations remains relatively limited. Furthermore, available studies generally examine inter-variable relationships partially, thus failing to produce a conceptual synthesis that comprehensively explains the mechanism linking digital leadership, digital organizational culture, and school digitalization.

Based on this literature development, several research gaps persist that require further attention. First, the conceptualization of digital leadership is still evolving through various theoretical perspectives, lacking a synthesis that comprehensively explains the evolution of this concept within educational leadership literature. Second, research on digital organizational culture generally emphasizes its role as a supporting factor for digital transformation but has not explained in depth how digital organizational culture is shaped by digital leadership practices. Third, most research discusses digital leadership, organizational culture, and school digitalization separately, leaving the causal and conceptual relationships among these three constructs fragmented. Fourth, various theories used, such as transformational leadership theory, organizational culture, digital transformation, organizational change, and educational leadership, are still applied partially, failing to yield an integrated conceptual framework encompassing all these perspectives.

This situation indicates the need for a literature review-based study that not only maps conceptual developments but also conducts a theoretical synthesis to produce a conceptual model capable of systematically explaining the relationships among constructs. Therefore, this study offers a contribution in the form of developing an integrated conceptual framework linking digital leadership, digital organizational culture, and school digitalization as a foundation for future empirical research. Based on this background, this study aims to develop an integrated conceptual framework regarding the relationship between digital leadership, digital organizational culture, and school digitalization through a comprehensive literature synthesis. Specifically, this research aims to analyze how the concept of digital leadership has been developed in educational leadership literature, identify how digital organizational culture facilitates and supports school digitalization, and synthesize the conceptual relationships among these three constructs into an integrated conceptual framework for educational organizations.

In line with these objectives, this study formulates three research questions. First, how has the concept of digital leadership developed within educational leadership literature? Second, how does

digital organizational culture facilitate and support school digitalization? Third, how can the relationship between digital leadership, digital organizational culture, and school digitalization be synthesized into an integrated conceptual framework for educational organizations? By answering these questions, this study is expected not only to enrich theoretical development in the fields of educational management and leadership but also to provide a stronger conceptual foundation for future empirical research on school digital transformation.

Method

This study employs a literature review approach with the objective of constructing an integrated conceptual framework that elucidates the relationship between digital leadership, digital organizational culture, and school digitalization. Distinct from a Systematic Literature Review (SLR), which is oriented towards synthesizing empirical evidence to answer questions regarding the effectiveness of an intervention, this research utilizes a conceptual literature review. This method focuses on concept development, theory synthesis, identifying relationships between constructs, and formulating conceptual propositions based on the integration of diverse scientific perspectives. This approach is chosen because the primary research aim is not to conduct a meta-analysis or measure effect sizes, but rather to develop a novel conceptual framework capable of explaining the mechanism linking digital leadership, digital organizational culture, and school digitalization. In a conceptual review, literature synthesis allows researchers to identify conceptual developments, discern patterns of relationships between constructs, and generate theoretical models that can serve as a foundation for subsequent empirical research (Snyder, 2019; Torraco, 2005). Consequently, this method aligns with the research objective, which emphasizes theory development through the integration of prior findings.

The literature review process is conducted systematically through four main stages. First, literature identification. Second, literature selection. Third, qualitative coding and thematic synthesis. Fourth, conceptual framework development. These four stages are designed to ensure the synthesis process is transparent, logical, and replicable. The research flow diagram, as shown in Figure 1, illustrates the interconnections between the stages, from article identification to the development of an integrated conceptual framework. The first stage is oriented towards searching for relevant literature, the second focuses on article selection based on specific criteria, the third involves content analysis through coding and thematic synthesis, and the final stage constructs conceptual relationships between themes into a cohesive conceptual model. This staged approach is widely used in conceptual review research, as it enables researchers to inductively build theory based on the convergence of various prior research findings (Torraco, 2005; Snyder, 2019).

The first stage aims to identify literature relevant to the research focus. Article searches were conducted through several reputable international academic databases: Scopus, Web of Science, ERIC, ScienceDirect, and Google Scholar. These databases were selected, as they provide peer-reviewed scientific publications widely used in studies on educational leadership, organizational culture, and digital transformation. The search strategy employed keyword combinations (**Boolean search**) such as “digital leadership,” “organizational culture,” “digital organizational culture,” “digital transformation,” “school digitalization,” “educational innovation,” and “technology leadership,” used individually or combined using AND and OR operators. To ensure source quality, the search was limited to English-language, peer-reviewed journal articles and key theoretical works underpinning concept development. This identification process yielded 312 documents, which proceeded to the selection stage. This search strategy adheres to the principles of transparency and traceability in literature review research, enabling a systematic and replicable identification process (Snyder, 2019).

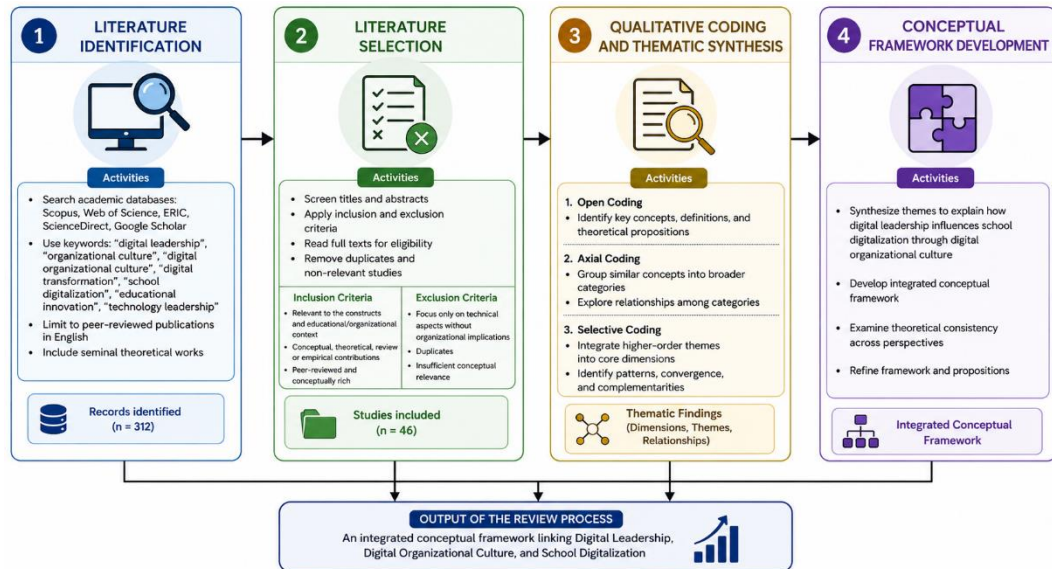


Figure 1. Literature Review Process Stages

The second stage involved screening and eligibility assessment to obtain articles precisely aligned with the research objectives. Selection began by reading the title and abstract of each article, followed by a full-text review of those meeting initial criteria. The study established inclusion criteria. First, articles discussing digital leadership, digital organizational culture, school digitalization, or digital transformation in educational organizations. Second, articles constituting conceptual/theoretical research, literature reviews, or empirical studies offering conceptual contributions. Third, articles published in peer-reviewed journals. Fourth, articles demonstrating strong relevance to the conceptual model development. Conversely, exclusion criteria comprised the following: first, articles focusing solely on technical aspects of technology without organizational implications. Second, duplicate articles. Third, articles providing no conceptual contribution to the relationships among the three research constructs. Upon completion, 46 articles met all criteria and served as primary sources for the conceptual synthesis.

The third stage was the core of the analysis, employing a qualitative content analysis approach through three coding stages: open, axial, and selective coding (Corbin & Strauss, 2015). First, open Coding: Each article was read in-depth to identify key concepts, definitions, dimensions, characteristics, and theoretical propositions related to digital leadership, digital organizational culture, and school digitalization. Second, axial Coding: Concepts with shared meanings were grouped into broader categories to identify inter-category relationships and conceptual patterns emerging from the literature. Third, selective Coding: All categories were integrated into core themes representing conceptual relationships among the research constructs. This process yielded dimensions, themes, relationship patterns, points of convergence, and complementarity among findings, forming the basis for the conceptual model. This approach was chosen for its capacity to generate deep theoretical synthesis and facilitate new concept development by integrating diverse research perspectives.

The final stage aimed to develop an integrated conceptual framework based on the previous thematic synthesis. All identified themes were re-analyzed to identify causal, mediating, and conceptual relationships among variables. This stage involved evaluating theoretical consistency, the coherence of findings across studies, and the level of conceptual convergence from various literature perspectives. The synthesis indicated that digital leadership acts as the primary driver of organizational transformation through shaping a digital vision, developing digital competence, managing change, and fostering innovation. Subsequently, digital leadership shapes a digital organizational

culture characterized by values of innovation, collaboration, adaptability, and continuous learning. This digital organizational culture then serves as the mechanism facilitating the effective implementation of school digitalization. Based on these relationships, the study produced an integrated conceptual framework proposing that successful school digitalization is a consequence of digital leadership capable of building a digital organizational culture as the foundational bedrock for educational transformation.

Synthesis Validity. To enhance the trustworthiness of the synthesis, the study implemented several validation strategies: first, consistent application of inclusion/exclusion criteria during article selection. Second, systematic coding procedures from open to selective coding. Third, constant comparative analysis across articles to identify commonalities, differences, and contradictions. Fourth, evaluation of conceptual consistency against core theories underpinning digital leadership, organizational culture, and digital transformation. These steps aimed to minimize researcher subjectivity while enhancing the credibility and consistency of the framework development, ensuring the resulting model has a robust theoretical foundation suitable for future empirical research.

Results and Discussion

Analysis of the 46 articles meeting the inclusion criteria yielded a conceptual synthesis grouping research findings into four main dimensions: (1) the conceptual development of digital leadership, (2) the dimensions and characteristics of digital leadership, (3) digital organizational culture as a digital transformation mechanism, and (4) school digitalization as an outcome of educational organization transformation. These four dimensions were derived through open coding, axial coding, and selective coding processes, resulting in themes demonstrating a high degree of convergence across the reviewed studies. The findings in this section only present the synthesis results based on the literature without providing further theoretical interpretation or discussion. All results are presented in narrative form and synthesis tables to illustrate the main trends emerging within each dimension. This synthesis subsequently forms the basis for developing the conceptual framework explained in the following section.

Conceptual Development of Digital Leadership in the Literature

The synthesis results indicate that the concept of digital leadership has evolved significantly over the last two decades. **First**, in the initial stage, most studies still positioned digital leadership as an extension of transformational leadership theory, particularly within the context of organizational change driven by digital technology development. These studies positioned leaders as the primary actors tasked with building organizational vision, inspiring members, and managing change toward a more technology-adaptive organization. **Second**, subsequent development shows an expanded meaning of digital leadership, no longer confined to leading change but also encompassing digital literacy, the ability to leverage information technology, data-driven decision-making, developing organizational members' digital competencies, and managing sustainable innovation. **Third**, in the most recent literature, digital leadership has begun to be positioned as a standalone construct with characteristics distinct from conventional transformational leadership. The synthesis also shows most studies define digital leadership as a leader's capability to integrate digital technology with organizational strategy to generate sustainable change. However, the operational definitions and dimensions used across studies still show variation, and a fully uniform conceptual consensus has not yet been achieved. This is evident in the use of various terms such as *digital leader*, *technology leadership*, *e-leadership*, and *leadership for digital transformation*, which essentially share the same orientation but are developed through different theoretical perspectives.

Table 1. Synthesis of the Conceptual Development of Digital Leadership

Dimension	Key Insight	Category	Subcategory	Reference
Theoretical Foundation	Digital leadership evolves from transformational leadership theory, emphasizing vision, inspiration, innovation, and organizational change.	Leadership Theory	Transformational Leadership	Bass & Riggio (2006)
Leadership Evolution	Modern leadership evolves into the capability to lead change, innovation, and the achievement of an organization's strategic goals.	Strategic Leadership	Change Leadership	Yukl (2013); Robbins & Judge (2014)
Digital Transformation Orientation	The success of digital transformation is more influenced by leadership and strategy than by technology investment alone.	Digital Transformation	Strategic Digital Leadership	Westerman et al. (2014); Kane et al. (2015)
Digital Vision	Leaders build a digital vision to guide the organization's transformation.	Leadership Capability	Digital Vision	Westerman et al. (2014)
Digital Competence	Leaders are required to possess digital literacy and the ability to leverage technology within the organization.	Leadership Capability	Digital Literacy	Suswardji et al. (2020); Wulandari et al. (2021)
Change Management	Digital leadership plays a role in managing organizational change toward sustainable digital transformation.	Organizational Change	Change Management	Yukl (2013); Kane et al. (2015)
Innovation Leadership	Leaders drive innovation by developing a work culture that is adaptive to technology.	Innovation	Organizational Innovation	Kane et al. (2015); Westerman et al. (2014)
Collaborative Leadership	Digital leadership strengthens collaboration among organizational members in implementing digital transformation.	Organizational Behaviour	Collaboration	Wulandari et al. (2021); Wati et al. (2021)
Data-driven Leadership	Data-driven decision-making is a characteristic of digital leadership in modern organizations.	Decision Making	Data-driven Decision Making	Lavranos (2025)
Educational Digital Leadership	In the educational context, digital leadership evolves into the principal's ability to lead the transformation of technology-based learning, administration, and school governance.	Educational Leadership	School Digital Leadership	Fullan (2014); Lavranos (2025)
Organizational Capacity Building	Digital leaders build organizational capacity through the development of digital competencies among teachers and educational staff.	Organizational Development	Capacity Building	Fullan (2014); Wulandari et al. (2021)
Conceptual Convergence	The literature indicates a convergence that digital leadership is an integration of digital vision, innovation, digital competence, change management, and organizational collaboration.	Conceptual Synthesis	Integrated Digital Leadership	Synthesis of 46 articles

Main Dimensions of Digital Leadership

The open coding process yielded a number of concepts that consistently emerged across the majority of reviewed articles. Subsequently, through axial coding, these concepts were grouped into several primary dimensions that constitute the construct of digital leadership. The most frequently identified dimensions include digital vision, change management, digital competence, innovation leadership, collaborative leadership, and data-driven decision-making. Almost all studies position the ability to build a digital vision as a principal characteristic of a digital leader, as the vision forms the foundation for determining the direction of organizational transformation. Furthermore, the capability to manage change (change management) also emerged as a dominant theme, indicating that the success of digitalization is determined not solely by technology but also by a leader's ability to reduce

organizational resistance to change. Several studies also identified the importance of digital competence as a prerequisite for leaders to understand the technologies employed by their organizations. Other themes that emerged consistently include the ability to foster innovation and create a collaborative culture as integral parts of implementing digital transformation. In addition, recent research has begun to incorporate the ability to leverage data (data-driven leadership) as a crucial dimension of digital leadership.

Table 2. Synthesis of Digital Leadership Dimensions

Dimension	Key Insight	Category	Subcategory	Reference
Digital Vision	Leaders formulate a strategic vision that continuously guides the organization's digital transformation.	Strategic Leadership	Vision Formulation	Westerman et al. (2014); Kane et al. (2015)
Strategic Digital Planning	Digital leadership integrates organizational strategy with the leveraging of digital technologies.	Strategic Management	Digital Strategy	Westerman et al. (2014); Yukl (2013)
Digital Competence	Leaders possess digital literacy, understand technology, and can leverage it in decision-making.	Digital Capability	Digital Literacy	Suswardji et al. (2020); Wulandari et al. (2021)
Technology Utilization	Leaders leverage digital technology to enhance organizational management effectiveness.	Technology Management	Technology Integration	Westerman et al. (2014); Lavranos (2025)
Change Management	Leaders manage organizational change through an adaptive approach to technological advancement.	Organizational Change	Managing Change	Yukl (2013); Kane et al. (2015)
Organizational Innovation	Digital leadership fosters innovation in work processes, services, and organizational governance.	Innovation Leadership	Innovation Development	Kane et al. (2015); Wulandari et al. (2021)
Collaborative Leadership	Leaders build collaboration across individuals and organizational units in implementing digital transformation.	Organizational Behaviour	Digital Collaboration	Wati et al. (2021); Wulandari et al. (2021)
Communication Agility	Leaders leverage digital communication to enhance organizational coordination and effectiveness.	Communication	Digital Communication	Westerman et al. (2014); Lavranos (2025)
Data-driven Decision Making	Decision-making is based on leveraging digital data as the foundation for organizational policy.	Decision Making	Evidence-based Decision	Lavranos (2025); Kane et al. (2015)
Capacity Building	Leaders continuously develop the digital competencies of teachers and educational staff.	Human Resource Development	Professional Development	Fullan (2014); Wulandari et al. (2021)
Learning Orientation	Digital leadership builds a culture of continuous learning and digital competency improvement.	Organizational Learning	Continuous Learning	Fullan (2014); Schein & Schein (2017)
Ethical Digital Leadership	Leaders ensure the responsible, transparent, and organizationally value-aligned use of technology.	Leadership Ethics	Responsible Digital Leadership	Robbins & Judge (2014); Yukl (2013)

Digital Organizational Culture as a Mechanism for Digital Transformation

A synthesis of articles discussing organizational culture indicates that digital organizational culture is the most consistently emerging theme as a factor related to the success of digital transformation. The results of selective coding reveal that most studies describe organizational culture as a mechanism that shapes the behavior of organizational members in accepting, utilizing, and

developing digital technology. The most frequently identified organizational values include innovation, collaboration, adaptability, continuous learning, openness to change, and trust among organizational members. Various studies also show that a flexible organizational culture is more frequently associated with successful digital implementation compared to a bureaucratic one. Furthermore, most research positions leaders as the primary actors in shaping organizational culture through instilling values, decision-making, and establishing organizational policies. The synthesis demonstrates that organizational culture is not positioned as the final outcome of digital transformation but as a mechanism that enables the effective implementation of technology. These findings consistently appear in studies using both organizational culture and digital transformation perspectives.

Table 3. Synthesis of Digital Organizational Culture

Dimension	Key Insight	Category	Subcategory	Reference
Innovation Culture	Organizational culture fosters creativity, experimentation, and innovation in response to digital technological advancements.	Organizational Innovation	Innovation Orientation	Cameron & Quinn (2006); Faried et al. (2025)
Collaborative Culture	Collaboration among organizational members accelerates knowledge sharing, problem-solving, and the implementation of digital transformation.	Organizational Behaviour	Knowledge Sharing	Wati et al. (2021); Wulandari et al. (2021)
Adaptability Culture	The organization possesses the capacity to continuously adapt to environmental changes and technological developments.	Organizational Adaptation	Organizational Flexibility	Cameron & Quinn (2006); Nasution et al. (2025)
Continuous Learning Culture	The organization builds a culture of continuous learning to enhance the digital competencies of all its members.	Organizational Learning	Continuous Professional Learning	Schein & Schein (2017); Fullan (2014)
Digital Mindset	Organizational members exhibit a positive mindset towards technology adoption and digital change.	Organizational Mindset	Digital Readiness	Westerman et al. (2014); Lavranos (2025)
Shared Digital Values	Shared values concerning innovation, collaboration, openness, and technology use serve as guiding principles for organizational behavior.	Organizational Values	Shared Values	Schein & Schein (2017)
Trust and Openness	Trust and openness strengthen cooperation and accelerate the acceptance of digital innovations.	Organizational Climate	Trust Building	Schein & Schein (2017); Wati et al. (2021)
Employee Engagement	The active participation of all organizational members increases the success of digital transformation implementation.	Human Resource Engagement	Organizational Participation	Fullan (2014); Wulandari et al. (2021)
Digital Communication	Technology-based communication enhances organizational coordination, transparency, and effectiveness.	Organizational Communication	Digital Interaction	Lavranos (2025); Westerman et al. (2014)
Knowledge Management	A culture of knowledge sharing supports the dissemination of digital competencies and organizational innovation.	Knowledge Management	Organizational Knowledge Sharing	Kane et al. (2015); Wati et al. (2021)
Organizational Agility	The organization is able to respond rapidly to technological change through flexible work processes.	Organizational Agility	Agile Organization	Kane et al. (2015); Faried et al. (2025)
Digital Ethics	Organizational culture instills values of responsibility, transparency, and ethics in the use of digital technology.	Organizational Ethics	Responsible Digital Culture	Robbins & Judge (2014); Schein & Schein (2017)

School Digitalization as an Outcome of Educational Organization Transformation

The synthesis results indicate that school digitalization is positioned as an outcome of organizational transformation involving changes across various aspects of educational administration. Most studies describe school digitalization as a process encompassing the digitalization of administration, learning, organizational communication, data management, academic services, and technology-based decision-making. Research findings reveal that school digitalization is measured not only by the availability of technological devices but also by the organization's ability to integrate technology into comprehensive school governance. Several studies position school principals as central actors steering the digitalization process through building a digital vision, strengthening organizational culture, and developing the capacity of teachers and educational staff. Furthermore, a number of studies identify that the success of school digitalization is linked to increased administrative effectiveness, organizational collaboration, service efficiency, and learning quality. All reviewed articles demonstrate that school digitalization is a multidimensional organizational process requiring supportive leadership and organizational culture. These findings emerged consistently despite variations in research approaches and national contexts.

Table 4. Synthesis of School Digitalization

Dimension	Key Insight	Category	Subcategory	Reference
Digital School Governance	The digitalization of schools is characterized by a transformation in governance through the use of digital technology in school planning, coordination, and evaluation.	School Governance	Digital Governance	Fullan (2014); Lavranos (2025)
Digital Administration	School administration is integrated through digital information systems to enhance the efficiency, accuracy, and transparency of services.	Administrative Transformation	Digital Administration System	Westerman et al. (2014); Lavranos (2025)
Digital Learning	Digital technology is integrated into the teaching and learning process to improve its effectiveness, flexibility, and quality.	Learning Transformation	Technology-Enhanced Learning	Fullan (2014); Wulandari et al. (2021)
Digital Assessment	The assessment system utilizes digital platforms to support more effective and data-driven learning evaluation.	Learning Assessment	Digital Assessment	Fullan (2014); Lavranos (2025)
Data-driven Decision Making	School decision-making is based on the analysis of digital data to improve the quality of educational governance.	School Management	Educational Data Analytics	Kane et al. (2015); Lavranos (2025)
Digital Communication	Communication among the school, teachers, students, parents, and stakeholders is conducted via digital platforms.	Organizational Communication	Stakeholder Digital Communication	Westerman et al. (2014); Wati et al. (2021)
Teacher Digital Competence	Teachers develop digital competencies to support learning and educational innovation.	Human Resource Development	Teacher Digital Capability	Wulandari et al. (2021); Fullan (2014)
Student Digital Engagement	Students actively participate in learning through the utilization of digital technology.	Learning Participation	Digital Learning Engagement	Fullan (2014); Lavranos (2025)
Digital Innovation	Schools develop technology-based educational service innovations as part of organizational transformation.	Educational Innovation	School Innovation	Kane et al. (2015); Westerman et al. (2014)
Organizational Agility	Schools are able to adapt quickly to technological developments, policies, and learning needs.	Organizational Adaptation	Agile School Organization	Cameron & Quinn (2006); Faried et al. (2025)

Dimension	Key Insight	Category	Subcategory	Reference
<i>Continuous School Improvement</i>	Digitalization supports school quality improvement through continuous evaluation and organizational development.	Quality Improvement	Continuous Improvement	Fullan (2014); Schein & Schein (2017)
<i>Sustainable Digital Transformation</i>	School digitalization is a sustainable organizational transformation process through the integration of leadership, organizational culture, and digital technology.	Educational Digital Transformation	Sustainable School Digitalization	Westerman et al. (2014); Kane et al. (2015); Lavranos (2025)

Based on a synthesis of 46 articles, four principal dimensions consistently emerge within the literature: **digital leadership**, the dimensions constituting digital leadership, **digital organizational culture**, and **school digitalization**. The coding results reveal a pattern of recurring conceptual interlinkages across various studies. This pattern subsequently formed the foundation for the advanced synthesis stage in Research Findings Part II, which encompassed the identification of interdimensional relationships and convergence patterns, the formulation of conceptual propositions, and the development of an **integrated conceptual framework** connecting digital leadership, digital organizational culture, and school digitalization.

This section presents the advanced synthesis results based on the qualitative coding and thematic synthesis process applied to the 46 articles that met the inclusion criteria. In contrast to Part I, which detailed the development of each construct separately, this part focuses on the research findings concerning the patterns of relationships between constructs, dominant themes, conceptual propositions, and the integrated conceptual framework resulting from the literature synthesis. All results are presented descriptively without theoretical interpretation, thus only depicting the main findings obtained from the coding process. The results of open coding yielded a number of basic concepts, while axial coding grouped these concepts into categories with similar characteristics. Subsequently, selective coding produced main themes indicating a pattern of conceptual relationships between digital leadership, digital organizational culture, and school digitalization. The forty-six articles show a high level of convergence regarding the role of digital leadership as a driver of organizational change, organizational culture as a mechanism for implementing change, and school digitalization as the outcome of educational organizational transformation. These findings are then summarized in the following subtopics of synthesis results.

Pattern of Relationship between Digital Leadership and Digital Organizational Culture

The synthesis results indicate that the relationship between digital leadership and digital organizational culture is the most frequently recurring pattern in the analyzed literature. Most articles describe that digital leadership practices are related to the formation of organizational values that support digital transformation. The most commonly found themes include building a digital vision, strengthening an innovation culture, enhancing collaboration, developing human resource digital competencies, and creating a work environment adaptive to change. Open coding identified various terms such as digital vision, innovation culture, collaborative environment, digital capability, and continuous learning that consistently appeared across various articles. Subsequently, axial coding grouped these concepts into categories showing a direct relationship between digital leadership practices and the formation of a digital organizational culture. In the selective coding stage, all these categories formed the main theme that digital leadership is the source for shaping organizational values, norms, behaviors, and work patterns in the era of digital transformation. Almost all articles discussing the transformation of educational organizations or business organizations show a similar relational tendency, albeit using different methodological approaches. Thus, the synthesis results

reveal a consistent pattern of conceptual relationship between digital leadership and digital organizational culture.

Table 5. Synthesis of the Relationship between Digital Leadership and Digital Organizational Culture

Dimension	Key Insight	Category	Subcategory	Reference
Digital Vision → Shared Digital Values	The digital vision constructed by leaders forms the foundation for establishing organizational values that support digital transformation.	Strategic Leadership	Shared Digital Vision	Westerman et al. (2014); Kane et al. (2015)
Transformational Leadership → Innovation Culture	Transformational leadership fosters the development of an innovation culture within educational organizations.	Organizational Innovation	Innovation Culture	Bass & Riggio (2006); Yukl (2013)
Change Leadership → Organizational Adaptability	The leader's ability to manage change strengthens an organizational culture that is adaptive to technological developments.	Organizational Change	Adaptive Culture	Yukl (2013); Cameron & Quinn (2006)
Digital Competence → Learning Culture	Leaders' digital competence encourages the formation of a continuous learning culture within the school environment.	Organizational Learning	Continuous Learning	Suswardji et al. (2020); Wulandari et al. (2021)
Technology Utilization → Digital Mindset	Leaders' utilization of technology shapes a digital mindset among organizational members.	Digital Capability	Digital Mindset	Westerman et al. (2014); Lavranos (2025)
Innovation Leadership → Creative Organizational Behaviour	Innovative leadership encourages creativity and experimentation in organizational work processes.	Organizational Behaviour	Creative Behaviour	Kane et al. (2015); Faried et al. (2025)
Collaborative Leadership → Collaborative Culture	Leaders build a collaborative culture through digital communication, participation, and cooperation.	Organizational Behaviour	Collaboration	Wati et al. (2021); Wulandari et al. (2021)
Data-driven Leadership → Evidence-based Culture	The use of data in leadership forms an organizational culture oriented towards evidence-based decision-making.	Decision Making	Evidence-based Culture	Kane et al. (2015); Lavranos (2025)
Organizational Capacity Building → Digital Capability Culture	Human resource competency development by leaders strengthens an organizational culture of digital capacity building.	Human Resource Development	Capacity Building	Fullan (2014); Wulandari et al. (2021)
Strategic Communication → Open Organizational Climate	Effective digital communication creates an open and transparent organizational culture.	Organizational Communication	Open Communication	Schein & Schein (2017); Wati et al. (2021)
Ethical Leadership → Responsible Digital Culture	Leadership grounded in ethics builds a culture of responsible technology use.	Organizational Ethics	Responsible Digital Behaviour	Robbins & Judge (2014); Schein & Schein (2017)
Digital Leadership → Digital Organizational Culture	Synthesis of all literature indicates that digital leadership is the primary determinant in shaping digital organizational culture through vision, innovation, change, collaboration, digital competence, and organizational learning.	Integrated Conceptual Relationship	Digital Leadership Shapes Digital Organizational Culture	Synthesis of 46 articles

The Pattern of the Relationship Between Digital Organizational Culture and School Digitalization

A synthesis of the literature reveals that digital organizational culture is a theme consistently linked to the success of school digitalization. Nearly all studies depict organizational culture as the enabling environment for the effective implementation of technology within educational organizations. The most dominant organizational values include innovation, adaptability, collaboration, openness to change, continuous learning, and data-driven decision-making. The results of open coding show that various studies employ different terminologies but share similar substance regarding digital organizational culture. The axial coding stage grouped these diverse concepts into the categories of innovative culture, collaborative culture, learning culture, and adaptive culture. Subsequently, selective coding indicated that all these categories maintain a consistent relationship with the implementation of school digitalization. Most studies describe that schools with an adaptive organizational culture demonstrate a broader scope of technology implementation compared to organizations that maintain a bureaucratic culture. These findings emerge consistently across various research contexts, thereby forming a dominant theme in the literature synthesis.

Table 6. Synthesis of the Relationship between Digital Organizational Culture and School Digitalization

Dimension	Key Insight	Category	Subcategory	Reference
<i>Innovation Culture → Digital Innovation</i>	An innovation culture fosters the development of digital technology-based services, learning processes, and school governance.	Educational Innovation	Digital School Innovation	Cameron & Quinn (2006); Faried et al. (2025)
<i>Collaborative Culture → Digital Collaboration</i>	A collaborative culture strengthens cooperation among teachers, educational staff, and stakeholders in the implementation of school digitalization.	Organizational Behaviour	Collaborative Digital Practice	Wati et al. (2021); Wulandari et al. (2021)
<i>Adaptability Culture → Organizational Agility</i>	An adaptive culture enhances the school's ability to respond to technological changes, policies, and learning needs.	Organizational Adaptation	Agile School Organization	Cameron & Quinn (2006); Nasution et al. (2025)
<i>Continuous Learning Culture → Teacher Digital Competence</i>	A culture of continuous learning enhances the digital competencies of teachers and educational staff.	Human Resource Development	Continuous Professional Development	Fullan (2014); Wulandari et al. (2021)
<i>Shared Digital Values → Digital Transformation Readiness</i>	Shared values regarding innovation and technology strengthen the school's readiness to implement digital transformation.	Organizational Values	Digital Readiness	Schein & Schein (2017); Westerman et al. (2014)
<i>Digital Mindset → Technology Adoption</i>	A digital mindset improves the acceptance and utilization of technology in all school activities.	Technology Adoption	Digital Acceptance	Westerman et al. (2014); Lavranos (2025)
<i>Knowledge Sharing Culture → Digital Knowledge Management</i>	A knowledge-sharing culture accelerates the dissemination of best practices and digital competencies within the school environment.	Knowledge Management	Knowledge Sharing	Kane et al. (2015); Wati et al. (2021)
<i>Open Communication Culture → Stakeholder Engagement</i>	Open communication enhances the participation of school community members and stakeholders in digital transformation.	Organizational Communication	Digital Stakeholder Engagement	Schein & Schein (2017); Lavranos (2025)
<i>Trust-based Culture →</i>	A trust-based culture strengthens organizational commitment to the	Organizational Climate	Organizational Trust	Schein & Schein

Dimension	Key Insight	Category	Subcategory	Reference
Sustainable Digital Change	sustainable implementation of school digitalization.			(2017); Fullan (2014)
Data-oriented Culture → Evidence-based School Management	A data-oriented organizational culture improves the quality of school governance based on digital information.	School Management	Data-driven School Governance	Kane et al. (2015); Lavranos (2025)
Organizational Agility → Sustainable School Digitalization	Organizational agility accelerates the implementation of digitalization in administration, learning, and school services.	Digital Transformation	Sustainable Digitalization	Faried et al. (2025); Westerman et al. (2014)
Digital Organizational Culture → School Digitalization	The synthesis of the literature indicates that Digital Organizational Culture serves as a primary mechanism facilitating the success of School Digitalization through innovation, collaboration, adaptability, continuous learning, communication, and organizational readiness for digital change.	Integrated Conceptual Relationship	Digital Organizational Culture Facilitates School Digitalization	Synthesis of 46 articles

Convergence of Findings and Literature Synthesis Patterns

The results of selective coding yielded several themes that exhibit a high level of convergence across all reviewed articles. The first theme indicates that Digital Leadership is consistently constructed as the ability of leaders to build a digital vision, manage change, develop digital competencies, and drive organizational innovation. The second theme suggests that Digital Organizational Culture is cultivated through values of innovation, collaboration, adaptability, continuous learning, and orientation towards change. The third theme reveals that School Digitalization is understood as the transformation of school organizations, encompassing the digitization of administration, learning, organizational communication, academic services, and data-driven decision-making.

The synthesis results also illustrate that these three themes emerge repeatedly in various studies, despite employing different conceptual approaches. All themes were subsequently grouped into three core interrelated dimensions, forming a pattern of conceptual relationships. No articles were found that positioned school digitalization as a standalone phenomenon without involving the dimensions of leadership or organizational culture. Therefore, the synthesis results demonstrate a high degree of convergence regarding the relationships among the three primary constructs of the research.

Table 7. Results of Thematic Synthesis

Dimension	Key Insight	Category	Subcategory	Reference
Digital Leadership as Strategic Driver	Digital Leadership has emerged as a key driver of digital transformation through vision, strategy, innovation, and organizational change management.	Strategic Leadership	Digital Vision; Strategic Leadership; Change Leadership	Bass & Riggio (2006); Yukl (2013); Westerman et al. (2014); Kane et al. (2015)
Digital Competency Development	Digital leadership enhances the digital competencies of organizations through the development of human resource capacities and continuous learning.	Human Resource Development	Digital Competence; Capacity Building; Continuous Learning	Fullan (2014); Suswardji et al. (2020); Wulandari et al. (2021)
Innovation-Oriented Organizational	A digital organizational culture is characterized by innovation, creativity, and the courage to make	Organizational Innovation	Innovation Culture; Creative Behavior	Cameron & Quinn (2006); Faried et al. (2025)

Dimension	Key Insight	Category	Subcategory	Reference
Culture	changes as a foundation for digital transformation.			
Collaborative Organizational Culture	Digital collaboration and communication strengthen coordination and accelerate the implementation of digitalization in educational organizations.	Organizational Behaviour	Collaboration; Knowledge Sharing; Digital Communication	Wati et al. (2021); Wulandari et al. (2021); Lavranos (2025)
Adaptive Organizational Culture	An adaptive organizational culture enhances schools' readiness to face technological changes and the educational environment.	Organizational Adaptation	Adaptability; Organizational Agility	Cameron & Quinn (2006); Nasution et al. (2025)
Organizational Learning Culture	Continuous learning becomes the primary mechanism for enhancing the digital readiness of teachers, educational staff, and school organizations.	Organizational Learning	Continuous Professional Learning	Schein & Schein (2017); Fullan (2014)
Data-driven School Management	Data-driven decision-making strengthens the effectiveness of school governance and supports the digitalization of educational organizations.	School Management	Evidence-based Decision Making	Kane et al. (2015); Lavranos (2025)
School Digitalization	School digitalization encompasses the transformation of administration, learning, communication, academic services, and school governance based on digital technology.	Educational Digital Transformation	Digital Administration; Digital Learning; Digital Governance	Fullan (2014); Westerman et al. (2014); Lavranos (2025)
Digital Leadership → Digital Organizational Culture	Digital leadership practices shape digital organizational culture through vision, innovation, learning, collaboration, and change management.	Antecedent Relationship	Leadership-driven Organizational Culture	Bass & Riggio (2006); Yukl (2013); Schein & Schein (2017); Wati et al. (2021)
Digital Organizational Culture → School Digitalization	Digital organizational culture facilitates the implementation of school digitalization through innovation, adaptability, learning, and digital communication.	Enabling Mechanism	Culture-enabled School Digitalization	Cameron & Quinn (2006); Faried et al. (2025); Fullan (2014); Lavranos (2025)
Integrated Digital Transformation Framework	The synthesis of the entire literature generates conceptual relationships indicating that the success of school digitalization results from the interaction between Digital Leadership and Digital Organizational Culture.	Integrated Conceptual Framework	Digital Leadership → Digital Organizational Culture → School Digitalization	Synthesis of 46 articles

Results of the Integrated Conceptual Framework Development

The final stage of the synthesis results in an integrated conceptual framework constructed based on the conceptual relationships among themes derived from selective coding. The coding results indicate that digital leadership serves as the initial construct that shapes the direction of organizational transformation through the development of a digital vision, digital competencies, change leadership, and organizational innovation. Furthermore, digital leadership is linked to the formation of a digital organizational culture, which comprises an innovation culture, a collaboration culture, a learning culture, organizational adaptability, and readiness for change. This digital organizational culture is subsequently related to the implementation of school digitalization, which includes the digitalization of administration, digital learning, digital communication, academic services, and data-driven governance. The synthesis results reveal that these three constructs create a sequential relationship pattern in the majority of the reviewed studies. No research was found that demonstrated a conceptual relationship contradicting this pattern, although variations in the dimensions used by different

researchers were noted. All themes resulting from the synthesis were then integrated into a conceptual framework that illustrates the relationships between digital leadership, digital organizational culture, and school digitalization. This framework serves as the main output of this literature review research.

Table 8. Integrated Conceptual Framework Development

Dimension	Key Insight	Category	Subcategory	Reference
Digital Leadership	Digital leadership serves as the primary driver of organizational transformation through digital vision, strategy, innovation, and change management.	Strategic Leadership	Digital Vision; Strategic Planning; Change Leadership	Bass & Riggio (2006); Yukl (2013); Westerman et al. (2014); Kane et al. (2015)
Digital Leadership	Digital leadership enhances the digital competence of organizations through the development of human resource capacity and continuous learning.	Human Resource Development	Digital Competence; Capacity Building; Continuous Learning	Fullan (2014); Suswardji et al. (2020); Wulandari et al. (2021)
Digital Leadership → Digital Organizational Culture	Digital leadership practices shape organizational culture through the internalization of digital vision, innovation, collaboration, communication, and organizational values.	Organizational Transformation	Leadership-driven Culture	Schein & Schein (2017); Wati et al. (2021); Wulandari et al. (2021)
Digital Organizational Culture	Digital organizational culture is characterized by innovation, collaboration, adaptability, continuous learning, openness, and change orientation.	Organizational Culture	Innovation Culture; Collaborative Culture; Adaptive Culture; Learning Culture	Cameron & Quinn (2006); Schein & Schein (2017); Faried et al. (2025); Nasution et al. (2025)
Digital Organizational Culture	Digital organizational culture builds organizational readiness to adopt technology and strengthens adaptability to digital transformation.	Organizational Readiness	Digital Readiness; Organizational Agility	Westerman et al. (2014); Lavranos (2025)
Digital Organizational Culture → School Digitalization	Digital organizational culture facilitates the implementation of school digitalization through innovation, collaboration, organizational learning, and data-driven decision-making.	Enabling Mechanism	Culture-enabled Digitalization	Fullan (2014); Kane et al. (2015); Lavranos (2025)
School Digitalization	School digitalization encompasses the transformation of administration, learning, communication, assessment, academic services, and governance based on digital technology.	Educational Digital Transformation	Digital Administration; Digital Learning; Digital Assessment; Digital Governance	Fullan (2014); Westerman et al. (2014); Lavranos (2025)
School Digitalization	The success of school digitalization is indicated by the improvement of governance effectiveness, learning quality, service efficiency, and the organization's ability to adapt sustainably.	Educational Quality Improvement	Organizational Effectiveness; Sustainable Digital Transformation	Fullan (2014); Kane et al. (2015); Faried et al. (2025)
Integrated Conceptual Relationship	Digital leadership shapes digital organizational culture, which subsequently facilitates school digitalization as a continuous transformation process in educational organizations.	Integrated Conceptual Framework	Digital Leadership → Digital Organizational Culture → School Digitalization	Synthesis of 46 articles

Based on a synthesis of 46 articles, the research yielded four main findings. First, Digital Leadership has emerged as a construct emphasizing digital vision, change management, innovation, digital competencies, and strategic leadership. Second, Digital Organizational Culture encompasses values of innovation, collaboration, adaptability, continuous learning, and organizational readiness for digital transformation. Third, School Digitalization includes the transformation of administration, learning, communication, academic services, and technology-based school governance. Fourth, the thematic synthesis results indicate a consistent pattern of conceptual relationships: Digital Leadership → Digital Organizational Culture → School Digitalization. This pattern forms the basis for the development of an Integrated Conceptual Framework, which serves as the primary output of the research. All findings in this section are presented descriptively based on literature synthesis without interpretation, while critical analysis, discussion of inter-theoretical relationships, and conceptual implications will be elaborated upon in the Discussion section.



Figure 2. Main Conceptual Model

Conceptual Development of Digital Leadership in Educational Leadership Literature

A synthesis of 46 articles indicates that the concept of digital leadership has evolved incrementally in response to the growing complexity of digital transformation across various organizations, including educational institutions. In the literature's early developmental phase, digital leadership was not positioned as a standalone construct but rather as an extension of the transformational leadership paradigm. This paradigm emphasizes a leader's ability to build vision, inspire organizational members, facilitate change, and foster organizational innovation (Bass & Riggio, 2006). From this perspective, technology use was not the primary focus but was viewed as an instrument supporting leadership effectiveness in managing organizational change. As the intensity of digital technology adoption increased, various studies began expanding the definition of transformational leadership by incorporating dimensions of digital literacy, information technology utilization, technology-based change management, and organizational digital competence development (Westerman et al., 2014; Kane et al., 2015). This literature synthesis reveals that this development was not linear but progressed through complementary conceptual approaches. Consequently, various studies employ different terminologies such as digital leadership, technology leadership, e-leadership, or leadership for digital transformation though all converge on the leader's capacity to steer technology-based organizational transformation. This finding indicates that digital leadership is a concept undergoing continuous evolution alongside changing organizational characteristics in the digital era.

This conceptual development also reveals a shift in research orientation from a technology-focused approach towards one positioning leadership as a strategic factor in organizational transformation. The reviewed prior research shows that organizations succeeding in digital transformation do so not merely because of adequate technological infrastructure but because they possess leaders capable of building a digital vision, managing organizational change, strengthening members' digital competence, and developing an innovative culture (Westerman et al., 2014; Kane et al., 2015). This study's findings confirm this pattern through a synthesis of diverse research contexts, including educational organizations, public organizations, and the business sector. Thus, digital

leadership is no longer understood merely as the technical ability to use technology but has evolved into a strategic capability for directing comprehensive organizational transformation. This orientational shift shows that contemporary literature increasingly positions technology as an *enabler*, while leadership is positioned as the primary *driver* of digital transformation. Therefore, the conceptual development of digital leadership in the literature demonstrates a paradigm shift from *technology-oriented leadership* towards *strategic digital leadership*, which emphasizes the integration of technology, organizational change, and human resource development.

The synthesis further indicates that the conceptual development of digital leadership in the field of *educational leadership* possesses distinct characteristics compared to business organizations. In educational organizations, digital leadership is directed not only towards enhancing organizational efficiency but also aims to improve learning quality, school governance effectiveness, intra-school collaboration, and data-driven decision-making. Fullan (2014) explains that the success of school change is highly influenced by a principal's ability to build organizational capacity and create a collaborative culture. This perspective is expanded by Lavranos (2025), who indicates that principals in the digital era are required to transform into digital leaders capable of leveraging digital technology, data analytics, and artificial intelligence to support more effective decision-making. This research synthesis reveals that these two perspectives are complementary in explaining the evolution of educational leadership in the digital era. The analyzed articles show that principals no longer function solely as educational administrators but also as transformation agents integrating technology with organizational vision, school culture, and teacher professional development. Consequently, this study's results demonstrate that the concept of digital leadership in an educational context is evolving towards a more comprehensive approach compared to the conventional transformational leadership concept.

Beyond illustrating conceptual development, the synthesis also identifies the core dimensions that consistently form the digital leadership construct. Nearly all reviewed studies position digital vision, change management, digital competence, innovation, collaboration, and data-driven decision-making as the most dominant dimensions. This finding indicates a high degree of convergence among prior studies despite differing theoretical approaches. Westerman et al. (2014) emphasizes the importance of digital vision and organizational strategy as the foundation for successful digital transformation, whereas Kane et al. (2015) position leadership and organizational culture as more determinative factors than technology itself. Conversely, research in the field of education shows that a principal's ability to build collaboration, enhance teacher digital competence, and manage organizational change are the characteristics most frequently associated with successful school digitalization implementation (Suswardji et al., 2020; Wulandari et al., 2021). This synthesis reveals that these six dimensions emerge consistently across various research contexts, thereby forming a relatively stable conceptual structure of digital leadership. Thus, this study successfully integrates previously dispersed dimensions into a more systematic conceptual construction.

Another significant finding is that most prior studies developed the digital leadership concept partially, focusing only on a specific dimension such as digital literacy, innovation, or change management. The synthesis conducted in this study reveals a lack of conceptual agreement regarding the interrelationships among these dimensions within a holistic framework. Some studies use transformational leadership theory as their primary foundation, while others emphasize digital transformation theory, organizational culture, or educational leadership. Consequently, the literature's development exhibits conceptual fragmentation, leading to diverse definitions of digital leadership. This study's results show that these various perspectives share a strong common ground: positioning the leader as the principal actor who integrates technology, organizational change, innovation, and human resource development. Therefore, this study provides a synthesis that unifies these

perspectives, yielding a more comprehensive conceptual understanding of digital leadership. This synthesis simultaneously addresses a prior research gap indicating the absence of an integrated concept of digital leadership within the educational organization context.

This study's primary contribution to the educational leadership literature lies in its ability to systematically reconstruct the conceptual development of digital leadership based on a synthesis of prior research. Unlike previous studies, which generally only described the characteristics of digital leadership or tested its influence on specific variables, this study demonstrates how the concept evolved from transformational leadership theory towards a broader construct more relevant to the demands of digital transformation in educational organizations. The resulting synthesis also shows that digital leadership is not merely the ability to use technology but is a strategic capability for building a digital vision, managing change, developing an innovation culture, enhancing organizational digital competence, and directing sustainable school transformation. Therefore, this study's results provide a theoretical contribution by clarifying the *conceptual boundary* of digital leadership while strengthening its position as a principal construct in the study of educational management and leadership in the digital era. This contribution forms an important foundation for developing a conceptual model linking digital leadership, digital organizational culture, and school digitalization, which will be discussed further in addressing Research Question 2 and Research Question 3.

Digital Organizational Culture as a Mechanism Facilitating School Digitalization

The synthesis results show that digital organizational culture is consistently positioned in the literature as an organizational mechanism facilitating the implementation of school digitalization. All reviewed articles indicate that the success of school digitalization is influenced not only by the availability of technological infrastructure but also by the values, norms, behaviors, and interaction patterns that develop within the educational organization. From an organizational culture perspective, Schein and Schein (2017) explain that organizational culture is a pattern of basic assumptions formed through collective learning processes and transmitted to organizational members as a guide for understanding, thinking, and acting. This research synthesis reveals that this concept has expanded in the context of digital transformation, where organizational culture is no longer understood merely as institutional identity but also as a mechanism that builds organizational readiness to accept technology-based change. These findings indicate that values of innovation, collaboration, adaptability, continuous learning, and openness to change are the cultural characteristics most frequently associated with successful school digitalization. Thus, digital organizational culture functions as the social environment that enables various digital innovations to be accepted, implemented, and sustained within educational organizations.

The synthesis also reveals that the relationship between organizational culture and school digitalization is broader than merely supporting technology use. Through the Competing Values Framework, Cameron and Quinn (2006) explain that organizational cultures oriented toward adhocracy are more conducive to fostering innovation, creativity, flexibility, and risk-taking than highly bureaucratic cultures. The findings of this study indicate that most articles discussing digital transformation in education identify these cultural characteristics as prerequisites for implementing school digitalization. Collaborative values enable teachers and educational staff to share best practices in technology use, while a culture of continuous learning encourages the ongoing enhancement of digital competencies. Furthermore, an adaptive culture accelerates the organization's adjustment process to external environmental changes driven by digital technology development. Various reviewed studies also show that educational organizations with an innovative culture tend to be more prepared to integrate technology into school administration, learning processes, organizational communication, and data-based decision-making (Faried et al., 2025; Nasution et al., 2025; Wati et al.,

2021). Therefore, the synthesis results demonstrate that digital organizational culture functions as a mechanism that strengthens organizational readiness to execute comprehensive digitalization.

The findings of this study also indicate that digital organizational culture does not develop independently but is shaped through consistent leadership practices. Most previous studies show that organizational values emerge through leaders' vision, policies, decisions, communication, and behavior in directing organizational change (Schein & Schein, 2017). The synthesis performed in this study reveals a similar pattern in the context of educational organizations, namely that school principals play a role in instilling innovation values, building a collaborative culture, enhancing teachers' digital readiness, and creating a work environment that supports digital transformation. Consequently, digital organizational culture is understood not only as an outcome of social interactions among organizational members but also as a consequence of ongoing digital leadership practices. These findings reinforce the position of organizational culture as a mechanism bridging the relationship between digital leadership and school digitalization. In other words, digital organizational culture becomes the medium that enables the digital vision constructed by leaders to be translated into daily organizational practices. This synthesis also explains why various studies show that technological investment alone is insufficient to yield digital transformation unless accompanied by organizational cultural change.

An important contribution of these findings is providing a more comprehensive explanation regarding the position of digital organizational culture in the educational transformation process. Previous studies generally discuss organizational culture as one factor influencing digital transformation but have not explained in detail how this culture functions as a connecting mechanism between digital leadership and school digitalization. Through a synthesis of 46 articles, this study reveals that digital organizational culture is a strategic mechanism linking leaders' vision with the implementation of digitalization at the school's operational level. This synthesis expands the conceptual understanding that the success of digital transformation is influenced not only by the direct relationship between leadership and digitalization but also by the formation of a conducive digital organizational culture. Thus, the results of this study provide a conceptual contribution that clarifies the position of digital organizational culture in the literature on educational management and educational leadership.

Development of an Integrated Conceptual Framework

The primary finding of this study is the successful synthesis of the conceptual relationships between digital leadership, digital organizational culture, and school digitalization into an integrated conceptual framework. The synthesis of all reviewed articles indicates that these three constructs do not exist in isolation but form interconnected and sequential relationships. Digital leadership emerges as the initial construct that directs organizational change through the establishment of a digital vision, the development of digital competence, change management, and the reinforcement of organizational innovation. These leadership practices subsequently shape a digital organizational culture characterized by values of innovation, collaboration, adaptability, continuous learning, and openness to change. This digital organizational culture, in turn, creates the organizational conditions that enable the more effective implementation of school digitalization across administrative, instructional, communication, governance, and data-driven decision-making aspects. The synthesis results show that this pattern of relationships appears consistently across various research contexts, despite the use of different theories and methodological approaches. Therefore, this study successfully integrates previously scattered findings in the literature into one comprehensive conceptual framework.

The resulting conceptual framework reveals that digital organizational culture holds a crucial position in explaining the mechanism of educational organizational transformation. In most prior

research, the relationship between digital leadership and school digitalization was predominantly explained as a direct one. However, this synthesis indicates that the majority of empirical evidence actually depicts a change in organizational culture occurring before digitalization can be widely implemented. Thus, this study not only links the three main constructs but also clarifies the sequential conceptual relationships that form the process of educational organizational transformation. This finding yields a model of *digital leadership-digital, organizational culture, school digitalization*, demonstrating that digital organizational culture is the organizational mechanism linking digital leadership with the success of school digitalization. This model provides a more systematic conceptual structure compared to the partial approaches found in previous studies.

From a theory development perspective, this study's results make a significant contribution to the fields of educational management, educational leadership, and school digital transformation. First, it successfully integrates theories of transformational leadership, organizational culture, digital transformation, and educational leadership into one coherent conceptual framework without altering the substance of each theory. Second, it clarifies the position of digital leadership as a strategic construct that is not only related to technology use but also functions to shape a digital organizational culture. Third, it expands the understanding of school digitalization as an outcome of organizational transformation influenced by the interaction between leadership and organizational culture. Consequently, this study provides a stronger conceptual foundation for developing empirical research that tests the relationships among these variables across various educational levels and institutional contexts.

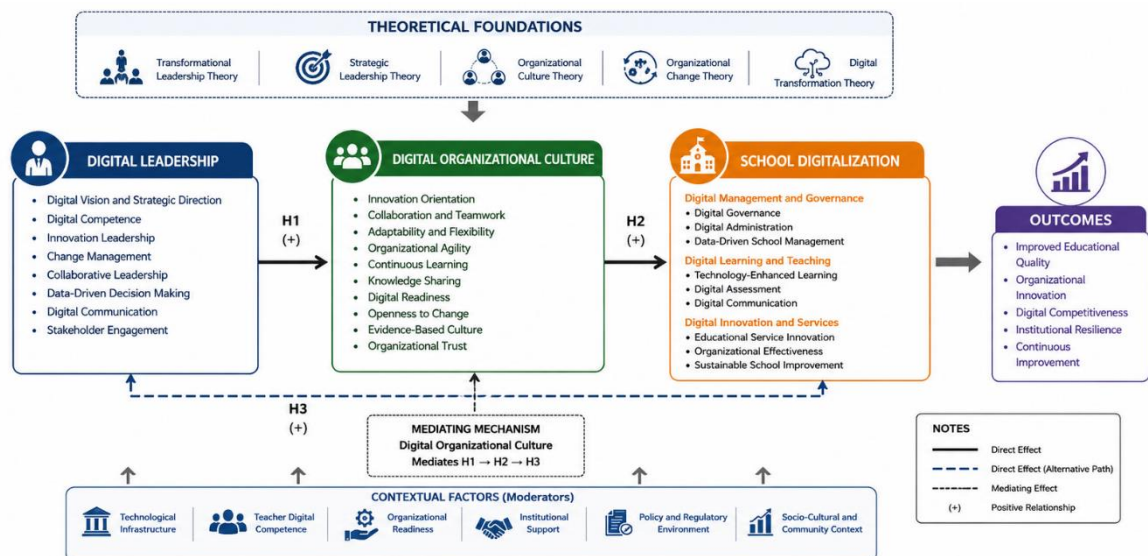


Figure 3. Development of an Integrated Conceptual Framework Linking Digital Leadership, Digital Organizational Culture, and School Digitalization

The significance of these findings is also evident in their contribution to school management practice. The synthesis shows that school digitalization cannot be achieved merely through the provision of technological devices or the development of digital infrastructure alone. Digital transformation requires leadership capable of building a digital vision and an organizational culture that supports innovation, collaboration, continuous learning, and readiness for change. Therefore, this study provides a conceptual basis for school principals, educational administrators, and policymakers to design more comprehensive digital transformation strategies. The developed framework can serve as a reference in formulating digital leadership development programs, strengthening school organizational culture, and establishing indicators for school digitalization implementation. Thus, the

contribution of this study is not only theoretical but also holds practical relevance in supporting the development of digital transformation-based educational governance. As in Figure 3, about the model development of an Integrated Conceptual Framework Linking Digital Leadership, Digital Organizational Culture, and School Digitalization.

The proposed integrated conceptual framework illustrates that **Digital Leadership** serves as the primary strategic driver of digital transformation by fostering a shared digital vision, innovation, digital competence, and effective change management. These leadership capabilities shape a **Digital Organizational Culture** characterized by collaboration, adaptability, continuous learning, digital readiness, and evidence-based decision-making, which functions as the mediating mechanism enabling **School Digitalization**. In turn, school digitalization is reflected in digital governance, technology-enhanced teaching and learning, digital administration, and data-driven school management, ultimately contributing to improved educational quality, organizational innovation, institutional resilience, digital competitiveness, and sustainable school improvement. The framework further acknowledges that contextual factors including technological infrastructure, teacher digital competence, organizational readiness, institutional support, policy and regulatory environments, and socio-cultural contexts may strengthen or weaken the relationships among the three principal constructs.

Research Implications and Limitations

This study has several important implications. Theoretically, the synthesis enriches educational leadership studies by offering an integrated conceptual framework that links digital leadership, digital organizational culture, and school digitalization in a coherent model. This framework can serve as a basis for developing quantitative or mixed-methods research models to test the inter-construct relationships in different educational contexts. Practically, the findings indicate that developing a digital school requires a strategy that prioritizes digital leadership and digital organizational culture, not just investment in technology. Therefore, developing school principals' competencies, strengthening an innovative culture, enhancing teacher digital literacy, and creating a collaborative organizational environment become aspects that need prioritization in educational digital transformation policies. From a policy perspective, the resulting conceptual model can guide governments, educational agencies, and institutions in designing more integrated and organizationally change-oriented school digitalization policies.

This study has several limitations to consider. First, it employs a literature review approach; therefore, all findings are derived from synthesizing previous research and have not been empirically tested in specific educational organizations. Second, the resulting conceptual model remains theoretical and requires validation through quantitative, qualitative, or mixed-methods research across various educational levels and different school characteristics. Third, although the reviewed literature covers various organizational contexts, most available studies still originate from higher education, business, and public organizations, meaning research specifically focused on primary and secondary schools remains relatively limited. Fourth, the variation in terminology such as Digital Leadership, Technology Leadership, E-Leadership, and Leadership for Digital Transformation indicates that the conceptualization of digital leadership continues to evolve. Therefore, future research needs to conduct empirical testing of the Digital Leadership → Digital Organizational Culture → School Digitalization model while exploring the possibility of other mediating or moderating variables that could enrich the understanding of digital transformation in educational organizations.

Conclusion

This conceptual literature review developed and proposed an Integrated Conceptual Framework that explains the dynamic relationships among Digital Leadership, Digital Organizational Culture, and

School Digitalization as essential drivers of sustainable digital transformation in educational organizations. Based on the thematic synthesis of 46 peer-reviewed studies, the findings demonstrate that Digital Leadership has evolved into a multidimensional strategic capability encompassing digital vision, strategic leadership, digital competence, innovation leadership, change management, collaborative leadership, and data-driven decision-making, thereby extending beyond the traditional boundaries of transformational leadership. The review further establishes that Digital Organizational Culture represents the pivotal organizational mechanism through which leadership practices are translated into shared values, norms, and behaviors that promote innovation, collaboration, adaptability, continuous learning, organizational agility, and digital readiness. These cultural attributes, in turn, facilitate the successful implementation of School Digitalization, reflected in digitally enabled governance, administration, teaching and learning, assessment, communication, and evidence-based school management, ultimately contributing to improved educational quality, organizational innovation, institutional resilience, and sustainable school improvement. The principal contribution of this study lies in the development of a theoretically grounded framework that conceptualizes Digital Leadership as the strategic antecedent, Digital Organizational Culture as the mediating organizational mechanism, and School Digitalization as the organizational outcome of digital transformation. By integrating insights from Transformational Leadership Theory, Strategic Leadership Theory, Organizational Culture Theory, Organizational Change Theory, and Digital Transformation Theory, this framework addresses existing conceptual fragmentation and provides a coherent foundation for understanding digital transformation in educational settings. Furthermore, it offers a robust platform for future empirical validation using advanced quantitative approaches while providing practical guidance for educational leaders and policymakers seeking to foster digitally resilient, innovative, and future-ready educational organizations capable of sustaining continuous improvement in an increasingly digital educational landscape.

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