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# Sustainable Digital Leadership: Relations with Organizational Ambidexterity and Strategic Decision-Making in Middle School Educational Leaders

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**Abstract.** Despite the growing importance of digital leadership in educational institutions, there remains limited empirical understanding of how digital leadership contributes to organizational ambidexterity and supports strategic decision-making. The lack of integration between these constructs may lead educational leaders to adopt technologies reactively rather than strategically, thereby reducing the effectiveness of decision-making processes. This study investigated the relationships between sustainable digital leadership, organizational ambidexterity, and strategic decision-making regarding educational leaders, from the perspectives of teachers. A descriptive correlational research design was used to identify and analyze the relationships between the variables under investigation.

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A sample consisting of 363 in-service teachers aged between 23 and 47 years (Mean = 26.95 years, SD = 4.624) participated in the study. Participants completed a questionnaire focusing on the three variables: Digital Leadership, Organizational Ambidexterity, and Strategic Decision-Making. SPSS and JASP statistical packages were utilized in analyzing the data. The findings revealed positive and significant correlations at the significance level of 0.01 between sustainable digital leadership (and organizational ambidexterity. Additionally, the study found positive and significant correlations at the significance level of 0.01 between sustainable digital leadership and strategic decision-making (including cognitive diversity and cognitive complexity). The study highlighted the significance of integrating digital tools and sustainability principles in school leadership development to enhance organizational ambidexterity and strategic decision-making in the digital age.

**Keywords:** educational leaders; organizational ambidexterity; strategic decision-making; sustainable digital leadership

## 1. Introduction

Organizations worldwide are under**go**ing rapid and significant changes due to the ongoing technological transformation of the current era. Consequently, leaders must acquire new skills to navigate the global digitalization trend. Digital leadership is a crucial pillar in modern institutions because the ongoing rapid institutional developments underscore the significance of digital leadership in driving sustainable and effective workplaces. In today's interconnected world, digital and physical realms are closely intertwined, leading to the emergence of agile managerial practices that adapt to this hybrid environment (Bellis et al., 2024).

Dynamic capability theory (DCT) is a key theory relevant to both digital leadership and organizational ambidexterity. According to Nayernia et al. (2025), dynamic capability involves sensing, seizing, and transforming organizational assets to align with market changes. This relies on micro-foundations like managerial cognition and learning routines. Sensing involves perceiving external opportunities and threats, while seizing capabilities requires mobilizing resources and making strategic decisions (Nayernia et al., 2025).

The digitalization of life has changed the role of leaders, who now need to be digitally competent and use technology effectively. Digital leadership involves understanding and utilizing technology to achieve organizational goals (Karakose et al., 2024). Chen and Lee (2003) suggest that advancements in computer technology and managerial cognition have sparked renewed interest in research. They point out the limitations of traditional decision support systems in identifying and unlearning outdated mental models. They propose integrating a system into a collaborative learning environment to support creative thinking, uncover implicit assumptions, and facilitate forward thinking.

Digital technologies have transformed societies, making digital leadership essential for organizations. Educational institutions, as key players in societal

development, are also impacted by these changes, leading to increased research on the digital leadership roles of school administrators (Karakose et al., 2024). Organizations are adapting to rapid technological advancements in the digital era. Digital leadership is crucial for navigating the digital landscape's opportunities and challenges, especially in education. It involves using digital tools and technology to enhance knowledge sharing and emotional intelligence in educational settings. Collaborative leadership approaches are often promoted in digital leadership to facilitate cooperative information exchange, particularly in educational environments that support collaborative learning (Anwar & Saraih, 2024).

Numerous researchers have explored the various aspects and effects of digital leadership from diverse viewpoints, yet it remains an area that is not extensively studied (Khaw et al., 2022). In recent years, the convergence of sustainable development and digital leadership has become a critical focus of research and application (Aygün et al., 2024). In education, digital leadership is crucial for transforming schools into digital learning environments. School administrators must develop digital skills and vision to keep up with the changing educational landscape. Research on digital leadership in education has grown rapidly, but further exploration is needed to understand its evolution and development (Karakose et al., 2024). Digital leadership is a popular term in the era of Industry 4.0, signifying a shift toward data-driven, flexible, people-oriented, collaborative, and technology-savvy leadership. However, research on digital leadership is still limited to short-term performance (Pratomo, 2022).

Authentic leadership has a positive impact on employee innovation behaviors and engagement. Digital transformation plays a moderating role in the relationship between authentic leadership and innovation behavior and engagement (Zhang et al., 2023). To effectively implement their digital strategy, organizations should focus on developing leadership talents and cultivating leadership skills (Khaw et al., 2022) due to the challenges faced by organizations and leaders in this digital age. These leading digital innovations prioritize adapting quickly. Effective leaders empower teams and cultivate a positive workplace culture. Genuine leaders build trust and reliability in the dynamic corporate landscape (Zhang et al., 2023). Leaders who embrace transformational leadership styles create a positive climate that significantly boosts employee engagement (Winasis et al., 2021).

It is crucial for leaders to understand how digital leadership, artificial intelligence, and sustainable performance are interconnected. This understanding will enable them to effectively leverage technology while upholding ethical and responsible corporate practices (Munir et al., 2023). The integration of AI and digital leadership has increased the capacity to innovate, which in turn has had a positive effect on sustainable organizational performance (Mahmood et al., 2024). The relationship between sustainable development and digital leadership is intricate and diverse.

Digital technologies can support sustainable development by enhancing resource efficiency, decision-making processes, and collaboration. In turn, sustainable development goals can guide digital leadership toward socially and environmentally responsible outcomes (Aygün et al., 2024). Sustainable digital leadership is a leadership style that emphasizes digital transformation and the adoption of new technologies. It involves exploring and utilizing a variety of technological tools, both existing and new, to achieve organizational ambidexterity. Organizational ambidexterity refers to the ability of an organization to balance the exploitation of current resources with the exploration of future capabilities, ultimately driving innovation.

Organizational ambidexterity refers to the organization's ability to simultaneously achieve both exploitations, gaining efficiency in current business operations, and exploration of new business ideas even in the face of market and technological shifts (Torbatjoo, 2018; Kaur et al., 2019; Chakma et al., 2021). Organizational ambidexterity arises from the dual activities of exploiting current knowledge for incremental innovation and exploring new knowledge for radical innovation within firms (Chakma et al., 2021), which involves monitoring market, financial, and technological data to make decisions for current operations and future strategy. Ambidextrous organizations balance exploiting current opportunities with exploring new ones that align with their vision (Kaur et al., 2019). Organizational ambidexterity focuses on balancing exploitation and exploration activities. Exploitation improves efficiency incrementally, while exploration seeks new opportunities with increased uncertainty. Balancing exploitation and exploration is crucial for organizational ambidexterity (Dranev et al., 2020).

Digital leadership is a blend of digital, strategic, business, and market leadership skills. These leaders are decision-makers with expertise in both business and information technology. Digital leaders inspire employees with varying digital skills to participate in digital transformation (Pandey et al., 2023). An ideal decision support system should be part of a human–computer collaborative environment, where the computer actively supports the decision maker’s thinking, helps reveal hidden assumptions, and provides tools to support forward planning (Chen & Lee, 2003).

Strategic decision-making is a key focus of current management research, with significant activity in this area (Papadakis et al., 1998). There is a growing interest in enhancing strategic decision-making among managers and researchers. This interest stems from the challenges that managers and leaders face in making decisions in today's dynamic and unpredictable landscape. The current environment is characterized by constant change, making decision-making more complex than ever before (Papulova & Gazova, 2016). Influenced by changes and demands from political, economic, and social fields, the education system is involved in complex decision-making with significant consequences (Divjak, 2016).

Digital technologies can support sustainable development by enhancing resource efficiency, decision-making processes, and collaboration. Sustainable development goals can guide digital leadership toward socially and environmentally responsible outcomes (Aygün et al., 2024). This leadership style goes beyond simple technology adoption to drive organizational ambidexterity, balancing the exploitation of current resources for incremental efficiency with the exploration of new knowledge for radical innovation (Chakma et al., 2021; Kaur et al., 2019; Torbatjoo, 2018).

Organizational ambidexterity involves exploiting current knowledge for incremental innovation and exploring new knowledge for radical innovation within firms (Chakma et al., 2021). It requires monitoring market, financial, and technological data to make decisions for current operations and future strategy (Kaur et al., 2019). Balancing exploitation and exploration activities is crucial for organizational ambidexterity (Dranev et al., 2020). Achieving this balance is a complex task of strategic decision-making, especially in today's unpredictable global landscape (Papadakis et al., 1998; Papulova & Gazova, 2016). Modern digital leaders must combine technical expertise with strategic vision to engage the workforce in transformation (Pandey et al., 2023).

Strategic decision-making is a key focus of current management research, with a growing interest in enhancing it among managers and researchers due to the challenges posed by today's dynamic and unpredictable environment (Papadakis et al., 1998; Papulova & Gazova, 2016). The education system is also involved in complex decision-making influenced by changes and demands from political, economic, and social fields, with significant consequences (Divjak, 2016). Strategic planning and strategic decision-making are essential components of strategic management. Strategic planning involves formulating strategies to address uncertainties and changes in the future, while strategic decision-making involves selecting the best options. Both processes are closely related and play vital roles in guiding an organization's direction (Aldhaen, 2017).

### 1.1. Significance of the Study

The literature indicates a shift toward a more integrated, technology-driven leadership paradigm. Digital leadership is no longer a technical subset but a core strategic requirement that enables organizations to balance exploration (innovation) and exploitation (efficiency). Whether in the private sector or education, the ability to maintain procedural rationality while fostering a digital-friendly culture is the primary driver of sustainable success and resilience in the digital era.

Sustainable digital leadership is crucial for managers and leaders, including educational leaders, to deal with the changing higher education landscape. It involves integrating technology with long-term ecological, social, cultural, and ethical considerations. This type of leadership gives education leaders the ability to balance the desire to explore new opportunities efficiently using existing resources, known as organizational ambidexterity. Sustainable digital leaders create adaptive cultures that respond to digital and sustainability challenges

while maintaining academic excellence. Sustainable digital leadership combined with organizational ambidexterity can produce strategic decisions characterized by a holistic, evidence-based vision aligned with sustainability goals, ensuring long-term institutional resilience and societal impact.

**1.2. Research Problem**

The rapid advancement of digital technologies has transformed leadership requirements in various service sectors, including healthcare, education, and government. Key service sectors such as healthcare, education, and government are recognizing the impact of the digital era on their clientele, including patients, students, and citizens (Tanniru & Peral, 2021).

In the education sector in particular, the emergence of instructional technologies has fundamentally reshaped teaching, learning, and institutional management. Technology is no longer considered a supplementary tool but rather a fundamental requirement for meeting the needs of 21st-century learners (Zhong, 2017). Although the concept has received increasing scholarly attention in recent years, a comprehensive understanding of how digital leadership influences organizational processes and outcomes in educational settings remains limited (Zhu et al., 2025). One of the major challenges facing educational leaders in the digital era is balancing the need for operational stability with the demand for innovation. According to Abashidze (2022), many educational leaders struggle to manage existing institutional practices while simultaneously exploring new technological and pedagogical opportunities.

To address these challenges, the concept of organizational ambidexterity has gained attention in organizational and management research. Organizational ambidexterity is crucial for educational institutions to balance efficiency and innovation. This concept involves pursuing exploitation for refining existing practices and exploration for developing new opportunities. Strategic decision-making plays a key role in achieving this balance, especially in technology integration and curriculum innovation. However, there is limited research on technology-assisted decision-making and the role of digital leadership in educational contexts.

Recent studies in educational leadership and management highlight the increasing importance of digital leadership, organizational ambidexterity, and decision-making in educational institutions (Anwar & Saraih, 2024; Karakose et al., 2024; Hrytsenchuk et al., 2025; Mohebi, 2019; Suksai et al., 2021; Tanniru & Peral, 2021; Zhu et al., 2025). However, these concepts are often investigated independently. Limited empirical research has explored the integrated relationship between digital leadership, organizational ambidexterity, and strategic decision-making, particularly within educational institutions undergoing digital transformation.

## 2. Theoretical Framework and Literature Review

### 2.1 Sustainable Digital Leadership: The Key Element for Transformation and Adaptation

Digital leadership is no longer just about technical skill; it is a dynamic organizational capability required to navigate hybrid educational landscapes (Bellis et al., 2024; Pandey et al., 2023). Technological advancements have impacted various leadership styles (Ridha et al., 2024), transforming teaching and learning landscapes quickly. An ideal learning environment should incorporate technology to empower students to leverage new tools to enhance their learning experience, similar to traditional learning resources (Retnowati & Santosa, 2023). While digital leadership is essential for agility (Ly, 2024), Arham et al. (2022) argues that a new form of leadership is required to bridge the gap between simple technological use and true digital transformation.

Digital leadership is defined as the ability to navigate complexity and adapt to the evolving needs of hybrid situations (Bellis et al., 2024). While digital leadership refers to an individual's skills, digital leadership capability is an organization's ability to leverage these skills for digital agility and transformation (Pandey et al., 2023). Based on DCT, digital leadership is a key factor in driving digital transformation in small and medium-sized enterprises (SMEs). Leadership experience plays a crucial role in enhancing this relationship, ensuring the long-term success of SMEs in adapting to modern technology and fostering sustainability (Imran et al., 2025).

This dynamic approach promotes collaboration across hierarchies, prioritizes teamwork, and emphasizes organizational innovation, encompassing technology, strategy, and digital skills (Ridha et al., 2024). The education sector is under pressure to improve efficiency, productivity, and quality, leading to increased government focus on accountability through evaluation and performance measurement (Kivistö et al., 2019). Effective digital leadership is crucial for promoting innovation and increasing agility in response to technological disruptions (Ly, 2024).

In education, this is a school-level approach that integrates leadership skills with digital competencies to create digitally enabled schools. This model focuses on utilizing technology for leadership functions, fostering leadership qualities, offering professional development, promoting a digital-friendly culture, and driving systemic improvements (Karakose & Tülübaş, 2023). Digital leadership fosters knowledge integration and inter-team coordination (Pandey et al., 2023), which directly influences business success and decision-making effectiveness (Dastan et al., 2011). For leadership to be sustainable, it must be measurable; Ören and Atik (2025) provide empirical grounding through the DigiFuehr 2.0 Scale, ensuring leaders possess the validated skills needed to drive this dynamic approach.

Literature distinguishes digital leadership from traditional e-leadership. While e-leadership concerns social influence mediated by technology, digital leadership is a broader capability to guide an entire organization toward digital transformation. Sağbaş and Erdoğan (2022) conclude that a digital leader is characterized by innovative thinking, the ability to motivate employees through digital means, and the capacity to develop digital strategies. Claassen et al. (2023) expanded the measurement of digital leadership through the "DigiFuehr 2.0" scale, revealing two critical dimensions: Support (providing digital literacy and help) and Self-Organization (fostering participation, self-determination, and coordination).

Empirical evidence suggests that digital leadership is a precursor to improved organizational performance because it fosters innovation and knowledge sharing. Al-Husban and Al-Hawary (2024) found a significant positive impact of digital leadership on organizational performance in industrial companies, mediated by innovation capability. Similarly, Lyu (2024) confirmed that digital leadership significantly enhances team knowledge sharing and performance. In education, digital leadership is vital for transforming schools into digital learning environments (Karakose et al., 2024).

Suksai et al. (2021) and Phakamach (2023) developed models for school administrators aligned with national policies. Furthermore, Sharma et al. (2025) underscore the role of digital leadership in driving sustainable development in Higher Education Institutions by optimizing resources and reducing carbon footprints. Zhong (2017) noted that visionary leadership involves an integrated technology vision, while systemic improvement is shown through increased learning achievement and strategic partnerships.

**2.2 Organizational Ambidexterity: Balancing Exploration and Exploitation**

Ambidexterity, the organization's ability to simultaneously exploit existing competencies and explore new future opportunities, is the catalyst for long-term survival in education (Clauss et al., 2021). The phenomenon has been an object of intense research focus for the past two decades (Du & Chen, 2018). It involves balancing trade-offs from different alternatives, such as applying paradoxical strategies simultaneously (Clauss et al., 2021). Recent studies highlight the importance of balancing technology transfer (exploitation) and research development (exploration), particularly in entrepreneurial universities (García-Hurtado et al., 2024).

Organizational ambidexterity arises from the dual activities of exploiting current knowledge for incremental innovation and exploring new knowledge for radical innovation within firms (Chakma et al., 2021). Organizations can implement ambidexterity in three ways: sequential (tackling one goal at a time), simultaneous (delegating tasks to different sub-units), and contextual (enabling members to transition between tasks as required) (Du & Chen, 2018). The literature highlights two key dimensions: The Balance Dimension, focusing on the equilibrium between exploration and exploitation, and the Combined Dimension, considering the overall magnitude of both aspects (Cao et al., 2009). While the general

consensus is that an ambidextrous institution can both exploit existing competencies and explore new opportunities to improve performance, there remains some ambiguity about the exact nature of this balance (Cao et al., 2009; Torbatjoo, 2018).

Crucially, ambidexterity is linked to performance measurement and strategic decision-making. Severgnini et al. (2018) revealed that dimensions of Performance Measurement Systems (PMS)—specifically attention focus, legitimization, and strategic decision-making—impact organizational ambidexterity. Furthermore, ambidexterity acts as a mediator for the indirect effects of these dimensions on organizational performance. Balancing these activities is crucial for gaining competitive advantages, though it requires monitoring market, financial, and technological data to make decisions for both current operations and future strategy (Kaur et al., 2019).

### 2.3 Strategic Decision-Making as a Driver for Organizational Effectiveness and Efficiency

Strategic decision-making (SDM) is a key focus of management research, involving crucial choices that allocate significant resources, establish precedents, and guide organization-level actions (Mitchell et al., 2011; Papadakis et al., 1998). These decisions shape the overall direction of an organization, impacting outcomes, effectiveness, and efficiency. The process is influenced by managers' knowledge, organizational context, and the external environment (Mitchell et al., 2011). It involves identifying key steps, stakeholders, and criteria, and is an integral part of strategic management focused on achieving organizational goals (Aldhaen, 2017). Successful SDM outcomes are characterized by reliability, adaptability, and performance. However, creating and implementing these decisions involves managing uncertainty, exploring synergies, and engaging stakeholders in psychological and social negotiations (Divjak, 2016).

The process of SDM involves seven dimensions: comprehensiveness/rationality, financial reporting, rule formalization, hierarchical decentralization, lateral communication, politicization, and problem-solving dissension (Papadakis et al., 1998). Strategic decisions, particularly on key organizational issues, are viewed as a matter of trust requiring careful management considerations (Eromafunu et al., 2022). While successful SDM is not purely mathematical—it is fundamentally a human act (Wang, 2021)—the rationality of a decision is often a product of its environment (Elbanna & Child, 2007).

High-performing organizations tend to make more rational decisions and fewer political ones (Elbanna & Naguib, 2009). To manage cognitive biases related to human nature, leaders must utilize Cognitive Decision Support Systems (Chen & Lee, 2003), ensuring the reliability and adaptability sought by Mitchell et al. (2011). In fast-changing environments, the SDM process must adapt; rational-comprehensive planning is most effective when paired with an understanding of external dynamism (Hough & White, 2003; Shepherd & Rudd, 2014).

In the context of higher education, SDM is increasingly complex due to influences from political, economic, and social fields (Divjak, 2016). Education institutions

adopt strategic changes to reach audiences emerging from online platforms (Jacociunas et al., 2024). Choosing the right method is essential, as leaders often encounter dependencies between criteria when tackling strategic problems (Kadoić et al., 2018). Divjak and Rađep (2015) examined SDM in higher education with a focus on institutional and national perspectives, utilizing a four-phase cycle to address decision-making processes within institutions and national authorities. In "entrepreneurial universities," the challenge is maintaining efficiency while innovating (García-Hurtado et al., 2024). Kadoić et al. (2017) suggest that complex decision-making in Open and Distance Education requires advanced tools (like ANP and SNA) to balance these competing demands. To achieve lateral communication and stakeholder engagement, methodologies using computer simulations to resolve stakeholder differences are vital for building trust (Stokman et al., 2000; Eromafunu et al., 2022).

Modern strategic leadership is augmented by technology. Data-driven SDM involves collecting relevant data, analyzing it effectively, distributing it to the right individuals, and utilizing it to enhance efficiencies (Masha, 2014). This is crucial for schools to enhance performance and student achievement; leaders must use data to improve teaching quality, communication, curriculum development, and financial management. Involving information experts and developing data warehouse management systems can strengthen organizational infrastructure, while data security and governance policies are vital for success (Masha, 2014; Ahmed & Malik, 2020).

Digital Leadership Capability (Ören & Atik, 2025; Pandey et al., 2023) acts as the foundation, providing the skills to use IT and Decision Support Systems (Chen & Lee, 2003; Dastan et al., 2011). These skills are applied through the SDM process (Divjak, 2016; Shepherd & Rudd, 2014), which is moderated by environmental dynamism (Hough & White, 2003). Finally, effective SDM enables organizational ambidexterity (Severgnini et al., 2018), allowing the institution to achieve the sustainability and performance required in the digital age (Imran et al., 2025; Mitchell et al., 2011).

Recent studies highlight the interconnection of these variables. Kaur et al. (2019) discussed how cognitive computing can enhance performance in global strategic partnerships. Obadimeji (2022) found a combined effect of digital leadership and decision-making styles on teacher job performance. Fang (2023) emphasized strategic thinking and collaboration in digital leadership's impact on innovation. Hrytsenchuk et al. (2025) and Zhu et al. (2025) focused on leadership competence and the need for dynamic definitions in digital management. Nasrun et al. (2025) and Qiao et al. (2024) explored the impact of digital leadership on organizational performance and employee well-being through digital transformation.

The significance of the digital shift indicates that leaders must possess specific digital competencies to navigate modern educational landscapes (Arham et al., 2022; Ören & Atik, 2025). Emotional and cognitive characteristics are important for making strategic decisions. While Sonfield et al. (2001) revealed limited relationships between owner education and entrepreneurial strategies in small

businesses, Musso and Francioni (2012) emphasized that a leader's education and emotional regulation directly filter how information is perceived. Shepherd and Rudd (2014) developed a framework illustrating how context variables influence the SDM process. Board characteristics, such as CEO/Chair duality, significantly impact the depth of strategic involvement (Ruigrok et al., 2006).

Based on the literature review, the following hypotheses were formulated:
**H1:** There will be a relationship between sustainable digital leadership and organizational ambidexterity.
**H2:** There is a relationship between sustainable digital leadership and SDM.

## 3. Methodology

A descriptive correlational research design was utilized to examine the relationships between the variables under investigation, namely sustainable digital leadership, organizational ambidexterity, and SDM. This research design focuses on identifying and describing the connections between two or more variables without manipulation, as outlined by Morallas and Baguio (2025).

### 3.1 Participants

The study included 363 in-service teachers aged between 23 and 47 years (M = 26.95 years, SD = 4.62). The sample was randomly drawn from a population of 1820 in-service teachers enrolled in the Educational Qualification Program at the College of Education, Al-Azhar University, Egypt, during the academic year 2025/2026. Most of participants were females (n = 242) compared to males (n = 121).

### 3.2 Measures

To test the study hypotheses, the following measures were utilized.

*3.2.1 The Digital Leadership Scale*

The Digital Leadership Scale (DigiFuehr 2.0) was developed by Claassen et al. (2023) to evaluate the level of digital leadership. The present study used the modified version of the scale by Ören and Atik (2025). The scale consists of nine items distributed across two sub-dimensions. The first dimension, 'Support', includes six items (e.g., "My school principal supports me to improve my digital literacy"). The second dimension, 'Self-Organization', consists of three items (e.g., "I am involved in decisions that affect my work and digital work environment").

3.2.1.1 Exploratory Factor Analysis (EFA)

**Data Suitability and Sampling Adequacy***:* Before extracting factors, we evaluated whether the data were suitable for factor analysis:

- **Kaiser–Meyer–Olkin (KMO) Test:** The overall Measure of Sampling Adequacy (MSA) was 0.819. This is considered meritorious for EFA (above 0.80), indicating that the variables have sufficient commonality to warrant factor analysis. Individual items such as 3 (0.893), 4 (0.853), and 6 (0.858) showed very high adequacy, while items 7 (0.588) and 8 (0.578) had lower adequacy scores but remained above the acceptable threshold of 0.50.

- **Bartlett's Test of Sphericity:** The test result was highly significant ($\chi^2$ = 776.064, df = 36, p < .001). This confirms that the correlation matrix is significantly different from an identity matrix, indicating detectable relationships between variables that can be grouped into factors.

**Model Fit:** The chi-square test for the model indicated a value of 30.729. This test assesses how well the suggested factor structure fits the observed data. The results suggest a robust foundation for the analysis. The high KMO score (0.819) and significant Bartlett's test (p < .001) provide strong evidence that the "Digital Leadership" dataset is appropriate for factor analysis. Most variables contributed well to the common variance, though a few (items 7, 8, and 9) showed weaker (though still acceptable) individual sampling adequacy.

3.2.1.2 Confirmatory Factor Analysis (CFA)
We conducted a CFA for the scale.
**Model Fit***:* The overall model fit was assessed to determine how well the proposed factor structure matched the observed data.

- **Chi-square Test:** The factor model had a chi-square value of 34.791 with 26 degrees of freedom (df).
- **p-value:** The p-value was .116. Since this is greater than .05, we fail to reject the null hypothesis, suggesting that the model fits the data well (i.e., there is no significant difference between the model and the data).

**Comparative Fit Indices**: These indices compare the hypothesized model to a "baseline" or null model. Higher values (typically > 0.90 or 0.95) indicate a good fit.

**Table 1: Fit Indices of the Model**

| Index | Value |
|---|---|
| Comparative Fit Index (CFI) | 0.988 |
| Tucker–Lewis Index (TLI) | 0.984 |
| Bentler–Bonett Non-normed Fit Index (NNFI) | 0.984 |
| Bentler–Bonett Normed Fit Index (NFI) | 0.956 |
| Incremental Fit Index (IFI) | 0.988 |
| Relative Noncentrality Index (RNI) | 0.988 |

All indices indicate a very good fit of the model. The non-significant chi-square p-value (.116) and near-perfect scores for CFI (0.988) and TLI (0.984) suggest that the factor structure for Digital Leadership defined in this analysis is highly representative of the underlying data.

**Reliability and Convergent Validity**
Convergent validity is confirmed when the Average Variance Extracted (AVE) is above 0.50 and Composite Reliability (CR) is above 0.70.

**Table 2: Reliability, Convergent Validity, and Discriminant Validity of the Digital Leadership Scale**

| Construct | Cronbach's α | CR | Average Variance Extracted (AVE) | Interpretation |
|---|---|---|---|---|
| Factor 1 | 0.887 | 0.891 | 0.672 | Excellent reliability and convergent validity |
| Factor 2 | 0.836 | 0.842 | 0.573 | Strong reliability and convergent validity |

- **Reliability:** Both factors demonstrated high internal consistency, with Cronbach's alpha and CR values well exceeding the 0.70 threshold.
- **Convergent Validity:** Both factors had an AVE greater than 0.50, indicating that the components explained more than half of the variance of their indicators.

**Discriminant Validity**

Discriminant validity is achieved when the components are clearly distinguishable from each other. According to the Fornell–Larcker criterion, the square root of the AVE for each construct should be higher than its highest correlation with any other construct.

For Factor 1, the square root of AVE is 0.820 (√0.672), and for Factor 2, it is 0.757 (√0.573). The correlation between Factor 1 and Factor 2 was 0.407. Therefore, discriminant validity is confirmed, as the square root of the AVE for both factors (0.820 and 0.757) is notably greater than the correlation between them (0.407).

In conclusion, the measurement model is robust for the following reasons:

- KMO MSA: 0.819 (meritorious), indicating the data's suitability.
- Bartlett's Test: Significant ($p < .001$), confirming factorability.
- CFA Model Fit: The model shows excellent fit with a CFI of 0.988 and TLI of 0.984.

*3.2.2 Organizational Ambidexterity Questionnaire*

The Organizational Ambidexterity Questionnaire, developed by Mashahra (2022), measures organizational ambidexterity among school principals from teachers' viewpoints. It consists of 46 items distributed across four sub-dimensions:

1. Ambidexterity of optimizing opportunities (11 items): e.g., "The school principal monitors available opportunities for teacher and student development."
2. Ambidexterity of exploring new opportunities (11 items): e.g., "The manager creates an organizational climate that supports change."
3. Ambidexterity of optimizing material resources (12 items): e.g., "The principal invests in the school's physical resources, such as the laboratory, computer room, library, art room, and everything else needed to discover students' talents and abilities."

4. Ambidexterity of optimizing human resources (12 items): e.g., "The principal invests in teachers by training them and providing them with new knowledge."

Participants responded on a 5-point Likert scale ranging from 1 (Very Low) to 5 (Very High).

3.2.2.1 Confirmatory Factor Analysis

A CFA was conducted to evaluate the hypothesized factor structure of the questionnaire. The hypothesized factor model demonstrated good to excellent fit to the data, $\chi^2(983) = 1903.97$, $p < .001$. Although the chi-square test was statistically significant, this result was expected given the large sample size and model complexity. Incremental fit indices indicated excellent model fit (CFI = .969, TLI = .967), and absolute fit indices were within recommended thresholds (RMSEA = .051, 90% CI [.048, .054]; SRMR = .041). The RMSEA test of close fit was non-significant (p = .321), further supporting the adequacy of the model. Collectively, these results suggest that the proposed factor structure provides an acceptable and parsimonious representation of the data.

Internal consistency reliability was assessed using Cronbach's alpha. The Organizational Ambidexterity Questionnaire demonstrated excellent reliability, with Cronbach's alpha exceeding the recommended threshold of .70, indicating a high degree of internal consistency among items. CR values exceeded the recommended threshold of .70, further confirming the internal consistency and reliability of the construct.

**Table 3: McDonald's Omega and Cronbach's Alpha Reliability for the Organizational Ambidexterity Questionnaire**

| Factors | Coefficient ω | Coefficient α |
|---|---|---|
| Factor 1: Ambidexterity of optimizing opportunities. | 0.964 | 0.964 |
| Factor 2: Ambidexterity of exploring new opportunities. | 0.940 | 0.939 |
| Factor 3: Ambidexterity of optimizing material resources. | 0.919 | 0.925 |
| Factor 4: Ambidexterity of optimizing human resources. | 0.624 | 0.623 |
| Total | 0.983 | 0.978 |

**Convergent Validity**

Convergent validity was assessed using standardized factor loadings, AVE, and CR. All items loaded significantly on their intended factors, with standardized loadings exceeding recommended thresholds. CR values were above .70, indicating adequate internal consistency. In addition, AVE values met or exceeded the .50 criterion, suggesting that each construct explained a substantial proportion of variance in its indicators. Together, these results support the convergent validity of the measurement model.

**Discriminant Validity**
Discriminant validity was evaluated using both the Fornell–Larcker criterion and the heterotrait–monotrait ratio of correlations (HTMT). Fornell–Larcker comparisons indicated that the square root of the AVE for each construct exceeded its correlations with other constructs. In addition, all HTMT values were below the recommended threshold of .85-.90, providing further evidence that the components are empirically distinct.

The results provide strong evidence for the reliability, convergent validity, and discriminant validity of the Organizational Ambidexterity Questionnaire. All reliability coefficients exceeded recommended thresholds, factor loadings were substantial and significant, and both AVE and discriminant validity criteria were satisfied. These findings support the adequacy of the measurement model and justify its use in subsequent analyses.

*3.2.3 Strategic Decision-Makers' Characteristics Questionnaire*
The Strategic Decision-Makers' Characteristics Questionnaire was developed by Eromafunu et al. (2022) to measure two components of SDM: namely, cognitive diversity, which included six items (e.g., "Manager's/organization's top management team members' cognitive diversity ability has a significant drive to making effective strategic choices at a glance from cumbersome situations, and where there are many or conflicting alternatives"), and cognitive complexity, which also includes six items (e.g., "It is opined that the cognitive complexity of strategic decision-makers has a positive influence on the quality and effectiveness of strategic decision outcomes"). Participants responded to the questionnaire on a 5-point Likert scale (modified from the 4-point scale in the original questionnaire).

3.2.3.1 Construct Validity Analysis
To assess the construct validity of the Strategic Decision-Makers' Characteristics Questionnaire, a Principal Component Analysis (PCA) was conducted using JASP. The Kaiser–Meyer–Olkin (KMO) MSA yielded a value of 0.908, indicating excellent suitability of the data for factor analysis. Bartlett's Test of Sphericity was statistically significant ($\chi^2 = 1607.589$, $df = 66$, $p < .001$), confirming that the correlation matrix was not an identity matrix. The PCA results showed strong factor loadings for all items on the principal components, supporting the multidimensional structure of the scale and providing robust evidence of construct validity.

3.2.3.2 Factor Loadings

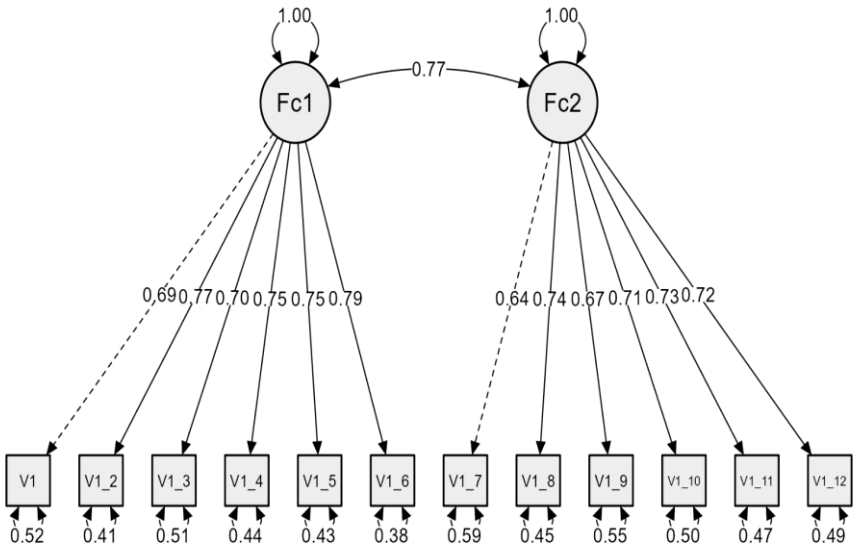


Figure 1. Factor loadings of the Strategic Decision-Makers' Characteristics Questionnaire

- **Latent factors:** Factor 1 and Factor 2, each with variance fixed at 1.00 (for identification).
- **Correlation between factors:** 0.77, indicating a strong positive relationship.
- **Indicators:** Factor 1 → V1–V1_6 with standardized loadings ranging from 0.69 to 0.79. Factor 2 → V1_7–V1_12 with loadings ranging from 0.64 to 0.74. Most items showed strong loadings on PC1, ranging from 0.68 to 0.75. These loadings exceed the typical threshold of 0.50. All items significantly contributed to assessing strategic decision-makers' characteristics, indicating robust convergent validity.

**Model Significance:**
The chi-square test for the PCA model was significant ($p < .001$). The extracted factor structure is statistically sound and theoretically coherent. A PCA was conducted on strategic decision-makers' characteristics items, with good factorability indicated by KMO (0.908) and significant Bartlett's test ($p < .001$). Two components with eigenvalues > 1 were retained, explaining 56.6% of variance. The scree plot supported this solution, with clean loadings and no cross-loadings, suggesting a clear two-component structure.

**Convergent Validity:**
Factor 1 showed strong convergent validity with high factor loadings, CR of 0.86, and AVE of 0.51. Factor 2 had acceptable convergent validity with slightly lower AVE but strong CR and good loadings. Overall, both factors demonstrated adequate convergent validity.

**Discriminant Validity:**
To assess discriminant validity, the heterotrait–monotrait ratio (HTMT) was used. The HTMT value between Factor 1 and Factor 2 was 0.755, which is below the

recommended threshold of 0.85-90. This indicates adequate discriminant validity between the two constructs.

*3.2.4 Confirmatory Factor Analysis:*
We conducted a CFA to evaluate the Strategic Decision-Makers' Characteristics Questionnaire. The results indicate a good fit with the data:

- CFI: 0.985, showing a very good fit.
- TLI (Tucker–Lewis Index): 0.979, confirming a well-specified model.
- RMSEA: 0.042, below the threshold of 0.06.
- SRMR (Standardized Root Mean Square Residual): 0.038, indicating high precision in representing variances.

3.2.4.1 Factor Loadings

- All items had significant factor loadings ($p < .001$) on their respective latent factors.
- Most loadings were above 0.70, indicating strong indicators of the Strategic Decision-Makers' Characteristics dimensions.

3.2.4.2 Latent Variables and Relationships

- The model supports the multidimensional nature of SDM.
- Positive and significant correlations exist between the latent dimensions, suggesting their collective impact on Strategic Decision-Makers' Characteristics. Overall, the questionnaire demonstrates strong construct validity.

### 3.3 Reliability Analysis (Internal Consistency)

**Table 4: McDonald's Omega and Cronbach's Alpha Reliability for the Strategic Decision-Makers' Characteristics Questionnaire**

| | Coefficient ω | Coefficient α |
|---|---|---|
| Factor 1 | 0.848 | 0.843 |
| Factor 2 | 0.817 | 0.817 |
| Total | 0.900 | 0.884 |

A Cronbach's alpha value of 0.884 indicates high internal consistency, exceeding the commonly accepted threshold of 0.70 and confirming that the scale is highly reliable.

## 4. Results and Findings

We began by describing the mean scores of participants on all variables, as shown in Table 5.

**Table 5: Descriptive Statistics of All Variables Included in the Analysis**

| Variable | N | Range | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|---|
| Support | 363 | 24 | 6 | 30 | 23.07 | 4.052 |
| Self-Organization | 363 | 10 | 5 | 15 | 11.96 | 1.957 |
| Total score of Sustainable Digital leadership | 363 | 31 | 14 | 45 | 35.04 | 5.344 |
| Ambidexterity of optimizing opportunities | 363 | 43.00 | 12.00 | 55.00 | 38.98 | 9.383 |
| Ambidexterity of exploring new opportunities | 363 | 44.00 | 11.00 | 55.00 | 40.28 | 8.911 |
| Ambidexterity of optimizing material resources | 363 | 39.00 | 21.00 | 60.00 | 47.04 | 8.059 |
| Ambidexterity of optimizing human resources | 363 | 46.00 | 14.00 | 60.00 | 45.23 | 8.950 |
| Total score of organizational ambidexterity | 363 | 172 | 58 | 230 | 171.53 | 32.894 |
| Cognitive diversity | 363 | 24 | 6 | 30 | 23.39 | 3.897 |
| Cognitive complexity | 363 | 24 | 6 | 30 | 22.38 | 3.889 |
| Total strategic decision-makers' characteristics | 363 | 48 | 12 | 60 | 45.77 | 7.067 |
| Valid N (listwise) | 363 | – | – | – | – | – |

The table above indicates that participants scored high on all main variables:

- **Sustainable Digital Leadership:** The mean total score was 35.04 (out of a maximum of 45), with a mean score of 23.07 for 'Support' and 11.96 for 'Self-Organization'.
- **Organizational Ambidexterity:** The mean total score was 171.53 out of a maximum of 230. The mean scores for the four dimensions were 38.98, 40.28, 47.04, and 45.23, respectively.
- **Strategic Decision-Makers' Characteristics:** The mean total score was 45.77 out of a maximum of 60. The mean score for 'Cognitive Diversity' was 23.39, and the mean score for 'Cognitive Complexity' was 22.38.

**H1: There will be a relationship between sustainable digital leadership and organizational ambidexterity.**
**Result**: **Supported**.

**Table 6: Correlations Between Organizational Ambidexterity and Sustainable Digital Leadership**

| | Support | Self-Organization | Total Score of Sustainable Digital Leadership |
|---|---|---|---|
| Ambidexterity of optimizing opportunities | .625** | .441** | .636** |
| Ambidexterity of exploring new opportunities | .616** | .449** | .632** |
| Ambidexterity of optimizing material resources | .664** | .496** | .685** |
| Ambidexterity of optimizing human resources | .565** | .415** | .581** |
| Total Score of Organizational Ambidexterity | .674** | .488** | .689** |
| **Note.** Correlation is significant at the 0.01 level (2-tailed). | | | |

Table 6 illustrates significant positive correlations between digital leadership (including its sub-dimensions) and organizational ambidexterity (including its four components), with correlation values ranging from 0.415 to 0.689 ($p \leq .01$). The findings indicate a strong, positive correlation ($r = .689$) between the total score of digital leadership and the total score of organizational ambidexterity. Regarding sub-factors, digital leadership shows the strongest relationship with "Ambidexterity of optimizing material resources" ($r = .685$).

A sustainable digital leader possesses the skills to explore new technological tools and leverage existing digital assets, achieving a balance between current tools and future innovations. Sustainable digital leadership acts as the bridge between exploration and exploitation, ensuring that innovative ideas are not only created but also leveraged. Effective leadership is crucial for successful digital transformation in enterprises, guiding them through disruption, skill development, process improvement, talent engagement, and new business model creation. Operationalizing digitalization and enhancing leadership capabilities are key to transformation success (Karippur & Balaramachandran, 2022).

Enterprises can foster ambidextrous innovation by enhancing managers' digital literacy and building digital capabilities. For low-tech enterprises, focusing on optimizing resources and structure before investing in advanced digital capabilities is recommended (Jiang et al., 2025). A study by Trieu et al. (2024) highlights the importance of enhancing IT competencies and promoting organizational ambidexterity to enhance organizational resilience, responsiveness to market changes, and overall business performance, particularly for SMEs. Paradoxical leadership plays a vital role in promoting organizational ambidexterity and resilience, leading to positive outcomes. Government policies supporting digital transformation can further aid SMEs in developing their IT capabilities and resilience.

Cai et al. (2024) emphasize the significance of digital leadership in gaining a competitive advantage, with ambidextrous innovation serving as a crucial link to competitive success. Value co-creation strengthens the impact of explorative innovation on competitive advantage while reducing the influence of exploitative innovation. These insights are valuable for businesses seeking to enhance their competitive positioning in a dynamic market.

The study by Alawneh et al. (2025) underscores the impact of digital transformational leadership on job performance and organizational ambidexterity, with organizational ambidexterity playing a significant mediating role. These findings offer practical guidance for organizations aiming to enhance performance through digital leadership and highlight the importance of ambidextrous business operations. Alkhozaim's (2025) results demonstrate a statistically significant positive effect of digital leadership on organizational ambidexterity, strategic flexibility, and its dimensions. Strategic flexibility and its dimensions also show a positive effect on organizational ambidexterity. The study reveals that strategic flexibility, production flexibility, and marketing flexibility act as partial mediators, while coordination flexibility and human resources flexibility serve as complete mediators in the relationship between digital leadership and organizational ambidexterity in travel agencies.

Jiang et al. (2025) highlights the critical role of managers' digital literacy, knowledge re-orchestration, and digital capabilities in fostering ambidextrous innovation. They found that managers' digital literacy positively influences knowledge re-orchestration and digital capabilities, ultimately impacting ambidextrous innovation through the sequential mediation of these factors.

**H2: There is a relationship between sustainable digital leadership and SDM. Result: Supported.**

**Table 7: Correlations Between Sustainable Digital Leadership and Strategic Decision-Makers' Characteristics**

| | Cognitive Diversity | Cognitive Complexity | Total Score of Strategic Decision-Makers' Characteristics |
|---|---|---|---|
| Support | .462** | .476** | .517** |
| Self-Organization | .438** | .381** | .451** |
| Total Score of Sustainable Digital Leadership | .510** | .500** | .557** |
| **Note.** Correlation is significant at the 0.01 level (2-tailed). | | | |

Table 7 shows a moderate-to-strong positive correlation (r = .557) between the total score of sustainable digital leadership and the total score of strategic decision-makers' characteristics. Sustainable digital leadership correlates almost equally with both sub-factors of strategic decision-makers' characteristics: 'Cognitive Diversity' (r = .510) and 'Cognitive Complexity' (r = .500). The overall correlations between the variables ranged from 0.381 to 0.557, all of which are statistically significant at the 0.01 level.

The findings align with prior research on the correlation between digital leadership and decision-making. Numerous studies (Cortellazzo et al., 2019; Mulyani, 2024; Oredein & Obadimeji, 2022; Siregar & Hermawan, 2025) have shown that the adoption of information technologies leads to changes in organizational structure, information utilization, and decision-making processes. Mulyani's study (2024) demonstrated that creativity and digital leadership positively impact the quality of decision-making. Nurturing a culture of creativity and digital leadership is crucial for enhancing decision-making quality.

## 5. Discussion

The study revealed a strong correlation between sustainable digital leadership and organizational ambidexterity in the educational sector. The results are based on in-service teachers' perspectives regarding school leaders, which enhances their credibility. This indicates that leaders who prioritize sustainability and digital innovation are able to help organizations adapt to new digital opportunities while leveraging their existing resources effectively. By integrating digital innovation with sustainability values, leaders empower organizations to remain agile and navigate rapidly changing environments. Sustainable digital leaders drive long-term strategic vision by integrating digital transformation with sustainability principles. They balance explorative activities like innovation with exploitative activities like process optimization, embodying organizational ambidexterity in the digital era.

Green (2004) emphasized the importance of cognitive complexity for success in project leadership. In a study conducted by Albannai et al. (2025), it was shown that digital leaders play a crucial role in developing three key dynamic capabilities for effective digital transformation. These capabilities include digital sensing (such as understanding technological trends, digital vision, and strategy development), digital seizing (focusing on organizational agility and digital portfolio management), and transforming (which involves restructuring internal processes and forming partnerships within the ecosystem).

The positive relationship between sustainable digital leadership and organizational ambidexterity, revealed by the current study, can be explained through dynamic capabilities theory (DCT), which emphasizes an organization's ability to sense, seize, and reconfigure resources in response to environmental changes. Drawing on DCT (Bleady et al., 2018; Samsudin & Ismail, 2019; Nayernia, 2025; Teece et al., 1997), this result indicates the importance of developing skills and capabilities to simultaneously explore new opportunities and exploit existing resources.

The study's results support previous research on the importance of digital leadership in promoting innovation, adaptability, and organizational resilience. However, this study goes further by emphasizing the sustainability aspect of digital leadership among school principals from teachers' viewpoints. It shows that leadership practices that prioritize long-term digital and sustainable strategies are especially effective in driving ambidextrous outcomes for an organization. This research adds to the existing literature by providing empirical

evidence of the link between sustainable digital leadership and organizational ambidexterity, an area that has not yet received due attention.

The results underscore the importance of digital leadership in enhancing SDM among leaders. Digital leaders utilize technology and data to steer organizations effectively. Incorporating technical expertise into agile management helps leaders make well-informed and strategic decisions using digital data and fosters innovation in collaborative teams through effective communication. Using this approach is vital for an organization to maintain a leading position, particularly in a rapidly changing digital environment. There is a reciprocal relationship between SDM and the support dimension of digital leadership. The support provided by digital management helps in making effective decisions, while strategic decisions determine where and when support is needed.

The quality of the support provided to leaders determines the extent to which these strategic decisions can be successful. Organizations need effective digital leadership to maintain their excellence in a rapidly changing environment. The self-organization aspect is essential for a leader to make strategic decisions effectively by managing time, controlling emotions, and reducing cognitive load. Self-organization enables leaders to save time, eliminate distractions, and utilize their peak mental hours for deep thinking, leading to well-informed decisions. Self-organized leaders can sift through information to exclude irrelevant data, which is crucial for making strategic decisions.

## 6. Practical Implications

In order to cope with the fast-changing world in the digital age, organizations need to incorporate sustainability and digital transformation practices and principles into their leadership development programs, performance evaluation systems, and SDM processes. This way, these organizations can create an organizational climate that supports ongoing innovation while maintaining operational excellence simultaneously.

From a practical perspective, the findings suggest that educational organizations focused on fostering and enhancing ambidexterity should prioritize the development of leaders who integrate digital competencies into sustainability-oriented strategic thinking. By effectively managing the balance between immediate efficiency and future innovation, this leadership style can assist an organization in balancing operational efficiency with continuous innovation, ultimately improving long-term organizational performance and adaptability, especially in volatile and unpredictable conditions. This underscores the importance of offering professional development initiatives aimed at school principals and other educational leaders to enhance their ongoing digital leadership skills and drive digital transformation in educational settings. These programs should also prioritize cultivating organizational ambidexterity skills among educational leaders.

## 7. Future Research Directions

The current study offered fundamental insights into the connections among sustainable digital leadership, organizational ambidexterity, and SDM, demonstrating notable positive correlations. Future studies should build upon these results by delving into structural modeling, emphasizing causal mechanisms and mediating factors (such as organizational culture, organization type, employee digital proficiency, organizational climate, job satisfaction, and knowledge management practices) that elucidate the translation of sustainable digital leadership into organizational ambidexterity.

Additionally, cross-cultural and longitudinal research can offer further understanding of how this relationship develops over time and across diverse organizational settings. Quasi-experimental research is also necessary to study the effects of sustainable digital leadership-focused professional development programs on improving SDM and organizational ambidexterity in educational leaders.

## 8. Conclusion

The study's results serve as clear empirical evidence of the impact of sustainable digital leadership on promoting and improving organizational ambidexterity among school leaders. The inclusion of in-service teachers, a key stakeholder group, in the study enhanced its ecological validity, given its focus on the educational sector. Drawing on DCT (Nayernia, 2025; Samsudin & Ismail, 2019; Teece et al., 1997; extended by Bleady et al., 2018;), the study's findings strongly support the idea that school leaders can develop both exploratory capabilities through digital innovation and strategic planning, and exploitative capabilities through process optimization and operational efficiency. Achieving a balance between exploration and exploitation within educational institutions is essential for attaining organizational ambidexterity.

According to Nayernia (2025), capabilities develop when individuals combine and transform resources in ways that contribute to the institution's strategic goals. For a modern educational institution to succeed, it must blend academic tradition with innovative education. This involves sensing opportunities by monitoring labor market trends, demographics, and advancements in technology. Schools can respond to the demand for specific skills like AI literacy by offering micro-credential programs. Educational institutions can seize new trends by investing in relevant school activities and learning experiences. Reconfiguration in education involves reallocating resources to support new models while maintaining traditional structures. Optimizing human resources includes training teachers in digital pedagogy and hiring industry experts for research and industry-aligned teaching.

Drawing on established psychological, cognitive, and behavioral leadership theories, our study suggests that successful digital leaders exhibit strong cognitive complexity (Green, 2004). This complexity enables them to manage competing priorities and cultivate a nurturing atmosphere that encourages both creativity and consistency. The focus on educators, a vital stakeholder group, underscores

the significance of relational and contextual leadership in enhancing flexibility at the organizational and institutional levels.

From a theoretical standpoint, this study addresses a significant gap in the field of digital leadership by connecting sustainability-focused digital leadership with ambidextrous practices within organizations, an area that has not been explored in educational leadership research. In terms of empirical findings, this study suggests the need for a structured incorporation of digital tools and sustainability principles into educational leadership development programs, along with enhancing SDM processes in public schools. This integration could potentially enhance long-term resilience and organizational adaptability in educational institutions in the digital era.

**Declarations**
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**Conflict of Interest**
There is no conflict of interest.

**Institutional Review Board Statement**
Ethical review and approval were waived for this study due to voluntary participation of the sample where all members were more than 18 years old. The data were collected anonymously and confidentially.

**Informed Consent Statement**
Participants were informed about the aims of the study and agreed to allow the research team to use the data to write this paper.

**Data Availability Statement**
Data is contained within the article.

## 9. Authorship and Level of Contribution

Mashael Nasser Ayed Al-Dosari contributed to the conceptualization of the study, development of the theoretical framework, and provided substantive academic input related to educational sciences. Mohamed Sayed Abdellatif, as the corresponding author, led the overall research design, coordinated the research team, supervised data analysis procedures, and critically revised the manuscript for intellectual content. Aljwhrh Nasr A. Aldwsri contributed to data organization, interpretation of findings from an administrative and applied perspective, and participated in drafting and reviewing specific sections of the manuscript. Abdulaaty Abdulkarim M. Ahmed contributed to the statistical analysis, methodological rigor, validation of results, and provided expert input in educational psychology and statistics. All authors contributed to the interpretation of the results, reviewed and approved the final manuscript, and agree to be accountable for all aspects of the work.

**Declaration of AI Use**

AI-assisted tools were used in a limited capacity to support language refinement and editing of the manuscript. All intellectual content, data analysis, interpretations, and conclusions were developed and verified solely by the authors.

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