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The Effect of Digital Leadership on Sustainable Development in Small and Medium-Sized Enterprises: The Mediating Role of Organizational Learning

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ABSTRACT

This study analyzes the impact of digital leadership on sustainable development through the mediating role of organizational learning. The research data was collected from 376 small and medium-sized enterprises (SMEs) in Thanh Hoa province, then a partial least squares structural equation modeling (PLS-SEM) method was used to analyze the research data and test its hypotheses. The results found a positive impact of digital leadership on the organization's sustainable development as well as on organizational learning, in which digital leadership has a stronger impact on organizational learning than it does on sustainable development. Furthermore, it has been shown that organizational learning plays a mediating role in the relationship between digital leadership and sustainable development. Therefore, the research contributes to providing a conceptual framework supported by empirical evidence for the role of organizational learning in enterprises' sustainability and the need for digital leadership through organizational learning towards sustainability. From the results, the author proposed a number of recommendations to leaders for accelerating organizational learning and improving sustainable development of enterprises.

Keywords: Digital leadership, organizational learning, SMEs, sustainable development, Thanh Hoa.

1. INTRODUCTION

The fourth industrial revolution has ushered in a new era, changing the way businesses operate by introducing digital into various aspects of production, organization, and business processes (Chen & Hao, 2022). In this context, digital transformation is the inevitable direction for businesses, and their success in embracing digital transformation depends on several key factors, including digital leadership (Ladkin & Patrick, 2022). Mollah et al. (2023) also argued that keeping up with the digital age, organizations must be transformed from traditional leadership to

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digital leadership, as well as organizational learning capabilities for sustainable development. Digital leadership, a concept that has emerged in the digital age, has become important in facilitating the dynamic and effective management of businesses. It plays a vital role in guiding businesses through the complexities of digital transformation. An effective leadership style can positively impact the effectiveness of digital transformation and sustainable business performance of an enterprise (Senadjki et al., 2023). Digital leadership is defined as doing the right things for the strategic success of digitalization for the enterprise and its business ecosystem (Ladkin & Patrick, 2022). Furthermore, digital leaders must build a digital vision that is acceptable to employees, which can be implemented through information technology capabilities and organizational learning (Mollah et al., 2023).

Digital transformation has also brought rapid organizational change and leadership actions must also be fast to lead the business to sustainable development (Mollah et al., 2023). Organizational learning is the process of enhancing action through knowledge and awareness where individuals receive appropriate personal, professional competencies (Brix, 2019) and social competence (Raudeliunien et al., 2020) from organizations. The knowledge of digital leaders is crucial to emphasize organizational learning in organizing sustainable operations. Sustainability is a methodical strategy that aims to establish businesses as leaders by influencing their performance (Akram et al., 2018). Sustainability is a development strategy that requires the use of knowledge in organizations by building an advanced learning environment and creating best practices through team efforts. There have been many studies on the impact of digital leadership on sustainability. They argue that digital leadership plays an important role and positively influences sustainable development in the context of digital transformation (Saddique et al., 2023). However, the impact of digital leadership on sustainable development may be through some mediating factors, such as the positive promoting role of organizational learning, information technology capabilities, and entrepreneurial orientation (Mollah et al., 2023). Therefore, it can be seen that the relationship between digital leadership and sustainable development of enterprises has been affirmed, it can be a direct or indirect relationship and needs to continue to be explored in different contexts and countries.

The importance of innovation is further exemplified by the case of Thanh Hoa province in Vietnam, where SMEs are increasingly playing a pivotal role in the local economy. Thanh Hoa ranks among the top 10 provinces in Vietnam by the number of businesses, particularly SMEs (Department of Planning & Investment of Thanh Hoa, 2024). As of June 30, 2024, Thanh Hoa had approximately 36,000 registered businesses, with more than 20,000 actively operating and generating revenue. Among these, SMEs account for about 97.4%. Aligning with the economy's digital transformation trends, Thanh Hoa's SMEs are progressively innovating across areas such as product development, process optimization, organizational restructuring, and marketing

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strategies to enhance competitiveness and move towards sustainable development. In that process, the business leadership team plays an extremely important role, deciding and leading the business to successfully transform digitally. However, the digital transformation process is still slow and has not brought high efficiency. Up to about 60% of businesses are facing barriers in technology, capital, and human resources for digital transformation. This study focuses on analyzing the impact of digital leadership on sustainable development through organizational learning with empirical evidence from a survey sample of 376 SMEs in Thanh Hoa province by data analysis using partial structure model (PLS - SEM). From the research results, the author will propose some recommendations for leaders of Thanh Hoa SMEs to stimulate organizational learning and promote sustainable development for the organization in the context of digital transformation.

2. LITERATURE REVIEW AND HYPOTHESIS

2.1. Relationship between Digital Leadership and Sustainable Performance

Mihardjo et al. (2019) defined digital leadership as combining a transformational leadership style and utilizing digital technology. In the contemporary era, organizations prioritize staffing employees with digital competencies, developing their internal information technologies infrastructure, and building organizational learning and supportive abilities to foster innovation and ensure enduring operational efficacy. For this, digital leadership facilitates the enhancement of sustainable performance. As Borah et al. (2022) suggested, he restrains the relationship between social platform usage and sustainable performance, specifically in the context of SMEs' sustainable performance. The capability dynamic theory and the based resource view are two significant philosophies that clarify the relationship between resources and their performance.

According to the Resource-Based View principles, organizational resources with value, non-substitutability, rareness, and inimitability contribute to achieving sustainable performance. Moreover, the resource-based view has been broadly employed in the prior data systems to clarify that digital technology competencies can be leveraged to augment organizational skills and enhance supply chain performance (Saddique et al., 2023). Another study suggested that digital leadership seems vital in transforming the digital workplace (Chatterjee et al., 2023). Moreover, another study suggests a positive association between digital leaders and the performance of organizations (Shin et al., 2023). Based on the above findings and our knowledge, there is still a research gap and a scope to find the relationship between digital and sustainable performance in Vietnam. Therefore, for this study, the following hypothesis was proposed:

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H1. There is a positive relationship between digital leadership and sustainable performance in Thanh Hoa SMEs.

2.2. The Effect of Digital Leadership on Organizational Learning

Organizational learning refers to the way companies create, support and organize experience and processes around their activities and cultures. For this reason, the adaptation of information technologies to the business for the recording, sharing and processing of information contributes to the formation of learning organizations (Qi and Chau, 2018). According to Ege et al. (2017), leaders can assess how technology affects learning organizations, raises their awareness, and better directs the structuring of learning approaches and processes in international corporations. Therefore, only existing skills or capabilities are unreliable for managing a dynamic digital environment. Therefore, digital leaders must focus on organizational learning to prepare for upcoming challenges. A comprehensive study of Taiwan's high-tech industry found that leadership affects organizational learning. Similarly, it was found that transformational leadership impacts organizational learning (Imran et al.,2016). Regarding upcoming challenges and adopting digital transformation, digital leaders are playing a pivotal role in improving organizational learning capabilities. Thus, organizational learning can support improving digital leadership skills. Still, digital leaders' IT capabilities are skills that did not obtain researchers' attention. Based on the above discussions and findings, this study proposed the following hypotheses:

H2. There is a positive relationship between digital leadership and organizational learning.

2.3. The effect of organizational learning on sustainable performance

Many research studies mentioned that organizational learning and innovation boost organizational performance. Hsiao & Chang (2011) found that organizational learning positively influences innovation. In general, organizational learning leads to organizational performance, and it was found that organizational learning positively influences technology and manufacturing firms' performances (Inkpen & Crossan, 1995). However, Gomes & Wojahn (2017) study on SMEs found that organizational learning capability is not associated with organizational performance but influences organizational innovation. Apart from this, a study by García-Morales et al. (2012) found that organizational learning, directly and indirectly with innovation, positively affects organizational performance.

Goh & Richards (1997) mentioned that organizational learning capability refers to the organization's tangible and intangible resources and competencies that support an organization's competitive advantage and enable the organizational learning process. Hence, organizational learning's capability serves as a facilitator for organizational learning. Therefore, the digital age

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organizational learning capacity is related to gathering, disseminating, and using IT-related information management to improve performance and sustainability. As we see, much research is related to organizational learning, innovation, and organizational performance. Therefore, this study supposed the following hypotheses:

H3. There is a positive relationship between organizational learning and sustainable performance.

2.4. The Mediating Role of Organizational Learning

Kordab et al. (2020) stated that organizational learning significantly and positively affects sustainable organizational performance through audit and consulting companies. Moreover, Akgün et al. (2014) found that organizational learning partially mediates the relationship between customer relationship management and firm performance. Therefore, it can be said that organizational learning influences organizational systems and culture, indirectly supporting organizational sustainability. More so, Hutomo et al. (2016) examined the mediating effect of organizational learning on the relationship between green distribution and green packaging and sustainability performance through Indonesia and Malaysia's fishery industries. They stated that organizational learning significantly and positively mediates these relationships. Furthermore, Aboramadan et al. (2021) determined the role of organizational learning in the relationship between inclusive leadership and extra-role behaviors in higher education. They concluded that organizational learning positively mediates this relationship. Based on previous studies, organizational learning mediates between leadership and organizational performance or innovation. However, no study is yet to find the mediating role of organizational learning on the relationship between digital leadership and sustainable performance**.** Therefore, the author proposes the following hypothesis:

H4. Organizational learning positively mediates the relationship between digital leadership and sustainable performance.

2.5. Proposed research model

Based on an extensive literature, the author proposes a research model at examining the impact of digital leadership on sustainable performance through organizational learning in SMEs in Thanh Hoa province as follows

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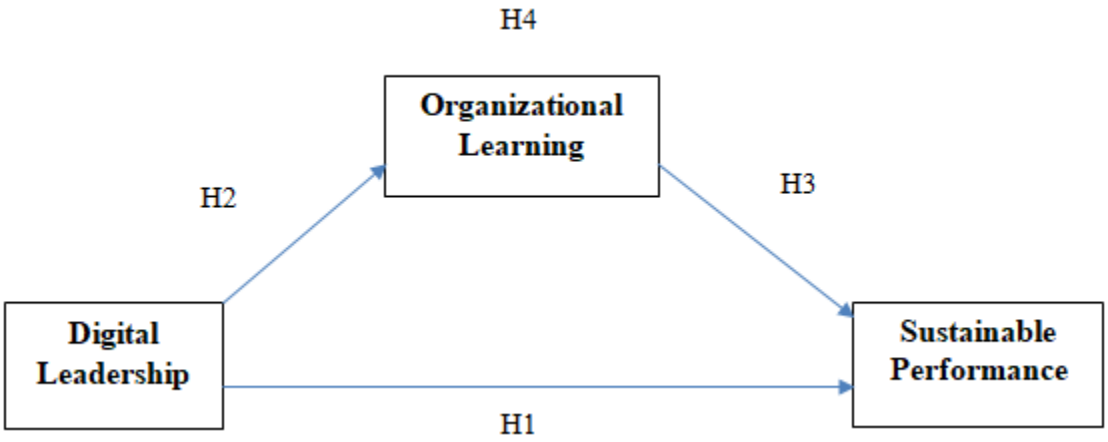
Figure 1: Research model on the impact of digital leadership on sustainable performance through organizational learning



3. RESEARCH METHODOLOGY AND MEASUREMENT SCALES

To thoroughly address the research objectives, this study adopts a mixed-method approach, integrating both qualitative and quantitative methods for a comprehensive analysis. The study began with a qualitative phase, where in-depth interviews were conducted with 4 experts in the field of digital transformation consulting and sustainable development and focus group discussions with 5 managers of SMEs in Thanh Hoa province to explore and adjust scales of the factors in the model accordingly. The quantitative phase utilizes a survey methodology, distributing questionnaires directly or via email to collect primary data from SMEs. Key members of these enterprises are targeted as respondents to ensure the information gathered is both relevant and accurate for analysis. The data was then synthesized and analyzed to examine the impact of digital leadership on sustainable performance through organizational learning.

In this study, primary data were collected from managers of SMEs in Thanh Hoa province, using a convenience sampling method. Out of 400 questionnaires distributed, 376 valid responses were retained after screening. The collected survey data were processed and analyzed using SMARTPLS 3.0 software. The analysis included several steps: testing the reliability of the measurement scales using Cronbach's alpha and composite reliability coefficients; assessing convergent and discriminant validity through AVE and HTMT values; checking for collinearity of observed variables via outer VIF/inner VIF coefficients; and evaluating the structural model using PLS-SEM to test the research hypotheses.

Based on prior research and qualitative findings, this study compiled measurement scales for three factors within the model, as shown in Table 1. Observed variables were rated on a 5-point

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Likert scale, with responses ranging from strongly disagree (1-point) to strongly agree (5-points). This structured methodology provides a strong foundation for testing and validating the proposed model and hypotheses.

Table 1. Definition of latent variables

Item	Definition	Source
DL	**Digital Leadership**	
DL1	Leader raises the awareness of the employees about the risks/ benefits of information technologies and sustainable performance	Mollah et al. (2023)
DL2	Leader raises awareness of the technologies that can be used to improve sustainable organizational performance.	
DL3	Leaders share his/her own experiences about technological possibilities that will increase the contribution of their employees to the learning of organizational structure	
DL4	Leaders always attach importance to research and development activities related to digital technology and sustainable development.	Based on expert's suggestion
DL5	Leaders always focus on digital technology training activities for employees.	
DL6	Leaders are always at the forefront of the organization's digital transformation process.	
OL	**Organizational Learning**	
OL1	Our organization encourages employees to attend training sessions to acquire new knowledge	Mollah et al. (2023)
OL2	Our organization considers employees learning as an investment in knowledge creation	
OL3	Our organization encourages employees to store the learning they earn	
OL4	Our organization encourages employees to continue their education, which will be a benefit to the organization	
OL5	Our organization has broad training processes where employees can share knowledge	
SP	**Sustainable Performance**	
SP1	Businesses have the ability to grow revenue in both the short and long term	Based on expert's

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SP2	Businesses are profitable in the long term	suggestion
SP3	Businesses can compete sustainably in the long term	Mollah et al. (2023)
SP4	Businesses can adapt well to changes in the digital economy	Based on expert's suggestion

Source: Compiled from the author

3. RESULTS

3.1. Evaluation of the measurement model

Reliability of measurement scales

To assess the reliability of the measurement scales, Cronbach's alpha and composite reliability values were analyzed. According to Hair et al. (2017), values between 0.6 and 0.7 are considered acceptable, while values between 0.7 and 0.9 indicate satisfactory reliability. Constructs with values below 0.6 lack internal consistency reliability. Table 2 summarizes the reliability test results based on the survey data.

Table 2. Reliability and composite consistency

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
DL	0.82	0.823	0.869	0.531
OL	0.834	0.838	0.884	0.605
SP	0.922	0.923	0.945	0.81

Source: Authors' data processing results

The results show that all constructs have Cronbach's alpha and composite reliability values above 0.7, confirming the consistency and reliability of the measurement scales.

Evaluation of convergent and discriminant validity of measurement scales

To further assess validity, convergent validity was evaluated using the average variance extracted (AVE) index. Hair et al. (2017) suggested that an AVE value of ≥ 0.5 indicates that a latent variable explains at least 50% of the variance in each observed indicator, confirming convergent validity. Table 2 shows that all constructs have AVE values above 0.5, thereby affirming the convergent validity needed for further analysis.

Discriminant validity was evaluated using the heterotrait-monotrait ratio (HTMT). A high HTMT value suggests potential issues with discriminant validity, which is essential for ensuring that constructs are distinct from one another. Following the guidelines of Henseler et al. (2015),

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an HTMT value below the threshold of 0.90 confirms discriminant validity. The analysis results presented in Table 3 show all HTMT values are below 0.9, thus supporting the discriminant validity of the measurement scales used in this study.

Table 3. Discriminant Validity - Heterotrait - monotrait ratio (HTMT)

	DL	OL	SP
DL			
OL	0.663		
SP	0.594	0.72	1

Source: Authors' data processing results

3.2. Evaluation of the structure model

Multicollinearity check of independent variables (Inner VIF)

Before analyzing the structural model, it is essential to assess multicollinearity among the independent variables using Variance Inflation Factor (VIF) values. A VIF value greater than 5 indicates potential multicollinearity, which could compromise the model's reliability for hypothesis testing, while values between 3.3 and 5 suggest a moderate multicollinearity risk (Hair et al., 2022). In this study, all VIF values were below 3, indicating that multicollinearity is not an issue among the variables in the structural model.

Evaluation of independent variables' explanatory power on dependent variables

The explanatory power of the independent variables on the dependent variables was assessed. As shown in Table 4, the R^2 value for the organizational learning (OL) variable is 0.338, indicating that the factors within the model explain 33.8% of the variance in digital leadership, while the remaining 66.2% can be attributed to systematic error and external factors. Similarly, the R^2 value for the sustainable performance (SP) variable is 0.449, meaning that the model's factors account for 44.9% of the variance in organizational learning and digital leadership, with the remaining 55.1% resulting from systematic error and influences outside the model.

Table 4. R - Square overview

	R Square	R Square Adjusted
OL	0.338	0.337
SP	0.449	0.446

Source: Authors' data processing results

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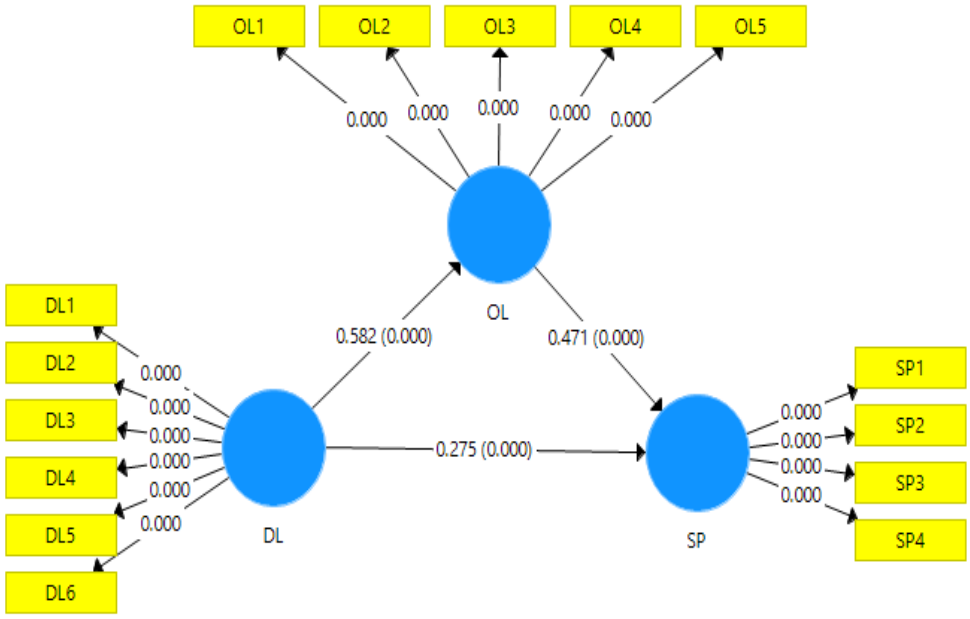
The results of model estimation

In this study, the structural model was estimated using a maximum of 5000 iterations, with a stopping criterion set at 0.00000001. The results indicate that the algorithm converged in fewer iterations than initially anticipated (Figure 2).

The empirical results, which display regression coefficients in the paths, provide valuable insights into the strength of the relationships among the variables. Notably, the strongest relationships are found between digital leadership and organizational learning. Next is the impact of organizational learning on the sustainable results of businesses. The direct impact of digital leadership on sustainable development is minimal.

Figure 2. Model estimation results



Following this, digital leadership significantly impacts organizational learning, with a coefficient of 0.582, contributing 58.2% to the total variance. Similarly, organizational learning affects sustainable performance with a coefficient of 0.471, explaining 47.1% of the total variance. In addition, digital leadership also influences sustainable performance, showing a coefficient of 0.275, which accounts for 27.5% of the total variance.

3.3. Hypothesis testing results

The results of hypothesis testing for the model are summarized in Table 5. After conducting the PLS-SEM model analysis, all 4 hypotheses were accepted, with statistical tests achieving a 95%

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confidence level. The results of testing the hypotheses show that digital leadership directly has a positive impact on the sustainable development results of SMEs in Thanh Hoa province at the lowest level, so the H1 hypothesis has been accepted. The results also show that digital leadership has the most positive and strongest impact on organizational learning, proving the correctness of the H2 hypothesis. In addition, organizational learning also has a positive impact on the sustainable development results of businesses.

Table 5. Research hypothesis testing results

Hypothesis		Beta (β)	t-value	p-value	Result
Direct effects					
H1	DL - >SP	0.275	5.112	0.000	Support
H2	DL - > OL	0.582	18.899	0.000	Support
H3	OL - > SP	0.471	9.072	0.002	Support
Indirect effects					
H4	DL - > OL - > SP	0.274	7.947	0.000	Support

Source: Authors' data processing results

Thus, after conducting the PLS - SEM model analysis, all hypotheses were accepted and demonstrated statistical significance at both the 5% levels. Furthermore, the research findings indicate that organizational learning acts as a moderator for relationships between digital leadership and sustainable performance. In other words, digital leadership influences sustainable performance both directly and indirectly through organizational learning.

4. DISCUSSION

Sustainable development is the effort of an entire organization to create better values for society. This effort must be initiated by the leaders. In the context of rapid digital transformation, businesses are forced to make transformation step by step, and the role of digital leadership becomes even more important. Leaders in SMEs will implement transformation strategies towards sustainable development, including organizational learning. The findings in this study provide evidence that there is a link between digital leadership and sustainable performance of businesses, especially SMEs. The research results explain that leaders raise the awareness of the employees about the risks/ benefits of information technologies and sustainable performance as well as raise awareness of the technologies that can be used to improve sustainable organizational performance will directly and indirectly promote sustainable development of the business. This result is also similar to the conclusion pointed out in the study of Mollah et al. (2023) which confirmed that digital leadership significantly directly affected sustainable organizational performance. Another study by Saddique et al. (2023) previously also came to a

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similar conclusion about the positive relationship between digital leadership and sustainable organizational performance.

Regarding Thanh Hoa SMEs, the role of leadership in digital transformation is extremely important and indispensable on the path to successful digitalization. Digital leaders must always lead the organization and have a vision, they clearly define the goals and missions of the organization to guide the business towards sustainable development in the new context. Therefore, the capacity, vision or experience of the leadership team are the factors that promote sustainable development for the business (Le et al., 2023). Thus, when leaders always attach importance to research and development activities related to digital technology and sustainable development and focus on digital technology training activities for employees, and are always the leaders in the digital transformation process of the organization, it will lead to effective sustainable development of the organization.

However, the research results also showed that the impact of digital leadership on sustainable performance of enterprises through organizational learning is even greater than the direct relationship from digital leadership to sustainable performance. This proves the mediating role of organizational learning in the relationship between digital leadership and sustainable development in Thanh Hoa SMEs. This implies that organizational learning, such as employee training and development, knowledge creation, storage, sharing and continuous education, is essential for sustainable business performance. The research results show that digital leadership has a positive impact on organizational learning with the strongest impact, and at the same time, organizational learning also has a direct positive impact on sustainable development of enterprises. This means that, to improve business performance sustainably, leaders and managers need to pay attention to organizational learning, and to improve organizational learning, the best way is to focus on raising the awareness of business leaders and managers, which is the new point of this study. Thereby, it shows that, in addition to the relationship between digital leadership and sustainable development of Thanh Hoa SMEs, there is also a relationship between organizational learning and sustainable development of enterprises.

In the context of digital transformation, organizational learning is a source of competitive advantage; the key to the success of an organization in the future (Mollah et al., 2023). Previously, Onag et al. (2014) also demonstrated that organizational learning is a factor that positively affects the sustainable development of enterprises. This research result is very important for the development of today's knowledge-based economy; Therefore, businesses should view organizational learning as an important component of their organizational culture, influencing the practical application of knowledge management processes relevant to sustainable business performance.

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5. CONCLUSION AND RECOMMENDATIONS

In the era of digital transformation, the importance of digital leadership is undeniable for innovation and sustainable performance of organizations. This study has made theoretical contributions to leadership behavior and knowledge management. Theoretically, this study contributes to affirming the mediating role of organizational learning in the positive relationship between digital leadership and sustainable performance in SMEs. In practice, through data analysis using the PLS-SEM model with 376 respondents, the research results show that digital leadership not only directly affects the sustainable performance of enterprises but also indirectly affects sustainable performance through organizational learning. In which, the role of digital leadership on organizational learning is the strongest, followed by the impact of organizational learning on sustainable performance. Thus, through organizational learning, digital leadership has a stronger influence on the sustainable performance of SMEs in Thanh Hoa province.

The research results emphasize the importance of digital leadership and organizational learning in sustainable business development. The author propose some recommendations for leaders of SMEs in Thanh Hoa province as follows:

Firstly, leaders need to understand the nature of sustainable development and business goals: a leader must first have knowledge of sustainable development, then review the value system of not only the business, but also the individual to reach the most common goal. Business leaders need to actively study and research to develop their capacity and skills in digital technology as well as strategic thinking skills to become excellent leaders in all business activities. Secondly, leaders need to lead their teams according to sustainable development goals: instead of providing solutions, they need to create opportunities for employees to give their answers. Because employees will be the ones to implement these goals, they will be the ones with the most practical and closest solutions. Leaders must know how to manage resources, have a vision and focus on long-term goals. Thirdly, leaders need to be pioneers and create learning movements in the organization because learning culture is a particularly important factor for sustainable business success because it positively impacts strategy, innovation, employee engagement and many other factors of an organization. Organizational learning creates an environment for employees to continuously improve their working skills, share knowledge and improve themselves. In today's ever-changing world, leaders who make continuous learning a priority in their business are not only smart but also necessary to create a competitive advantage for the business, helping the business overcome difficulties in the digital transformation process, towards sustainable development in the long term. Finally, leaders in SMEs should connect and seek community and support: to achieve the three ultimate goals of sustainable development: economic efficiency, social cohesion and environmental responsibility, leaders need to know how to connect with stakeholders who can support and advocate for the business in this strategy.

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Understanding stakeholders is also a way for leaders to build a plan and create values to share with the community.

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