

ENHANCING EMPLOYEE DIGITAL SKILLS IN SMEs FOR SUSTAINABLE GROWTH IN THE DIGITAL TRANSFORMATION ERA: A GOVERNANCE OUTLOOK

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Abstract

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In the rapidly evolving Industrial Revolution 4.0, digital skills are a core factor enabling enterprises to maintain and grow in the global market. They improve production and business efficiency, enhance labor productivity, and strengthen competitiveness. However, the lack of digital skills among employees in Vietnam's enterprises reduces competitiveness, hampers productivity, and hinders sustainable economic development. This study aims to identify and analyze key challenges faced by employees in small and medium-sized enterprises (SMEs) during the national digital transformation toward a digital economy and society. Using a mixed-methods approach, combining surveys and in-depth interviews with 306 SMEs in major cities, the study reveals four main barriers to developing employees' digital skills: 1) financial constraints; 2) difficulty in allocating time for training; 3) limited access to training resources; and 4) insufficient government support. Based on these findings, recommendations are proposed to help SMEs overcome these barriers, build a digitally skilled workforce, and enhance competitiveness in the digital era.

Keywords: Digital Skills, Digital Transformation, Employee Upskilling, SMEs, Vietnamese Enterprises

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1. INTRODUCTION

In the context of the strong development of the Industrial Revolution 4.0, the digital skills of employees have become one of the core factors helping enterprises maintain and grow. Digital skills not only help improve the efficiency of production and business activities but also play an important role in enhancing labor productivity and

the competitiveness of enterprises (Dam, 2024). This is especially crucial for small and medium-sized enterprises (SMEs), as they face increasing demands for the application of digital technologies across all fields (Omran et al., 2024).

Currently, SMEs in Vietnam play a vital role in the economy, accounting for the majority of enterprises nationwide and creating millions of jobs. According to statistics from the General Statistics

Office of Vietnam (GSO, 2024), SMEs make up more than 97% of the total number of enterprises and contribute about 45% of the national gross domestic product (GDP). SMEs not only contribute substantially to GDP but are also a major source of employment, creating approximately nine million jobs for the Vietnamese economy (Pham, 2025). However, SMEs in Vietnam often face many challenges in their development process, particularly the lack of digital skills among employees. In the context of rapid digital transformation, this lack of digital skills not only reduces the competitiveness of Vietnamese enterprises but also impacts labor productivity and the sustainable development of the entire economy (Pham, 2023).

This study will employ a survey method using a questionnaire designed to collect information from SMEs in Vietnam. The data collection period will be 2024, and the data collection channels will include the online platform Google Forms, combined with direct interviews to approach the research subjects. The objective of the study is to identify and analyze the main challenges that employees in SMEs in Vietnam face amid the national digital transformation aimed at developing a digital economy and society. Based on this, the study will provide recommendations to help SMEs in Vietnam overcome bottlenecks in developing quality human resources (HR), contributing to the enhancement of digital skills for the workforce, and promoting sustainable development for enterprises.

The paper is organized as follows. Section 1 introduces the research context and sets the stage for the study. Section 2 reviews the relevant literature. Section 3 describes the materials and methods. Section 4 provides an in-depth discussion of the results. Finally, Section 5 summarizes the key conclusions and offers recommendations for SMEs on developing a digital workforce.

2. LITERATURE REVIEW

In the context of the Industrial Revolution 4.0, developing digital skills has become an urgent requirement for the survival and growth of businesses worldwide, in response to the demands of the digital workplace (Weritz, 2022). Digital skills encompass not only proficiency in technological tools, such as data management, data analysis, and web development, but also critical thinking, complex problem-solving, continuous learning in digital environments, and digital responsibility (Marlapudi & Lenka, 2024).

Recent studies emphasize that investing in digital skills development not only enhances individual productivity but also plays a crucial role in fostering innovation, improving competitiveness, and enabling businesses to adapt to market volatility (Hakim et al., 2022; Joensuu-Salo & Matalamäki, 2023). Understanding current trends, challenges, and effective strategies for digital skill development is, therefore, essential, particularly when informed by reputable academic research.

According to Rogacka (2022), differing perceptions of what constitutes digital skills present a major challenge in building a digitally competent workforce. A workforce equipped with comprehensive digital capabilities can effectively leverage emerging technologies to optimize operations, enhance

customer experiences, and develop innovative business models. However, the lack of digitally skilled workers remains a critical constraint for many businesses today (Lebedeva, 2019). This shortage is especially pronounced among older and low-income employees, contributing to a significant digital divide. To address this gap, Lebedeva (2019) advocated for retraining and upskilling programs, including collaborations between businesses and educational institutions.

Digital skills are also considered a foundational element for fostering an innovative culture within organizations, encouraging employees to proactively explore, experiment with, and apply technological solutions to their work (Kavanaugh, 2020). The benefits extend beyond the organizational level, positively impacting individual employees by enhancing their self-worth, expanding career opportunities, and increasing their commitment to the organization (Setiawan et al., 2025).

To address the diverse demands of digital skill development, businesses are increasingly adopting flexible and creative training strategies. Research by Silva and Souza (2016) highlighted the effectiveness of blended learning programs, which combine online platforms (e-learning, massive open online courses [MOOCs]) with direct engagement methods (workshops, coaching), in attracting learners and enhancing knowledge acquisition. Additionally, personalized learning pathways — based on assessments of individual competencies and career goals — are emerging as a key trend (Naseer et al., 2024). Project-based learning and on-the-job training are also widely prioritized, as they promote practical application and enable employees to immediately apply new skills to real business challenges (Szanter & Matuska, 2024).

Despite its importance, businesses face numerous challenges in implementing digital skills development programs. One of the primary barriers is the rapid pace of technological change, which demands constant updates to training content, placing significant pressure on time and resources (Ollerenshaw et al., 2021). Another major challenge, as noted by Weritz (2022) and Rajahonka et al. (2023), is the high cost of digital skills training, particularly for SMEs. Such training requires substantial financial investment and considerable time for employees to adapt to new technologies.

Moreover, evaluating the effectiveness and real impact of digital training programs on job performance and business outcomes remains difficult, leading to hesitation among firms to invest heavily in these initiatives (Staboulis & Lazaridou, 2020). The shortage of qualified internal trainers with strong communication skills, along with employee resistance to change, also presents significant obstacles (Tu et al., 2025).

On the other hand, technological advancements offer powerful tools to support digital skills development. Learning Experience Platforms (LXPs) are becoming increasingly popular, providing flexible, personalized learning environments that allow employees to explore and access a wide range of resources at their own pace (Kaklij et al., 2019). Artificial intelligence (AI) and machine learning are also being leveraged to assess learning needs, recommend relevant content, automate evaluations, and deliver real-time feedback (Jaiswal et al., 2023);

Bodea et al., 2024). Additionally, technologies such as virtual reality (VR) and augmented reality (AR) offer immersive and interactive learning experiences, which are particularly effective for practicing complex skills in safe, controlled environments (Lancellotta et al., 2025).

In Vietnam, although economic and technology development policies are increasingly emphasized, the shortage of digital skills in the workforce, especially in SMEs, remains a significant issue. According to PricewaterhouseCoopers (PwC) Vietnam's Report (2021), about 45% of survey participants in Vietnam expressed concerns about job loss due to automation, while a large proportion (90%) believes that technology will improve career opportunities in the future. At the same time, 93% of employees are actively trying to learn and acquire new skills, particularly those related to digital technology, such as cloud computing, cybersecurity, and Big Data analytics. This shows that Vietnamese employees have a positive perception of the importance of digital skills in the context of a digital future.

The Ministry of Information and Communications' (2023) report pointed out that the shortage of digital skills in the workforce in Vietnam is largely due to training programs that do not meet the practical requirements of the labor market. Most training institutions fail to focus on practical skills and emerging technologies, resulting in employees graduating without the necessary preparation to work in a digital environment. This creates a significant gap between employers' expectations and candidates' capabilities. Thus, this report only highlights the digital skills that employees in Vietnam lack before being recruited by enterprises. In reality, due to the rapid development of technology, even though HR has been well-trained at universities, they still lack new skills after a period of working. Therefore, self-study and retraining for employees is an inevitable necessity that every business must address in order to meet increasingly high job requirements.

Other studies by Nguyen (2022), Pham (2023), and Nguyen (2024) also showed that the quality of digital HR in Vietnam has not met employers' requirements. The majority of the Vietnamese workforce possesses average skills, which will pose a barrier in the context of digital transformation in Vietnam. In the digital age, employees with average skills will struggle to master and apply new technologies to their work, leading to low work efficiency and poor competitiveness. However, these studies did not conduct specific surveys but merely cited the research results of TopDev (2023) or GSO (2023). Therefore, the solutions proposed by these authors to train digital skills for the Vietnamese workforce in enterprises remain general and lack a solid foundation based on the reality of enterprises.

In summary, the above studies have provided a comprehensive view of the challenges that enterprises face in developing digital skills for their workforce. However, these studies have not addressed the current reality of which specific digital skills are lacking among employees of SMEs in Vietnam. Current work practices show that digital skills are not only the ability to use computers and information technology tools, but also the ability to use advanced technologies such as AI, Big Data

management and analysis, and cloud computing in the workplace. What should SMEs in Vietnam do to address these shortages of employees? How can the Vietnamese Government support SMEs in overcoming these challenges? Therefore, this is a gap that we will address in this study.

3. RESEARCH METHODOLOGY

3.1. The concept of digital skills

Digital skills are a broad concept that encompasses all the abilities required to use digital tools, platforms, and technologies to perform tasks and solve problems in the modern workplace. According to the Organisation for Economic Co-operation and Development (OECD, 2021), digital skills include a wide range of competencies, from basic usage of technology tools such as computers and smartphones to advanced skills like data analysis, programming, and information technology system management. These skills are essential for employees to integrate and thrive in the digital age, where digital technologies and digital transformation are gradually changing the way production and interaction occur in organizations. According to a study by Tran and Bui (2021), digital skills are divided into three main categories:

1) *Foundational digital skills*: Basic skills such as proficiency in using email, web browsers, and office applications. These skills are required in most modern office jobs.

2) *Intermediate digital skills*: The ability to use professional tools and software, manage databases, or develop software. This skill is especially needed in enterprises in the information technology, banking, and finance industries.

3) *Advanced digital skills*: More complex abilities such as programming, Big Data analysis, application of AI tools, data security, and cybersecurity. These skills are in demand in industries related to advanced technology.

In addition, another important aspect is that digital skills not only affect work productivity but are also closely related to creativity and problem-solving ability in the work environment. Digital skills enable connections, allow employees to collaborate more effectively, and help them make decisions based on data rather than intuition (Hakim et al., 2022).

Thus, digital skills include not only the ability to use basic technology tools but also require employees to possess advanced knowledge and expertise in new technologies. These skills not only improve work efficiency but also play a decisive role in maintaining and advancing careers in the digital age.

3.2. Developing digital skills for employees

Nowadays, we are living in an era of digital technology explosion, where digital HR has become an essential factor for organizations to maintain competitiveness and adapt to rapid market changes. Accenture (2024) stated that developing digital HR could create an additional USD 10.3 trillion in global economic value by 2038 if organizations implement a comprehensive and effective innovation strategy.

The OECD (2019) emphasized the need to develop digital skills for the entire workforce to promote innovation and economic growth. According to the OECD (2019), the following factors should be prioritized to develop digital skills for the workforce: continuous education and training in digital skills; cooperation between governments, businesses, and educational institutions; and ensuring that all population groups, including disadvantaged communities, have opportunities to learn and improve their digital skills.

Agreeing with the OECD's perspective but approaching the issue from a business standpoint, Bughin et al. (2018) stressed that automation and AI will transform the structure of work and require new skills from workers. To develop digital skills for employees, businesses should create continuous internal training programs and invest in online learning platforms. At the same time, businesses must cooperate with educational institutions to design training programs aligned with labor market demands.

Thite (2022) highlighted that digital HR development refers to the nature, role, and contribution of technology in talent management strategies in the digital era. It integrates social networks, mobile devices, Big Data analytics, social, mobile, analytics, and cloud computing (SMAC), and emerging technologies such as AI to effectively deliver on-demand HR services. Furthermore, digital workforce development should also address unintended negative consequences of technology, including ethical concerns, information security, and privacy issues.

In summary, digital workforce development is a comprehensive set of organized digital skills training activities conducted over a defined period to create positive changes in workers' digital capabilities. This process is not limited to teaching technical skills but also involves enhancing adaptability, creative thinking, and problem-solving abilities in a constantly changing work environment. Achieving this goal requires close cooperation between governments, businesses, and educational institutions to ensure that the workforce can meet the demands of the digital economy.

3.3. Enterprise issues in developing digital skills for employees

In the context of digital transformation and digital economic development taking place strongly on a global scale, digital skills are becoming increasingly important as enterprises transform to adapt to that trend. However, accessing and developing digital skills is still a big challenge for many enterprises in different fields. Regardless of the size of the enterprise, large or small, they are faced with improving the digital skills of employees to meet new requirements in the digital age.

According to a report by De Smet et al. (2021), 80% of global enterprises find that the digital skills that employees are trained in can become obsolete after only 3-5 years. This requires enterprises to not only focus on one-time training but also build a lifelong learning model.

Developing digital skills has become a vital strategy for enterprises if they want to maintain development and achieve long-term success.

According to Telukdarie et al. (2023), the main challenges can be divided into three groups:

- First, financial challenges: Many enterprises, especially SMEs, often face financial difficulties when they want to invest in technology and employee training. Intensive digital skills training programs often require large costs, which are beyond the capacity of many enterprises. In addition, many enterprises also lack the capital to invest in information technology infrastructure and training.

- Second, lack of time and training HR: Due to the scale and nature of operations, many enterprises face a situation where employees are multitasking. This leads to employees not having enough time to participate in digital skills training courses. In addition, business leaders often have difficulty setting up internal training programs or finding suitable external training programs.

- Third, access to technology and knowledge: For many enterprises, access to modern digital technologies such as AI, Big Data analytics, or cloud computing remains a major challenge. The main reasons are high costs and a lack of HR with expertise in these areas.

In addition, another challenge is inequality in access to technology and training. In developed countries, enterprises can easily deploy online courses and apply modern training technologies such as VR or AI to personalize the learning process. However, in developing countries, access to these technologies is limited due to high costs and a lack of appropriate infrastructure (World Economic Forum, 2024). Risks related to data security and privacy are also a major concern. As enterprises increasingly use online training platforms and digital HR management software, they also face the risk of cyberattacks or HR data leaks (PwC, 2021).

According to a study by the United Nations Trade and Development (UNCTAD, 2021), in developing economies, access to and adoption of advanced technology are limited by technical factors and a lack of government support. Digital skills are not only essential for enterprises in the technology sector, but are also key for all other industries. In the modern business environment, the ability to access information, use digital tools to optimize processes, and manage data are all core skills. This is especially important in sectors such as manufacturing, retail, finance, and services, where adopting digital skills can make a big difference in competitiveness and market expansion.

3.4. Research methods

First, the research method we used for this study involved conducting a literature review and analysis to identify important research issues and factors that may influence the digital skills of employees in enterprises. A thorough review of relevant literature not only helps identify factors that need to be surveyed but also assists in developing accurate and reliable survey questions. Based on the theoretical framework and previous research findings, we will develop a questionnaire that aligns with the set objectives. The questions have been refined to ensure data is collected in an organized and analyzable manner.

The questionnaire will include a variety of questions, including both closed and open-ended

questions. The objective of the questionnaire is to gather information from enterprises on issues such as:

- types and levels of current digital skills application;
- forms of digital skills training for employees;
- difficulties in implementing digital skills training programs;
- government support;
- the level of leadership awareness regarding the importance of improving digital skills for employees.

The questionnaire will be created using the Google Forms tool and sent online to enterprises to collect data in the most convenient and cost-effective way possible. Additionally, we will also conduct direct interviews with enterprises based on the content outlined in the questionnaire.

Thus, by building a questionnaire grounded in both theoretical and practical foundations, this research method not only helps us identify the necessary factors but also optimizes the data collection process. As a result, the accuracy of the data and the reliability of the research findings will be improved, laying a solid foundation for the development of subsequent research hypotheses.

3.5. Data collection

According to data published by the Ministry of Planning and Investment (2024), Vietnam has approximately 900,000 SMEs operating in 16 sectors: 1) manufacturing; 2) construction; 3) real estate business; 4) mining; 5) accommodation and catering services; 6) financial, banking, and insurance activities; 7) production and distribution of electricity, gas, hot water, steam, and air conditioning; 8) transportation and warehousing; 9) information and communication; 10) professional, scientific, and

technological activities; 11) education and training; 12) health and social assistance activities; 13) arts, entertainment, and recreation; 14) wholesale and retail trade, repair of automobiles, motorcycles, motorbikes, and other motor vehicles; 15) agriculture, forestry, and fisheries; 16) administrative activities and service support.

In this study, we will conduct stratified sampling to reduce the required sample size while maintaining representativeness. This method is useful when the research population has significant differences between groups and helps ensure that all important groups in the population are represented in the sample, reducing bias and improving the accuracy of the research. According to Hair et al. (1998), when choosing a sample ratio compared to an analytical variable (or a survey question) of 5:1 or preferably 10:1, it means that for each analytical variable, there should be a minimum of five observations, or ideally, a minimum of 10 observations. Therefore, with the goal of selecting a stratified sample based on the first criterion of the business sector of the SME, and the second criterion being the size of the enterprise (whether it is a medium-sized enterprise or a small enterprise), we plan to select 10 small enterprises and 10 medium-sized enterprises for each business sector. Thus, the expected number of SMEs to whom we will send the survey questionnaires is 320 enterprises. The business locations of these SMEs are concentrated in large cities such as Hanoi, Ho Chi Minh City, Da Nang, and some provinces with potential for economic development, where employees have a genuine need for training and development of digital skills.

The results we obtained from 306 enterprises ensure the diversity of industries, business sizes, and geographical areas as outlined. Specific information is described in the tables below.

Table 1. Survey sample structure by business sector

<i>Business sector</i>	<i>No. of responses</i>	<i>Percentage (%)</i>
Manufacturing	26	8.50
Construction	22	7.19
Real estate	20	6.54
Mining	16	5.23
Accommodation and food services	25	8.17
Financial, banking, and insurance activities	21	6.86
Production and distribution of electricity, gas, hot water, steam, and air conditioning	14	4.58
Transportation and warehousing	14	4.58
Information and communication	22	7.19
Professional, scientific, and technological activities	12	3.92
Education and training	16	5.23
Health and social assistance activities	23	7.52
Arts, entertainment, and recreation	20	6.54
Wholesale and retail trade, repair of automobiles, motorcycles, motorbikes, and other motor vehicles	25	8.17
Agriculture, forestry, and fisheries	14	4.58
Administrative activities and service support	16	5.23
Total	306	100%

Source: Authors' synthesis from survey data.

Table 2. Survey sample structure by region of SMEs headquarters

<i>Business sector</i>	<i>No. of responses</i>	<i>Percentage (%)</i>
Northern region	142	46.41
Central region	48	15.69
Southern region	116	37.91
Total	306	100%

Source: Authors' synthesis from survey data.

Table 3. Survey sample structure by enterprise size

<i>Business sector</i>	<i>No. of responses</i>	<i>Percentage (%)</i>
Small enterprise	151	49.35
Medium enterprise	155	50.65
Total	306	100%

Source: Authors' synthesis from survey data.

Table 4. Survey sample structure by survey method

<i>Business sector</i>	<i>No. of responses</i>	<i>Percentage (%)</i>
Online	272	88.89
Face-to-face interview	34	11.11
Total	306	100%

Source: Authors' synthesis from survey data.

4. RESULTS AND DISCUSSION

4.1. Results

The survey results show that SMEs in Vietnam require digital skills in a number of key positions. Specifically, job positions that require good digital skills are described in Table 5 below.

Table 5. Positions that require good digital skills

<i>Job position</i>	<i>No. of responses</i>	<i>Percentage (%)</i>
Marketing	274	89.54
Data analysis/business analysis	180	58.82
Network management	166	54.25
Software development	61	19.93
Digital project management	44	14.38
System security	40	13.07

Source: Authors' synthesis from survey data.

Digging deeper into the survey data, we found that one of the major problems many SMEs in Vietnam are facing is the lack of necessary digital skills among employees. Despite recognizing the importance of digital skills, enterprises are still unable to meet the demand for advanced digital skills training for employees. This reduces the efficiency and competitiveness of enterprises. Specifically, the digital skills that SMEs require from employees to meet the practical requirements of the job are described in Table 6 below.

Table 6. The digital skills gap among employees

<i>Skills</i>	<i>No. of responses</i>	<i>Percentage (%)</i>
Data analysis and processing skills	260	84.97
Proficiency in using e-commerce platforms	220	71.90
Proficient in using AI tools	171	55.88
System security skills	140	45.75
Network administration skills	139	45.42
Programming skills	50	16.34

Source: Authors' synthesis from survey data.

To compensate for the lack of digital skills among employees, SMEs in Vietnam have implemented various training programs to enhance the capacity of their employees. Table 7 below outlines the main forms of training that enterprises are implementing.

Table 7. Preferred corporate training formats for employees

<i>Training method</i>	<i>No. of responses</i>	<i>Percentage (%)</i>
Off-site training with experts	231	75.49
Online training	208	67.97
Internal training at the enterprise	202	66.01
Training cooperation with universities	50	16.34

Source: Authors' synthesis from survey data.

Regarding barriers to developing digital skills for employees at enterprises in Vietnam, the survey results are described in Table 8 below.

Table 8. Barriers to developing digital skills for employees

<i>Barriers to developing digital skills</i>	<i>No. of responses</i>	<i>Percentage (%)</i>
Financial barriers	238	77.78
Barriers to training support resources	230	75.16
Time barriers for employees	180	58.82
Lack of awareness and understanding of the importance of digital skills	48	17.65

Source: Authors' synthesis from survey data.

Through the survey data in the figure above, we see that in reality, Vietnamese enterprises have four major barriers to training and developing digital skills for employees, of which financial barriers are an important factor. However, challenges in terms of time and HR also play a big role in limiting the ability to train digital skills for employees. In addition, the lack of support from the government and training organizations also prevents many enterprises from accessing the necessary training resources to sustainably develop their high-quality HR.

4.2. Discussion

The above research results are consistent with many previous studies by Hakim et al. (2022), Pham (2023), and Nguyen (2024) on the challenges that SMEs face in developing digital skills for employees. In addition, the limitations in the digital capabilities of employees in Vietnamese SMEs are similar to the findings of Doungpitak et al. (2023) regarding the labor force in Thailand. This similarity may be attributed to the fact that both Vietnam and Thailand are developing

countries in Southeast Asia, sharing comparable economic scales and cultural characteristics.

In fact, SMEs in Vietnam are focusing on developing digital skills for employees in three main areas:

1) Marketing, especially digital marketing, is necessary for enterprises to leverage new technology in approaching and interacting with customers. This includes skills such as using market analysis tools, search engine optimization (SEO), and running online advertising campaigns.

2) Data analysis, a critical area that plays an important role in strategic decision-making and information management. Enterprises find that data analysis can help optimize business processes, improve operational efficiency, and increase profits.

3) Network management, where SMEs need to ensure safety and efficiency, especially as business data increases and cyber-attacks become more frequent.

To meet the requirements of today's digital age, employees in enterprises need to possess the necessary digital skills. However, in SMEs in Vietnam, 84.97% of surveyed enterprises are not satisfied with their staff's data analysis and processing skills. This reflects the increasing importance of data analysis in decision-making and business management. As enterprises move towards using data to optimize operations and develop business strategies, the need for HR capable of data analysis becomes urgent. This shortage can hinder the competitiveness and innovation of Vietnamese enterprises. Additionally, 71.9% of enterprises reported that their employees have not acquired the skills necessary to proficiently use e-commerce platforms. The shortage in this area indicates that many enterprises have not fully exploited the potential of the online market, which affects revenue and business development.

Regarding skills such as the use of AI tools, network security, and system administration, the proportion of SME employees who fall short is lower compared to deficiencies in data analysis or e-commerce platform proficiency. However, this gap remains significant, with approximately 56% of enterprises reporting dissatisfaction with employee performance in these areas. In the digital era, proficiency in AI tools and the ability to manage and secure network systems are essential competencies for employees across all sectors.

In terms of digital capacity training for SME employees, the majority of surveyed enterprises, over three-quarters, prefer to hire professional training organizations or send staff to external courses led by reputable experts with extensive practical experience. Although this approach is often more costly and requires careful planning to allocate personnel, it delivers practical knowledge that can be directly applied in the workplace. Moreover, learning outcomes tend to be more effective, as such training programs address operational gaps and require participants to implement solutions immediately.

In addition, about 67.97% of SMEs in Vietnam reported using online courses. The reason cited is that this method offers flexible learning capabilities, allowing employees to study at any time without disrupting their daily work. With the development of technology and online learning platforms, many

enterprises have encouraged employees to take online courses from reputable training sites. In fact, the demand for online courses to enhance the digital capacity of employees in Vietnam is growing significantly, reflecting the profound digital transformation in the economy.

To reduce costs when training digital skills for employees, about 66.01% of SMEs in the survey said they prioritize using internal training programs. Some enterprises conduct internal training, where employees with stronger digital skills train newer staff. However, this approach may be limited by a lack of exposure to the latest technologies. As a result, approximately 16.34% of SMEs express interest in partnering with universities for training. This relatively low figure may be due to the complexity and rigidity of establishing formal training agreements, or concerns that university lecturers may lack practical experience and, therefore, be unable to address business-specific challenges effectively.

Regarding barriers to the training and development of digital skills for employees in SMEs in Vietnam, the survey data also shows that finance is the biggest barrier for enterprises investing in digital skills training. With 77.78% of SMEs in Vietnam reporting financial difficulties, this emphasizes that the cost of training and implementing digital technologies is a key factor preventing enterprises in Vietnam from keeping pace with global digital transformation.

This study found that 58.82% of SMEs have difficulty arranging time for employees to participate in training, reflecting the reality that many enterprises face: limited HR for positions and heavy workloads. The study also found that quality training resources are a serious problem, with 75.16% of SMEs reporting that they lack sufficient support and resources to improve digital skills for their employees. This is especially true for enterprises in remote areas, further highlighting the lack of programs from training organizations and the insufficient support from the government in the process of developing digital skills.

Based on in-depth interviews with 34 leaders at SMEs in Vietnam, we also found that the main challenges enterprises face in developing digital skills for employees can stem from the following three primary causes.

- First, financial constraints: Enterprises often have limited financial resources for employee training and face the challenge of optimizing costs across all operations. Investing in digital skills training, especially advanced skills such as Big Data analytics, AI, and cybersecurity, requires high costs not only for training but also for deploying supporting technologies. This results in many enterprises having to delay or even abandon employee training plans.

- Second, lack of HR and time: As pointed out in the study, enterprises often do not have a large staff, which makes digital skills training difficult. Ensuring day-to-day business operations while also providing time for employees to learn and develop skills is a significant challenge. This also explains why enterprises in the service and manufacturing industries, which are labor-intensive, face more difficulty in implementing digital skills training programs.

• Third, limited access to training resources: Although the demand for digital skills training is increasing, many enterprises are unsure how to access or lack the knowledge to find suitable training programs. This is particularly true for enterprises in remote areas, where high-quality training programs are not widely available. Additionally, many enterprises have not received effective support from national digital skills training programs. Support policies and programs related to finance, training strategies, and technology infrastructure remain insufficient.

5. CONCLUSION

This study has shed light on some of the issues that SMEs in Vietnam are facing in developing digital skills for their employees. There are three main areas where employee training is needed: digital marketing, data analysis, and network management. Currently, most SMEs are well aware of the importance of digital marketing skills in approaching customers, data analysis skills in strategic decision-making, and network management skills to ensure business security. However, they are not satisfied with the skill level of their employees. This dissatisfaction is particularly high in the fields of data analysis (84.97%) and e-commerce platforms (71.9%).

While the skill shortage in AI, network management, and network security is not considered as critical, about 56% of SMEs in Vietnam still feel that these areas are underdeveloped. This skills gap hinders the digital transformation process and the competitiveness of Vietnamese enterprises in the international market.

In terms of training methods, about three-quarters of SMEs in Vietnam choose to hire professional training organizations or send employees to external courses, despite the high costs and time required. Meanwhile, a relatively large proportion of SMEs still use online courses to provide flexibility in terms of time for employees.

The final point worth noting is that the study highlighted the main challenges to developing digital capacity and digital skills for employees in SMEs in Vietnam. These challenges include: financial issues; arranging time for employees to participate in training programs to develop digital skills; access to training resources; and limited support from the government. These results reflect the difficult situation that SMEs in Vietnam are facing in the context of globalization and digital transformation. They highlight the importance of developing policies and support programs to promote the upgrading of digital skills for the workforce in Vietnam.

The biggest limitation of this study is that, due to the limited time available to conduct the survey and insufficient funding for the research, we were only able to survey 306 enterprises, focusing on SMEs in large cities such as Hanoi, Ho Chi Minh City, Da Nang, and some provinces with potential for economic development. In the future, we may expand the scope of the study to further validate the conclusions we have drawn.

Nowadays, Vietnamese enterprises in general, and SMEs in particular, still do not have a digital HR training strategy linked to the vision and long-term development goals of the enterprise, which leads to

a shortage of skills and capacity needed for the digital transformation process. The main reason is that most SMEs are currently focused on optimizing business results, rather than investing strategically in training, especially in high-tech fields such as Big Data analysis and AI.

Therefore, government agencies need to coordinate with each other to issue specific regulations on digital skills training, especially for cutting-edge technology fields such as AI, cloud computing, and Big Data. They should develop national digital skills standards, from basic to advanced, as a foundation for enterprises to build training programs tailored to their development needs.

Specifically, the Ministry of Finance should develop financial support packages, such as tax exemptions for enterprises investing in digital skills training. Introduce industry-specific funding programs for SMEs to make it easier for them to access digital skills courses at reasonable costs.

The Ministry of Education and Training should coordinate with the Ministry of Science and Technology to build a national portal providing online training courses on digital skills for enterprises, offering short-term courses from basic to advanced levels. This portal should integrate free or low-cost learning materials, as well as courses tailored to the needs of industries and enterprises. At the same time, universities and educational institutions should cooperate with enterprises to develop practical learning programs, both formal and informal training programs, and lifelong learning initiatives. Additionally, MOOCs should be developed so that enterprises and individuals can easily update new digital skills and keep up with technological changes.

For SMEs in Vietnam, each enterprise needs to specifically analyze its long-term vision and identify the necessary digital skills of employees to support business development goals. At the same time, enterprises should regularly organize internal seminars and surveys to assess employees' current capabilities and forecast future skill requirements, thereby establishing appropriate training strategies. Activities to develop digital skills for employees in SMEs in Vietnam include:

First, enterprises should invite industry experts or cooperate with external training organizations to provide practical courses for employees. Next, they should build an internal training program that covers basic skills such as conducting business on e-commerce platforms, enterprise resource planning systems, and programming, and then expand to advanced skills such as data analysis, data security, information security, and AI applications at work.

Second, enterprises need to proactively access digital skills courses through the national information portal, encouraging and facilitating employees to participate in these online courses. Business leaders should also issue policies to motivate employees to study, such as tuition subsidies, flexible working hours, or rewards upon course completion, and establish clear development paths for employees.

Third, enterprises with both financial and technological capabilities need to further promote the application of AI and automation in training to analyze learning needs and optimize learning paths

for employees. This helps personalize training programs and ensures the highest efficiency. Additionally, investing in modern learning technologies such as VR simulations can provide employees with a more intuitive and realistic training experience.

Finally, enterprises should participate in international forums on digital skills to stay abreast of new technology trends and apply advanced techniques to corporate training programs.

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