



Digital Technology Readiness: The Moderating Role of Employees' Innovativeness in the Technology Acceptance Model

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Abstract

Abstract

This study aims at employing TAM model to assess the moderating role of employee innovativeness on employee digital transformation readiness. This is a widely recognized yet little-researched topic in the range of digital transformation. This analysis is situated in the context of small and medium-sized enterprises (SMEs) in Vietnam, where the enterprise cohort's overall readiness for digital transformation is comparatively inadequate when compared to numerous countries in the region and worldwide. Hence, it is anticipated that the findings of this research would offer a practical basis for improving the digital transformation of SMEs in Vietnam.

Research purpose:

The objective of this article is to examine the moderating role of employee innovativeness on employee digital transformation readiness on the theoretical basis of technology acceptance model. Some implications for the enterprises are suggested from the research results.

Research motivation:

Employees' preparedness in the digital realm is a crucial factor that determines the success of an organization's digital transformation. However, while numerous studies have been conducted on the technological aspects of digitalisation, there is a noticeable dearth of research that delves into the human dimensions, particularly the readiness of employees for such transformative processes.

Research design, approach, and method:

Data were collected from a survey of 277 employees who worked for small and medium-sized enterprises in Vietnam. Partial least squares structural equation modeling (PLS-SEM) was employed to achieve the research's objective. Analyzed variables include perceived ease of use, perceived usefulness, intentional digital readiness and employee innovativeness.

Main findings:

The findings of the research indicate show that both perceived ease of use and perceived usefulness have impact on intentional digital transformation readiness. Perceived ease of use also exhibits an positive impact on intentional digital transformation readiness. Regarding the moderating role of employee innovativeness, the three proposed hypothesis are supported, in which two hypotheses with positive impact and one with negative impact.

Practical/managerial implications:

Enterprises must fully comprehend the significance of incentivizing employees to be prepared for digital transformation, while simultaneously fostering employees' learning spirit and creativity.

Keywords: knowledge management, systematic research review

Keywords: Digital transformation, Employee, Moderating, Readiness, SMEs

1. INTRODUCTION

Digital transformation has emerged as a critical means for enterprises to achieve high-quality development (Wang & Esperança, 2023), especially for SMEs. It can be seen that digital transformation is an opportunity for small and medium-sized enterprises to leapfrog and shorten the gap with larger ones. The process of digital transformation offers small and medium-sized enterprises a powerful method to explore and create novel products and services, as well as identify more efficient approaches to conducting business (Thuy et al, 2023).

Enterprises implementing digital transformation need to rely on many resources to succeed, including human factors, especially employees, who will realize the business's digital transformation goals. Adequately prepared employee ensures a smooth transition and minimize disruptions since digital transformation is a complex process, requiring alignment between the existing enterprise human resource and the new digital initiatives. The more employees are ready for digital transformation, the more opportunities enterprises have for success, thereby bringing benefits to enterprises and employees themselves. Enterprises can optimize resource allocation if they know the readiness levels of different groups of employees to target investments in training and support directly towards areas where they are most needed, maximizing the impact of resources. Therefore, understanding employees readiness in general and of different groups of employees in particular has a crucial role for the enterprise' successful digital transformation.

In the context of organizational change and technology adoption, innovativeness represents as one of the most meaningful criteria to identify potential contribution of various groups of employees to digital transformation. Commonly and widely proved by many studies, employees who possess a higher degree of innovativeness may be more open to change and more willing to experiment with new technologies, have a proactive approach to problem-solving and may be more adaptable to new tools and processes. They are more comfortable with continuous learning and adapting to new technologies, since then to embrace digital transformation more readily.

Researchers have explored employees' innovativeness from various perspectives and approaches. Some studies Much focused on investigating innovativeness along with other individual's personalities as the determinants of technology acceptance (Hoyng and Lau, 2023). However, little effort has so far been made to combine personality-based features as moderator. This paper tries to fill the research gap by examining the moderating effect of employee innovativeness in TAM model based on data collected at small and medium sized enterprise in Vietnam. The country is striving to become a digitally prosperous country by 2030, taking human and business factors as the core, subjects, goals, motivation and resources for digital transformation, and emphasizing the importance of ensuring equal opportunities for all in digital transformation. Thus, it is anticipated that the findings of this research would offer a practical basis for ensuring a smooth and successful transition, optimizing resource allocation, and ultimately maximizing the benefits of digital initiatives for both employees and the Vietnam's SMEs.

2. THEORETICAL BACKGROUND AND HYPOTHESIS

Several models have been created to examine and comprehend the elements that influence the adoption of technology in businesses. Several models were conducted at the person level, while others were conducted at the organizational level. The Technology Acceptance Model (TAM), established by Davis (1989), is commonly employed to ensure strong validity in research. The Theory of Planned Behavior (TAM) is a modified version of the Theory of Reasoned Action (TRA) originally proposed by Fishbein. Researchers and scholars have extensively employed the Technology Acceptance Model (TAM) to investigate the factors that affect individuals' acceptance or intention to continue using new technologies. This has been done in several studies conducted by Abdullah and Ward (2016), Al-Fraihat et al. (2020), and Jeong, Yoo, and Heo (2009). The Technology Acceptance Model (TAM) posits that the perceived ease of use (PEOU) and perceived usefulness (PU) are the primary factors that influence an individual's intention to utilize a technology. Gangwar et al. (2013) determined that the TAM model has significant implications for the adoption of technology from both a theoretical and conceptual standpoint. The current research mostly centers around the Technology Acceptance Model (TAM) due to two primary factors: (i) This study focuses on the relationship between the usefulness, ease of use, and usage of technologies, which are three important concepts of interest. (ii) The Technology Acceptance Model (TAM) is highly regarded for its theoretical resilience and predictive power, making it applicable in various situations. TAM is easy to understand

and has consistently shown a high level of predictiveness in different contexts. This study focuses on a broad range of small and medium-sized firms, rather than a specialized subset.

a. Perceived Usefulness

"Perceived usefulness" is a concept commonly used in the field of technology adoption and user experience to assess the extent to which individuals believe that a particular technology or system would enhance their performance or make their tasks easier. Perceived usefulness (PU) is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis 1989). Perceived usefulness can be inferred as an individual's conviction in decision-making, as per Jogiyanto's definition (2007). Perceived usefulness has a significant role in user acceptability, adoption, and user habits within the TAM model. Perceived utility dimensions have the potential to influence behavioral intention in the realm of digital technology fields. Therefore, individuals who perceive a particular technology as easy to use and helpful in improving their performance will most likely develop positive readiness toward that technology and then use it. Understanding and enhancing perceived usefulness is vital for technology designers and developers. Positive perceptions can lead to greater user acceptance and adoption, while negative perceptions may result in resistance or rejection of the technology. As such, usability studies, user feedback, and continuous improvement efforts are often employed to optimize perceived usefulness in the design and implementation of technologies.

H1. Perceived usefulness has a positive impact on employees' digital technology readiness

b. Perceived Ease of Use

Perceived ease of use in TAM pertains to an individual's belief regarding the absence of exertion when utilizing a specific technology. PEOU refers to an individual's perception of the ease with which a specific system can be used, without requiring much effort (Davis et al., 1989). Put simply, it evaluates the user's subjective evaluation of the ease or difficulty of using a particular technology.

Perceived ease of use has been shown to influence behavioral intention in two ways: directly affecting technology acceptance and indirectly affecting it through perceived usefulness. Assuming all other factors are the same, a technological application that is seen as more user-friendly than another has a higher likelihood of being adopted. The perception of ease of use can have a substantial impact on the likelihood of user acceptance, potentially serving as a catalyst for increased acceptance. The level of usability of a system directly impacts the level of effort required to do activities, which in turn affects the user's intention to use the system. The indirect impact is evident in the user-friendliness of the used technology (Davis et al., 1989). Reducing the amount of effort required to perform tasks allows for the allocation of additional cognitive resources to other activities. In this scenario, the extra cognitive resources are utilized to meet performance goals by increasing attentiveness when utilizing the device. This link thus exerts an indirect impact on behavioral intention. Several factors contribute to the perceived ease of use, including usability, learnability, ease of understanding and consistency.

Therefore, the hypotheses are as follows:

H2. Perceived ease of use has a positive impact on perceived usefulness

H3. Perceived ease of use has a positive impact on employees' digital technology readiness

c. The moderating role of employees' innovativeness.

Agarwal and Prasad (1998a) defined personal innovativeness in the field of information technology, based on Rogers' theory of the spread of innovations, as an individual's desire to experiment with any new IT. The authors initially suggested personal innovativeness as a moderating factor in the factors that influence the adoption of innovation, as it is possible to measure end-user opinions prior to adoption. Personal innovativeness in IT has a significant impact on IT situation-specific individual differences, such as computer self-efficacy and computer anxiety, which ultimately influence the adoption of innovation (Thatcher & Perrewe, 2002). Ho and Wu (2011) demonstrated that customer innovativeness has a moderate impact on the connections between perceived new production attributes and consumers' adoption intentions in their analysis of Apple's iPad adoption. Fu and Elliott (2013) demonstrated that customers' purchase intention is directly influenced by their perception of product innovativeness and product knowledge, while also mitigating the impacts of attitude and subjective norm on buy intention. The correlation between attitude and purchase intention was more pronounced for consumers who perceived the product as more creative. Aldahdouh et al. (2020) shown that personal innovativeness has a beneficial impact on forecasting the adoption of technological equipment. According to Alkawsi et al. (2021), those with a strong inclination towards personal innovation were more likely to have a greater intention to accept and adopt smart meter technology. Jeong et al. (2022) investigated the role of personal innovativeness as a moderating factor in the link between the factors that determine the adoption of wearable devices and the intention to purchase them. Hence, proactive customers who exhibit indications of innovativeness are inclined to embrace and employ innovation at an earlier stage compared to their counterparts. Engaged consumers are more inclined to demonstrate

emotions of curiosity, enjoyment, and excitement towards pertinent product categories. Furthermore, individuals with a high level of personal innovativeness are more inclined to participate in product creation and provide guidance or information regarding a relevant product, thereby exerting an influence on the purchasing behavior of other consumers. According to Khazaei & Tareq (2021), the technology acceptance TAM model (TAM) lacks any moderator variable. However, incorporating moderators into the fundamental TAM model can enhance the explanation and analysis of usage behavior towards new technology. Rogers (2003) suggests that individuals' propensity for innovation can potentially impact their intentions to engage in certain behaviors, as per the diffusion of innovation hypothesis. Personal innovativeness refers to a distinctive trait exhibited by individuals in their approach towards novel technologies or ideas (Khazaei, 2019a, b). An individual with high innovativeness exhibits a propensity to make purchasing or utilization decisions for novel technologies independent of the opinions or experiences of others. According to Alkawsu et al. (2021), personal innovativeness is believed to have a moderating effect on the relationships between elements that influence behavioral intention. The study examined the positive and significant influence of consumers' personal innovativeness on their perception of utility and simplicity of use, as well as their attitude and intention towards consuming behavior and adoption. Previous research has also demonstrated that personal innovativeness has an impact on individuals' perception of how easy a technology is to use and how valuable it is thought to be. In its capacity as a moderator, it has demonstrated its ability to moderate the links between perceived usefulness and intention, perceived simplicity of use and intention (Palash et al., 2022), as well as compatibility and intention. In summary, employee innovativeness acts as a moderator in TAM, influencing the strength and nature of the relationships between perceived usefulness, perceived ease of use, and actual system use.

H4. Employee innovativeness has a positive impact on perceived usefulness

H5. Employee innovativeness has a positive impact on employees' digital technology readiness

H6. Employee innovativeness positively moderates the relationship between perceived ease of use and perceived usefulness

H7. Employee innovativeness positively moderates the relationship between perceived ease of use and digital technology readiness

H8. Employee innovativeness positively moderates the relationship between perceived usefulness and digital technology readiness

d. Digital transformation readiness:

Digitization of employee processes and systems Readiness pertains to the state of preparedness of individuals within an organization to readily accept and actively engage in the digital transformation efforts of their workplace. Intentional digital readiness refers to the deliberate inclination of an individual to engage in a specific behavior, indicating their willingness to undertake that behavior (Miake-Lye et al., 2020). At the individual level, it is known as the extent to which individuals/employees possess the mental and behavioral readiness for organizational change (Weiner, 2009). From a digital transformation approach, readiness (digital technology readiness) refers to the individual ability/capability to adopt and benefit from technological innovation (Richey et al., 2007). This study adopts the concept of employees' intentional digital readiness developed by Hoyng and Lau (2023). It is defined as the degree to which employees are willing to put their energy and effort for digital technologies and thus determine their subsequent behavior. For a successful digital transformation, it's not only the technology and processes that need to change but also the mindset, skills, and capabilities of the workforce.

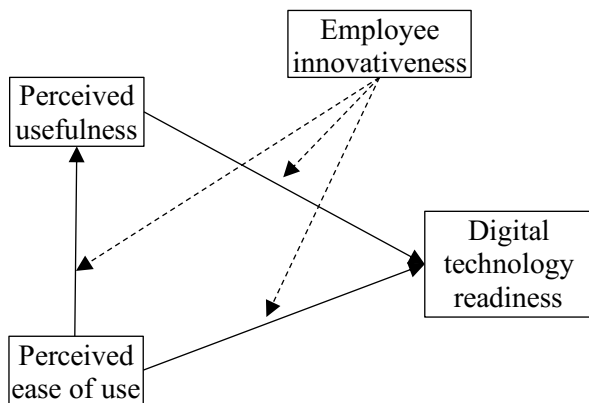


Fig.1 Research model

3. METHODOLOGY

3.1. Data collection

Data were collected by the method of submitting an online survey on Google form. Respondents were gathered from different sectors of the economy. The survey instrument comprised three sections including some question to ensure their experience with digital transformation. In order to achieve a genuine, comprehensive, and unbiased evaluation of digital transformation within the organization, only workers with a minimum of 5 years of work experience were surveyed. A pilot test was performed to authenticate the constructions and scales. Subsequently, the sample was formed by including supplementary demographic information and professional status criteria, with the aim of guaranteeing equitable representation of all potential permutations of elements. 390 copies of invalid questionnaires with missing values, wrong answers or random answers were collected, 277 valid questionnaires were collected, and the effective rate of the questionnaires was 71%. Respondents engage in various activities from different fields.

2.2 Measurement of the variables and analysis strategy

This study incorporated four latent variables including employee innovativeness, digital technology readiness, perceived ease of use and perceived usefulness. The observed variables used in the research are mostly inherited from previous studies with a certain degree of adjustment to suit the research goals and context. Perceived usefulness was measured using four items referred to the job performance improvement, productivity increase, effectiveness enhancement adapted from Venkatesh and Davis (2000); Hoyng " and Lau (2023). Perceived ease of use was also evaluated using the original four-item scale developed by Venkatesh and Davis (2000); Hoyng " and Lau (2023). This study adapted the items to the specific digital labor context by using "digital technology" in all items. Employee innovativeness was measured using four items adapted from: Agarwal and Prasad (1998); Jeong et al., (2009), in which the term "information technology" used in the original scale was replaced by "digital technology". Digital technology readiness was measured using four items adapted from: Bouckenooghe et al. (2009); Berndt et al., (2010); Issa et al., (2022). Although the three-item scale is grounded on the "intentional readiness for change" scale of Bouckenooghe et al. (2009), which was adapted to this context, one question was added when considering the case of SMEs in Vietnam which made the total number of was four.

A structural equation model incorporating a moderating variable was utilized to examine the potential associations. In order to evaluate the strength and consistency of the initial estimates and to determine the importance of the suggested indirect effects, we conducted bootstrapping with 5000 bootstrap samples and 95% bias-corrected confidence intervals (CI).

2.3. Characteristics of the Sample

The analysis results show that the number of people with 5-9 years of working experience accounted for 25.3% and the number of people working from 10 to 15 years accounted for 38.3%. The number of employees working from 16 years to 20 years and over 20 years accounted for the rest the total survey respondents, respectively. Regarding the gender of survey participants, 31.8% of participants were female and 68.2% of participants were male. Regarding age, the number of workers aged 25–35 accounted for the highest proportion with 30.7%, followed by workers aged 36–45 with 27.4%. With regard to the educational level, the respondents who have bachelor degree account for the largest part of 55.6%.

4. RESULTS

Validity and Credibility

The construct validity was assessed by confirmatory factor analysis, which demonstrated both convergent and discriminant validity. The Cronbach alpha was utilized to assess the internal consistency and dependability of the items. Table 1 provides a comprehensive overview of the measuring items, including the standardized loadings for each factor, the average variance extracted (AVE), and the reliability measurements such as Cronbach alpha (CA) and composite reliability (CR). The measurement model demonstrates satisfactory convergent validity, as indicated by Fornell and Larcker's criterion, with a composite reliability (CR) of 0.7 and an average variance extracted (AVE) value surpassing the threshold of 0.5.

Table 1: Reliability and validity

		Employee Innovativeness	Intentional Digital Readiness	Perceived Ease of Use	Perceived Usefulness	Composite Reliability (CR)	Cronbach's Alpha (CA)	rho_A
Employee Innovativeness	EI1	0.6853				0.8464	0.7271	0.7546
	EI2	0.8459						

	EI3	0.8745						
Intentional Digital Readiness	DTR1		0.8856			0.9416	0.9173	0.9179
	DTR2		0.9120					
	DTR3		0.8964					
	DTR4		0.8863					
Perceived Ease of Use	PEOU1			0.8660		0.9336	0.9050	0.9072
	PEOU2			0.9009				
	PEOU3			0.9043				
	PEOU4			0.8571				
Perceived Usefulness	PU1				0.8823	0.9111	0.8694	0.8739
	PU2				0.8525			
	PU3				0.7775			
	PU4				0.8773			

The model's discriminant validity (Table 2) is ensured when all values in a column are smaller than the value on the corresponding diagonal (Fornell & Larcker, 1981) (or all values on the corresponding diagonal). The values in the diagonal of the correlation matrix presented in Table 2 represent the square root of the Average Variance Extracted (AVE) for each construct. On the other hand, the values in the lower diagonal of the correlation matrix indicate the linear link between each pair of constructs. It is evident that all the square root AVE values are larger than the pair of correlations, indicating clear discriminant validity. The HTMT (heterotrait–monotrait) ratio criterion has become more common than the Fornell & Larcker criterion (Roemer, Schubert, & Henseler, 2021) for proving discriminant validity in structural equations. Table 4 displays the HTMT ratios. The discriminant validity is confirmed, as all HTMT ratios are below the threshold of 0.9 recommended by Henseler, Ringle, and Sarstedt (2015). Therefore, the measures of the construct are empirically discernible.

Table 2: Discriminant validity according to Fornell-Larcker

Constructs	AVE	Correlation			
		EI	DTR	PEOU	PU
Employee Innovativeness (EI)	0.6500	0.8062			
Digital Technology Readiness (DTR)	0.8013	0.5029	0.8952		
Perceived Ease of Use (PEOU)	0.7785	0.4880	0.6877	0.8823	
Perceived Usefulness (PU)	0.7198	0.5089	0.6512	0.5742	0.8484

Structural Equation Model (SEM)

The SEM analysis method by SmartPLS software was used to test the research model. The values in Figure 2 are the result of model estimation using Bootstrapping analysis in SmartPLS (Hair Jr. et al., 2016). This analysis allows to test the links in the linear structural model.

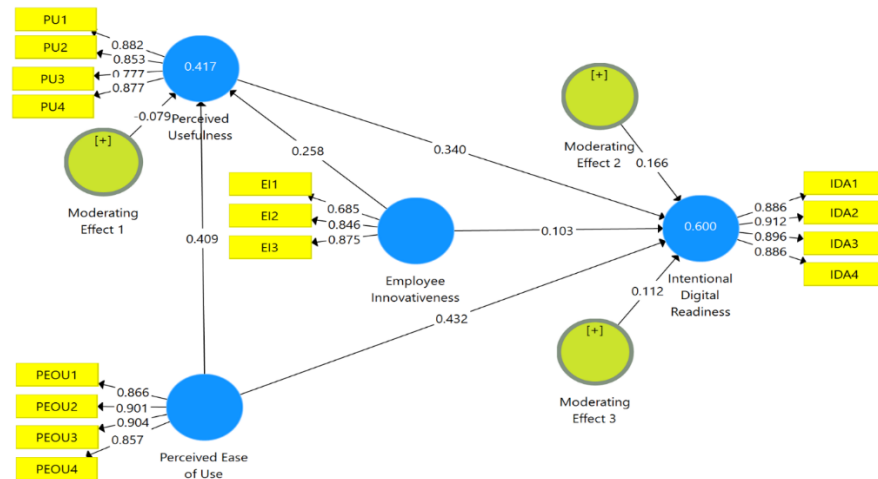


Table 3: Path coefficients

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P-Values	Conclusion
H1 Perceived Usefulness -> Digital Technology Readiness	0.3401	0.3382	0.0531	6.4072	0.0000	Supported
H2 Perceived Ease of Use -> Perceived Usefulness	0.4095	0.4041	0.0556	7.3640	0.0000	Supported
H3 Perceived Ease of Use -> Digital Technology Readiness	0.4321	0.4346	0.0516	8.3742	0.0000	Supported
H4 Employee Innovativeness -> Perceived Usefulness	0.2577	0.2576	0.0551	4.6754	0.0000	Supported
H5 Employee Innovativeness -> Digital Technology Readiness	0.1025	0.1023	0.0514	1.9955	0.0465	Supported
H6 PEOU*EI_PU -> Perceived Usefulness_ (Moderating effect 1)	-0.0793	-0.0688	0.0403	1.9658	0.0499	Supported
H7 PEOU*EI_DTR -> Digital Technology Readiness (Moderating effect 2)	0.1660	0.1635	0.0562	2.9551	0.0033	Supported
H8 PU*EI_DTR -> Digital Technology Readiness (Moderating effect 3)	0.1118	0.1077	0.0480	2.3300	0.0202	Supported

The results show that that perceived usefulness has a positive impact on employees’ digital technology readiness ($\beta = 0.3382$; $t = 6.4072$; $p < 0.05$). Therefore, hypothesis H1 is accepted.

H2 assumes that perceived ease of use has a positive impact on perceived usefulness ($\beta = 0.4041$; $t = 7.3640$; $p < 0.05$). Therefore, H2 is accepted.

H3 assumes that perceived ease of use has a positive and significant effect on employees’ intentional digital transformation readiness ($\beta = 0.4346$; $t = 8.3742$; $p < 0.05$). Therefore, H3 is accepted.

Regarding the moderating of employee innovativeness on the relationship among original variables in TAM model, research results have shown that all three hypothesis are supported. Accordingly, employee innovativeness moderates the relationship between perceived ease of use and employees’ digital technology readiness ($\beta = 0.1077$; $t = 2.3300$; $p < 0.05$). Also, employee innovativeness moderates the relationship between perceived usefulness and employees’

intentional digital readiness ($\beta = 0.1635$; $t = 2.9551$; $p < 0.05$). Noticeably, in this study, employee innovativeness negatively moderates the relationship between perceived ease of use and perceived usefulness ($\beta = 0.0688$; $t = 1.9658$; $p < 0.05$). This result to some extent both agrees and disagrees with previous ones.

5. CONCLUSION

This study seeks to estimate the moderating role of employee innovativeness on employee digital transformation readiness. The factors are determined on the theoretical basis of technology acceptance model, which ensures capturing fundamental elements of digital transformation context. The study was conducted with employees working in small and medium-sized enterprises in Vietnam. Research results show that both perceived ease of use and perceived usefulness have impact on digital technology readiness. Regarding the moderating role of employee innovativeness, the three proposed hypothesis are supported, in which two hypothesis with positive impact and one with negative impact.

From the research results, the following suggestions can help businesses motivate employees in digital transformation, including: (i) Begin by conducting a thorough assessment of the existing digital skills within the organization. Identify areas where employees may need improvement or new skills; (ii) Create a comprehensive digital transformation strategy that outlines the organization's goals, the role of technology, and the desired skill sets. Ensure alignment between business objectives and technology initiatives; (iii) Implement targeted training programs to address identified skill gaps. These programs should cover a range of digital skills, including data analysis, digital communication, project management tools, and emerging technologies relevant to the industry; (iv) Facilitate mentorship programs where employees with strong digital skills can mentor others. Encourage collaboration and knowledge sharing among teams to foster a culture of continuous learning; (v) Foster a culture that encourages a growth mindset, where employees are motivated to embrace challenges, learn from failures, and continually improve their skills. Recognize and reward efforts to acquire new digital competencies. Ensure that leadership is actively involved and supportive of digital readiness initiatives. Leaders should set an example by continually upgrading their skills and encouraging others to do the same. It's worth noting that enhancing digital technology readiness is an ongoing process, and staying abreast of technological advancements is crucial for long-term success. Regularly revisit and update the digital readiness strategy to align with the organization's evolving needs and the dynamic nature of technology.

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