

Digital leadership enhances lecturers' job performance through mediating roles of work engagement and digital competence

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Received: 29 January 2026; **Revised:** 12 May 2026; **Accepted:** 14 May 2026

ABSTRACT

This study examines the impact of digital leadership on lecturers' job performance in the context of digital transformation in higher education. The proposed model was tested using partial least squares structural equation modeling (PLS-SEM) based on data collected from 312 Vietnamese university lecturers. The results indicate that digital leadership significantly enhances lecturers' digital competence, work engagement, and job performance. Furthermore, both digital competence and work engagement have significant positive effects on job performance, confirming their mediating roles. The model demonstrates strong predictive relevance ($Q^2_{\text{predict}} = 0.404$) and moderate explanatory power for job performance ($R^2 = 0.462$). Overall, this study contributes to the understanding of digital resource mechanisms in higher education and provides practical implications for university administrators to enhance academic performance through value alignment, supportive technological environments, and effective digital leadership.

Keywords: Digital leadership, Job performance, Work engagement, Digital competence

Introduction

The rapid expansion of the Fourth Industrial Revolution (4IR) has triggered profound transformations in global socio-economic structures, with higher education being among the most significantly affected sectors [1]. In this context, digital transformation is no longer optional but has become an imperative, compelling universities to restructure their governance and operational models toward greater flexibility, innovation, and technology-driven approaches. This shift simultaneously amplifies the importance of leadership and organizational support systems in developing human resources capable of adapting to digital environments.

Among organizational factors, Digital Leadership (DL) is recognized as a critical capability for shaping strategic direction, fostering innovation, and influencing employee behavior in technology-enabled environments [2, 3]. Unlike traditional leadership, digital leadership encompasses not only the adoption of technologies but also digital vision, innovative thinking, and strategic adaptability. In parallel, Technology Support (TS) functions as a key organizational resource, including technological infrastructure, training, and technical assistance, which helps reduce technostress and enhance job performance [4].

However, recent studies suggest that technology investment alone is insufficient to improve job performance without effective transformation mechanisms at the individual level. In higher education, two critical mediating factors are Digital Competence (DC) and Work Engagement (WE). While job engagement is a good psychological state marked by vigor, dedication, and absorption, digital competence is the capacity to use technology in teaching and research in an efficient manner [5, 6]. These elements are crucial in converting organizational resources into Job Performance (JP).

Access this article online

Website: www.japer.in

E-ISSN: 2249-3379

How to cite this article: Lam LD, Long NN, Giang PX. Digital leadership enhances lecturers' job performance through mediating roles of work engagement and digital competence. *J Adv Pharm Educ Res.* 2026;16(2):145-52. <https://doi.org/10.51847/Y55M4VYZO4>

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In Vietnam, the National Digital Transformation Program toward 2025 identifies education as a priority sector for developing digital human resources [1]. Despite improvements in technological infrastructure, digital teaching and research performance remain constrained due to disparities in digital competence and limited managerial innovation [7]. This highlights the urgent need to strengthen leadership roles and optimize the utilization of technological resources in higher education institutions.

Although prior studies have confirmed the effects of digital leadership and technology support [6, 8, 9], significant gaps remain regarding the interaction mechanisms between DL and TS in shaping DC and WE, particularly in developing countries such as Vietnam [2]. Additionally, not enough research has been done on the moderating function of Person–Organization Fit (P–O Fit) [10, 11].

To bridge these identified deficiencies, this research advances a unified framework anchored in Job Demands–Resources (JD–R) theory and Social Exchange Theory (SET). Specifically, DL and TS are conceptualized as key resources that activate both capability and motivation, while SET explains the reciprocity mechanism between institutions and lecturers [12]. This research examines both primary and secondary influences, alongside the regulatory function that P–O Fit performs regarding these specific associations [11].

Theoretical background and hypotheses development

Theoretical background

This research utilizes two foundational theoretical lenses—the Job Demands–Resources (JD–R) model and Social Exchange Theory (SET)—to thoroughly interpret the motivational drivers and interpersonal dynamics surrounding digital transformation within academic settings. Per the JD–R framework, workplace attributes are divided into demands and resources, with the latter serving both to alleviate professional strain and to actively catalyze intrinsic motivation and operational output. In this study, Digital Leadership (DL) and Technology Support (TS) are conceptualized as strategic job resources that provide direction, technical support, and a conducive working environment for lecturers [4, 13].

Drawing on the JD–R framework, these resources trigger motivational mechanisms, subsequently boosting Work Engagement (WE) and promoting the growth of Digital Competence (DC), helping educators proficiently manage escalating requirements within digital workspaces. These constructs act as mediators in transforming resources into Job Performance (JP).

Complementing JD–R, SET explains relationships based on the principle of reciprocity between organizations and individuals. Academic staff demonstrate increased dedication and enhanced professional output when they acknowledge the backing of digital management initiatives and available technical infrastructure [14,

15]. Moreover, DL and TS function as signals of organizational support, reinforcing trust and commitment [16, 17].

The integration of JD–R and SET thus provide a comprehensive analytical framework that captures both intrinsic motivational pathways and social exchange mechanisms, explaining the roles of DL, TS, DC, WE, and JP in the digital transformation of higher education.

Research concepts

To maintain rigorous theoretical alignment and robust measurement precision, this research incorporates and synthesizes primary variables relevant to digital evolution in academic settings, specifically Digital Leadership, Technology Support, Digital Competence, Work Engagement, Job Performance, and Person–Organization Fit.

First, Digital Leadership (DL) is defined as the capability of leaders to formulate technology-driven strategies while fostering innovation and cultivating a learning-oriented culture in digital environments [10]. This concept extends beyond technical proficiency to encompass strategic vision and adaptability in digital contexts. Second, Technology Support (TS) reflects the extent to which organizations provide resources such as infrastructure, software, training, and technical assistance to facilitate the effective use of technology at work [7]. It represents a critical organizational resource that reduces technological barriers. Third, Digital Competence (DC) denotes the systematic amalgamation of knowledge, skills, and dispositions essential for effective, responsible technology use [5]. In higher education, DC comprises the critical capacity to create digital materials and innovate instructional strategies. Fourth, Work Engagement (WE) is described as a deeply psychological state marked by vigor, dedication, and absorption [18], indicating emotional and cognitive commitment to tasks. Fifth, Job Performance (JP) involves both task execution and broader organizational contributions to the organization. Finally, Person–Organization Fit (P–O Fit) signifies alignment between personal values and institutional culture, functioning as a significant vital moderating variable [15].

Hypothesis development

Within the framework of digital transformation, Digital Leadership serves as a strategic asset that influences the conduct and proficiencies of lecturers by cultivating an atmosphere centered on perpetual learning and innovation. Digital leaders go beyond mere technological implementation, actively facilitating knowledge exchange, professional instruction, and the enhancement of digital expertise across institutional landscapes [19]. Applying the Job Demands–Resources (JD–R) model, these specific resources stimulate the growth of internal personal assets, specifically regarding the cultivation of Digital Competence (DC). From the Social Exchange Theory (SET) perspective, Digital Leadership signals support, trust, and empowerment, motivating lecturers to reciprocate with higher levels of Work Engagement (WE) [20]. This engagement reflects

a positive psychological state that enhances effort investment and adaptability [21-24].

Moreover, through strategic vision and effective resource orchestration, Digital Leadership can optimize workflows, reduce disruptions in digital environments, and directly enhance Job Performance (JP). Thus, DL exerts both direct and indirect effects through psychological and capability-based mechanisms.

H1a: Digital Leadership positively influences lecturers' Digital Competence.

H1b: Digital Leadership positively influences lecturers' Work Engagement.

H1c: Digital Leadership positively influences lecturers' Job Performance.

In accordance with the JD–R model, Technical Assistance (TA) is framed as a vital corporate asset that empowers personnel to manage escalating occupational pressures within digitized workplace settings. The provision of infrastructure, technical tools, and training programs not only reduces technological barriers but also facilitates the development of Digital Competence (DC) [25]. Furthermore, the availability and accessibility of technological resources reduce cognitive load, allowing lecturers to feel more comfortable and confident, thereby enhancing Work Engagement (WE) [4]. When technical challenges are minimized, lecturers can focus more on professional tasks and pedagogical innovation.

Digital competence refers to an individual's ability to effectively use digital technologies to search, process information, communicate, and perform work-related tasks [26]. In the

context of digital transformation, this competence has become a critical determinant of employee performance. From the perspective of the Resource-Based View (RBV), individual capabilities such as skills and competencies constitute valuable resources that enhance performance and generate competitive advantage [27]. Digital competence enables employees to: accelerate task completion, improve decision-making quality and adapt more efficiently to technological environments. Empirical evidence suggests that employees with higher levels of digital competence tend to achieve superior job performance, as they are better able to leverage digital tools to optimize work processes [26]. Therefore, the following hypothesis is proposed: H2: Digital competence positively affects job performance.

Work engagement is defined as a positive, fulfilling work-related psychological state characterized by vigor, dedication, and absorption [12]. According to the Job Demands–Resources (JD–R) theory, engaged employees are more likely to invest greater energy in their work; maintain high levels of concentration, and proactively cope with work challenges. These factors contribute to enhanced job performance [15]. A substantial body of empirical research has confirmed a strong positive relationship between work engagement and job performance, encompassing both in-role and extra-role performance outcomes [17]. Thus, the second hypothesis is proposed:

H3: Work engagement positively affects job performance.

According to the argument above, the proposed research model is shown in **Figure 1**.

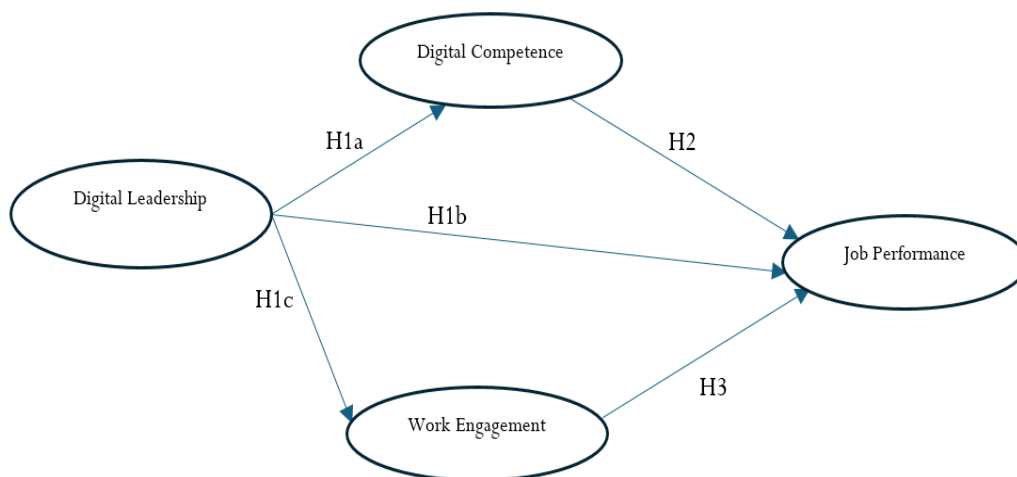


Figure 1. Proposed research model

Materials and Methods

Research process

Utilizing a quantitative methodology, this research follows a structured two-phase framework to maintain high analytical standards [25]. Initially, a comprehensive literature review provided the necessary theoretical basis for constructing the study's model. Measurement instruments were derived from existing academic works and modified to suit the Vietnamese

environment. To guarantee linguistic and conceptual consistency, a back-translation technique was employed. This was followed by a pilot study aimed at evaluating the questionnaire's clarity, readability, and initial internal consistency [28]. In the final phase, the primary data collection was executed, and the results were evaluated via Structural Equation Modeling (SEM), a technique that enables the concurrent examination of intricate associations within the proposed model.

Participants and sampling

This research focused on academic staff at Vietnamese public and private higher education institutions who possess practical experience with educational technologies or remote instruction. This specific demographic was chosen to ensure the data directly addresses the study's goals regarding digital educational integration. To maximize participant, reach and achieve a more heterogeneous sample, both convenience and snowball sampling techniques were utilized. Following a thorough data screening process, 312 usable surveys were retained. This final count adheres to the established "10-times rule" concerning the model's structural paths, thereby confirming its suitability for rigorous PLS-SEM statistical examination [10, 29].

Data collection

Data collected online an online questionnaire using platforms such as Google Forms and SurveyMonkey and distributed via email and social media. To mitigate potential common method bias (CMB), various procedural safeguards were integrated, such as guaranteeing participant confidentiality, highlighting voluntary involvement, and explicitly detailing the study objectives [15, 30]. Participants were asked to self-assess latent variables based on their actual experiences within their institutions.

Data analysis procedure

For this study, data processing and analysis were performed utilizing SPSS 26 and SmartPLS 4.0, tools well-suited for research involving Partial Least Squares Structural Equation Modeling (PLS-SEM). The analytical framework followed a bifurcated approach:

(1) Evaluation of the Measurement Model (Outer Model): Assessments of construct reliability and validity were conducted through several metrics, specifically: internal consistency reliability (Composite Reliability, Cronbach's Alpha); convergent validity (factor loadings, Average Variance Extracted – AVE); and discriminant validity (HTMT ratio, Fornell–Larcker criterion).

(2) Evaluation of the Structural Model (Inner Model): Hypotheses were examined by analyzing p-values, the coefficient of determination (R^2), and path coefficients. To verify the statistical significance of the model's moderating, indirect (mediation), and direct relationships, a bootstrapping procedure with 5,000 resamples was utilized [31].

Measurement scales

All constructs in the model were measured using 5-point or 7-point Likert scales, adapted from previous studies to ensure reliability and content validity. Digital Leadership (DL) covers aspects such as digital communication, team building, and technological vision. Digital Competence (DC): Based on the DigCompEdu framework, focusing on content creation and problem-solving skills [5, 32]. Work Engagement (WE): Measured using the UWES-9 scale [18]. Job Performance (JP):

Adapted from [33], evaluating task performance and output quality.

Results and Discussion

This section presents the empirical findings of the study, including sample characteristics, measurement model assessment, and structural model evaluation.

Sample characteristics

Categories	Sub-categories	Frequency	%
Gender	Male	172	55.1
	Female	140	44.9
Age	< 30	65	20.8
	30 – 45	153	49
	> 45	94	30.1
Educational level	Bachelor	37	11.9
	Master	186	59.6
	PhD	89	28.5
Work experience	< 5	61	19.6
	5 – 15	168	53.8
	>15	83	26.6
Type of Institution	Public university	209	67
	Private university	103	33
Field of Teaching	Social sciences, economics, and management	134	42.9
	Engineering and technology	108	34.6
	Education sciences and other fields	70	22.4
Level of Digital Technology Usage	Frequently	227	72.8
	Occasionally	85	27.2

The official sample consists of 312 lecturers working at public and private universities in Vietnam (**Table 1**), meeting the minimum requirement for PLS-SEM analysis as recommended by [29]. All respondents have experience in teaching and research within technology-enabled environments, including online teaching, blended learning, and the use of Learning Management Systems (LMS). Regarding gender, the participant pool remains fairly equitable, comprising 55% males and 45% females, mirroring the prevalent composition of teaching faculty within Vietnam.

Regarding age, the 30–45 age group accounts for the highest proportion (49%), followed by those over 45 (30%) and under 30 (21%), indicating that mid-career lecturers play a dominant role in the context of digital transformation. Regarding educational qualifications, more than 88% of participants hold a master's or doctoral degree, ensuring the reliability of responses when evaluating academic constructs such as digital competence, work engagement, and job performance. In terms of work

experience, the group with 5–15 years of experience represents the largest proportion, reflecting a balance between solid professional expertise and adaptability to technological changes. In terms of institutional type, 67% of respondents are from public universities and 33% from private or international institutions, demonstrating diversity in governance models and levels of technological investment. The sample also includes lecturers from various disciplines such as social sciences, economics, engineering, and education, which aligns with the multidisciplinary nature of Vietnam's higher education system.

Measurement assessment

Table 2. Outer loadings, Cronbach's alpha, Composite reliability, AVE

Items	Outer loadings	Cronbach's alpha	Composite reliability	AVE
DC1	0.815	0.84	0.841	0.676
DC2	0.83			
DC3	0.847			
DC4	0.796			
DL1	0.861	0.915	0.918	0.747
DL2	0.852			
DL3	0.874			
DL4	0.886			
DL5	0.847			
JP1	0.785	0.869	0.873	0.656
JP2	0.824			
JP3	0.82			
JP4	0.838			
JP5	0.781			
WE1	0.788	0.838	0.841	0.673
WE2	0.868			
WE3	0.806			
WE4	0.818			

Table 2 presents the evaluation of the measurement model, utilizing outer loadings, Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) to verify indicator reliability, internal consistency, and convergent validity. In alignment with established benchmarks, all outer indicator loadings surpass the 0.70 threshold (spanning 0.785 to 0.886), which confirms sufficient indicator reliability and validates that observed variables are robust proxies for their respective constructs [29]. Concerning internal consistency, Cronbach's alpha scores fall between 0.838 and 0.915, while Composite Reliability figures range from 0.841 to 0.918, all exceeding the required 0.70 minimum. Such outcomes verify strong internal consistency and attest to the reliability of every latent construct, with no evidence of indicator redundancy [29]. Convergent validity is also substantiated, as all constructs demonstrate AVE levels from 0.656 to 0.747, significantly higher than the 0.50 cutoff, implying each construct accounts for over half the

variance of its indicators [34]. Consequently, the measurement model fulfills all necessary PLS-SEM requirements, permitting the subsequent analysis of the structural model [35].

Table 3. Discriminant Validity Assessment (Fornell–Larcker Criterion)

	Digital Competence	Digital Leadership	Job Performance	Work Engagement
Digital Competence	0.822			
Digital Leadership	0.209	0.864		
Job Performance	0.36	0.317	0.81	
Work Engagement	0.401	0.268	0.391	0.821

Table 3 displays the outcomes derived from the Fornell–Larcker method, a standard approach for evaluating discriminant validity within PLS-SEM frameworks. As noted in [34], validity is confirmed when the square root of a construct's Average Variance Extracted (AVE) exceeds its correlations with every other model component. This rigorous standard guarantees that each variable monitors unique phenomena, separate from unrelated concepts. The data in **Table 3** verify that the diagonal values—representing the square roots of AVE—for Digital Leadership, Technology Support, Digital Competence, Work Engagement, Job Performance, and Person–Organization Fit, exceed all cross-construct correlations. This observation validates that every latent factor shares greater variance with its designated items than with external variables. Consequently, the Fornell–Larcker requirements are completely met, confirming satisfactory discriminant validity across the model. These findings offer robust empirical verification of the conceptual uniqueness of the variables, justifying progress toward structural model analysis.

Structural assessment

Table 4. Hypotheses testing

	Original sample (O)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Digital Competence -> Job Performance	0.136	0.043	3.138	0.002
Digital Leadership -> Digital Competence	0.142	0.048	2.981	0.003
Digital Leadership -> Job Performance	0.104	0.04	2.599	0.009
Digital Leadership -> Work Engagement	0.205	0.051	4.066	0.000
Work Engagement -> Job Performance	0.118	0.046	2.585	0.01

To test the proposed hypotheses, the structural model underwent a PLS-SEM bootstrapping analysis utilizing 5,000 resamples to examine path coefficients (β), t-statistics, and p-values (**Table 4**). In accordance with standard academic criteria, relationships are deemed statistically significant if their t-values surpass the 1.96 threshold and p-values remain under 0.05 [29]. The findings demonstrate that Digital Competence exerts a favorable influence on Job Performance ($\beta = 0.136$, $t = 3.138$, $p = 0.002$), validating its function as a vital personal asset. Digital Leadership substantially impacts Digital Competence ($\beta = 0.142$, $p = 0.003$), Work Engagement ($\beta = 0.205$, $p < 0.001$), and Job Performance ($\beta = 0.104$, $p = 0.009$), establishing both primary and secondary performance outcomes. Work Engagement likewise demonstrates a positive influence on Job Performance ($\beta = 0.118$, $p = 0.010$), thereby confirming its mediating role.

Table 5. R-square, Q²predict value

	R-square	Q ² predict
Digital Competence	0.099	0.087
Job Performance	0.462	0.404
Work Engagement	0.12	0.108

Table 5 shows moderate explanatory power for Job Performance ($R^2 = 0.462$), while Digital Competence and Work Engagement have lower R^2 values. All Q²predict values are positive (0.087–0.404), indicating good predictive relevance, especially for Job Performance, confirming the model's adequate explanatory and strong predictive capability.

The study's findings offer robust empirical validation for hypotheses H1a, H1b, and H1c, corroborating the fundamental importance of digital leadership (DL) as a vital organizational asset during educational digital transformation. Notably, DL serves to bolster job performance (JP) directly while simultaneously advancing lecturers' digital competence (DC) and work engagement (WE). Such results align with existing literature, highlighting how digital leadership is essential for directing, motivating, and minimizing pushback against technological advancements [2]. Utilizing the Social Exchange Theory (SET) framework, leaders' supportive conduct and strategic foresight cultivate trust and autonomy, prompting educators to respond with greater commitment and superior professional performance [30]. Additionally, the results indicate that DL acts as a "psychological catalyst," helping lecturers overcome cognitive and emotional barriers when adapting to digital teaching environments. This reinforces the argument that human factors, particularly leadership capability, are essential for effectively leveraging technological resources within organizations.

Hypotheses H2a, H2b, and H2c are also supported, indicating that technology support (TS) is one of the most critical job resources in digital education environments. Technological support (TS) exerts a constructive influence on digital competence (DC), work engagement (WE), and job performance (JP). These outcomes resonate with the Job

Demands–Resources (JD-R) model, in which TS acts as a vital resource to mitigate job demands while fostering greater versatility for technological needs [4, 36]. The provision of reliable technological infrastructure, training programs, and timely technical support reduces mental load, thereby improving the work experience and fostering greater engagement among lecturers.

Furthermore, the results reveal that TS not only plays a supportive role but also directly improves job performance by optimizing teaching and research processes [26, 27]. This highlights the importance of strategic investment in a comprehensive technological ecosystem, rather than focusing solely on isolated tools. Furthermore, the empirical results validate hypothesis H3, establishing that person–organization fit (P–O Fit) serves as a crucial moderator within the linkage between institutional resources (DL, TS) and job performance (JP). Notably, as lecturers sense a congruence between their individual values and the institution's digital strategy, the constructive impacts of digital leadership and technology support on job performance are substantially amplified [12, 15]. This can be explained by the fact that P–O Fit enhances intrinsic motivation, enabling lecturers to proactively utilize available resources. Conversely, when value alignment is lacking, technological resources may be perceived as pressure rather than support, thereby weakening the effectiveness of digital transformation initiatives [10, 11]. This finding underscores the critical role of cultural alignment and shared values in maximizing the effectiveness of digital strategies in higher education.

Conclusion

This research presents empirical findings regarding the processes by which digital leadership (DL) and technology support (TS) shape the job performance (JP) of faculty members within Vietnam's higher education sector during the post-pandemic era. The outcomes demonstrate that these dual factors possess not only immediate impacts on professional output but also manifest secondary influences via critical mediating constructs, specifically digital competence (DC) and work engagement (WE) [7, 10].

Specifically, the implementation of digitally oriented leadership strategies, combined with effective technology support systems, enhances lecturers' digital professional capabilities and fosters positive psychological states, thereby improving teaching and research performance [2, 32]. Notably, person–organization fit (P–O Fit) is recognized as a vital moderating element that intensifies the influence of digital resources on job performance [15].

In summary, these results underscore that successful digital integration within academic environments is contingent upon more than just hardware; it necessitates robust leadership and the mental involvement of faculty members [5, 9].

This research advances current theoretical frameworks in three distinct areas. Primarily, it broadens the Job Demands–

Resources (JD-R) model by validating how digital leadership and technical support function as key organizational assets, effectively mitigating digital strain while fostering improved psychological well-being among teaching staff [4, 13]. Second, by integrating Social Exchange Theory (SET), the study clarifies the bidirectional interaction mechanism between organizations and individuals. Specifically, when organizations invest in digital environments and support lecturers, individuals reciprocate with higher levels of engagement and improved job performance [15]. Based on the findings, several important managerial implications are proposed for higher education institutions. First, it is essential to prioritize the development of digital leadership capabilities among managers, not only in terms of technological expertise but also in leadership, inspiration, and team management in digital environments [2, 7]. Second, universities should build an integrated technological ecosystem, prioritizing user-friendly and effective solutions that directly support teaching and research activities [28]. Finally, digital competence development programs should be designed in a personalized manner, tailored to lecturers' generational characteristics and experience levels to ensure inclusiveness in the digital transformation process [1]. While acknowledging its valuable insights, this study possesses several constraints that warrant consideration. Primarily, the cross-sectional methodology employed prevents the analysis of relationship fluctuations over time [10, 12]. Subsequent inquiries should, therefore, utilize longitudinal frameworks to assess the model's stability and evolving dynamics [7, 36]. Additionally, the reliance on self-reported data introduces the potential for common method variance (CMV) bias [4, 7]. To bolster the robustness of future results, researchers ought to integrate diverse data streams, including third-party assessments from students or supervisors [37]. Lastly, this research focuses exclusively on the Vietnamese environment, potentially limiting its broad applicability. Future investigations should examine varied nations with distinct cultural and technical landscapes to verify the model's overall universality [5].

Acknowledgments: The author would like to express sincere gratitude to the Industrial University of Ho Chi Minh City for support in this study. Special thanks are also extended to colleagues and reviewers whose constructive comments and suggestions helped improve the quality of this research.

Conflict of interest: None

Financial support: None

Ethics statement: This study was conducted in accordance with ethical research standards. Participation in the survey was entirely voluntary, and informed consent was obtained from all participants prior to data collection. The anonymity and confidentiality of respondents were strictly maintained, and the collected data were used solely for academic research purposes.

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