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The relationship between digital competence and job satisfaction and loyalty of lecturers in vietnamese higher education institutions

Đỗ Thị Ý Nhi[*1], Huỳnh Công Phượng[2], Khương Thị Huế[3]
[1,2,3]: Lecturers, Thu Dau Mot University
* Corresponding author. Email: nhidty@tdmu.edu.vn

Abtrast

The study aims to clarify the relationship between faculty members' digital transformation competency and two key factors in the higher education environment: job satisfaction and organizational loyalty. Building upon foundational theories and prior empirical studies, the research proposes a theoretical model comprising four core components of digital transformation competency: digital technology proficiency, digital pedagogy competency, digital research competency, and digital management competency. Based on this model, a set of research hypotheses was developed and an empirical survey was conducted with 250 university lecturers. Through a series of quantitative analyses, including Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modeling (SEM), the study empirically examined the relationships among the variables. It also assessed the mediating role of job satisfaction in the linkage between digital transformation competency and faculty loyalty. The findings not only confirmed the mediating role of job satisfaction but also highlighted the profound and positive impact of digital transformation competency on lecturers' work motivation and professional commitment. These findings contribute to the theoretical foundation of digital transformation in higher education and offer important managerial implications for educational administrators and policymakers. Specifically, the study provides practical suggestions for the development of training policies, faculty development strategies, and retention initiatives in the context of comprehensive digital transformation—ultimately enhancing the quality and sustainability of Vietnam's higher education system..

Keywords: Digital competence, university lecturers, job satisfaction, organizational loyalty, higher education, Vietnam.

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1. Introduction

In the context of the Fourth Industrial Revolution, digital transformation is no longer a matter of choice but a mandatory requirement across all sectors, with higher education playing a pivotal role in developing the digital workforce. UNESCO (2022) emphasizes that to adapt to a rapidly changing world, educational institutions must transition toward digitized teaching and learning models, placing a strong emphasis on enhancing the digital competence of lecturers—those who directly implement pedagogical innovation and inspire student learning. Moreover, the impact of the COVID-19 pandemic has significantly accelerated the global process of digital transformation in education, compelling universities to rapidly adapt to new technological tools and platforms. According to a report by the OECD (2021), over 90% of higher education institutions worldwide implemented at least one form of online teaching during the pandemic, and this trend has continued into the post-COVID era.

In Vietnam, digital transformation in education has been identified as one of the three critical pillars in the National Digital Transformation Strategy toward 2025, with a vision to 2030 (Decision No. 749/QĐ-TTg, 2020). The Ministry of Education and Training has introduced several key policies to accelerate digital transformation in education, particularly in the post-COVID-19 context, where online teaching emerged as both a necessary and widespread solution (MoET, 2021). In practice, however, the level of implementation and effectiveness of digital transformation remains inconsistent across educational institutions, primarily due to disparities in lecturers' digital competence. According to a survey conducted by the Ministry of Education and Training (2022), over 60% of university lecturers still face challenges in adapting to digital technologies, particularly in areas such as digital content development, online assessment, and digital research. In addition, challenges such as inadequate digital skills, increased workload pressure, and insufficient internal policy support have had a negative impact on lecturers' job satisfaction and their long-term commitment to their institutions (Nguyen Van Bien, 2023). According to a study conducted by Nghe An University of Economics (2023), the digital competence of lecturers at many Vietnamese universities remains at a relatively moderate level. While many lecturers have become familiar with online teaching platforms such as Zoom, Google Meet, and Learning Management Systems (LMS), they continue to face considerable difficulties in designing digital learning materials, applying

technology in student assessment, and managing classes effectively. These challenges have negatively impacted teaching quality and contributed to increased job-related stress, thereby undermining lecturers' job satisfaction (NAUE, 2023).In addition, research by Nguyen and Nguyen (2021) indicates that lecturers' satisfaction in digital environments largely depends on whether they receive adequate support from their institutions in the form of technology training, appropriate infrastructure, and opportunities for professional development. In the absence of such support, lecturers tend to experience a decline in motivation, which in turn leads to reduced organizational loyalty. Particularly in the context of increasing competition for qualified personnel among higher education institutions, the phenomenon of "brain drain" in Vietnam's academic sector is becoming increasingly apparent (Tran & Le, 2023).

Given this reality, investigating the relationship between digital competence, job satisfaction, and organizational loyalty among university lecturers holds not only academic significance but also practical implications for human resource management in higher education. A comprehensive assessment of this relationship provides a foundation for developing strategic initiatives aimed at sustainable faculty training and development in the digital age. In summary, this research is both timely and essential for the following reasons:

(1) Digital transformation is an irreversible global trend in higher education;

(2) Vietnam is currently undergoing a strong push toward educational digitization;

(3) Lecturers' digital competence is a critical factor, yet significant gaps remain in both policy and research;

(4) Understanding the interrelationship between digital competence, job satisfaction, and organizational loyalty will enable universities to retain high-quality faculty members and enhance the effectiveness of digital transformation implementation.

2. Theoretical Framework and Research Model

2.1. Theoretical Background

Concept of Digital Transformation

Digital transformation refers to the process of integrating digital technologies across all areas of an organization in order to fundamentally alter its operations and the way it delivers value to stakeholders. This process necessitates shifts in organizational culture, mindset, and workforce competencies. According to the OECD (2020), digital transformation in education goes beyond the mere

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application of technology; it also entails the innovation of teaching methods, learning content, assessment practices, and educational management. In the Vietnamese context, digital transformation in education has been identified as one of the three core pillars of the national digital transformation program through 2025, with a vision toward 2030 (Ministry of Information and Communications, 2020).

Concept of Digital Competence

Digital competence refers to the combination of knowledge, skills, attitudes, and behaviors necessary for individuals to effectively utilize digital technologies in their work, learning, and everyday life. According to Redecker (2017), the *DigCompEdu* framework developed by the European Commission outlines six key areas of digital competence for educators:(1) digital professional engagement,(2) digital resource creation and sharing,(3) digital learning management,(4) digital assessment,(5) empowering learners, and(6) facilitating learners' digital competence development.

Similarly, Nguyen Van Hung and Tran Van Tung (2022) proposed that in the context of Vietnamese higher education, lecturers' digital competence should be conceptualized across four main components:(1) digital technology competence,(2) digital pedagogical competence,(3) digital research competence, and(4) digital management competence.

Concept of Lecturer Job Satisfaction

Job satisfaction is defined as a positive emotional state resulting from an individual's evaluation of their job or job-related experiences (Locke, 1976). In the context of higher education, lecturers' job satisfaction refers to the extent to which they are content with various aspects of their professional environment, including working conditions, teaching resources, academic support, opportunities for career development, and interpersonal relationships with colleagues and institutional leadership. According to Noor and Arif (2011), lecturers' job satisfaction is shaped by the interaction between personal factors (such as expectations and motivation) and organizational factors (such as institutional policies, infrastructure, compensation, and organizational culture).

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Concept of Organizational Loyalty

In the field of human resource management, organizational loyalty is understood as the degree of attachment, commitment, and willingness of employees to maintain a long-term relationship with their organization. According to Mowday, Steers, and Porter (1979), loyalty is manifested through trust in the organization's values, a willingness to exert effort on behalf of the organization, and a desire to remain a member of it. In the context of higher education, lecturers' loyalty refers to their long-term commitment, positive attitudes, and sustained engagement with the institution in which they are employed. Loyalty is demonstrated not only through continued employment but also through proactive contributions to the institution's sustainable development.

2.2. Literature Review

Studies on Lecturers' Digital Competence

Amid the ongoing digital transformation in education, numerous studies have focused on measuring and evaluating lecturers' digital competence—an essential factor in enhancing teaching quality and enabling effective adaptation to modern educational environments. Redecker (2017) developed the DigCompEdu framework, which identifies six core areas of digital competence designed to support lecturers in innovating their teaching practices and integrating digital technologies into professional activities. Subsequently, Tondeur et al. (2020) emphasized that lecturers' digital competence is not solely dependent on individual skills, but is also influenced by organizational support, attitudes toward technology, experience with information and communication technologies (ICT), and appropriate training policies. In another study, Khan et al. (2021) surveyed 415 university lecturers in Pakistan and found that digital competence is positively associated with the effectiveness of online teaching—a relationship that became particularly evident during the COVID-19 pandemic, when online learning became the default mode of instruction.

Studies on Lecturer Job Satisfaction

Lecturer job satisfaction and organizational loyalty are critical factors that contribute to both the quality of academic staff and the operational effectiveness of higher education institutions. Skaalvik and Skaalvik (2017), in a study conducted in Norway, asserted that lecturers' job satisfaction is influenced by multiple factors, most notably workload, autonomy in teaching, and support from the institution. In

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addition, Alonderiene and Majauskaite (2016) highlighted the role of leadership style, suggesting that effective leadership from university administrators can have a positive impact on both lecturers' satisfaction and loyalty. In the Vietnamese context, research by Nguyen and Nguyen (2021) similarly found that a positive working environment, clear opportunities for career advancement, and professional support are key determinants of job satisfaction among university lecturers.

Studies on Lecturer Loyalty

Lecturer loyalty toward their institutions has attracted considerable attention in higher education research, particularly in the context of universities seeking to build a stable and committed academic workforce. Meyer and Allen (1991) developed the widely adopted three-component model of organizational commitment—comprising affective, continuance, and normative commitment—which has been extensively used to assess loyalty in public sector settings, including education. According to Kim and Loadman (1994), job satisfaction serves as one of the strongest predictors of lecturer loyalty, highlighting a close relationship between individuals' subjective perceptions and their level of attachment to the organization. More recently, Pham et al. (2022), in a study conducted at a university in Ho Chi Minh City, found that job satisfaction not only directly influences loyalty but also plays a significant mediating role in the relationship between professional competence—including both subject expertise and adaptability—and lecturers' organizational loyalty.

Integrated Studies on Digital Competence, Job Satisfaction, and Organizational Loyalty

Amid the rapid transformation of the education sector driven by technological advancement, recent studies have increasingly focused on exploring the relationship between lecturers' digital competence, job satisfaction, and organizational loyalty. Ching et al. (2021) argued that when lecturers are adequately supported with technological resources, their digital competence not only improves work efficiency but also positively contributes to their job satisfaction and loyalty toward the educational institution. In a similar vein, Lee et al. (2021), in a study conducted in South Korea, demonstrated that job satisfaction plays a mediating role in the relationship between digital competence and organizational commitment among university lecturers. In the Vietnamese context, Tran and Le (2023) employed structural equation modeling (SEM) to test the causal

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relationships and reached similar conclusions: digital competence has a positive impact on job satisfaction, which in turn leads to higher levels of organizational loyalty. Their study also recommended that universities invest more heavily in digital training programs for lecturers as a strategic approach to sustainable human resource development.

2.3. Research Hypotheses and Conceptual Model

H1: Lecturers' digital competence has a positive impact on job satisfaction.

According to Redecker (2017), digital competence among lecturers encompasses the effective use of technological tools in teaching, digital pedagogical skills, digital research capabilities, and the ability to manage academic tasks through digital platforms. When lecturers feel confident and proficient in using digital technologies to support teaching and learning, they are more likely to feel empowered, proactive, and creative—factors that contribute to higher levels of job satisfaction (Koehler & Mishra, 2009; Jisc, 2020). Moreover, Kim and Lee (2021) found that lecturers who are well-equipped with digital skills adapt more easily to online teaching formats, enhance student engagement, and manage learning content more effectively—all of which are critical elements of job satisfaction. Additionally, digital competence reduces stress by enabling lecturers to better cope with rapid technological and environmental changes, thereby improving mental well-being and long-term satisfaction (Nguyen et al., 2022). In sum, lecturers with high levels of digital competence not only adapt more effectively to modern teaching methods but also perceive their work as more meaningful, flexible, and engaging—ultimately leading to enhanced professional satisfaction. Therefore, Hypothesis H1 is proposed as a theoretically grounded and plausible causal relationship.

H2: Lecturers' digital competence has a positive impact on their organizational loyalty to the educational institution**.**

According to the European Commission (Redecker, 2017), digital competence encompasses the effective use of digital technologies, digital pedagogical skills, digital research capabilities, and academic management through digital platforms. When lecturers feel that they are adequately equipped with the necessary knowledge and skills to work in a digitalized environment, they tend to develop a stronger sense of attachment to their institutions (Nguyen et al., 2022). Lecturer loyalty is understood as a long-term commitment to the institution, manifested through a willingness to continue contributing, an absence of intent to

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leave, and active participation in the university's development activities (Meyer & Allen, 1991).

Lecturers with high levels of digital competence often perceive alignment between their personal capabilities and the strategic direction of the institution. This sense of fit fosters feelings of respect and recognition—fundamental elements of organizational loyalty (Tschannen-Moran & Gareis, 2015). Recent studies have also shown that in modern higher education environments, confidence in one's digital competence helps lecturers avoid feeling obsolete, while simultaneously enabling access to more academic and research opportunities, which in turn enhances job satisfaction and loyalty (Almpanis, 2019; Goh & Sandhu, 2020). Therefore, there is a strong theoretical basis for asserting that lecturers' digital competence plays a critical role in fostering both psychological and professional bonds with their institutions, thereby contributing to the retention of high-quality academic staff in an increasingly competitive environment.

H3: Lecturers' job satisfaction has a positive impact on their organizational loyalty.

In the context of higher education, lecturers serve as the core workforce, and their level of job satisfaction reflects the degree to which they are content with factors such as their working environment, teaching conditions, professional development opportunities, and recognition from the institution. According to Locke (1976), job satisfaction is a positive emotional state resulting from the evaluation of one's job as fulfilling or exceeding expectations. When lecturers experience high levels of satisfaction, they are more likely to demonstrate long-term commitment to the institution, as evidenced by behaviors such as continuing their employment, actively contributing to the institution, and expressing no intention to leave (Porter et al., 1974; Meyer & Allen, 1991). Empirical studies in the field of education have also confirmed the positive relationship between job satisfaction and lecturers' organizational loyalty. For instance, Markow and Pieters (2011) found that lecturers with higher levels of satisfaction tend to exhibit stronger organizational commitment and a lower intention to leave. Similarly, Tella, Ayeni, and Popoola (2007) demonstrated that job satisfaction reliably predicts lecturers' loyalty to their employing institutions. In the Vietnamese context, amidst the growing trend toward university autonomy and intensified competition among institutions, lecturer loyalty has become a strategic factor in retaining high-quality academic personnel. Enhancing job satisfaction through improved compensation packages, professional development opportunities, and reduced administrative burden directly contributes to strengthening lecturers' organizational loyalty

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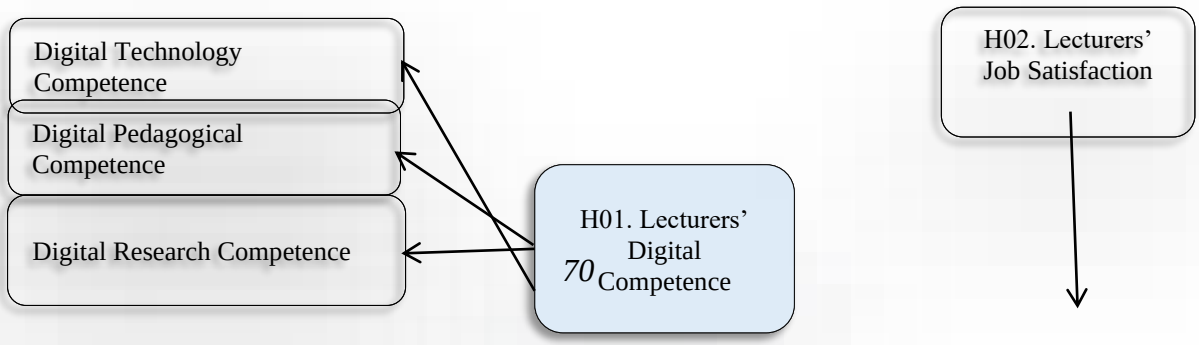
(Nguyen Van Phuc, 2021). Based on these theoretical and empirical foundations, Hypothesis H3 is posited as a well-grounded causal relationship, appropriate to the research context.

H4: Job satisfaction mediates the relationship between lecturers' digital competence and organizational loyalty.

In organizational behavior models, the relationship between individual competence and organizational loyalty is often not a simple direct linear relationship but is instead influenced by mediating variables such as job satisfaction (Baron & Kenny, 1986). In the context of contemporary higher education, where institutions are undergoing significant digital transformation, job satisfaction plays a critical role in converting individual capabilities into sustainable organizational commitment.

According to Cognitive Evaluation Theory (Deci & Ryan, 1985), when individuals feel competent and in control within their work environment, they are more likely to experience job satisfaction. This satisfaction, in turn, fosters emotional commitment and behavioral loyalty toward the organization (Meyer & Allen, 1991). A study by Kim et al. (2020) on university lecturers in South Korea found that technological competence indirectly influenced loyalty through its positive effect on job satisfaction. Similarly, Tian et al. (2021) affirmed that in a digitalized higher education environment, digital competence not only enhances work effectiveness but also improves perceptions of the work environment, thereby increasing lecturers' organizational loyalty.

In Vietnam, as universities increasingly pursue institutional autonomy and integrate technologies into teaching—from Learning Management Systems (LMS) and Artificial Intelligence (AI) to electronic academic management systems—digital competence has become a crucial factor not only in determining job performance but also in shaping positive emotional and psychological states among lecturers, which in turn contribute to sustainable organizational loyalty (Nguyen Thi My Linh & Tran Van Binh, 2022). Therefore, there is both theoretical and empirical support for the proposition that job satisfaction mediates the relationship between digital competence and organizational loyalty among lecturers—a relationship that warrants empirical testing within the proposed research model.



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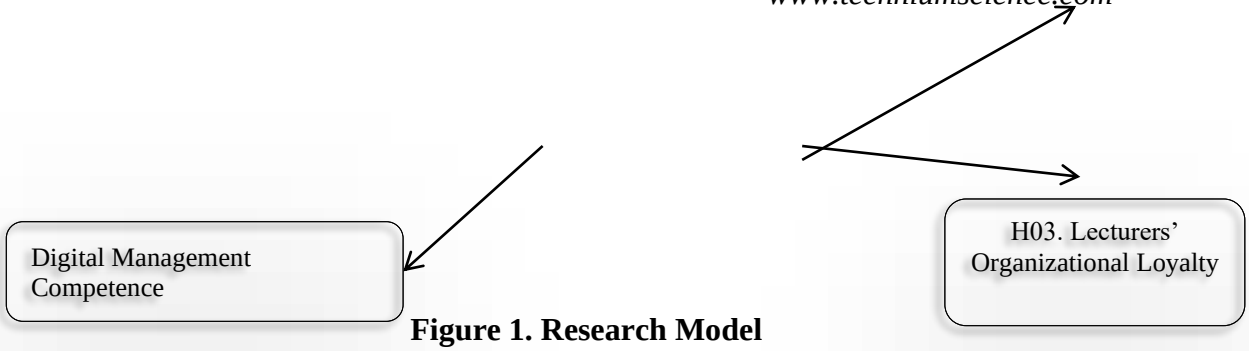

Figure 1. Research Model

(Source: Proposed by the authors)

3. Research Approach and Methodology

This study adopts a quantitative research approach to examine the relationships among key variables: lecturers' digital competence, job satisfaction, and organizational loyalty. The research was conducted in two main phases:

Phase 1: Preliminary Qualitative Study. This phase involved a literature review and expert panel discussions with seven academic leaders from various Vietnamese universities. The qualitative results yielded 25 observed variables for measuring the core research constructs. The measurement scales were developed based on reputable prior studies and established competency frameworks, including: (1) DigCompEdu (Redecker, 2017) – the European Framework for the Digital Competence of Educators; (2) Tanhueco-Tumapon (2020) – regarding digital transformation in management and teaching; (3) INTEF (2017) – Instituto Nacional de Tecnologías Educativas y de Formación del Profesorado, Spain.

Phase 2: Main Quantitative Study. In this phase, a structured questionnaire was administered, and quantitative data were collected from 280 university lecturers working at higher education institutions between July 2024 and March 2025. However, only 250 valid responses met the criteria for analysis. The data were analyzed using SPSS software to assess Cronbach's Alpha reliability, followed by Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to test the proposed model and hypotheses.

4. Research Findings

4.1. Sample Characteristics

Table 1. Sample Characteristics

Sample Characteristics	Total	Gender

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				Male		Female	
		Quantity	Percentage (%)	Quantity	Percentage (%)	Quantity	Percentage (%)
Age	Under 30	89	35.6%	46	51.7%	43	48.3%
	From 30 to 40	140	56.0%	55	39.3%	85	60.7%
	Over 40	21	8.4%	9	42.9%	12	57.1%
Academic Qualification	Master's degree	186	74.4%	78	41.9%	108	58.1%
	Doctorate or higher	64	25.6%	36	56.3%	28	43.8%
Teaching Experience	Less than 5 years	43	17.2%	19	44.2%	24	55.8%
	From 5 to 10 years	178	71.2%	81	45.5%	97	54.5%
	More than 10 years	29	11.6%	17	58.6%	12	41.4%
Type of Institution	Public	81	32.4%	33	40.7%	48	59.3%
	Non-public	169	67.6%	88	52.1%	81	47.9%
Work Location	Ho Chi Minh City	130	52.0%	79	60.8%	51	39.2%
	Hanoi	57	22.8%	21	36.8%	36	63.2%
	Can Tho	63	25.2%	44	69.8%	19	30.2%

Source: Results of survey data analysis

4.2. Scale Reliability Analysis

4.2.1. Scale Evaluation

Table 2. Descriptive Statistics of the Measurement Scales

Construct	Number of Items	Mean	Std. Dev.
Digital Technology Competence	4	3.98	0.62
Digital Pedagogical Competence	4	3.85	0.70
Digital Research Competence	4	3.60	0.75
Digital Management Competence	4	3.70	0.68
Job Satisfaction	4	3.90	0.65
Organizational Loyalty	3	4.05	0.60

Source: Results of survey data analysis

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The mean values of the measurement scales ranged from 3.6 to 4.1, indicating that, overall, lecturers held relatively positive perceptions of their own digital competence, as well as their levels of job satisfaction and organizational loyalty toward the institutions where they are employed.

4.2.2. Scale Reliability Analysis

Table 3. Scale Reliability

Factor	Variable	Variable	Corrected Item-Total Corr.	Cronbach's Alpha if Item Deleted	Conbach's Alpha
Digital Technology Competence	CN1	I am proficient in using office software.	0.654	0.796	0.814
	CN2	I effectively utilize online tools to support teaching.	0.712	0.779	
	CN3	I know how to secure data when using digital technologies.	0.684	0.788	
	CN4	I regularly update myself on new technologies.	0.639	0.802	
Digital Pedagogical Competence	SP1	I design lessons appropriate for digital learning environments.	0.684	0.793	0.826
	SP2	I know how to use LMS platforms for teaching.	0.755	0.772	
	SP3	I develop learning activities with a high level of digital interactivity.	0.728	0.779	

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	SP4	I adapt my teaching methods to suit online learning.	0.67	0.8	
Digital Research Competence	NC1	I use software for quantitative data analysis.	0.702	0.768	0.821
	NC2	I search for academic materials through digital databases.	0.673	0.783	
	NC3	I apply digital tools to process scientific articles.	0.695	0.774	
	NC4	I share research through online academic platforms.	0.618	0.805	
Digital Management Competence	QL1	I manage my teaching and research time using digital tools.	0.675	0.794	0.818
	QL2	I communicate and respond promptly via online platforms.	0.703	0.78	
	QL3	I plan my personal tasks using digital applications.	0.648	0.802	
	QL4	I comprehend and process administrative information through digital systems.	0.672	0.796	
Job Satisfaction	HL1	I am satisfied with the working conditions at my institution.	0.688	0.779	0.824
	HL2	I am satisfied with the compensation and	0.734	0.765	

		professional development policies.			
	HL3	I am satisfied with the digital transformation environment in teaching.	0.712	0.77	
	HL4	I am satisfied with the integration of technology into my professional work.	0.668	0.788	
Organizational Loyalty	TT1	I intend to continue working at my current institution.	0.786	0.822	0.862
	TT2	I recommend my institution to others as an ideal place to teach.	0.742	0.834	
	TT3	feel a strong sense of long-term attachment to my institution.	0.768	0.826	

Source: Results of survey data analysis

All measurement scales in the study reported Cronbach's Alpha values greater than 0.8, indicating a high level of internal consistency and satisfying the criteria for subsequent analysis.

4.3. Factor Analysis

Table 4. KMO Values

Criteria	Result	Evaluation

KMO (Kaiser-Meyer-Olkin)	0.884	> 0.5 → Fit Assessment
Bartlett's Test of Sphericity	Sig. = 0.000	< 0.05 → Fit Assessment
Total Variance Explained	> 60%	Đạt yêu cầu

Source: Results of survey data analysis

All observed variables have factor loadings greater than 0.5 and no cross-loading issues were detected.

Table 5. Results of Factor Analysis

Factor	Number of Observed Variables	Eigenvalue	% Variance	Factor Loading ≥ 0.5
Digital Technology Competence	4	3.1	14.5	0.68 - 0.81
Digital Pedagogical Competence	4	2.9	13.1	0.70 - 0.79
Digital Research Competence	4	2.6	12.2	0.65 - 0.78
Digital Management Competence	4	2.5	11.8	0.66 - 0.76
Job Satisfaction	4	2.3	10.8	0.69 - 0.82
Organizational Loyalty	3	2.1	10.5	0.72 - 0.85
Total	23		72.9	

Source: Results of survey data analysis

All measurement scales met the required standards, with no items eliminated. The total extracted variance exceeded 60%, confirming that the scales demonstrate good construct validity.

Table 6. Pearson Correlation Coefficients

	Digital Technology	Digital Pedagogy	Digital Research	Digital Management	Job Satisfaction	Organizational Loyalty
Digital Technology Competence	**1**	0.65	0.62	0.68	0.71	0.60
Digital Pedagogical Competence	0.65	**1**	0.58	0.63	0.68	0.55
Digital Research Competence	0.62	0.58	**1**	0.66	0.66	0.59
Digital Management Competence	0.68	0.63	0.66	**1**	0.73	0.65
Job Satisfaction	0.71	0.68	0.66	0.73	**1**	0.78
Organizational Loyalty	0.60	0.55	0.59	0.65	0.78	**1**

Source: Results of survey data analysis

All correlation coefficients were positive and relatively high ($r > 0.5$), indicating strong positive relationships among the factors. Job satisfaction showed a particularly strong correlation with organizational loyalty ($r = 0.78$), supporting Hypothesis H3. All dimensions of digital competence were significantly correlated with both job satisfaction (H1) and organizational loyalty (H2).

4.4. Model Testing

Table 7. Model Fit Indices

Index	Value	Result
CMIN/df	2.312	Đạt
GFI	0.925	Đạt
CFI	0.951	Đạt
TLI	0.942	Đạt
RMSEA	0.061	Đạt
SRMR	0.042	Đạt

Source: Results of survey data analysis

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The measurement model demonstrates good fit with the empirical data. All measurement scales satisfy both convergent and discriminant validity criteria, making them suitable for subsequent structural equation modeling (SEM) analysis.

Table 8. Hypothesis Testing

Construct	Path Coefficient (β)	P-value	Conclusion
Digital Technology Competence	0.32	0.002	Accepted
Digital Pedagogical Competence	0.29	0.010	Accepted
Digital Research Competence	0.21	0.015	Accepted
Digital Management Competence	0.36	0.001	Accepted
Job Satisfaction	0.48	0.000	Accepted

Source: Results of survey data analysis

All path coefficients were positive and statistically significant ($p < 0.05$); therefore, all hypotheses were supported.

4.5. Testing the Mediating Role

Table 10. Bootstrap Mediation Test

Path	Direct Effect	Indirect Effect via HL	Total Effect	Mediation Conclusion	Path
NLSDCN → TT	0.10 (p = 0.09)	0.16 (p = 0.01)	0.26	Full mediation	NLSDCN → TT
NLSP → TT	0.12 (p = 0.07)	0.14 (p = 0.02)	0.26	Full mediation	NLSP → TT
NLNC → TT	0.09 (p = 0.12)	0.10 (p = 0.03)	0.19	Full mediation	NLNC → TT

NLQL → TT	0.15 (p = 0.05)	0.17 (p = 0.01)	0.32	Full mediation	NLQL → TT

Source: Results of survey data analysis

The Bootstrap test results indicate that job satisfaction plays a significant mediating role in the relationship between digital competence and organizational loyalty. For three components—digital technology competence, digital pedagogical competence, and digital research competence—the indirect effects were statistically significant, while the direct effects were not. This suggests the presence of full mediation. In contrast, for digital management competence, both direct and indirect effects were significant, indicating partial mediation.

4.6. Discussion

These findings suggest that enhancing lecturers' digital competence does not directly lead to greater organizational loyalty; rather, it fosters loyalty indirectly through positive perceptions of work and institutional environment, i.e., job satisfaction. This highlights the critical role of psychological–organizational linkage, which should be prioritized in policies aimed at academic staff development. The results from the Structural Equation Modeling (SEM) analysis show that all model fit indices met acceptable thresholds, indicating that the proposed research model is empirically valid and well-aligned with the observed data. This validation enables a more accurate assessment of the relationships among the key constructs in the model.

According to the findings of each hypothesis...

H1: Digital Technology Competence → Job Satisfaction ($\beta = 0.32$, $p < 0.01$).

Hypothesis H1 is supported. This result indicates that lecturers who are proficient in using digital tools (e.g., Zoom, LMS, Google Workspace, interactive software) tend to experience higher levels of job satisfaction in their teaching practice. These findings are consistent with the studies by Tondeur et al. (2017) and Nguyen et al. (2022), which emphasize that technological competence forms the foundation for adaptability and innovation in digitally transformed educational environments.

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H2: Digital Pedagogical Competence → Job Satisfaction ($\beta = 0.29$, $p < 0.05$).

The findings support Hypothesis H2. Lecturers who are capable of designing digital lessons, managing online classrooms, and assessing students through digital platforms are more likely to have positive professional experiences. This result aligns with Redecker's (2017) DigCompEdu framework, which highlights the essential role of pedagogical competence in educational digital transformation.

H3: Digital Research Competence → Job Satisfaction ($\beta = 0.21$, $p < 0.05$).

Hypothesis H3 is supported. Lecturers who are proficient in using online research tools (e.g., SPSS, Zotero, AI-powered academic applications) are more likely to improve their research efficiency, thereby enhancing overall job satisfaction. This result is consistent with Almarzooq et al. (2021), who found that digital transformation contributes to enhanced research and publication capacity.

H4: Digital Management Competence → Job Satisfaction ($\beta = 0.36$, $p < 0.01$).

Hypothesis H4 received the highest path coefficient among the digital competence components. Lecturers who are skilled in using digital systems for task management, scheduling, data storage, and online collaboration tend to feel more efficient, experience reduced work-related stress, and demonstrate higher levels of professional motivation. This finding aligns with the OECD (2020) report, which highlights the importance of personal digital management in the modern academic environment.

H5: Job Satisfaction → Organizational Loyalty ($\beta = 0.48$, $p < 0.001$).

This result demonstrates that lecturers' job satisfaction has a strong and significant influence on their organizational loyalty. When lecturers feel supported, empowered, and equipped with appropriate tools for professional growth, they are more likely to remain committed to their institutions. These findings are consistent with those of Kuo et al. (2010) and Nguyen & Le (2021) in the Vietnamese higher education context

5. Conclusion

5.1. General Conclusion

Building upon established theoretical frameworks and an analysis of empirical studies, this research has developed a theoretically grounded model that

reflects the relationship between digital competence, job satisfaction, and organizational loyalty among university lecturers. The findings not only clarify the mediating role of job satisfaction but also affirm the significant and positive influence of digital competence on lecturers' motivation and professional commitment. These results offer practical insights for educational administrators in formulating strategies to train, develop, and retain academic staff in the context of digital transformation—thereby contributing to the quality and long-term sustainability of Vietnam's higher education system.

5.2. Managerial Implications for Educational Institutions

Based on the results of the Structural Equation Modeling (SEM) analysis, components of digital competence were found to have a positive effect on job satisfaction, which in turn enhances lecturers' organizational loyalty. This implies that, in order to build a high-quality and committed academic workforce, universities should consider the development of digital competence as a core human resource management strategy in the digital era. Specific recommendations include the following:

First, develop a comprehensive strategy for enhancing lecturers' digital competence. Universities should formulate a digital competence framework specifically tailored to academic staff in different disciplinary fields, encompassing digital technology usage, digital pedagogy, digital research, and digital management. In parallel, institutions should design training and professional development programs—either internally or in collaboration with external partners—that go beyond formality and focus on meaningful capacity building. Moreover, universities are encouraged to establish professional learning communities and innovation-driven working groups to foster experience sharing and promote a culture of continuous improvement.

Second, strengthen motivation policies to enhance job satisfaction. Since job satisfaction plays a mediating role in fostering organizational loyalty, universities should: (1) Improve working conditions, including infrastructure and online teaching support systems; (2) Provide proper recognition and rewards for innovative teaching and research efforts; (3) Facilitate access to research projects, international conferences, and career advancement opportunities, while offering clearly defined career development pathways for each lecturer.

Third, integrate digital transformation initiatives with human resource management practices. Institutions should incorporate digital transformation

objectives into recruitment, performance evaluation, and reward systems. Additionally, universities are advised to develop comprehensive evaluation frameworks for teaching effectiveness that incorporate technological dimensions and collect multi-source feedback (from students, peers, and administrators). The development of a smart Human Resource Management (HRM) system is also recommended to monitor lecturers' digital competence development and professional commitment over time.

Fourth, foster an organizational culture of innovation, digitalization, and engagement. Digital culture serves as a foundational element for sustaining organizational loyalty. Therefore, higher education institutions should: (1) Promote digital mindsets and a culture of lifelong learning among academic staff; (2) Encourage interdisciplinary, intergenerational, and innovation-oriented collaboration across the institution; (3) Build the university's identity as an ideal workplace in the digital era, capable of attracting and retaining top talent.

5.3. Recommendations for Educational Regulatory Authorities

In the context of higher education undergoing a profound transformation driven by digital technologies, the development of digital competence among lecturers has become a strategic and urgent priority. However, to ensure effective and consistent implementation nationwide, coordinated guidance, support, and oversight from educational regulatory authorities are essential. The following are specific policy recommendations:

First, develop and promulgate a national Digital Competence Framework for university lecturers. The Ministry of Education and Training (MoET) should take the lead in formulating this framework, drawing on international standards (e.g., the European Union's DigCompEdu) while adapting it to the specific context of Vietnamese higher education. The framework should include core components such as digital technology use, digital pedagogy, digital research, and digital management—consistent with the model proposed in this study.

Second, design and implement national-scale professional development programs to enhance digital competence. It is necessary to organize interdisciplinary, intensive, and online training courses on digital transformation for lecturers across various regions. These programs should combine traditional and online learning formats, following a "demand-driven" training model tailored to the practical needs and existing competencies of each lecturer. Special attention and investment should be given to universities in remote and disadvantaged areas,

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where access to technology remains limited, in order to ensure equitable access to digital transformation opportunities.

Third, integrate digital transformation into the national higher education development strategy for the period 2025–2035, positioning lecturers as key actors and promoting a mechanism of autonomy with accountability in the implementation of digital transformation models at the institutional level.

Fourth, establish a national data system and regular evaluation mechanisms for lecturer competencies. This includes developing a comprehensive national database on academic staff, incorporating indicators related to digital competence, job satisfaction, and professional commitment.

Fifth, promote public–private partnerships in building digital capacity among lecturers. The MoET can serve as a coordinating body to foster collaboration with major technology companies (e.g., Google, Microsoft, VNPT, Viettel) to provide training programs and digital certification opportunities. At the same time, universities should be encouraged to partner with industry in applying emerging technologies to teaching, research, and academic governance—thereby enhancing lecturers' practical digital skills.

5.4. Study Limitations

Although the study has achieved certain results in assessing the relationship between digital competence and lecturers' job satisfaction and organizational loyalty in higher education institutions, several limitations remain: (1) The research scope was geographically limited and focused on a specific sample of respondents; (2) The study employed a cross-sectional design, with data collected at a single point in time. As such, it does not capture potential changes in lecturers' perceptions over time or across different stages of digital competence development; (3) Other potential mediating or moderating variables—such as organizational culture, leadership style, compensation policies, or intrinsic motivation—were not included in the current model, although they may also influence organizational loyalty.

5.5. Directions for Future Research

Building upon the limitations identified, several directions for future research are suggested: (1) Expanding the scope of the study to include broader and more diverse institutional contexts and allowing for comparisons across different types of universities;; (2) Applying a longitudinal research design to examine

changes in lecturers' perceptions and behavior over time; (3) Developing a more comprehensive research model that integrates additional mediating or moderating variables to further explain the mechanisms linking digital competence, job satisfaction, and organizational loyalty.

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