Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

233

Applying extended UTAUT model to examine microlearning adoption: An Empirical study of Vietnamese Telecommunication Companies[*]

Bui Quang Tuyen[1], Phuong Mai Nguyen[2]

Abstract

This paper extends the UTAUT model to examine microlearning adoption in the Vietnamese telecommunication industry. A self-administered survey was implemented to collect data from the three biggest Vietnamese telecommunication companies. After two months, we received 349 valid questionnaire responses. The structural equation modeling (SEM) analysis was run in SmartPLS to test the proposed hypotheses. Our research findings revealed that performance expectancy is the most crucial factor determining employees' intention to use the microlearning system. In addition, effort expectancy and management support positively impact the intention to use the system. However, social influence and facilitating conditions do not statistically influence the intention to use microlearning. Our findings suggest that corporate managers should give more attention to the design of the e-learning system so that microlearning can be integrated into different platforms to facilitate employees' access to the system. Furthermore, managers should showcase to promote microlearning adoption by employees.

Keywords: *microlearning adoption, telecommunication industry, unified theory of acceptance and use of technology (UTAUT), Vietnam*

JEL classification: *I20, M12, M15, L96*

[1] PhD, University of Economics and Business, Vietnam National University Hanoi, 144 Xuan Thuy, Cau Giay District, Hanoi, 100000, Vietnam. Scientific affiliation: organizational behavior, digital transformation, innovation in businesses, leadership, organizational learning. E-mail: tuyenbq@vnu.edu.vn.

[2] Associate Professor, International School, Vietnam National University Hanoi, G7 Building, 144 Xuan Thuy, Cau Giay District, Hanoi, 100000, Vietnam. Scientific affiliation: sustainability, organizational behavior, digital transformation. Phone: +84 944398788. E-mail: mainp@vnu.edu.vn (Corresponding author).

234

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

1. Introduction

Organizations have witnessed rapid advancements in information and communication technologies (ICT) in recent years, comparable to the pace of progress during the fourth Industrial Revolution. In the era of the Industrial Revolution 4.0, advancements in artificial intelligence, automation, engineering, technology, robotics, data analytics, social networks, and mobile platforms have resulted in profound transformations in how society, the economy, and organizations function (Bloem et al., 2014). The progress in information and communication technology (ICT) has resulted in the proliferation of novel applications and services across several industries, necessitating enterprises to modify their operational methods and processes. Digital transformation is an unavoidable phenomenon that impacts companies of all kinds globally. Consequently, the work environment is increasingly characterized by technology-driven operations and a rapid pace.

Moreover, the evolving work environment demands that employees regularly enhance their knowledge and capabilities. Within this particular environment, the expectations for lifelong learning are transforming towards providing instructions that are delivered precisely when needed, and training tailored to specific needs (Brandenburg and Ellinger, 2003; Nanjappa et al., 2023). Microlearning is an effective method for corporate training that meets these requirements by focusing on providing self-paced, bite-sized content and just-in-time training (Loh, 2021).

Microlearning is a modern approach to learning and development that addresses the growing fragmentation of information sources and units utilized for learning. It is instrumental in fast-moving businesses (Govender and Madden, 2020). The efficacy of microlearning is contingent upon adult learners' acceptance and utilization of the technology. Hence, it is imperative to ascertain the determinants that impact the implementation of microlearning in businesses.

The significance of microlearning has grown in different sectors because of its capacity to improve learning effectiveness, adaptability, and involvement. In the fast-paced technology sector, microlearning allows employees to quickly grasp new tools and software updates, maintaining their competitive edge (Kapp and Defelice, 2018). For example, microlearning is advantageous for healthcare personnel as it enables them to remain up-to-date with the most recent medical treatments and patient care practices. This is essential for guaranteeing the provision of high-quality service (Sharma, 2019). In the finance industry, microlearning facilitates comprehension of intricate rules and compliance obligations, enabling personnel to adhere to ever-changing legal norms (Keegan, 2002). Retail workers apply microlearning to rapidly acquire knowledge about novel products and customer care strategies, hence augmenting customer contentment and sales proficiency (Bersin, 2018). Microlearning is a scalable and efficient method for continuously improving the skills of employees. It is an essential instrument for preserving the

competency and adaptability of the workforce in various industries, including the telecommunications industry.

It is apparent that microlearning is essential in the worldwide telecommunications business because it effectively tackles the fast-paced technical improvements, regulatory changes, and the constant need for skill enhancement. In order to remain competitive, telecom workers must rapidly acquire new information as the business progresses with advancements such as 5G, IoT, and cloud computing (Deloitte, 2020a). Microlearning is a method of learning that provides employees with brief and targeted content. This allows them to acquire and apply new concepts rapidly without interrupting their work. It helps them stay adaptable in a fast-paced setting (Bersin, 2018). Moreover, the telecommunications business is frequently characterized by a workforce that is spread out across several geographical locations. Microlearning promotes uniform and easily available training across various geographical areas, allowing employees to remain in sync with business norms and procedures (Keegan, 2002). This strategy not only improves the ability to remember information and increases the level of involvement of employees, but also decreases the expenses and duration of training, ultimately leading to higher levels of productivity and innovation in the sector.

In Vietnam, the telecommunications industry is considered one of the fastest growing industries and dispersed in market scope. The Vietnamese government has invested heavily in communications infrastructure. For example, Vietnam has deployed 3G, 4G and 5G networks to provide high-speed Internet and digital utilities to people and businesses. This has facilitated the development of online services, e-commerce and mobile applications. Vietnam has experienced a communications revolution with the explosive spread of mobile communications and the Internet. The number of mobile phone subscribers and internet users has increased significantly, showing that the digital gap between Vietnam and developed countries has been significantly narrowed (Ministry of Information and Communication, 2020). As Vietnam continues to expand its digital economy, the demand for up-to-date skills in areas such as 5G technology, cybersecurity, and digital services is accelerating (Deloitte, 2020b). This fast-paced environment requires telecom companies to ensure their employees are continuously learning and adapting to new technologies and market demands.

The telecommunications industry contributes significantly to Vietnam's economic growth by creating many job opportunities, promoting related industries, and creating a business environment that encourages creativity and entrepreneurship. The telecommunications industry is crucial for connecting people, businesses, and organizations globally. It has also significantly contributed to the advancement of information and communication technology. However, in these two recent years, the impact of the global economic recession and unpredictable developments have significantly reduced the potential and growth prospects of Vietnam's

236

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

telecommunications industry. In addition, according to a survey conducted by Vietnam Report from May to June 2023, most companies and industry experts do not expect significant growth of the entire information technology and telecommunications industry (Vietnam National Innovation Center, 2023). In such a context, the demand for employee training in telecommunication companies is becoming more essential to equip employees with up-to-date skills and knowledge to gain the competitive advantages. In other words, the application of microlearning is a good option. Microlearning, with its focus on delivering small, easily digestible chunks of information, is particularly well-suited to this industry. It allows employees to learn and apply new skills quickly, which is crucial in an industry, where staying ahead of technological trends can provide a competitive edge (Bersin, 2018; Uğur and Turan, 2018). Moreover, the high turnover rates and the need for continuous professional development in the telecommunications sector highlight the importance of flexible and efficient training methods (Statista, 2021). Implementing microlearning can also address the logistical challenges of training a geographically dispersed workforce, as it enables on-the-go learning accessible via mobile devices, aligning with the industry's digital nature. By adopting microlearning, it í expected that Vietnamese telecommunication companies can enhance employee engagement, reduce training costs, and ensure their workforce remains skilled and competitive.

Previous studies have used different theories and models to examine the acceptance of technology in various digital learning contexts, such as the Theory of Planned Behavior (TPB) Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), the Diffusion of Innovations Theory (Lee et al., 2011; Lin et al., 2019; Chu and Chen, 2016; Hadadgar et al., 2006; Cheng, 2019; Younes and Shlapy, 2020; Alassafi, 2022). Although many theories have been used in previous studies to investigate the adoption of new technology, there are limited studies that use UTAUT to investigate microlearning adoption, particularly in an emerging country like Vietnam. In this regard, the present study applied the UTAUT to examine microlearning adoption in the Vietnamese telecommunications industry context. We aim to evaluate whether factors in the UTAUT model including performance expectancy, effort expectancy, social influence, facilitating conditions, affect the intention to use microlearning of employees in the Vietnamese telecommunication companies. Furthermore, we extended the UTAUT model with the management support as our assumption is that managers might influence the intention of employees to adopt microlearning system at work. Our main research question focuses on how management support and UTAUT model variables affect the intention to use microlearning in the Vietnamese telecommunications industry. Thus, the remainder of this paper discusses the theoretical background, methodology, findings, and discussions. Finally, some theoretical and practical implications are presented in the conclusion.

2. Theoretical background

This section presents the concept of microlearning and related theories and models that serve as the background for our study.

2.1. Microlearning

Microlearning encompasses several brief learning activities that involve microcontents (Hug, 2007). Additionally, it can be described as compact learning modules that are concentrated and typically last from one to ten minutes. These modules are accessible on various devices (Shail, 2019). Microlearning training contents are supplied in small, easily digestible portions accessible at any location and time (Puah et al., 2022).

Microlearning enables adult learners to continue their learning beyond the confines of a physical classroom setting. By mitigating information overload and complexity, individuals can incorporate their acquired knowledge into their everyday tasks (Govender and Madden, 2020). Microlearning has gained popularity in professional development across various areas, including retail banking (Govender and Madden, 2020), journalism (Lee, 2021), scientific education (Fagerstrøm, 2017), engineering (Zheng et al., 2019), and programming skills (Skalka and Drlik, 2020; Alshammari, 2024). Particularly, during the COVID-19 pandemic and post-pandemic context, microlearning has become more widely applied in training than ever before (Chamorro-Atalaya et al., 2024).

2.2. Unified Theory of Acceptance and Use of Technology (UTAUT)

Several studies have used the Theory of Planned Behavior (TPB) or Technology Acceptance Model (TAM) to examine the intention to use microlearning in different contexts.

In TPB, three main variables that predict an individual's behavioral intention are attitude (beliefs about a behavior), subjective norms (beliefs about others' attitudes toward a behavior), and perceived behavioral control. These factors have been confirmed to be good predictors of behavioral intention in many contexts, particularly e-learning adoption. Meanwhile, in TAM, two factors that are believed to determine the intention to use a technology include perceived usefulness (PU) and perceived ease of use (PEOU).

For example, Chikhi and Guettaf (2023) used TAM to explore English as a Foreign Language (EFL) teachers' views and students' attitudes towards the use of TikTok as a form of microlearning. They found that PU and PEOU are critical factors influencing EFL students' acceptance of TikTok. Similarly, Lamimi et al. (2024) used TAM and collected responses from 153 master students to investigate the educational

value of TikTok and its potential for microlearning. These authors insisted that PU, PEOU, attitudes, and content richness positively influence the intention to use TikTok as a learning tool. Furthermore, in a study of microlearning for librarians' training in Tanzania, Isibika et al. (2023) also confirmed that the positive influence of PU and PEOU on the acceptance of microlearning strengthens the relevance of adopting microlearning as a didactic technology for librarians' training.

Some studies extended the TAM model with other factors to examine the use of microlearning. Wang et al. (2023) integrated TAM and task-technology-fit (TTF) theory to conduct an empirical analysis of user satisfaction and continuance intention to adopt microlearning. These authors confirmed that PU, PEOU, and TTF significantly influenced the use of microlearning and contributed to 78.2% of the variance in user satisfaction. Notably, Puah et al. (2021) used the Decomposed Theory of Planned Behavior to explain working adults' intentions to use microlearning in Singapore. They included TAM variables and other variables such as resource facilitating conditions, technology-facilitating conditions, and self-efficacy into TPB to investigate microlearning adoption.

Previous studies have explored the adoption of microlearning in the banking industry It is observed that previous studies have investigated microlearning adoption in the banking industry (Govender and Madden, 2020) as well as in various other sectors, including fashion, semiconductor, software, and pharmaceutical (Fagerstrom et al., 2017). Two commonly used models in these studies on microlearning adoption are the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM). Although these models have shown their appropriateness to explain the behavioral intention of individuals when choosing microlearning system, several factors have not yet been addressed, such as the facilitation of the organization or managers, the influence of relevant others. In this sense, the unified theory of acceptance and use of technology (UTAUT) might be considered an option for the theoretical framework.

The unified theory of acceptance and use of technology (UTAUT) is a technology acceptance model formulated by Venkatesh et al. (2003). The UTAUT aims to explain user intention to use an information system and subsequent usage behavior. The theory holds four fundamental constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions.

The UTAUT model was developed by reviewing and consolidating the constructs of eight models that earlier research had employed to explain information systems usage behavior. They are the theory of reasoned action, technology acceptance model, motivational model, theory of planned behavior, a combined approach of planned behavior and technology acceptance model, model of personal computer use, diffusion of innovations theory, and social cognitive theory). Subsequent validation by Venkatesh et al. (2003) of UTAUT in a longitudinal study found it to account for

70% of the variance in Behavioural Intention to Use (BI) and about 50% in actual use (Venkatesh et al., 2003). However, few studies used the UTAUT model to investigate microlearning adoption and focused on the telecommunications industry. Thus, we employed UTAUT in the present study due to its high predictability of individuals' behavioral intentions and aimed to test its applicability in a new context of the telecommunications industry.

3. Proposed framework and hypothesis development

This section explains our proposed framework and hypotheses. In the present study, we applied the UTAUT model to examine microlearning adoption. However, we added management support into the UTAUT model, assuming managers might influence the employees when they consider using microlearning. Thus, we developed some hypotheses as follows.

3.1. Performance expectancy

Performance Expectancy (PE) is the degree to which the user expects that using the system will help them to attain achievements in performing a particular job. PE was confirmed by Venkatesh et al. (2003) as the most crucial exploratory factor in the UTAUT model (Venkatesh et al., 2003). PE refers to the end-user's perceptions of the benefits, such as improving performance and increasing efficiency, that could be achieved through e-learning technology.

Previous studies insisted that PE has a positive impact on the intention to use e-learning (Alrawashdeh and Al-Mahadeen, 2014; Indriati and Agustina, 2018; Siregar et al., 2022). For example, Alrawashdeh and Al-Mahadeen (2014) confirmed that PE positively influences employees' acceptance of web-based training systems in Jordan's public sector. Similarly, Wang (2016) proved that PE has a direct and positive impact on employees acceptance to use e-learning systems in Taiwan's public sector. Sayginer (2023) applied the UTAUT model in a study with 313 Turkish students and found that PE significantly influenced their acceptance of cloud-based virtual platforms, particularly during the COVID-19 pandemic. Moreover, recent studies also confirm the positive impact of PE on user intention in various professional training contexts, such as mobile learning in Jordan (Faqih, 2022), pharmacovigilance training in 97 countries (Hegerius et al., 2020)

From the above arguments, we hypothesized the positive relationship between performance expectancy and intention to use microlearning in the present study.

> *H1: Performance expectancy (PE) positively influences the intention to use microlearning (IU).*

240

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

3.2. Effort expectancy

Effort expectancy (EE) is the degree of ease linked to the use of the system (Venkatesh et al., 2003). EE is a good predictor of intention to utilize e-learning technologies. Many studies have confirmed that EE positively affects the intention to use e-learning technologies (Kayali and Alaaraj, 2020).

For example, Bellaaj et al. (2015) investigated the continued use of the e-learning system at the University of Tabuk in Saudia Arabia, then confirmed that for students who have Internet experience, the impact of EE on continued intention to use the e-learning system decreases. Faqih (2022) also tested the impact of EE on the adoption of mobile learning technology with a sample of 202 students in Jordan and found that EE is the third most influential factor in an extended UTAUT model. Similar results about the positive relationship between EE and intention to use e-learning systems were found in several studies such as Wang (2016), Alshehri et al. (2019), Salloum and Shaalan (2019). Therefore, we formulated the second hypothesis:

> *H2: Effort expectancy (EE) positively influences the intention to use micro-learning (IU).*

3.3. Social influence

Social influence (SI) is defined by Venkatesh et al. (2003) as the degree to which an individual perceives that other people think they should use the technology-based system (Venkatesh et al., 2003). However, previous studies of e-learning adoption have shown contradictory results about the influence of SI on user intention. For example, Welch et al. (2020) found that SI positively influences the adoption of mobile learning by employees working in a science museum group. Sayginer (2023) also supported the positive impact of SI on Turkish students' acceptance of cloud-based virtual platforms during COVID-19 pandemic. Furthermore, Alshehri et al. (2019) insisted that SI strongly affects students' intention to use the Blackboard system in Saudi tertiary. Several studies in both Western and Eastern contexts share similar positive results, such as Puah et al. (2021), Mahande and Malago (2019), Alrawashdeh and Al-Mahadeen (2014), Sharma et al. (2024).

Meanwhile, Abbad (2021), in his study on students' usage of e-learning systems, discovered that SI does not influence the intention to use the system (e.g., Moodle) of students at a public university in Jordan.

Nevertheless, in this study, we assumed that SI has a positive impact on the intention to use microlearning. Thus, the following hypothesis was initiated.

> *H3: Social influence (SI) positively influences the intention to use micro-learning (IU).*

3.4. Management support

Management support (MS) is defined by Purnomo et al. (2013) as the encouragement of a user's management, the allocation of resources, and assistance for instructional development. In another view, Facteau et al. (1995) concerned MS with learners' perception and belief that managers offer them chances and reinforcement to acquire new knowledge, skills, and attitudes via participating in continuous learning and development. Managers and supervisors motivate their staff to embrace self-directed Internet learning and facilitate staff perception of web-based training.

Noticeably, Walker and Johnson (2008) concluded that the acceptance of e-learning systems was predicted by MS to be one of the main factors. Santosa and Nugroho (2016) also confirmed the critical role of MS in successful e-learning implementation. Similarly, Ali and Magalhaes (2008) highlighted that the lack of MS is one of the barriers to e-learning system adoption in a study of 11 largest companies in Kuwait. Furthermore, Purnomo and Nastiti (2019) in a survey of e-learning acceptance in the Indonesian banking industry, insisted that MS was positively related to both PU and PEOU. Thus, MS had an important influence on e-learning adoption (Purnomo and Nastiti, 2019).

Based on the above discussion, we developed the following hypothesis:

> *H4: Management support (MS) positively influences the intention to use microlearning (IU).*

3.5. Facilitating conditions

According to Venkatesh et al. (2003), facilitating conditions (FC) is the extent to which an individual perceives the organizational and technical infrastructure's ability to provide support for the information system (Venkatesh et al., 2003). Furthermore, FC has been confirmed in studies on e-learning adoption to influence the behavioral intention positively to use the system (Abbad, 2021; Welch and Nichol, 2020; Gunasinghe et al., 2019). In particular, Kocaleva et al. (2015), in a study with teaching staff in European countries, discovered that FC is one of the two strongest factors that determine the acceptance of e-learning. Moreover, Malanga et al. (2022) proved that FC significantly affects the intention to use a learning management system in a study with 1237 students in Brazil during the COVID-19 pandemic. In other words, previous studies in different countries have strongly confirmed the positive influence of FC on e-learning acceptance.

Similarly, we also hypothesized the positive impact of FC on the intention to use microlearning in this study. Therefore, hypothesis 5 was formulated as follows.

> *H5: Facilitating conditions (FC) positively influence the intention to use microlearning (IU).*

Bui Quang Tuyen, Phuong Mai Nguyen • *Applying extended UTAUT model...*
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

242

Figure 1 below summarizes the hypotheses in our study.

Figure 1: Proposed research framework
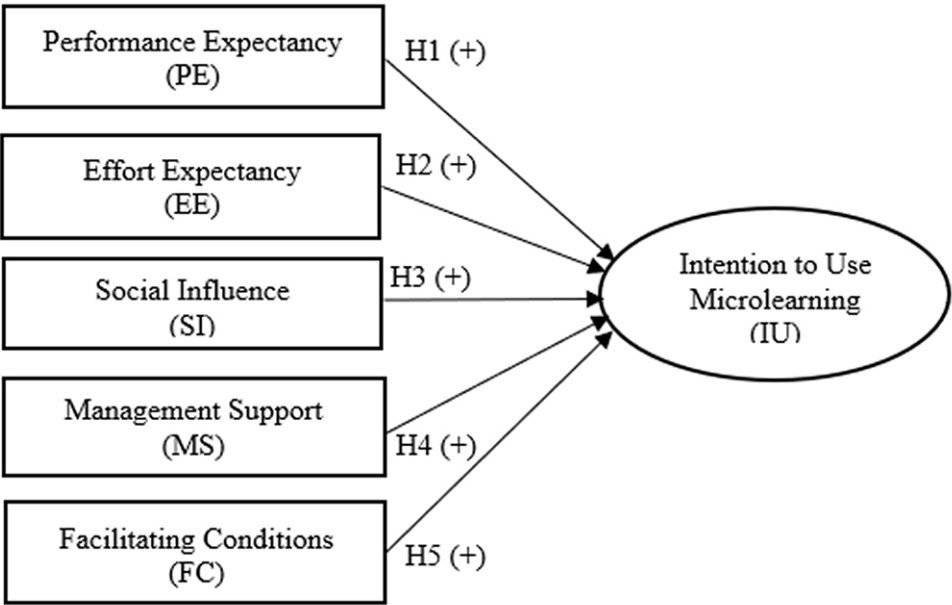
Source: Author's construction

4. Methodology

In this section, we describe the measurements adopted and adapted for our study. Furthermore, the sampling methods and the data collection process are thoroughly explained.

4.1. Measurements

In the present study, we adopted the measurements of previous studies that have used UTAUT as the founding theory and research framework. Five constructs in the UTAUT model were adopted from Venkatesh et al. (2003), including Performance Expectancy (3 items), Effort Expectancy (3 items), Social Influence (3 items), and Facilitating Conditions (4 items), Intention to Use (3 items) (Venkatesh et al., 2003). In addition, the Management Support construct has four items and was adapted from Lee et al. (2014).

4.2. Sampling and data collection process

The population of our study includes employees who are working in the Vietnamese telecommunication industry. We chose to study the telecommunication industry for two reasons. Firstly, Vietnamese telecommunication is one of the fastest-growing industries in Vietnam. Secondly, the telecommunication industry creates a lot of jobs for Vietnamese people. As of 2020, nearly 80 thousand people were working in this industry (Ministry of Information and Communication, 2021). Employees in this industry must update their knowledge and skills regularly, particularly when the digital transformation trend is affecting all types of businesses. Thirdly, the telecommunication industry should adapt very quickly to respond to the Industrial Revolution 4.0 while the working sites of employees are scattered. Traditional learning in the brick-and-mortar learning environment is costlier for telecommunication companies. Thus, microlearning has been adopted in large telecommunication companies in recent years.

In the present study, we conducted a self-administered survey to collect data. We approached the three biggest telecommunication companies in Vietnam and asked for help distributing our online questionnaire. The human resource departments of these companies helped us to spread our questionnaire to all employees working for their companies. After two months, we collected 349 valid questionnaire responses.

5. Findings and discussions

This section provides the results of our data analysis. It includes the reliability and validity test of the measurements, and hypothesis testing results.

5.1. Preliminary testing

Data were analyzed using SPSS version 22 to identify the sample characteristics. As shown in Table 1 below, more male (58.7%) than female (41.3%) employees participated in our survey. This is attributed to the fact that job vacancies in the Vietnamese telecommunication industry are mainly occupied by men. Regarding the age of respondents, most of them are young and middle-aged, accounting for 96.6% of the total sample. Moreover, nearly half of our sample has more than ten years of working experience. Table 1 below shows the details of the sample profile.

244

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

Table 1: Sample characteristi cs (n = 349)

Characteristic	Frequency	Percent (%)
Gender		
Male	205	58.7
Female	144	41.3
Age		
18-29 years old	65	18.6
30-39 years old	166	47.6
40-49 years old	106	30.4
50-60 years old	12	3.4
Working Experience		
Less than 3 years	58	16.6
From 3 to 5 years	66	18.9
From 6 to 10 years	57	16.3
Over 10 years	168	48.1

Source: Authors' calculation

The reliability of measurements was checked in SmartPLS version 4.0 using several criteria, including Cronbach's alpha, item outer loadings, and composite reliability (CR). Table 2 shows the results.

Table 2: Reliability, validity, convergence of the measurements

Constructs	Items	Loadings	VIF	Cronbach's alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Performance Expectancy (PE)	PE1	0.774	1.361	0.760	0.862	0.677
	PE2	0.847	1.759			
	PE3	0.846	1.698			
Effort Expectancy (EE)	EE1	0.745	1.476	0.737	0.827	0.618
	EE2	0.697	1.643			
	EE3	0.902	1.374			
Social Influence (SI)	SI1	0.695	1.374	0.745	0.851	0.657
	SI2	0.833	1.529			
	SI3	0.891	1.711			
Management Support (MS)	MS1	0.790	1.763	0.825	0.882	0.651
	MS2	0.840	1.646			
	MS3	0.779	1.720			
	MS4	0.817	1.910			

Constructs	Items	Loadings	VIF	Cronbach's alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Facilitating Conditions (FC)	FC1	0.677	1.839	0.797	0.849	0.586
	FC2	0.708	1.447			
	FC3	0.867	1.657			
	FC4	0.797	1.587			
Intention to Use Microlearning (IU)	IU1	0.820	1.538	0.753	0.859	0.670
	IU2	0.773	1.414			
	IU3	0.861	1.679			

Note: AVE = Average Variance Extracted, CR = Composite Reliability, VIF = Value Inflation Factor

Suggested value: Cronbach's alpha ≥ 0.7; Outer loadings ≥ 0.5; VIF < 5; CR ≥ 0.7; AVE ≥ 0.5

Source: Authors' calculation

All items in the six measurement constructs have met the cut-off values for outer loadings, VIF (Hair et al., 2014). Furthermore, Cronbach's alpha values of six constructs range from 0.760 to 0.825. Meanwhile, composite reliability (CR) and average variance extracted (AVE) values are higher than 0.8, which are higher than the accepted values of 0.7 (Hair et al., 2014). As a result, the reliability and validity of six measurement constructs were obtained.

In addition, the discriminant validity was checked using the Fornell-Larcker criterion test results. Table 3 shows the details of the Fornell-Larcker criterion test.

Table 3: Fornell-Larcker criterion test

|	EE	FC	IU	MS	PE	SI
EE	0.786					
FC	0.331	0.766				
IU	0.205	0.174	0.819			
MS	-0.083	0.173	0.194	0.807		
PE	0.324	0.256	0.293	0.396	0.823	
SI	0.379	0.191	0.211	0.176	0.475	0.811

Source: Authors' calculation

According to Fornell and Larcker (1981) and Hair et al. (2013), discriminant validity is satisfactory when the square root of AVE for each endogenous variable is greater than the latent variable correlations (Fornell and Larcker, 1981; Hair et al., 2013). We determined the discriminant validity of each construct

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
246
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

by comparing the square root of each AVE in the diagonal to the correlation coefficients (off-diagonal) in the relevant rows and columns. As shown in Table 3, the square root of the AVE ranges from 0.786 to 0.823 for all constructs. It exceeds all correlation coefficients found in the vertical and horizontal related cells. Thus, discriminant validity among the constructs in this study is established.

5.2. Hypotheses testing and discussions

We ran the PLS-SEM analysis in SmartPLS software version 4.0 to test the hypotheses in this study. Results were presented in Figure 2 and Table 4 below.

Figure 2: Structural equation modeling analysis result
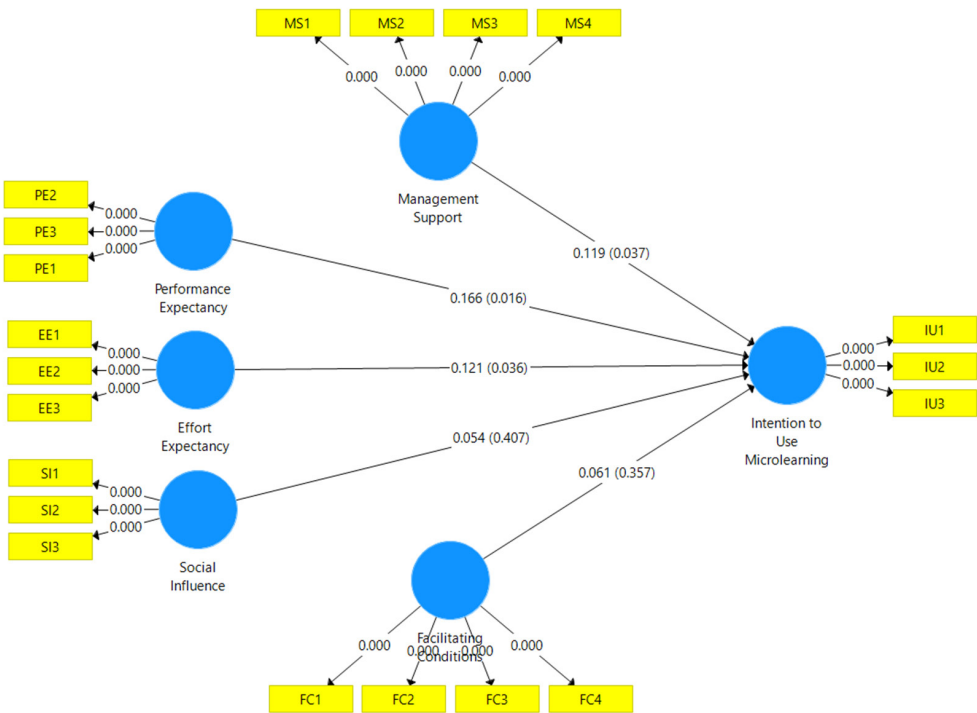
Source: Authors' calculation

Table 4: Hypothesis testing result

Hypothesis	Relationship	β	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Result
H1	PE → IU	0.166	0.069	2.415	0.016	Accepted
H2	EE → IU	0.121	0.058	2.093	0.036	Accepted
H3	SI → IU	0.054	0.065	0.829	0.407	*Rejected*
H4	MS → IU	0.119	0.057	2.092	0.037	Accepted
H5	FC → IU	0.061	0.065	0.932	0.357	*Rejected*

Note: β = beta cofficient; STDEV = Standard Deviation

Suggested value: P value ≥ 0.05: Reject the hypothesis; P value < 0.05: Accept the hypothesis

Source: Authors' calculation

Table 4 reveals that two out of five proposed hypotheses, H3 and H5, were rejected. The remaining hypotheses (H1, H2, and H4) were accepted. The findings of our study are discussed as follows.

Firstly, performance expectancy ($β_1$ = 0.166, p = 0.016 < 0.05) was the most important factor that affects the intention to use microlearning of employees in Vietnamese telecommunication companies, followed by effort expectancy ($β_2$ = 0.121, p = 0.036 < 0.05). Our finding is in line with the studies of Gunasinghe et al. (2019), Abbad (2021), and Welch et al. (2020). This finding can be attributed to the demographic factors of our respondents. Most individuals fall within the age range of 30 to 49 years and have over five years of work experience. Thus, they are very acquainted with the company and tend to make their choice of using the system based on logical thinking toward efficiency increase and performance improvement rather than just trying something new and innovative. Moreover, EE ranks after PE which affects the IU of employees in the surveyed telecommunication companies. We might explain this finding based on the fact that middle-aged employees in our survey still prefer a microlearning system that is easy enough to use with user-friendly interface.

Secondly, our study confirmed that management support ($β_4$ = 0.119, p = 0.037 < 0.05) positively influences the intention to use microlearning. This finding is congruent with previous studies on e-learning, such as those by Walker and Johnson (2008), Lee et al. (2012), and Welch et al. (2020). It is undeniable that microlearning system is still new for many employees in the Vietnamese telecommunications industry. Thus, the support of management in encouraging the use of the system plays a critical role. Meanwhile, organizational learning requires the full commitment of employees. Fostering a culture of learning also creates an inclusive and positive workplace, reduces employee turnover, and increases employee satisfaction due to

248
Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

promotions and recognition of their own abilities. Organizations that implement learning activities report employee engagement and retention rates that are 30% higher than other organizations (Indriati and Agustina, 2018). In addition, organizational learning enables teams to adapt to change more easily by instilling a mindset of continuous improvement, encouraging shared ownership of projects and shared accountability for project results. Previous results in Vietnam have not addressed the role of managers in promoting microlearning adoption. Thus, the present study contributes to the existing literature with evidence of microlearning and management in a new context.

Thirdly, there is not enough statistical evidence to confirm the positive impact of social influence ($\beta_3 = 0.054$, p = 0.407 > 0.05). Regarding the impact of the social influence factor, our finding is similar to Abbad (2021), but opposite to Welch et al. (2020), and Yakubu and Dasuki (2019). This finding is explained by the fact that our respondents are adults who are mature enough to make their own life decisions. Thus, the influence of relatives or references do not affect them. Moreover, the choice of using microlearning is not a big decision for adults so they may not need to seek advice from others to use the system.

Fourthly, it was found that facilitating conditions ($\beta_5 = 0.061$, p = 0.357 > 0.05) do not influence the intention to use microlearning of telecommunication employees. This finding in our study is different from other studies in the e-learning adoption context, such as Welch et al. (2020) in a museum, Abbad (2021) in the higher education sector, and Abdou and Jasimuddin (2020) in the banking industry. Our finding can be attributed to the telecommunication industry's high tech nature, ensuring the infrastructure for microlearning remains in good condition. Furthermore, telecommunication employees are very familiar with the technology. As a result, they may not consider facilitating conditions as crucial for adopting a new learning method, such as microlearning.

6. Implications and conclusion

In this study, the UTAUT model was applied to examine factors affecting the intention to use microlearning in Vietnamese telecommunication companies. Our findings have both theoretical contributions and practical implications.

In terms of theory, this study validates the applicability of the UTAUT model within the context of an emerging country, specifically in the telecommunications industry. The present study fills the existing literature gap with empirical research in the Vietnamese telecommunications industry. Moreover, we also explore how management support affects the employees' intention to use microlearning in conjunction with other UTAUT model variables. In previous research, the simultaneous influence of UTAUT factors and management support on e-learning or

microlearning adoption was not appropriately addressed. Therefore, this integrative research model that we proposed in the present study is our new contribution to the existing literature. Our findings reveal more insights into the behaviors of employees when choosing microlearning which might bring more contribution to management theory, particularly the issue related to human resource development.

In terms of practice, it is suggested that corporate managers should pay more attention to some factors that drive employees' adoption of microlearning. Notably, performance expectancy was found in this study as the most important factor that affects employees' microlearning adoption. Thus, companies demonstrate how microlearning effectively enhances job-specific skills and knowledge. This can be achieved by using case studies, testimonials, and concrete evidence of measurable performance enhancements. When employees perceive the immediate advantages of microlearning in their job responsibilities, their inclination to actively participate in and embrace these resources escalates substantially. Therefore, it is implied in this study that the e-learning system should be designed in an attractive and user-friendly way to save time for learners. The contents of microlearning courses should also concentrate on upskilling so that learners can perceive the gains in their performance after studying.

In addition, this study also confirmed the positive relationship between management support and employees' microlearning adoption. The functions of organizational culture and leadership are crucial in this context. When leaders and peers support and actively engage in microlearning activities, it fosters a favorable social atmosphere that motivates others to do the same. Providing recognition and rewards to employees who participate in microlearning can strengthen its significance and promote greater adoption (Venkatesh et al., 2012). As a result, managers in telecommunication companies should showcase and motivate employees to use microlearning. Encouragement can be regularly enforced by words and deeds. Moreover, a policy should be developed to assess employee participation in the microlearning system and connect their learning and development progress to work performance evaluation.

Furthermore, this study found that facilitating conditions do not have a statistically significant impact on employees' intention to use microlearning. However, previous studies have proved the positive relationship among these variables. Thus, to a certain extent, we still suggest that managers in telecommunication companies take into consideration the critical role of facilitating conditions. It is imperative for companies to guarantee that employees are provided with essential resources, like dependable internet connections, appropriate devices, and technical assistance. Incorporating microlearning platforms into current learning management systems (LMS) can simplify access and improve the overall user experience.

This study has some limitations. A small sample size might lead to potential bias in explaining the findings. Thus, we suggest that future research might expand

250

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

the sample size to achieve a higher explanation possibility. Further research should include other industries to have a cross-sector analysis of the intention of microlearning adoption and its actual use. Moreover, our research model focused mainly on the direct impact of elements in the UTAUT model on the intention to use microlearning. Therefore, we omitted the demographic factors in the proposed model. Future research might extend our research model by adding moderators and mediators to have insights into employees' adoption of microlearning.

References

Abbad, M. M. (2021) "Using the UTAUT Model to Understand Students' Usage of E-learning Systems in Developing Countries", *Education and Information Technologies*, Vol. 26, pp. 7205–7224, https://doi.org/10.1007/s10639-021-10573-5.

Abdou, D., Jasimuddin, S. M. (2020) "The Use of the UTAUT Model in the Adoption of e-Learning Technologies: An Empirical Study in France Based Banks", *Journal of Global Information Management*, Vol. 28, No. 4, pp. 38–51, htttps://doi.org/10.4018/JGIM.2020100103.

Alassafi, M. O. (2022) "E-learning intention material using TAM: A case study", In *Proceedings of the International Conference on Recent Advances in Mechanical Engineering and Nanomaterials.* 19-20 February, 2022 Pune, Maharashtra, India, Materials Today: Proceedings, Elsevier BV, Vol. 61, pp. 873–877, https://doi.org/10.1016/j.matpr.2021.09.457.

Ali, G. E., Magalhaes, R. (2008) "Barriers to implementing e-learning: a Kuwaiti case study", *International Journal of Training and Development*, Vol. 12, No. 1, pp. 36–53, https://doi.org/10.1111/j.1468-2419.2007.00294.x.

Alrawashdeh, T. A., Al-Mahadeen, B. M. (2014) "Extended UTAUT to Examine the Acceptance of Web Based Training System by Public Sector", *International Journal of Interactive Mobile Technologies*, Vol. 7, No. 1, pp. 4–9. http://dx.doi.org/10.3991/ijim.v7i1.2044.

Alshammari, F. L. (2024) "Video-Based Microlearning and the Impact on Programming Skills and Technology Acceptance", *Journal of Education and e-Learning Research*, Vol. 11, No. 1, pp. 155–165, https://doi.org/ 10.20448/jeelr.v11i1.5399.

Alshehri, A., Rutter, M. J., Smith, S. (2019) "An Implementation of the UTAUT Model for Understanding Students' Perceptions of Learning Management Systems: A Study within Tertiary Institutions in Saudi Arabia.", *International Journal of Distance Education Technologies*, Vol. 17, No. 3, pp. 1–24, htttps://doi.org/10.4018/IJDET.2019070101.

Bellaaj, M., Zekri, I., Albugami, M. (2015) "The Continued Use of E-learning system: An Empirical Investigation Using UTAUT Model at the University of

Tabuk", *Journal of Theoretical and Applied Information Technology*, Vol. 72, No. 3, pp. 464–474, https://www.jatit.org/volumes/Vol72No3/18Vol72No3.pdf.

Bersin, J. (2018) "The Disruption of Digital Learning: Ten Things We Have Learned". Available at: <https://joshbersin.com/2017/03/the-disruption-of-digital-learning-ten-things-we-have-learned/> [Accessed: September 22, 2023]

Brandenburg, D. C., Ellinger, A. D. (2003) "The Future: Just-in-time Learning Expectations and Potential Implications for Human Resource Development", *Advances in developing Developing Human Resources*, Vol. 5, No. 3, pp. 308–320, https://doi.org/10.1177/1523422303254629.

Chamorro-Atalaya et al. (2024) "Microlearning and Nanolearning in Higher Education: A Bibliometric Review to Identify Thematic Prevalence in the COVID-19 Pandemic and Post-Pandemic Context", *International Journal of Learning, Teaching and Educational Research*, Vol. 23, No. 4, pp. 279–297, https://doi.org/10.26803/ijlter.23.4.15.

Cheng, E. W. (2019) "Choosing Between the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM)", *Educational Technology Research and Development*, Vol. 67, pp. 21–37, https://doi.org/10.1007/s11423-018-9598-6.

Chikhi, H., Guetaf, C. (2023*) EFL Teachers' Views and Learners' Attitudes towards the Use of TikTok as a Microlearning Tool*, PhD thesis, Mouloud Mammeri University of Tizi–Ouzou.

Chu, T. H., Chen, Y. Y. (2016) "With Good we Become Good: Understanding E-learning Adoption by Theory of Planned Behavior and Group Influences", *Computers & Education*, Vol. 92-93, pp. 37–52, https://doi.org/10.1016/j.compedu.2015.09.013.

Deloitte (2020a) *2020 Telecommunications Industry Outlook*. Available at: <https://deloitte.wsj.com/cio/2020-telecommunications-industry-outlook-01579725968> [Accessed: July 15, 2024]

Deloitte. (2020b) *Technology, Media, and Telecommunications Predictions 2020*. Available at: <https://www2.deloitte.com/content/dam/Deloitte/cn/Documents/technology-media-telecommunications/deloitte-cn-tmt-prediction-full-report-2020-en-200217.pdf> [Accessed: September 30, 2024]

Facteau, J. D.et al. (1995). "The Influence of General Perceptions of the Training Environment on Pretraining Motivation and Perceived Training Transfer", *Journal of Management*, Vol. 21, No. 1, pp. 1–25, https://doi.org/10.1016/0149-2063(95)90031-4 .

Fagerstrøm, A., Gulliksen, M., Grønli, T. M. (2017) "Microlearning in Educating Healthcare Professionals". In Proceedings of the 2017 International Conference on Advanced Technologies Enhancing Education (ICAT2E2017), 18-20 March, Qingdao, China: Atlantis Press, pp. 31–34, https://doi.org/10.2991/icat2e-17.2016.8.

252

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

Faqih, K. M. (2022) "Investigating The Adoption Of An Innovation Using An Extended Utaut Model: The Case Of Mobile Learning Technology", *Journal of Theoretical and Applied Information Technology*, Vol. 100, No. 17, pp. 5600–5631, Available at: <https://www.jatit.org/volumes/Vol100No17/26Vol100No17.pdf> [Accessed: October 3, 2024]

Fornell, C., Larcker, D. F. (1981) "Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics", *Journal of Marketing Research*, Vol. 18, No. 3, pp. 382–388, https://doi.org/10.1177/002224378101800313.

Govender, K. K., Madden, M. (2020) "The Effectiveness of Micro-learning in Retail Banking", *South African Journal of Higher Education*, Vol. 34, No. 2, pp. 74–94, https://doi.org/10.20853/34-2-3733.

Gunasinghe, A. et al. (2019) "The Adequacy of UTAUT-3 in Interpreting Academician's Adoption to e-Learning in Higher Education Environments", *Interactive Technology and Smart Education*, Vol. 17, No. 1, pp. 86–106, https://doi.org/10.1108/ITSE-05-2019-0020.

Hadadgar, A. et al. (2016) "Applicability of the Theory of Planned Behavior in Explaining the General Practitioners eLearning Use in Continuing Medical Education", *BMC Medical Education*, Vol. 16, No. 1, pp. 1–8, https://doi.org/10.1186/s12909-016-0738-6.

Hair, J. F., Ringle, C. M., Sarstedt, M. (2013) "Editorial - Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance", *Long Range Planning*, Vol. 46, No. (1-2), pp. 1–12, Available at: <https://ssrn.com/abstract=2233795> [Accessed: July 23, 2024]

Hair, J. F. et al. (2014) *A Primer on Partial Least Squares Structural Equation Modeling*, Thousand Oaks, CA: Sage.

Hegerius, A., Caduff-Janosa, P., Savage, R., Ellenius, J. (2020) "E-Learning in Pharmacovigilance: An Evaluation of Microlearning-based Modules Developed by Uppsala Monitoring Centre", Drug Safety, Vol. 43, pp. 1171–1180, https://doi.org/10.1007/s40264-020-00981-w.

Hug, T. (2007) "Didactics of microlearning". In Hug, T. ed., *Micro learning*, Berlin: Waxmann Verlag GmbH.

Indriati, F., Agustina, P. (2018) "The Influence of UTAUT Factors on E-retention with E-Satisfaction as Mediating Variable in E-learning", *Hasanuddin Economics and Business Review*, Vol. 2, No. 1, pp. 19–33, http://dx.doi.org/10.26487/hebr.v2i1.1465.

Isibika, I. S. et al. (2023) "The Influence of User-perceived Benefits on the Acceptance of Microlearning for Librarians' Training", *Research in Learning Technology*, Vol. 31, pp. 1–14. https://doi.org/10.25304/rlt.v31.2930.

Kapp, K.M., Defelice, R. A. (2018) *Microlearning: Short and Sweet*, Alexandria: Association for Talent Development (ATD) Press.

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258
253

Kayali, M., Alaaraj, S. (2020) "Adoption of cloud based E-learning in developing countries: a combination a of DOI, TAM and UTAUT", *International Journal of Contemporary Management and Information Technology*, Vol. 1, No. 1, pp. 1–7. Available at <https://ijcmit.com> [Accessed: June 3, 2024]

Keegan, D. (2002) *The Future of Learning: From eLearning to mLearning*. Hagen: Fern University, Institute for Research into Distance Education.

Kocaleva, M., Stojanovic, I., Zdravev, Z. (2015) "Model of E-learning Acceptance and Use for Teaching Staff in Higher Education Institutions", *International Journal of Modern Education and Computer Science (IJMECS)*, Vol. 7, No. 4, pp. 23–31, https://doi.org/10.5815/ijmecs.2015.04.03.

Lamimi, I. J., Alaoui, S. M., Ouelfatmi, M. (2024) "Bite-Sized Learning on TikTok: Exploring the Platform's Educational Value within the Framework of TAM (Technology Acceptance Theory)", *Open Journal of Social Sciences*, Vol. 12, No. 4, pp. 228–245, https://doi.org/10.4236/jss.2024.124015

Lee, Y. H., Hsieh, Y. C., Ma, C. Y. (2011) "A Model of Organizational Employees' e-learning Systems Acceptance", *Knowledge-based Systems,* Vol. 24, No. 3, pp. 355–366, https://doi.org/10.1016/j.knosys.2010.09.005.

Lee, Y. H., Hsiao, C., Hadi, S. (2012) "Enhancing e-learning Acceptance: An Empirical Examination on Individual and System Characteristics", *Academy of Management Proceedings*, Vol. 2012, No. 1, https://doi.org/10.5465/AMBPP.2012.15828abstract.

Lee, Y. H., Hsiao, C., Purnomo, S. H. (2014) "An Empirical Examination of Individual and System Characteristics on Enhancing e-learning Acceptance", *Australasian Journal of Educational Technology*, Vol. 30, No. 5, pp. 562–579, https://doi.org/10.14742/ajet.381.

Lee, Y. M. (2021) *A study of learner experience design and learning efficacy of mobile microlearning in journalism education*, PhD thesis, University of Missouri, Columbia.

Lin, C. Y., Huang, C. K., Zhang, H. (2019) "Enhancing Employee Job satisfaction via E-learning: The Mediating Role of an Organizational Learning Culture", *International Journal of Human–Computer Interaction*, Vol. 35, No. 7, pp. 584–595, https://doi.org/10.1080/10447318.2018.1480694.

Loh J., K. (2021) *The strategic use of microlearning as a training approach for the purpose of workforce skills development in multinational corporations*, Master Thesis, Zurick University of Applies Sciences, Germany.

Mahande, R. D., Malago, J. D. (2019) "An E-Learning Acceptance Evaluation through UTAUT Model in a Postgraduate Program", Journal of Educators Online, Vol. 16, No. 2, pp. 1–10, Available at: <https://eric.ed.gov/?id=EJ1223779> [Accessed: May 3, 2024]

Malanga, A. C. M., et al. (2022) "Towards Integrating Quality in Theoretical Models of Acceptance: An Extended Proposed Model Applied to e-learning Services",

British Journal of Educational Technology, Vol. 53, No. 1, pp. 8–22, https://doi.org/10.1111/bjet.13091.

Ministry of Information and Communication (2020) *White book of Vietnam information and communication technology 2020*. Hanoi: Information and Communication Publishing HouseMinistry of Information and Communication (2021) *The role of telecommunication companies in economy recovery post-COVID-19*. Hanoi: Information and Communication Publishing House.

Morrar, R., Arman, H., Mousa, S. (2017) "The fourth industrial revolution (Industry 4.0): A social innovation perspective", *Technology Innovation Management Review*, Vol 7, No. 11, pp. 12–20. Available at: <https://pdfs.semanticscholar.org/6d54/724adc2461105a3b37fc1e9bf848c2a0ba97.pdf> [Assessed: June 30, 2024]

Nanjappa, S., et al. (2023) "Microlearning in Corporate Settings: Practitioner Perspectives", *Human Resource Development International*, Vol. 26, No. 5, pp. 655–662, https://doi.org/10.1080/13678868.2022.2160688.

Puah, S., et al. (2022) "Investigating Working Adults' Intentions to Participate in Microlearning Using the Decomposed Theory of Planned Behaviour", *British Journal of Educational Technology*, Vol. 53, No. 2, pp. 367–390, https://doi.org/10.1111/bjet.13170.

Purnomo, S. H., Lee, Y. H. (2013) "E-learning Adoption in the Banking Workplace in Indonesia: an Empirical Study", *Information Development*, Vol. 29, No. 2, pp. 138–153, https://doi.org/10.1177/0266666912448258.

Purnomo, S. H., Nastiti, T. (2019) "Does Management Support Matter in Elucidating the Linkage of Individual Characteristics and e-Learning Acceptance?", *Asian Academy of Management Journal*, Vol. 24. No. 1, pp. 83–110, https://doi.org/10.21315/aamj2019.24.1.4.

Salloum, S. A., Shaalan, K. (2019) "Factors Affecting Students' Acceptance of e-learning System in Higher Education Using UTAUT and Structural Equation Modeling Approaches". In *Proceedings of the International Conference on Advanced Intelligent Systems and Informatics 2018 (AISI2018)*, 1-3 September, Cairo, Egypt: Springer International Publishing, pp. 469–480, https://doi.org/10.1007/978-3-319-99010-1_43.

Santosa, P. I., Nugroho, W. S. (2016) "Management Support for Successful e-learning Implementation", In *Proceedings of the 10th International Technology, Education and Development Conference (IATED2016)*, 7-9 March, Valencia, Spain, pp. 3265–3273, https://doi.org/10.21125/inted.2016.1764.

Sayginer, C. (2023) "Acceptance and Use of Cloud-based Virtual Platforms by Higher Education Vocational School Students: Application of the UTAUT Model with a PLS-SEM Approach", *Innoeduca - International Journal of Technology and Educational Innovation*, Vol. 9, No. 2, pp. 24–38, https://doi.org/10.24310/innoeduca.2023.v9i2.15647.

Shail, M. S. (2019) "Using Micro-learning on Mobile Applications to Increase Knowledge Retention and Work Performance: A Review of Literature", *Cureus*, Vol. 11, No. 8, pp. 1–7, https://doi.org/10.7759/cureus.5307.

Sharma, H. et al. (2024) "Blended Learning and Augmented Employability: A Multi-stakeholder Perspective of the Micro-credentialing Ecosystem in Higher Education", *International Journal of Educational Management*, Vol. 3, No. 4, pp. 1021–1044, https://doi.org/10.1108/IJEM-12-2022-0497.

Sharma, M., Singh, R. K. (2022) "The impact of mobile-learning on pharmacy education during COVID-19 pandemic", *Indian Journal of Pharmacy Practice*, Vol. 15, No. 2, pp 105–112, https://doi.org/10.5530/ijopp.15.2.19.

Siregar, I. et al. (2022) "The Role of Motivation of Unified Theory Acceptance, Use of Technology Model and Innovation Diffusion Theory on e-learning Intention of SMEs Employee", *International Journal of Data and Network Science*, Vol. 6, No. 4, pp. 1055–1064. http://dx.doi.org/10.5267/j.ijdns.2022.8.003.

Skalka, J., Drlík, M. (2020) "Educational Model for Improving Programming Skills Based on Conceptual Microlearning Framework". In *Proceedings of the 21st International Conference on Interactive Collaborative Learning (ICL2018) – The Challenges of the Digital Transformation in Education,* 25-28 September, Vol. 1, pp. 923–934, Kos Island, Greece: Springer, Cham. https://doi.org/10.1007/978-3-030-11932-4_85.

Statista. (2021). *Vietnam Telecommunications Market - Statistics & Facts*. Available at: <https://www.statista.com/topics/9135/telecommunications-industry-in-vietnam/> [Accessed: September 20, 2024]

Uğur, N. G., Turan, A. H. (2018) "E-learning Adoption of Academicians: A Proposal for an Extended Model", Behaviour & Information Technology, Vol. 37, No. 4, pp. 393–405, https://doi.org/10.1080/0144929X.2018.1437219.

Venkatesh, V. et al. (2003) "User Acceptance of Information Technology: Toward a Unified View", *MIS Quarterly*, Vol. 27, No. 3, pp. 425–478, https://doi.org/10.2307/30036540.

Vietnam National Innovation Center (2023) *Vietnam Innovation and Tech Investment Report 2023*. Hanoi. Available at: <https://nic.gov.vn/img/wpuploads/2023/04/ENG_Vietnam-Innovation-Tech-Investment-Report2023_final.pdf > [Accessed: September 30, 2024]

Walker, G., Johnson, N. (2008) "Faculty Intentions to use Components for Web-enhanced Instruction", International Journal on E-learning, Vol. 7, No. 1, pp. 133–152. Available at: <https://www.learntechlib.org/primary/p/19878/> [Accessed: August 25, 2024]

Wang, C. et al. (2023) "Understanding the Continuance Intention of College Students Toward New E-learning Spaces Based on an Integrated Model of the TAM and TTF", *International Journal of Human–Computer Interaction*, Vol. 40, No. 24, pp. 8419–8432, https://doi.org/10.1080/10447318.2023.2291609.

256

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

Wang, M. H. (2016) "Factors Influencing Usage of e-learning Systems in Taiwan's Public Sector: Applying the UTAUT Model", *Advances in Management and Applied Economics*, Vol. 6, No. 6, pp. 63-82. Available at: <https://www.scien-press.com/Upload/AMAE/Vol%206_6_5.pdf> [Accessed: August 25, 2024]

Welch, R., Alade, T., Nichol, L. (2020). "Mobile Learning Adoption at a Science Museum". In: Arai, K., Kapoor, S., Bhatia, R. ed., *Intelligent Computing. SAI 2020. Advances in Intelligent Systems and Computing*, Vol. 1228. 16-17 July, London, Springer, Cham, pp. 726–745, https://doi.org/10.1007/978-3-030-52249-0_49.

Yakubu, M. N., Dasuki, S. I. (2019). "Factors Affecting the Adoption of E-learning Technologies among Higher Education Students in Nigeria: A structural equation modelling approach", *Information Development*, Vol. 35, No. 3, pp. 492–502, https://doi.org/10.1177/0266666918765907.

Younes, A., Shlapy, H. (2020) "Measuring Faculty Members' Readiness to Use E-learning in Social Work Education, Based on the Theory of Planned Behavior", *Egyptian Journal of Social Work*, Vol. 10, No. 1, pp. 39–62, https://dx.doi.org/10.21608/ejsw.2020.20614.1076.

Zheng, R., et al, (2019) "A Novel Resource Deployment Approach to Mobile Microlearning: From Energy-Saving Perspective", *Wireless Communications and Mobile Computing*, Vol. 2019, pp. 1–16, https://doi.org/10.1155/2019/7430860.

Primjena proširenog UTAUT modela za ispitivanje usvajanja mikroučenja: empirijska studija vijetnamskih telekomunikacijskih tvrtki

Bui Quang Tuyen[1], *Phuong Mai Nguyen*[2]

Sažetak

U ovom se radu proširuje model UTAUT kako bi se ispitalo usvajanje mikroučenja u vijetnamskoj telekomunikacijskoj industriji. Provedena je samostalna anketa za prikupljanje podataka triju najvećih telekomunikacijskih tvrtki u Vijetnamu. Nakon dva mjeseca dobili smo 349 valjanih odgovora na upitnik. Analiza modeliranja strukturnih jednadžbi (SEM) provedena je u SmartPLS-u kako bi se testirale predložene hipoteze. Rezultati našeg istraživanja otkrili su da je očekivani učinak najvažniji čimbenik koji određuje namjeru zaposlenika da koriste sustav za mikroučenje. Osim toga, očekivani napor i podrška menadžmenta pozitivno utječu na namjeru korištenja sustava. Međutim, društveni utjecaj i olakšavajući uvjeti statistički ne utječu na namjeru korištenja mikroučenja. Naši nalazi sugeriraju da bi korporativni menadžeri trebali posvetiti više pozornosti dizajnu sustava za e-učenje kako bi se mikroučenje integriralo u različite platforme s ciljem da se zaposlenicima olakša pristup sustavu. Nadalje, menadžeri bi trebali primjerom promovirati zaposlenike za usvajanje mikroučenja.

Ključne riječi: *usvajanje mikroučenja, telekomunikacijska industrija, jedinstvena teorija prihvaćanja i korištenja tehnologije (UTAUT), Vietnam*

JEL klasifikacija: *I20, M12, M15, L96*

---

[1] *Doktor ekonomskih znanosti, University of Economics and Business, Vietnam National University Hanoi, 144 Xuan Thuy, Cau Giay District, Hanoi, 100000, Vijetnam. Znanstveni interes: organizacijsko ponašanje, digitalna transformacija, inovacije u poduzećima, vodstvo, organizacijsko učenje. E-mail: tuyenbq@vnu.edu.vn.*

[2] *Izvanredni professor, International School, Vijetnam National University Hanoi, G7 Building, 144 Xuan Thuy, Cau Giay District, Hanoi, 100000, Vijetnam. Znanstveni interes: održivost, organizacijsko ponašanje, digitalna transformacija. Tel.: +84 944398788. E-mail: mainp@vnu.edu.vn (Autor za korespondenciju).*

258

Bui Quang Tuyen, Phuong Mai Nguyen • Applying extended UTAUT model...
Zb. rad. Ekon. fak. Rij. • 2025 • Vol. 43 • No. 1 • 233–258

Appendix

Table A.1: Measurement items

Constructs	Code	Item description
Performance Expectancy (PE)	PE1	I find microlearning useful in my learning
	PE2	Using microlearning enables me to accomplish learning activities more quickly
	PE3	Using microlearning increases my learning productivity
Effort Expectancy (EE)	EE1	My interaction with microlearning is clear and understandable
	EE2	Learning to use microlearning is easy for me
	EE3	I am skillful at using microlearning
Social Influence (SI)	SI1	People who are important to me think that I should use microlearning
	SI2	My colleagues think that I should use microlearning
	SI3	In general, my company has supported the use of microlearning
Management Support (MS)	MS1	My manager encourages me to upgrade my capabilities by using microlearning
	MS2	My manager suggests relevant content to me on microlearning
	MS3	My manager supports and encourages me to refer microlearning for my work
	MS4	My manager cares about how I use microlearning
Facilitating Conditions (FC)	FC1	I have enough resources to use microlearning
	FC2	I have the knowledge necessary to use microlearning
	FC3	Microlearning is compatible with other systems I use
	FC4	Microlearning in my company is available for assistance with users' difficulties
Intention to Use Microlearning (IU)	IU1	I will use microlearning in the future
	IU2	I plan to use microlearning as soon as possible
	IU3	I would recommend microlearning to my colleagues

Source: Authors adapted from previous studies