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Factors Affecting the Adoption of Artificial Intelligence in Trade Union Financial Management in Vietnam

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Abstract
In the context of national digital transformation and the Fourth Industrial Revolution, Artificial Intelligence (AI) has emerged as a foundational technology driving managerial innovation in both the public and private sectors. For trade union organizations, the adoption of AI in financial management not only enhances the efficiency of revenue and expenditure management and the utilization of financial resources but also improves transparency, monitoring capabilities, and decision-making quality. However, the level of AI adoption in trade union financial management in Vietnam remains limited and is influenced by various factors. Drawing upon the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Resource-Based View (RBV), this study proposes a research framework consisting of six determinants affecting AI adoption in trade union financial management: perceived usefulness, perceived ease of use, digital technology infrastructure, financial data quality, digital competence of trade union officials, and leadership support. The study contributes to the theoretical foundation for future empirical research and provides policy implications for promoting AI adoption within Vietnam's trade union system.

Keywords: Artificial Intelligence, trade union financial management, digital transformation, digital competence, AI adoption

1. Introduction

The rapid advancement of the Fourth Industrial Revolution has accelerated the integration of advanced digital technologies into organizational management practices, among which Artificial Intelligence (AI) is widely recognized as a transformative technology with significant disruptive potential. According to the Organisation for Economic Co-operation and Development (OECD, 2024), AI refers to a machine-based system capable of inferring from input data to generate outputs such as predictions, content, recommendations, or decisions that can influence either physical or virtual environments. With its ability to process large volumes of data, automate business processes, and support data-driven decision-making, AI is increasingly being applied in management, finance, accounting, auditing, and public administration.

In Vietnam, digital transformation has been identified as a key driver of socio-economic development in the new era. Decision No. 749/QĐ-TTg dated June 3, 2020, issued by the Prime Minister on the National Digital Transformation Program to 2025 with a vision toward 2030, emphasizes the development of digital government, digital economy, and digital society while encouraging organizations and enterprises to accelerate the adoption of digital technologies to enhance operational efficiency and governance quality.

Within this context, the Vietnam Trade Union system has gradually implemented digital transformation initiatives to improve management effectiveness and better serve union members and workers. Among the various functions of trade unions, financial management plays a particularly critical role as it directly relates to the mobilization, allocation, utilization, and supervision of organizational financial resources. The adoption of AI in trade union financial management is expected to facilitate the automation of accounting and financial processes, strengthen data analytics capabilities, support revenue and expenditure forecasting, enhance transparency, and improve the quality of financial decision-making.

Despite these expectations, the practical adoption of AI in trade union financial management in Vietnam remains relatively limited. Financial management activities in many grassroots trade unions and upper-level trade unions continue to rely heavily

on manual procedures, standalone software systems, and the experience of financial officers. Meanwhile, the successful implementation of AI solutions requires adequate technological infrastructure, high-quality data, skilled human resources, and appropriate governance mechanisms. This situation highlights the need for a systematic investigation of the factors influencing AI adoption in trade union financial management. Such research can provide a scientific basis for developing policies and solutions aimed at accelerating digital transformation within Vietnam's trade union system.

2. Literature Review

The rapid advancement of Artificial Intelligence (AI) is fundamentally transforming management practices across both public and private sector organizations. Owing to its capabilities in processing large volumes of data, learning from data patterns, and supporting real-time decision-making, AI has been increasingly applied in various financial activities, including budget forecasting, fraud detection, risk management, investment analysis, and internal control (Makridakis, Spiliotis, & Assimakopoulos, 2022). In the public sector, AI is expected to enhance governance effectiveness, improve transparency, reduce operational costs, and strengthen the quality of public service delivery (OECD, 2024).

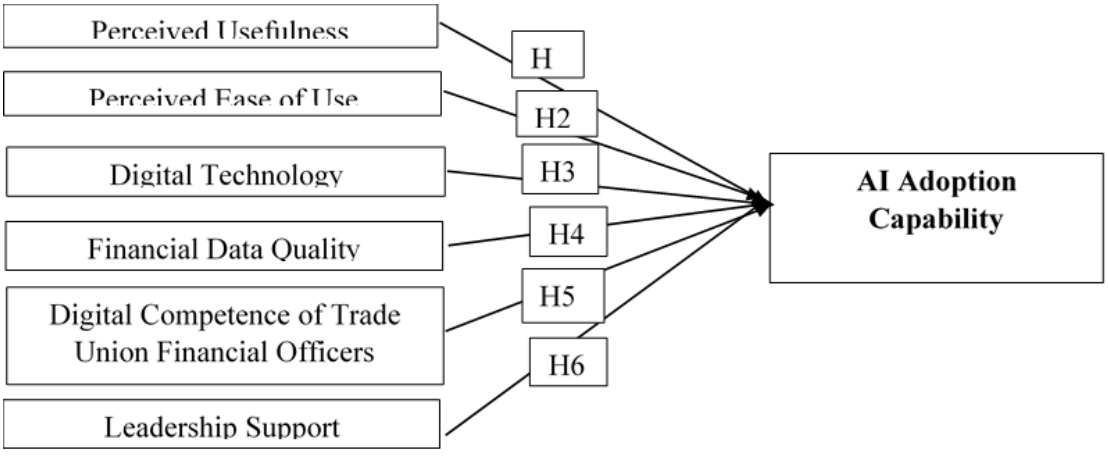
To explain technology adoption and usage behavior, numerous theoretical models have been developed and empirically validated across different contexts. One of the most influential frameworks is the Technology Acceptance Model (TAM) proposed by Davis (1989) [6]. According to TAM, individuals' intentions to adopt and use a technology are primarily determined by two factors: perceived usefulness and perceived ease of use. Subsequent studies have consistently confirmed the significant influence of these factors on the adoption of emerging digital technologies, including AI-based applications.

Building upon TAM, Venkatesh *et al*. (2003) [16] developed the Unified Theory of Acceptance and Use of Technology (UTAUT). This model posits that technology usage behavior is influenced by performance expectancy, effort expectancy, social influence, and facilitating conditions. Compared with earlier frameworks, UTAUT has demonstrated greater explanatory power regarding technology adoption and usage intentions within organizational settings, particularly in the case of complex and innovative technologies.

In addition to technology acceptance theories, the Resource-Based View (RBV) has been widely employed to examine organizations' technological capabilities. According to Barney (1991) [5], resources that are valuable, rare, inimitable, and non-substitutable constitute the foundation of sustainable competitive advantage. In the digital transformation era, technological infrastructure, data quality, and employees' digital competencies are increasingly recognized as strategic resources that determine an organization's ability to implement and leverage AI effectively (Mikalef & Gupta, 2021) [13]. Recent studies suggest that organizations equipped with advanced technological infrastructure, high-quality data, and digitally competent personnel are more likely to achieve successful AI adoption and superior organizational performance.

Despite the growing body of literature on AI adoption in businesses and public-sector organizations, research focusing on trade union organizations remains relatively limited. In particular, few studies have systematically examined the determinants of AI adoption in trade union financial management within the Vietnamese context. Financial management represents a critical function of trade unions, requiring high levels of accuracy, transparency, and efficiency in the management and utilization of financial resources. Therefore, investigating the factors influencing AI adoption in trade union financial management is not only theoretically relevant but also practically significant for promoting digital transformation and modernizing trade union operations in Vietnam.

Based on the literature review, the proposed research framework integrates three major theoretical foundations: the Technology Acceptance Model (TAM) developed by Davis (1989) [6], the Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh *et al*. (2003) [16], and the Resource-Based View (RBV) introduced by Barney (1991) [5]. TAM and UTAUT are employed to explain individual and organizational technology adoption behavior, whereas RBV is utilized to clarify the role of strategic resources such as technological infrastructure, data quality, and digital competencies in facilitating AI implementation. Accordingly, this study proposes a research model comprising six determinants of AI adoption in trade union financial management in Vietnam: (1) Perceived Usefulness, (2) Perceived Ease of Use, (3) Digital Technology Infrastructure, (4) Financial Data Quality, (5) Digital Competence of Trade Union Financial Officers, and (6) Leadership Support.



Source: Developed by the authors.

Fig 1: Proposed Research Model

3. Theoretical Background and Research Hypotheses

3.1. Perceived Usefulness and AI Adoption in Trade Union Financial Management

Perceived Usefulness (PU) is defined by Davis (1989) [6] as the degree to which an individual believes that using a particular technology system will enhance job performance. Within the Technology Acceptance Model (TAM), perceived usefulness is considered one of the most important determinants of users' attitudes toward and intentions to adopt technology. When individuals perceive that a technology can improve productivity, reduce processing time, and enhance decision-making quality, they are more likely to accept and use that technology.

In the field of financial management, AI can automate data-processing tasks, support financial analysis, facilitate revenue and expenditure forecasting, and provide valuable information for decision-making. For trade union organizations, awareness of the benefits generated by AI may encourage financial officers to adopt and integrate AI into their professional activities. Previous empirical studies have consistently confirmed that perceived usefulness positively influences individuals' intentions and behaviors regarding the adoption of emerging digital technologies (Davis, 1989; Venkatesh & Davis, 2000) [6, 16].

H1: Perceived usefulness positively affects AI adoption in trade union financial management.

3.2. Perceived Ease of Use and AI Adoption in Trade Union Financial Management

According to Davis (1989) [6], Perceived Ease of Use (PEOU) refers to the degree to which an individual believes that using a technology requires minimal effort. A technology that is perceived as easy to use reduces psychological barriers, lowers learning costs, and increases users' willingness to adopt it.

In the context of AI applications, tools that are user-friendly, accessible, and easily integrated into existing business processes are more likely to be accepted and utilized. Conversely, technical complexity may increase resistance and hinder technology adoption within organizations. Venkatesh *et al*. (2003) [16] found that effort expectancy, a concept closely related to perceived ease of use, significantly influences technology usage behavior in organizational settings.

Therefore, the following hypothesis is proposed:

H2: Perceived ease of use positively affects AI adoption in trade union financial management.

3.3. Digital Technology Infrastructure and AI Adoption in Trade Union Financial Management

The Resource-Based View (RBV) suggests that technological resources play a crucial role in developing organizational capabilities and enhancing performance (Barney, 1991) [5]. Digital technology infrastructure encompasses hardware, software, databases, cloud computing platforms, and communication networks that support the deployment and operation of digital technologies. For AI applications, technological infrastructure serves as a fundamental prerequisite for data collection, storage, processing, and utilization. Mikalef and Gupta (2021) [13] identified technological infrastructure as a core component of organizational AI capability. Within trade union organizations, adequate investment in digital infrastructure is expected to facilitate the implementation of AI-based solutions in financial management.

Accordingly, the following hypothesis is proposed:

H3: Digital technology infrastructure positively affects AI adoption in trade union financial management.

3.4. Financial Data Quality and AI Adoption in Trade Union Financial Management

Data are widely recognized as a strategic resource in the digital economy and constitute the foundation of AI applications. According to DeLone and McLean (2003) [7], data quality and information quality are critical determinants of information system effectiveness. AI systems can only generate reliable analyses and forecasts when they are supported by complete, accurate, consistent, and timely data. In trade union financial management, data related to union fees, membership contributions, operational expenditures, and member support programs provide essential inputs for AI-based analysis and forecasting. Higher-quality financial data enable organizations to exploit AI applications more effectively and achieve better outcomes.

Thus, the following hypothesis is proposed:

H4: Financial data quality positively affects AI adoption in trade union financial management.

3.5. Digital Competence of Trade Union Officials and AI Adoption in Trade Union Financial Management

Digital competence refers to the ability to use digital technologies, manage and analyze data, and operate digital tools effectively in professional contexts (European Commission, 2022). In digital transformation initiatives, human resources are widely regarded as the central factor determining the success of technology implementation.

Beyond technological infrastructure and data availability, AI adoption requires personnel who possess the knowledge and skills necessary to understand, operate, and utilize AI applications effectively. Mikalef and Gupta (2021) [13] emphasized that skilled human resources and digital competencies constitute essential components of organizational AI capability. Consequently, the digital competence of trade union officials is expected to facilitate the adoption of AI in financial management activities.

Accordingly, the following hypothesis is proposed:

H5: The digital competence of trade union officials positively affects AI adoption in trade union financial management.

3.6. Leadership Support and AI Adoption in Trade Union Financial Management

Studies on technological innovation consistently highlight leadership commitment and support as critical determinants of successful technology implementation within organizations (Venkatesh *et al*., 2003; Tornatzky & Fleischer, 1990) [16]. Leadership support is reflected in the establishment of a digital transformation vision, allocation of resources, formulation of supportive policies, and encouragement of employees to embrace technological innovation.

Within the trade union system, AI implementation requires substantial investments in financial resources, technological infrastructure, and human capital. Therefore, the commitment and support of trade union leaders are expected to facilitate the deployment and expansion of AI applications in financial

management.
Based on these arguments, the following hypothesis is proposed:
H6: Leadership support positively affects AI adoption in trade union financial management.

4. Research Methodology

This study adopts a quantitative research approach to examine the factors influencing the adoption of Artificial Intelligence (AI) in trade union financial management in Vietnam. Research data were collected through a structured questionnaire survey administered to trade union officials directly involved in financial management at different levels of the trade union system, including financial officers, trade union accountants, members of trade union inspection committees, and trade union leaders responsible for financial management activities.
The measurement scales were adapted and refined from prior studies on technology acceptance and AI adoption. The proposed model includes six independent constructs: perceived usefulness, perceived ease of use, digital technology infrastructure, financial data quality, digital competence of trade union officials, and leadership support. All observed variables were measured using a five-point Likert scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree").
The collected data were analyzed using SPSS and AMOS/SmartPLS through a multivariate analytical procedure.
First, Cronbach's Alpha was employed to assess the reliability of the measurement scales and eliminate items that failed to meet the required standards.
Second, Exploratory Factor Analysis (EFA) was conducted to examine the underlying factor structure and identify representative constructs.
Third, Confirmatory Factor Analysis (CFA) was performed to evaluate the goodness-of-fit of the measurement model and to assess convergent and discriminant validity.
Finally, Structural Equation Modeling (SEM) was employed to test the proposed hypotheses and evaluate the magnitude of the effects of the independent variables on AI adoption in trade union financial management. SEM enables the simultaneous examination of multiple relationships among latent constructs, thereby enhancing the reliability and generalizability of the research findings.

5. Research Results

5.1. Descriptive Statistics of the Research Sample

The study was conducted through a survey of trade union officials directly involved in financial management activities at different levels of the trade union system throughout Vietnam. A total of 320 questionnaires were distributed using a combination of convenience sampling and purposive sampling techniques. After the data collection period, 302 responses were received, representing a response rate of 94.38%. Following data screening and cleaning procedures, 18 questionnaires were excluded due to incomplete responses or inconsistent answering patterns. Consequently, 284 valid responses were retained for subsequent analyses, accounting for 88.75% of the distributed questionnaires and 94.04% of the returned questionnaires.
Regarding respondents' positions, trade union accountants constituted the largest proportion (39.4%), followed by trade union financial officers (31.0%), members of trade union inspection committees (15.5%), and trade union leaders (14.1%). In terms of work experience, 69.0% of respondents had more than five years of professional experience, 23.6% had between three and five years of experience, and 7.4% had less than three years of experience. These figures indicate that the majority of respondents possessed substantial experience and a sound understanding of trade union financial management, thereby enhancing the reliability of the collected data.

5.2. Reliability Assessment of Measurement Scales

The reliability of the measurement scales was evaluated using Cronbach's Alpha coefficients. According to Nunnally and Bernstein (1994) [15], a scale is considered reliable when Cronbach's Alpha exceeds 0.70 and the corrected item-total correlation is greater than 0.30.

Table 1: Reliability Assessment Results

Construct	Number of Items	Cronbach's Alpha
Perceived Usefulness (PU)	4	0.857
Perceived Ease of Use (PEOU)	4	0.842
Digital Technology Infrastructure (DTI)	4	0.871
Financial Data Quality (FDQ)	4	0.848
Digital Skills Competency (DSC)	4	0.883
Leadership Support (LSS)	4	0.861
AI Adoption Ability (AIA)	5	0.894

Source: Authors' calculations.

The results indicate that all constructs achieved Cronbach's Alpha values above 0.80, demonstrating a high level of internal consistency. Furthermore, all corrected item-total correlations exceeded the recommended threshold of 0.30. Therefore, all observed variables were retained for subsequent exploratory factor analysis.

5.3. Exploratory Factor Analysis (EFA)

Prior to conducting EFA, the suitability of the data was assessed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity.

Table 2: KMO and Bartlett's Test Results

Indicator	Value
KMO	0.901
Bartlett's Test (Sig.)	0.000

Source: SPSS output.

The KMO value of 0.901 exceeded the recommended threshold of 0.50, while Bartlett's Test was statistically significant ($p < 0.001$), indicating that the data were appropriate for factor analysis.
For the independent variables comprising 24 observed indicators, EFA extracted six factors exactly as proposed by the theoretical model. The total variance explained reached 66.84%, exceeding the minimum threshold of 50% suggested by Hair *et al*. (2022) [9]. Factor loadings ranged from 0.682 to 0.854, all above the acceptable level of 0.50. No cross-loading exceeded 0.40, confirming satisfactory convergent and discriminant validity.
For the dependent construct, "AI Adoption Ability in Trade Union Financial Management," the five observed variables converged into a single factor with an Eigenvalue of 3.487

and a total variance explained of 69.74%. All factor loadings exceeded 0.70, indicating that the indicators effectively represented the construct.

5.4. Confirmatory Factor Analysis (CFA)

Following the EFA results, CFA was conducted to assess the goodness-of-fit of the measurement model.

Table 3: Goodness-of-Fit Indices of the CFA Model

Index	Value	Recommended Threshold
Chi-square/df	1.972	< 3
GFI	0.918	> 0.90
TLI	0.949	> 0.90
CFI	0.956	> 0.90
RMSEA	0.058	< 0.08

Source: AMOS output.

All model fit indices satisfied or exceeded the recommended thresholds proposed by Hair *et al*. (2022) [9] and Kline (2023) [10], indicating a satisfactory fit between the measurement model and the observed data.

The study further evaluated Composite Reliability (CR) and Average Variance Extracted (AVE).

Table 4: Convergent Validity Assessment

Construct	CR	AVE
PU	0.861	0.609
PEOU	0.846	0.580
DTI	0.875	0.637
FDQ	0.852	0.592
DSC	0.887	0.663
LSS	0.868	0.622
AIA	0.901	0.646

Source: AMOS output.

All constructs achieved CR values above 0.70 and AVE values above 0.50, confirming convergent validity. In addition, the square root of AVE for each construct exceeded its correlations with other constructs, demonstrating adequate discriminant validity.

5.5. Structural Model and Hypothesis Testing

After confirming the adequacy of the measurement model, Structural Equation Modeling (SEM) was employed to examine the effects of the proposed factors on AI adoption in trade union financial management.

Table 5: Hypothesis Testing Results

Hypothesis	Relationship	β	S.E.	C.R.	P-value	Result
H1	PU → AIA	0.187	0.054	3.463	<0.001	Supported
H2	PEOU → AIA	0.143	0.058	2.466	0.014	Supported
H3	DTI → AIA	0.224	0.051	4.392	<0.001	Supported
H4	FDQ → AIA	0.169	0.053	3.189	0.001	Supported
H5	DSC → AIA	0.301	0.049	6.143	<0.001	Supported
H6	LSS → AIA	0.211	0.052	4.058	<0.001	Supported

Source: SEM analysis results.

The findings indicate that all six hypotheses were supported at the 5% significance level. Among the examined factors, the digital competence of trade union officials exerted the strongest effect on AI adoption in trade union financial management (β = 0.301), followed by digital technology infrastructure (β = 0.224) and leadership support (β = 0.211). In contrast, perceived ease of use exhibited the weakest effect (β = 0.143), although it remained statistically significant.

Furthermore, the coefficient of determination (R^2 = 0.628) indicates that the six independent variables collectively explain 62.8% of the variance in AI adoption capability within trade union financial management. This result suggests that the proposed model possesses substantial explanatory power.

Overall, the findings demonstrate that promoting AI adoption in trade union financial management depends not only on technological conditions but also on the digital competencies of trade union officials, the quality of financial data, and leadership commitment. These factors should therefore be prioritized in the implementation of digital transformation and AI initiatives within the Vietnamese trade union system.

6. Conclusion and Recommendations

In the context of accelerating digital transformation, Artificial Intelligence (AI) is increasingly playing a critical role in enhancing the effectiveness of financial management within organizations. Drawing upon the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Resource-Based View (RBV), this study developed and empirically tested a model examining the factors influencing the adoption of AI in trade union financial management in Vietnam.

The findings indicate that all six proposed determinants—namely perceived usefulness, perceived ease of use, digital technology infrastructure, financial data quality, digital competence of trade union officers, and leadership support—have positive and statistically significant effects on the adoption of AI in trade union financial management. Among these factors, the digital competence of trade union officers exerts the strongest influence, followed by digital technology infrastructure and leadership support. These results suggest that successful AI adoption depends not only on technological readiness but also on human capabilities and organizational commitment.

The study implies that promoting AI adoption in trade union financial management requires a comprehensive approach that simultaneously addresses technological, data-related, and human-resource dimensions.

First, the Vietnam General Confederation of Labour and trade unions at all levels should prioritize investments in digital infrastructure to ensure interoperability, integration, and scalability for future AI applications. A robust technological foundation will facilitate the deployment and effective utilization of AI-driven financial management systems.

Second, a centralized and standardized trade union financial database should be established. Standardizing data collection, storage, and management processes is essential for improving data quality, thereby enhancing the reliability and effectiveness of AI-based analytical and forecasting models.

Third, strengthening the digital competence of trade union personnel should be considered a strategic priority in the digital transformation process. Training and capacity-building programs should focus on data analytics, AI applications, digital tools, and technology-enabled financial management practices. Enhancing employees' digital skills will increase their readiness and ability to effectively utilize AI solutions in their daily operations.

Finally, trade union leaders at all levels should play a proactive role in promoting digital transformation initiatives. Leadership commitment is crucial in mobilizing resources, fostering an innovation-oriented culture, and encouraging the adoption of emerging technologies. Strong leadership support can significantly accelerate the implementation and diffusion of AI applications across the trade union system.

The coordinated implementation of these recommendations is expected to enhance the efficiency, transparency, accountability, and decision-making quality of trade union financial management, thereby contributing to the modernization of trade union operations in the digital era.

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