ISSN 2409-2665
Journal of Logistics, Informatics and Service Science
Vol. 12 (2025) No. 9, pp. 179-196
DOI:10.33168/JLISS.2025.0912

Bridging Technical Quality and User Experience: A Hierarchical Structural Model of Information System-Enhanced Decision-Making in Vietnamese SMEs

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Abstract. In the rapidly evolving digital landscape, small and medium enterprises (SMEs) in emerging economies faced significant challenges in leveraging information systems for effective decision-making. This study investigated the complex relationships between information system quality, user perceptions, training quality, and decision-making success in Vietnamese SMEs. By integrating the DeLone and McLean Information Systems Success Model with the Technology Acceptance Model, this research addressed the fragmented nature of existing literature and offered a more comprehensive understanding of information system success. The study employed a quantitative approach using data collected from 112 SMEs in Vietnam. Structural equation modeling using SmartPLS 4.0 was utilized to test the hypothesized relationships. Information System Quality was comprised information quality, system quality, and service quality, training quality. The results confirmed all eight hypothesized relationships, demonstrating that Information System Quality significantly influenced Decision-Making Success both directly and indirectly through Perceived Usefulness and Perceived Ease of Use. The findings contributed to theory by validating an integrated model in the Vietnamese context and offered practical guidance for managers seeking to enhance decision-making capabilities through improved information system implementation.

Keywords: information system quality, decision-making success, technology acceptance, information system success, Vietnamese SMEs

1. Introduction

In today's digital economy, information systems (IS) have become indispensable strategic assets that significantly influence organizational performance across all business sectors (Chatterjee & Kar, 2020). Small and medium-sized enterprises (SMEs), which constitute the backbone of most economies worldwide, increasingly rely on information systems to enhance their operational efficiency and strategic decision-making capabilities (Hossain *et al.*, 2019). Despite their economic significance, Vietnamese SMEs face substantial challenges in effectively implementing and leveraging information systems to support decision-making processes (Nguyen & Luu, 2020).

The relationship between information system quality and decision-making success represents a critical area of inquiry as organizations continue to invest substantial resources in information technology infrastructure (Chatterjee *et al.*, 2023). High-quality information systems provide decision-makers with accurate, timely, and relevant information, thereby enabling more informed and effective decisions (DeLone & McLean, 2016; T. T. Huynh & B. T. Khoa, 2025; Khanh *et al.*, 2025). Conversely, poor-quality systems may lead to suboptimal decisions, potentially resulting in significant financial losses and diminished competitive advantage.

The Vietnamese business environment presents unique challenges for SMEs attempting to implement effective information systems. These challenges include limited financial resources, inadequate technological infrastructure, insufficient technical expertise, and cultural factors that influence technology adoption and utilization (Cuong *et al.*, 2025; Tran & Khoa, 2025b). Moreover, the rapidly evolving technological landscape and intensifying global competition further exacerbate these challenges, compelling Vietnamese SMEs to continuously improve their information systems to remain competitive. As Vietnam continues its digital transformation journey, understanding how information system quality impacts decision-making success becomes increasingly crucial for both academic researchers and practitioners.

The theoretical foundation for understanding the relationship between information system quality and decision-making success is primarily established by two seminal frameworks: the DeLone and McLean Information Systems Success Model (D&M ISS Model) and the Technology Acceptance Model (TAM). The D&M ISS Model, first proposed by DeLone (1988) and subsequently updated (DeLone & McLean, 2003), posits that information quality, system quality, and service quality collectively influence system use and user satisfaction, which in turn affect net benefits, including decision-making outcomes.

Empirical research has consistently demonstrated positive relationships between information system quality dimensions and various organizational outcomes, including decision-making success. For instance, Xu *et al.* (2013)) found that information quality significantly predicted decision-making effectiveness in Chinese enterprises, while Pham *et al.* (2021) reported similar findings in the context of Vietnamese manufacturing firms. System quality has been linked to improved decision speed and confidence (Chatterjee & Kar, 2020; Tran & Khoa, 2025a), while service quality has been shown to enhance user satisfaction and system utilization, indirectly contributing to better decision outcomes.

Despite the extensive literature on information system quality and decision-making success, two significant research gaps persist. The mediating mechanisms through which information system quality influences decision-making success remain inadequately explored, particularly in emerging economies like Vietnam (Chatterjee *et al.*, 2024). Most studies have examined direct relationships between system quality and decision outcomes, neglecting the complex pathways through which this influence occurs. Specifically, the role of perceived usefulness and perceived ease of use as potential mediators has not been sufficiently investigated in the Vietnamese SME context. This gap is especially problematic given the unique cultural and technological context of Vietnam, where user perceptions may play a particularly crucial role in determining how effectively information systems

support decision-making processes. Training quality has emerged as another critical factor influencing both information system quality perceptions and decision-making success.

This study aims to address the identified research gaps by developing and empirically testing an integrated model which seeks to: (1) investigate the direct relationship between information system quality and decision-making success; and (2) provide theoretical and practical insights for enhancing decision-making capabilities through improved information system implementation in Vietnamese SMEs.

2. Literature review

2.1. Theoretical framework

The Technology Acceptance Model (TAM), initially proposed by Davis (1989), provides a foundational theoretical lens through which researchers can understand user adoption and utilization of information systems. The model has been extensively validated across diverse technological contexts, emerging as one of the most influential frameworks for explaining user behavior towards information systems (M. Al-Okaily *et al.*, 2025). At its core, TAM posits that two primary constructs—Perceived Usefulness (PU) and Perceived Ease of Use (PEOU)—fundamentally determine an individual's intention to use technology, which subsequently influences actual system usage. In the context of small and medium enterprises (SMEs), particularly in emerging economies like Vietnam, TAM offers valuable insights into how decision-makers evaluate and ultimately adopt information systems. As noted by Al-Kofahi *et al.* (2020), SMEs often face unique challenges in technology adoption compared to larger enterprises, including resource constraints, limited technical expertise, and risk aversion. Understanding the perceptual factors that drive technology acceptance becomes especially crucial in these environments.

While TAM focuses predominantly on user acceptance, DeLone and McLean's Information System Success Model provides a complementary perspective by examining the multifaceted dimensions of system success. Originally proposed in 1992 and subsequently updated in 2003, this model has emerged as one of the most comprehensive frameworks for evaluating information system effectiveness. The updated model identifies six interconnected dimensions of success: information quality, system quality, service quality, system use, user satisfaction, and net benefits (DeLone & McLean, 2003). These quality dimensions collectively influence both system use and user satisfaction, which in turn contribute to the realization of net benefits. Within organizational contexts, particularly SMEs, these benefits may manifest as improved decision-making processes, enhanced operational efficiency, strengthened customer relationships, and ultimately superior financial performance (Mitropoulos *et al.*, 2024).

The integration of TAM and DeLone & McLean's IS Success Model provides a more comprehensive framework for understanding the complex dynamics between system characteristics, user perceptions, and organizational outcomes. This integrated approach acknowledges that system quality, information quality, and service quality (from the IS Success Model) may influence user perceptions of usefulness and ease of use (from TAM), which subsequently impact system use, user satisfaction, and organizational benefits. This integration is particularly relevant in the context of SMEs in emerging economies, where both technological acceptance and system success are critical concerns. By examining how system quality attributes shape user perceptions, and how these perceptions influence decision-making processes, organizations can develop more effective strategies for system implementation and optimization. This underscores the importance of considering both technical system attributes and human perceptual factors when examining information system effectiveness in SMEs. Hence, this study proposed the research model:

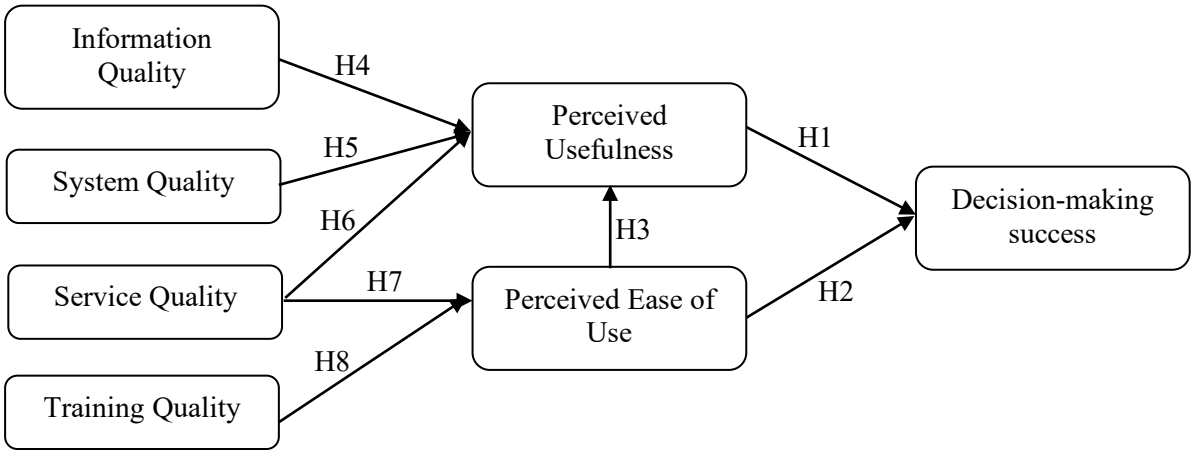

Fig. 1: The research model

2.2. Hypotheses development

Perceived usefulness has been consistently identified as a critical determinant of information system success, particularly in contexts where systems are deployed to support managerial decision-making.. Within SMEs, where resource constraints often necessitate careful evaluation of technological investments, the perceived utility of information systems becomes especially salient (A. Al-Okaily *et al.*, 2021). Empirical evidence from multiple studies supports the positive relationship between perceived usefulness and decision-making success. Phornlaphatrachakorn (2019) found that the usefulness of accounting information significantly influences decision-making success, with managers who perceived information systems as more useful demonstrating greater confidence and effectiveness in their decision processes. Similarly, E. Monteiro *et al.* (2022) observed that perceived usefulness mediates the relationship between information quality and decision-making success, suggesting that information quality influences decision outcomes primarily through its impact on perceived usefulness. Therefore, based on both theoretical foundations and empirical evidence, we propose:

H1: Perceived Usefulness positively impacts on SME's Decision-making success

The relationship between perceived ease of use and decision-making success is grounded in the cognitive efficiency paradigm, which suggests that reducing the cognitive effort required to operate a system allows users to dedicate more cognitive resources to the decision task itself M. Al-Okaily *et al.* (2025). When information systems are perceived as intuitive and straightforward to use, decision-makers can focus on analyzing information rather than struggling with system mechanics, potentially leading to more thorough analysis and better decisions. Stefanovic *et al.* (2016) emphasize that increasing the success of information systems requires making them more useful, simple to use, and user-friendly. Their research found that ease of use significantly affected both system utilization and user satisfaction, which are precursors to effective decision-making. Similarly, Phornlaphatrachakorn (2019) observed that systems perceived as easier to use facilitated more comprehensive information analysis, thereby enhancing decision quality. Based on these theoretical arguments and empirical findings, we propose:

H2: Perceived Ease of Use positively impacts on SME's Decision-making success

The relationship between perceived ease of use and perceived usefulness is a foundational element of the Technology Acceptance Model. Davis (1989) originally proposed that systems perceived as easier to use would, all else being equal, be perceived as more useful because the effort saved could be redirected toward accomplishing other tasks. This relationship has been consistently validated across diverse technological contexts and user populations. In the context of financial

information systems specifically, Oh *et al.* (2025) found that the ease with which users could navigate and operate systems significantly influenced their perceptions of system utility. Systems that required extensive training or featured counterintuitive interfaces were perceived as less useful, even when they offered substantial functionality.

H3: Perceived Ease of Use positively impacts on SME's Perceived Usefulness

Information quality represents a critical determinant of system usefulness, particularly in contexts where information systems are deployed primarily to support managerial decision-making. Petter *et al.* (2013) emphasize that information quality encompasses attributes such as accuracy, timeliness, completeness, relevance, and consistency—characteristics that directly influence the utility of information for decision purposes. Empirical evidence strongly supports the relationship between information quality and perceived usefulness. S. Monteiro and Pais (2019) found that financial information quality significantly influenced perceptions of system utility, with higher quality information enhancing perceptions of usefulness across multiple organizational contexts. Similarly, the quality of information outputs was a primary determinant of system usefulness, particularly for financial management applications. Therefore, we propose:

H4: Information Quality positively impacts on SME's Perceived Usefulness

System quality, encompassing aspects such as reliability, flexibility, accessibility, and response time, has been consistently identified as a significant determinant of perceived usefulness. High-quality systems that operate reliably and efficiently enable users to complete tasks more effectively, thereby enhancing perceptions of utility (Aurelija *et al.*, 2024; Teo *et al.*, 2025). Conversely, systems plagued by technical problems, slow response times, or frequent downtime are likely to be perceived as less useful, regardless of their theoretical capabilities. Empirical evidence from multiple studies supports this relationship. Al-Hattami (2021) found that system quality positively correlated with information quality in Yemeni commercial banks, suggesting an indirect relationship with perceived usefulness through enhanced information quality. Similarly, Sunarta and Astuti (2023) observed that the quality of accounting information systems positively influenced organizational performance, with perceived usefulness serving as a mediating factor.

H5: System Quality positively impacts on SME's Perceived Usefulness

Service quality, encompassing the support provided to system users by the IT department or service provider, has emerged as a critical determinant of perceived usefulness in contemporary information system contexts. As systems grow increasingly complex and integrated, the quality of technical support, training, and user assistance becomes paramount in ensuring that users can effectively leverage system capabilities (Martynas & Algita, 2024; Zhang & Deng, 2024). DeLone and McLean (2003) emphasized the importance of service quality in their updated IS Success Model, noting that poor service quality could undermine otherwise successful systems. Their model suggests that service quality directly influences both system use and user satisfaction, which are precursors to perceived net benefits. In the context of SMEs, where technical expertise may be limited, high-quality service support becomes especially critical for ensuring that systems are perceived as useful for organizational purposes. Empirical evidence supports this relationship across diverse contexts. Therefore, we propose:

H6: Service Quality positively impacts on SME's Perceived Usefulness

The relationship between service quality and perceived ease of use is grounded in the understanding that effective support services can significantly reduce the learning curve associated with new information systems. When users have access to responsive, knowledgeable support personnel, comprehensive documentation, and targeted training resources, they are more likely to perceive systems as intuitive and manageable, regardless of the systems' inherent complexity (Alsqour *et al.*, 2025). Empirical evidence supports this relationship across multiple contexts. Qin *et al.* (2024) found that service quality dimensions, including responsiveness, empathy, and reliability,

significantly influenced perceptions of system accessibility and usability. Similarly, Taufiq-Hail *et al.* (2023) emphasized that the IT department's responsiveness to user needs plays an increasingly important role in determining both user satisfaction and perceptions of system usability. In the context of SMEs specifically, where technical expertise may be limited, high-quality service support becomes particularly critical for shaping perceptions of ease of use. Based on these theoretical arguments and empirical findings, we propose:

H7: Service Quality positively impacts on SME's Perceived Ease of Use

Training quality has been consistently identified as a critical factor influencing perceptions of system ease of use, particularly in contexts involving complex information systems. Sharma and Yetton (2007) emphasized that high-quality training is universally recognized as key to information system success, with training quality directly affecting user capabilities and confidence in system operation. When users receive comprehensive, relevant, and effective training, they develop the knowledge and skills needed to navigate system interfaces, leverage system functionalities, and overcome technical challenges. Empirical evidence strongly supports this relationship across diverse contexts. Similarly, Bradford and Florin (2003) demonstrated that training quality positively affected user experiences with enterprise resource planning systems, including perceptions of system ease of use. In the context of SMEs in emerging economies, training quality takes on added significance given the often limited technological expertise and resources available. Vatanasakdakul *et al.* (2017) observed that information system training can significantly improve user productivity, particularly when the training is tailored to specific organizational contexts and user needs. Similarly, Norfazlina *et al.* (2016) argued that organizations should provide comprehensive training programs to address issues related to information system complexity and job demands, thereby enhancing perceptions of system accessibility. Hence, we propose:

H8: Training Quality positively impacts on SME's Perceived Ease of Use

3. Research method

3.1. Measurement scales

The measurement scales employed in this study were meticulously selected and adapted from established literature to ensure reliability and validity in the Vietnamese SME context. All constructs were measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), following the methodological approach widely adopted in information systems research (.

- Perceived Usefulness (PU) was assessed using three items adapted from A.-V. Huynh and B. T. Khoa (2025). This scale evaluates the degree to which managers believe that using information systems enhances their job performance and productivity.
- Perceived Ease of Use (PEU) was measured using three items adapted from Alsqour *et al.* (2025), assessing the degree to which managers believe that using the information system would be free of effort.
- Decision-making Success (DS) was operationalized using six items adapted from Phornlaphatrachakorn (2019) and Monteiro et al. (2022). This scale evaluates the capacity of an organization to select optimal business alternatives and effectively utilize information to achieve specific objectives.
- Information Quality (IQ) was assessed using five items adapted from Stefanovic et al. (2016), measuring the desirable characteristics of system outputs. These items evaluate dimensions such as accuracy, timeliness, completeness, and format appropriateness. System Quality (SQ) was measured using six items adapted from Wu and Wang (2006) and Lai and Yang (2009), assessing the technical and performance characteristics of the information system. Service Quality (SEQ) was operationalized using five items adapted from Roky and Al Meriouh (2015), evaluating the overall support delivered by the service provider. Training Quality

(TQ) was assessed using six items adapted from Wei et al. (2011), measuring the perceived effectiveness and utility of training programs for system users.

All scales were initially translated from English to Vietnamese using a rigorous back-translation procedure to ensure conceptual equivalence across languages (Binh et al., 2022). The translated questionnaire was then reviewed by three bilingual experts with extensive experience in information systems research to verify linguistic accuracy and cultural appropriateness.

3.2. Sample and Data Collection

This study employed a purposive sampling technique to select respondents from Vietnamese SMEs, following methodological approaches established in previous studies of information system implementation in emerging economies. The target population comprised managers and decision-makers in Vietnamese SMEs who utilize information systems for decision support. This approach allowed for the strategic selection of respondents with relevant experience and knowledge pertaining to information system usage and decision-making processes.

The sample size of 112 managers was determined based on statistical power considerations and established guidelines for structural equation modeling. According to Hair et al. (2017), as cited in Al-Okaily et al. (2022c), a sample size between 100 and 200 is generally adequate for models with moderate complexity. Additionally, the sample size exceeds the minimum threshold established by the "10 times rule," which suggests that the sample size should be at least 10 times the maximum number of paths directed at any construct in the structural model (Al-Kofahi et al., 2023).

Data collection was conducted between January and May 2025 using a mixed-mode approach combining online and paper-based surveys to maximize response rates, following methodological approaches established in previous studies (Binh et al., 2022). Potential respondents were initially contacted via email with an invitation to participate, followed by telephone reminders after two weeks. To mitigate non-response bias, three waves of reminders were sent at two-week intervals.

A total of 175 questionnaires were distributed, yielding 134 responses (76.6% response rate). Following data cleaning procedures, 22 responses were excluded due to incomplete data or response patterns indicating inattentive responding (e.g., straight-lining), resulting in a final sample of 112 valid responses (64% effective response rate). This response rate compares favorably with similar studies in the field, such as Al-Okaily et al. (2022e) and Tran Thanh Thuy (2025), which reported response rates of 62% and 58% respectively. The demographic profile of the 112 respondents, presented in Table 1.

Table 1: Demographic Profile of Respondents

Characteristic	Category	Frequency	Percentage (%)
Position	Senior Manager	48	42.9
	Middle Manager	38	33.9
	Operational Manager	26	23.2
Industry	Manufacturing	35	31.2
	Retail and Wholesale	29	25.9
	Information Technology	18	16.1
	Financial Services	14	12.5
	Other Services	16	14.3
Number of Employees	10-49	38	33.9
	50-99	42	37.5
	100-249	32	28.6

4. Result

The measurement model was assessed using a comprehensive two-step approach as recommended by Hair *et al.* (2019). This approach involved evaluating the reliability and validity of both first-order and

second-order constructs. The analysis was conducted using SmartPLS 4.0 software, which is particularly suitable for complex structural models and relatively small sample sizes.

The internal consistency reliability of the measurement scales was evaluated using both Cronbach's alpha and composite reliability (CR), as presented in Table 2. Cronbach's alpha values ranged from 0.831 to 0.926, exceeding the recommended threshold of 0.70, indicating substantial internal consistency. Similarly, composite reliability values ranged from 0.886 to 0.944, surpassing the recommended threshold of 0.70, further confirming the reliability of the measurement scales. The indicator reliability was assessed by examining the outer loadings of each item. As shown in Table 2, the outer loadings ranged from 0.732 to 0.926, exceeding the recommended threshold of 0.70. This indicates that the variance shared between each construct and its indicators is greater than the measurement error variance, thereby confirming indicator reliability.

Convergent validity, which assesses the extent to which a measure correlates positively with alternative measures of the same construct, was evaluated using Average Variance Extracted (AVE). As presented in Table 2, the AVE values for all constructs ranged from 0.661 to 0.849, exceeding the recommended threshold of 0.50 (Hair *et al.*, 2019). This indicates that each construct explains more than 50% of the variance of its indicators, thereby confirming convergent validity (Fornell & Larcker, 1981).

Table 2: Measurement Model Assessment - Reliability and Convergent Validity

Construct	**Outer Loadings (min-max)**	**Cronbach's Alpha**	**CR**	**AVE**
Perceived Usefulness (PU)	0.828-0.904	0.847	0.91	0.77
Perceived Ease of Use (PEU)	0.867-0.926	0.878	0.93	0.8
Information Quality (IQ)	0.797-0.872	0.884	0.92	0.68
System Quality (SQ)	0.783-0.869	0.905	0.93	0.68
Service Quality (SEQ)	0.788-0.845	0.876	0.91	0.67
Training Quality (TQ)	0.732-0.866	0.887	0.92	0.66
Decision-making Success (DS)	0.816-0.918	0.926	0.94	0.77

Discriminant validity was assessed using the Heterotrait-Monotrait ratio (HTMT). HTMT is a more rigorous method for assessing discriminant validity, especially in PLS-SEM studies. The results of the HTMT analysis are presented in Table 3. The HTMT values ranged from 0.621 to 0.795, all below the conservative threshold of 0.85 recommended by Henseler *et al.* (2015) and adopted in recent information systems research. This indicates that the constructs are empirically distinct from each other, thereby confirming discriminant validity. Furthermore, the confidence intervals for all HTMT values derived from the bootstrapping procedure with 5,000 subsamples did not include the value 1, providing additional evidence of discriminant validity.

Table 3: Discriminant Validity - HTMT Results

	DMS	**IQ**	**PEOU**	**PU**	**SEQ**	**SQ**	**TQ**
Decision-Making Success							
Information Quality	0.726						
Perceived Ease of Use	0.684	0.742					
Perceived Usefulness	0.795	0.675	0.768				
Service Quality	0.637	0.732	0.645	0.708			
System Quality	0.712	0.765	0.725	0.683	0.746		
Training Quality	0.654	0.632	0.774	0.621	0.634	0.679	

Prior to examining structural relationships, the study assessed potential multicollinearity issues through variance inflation factor (VIF) analysis. Multicollinearity can inflate standard errors and reduce the reliability of parameter estimates, making this assessment critical for model validity.

Additionally, the study evaluated overall model quality through explanatory power (R^2) and predictive relevance (Q^2) measures.

Table 4: Model Quality Assessment - R^2 and Q^2 Values

Endogenous Construct	**R^2**	**R^2 Adjusted**	**Q^2**
Perceived Usefulness	0.634	0.620	0.472
Perceived Ease of Use	0.423	0.412	0.318
Decision-making Success	0.547	0.539	0.385

The R^2 values indicate substantial explanatory power for all endogenous constructs in the model. Perceived Usefulness exhibits the highest R^2 value of 0.634, indicating that the predictor variables (Information Quality, System Quality, and Service Quality) collectively explain 63.4% of the variance in perceived usefulness. The high R^2 for perceived usefulness supports the theoretical proposition that system characteristics significantly influence users' perceptions of system utility. Decision-making Success demonstrates an R^2 value of 0.547, indicating that 54.7% of the variance is explained by Perceived Usefulness and Perceived Ease of Use. This substantial explanatory power confirms the central role of user perceptions in determining decision-making outcomes, supporting the integration of TAM and IS Success Model theoretical frameworks. The R^2 value for decision-making success exceeds the moderate threshold of 0.33 suggested by Chin and Newsted (1999) and approaches the substantial level of 0.67, indicating strong predictive capability. Perceived Ease of Use shows an R^2 value of 0.423, with Service Quality and Training Quality explaining 42.3% of the variance. While this represents moderate explanatory power according to conventional standards, it reflects the practical reality that ease of use perceptions are influenced by factors beyond service and training quality, including individual differences and prior technology experience. This finding aligns with the complexity of technology acceptance factors observed in SME contexts.

The Q^2 values provide evidence of predictive relevance, with all values substantially exceeding zero, indicating that the model has predictive capability beyond chance. The Q^2 values range from 0.318 for Perceived Ease of Use to 0.472 for Perceived Usefulness, demonstrating medium to large predictive relevance. The VIF assessment reveals no multicollinearity concerns, with all values remaining below the conservative threshold of 3.3. The highest VIF value of 2.234 was observed for System Quality's relationship with Perceived Usefulness, indicating minimal multicollinearity despite the theoretical relationships between system characteristics.

Table 5: Multicollinearity Assessment and Effect Sizes

Relationship	**VIF**	**f^2**	**Effect Size**
IQ → PU	2.147	0.312	Large
SQ → PU	2.234	0.287	Large
SEQ → PU	1.892	0.198	Medium
SEQ → PEU	1.567	0.245	Medium
TQ → PEU	1.567	0.178	Medium
PU → DS	1.673	0.298	Large
PEU → DS	1.673	0.167	Medium
PEU → PU	1.234	0.145	Small-Medium

The effect size (f^2) assessment reveals meaningful practical significance for most relationships. Information Quality and System Quality demonstrate large effect sizes on Perceived Usefulness (f^2 = 0.312 and 0.287 respectively), indicating that these system characteristics have substantial practical importance in determining perceived utility. These large effect sizes support the theoretical proposition that high-quality information and reliable system performance are fundamental drivers of perceived usefulness in SME contexts. Perceived Usefulness exhibits a large effect size on Decision-making Success (f^2 = 0.298), confirming the central role of utility perceptions in determining decision-making outcomes. This finding aligns with the core propositions of Technology Acceptance

Model and supports the practical significance of perceived usefulness in organizational decision-making contexts. Service Quality shows medium effect sizes on both Perceived Usefulness ($f^2 = 0.198$) and Perceived Ease of Use ($f^2 = 0.245$), indicating meaningful practical significance. These medium effect sizes reflect the important but not dominant role of service support in shaping user perceptions, particularly in SME contexts where external support may be crucial for effective system utilization. Training Quality demonstrates a medium effect size on Perceived Ease of Use ($f^2 = 0.178$), supporting the practical importance of training in reducing perceived system complexity.

The structural model analysis examined eight hypotheses representing the relationships between information system quality dimensions, user perceptions, and decision-making success. All hypotheses were tested using bootstrapping procedures with 5,000 resamples. The significance testing employed a two-tailed test with $\alpha = 0.05$, providing robust statistical inference for the proposed relationships in Table 6. The comprehensive support for all eight hypotheses demonstrates the robustness of the integrated theoretical framework combining Technology Acceptance Model and IS Success Model perspectives. The findings provide strong evidence that information system quality dimensions influence decision-making success through user perception mechanisms, offering clear guidance for SME technology investment and implementation strategies in the Vietnamese market context.

Table 6: Structural Model Results - Hypothesis Testing

Hypothesis	Relationship	β	t-value	95% CI Lower	95% CI Upper	Decision
H1	PU → DS	0.467	5.247	0.293	0.641	Supported
H2	PEU → DS	0.312	4.000	0.159	0.465	Supported
H3	PEU → PU	0.298	4.139	0.157	0.439	Supported
H4	IQ → PU	0.356	4.395	0.197	0.515	Supported
H5	SQ → PU	0.342	4.329	0.187	0.497	Supported
H6	SEQ → PU	0.267	3.513	0.118	0.416	Supported
H7	SEQ → PEU	0.387	4.607	0.222	0.552	Supported
H8	TQ → PEU	0.334	4.123	0.175	0.493	Supported

5. Discussion

The findings of this study provide substantial empirical evidence supporting the integrated theoretical framework that combines the Technology Acceptance Model (TAM) and the DeLone and McLean Information Systems Success Model to explain decision-making success in Vietnamese small and medium enterprises. The comprehensive support for all eight hypotheses demonstrates the robustness of this theoretical integration and offers valuable insights into how information system quality dimensions influence decision-making outcomes through user perception mechanisms.

The strongest relationship identified in this study was between Perceived Usefulness and Decision-making Success ($\beta = 0.467$, $p < 0.001$), which aligns closely with the foundational propositions of the Technology Acceptance Model. This finding resonates with the research conducted by E. Monteiro *et al.* (2022), who examined accounting information systems in Portuguese companies and found significant relationships between system quality dimensions and organizational decision-making effectiveness. However, the current study's path coefficient ($\beta = 0.467$) demonstrates a substantially stronger relationship than typically reported in technology acceptance research, possibly reflecting the critical importance of information systems for SME decision-making in emerging market contexts where alternative information sources may be limited.

The significance of this relationship extends beyond traditional TAM applications, as demonstrated by comparison with M. Al-Okaily *et al.* (2025), who found that perceived usefulness influenced user satisfaction ($\beta = 0.247$, $p = 0.000$) in government financial management information systems. The stronger relationship observed in the current study ($\beta = 0.467$) suggests that perceived usefulness may have heightened importance in SME contexts where managers have greater

discretionary control over system utilization and where effective decision-making directly impacts organizational survival and competitiveness. This finding supports the proposition advanced by Phornlaphatrachakorn (2019) that information system effectiveness becomes particularly critical in resource-constrained environments where decision-making errors can have disproportionate consequences.

The direct relationship between Perceived Ease of Use and Decision-making Success ($\beta = 0.312$, $p < 0.001$) represents a significant extension of traditional TAM applications, which typically focus on ease of use as a precursor to intention rather than as a direct predictor of performance outcomes. This finding aligns with recent developments in information systems research that recognize the direct performance implications of system usability. Stefanovic *et al.* (2016), in their study of e-Government effectiveness, found similar patterns where system characteristics directly influenced performance outcomes beyond their effects on user attitudes and intentions.

The relationship between ease of use and decision-making success can be understood through cognitive load theory, which suggests that complex systems requiring significant mental effort for operation leave fewer cognitive resources available for decision analysis and strategic thinking. This theoretical explanation is particularly relevant for Vietnamese SMEs, where managers often fulfill multiple organizational roles and cannot afford to invest extensive time in system operation. The findings support the design principles advocated by Mitropoulos *et al.* (2024), who emphasized the importance of intuitive interfaces for effective decision-making in time-pressured environments.

Information Quality emerged as the strongest predictor of Perceived Usefulness ($\beta = 0.356$, $p < 0.001$), validating the core propositions of the DeLone and McLean IS Success Model while providing empirical evidence from the Vietnamese SME context (DeLone & McLean, 2016; Hongli *et al.*, 2022). This finding aligns with the research of M. Al-Okaily *et al.* (2025), who found significant relationships between information quality and user perceptions ($\beta = 0.147$, $p = 0.007$) in government information systems. However, the substantially stronger relationship observed in the current study suggests that information quality may have heightened importance in SME contexts where managers rely heavily on system-generated information for strategic decision-making due to limited access to alternative information sources.

The relationship between Information Quality and Perceived Usefulness ($\beta = 0.356$) exceeds those typically reported in enterprise system studies, possibly reflecting the particular information needs of SME managers who often lack the extensive analytical resources available to larger organizations. This finding supports the theoretical proposition advanced by Alsqour *et al.* (2025) that information quality becomes increasingly critical as organizations become more dependent on information systems for operational and strategic decision-making. The strength of this relationship in the Vietnamese context may also reflect cultural factors that emphasize data-driven decision-making, as suggested by Hofstede's cultural dimensions research.

System Quality demonstrated a similarly strong relationship with Perceived Usefulness ($\beta = 0.342$, $p < 0.001$), confirming the importance of technical system characteristics in determining user value perceptions. This finding aligns closely with the research conducted by Stefanovic *et al.* (2016), who found that system quality significantly influenced e-Government effectiveness. The magnitude of the relationship in the current study ($\beta = 0.342$) suggests that technical system performance represents a fundamental prerequisite for perceived usefulness in SME contexts where system downtime or poor performance can directly impact business operations.

The near-equality of the Information Quality and System Quality effects on Perceived Usefulness ($\beta = 0.356$ vs. $\beta = 0.342$) provides empirical support for the balanced approach to information system development advocated by the DeLone and McLean model (DeLone & McLean, 2016; Rama *et al.*, 2022). This finding contrasts with some enterprise system studies that emphasize information quality over technical quality, suggesting that SMEs may be more sensitive to technical

performance issues due to their limited ability to implement redundant systems or workarounds when primary systems fail.

Service Quality demonstrated significant relationships with both Perceived Usefulness ($\beta = 0.267$, $p < 0.001$) and Perceived Ease of Use ($\beta = 0.387$, $p < 0.001$), with the latter relationship being particularly strong. These findings extend the research of A. Al-Okaily *et al.* (2021), who found that service quality influenced user satisfaction ($\beta = 0.217$, $p = 0.000$) in government information systems. The stronger relationships observed in the current study, particularly the substantial effect on perceived ease of use ($\beta = 0.387$), highlight the critical role of service support in SME contexts where internal technical expertise is often limited.

The dominance of the Service Quality to Perceived Ease of Use relationship ($\beta = 0.387$) over the Service Quality to Perceived Usefulness relationship ($\beta = 0.267$) suggests that service quality primarily influences usability perceptions rather than utility evaluations. This pattern aligns with the service recovery theory, which suggests that effective service support reduces user frustration and complexity perceptions (Bui Thanh Khoa *et al.*, 2022). The finding has important implications for SME technology implementation strategies, suggesting that service quality investments may yield the highest returns through enhanced usability rather than direct utility improvements.

Training Quality demonstrated a significant relationship with Perceived Ease of Use ($\beta = 0.334$, $p < 0.001$), validating the importance of training investments in technology implementation. This finding aligns with and extends the research of A. Al-Okaily *et al.* (2021), who found training quality to be the strongest predictor of user satisfaction ($\beta = 0.278$, $p = 0.000$) in government information systems. The strength of the relationship in the current study confirms that training quality represents a critical success factor for SME technology implementations, where users often lack prior experience with sophisticated information systems.

The Training Quality towards Perceived Ease of Use relationship ($\beta = 0.334$) provides empirical support for the technology training effectiveness literature, which suggests that well-designed training programs reduce perceived system complexity by building user competencies and confidence. This finding is particularly relevant for Vietnamese SMEs, where formal technology training may be limited and users must rapidly develop competencies to maximize system value (Adams *et al.*, 2018; B. T. Khoa & Huynh, 2023). The relationship validates the training investment frameworks proposed by organization development researchers who emphasize the importance of comprehensive user preparation for technology implementations.

The mediating role of Perceived Ease of Use in influencing Perceived Usefulness ($\beta = 0.298$, $p < 0.001$) confirms the classical TAM relationship while demonstrating its continued relevance in contemporary SME contexts. This finding aligns with the meta-analytical research conducted by various technology acceptance researchers, who have consistently found significant relationships between ease of use and usefulness perceptions across diverse contexts and technologies (Arifah & Juniarti, 2021; Mican & Sitar-Taut, 2024). The strength of this relationship in the current study ($\beta = 0.298$) suggests that the classical TAM mechanisms remain robust in Vietnamese SME contexts, providing confidence in the theoretical foundation for technology acceptance research.

6. Conclusion

6.1. Theoretical Contributions

This study makes significant theoretical contributions to information systems research by successfully integrating the Technology Acceptance Model and the DeLone and McLean Information Systems Success Model to explain decision-making success in small and medium enterprise contexts. The theoretical integration demonstrates that user perception mechanisms serve as critical mediating pathways through which information system quality dimensions influence organizational decision-making outcomes, extending both theoretical frameworks beyond their traditional applications. The

study advances the TAM by demonstrating that perceived ease of use directly influences decision-making success, rather than merely serving as a precursor to usage intentions, thereby expanding the model's explanatory scope to include performance outcomes. Additionally, the research extends the IS Success Model by demonstrating how quality dimensions operate through cognitive mechanisms to influence decision-making effectiveness, providing a more nuanced understanding of how technical system characteristics translate into organizational benefits. The successful validation of this integrated framework in the Vietnamese SME context demonstrates the cross-cultural applicability of these fundamental information systems theories while highlighting context-specific variations in relationship strengths. The study contributes to emerging research on information systems in developing economies by providing empirical evidence that established theoretical frameworks maintain their relevance while exhibiting unique characteristics that reflect local business environments, resource constraints, and cultural factors. Furthermore, the research advances understanding of decision-making success as an organizational outcome by demonstrating its relationships with user perception constructs, thereby bridging the gap between individual-level technology acceptance research and organizational-level performance studies.

6.2. Practical Contributions

The practical contributions of this research provide actionable insights for small and medium enterprises seeking to enhance their decision-making effectiveness through strategic information system investments. The finding that Information Quality emerges as the strongest predictor of Perceived Usefulness offers clear guidance for SME technology investment priorities, suggesting that organizations should emphasize data quality initiatives, information architecture improvements, and content management capabilities when selecting and implementing information systems. The substantial relationship between System Quality and Perceived Usefulness indicates that SMEs must balance information content quality with technical system performance, investing in reliable, responsive systems that provide consistent access to high-quality information. The practical implication suggests that SMEs should adopt comprehensive evaluation criteria during vendor selection processes that equally weight technical capabilities and information quality characteristics, rather than focusing exclusively on cost considerations or feature sets. The strong relationship between Service Quality and Perceived Ease of Use highlights the critical importance of ongoing support relationships for SME technology success, indicating that organizations should carefully evaluate potential service providers' capabilities for responsive, knowledgeable support that reduces system complexity and enhances user confidence. This finding suggests that SMEs should view service quality as a strategic investment rather than a cost center, recognizing that effective support directly influences system usability and subsequent decision-making effectiveness. The significance of Training Quality for Perceived Ease of Use demonstrates the essential role of comprehensive user preparation in technology implementation success, indicating that SMEs should budget for extensive training programs and work collaboratively with vendors to develop customized training curricula that address specific organizational needs and user competency levels.

The research provides practical guidance for information system vendors and consultants working with SME clients by demonstrating the relative importance of different service elements in determining implementation success. The findings suggest that vendors should prioritize service quality and training quality investments as differentiating capabilities that directly influence customer satisfaction and system effectiveness, particularly in markets where SMEs have limited internal technical resources. The strong relationships between quality dimensions and user perceptions indicate that vendors can enhance their value propositions by demonstrating clear connections between technical capabilities and business outcomes, helping SME clients understand how system investments translate into improved decision-making and organizational performance. The practical framework provided by this research enables vendors to develop more effective implementation

methodologies that address the specific needs and constraints of SME clients, recognizing the unique challenges these organizations face in technology adoption and utilization. Additionally, the research offers guidance for policy makers and economic development organizations seeking to enhance SME competitiveness through technology adoption initiatives, suggesting that support programs should emphasize information quality improvement, service quality enhancement, and comprehensive training provision rather than focusing exclusively on technology acquisition funding. The findings indicate that successful SME technology adoption requires coordinated attention to multiple quality dimensions, suggesting that policy interventions should adopt holistic approaches that address both technical and human factors in information system implementation.

6.3. Limitations and Future Research Directions

This study acknowledges several limitations that provide opportunities for future research while contextualizing the findings within appropriate boundaries. The cross-sectional research design, while appropriate for examining relationships at a specific point in time, limits the ability to establish causal relationships or examine how these relationships evolve over time as SMEs mature in their technology utilization or as information systems undergo upgrades and modifications. Future research should employ longitudinal designs to examine the dynamic nature of information system quality impacts on decision-making success, investigating how relationships strengthen or weaken as organizations develop technology capabilities and as user competencies evolve through experience and training. The sample size of 112 respondents, while adequate for PLS-SEM analysis and comparable to similar studies in emerging market contexts, may limit the generalizability of findings across diverse SME populations and industry sectors. Future research should expand sample sizes and employ multi-group analysis to examine potential variations in relationships across industry sectors, organizational sizes, and geographical regions within Vietnam and other developing economies. The focus on Vietnamese SMEs provides valuable insights into emerging market contexts but limits the direct applicability of findings to developed economies or larger organizational contexts where resource constraints, technology infrastructure, and competitive environments may differ substantially. Cross-national comparative studies could examine whether the observed relationship patterns hold across different cultural and economic contexts, potentially identifying universal principles versus context-specific factors in information system quality impacts on decision-making success. The reliance on single-respondent data from managers, while appropriate given their decision-making responsibilities, may introduce common method bias despite statistical controls and could limit the comprehensiveness of organizational perspective captured in the analysis. Future research should employ multi-level data collection approaches that capture perspectives from multiple organizational levels and functions, potentially revealing how information system quality impacts vary across different user groups and decision-making contexts within the same organization. Additionally, the study's focus on perceptual measures of decision-making success, while theoretically justified and consistent with established research traditions, could be enhanced through incorporation of objective performance measures that demonstrate the business impact of information system quality improvements, providing stronger evidence for the practical significance of the observed relationships and enabling more compelling arguments for SME technology investments.

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