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Information System Success Factors and Their Influence on Employee Performance in a Digital Environment

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Abstract

The banking sector is rapidly evolving with advancements in information systems and AI. This study examines key factors influencing their adoption among employees, assessing their impact on job performance and challenges to implementation. Using the DeLone and McLean Information Systems Success Model, data from banking employees will be analyzed through PLS-SEM. Findings provide insights into adoption determinants, performance benefits, and barriers, contributing to the digital transformation of banking. The study highlights the need for strategic integration of AI and information systems to enhance workforce efficiency.

1. Introduction

Malaysia's banking sector has undergone significant digital transformation, driven by regulatory frameworks, market competition, and evolving customer expectations. Early adoption of digital banking tools, such as Bumiputra Commerce Bank's (BCB) internet banking platforms, laid the foundation for modern innovations (Goi, 2006). Regulatory bodies like Bank Negara Malaysia (BNM) have played a crucial role in this evolution through initiatives like the Financial Sector Masterplan (2001) and the Digital Banking License framework (2020), promoting financial inclusion and technological adoption (Mohsin et al., 2022).

The integration of cloud computing, artificial intelligence (AI), and automation has modernized banking operations, enhancing security and scalability while ensuring regulatory compliance (Shaharruddin & Musa, 2022). Globally, the banking sector remains pivotal to economic growth, adapting to rapid technological advancements, regulatory changes, and shifting consumer behaviors (Li Y., 2023; Broby, 2021). Innovations such as online banking, mobile payments, and blockchain technology have revolutionized financial services, fostering efficiency and new business model (Addula et al., 2024; Dissanayake et al., 2023).

However, banks continue to face challenges, including cybersecurity threats, economic volatility, and regulatory complexities (Dissanayake et al., 2023; Lin et al., 2022). The COVID-19 pandemic has further accelerated digitalization, reshaping banking strategies and necessitating agility and collaboration for future resilience (Anitha, 2021). As the industry evolves, strategic digital investments remain crucial to sustaining competitiveness and addressing emerging financial trends (Baskerville et al., 2021; Osei et al., 2023).

1.1 Research Background

The Malaysian banking industry is a cornerstone of the nation's financial infrastructure, driving economic growth, financial intermediation, and wealth creation (Bank Negara Malaysia & AFI, 2024). In response to rising competition, digital transformation, and evolving consumer expectations, banks are leveraging technology to enhance operational efficiency and service delivery (Shahriar et al., 2023) Digital banking initiatives, including the

issuance of digital banking licenses by Bank Negara Malaysia (BNM) in 2022, have accelerated financial inclusion and modernized banking services (Mohsin et al., 2022). Concurrently, fintech collaborations and artificial intelligence (AI) applications are redefining banking operations, with AI-driven solutions improving service personalization, fraud detection, and automation (Desiraju & Khan, 2024).

Bank performance is integral to economic development, with job performance playing a crucial role in sustaining competitive advantage and profitability (Farmanesh et al., 2023; Hossin et al., 2021) .Employees' efficiency, influenced by advanced information systems (IS) and AI, directly impacts customer satisfaction, innovation, and financial performance (Ogbonnaya & Aryee, 2021) . AI-powered systems, such as predictive analytics and automated decision-making tools, enhance employee productivity by streamlining processes and reducing routine workloads (Husain et al., 2022).

The Delone-McLean Information System Success (DMISS) Model provides a theoretical framework for evaluating IS effectiveness in organizations, emphasizing system quality, information quality, and user satisfaction as determinants of performance (Delone & Mclean, 2003a). Empirical studies suggest that AI integration into IS frameworks enhances job performance through automation, data-driven decision support, and employee skill augmentation (Alsakarneh et al., 2025; Malik, 2024). While research has examined IS and AI adoption separately in banking, limited studies have explored their combined impact on job performance, particularly in Malaysia (Rahman et al., 2023).

This study seeks to bridge this gap by examining how the integration of the IS Model and AI technologies influences banking staff performance in Malaysia. By assessing key factors such as system usability, information quality, AI effectiveness, and staff productivity, the study aims to offer insights into optimizing IS investments and AI adoption in the banking sector. The findings hold practical implications for Malaysian banks, guiding strategies for enhancing employee performance, operational efficiency, and customer service in an increasingly digitalized financial landscape (Thomas, 2021).

1.2 Problem Statement

Banking sector employees face significant job performance challenges due to stress, burnout, and evolving technological demands. Studies indicate that role ambiguity, workload, and regulatory pressures contribute to disengagement and reduced productivity (Krishnamuthi & Abdul Rahim, 2024; Majid et al., 2023). Additionally, digital transformation and AI adoption create skill gaps and job insecurity (Munusamy et al., 2020). Although considerable research has examined the technical implementation of information systems and their impact on customer satisfaction, limited attention has been given to how system-related issues, such as those reflected in recurring customer complaints, affect the performance and well-being of frontline banking staff. In public-sector institutions like Bank Simpanan Nasional (BSN), persistent digital service disruptions and inefficiencies reported by customers may lead to increased pressure, reduced morale, and lower productivity among employees. However, this internal impact remains underexplored in the Malaysian context.

The DeLone and McLean Information Systems Success (DMISS) Model, integrated with Artificial Intelligence Applications (AIA), offers a useful framework to examine how system quality, service quality, and information quality influence job performance (Delone & McLean, 2003b; Ojo, 2017). AI enhances decision-making and operational efficiency but requires employee trust and training for effective adoption (Viriando & Sfenrianto, 2021). This study aims to assess the interplay between IS success factors, AI-driven banking solutions, and employee performance, particularly concerning customer-facing digital system challenges, addressing a key gap in optimizing technology for workforce productivity in Malaysia's banking sector. To address these performance-related challenges, understanding the role of technological systems becomes essential.

1.3 Research Questions

1) What are the relationships between DMISS Model factors system quality (SQ), information quality (IQ), service quality (SEQ), artificial intelligence application (AIA), and job performance (JP) of the banking employees?
2) What is the effect of user satisfaction (US) on the job performance (JP) of banking employees?
3) Does user satisfaction (US) mediate the relationships between DMISS Model factors system quality (SQ), information quality (IQ), service quality (SEQ), artificial intelligence (AI), and job performance (JP) of the banking employees?

1.4 Research Objectives

1) To determine the relationships between DMISS Model factors system quality (SQ), information quality (IQ), service quality (SEQ), artificial intelligence application (AIA), and job performance (JP) of the banking employees.
2) To determine the effect of user satisfaction (US) on the job performance (JP) of the banking employees.

3) To examine whether user satisfaction (US) mediates the relationships between DMISS Model factors system quality (SQ), information quality (IQ), service quality (SEQ), artificial intelligence application (AIA), and job performance (JP) of the banking employees.

1.5 Significance of Study

The study will explore the effect of DMISS and AI application on the job performance of banking employees in Malaysia holds significant implications for both academia and the banking industry. Firstly, understanding the impact of information system success factors, as proposed by Delone and McLean, in the context of Malaysian banks provides valuable insights into the effectiveness of these systems in enhancing employee performance. By analyzing various dimensions such as system quality, information quality, service quality, and user satisfaction, the study can identify which factors contribute most significantly to job performance, enabling banks to prioritize resource allocation and system improvements accordingly.

1.6 Scope of Study

This study focuses on examining the influence of information system (IS) success factors and artificial intelligence applications (AIA) on employee performance within the Malaysian banking sector, with particular emphasis on Bank Simpanan Nasional (BSN) which comprises 390 branches in Malaysia (CBI, 2018). BSN is selected as the case institution due to its nationwide presence, public-sector orientation, and active engagement in digital transformation. Repeated system-related complaints observed in public reviews suggest potential internal performance challenges, making it a relevant context for investigation.

Methodologically, the research will employ quantitative research, designed by a questionnaire survey to obtain data that will be distributed among frontline employees, including tellers, customer service representatives, and digital support staff, who directly interact with customers and are most exposed to the impact of system performance on day-to-day operations. Their perspectives are crucial for understanding how system quality, information quality, and service quality affect work efficiency, stress levels, and overall job satisfaction. While the primary focus remains on frontline staff, branch-level managerial personnel (e.g., supervisors, assistant managers) may also be included selectively to provide supporting insights on system implementation, staff performance management, and operational policy enforcement.

The study intends to collect data from BSN branches across various regions of Malaysia to ensure representativeness. However, if limitations in access or resources arise, the scope may be refined to include a stratified sample of branches, covering both urban and rural locations, based on factors such as transaction volume, customer base size, and frequency of reported system issues. This will enable a balanced understanding of system-related employee performance challenges within diverse operational settings.

Besides, this study is concerned with investigating the relationship between the dimensions in Delone and McLean's Model of Information Systems (IS) known as D&M IS Success Model namely system quality (SQ), information quality (IQ), service quality (SEQ), user satisfaction (US), artificial intelligence (AI) and job performance (JP) among the bank employees in the Malaysian Banks.

2. Literature Review

2.1 Malaysian Banking Sector

The banking sector in Malaysia is overseen by Bank Negara Malaysia and comprises commercial banks, investment banks, and Islamic banks (BNM, 2023). There are 26 commercial banks, 16 Islamic banks, one international Islamic bank, and 11 investment banks in the country. The sector is dominated by local banks, which control 80% of total sector assets.

The asset size of Malaysian banks has been growing steadily. Loan-loss provisions, which had increased in the Corona disaster, have recently decreased. The financial position of the bank is sound, with liquidity secured. The total assets of Malaysian banks continue to expand, growing to RM3.34 billion at the end of 2022, up 7.1% from the end of the previous year, as shown in Fig. 1.

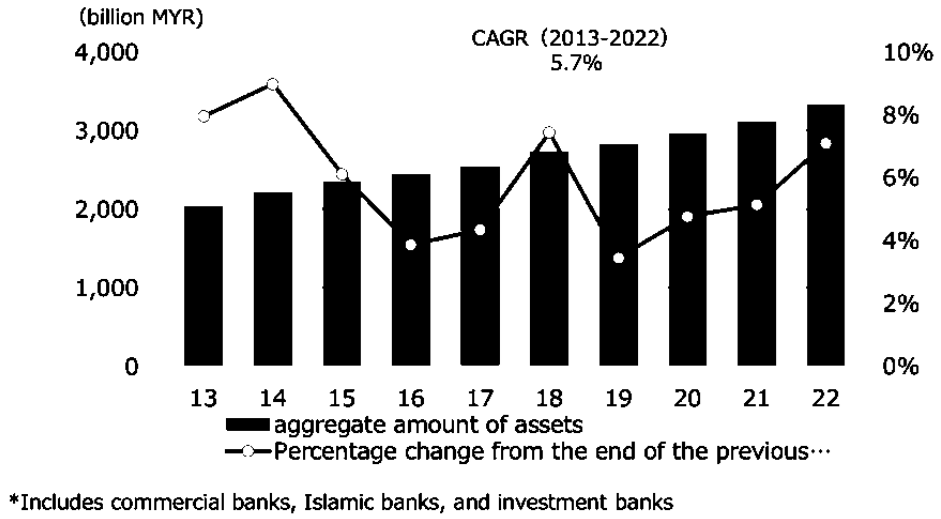

Fig. 1 *Malaysia total bank assets (BNM, 2022)*

Islamic banks play a crucial role in Malaysia's banking landscape, accounting for about 30% of the total banking assets. With 16 Islamic banks in operation, including leaders like Bank Islam Malaysia, CIMB Islamic, Maybank Islamic, and RHB Islamic, the sector has been growing at an average annual rate of around 10%, driven by increasing demand for Sharia-compliant financial products.

Development financial institutions (DFIs) under the Development Financial Institution Act 2002 are Bank Kerjasama Rakyat Malaysia (Bank Rakyat), Bank Pertanian Malaysia Berhad (Agrobank), Bank Simpanan Nasional (BSN), Bank Pembangunan Malaysia Berhad, Export-Import Bank of Malaysia Berhad and Small Medium Enterprise Development Bank Malaysia Berhad are instrumental in financing infrastructure projects, supporting SMEs, and promoting agricultural development, thus contributing significantly to the country's economic growth. Fig. 2 presents DFIs' Achievements in Additionality Creation in 2023.

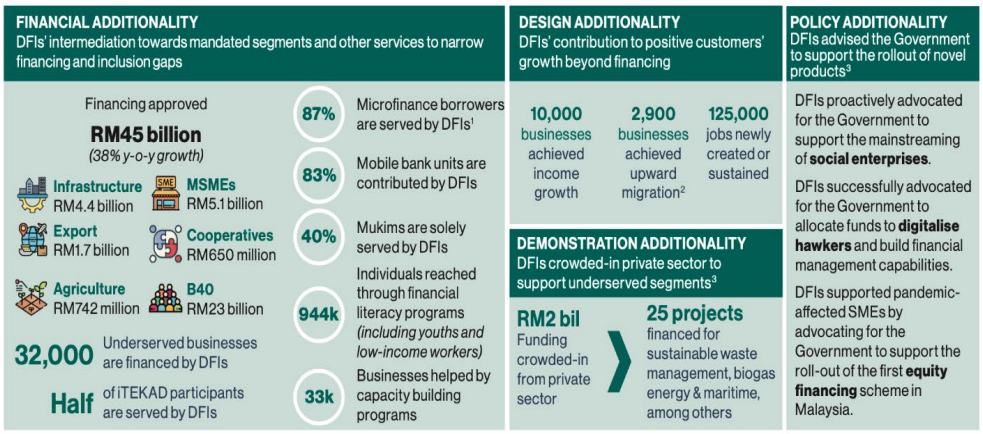

Fig. 2 *DFIs' achievements in additionality creation in 2023 (BNM, 2023)*

Fig. 2 shows DFIs play a crucial role in supporting key strategic sectors in the economy. In 2023, DFIs continued complementing the banking system in financing underserved sectors and segments. Outstanding DFI financing grew by 5.9% to RM173.4 billion (2022: 1.3% to RM163.8 billion), while financing to mandated sectors3 grew by 12.5%, benefitting more than 176,000 businesses. New financing approved by DFIs saw a notable increase of 38.2% (2022: 7.2%), reaching more than 740,000 low-income borrowers and 30,000 SMEs including start-ups and first-time borrowers. DFIs also remain the main credit provider for microenterprises, constituting 87% of total microfinance accounts. Supported by financing from DFIs, over 10,000 businesses achieved higher turnover and around 2,900 businesses expanded their operations, creating and retaining an estimated 125,000 jobs for the economy in 2023.

The Performance Measurement Framework (PMF) introduced in 2018 helps BNM to track the progress, impact, and effectiveness of DFIs and align them with their developmental mandate. In 2023, DFIs continued to narrow financing and inclusion gaps and contribute to positive socioeconomic outcomes. Malaysia boasts high levels of financial inclusion, with over 90% of adults having a bank account. The sector has witnessed a significant shift towards digital banking, with increased online and mobile banking platform usage. This trend aligns with

Johor Business School (JBS) Nexus Vol. 2 No. 1 (2025) p. 54-70

technological advancements and the issuance of digital banking licenses in 2022 by Bank Negara Malaysia, marking a milestone in the sector's digital transformation.

Non-performing loans, (NPLs) in Fig. 3, on the other hand, have increased since mid-2022. The most recent highest amount was RM36.8 billion in May 2023. However, there has also been a commensurate increase in lending, with the NPL ratio hovering around 1.10%.

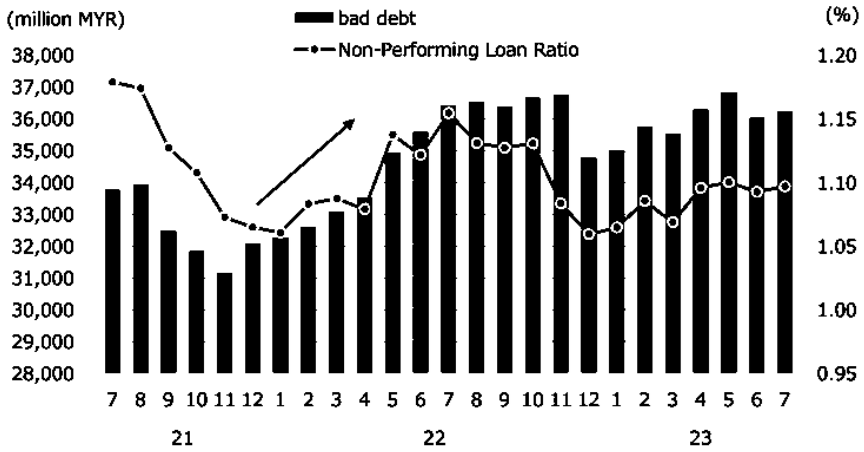

Fig. 3 *Non-performing loans, NPL ratio (monthly) (BNM, 2023)*

Despite challenges such as non-performing loans (NPLs), which average around 1.5% for the Malaysian banking sector, the overall asset quality remains relatively healthy. While construction and real estate sectors exhibit higher NPLs, consumer banking NPLs remain low.

The Malaysian banking sector is characterized by its resilience, diversity, and commitment to innovation. The sector is well-positioned for continued stability and growth with a strong regulatory framework provided by Bank Negara Malaysia and high financial inclusion and technological adoption levels. Table 1 summarize the types of banks in Malaysia, their descriptions, and examples:

Table 1 *The types of banks in Malaysia*

Type of Bank	Descriptions	Bank Names
Commercial Banks (BNM, 2020)	Provide a wide range of services including savings and deposit accounts, loans, and payment services to individuals and businesses.	Maybank, CIMB Bank, Public Bank, RHB Bank, Hong Leong Bank
Islamic Banks (BNM, 2020)	Operate based on Sharia (Islamic law) principles, prohibiting interest and investing in ethical, Sharia-compliant ventures.	Bank Islam Malaysia, CIMB Islamic, Maybank Islamic, RHB Islamic, Al Rajhi Bank Malaysia
Investment Banks (BNM, 2020)	Specialize in services related to capital markets, such as underwriting, mergers and acquisitions, advisory services, and securities trading.	CIMB Investment Bank, Maybank Investment Bank, RHB Investment Bank, Kenanga Investment Bank
Development Financial Institutions (DFIs) (BNM, 2023)	Government-owned institutions that provide medium to long-term financing to strategic sectors like infrastructure, agriculture, and SMEs.	Bank Pembangunan Malaysia (BPMB), BSN Bank, Agrobank, SME Bank, Export-Import Bank of Malaysia (EXIM Bank)

Type of Bank	Descriptions	Bank Names
Foreign Banks (BNM, 2023)	Operate through branches or subsidiaries, offering services similar to local commercial banks and often catering to multinational corporations and expatriates.	HSBC Bank Malaysia, Standard Chartered Bank Malaysia, Citibank Malaysia, UOB Malaysia

Bank Simpanan Nasional (BSN) falls under the Development Financial Institution (DFI) category. BSN's primary mandate as a government-owned bank is to promote savings among Malaysians and provide accessible financial services to support financial inclusion and economic development. DFIs like BSN are vital in channeling funds to specific economic sectors and supporting government development policies.

In addition, according to Bagatsing (2022), total assets can be one of the stabilities of financial institutions. As shown in Table 2, BSN is not listed as one of the top 10 banks with asset value. This shows that BSN Bank, as a cooperation bank, does not focus on high asset value as compared to others; table 2 shows the top 10 banks in Malaysia based on total assets.

Table 2 *The top 10 banks in Malaysia based on total assets*

Rank	Bank	Total Assets (RM Billion) 2021
1	Maybank Malaysia	888
2	CIMB Group	672
3	Public Bank Berhad	462
4	RHB Bank	257
5	Hong Leong Bank	237
6	AmBank	180
7	UOB Malaysia	128
8	Bank Rakyat	115
9	OCBC Bank Malaysia	98
10	HSBC Bank Malaysia	94

2.2 Job Performance

Ability and motivation are the two distinct determinants of job performance (JP). JP is the direct outcome of an individual's ability and motivation to perform (Kuranchie & Amponsah, 2016). It is hypothesized in the expectancy theory that these two determinants i.e., ability and motivation interact to determine performance. According to Chung and Pak (2021), one cannot perform a task successfully unless one can do it no matter how motivated they could be to perform it. Likewise, motivation is required by an individual irrespective of one's ability to perform a task successfully. The learning and cognitive abilities of an individual along with his attitudes and values affect his or her JP (Nye et al., 2022).

The literature review on organizational performance clearly shows a general finding of all researchers that there is still a lack of universal measure that can be utilized to assess overall organizational performance (Sangwa & Sangwan, 2018). Performance can be seen as a multi-dimensional structure that includes more than simply financial performance. It is described as the scope to which the organization can match the scope of its stakeholders and its own survival needs. Many researchers provide evidence through their work and literature review that offering quality services to internal customers is one of the reasons for success in terms of enhanced and better organizational performance (Kankam, 2023). According to Almuayad and Chen (2024b) bank employees' performance comprises knowledge, skills, and experience needed for quality at bank level and effective performance in various banking environments. Organizations achieve their goals by satisfying their customers with higher efficiency and effectiveness than their rivals (Gomide Júnior et al., 2022a)

Various organizational variables have effects on an individual's ability to perform in organizations (Kuvaas et al., 2020). Task design set by supervisors is the specific variable that has a direct effect on individual JP. If the supervisors do not clearly document and explain their and the organization's expectations in terms of performance, it would be difficult for an employee to perform according to the expected standard (Ali *et al.*, 2017). In this study, JP was used in the banking sector which refers to how well an individual employee is fulfilling their duties and responsibilities within their specific role at the bank. JP in the banking sector is critical to the success

of the bank. Employees must be highly skilled and knowledgeable, with a strong work ethic and a commitment to delivering high-quality customer service.

2.3 Overview of Information System

According to Puasa (2017), an information system is technically defined as a man-made system that typically consists of an integrated set of computer-based components and manual components. As Soudani (2012) and Puasa (2017) mentioned, the system is designed to gather, enter, store, control, and manage data and report the processed data as usable information. Information systems nowadays rely heavily on technology. As highlighted by Kaur and Aggrawal (2013), an information system is made up of people, a structure, technology, and work methods that are created by the needs of the organisation. An information system's main goals are to improve operational processes and offer information for use in decision-making (Puasa, 2017). For an organisation to thrive in a highly competitive climate, information technology (IT) is generally essential (Mgaya & Kitindi, 2008; Bachet al., 2011; Hidayah et al., 2020). The optimization of information system effectiveness requires knowledge and understanding of the system's operations (Bachet al.,2011).

An information system can be considered as a broad area comprised of several specific systems based on function and purpose, such as Enterprise Resource Planning (ERP), Management Information System (MIS), Accounting Information System (AIS), and so on. Daoud and Triki (2013) refer to AIS as a subsystem of MIS, while others consider it to be a subsystem of ERP, depending on the scope of their studies. MIS is a system with greater capability, in terms of its function, compared to IS (Puasa, 2017). It covers a broader context such as sales forecasting, supplier record, and analysis, etc. Technically, Puasa (2017) defines ERP as 'an information system model that enables an organization to automate and integrate its key business processes'. Specifically, Daoud and Triki (2013) discuss ERP as a set of systems that are designed to integrate computer applications to process an organization's transactions, including its accounting processes. Nowadays, the system that is used to manage the accounting process, known as AIS, offers not just historical accounting information but also accounting information forecasts for control and analysis (Daoud & Triki, 2013).

2.4 Information System Effectiveness

System efficacy is a frequently used dependent variable in the literature on information systems. Because of the topic's importance to the organization and the contradicting results of past studies, researchers continue to debate it. Because the definition varies from research to study and depends on the context of the investigation, there are several approaches to measure system effectiveness in the fields of information systems (Hamilton & Chervany, 1981; Chalu, 2012). How something is assessed depends on various ideas, including qualitative and quantitative components, technological, individual or organizational, and environmental factors.

Effectiveness is portrayed as a component of success in the D&M IS Success Model. The model was created in 1992 by DeLone and McLean to evaluate the efficacy of information systems. The D&M IS Success Model views success as a more all-encompassing concept encompassing the event, process, influence, and consequence. emphasizes the usage and deployment of information systems. According to Ajami (2012), user acceptability and continued system use are indicators of success. On the other hand, success is seen as leading to effectiveness in the D&M IS Success Model. The ability of an information system to accomplish its objectives (Hamilton & Chervany, 1981), meet organizational goals (Raymond, 1990), support decision-making processes (Thong & Yap, 1996), and enhance organizational performance in terms of activity, process, and results (Gatian, 1994) is generally regarded as a sign of its effectiveness.

Regarding IS, the definition of system efficacy has been thoroughly investigated and explored. For instance, IS efficacy is described as the system's capacity to provide information that meets the needs of the decision-makers for coordination and control purposes (Nicolaou, 2000; Kouser, Rana, & Shahzad, 2011). As a result, the system's users inside the organization may experience enhanced performance (Sajady *et al.*, 2008) and improved decision-making (Kouser *et al.*, 2011). IS efficacy is defined by Salehi *et al.* (2010) as successfully built systems that meet users' needs. By considering the system's ability to deliver the anticipated information, considering the relevant legal obligations, preparing financial reports, and providing adequate control structures to meet the needs of decision-makers, Dehghanzade, Moradi, and Raghibi's (2011) definition is modified.

According to a study by Chalu (2012), while establishing how effective an IS is, the four factors of user satisfaction, system quality, accounting information quality, and organizational performance are all considered. In a different study, Esmeray (2016) precisely defined the IS's usefulness based on the qualities of high-quality information. The qualities are dependability, applicability, and timeliness. These definitions are more likely to focus on the IS's role in providing its users with information. Theoretically, it takes a lot of trustworthy data to establish a reliable opinion. However, not every IS user uses the system to retrieve data for decision-making (Chalu, 2012). In a perfect world, effectiveness would be attained and then maintained. Effective information systems are associated with enhanced company performance, according to earlier studies (Myers, Kappelman, & Prybutok, 1997). In addition to the rapid technological development and the rising need for high-quality

information, maintaining system effectiveness is essential for an organization to compete in this era of globalization. To keep the system functioning well, all important components (such as people, machines, organizations, and regulations) must be able to perform at their highest level.

2.5 Underpinning Theory DeLone McLean's (ISS) Model

The DeLone and McLean (D&M) IS Success Model (1992, 2003) is widely used in IS research, providing a structured approach to evaluating system effectiveness. The model identifies six key dimensions: system quality (SQ), information quality (IQ), service quality (SEQ), user satisfaction (US), intention to use, and net benefits (DeLone & McLean, 1992, 2003). These elements influence user engagement, decision-making, and job performance (JP).

Prior research supports the model's relevance in assessing IS success (Seddon, 1997; Ballantine et al., 1998), particularly in Malaysia (Ismail, 2009; Daoud & Triki, 2013). Studies highlight SQ's impact on decision-making efficiency (Wixom & Watson, 2001) and organizational benefits (Bradley et al., 2006). IQ enhances IS adoption and job performance (Yim & Shin, 2014), while SEQ strengthens employee productivity (Singh, 2016). Additionally, user satisfaction mediates the relationship between IS factors and JP (McGill & Hobbs, 2003; Rouibah et al., 2020).

Despite extensive research, gaps remain in understanding the combined effects of SQ, IQ, and SEQ on JP within the banking sector. This study addresses this gap by applying the D&M model to assess IS success in Malaysian banks, emphasizing the role of user satisfaction in enhancing job performance.

2.6 System Quality

System Quality (SQ) is a critical factor in the success and functionality of information systems, transforming data into meaningful information (Iskandar, 2015). Due to advancements in IS, scholars and practitioners emphasize improving SQ to enhance system performance and user experience (Aldholay et al., 2018). SQ is defined by its ability to meet user needs, incorporating aspects such as reliability, flexibility, usability, and responsiveness (Leung et al., 2006; Gorla et al., 2010; Urbach et al., 2010; Mamić Sačer & Oluić, 2013).

SQ is often measured based on system attributes, including technical capabilities, response time, and overall reliability (DeLone & McLean, 1992, 2003, 2016; Petter et al., 2008). It reflects the system's capacity to execute required tasks effectively from a technical and design standpoint (Knauer et al., 2020). User perceptions also play a significant role in evaluating SQ, with studies linking high SQ to system trustworthiness and effectiveness (Ives et al., 1983; Ifinedo, 2006). Key elements of SQ include adaptability, user-friendliness, integration, and security (Ifinedo, 2006; Lanin & Hermanto, 2016).

The DeLone and McLean IS Success Model (1992) conceptualizes SQ as a multidimensional construct encompassing usability, security, and efficiency (Hien et al., 2014). However, measuring SQ remains complex due to varied conceptualizations and methodologies (Ding, 2008; Petter et al., 2007). Recent studies suggest a second-order formative model to overcome measurement challenges (Chang et al., 2012).

Ultimately, SQ significantly impacts IS effectiveness and organizational performance. By addressing SQ dimensions, organizations can enhance system usability, security, and efficiency, ensuring better alignment with user needs and business objectives.

2.7 Information Quality

Information Quality (IQ) is essential for IS effectiveness, influencing user satisfaction and decision-making (DeLone & McLean, 2003; Xu, 2015). A successful IS provides accurate, timely, and relevant information (Boockholdt, 1996; Xu et al., 2003), with common IQ indicators including completeness, accuracy, and consistency (Ramayah et al., 2010; Urbach et al., 2010).

IQ is a key measure of IS success, though its impact on user satisfaction varies across studies (Cidral et al., 2018; Roky & Al Meriouh, 2015). Organizations leverage high-quality information for competitive advantage (Barney, 1991), yet measuring IQ remains complex (Redman, 1998). Conceptualized as a multidimensional construct, IQ includes correctness, completeness, and timeliness (DeLone & McLean, 1992; 2003).

This study adopts IQ as a second-order formative construct with dimensions such as content, accuracy, and ease of use (Mueedh & Suryawanshi, 2018). Understanding IQ enables organizations to optimize IS performance, improve decision-making, and drive success.

2.8 Service Quality

Service Quality (SEQ) is a critical factor in customer satisfaction and business success (Urbach et al., 2010; Al-Jazzazi & Sultan, 2017). It reflects how well a service meets customer needs and influences competitiveness, especially in banking (Mualla, 2011; Palamidovska-Sterjadovska, 2017). Organizations must innovate to enhance SEQ and maintain a market advantage (CBI, 2018).

Johor Business School (JBS) Nexus Vol. 2 No. 1 (2025) p. 54-70

SEQ, originating from marketing, is now a key measure of IS success (Pitt et al., 1995; DeLone & McLean, 2003, 2016). It includes factors such as responsiveness, assurance, empathy, and reliability (Liu & Arnett, 2000; Gorla et al., 2010). The SERVQUAL model assesses SEQ gaps by comparing customer expectations to service perceptions (Parasuraman et al., 1985, 1991).

By prioritizing SEQ improvements, organizations can enhance customer satisfaction, strengthen loyalty, and maintain a competitive edge (Yarimoglu, 2014; Angelova, 2011). Understanding SEQ's role in IS helps optimize service delivery and sustain business success.

2.9 User Satisfaction (US)

User Satisfaction (US) is a key measure of IS success, reflecting users' perceptions of how well a system meets their needs (DeLone & McLean, 1992; Ives, Olson, & Baroudi, 1983). It originates from psychology studies and involves cognitive and affective evaluations of system performance (Pauluzzo & Geretto, 2017; Au, Ngai, & Cheng, 2008).

US is influenced by system speed, functionality, and quality (Lin & Wang, 2012) and applies across various domains, including online learning and business systems (Roca, Chiu, & Martínez, 2006; Wang, 2008; Smith & Puasa, 2016). Measurement models such as TAM (Davis, 1985), EUCS (Doll & Torkzadeh, 1988), and the D&M IS Success Model (DeLone & McLean, 1992) highlight key factors like system quality, ease of use, and usefulness.

2.10 Artificial Intelligence Application (AIA)

Artificial Intelligence Application (AIA) involves developing intelligent systems that analyze data, learn from experiences, and make decisions (Joiner, 2018; Xu et al., 2021). AI spans various fields, including natural language processing, robotics, and neural networks, with applications in healthcare, finance, SMEs, and marketing (Ma & Sun, 2020; Baadullah et al., 2021; Mikalef et al., 2023).

Firms benefit from AI by streamlining operations (Davide et al., 2021), improving decision-making (Ragazou et al., 2023), and increasing productivity (Wu et al., 2023). AI-driven digitalization enhances agility, efficiency, and interdepartmental integration, enabling firms to adapt to evolving customer demands. Strategic AI implementation optimizes data processing and decision-making, significantly impacting industries like banking and finance.

2.11 Research Framework

This study focuses primarily on the impact of Delone-Mclean's information success model and AI on Malaysian banking employees' job performance. These factors form the research framework Fig. .4.

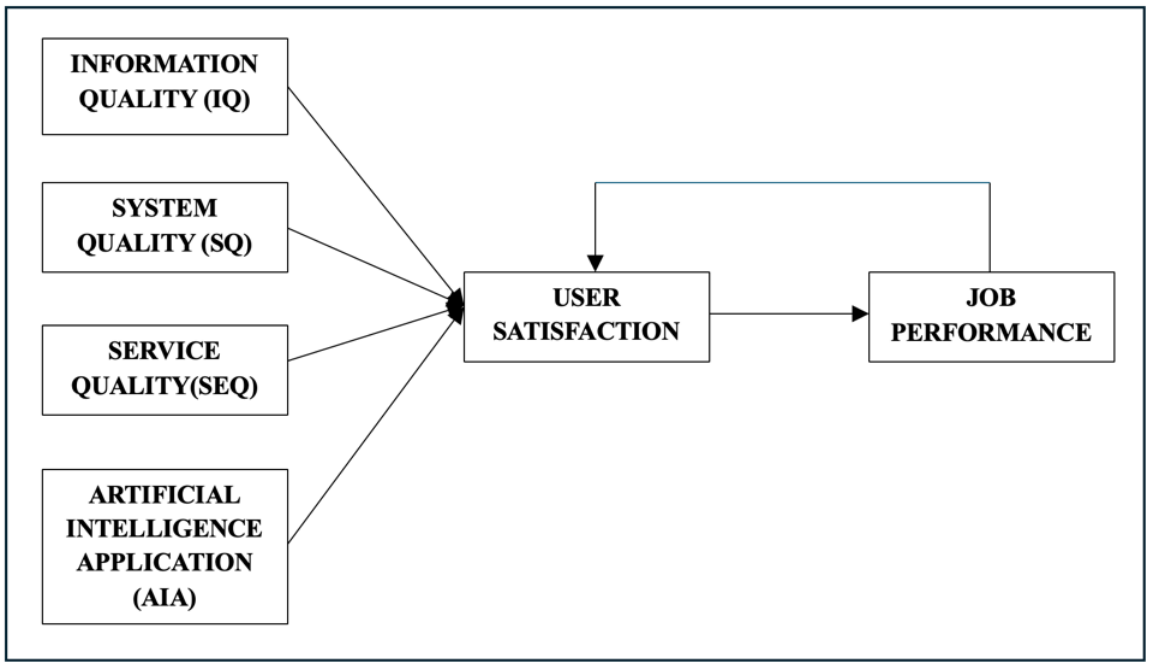

Fig. 4 *The theoretical framework*

The first part of the framework is the independent variables (IV): information quality, system quality, service quality, and artificial intelligence application. The second part is the mediating variable: user satisfaction. Lastly, the dependent variable (DV) is job performance.

As mentioned before, this framework is underpinned by Delone-Mclean's information success model. The framework is employed in the context of information quality, system quality, service quality, and artificial intelligence applications.

2.12 Hypothesis Development

2.12.1 The Relationship Between System Quality and Job Performance

System Quality (SQ) is a key determinant of IS effectiveness, focusing on technical efficiency, user interface consistency, ease of use, and maintainability (Gomide Júnior et al., 2022b). A well-designed system enhances cost reduction, revenue growth, and process efficiency, while poorly constructed systems can lead to crashes and increased costs (Wang & Franke, 2020).

Research shows mixed findings on the relationship between SQ and perceived usefulness. Some studies report a positive impact on organizational benefits (Alkhawaja et al., 2022; Johari et al., 2023), while others argue that system reliability and ease of use do not always improve productivity (Goodhue, 1995; Gefen, 2000; McGill & Klobas, 2005). However, empirical evidence suggests a strong link between SQ and IS effectiveness (DeLone & McLean, 2016; Chang et al., 2012). The following hypothesis is proposed:

H1: System Quality (SQ) has a significant relationship with Job Performance (JP).

2.12.2 The Relationship Between Information Quality and Job Performance

Information Quality (IQ) plays a crucial role in improving business performance, reducing operational costs, and enhancing decision-making (King & Schrems, 1978; Hamilton & Chervany, 1981). High IQ supports market intelligence, internal efficiency, and management commitment (Bharati & Chaudhury, 2015; Al-Hiyari et al., 2013). Studies on large firms and SMEs confirm its positive impact on organizational and individual performance (Kharuddin, Ashhari, & Nassir, 2010). IQ is defined by accuracy, timeliness, and completeness in delivering relevant information for decision-making. The following hypothesis is proposed:

H2: Information Quality (IQ) has a significant relationship with Job Performance (JP).

2.12.3 The Relationship Between Service Quality and Job Performance

Service Quality (SEQ) is a key factor in business success, driving customer loyalty, profitability, and cost reduction (Bitran, Rocha, & Schilkrut, 2008; George, Amfo, & Derald, 2015). High SEQ enhances revenue, productivity, and repurchase intentions (Ferrand, Robinson, & Valette-Florence, 2010; Ayu et al., 2013). Research confirms a strong positive relationship between SEQ and financial performance, customer loyalty, and business impact (Duncan & Elliott, 2002; Wei, 2012; Saadi et al., 2016). Thus, the following hypothesis is proposed:

H3: Service Quality (SEQ) has a significant relationship with Job Performance (JP).

2.12.4 The Relationship Between Artificial Intelligence Applications (AIA) and Job Performance

Artificial Intelligence (AI) significantly impacts high-skilled jobs requiring cognitive abilities like information processing and reasoning, benefiting workers with strong digital skills (Acemoglu et al., 2020; Brynjolfsson et al., 2021). However, AI adoption varies across job types, with lower computer-use occupations experiencing reduced work hours (Felten et al., 2022) and widening labor market disparities (Autor et al., 2023).

AI development positively influences employment, income, and job performance, enabling skilled workers to advance in their careers (Katz & Kreuger, 2021; Zhang et al., 2024). While AI exposure does not directly correlate with employment growth, it enhances job expansion in computer-intensive fields (Frank et al., 2023). Despite AI adoption in large firms, productivity gains remain modest after accounting for firm differences (Gordon & Mandel, 2020; Aghion et al., 2022). Thus, the following hypothesis is proposed:

H4: Artificial Intelligence Applications (AIA) have a significant relationship with Job Performance (JP).

Johor Business School (JBS) Nexus Vol. 2 No. 1 (2025) p. 54-70

2.12.5 The Mediating Effect on Job Performance

The Relationship Between System Quality (SQ) and User Satisfaction (US)

System quality (SQ) significantly influences user satisfaction (US) across various IS types, including management support (Gelderman, 2002), knowledge management (Wu & Wang, 2006), and websites (Kim et al., 2002; Palmer, 2002). Perceived ease of use is also strongly linked to US (Devaraj et al., 2002; Hsieh & Wang, 2007). While most studies confirm this relationship (Iivari, 2005; Wixom & Todd, 2005; Isaac et al., 2017a), some report mixed findings (Sharma & Sharma, 2019; Raymond & Bergeron, 2008). However, SQ remains a key determinant of US through ease of use and reliability (Delone & McLean, 2003; Petter et al., 2008). This study assumes a significant SQ–US relationship.

H5: User satisfaction (US) mediates the relationship between system quality (SQ) and job performance (JP).

The Relationship Between Information Quality (IQ) and User Satisfaction (US)

Research strongly supports the relationship between information quality (IQ) and user satisfaction (US) at the individual level (Alterkait & Alduaij, 2024; Ulhaq Qurrata et al., 2023; Flack, 2016). Studies on various IS types, including websites and organizational systems, confirm this link (Kim et al., 2002; Palmer, 2002; Rai et al., 2002; Wixom & Todd, 2005).

The IS success model highlights IQ as a key factor influencing US, emphasizing relevance as a critical dimension (Hsieh et al., 2012). While some studies report mixed findings (Marble, 2003), the literature consistently supports a positive IQ–US relationship (Seddon & Yip, 1992; Bharati, 2002; Ferreira et al., 2023).

H6: User satisfaction (US) mediates the relationship between information quality (IQ) and job performance (JP).

The Relationship Between Service Quality (SEQ) and User Satisfaction (US)

Research on the relationship between service quality (SEQ) and user satisfaction (US) has produced mixed results, largely due to varying measurement approaches. While some studies find strong correlations between SEQ and US (Urbach & Müller, 2012; Kettinger & Lee, 1994), others report no significant link (Palmer, 2002; Aladwani, 2002).

At the organizational level, factors such as training quality, vendor support, and consultant effectiveness show inconsistent impacts on US (Alrwashdeh et al., 2020; Pang & Zhang, 2024; Hong et al., 2020). Similarly, the DeLone and McLean model highlights SEQ as a key IS success factor, but studies reveal conflicting evidence across different settings (Ojo, 2017; Tam & Oliveira, 2017; Chiu et al., 2007). These discrepancies underscore the complexity of the SEQ–US relationship across contexts and measurement methods.

H7: User satisfaction (US) mediates the relationship between service quality (SEQ) and job performance (JP).

The Relationship Between Artificial Intelligence Applications (AIA) and User Satisfaction (US)

AI applications significantly impact user satisfaction across various domains. In E-Commerce, AI-powered CRM systems, particularly chatbots, enhance customer experience (Nilashi et al., 2023). AI-driven technologies like conversational agents, machine learning models, and recommendation systems also improve engagement and loyalty (Chatterjee et al., 2022).

Research highlights a strong correlation between AI-mediated gratification and user satisfaction (Zheng et al., 2022), while AI adoption in workplaces improves job satisfaction among senior leadership (Yin et al., 2024). However, the effectiveness of AI in enhancing user satisfaction depends on the specific technology, context, and user expectations (Peruchini et al., 2024).

H8: User satisfaction (US) mediates the relationship between artificial intelligence application (AIA) and job performance (JP).

The Relationship Between User Satisfaction (US) and Job Performance (JP)

Empirical studies confirm a strong link between user satisfaction (US) and system benefits (Iivari, 2005). US positively impacts job performance (Deng et al., 2022), productivity (McGill & Hobbs, 2003; Kendall et al., 1997; Urbach & Müller, 2012), decision-making (Vlahos & Ferratt, 1995), and job satisfaction (Ang & Soh, 1997). US is also correlated with organizational performance, including profitability and revenue (Rouibah et al., 2020b).

While some studies report weak correlations with decision-making (Lee & Jeon, 2020), overall findings suggest that higher user satisfaction leads to improved job performance.

H9: User satisfaction (US) has a significant relationship with job performance (JP).

3. Research Methodology

3.1 Research Design

This study employs a descriptive survey design to collect data directly from frontline banking employees, aiming to describe population characteristics and measure relevant conditions. A quantitative approach is selected over a qualitative one, as it allows for statistical evaluation, generalization to a broader population, and comparison with prior research (Sekaran & Bougie, 2010; Zikmund, 2003).

Given the study's objective of examining relationships between variables, it follows a correlational research design (Sekaran & Bougie, 2010). Data will be collected using a cross-sectional survey, which captures information at a single point in time, ensuring a larger sample size and broader applicability (Sekaran, 2003).

A structured survey questionnaire will be used as the primary data collection tool, incorporating a 5-point Likert scalefor precise statistical analysis (Cavana et al., 2001). This methodology ensures reliability and validity in measuring respondents' behaviors, beliefs, and attitudes.

3.2 Population and Sampling

The study focuses on Bank Simpanan Nasional (BSN), where regular use of information systems (IS) in their roles. A random sampling approach is used to ensure representation from various banking positions, including tellers, customer service representatives, and digital support staff. Participants are selected based on their experience and interaction with IS, ensuring relevant insights. The sample size is determined using Krejcie and Morgan (1970), ensuring sufficient representation for reliable statistical analysis.

3.3 Data Collection

The data collection using a questionnaire and the process of the questionnaire was meticulous, encompassing several critical stages. Initially, an extensive literature review was conducted to identify existing validated scales and relevant variables. This was followed by consultations with subject matter experts to refine the questions for clarity and relevance. Finally, a pilot test will be conducted to ensure reliability and validity.

The questionnaire comprises two sections. Section One contains questions regarding the employee's profile, educational background, and software experience. Four components make up section two. Part (A) will question about system quality (SQ), information quality (IQ), and service quality (SEQ). While Part (B) is concerned with artificial intelligence applications (AIA). Part (C) is concerned with user satisfaction (US). Concerning job performance is Part (D).

By linking each question to the research objectives, the questionnaire not only facilitates data collection but also ensures that the data gathered is pertinent and comprehensive. This alignment is crucial for deriving meaningful insights and advancing our understanding of job performance in the banking sector.

3.4 Pilot Study

This pilot study aims to provide the necessary information about the pre-test questionnaire to detect the defects in the design of the questionnaire such as the unexplained paragraphs that can result in inaccurate answers (Oppenheim, 1992). It also helps in analyzing the responses and detecting expected relationships between them, ensuring consistency in the respondents' answers. Saunders *et al.* (2016) emphasized that it is necessary to revise the items and to ensure that there are no errors that lead to misleading or inaccurate answers in the final questionnaire. The aim of conducting a pilot study before the main study is to have a proper questionnaire, which is flawless. The researcher can do any necessary modifications after conducting the pilot study.

3.5 Data Analysis

The data analysis for this study will be conducted using different statistical software, namely SPSS version 22.0 and Smart PLS version 3, which is based on the Partial Least Squares Structural Equation Model (PLS-SEM). The combination of descriptive and inferential statistics was employed to ensure the dependability of the findings. Descriptive statistics in SPSS were utilized to gather information about the sample characteristics, while Smart-PLS Version 3, with its inferential approach, was used to assess the research hypotheses within the conceptual model.

Johor Business School (JBS) Nexus Vol. 2 No. 1 (2025) p. 54-70

PLS-SEM is particularly well-suited for this study for several reasons. Firstly, PLS-SEM is effective in examining complex models with multiple constructs, particularly when the research aims to assess relationships between latent variables, as is the case with system quality, information quality, service quality, AI applications, user satisfaction, and job performance in the banking sector. Unlike covariance-based SEM, which requires a large sample size and assumptions of normality, PLS-SEM can handle smaller sample sizes and does not require the data to be normally distributed, making it a practical choice for this study, where data may be non-normally distributed data (Hair, 2019).

3.6 Operationalization of Variables

This study operationalizes key constructs to quantitatively assess the relationship between information systems and employee performance in the banking sector. System quality is defined in terms of technical reliability, usability, and response efficiency, consistent with Abdullah et al. (2024). It is measured through items such as system stability and ease of navigation. Information quality pertains to the relevance, accuracy, and timeliness of the data produced by the system (Al-Okaily et al., 2025) as shown in Table 3, evaluated using indicators of data completeness and clarity.

Table 3 *The operationalization of variables*

Variables	Operational definition	Sample Measurement items	Sources
System Quality	Refers to the degree to which the banking system is technically reliable, user-friendly, and responsive.	-The system is easy to navigate and use. - The platform is stable and rarely crashes. - System response time is fast.	Abdullah et. al (2024)
Information Quality	Defined as the extent to which system output is accurate, timely, relevant, and complete.	- Information provided is accurate. - The system provides up-to-date data. - Output is clear and understandable.	Al-Okaily et. al (2025)
Service Quality	Denotes the perceived responsiveness, empathy, and competence of technical support services.	- IT support is available when needed. - Support staff are knowledgeable. - Technical issues are resolved efficiently.	Abdullah et. al (2024)
AI Applications	Refers to the extent to which AI-based tools assist employees in decision-making, task efficiency, and service delivery.	- AI tools improve my decision-making. - AI systems are easy to interact with. - AI reduces task completion time.	Sharma et. al (2024) & Viriando & Sfenrianto (2021)
User Satisfaction	Refers to employees' affective response and overall satisfaction with the banking system's usefulness and usability.	- I am satisfied with the banking system. - The system improves my job effectiveness. - I feel confident using the system.	Vaezi et. al (2019)
Job Performance	Represents the self-perceived ability of employees to achieve work objectives efficiently and effectively using the system.	- I complete tasks more efficiently using the system. - The system helps me achieve job targets. - System usage improves work quality.	Lai et. al (2025)

Service quality encompasses the effectiveness of IT support services, including responsiveness and staff competence, also grounded in Abdullah et al. (2024). AI applications are assessed based on their contribution to employee decision-making, task automation, and operational speed, as proposed by Sharma et al. (2024). User satisfaction reflects employees' affective responses to system usage, gauging their perceived usefulness and usability of the system (Vaezi et al., 2019). Finally, job performance is measured through employees' self-assessed ability to meet job targets and complete tasks efficiently with system support, operationalized following Lai et al. (2025). These operational definitions and measurement items ensure clarity, construct validity, and facilitate statistical testing of the study's theoretical model.

3.7 Ethical Considerations

This study will adhere to the ethical guidelines set by the Universiti Tun Hussein Onn Malaysia (UTHM) Research Ethics Committee. Before data collection, ethical approval will be obtained from the UTHM Human Research Ethics Committee (HREC). Participation is voluntary, and informed consent will be obtained from all participants. They will be informed of the study's purpose, procedures, potential risks, and their right to withdraw at any time without consequence. All data will be anonymized, stored securely, and accessible only to the research team. Results will be reported in aggregate form to maintain participant confidentiality. No conflicts of interest are anticipated, and the study will follow UTHM's data governance policies regarding the handling and disposal of research data.

4. Conclusion

This study underscores the critical role of information systems success factors—namely system quality, information quality, service quality—and AI applications in shaping employee satisfaction and job performance within Malaysia's banking sector. The findings offer valuable insights for bank management and policy-makers aiming to foster digital resilience and workforce productivity. Specifically, the results suggest that enhancing system reliability, ensuring accurate and timely information delivery, and improving IT support services can significantly elevate user satisfaction and, in turn, employee performance. For instance, banks like BSN could invest in user-centered system design, regular staff training in AI tools, and responsive IT helpdesks to reduce stress, role ambiguity, and operational inefficiencies. Additionally, policy-makers might consider frameworks that promote digital literacy, data ethics, and inclusive technological transformation across the banking workforce. By addressing these systemic factors, banking institutions can better align their digital initiatives with employee well-being and performance outcomes, thereby ensuring sustainable service delivery and competitiveness in the digital era.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of the paper.

Author Contribution

The authors confirm their contribution to the paper as follows: ***study conception and design:*** *Nurul Syahirah Senin, Umi Kartini Rashid;* ***data collection:*** *Nurul Syahirah Senin;* ***analysis and interpretation of results:*** *Nurul Syahirah Senin;* ***draft manuscript preparation:*** *Nurul Syahirah Senin, Umi Kartini Rashid. All authors reviewed the results and approved the final version of the manuscript.*

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