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Quality Factors of Real-Time Remote Patient Monitoring Systems (RPM) Satisfaction in Malaysia

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Abstract

Malaysia's healthcare institutions face significant challenges, with technology frequently adopted to ensure optimal performance for healthcare services and patient experiences. Nowadays, the healthcare industry is incorporating Real-Time Remote Patient Monitoring Systems (RPM) into daily operations. However, there is low adoption of RPM among patients in Malaysia due to technology adoption limitations. Therefore, this research aims to study the service quality factors of Real-Time Remote Patient Monitoring (RPM) Systems in Malaysia, based on DeLone and McLean's IS Success Model (ISSM). The model measures system quality, service quality, information quality, trust issues, and user satisfaction with the RPM system. The goal is to enhance patient satisfaction and contribute to the Malaysian healthcare sector. Data were collected from patients in both government and private hospitals across Malaysia. A total of 182 questionnaires were distributed via an online survey to patients in Peninsular Malaysia. The data were analyzed using IBM SPSS version 27.0 to test the hypotheses. The findings demonstrate a strong link between all relevant components and RPM system user satisfaction. The results indicate the level of user satisfaction with the current RPM systems in Malaysia's healthcare sector and aim to encourage the Malaysian government to invest more in these systems, potentially benefiting both patients and medical practitioners. Future research should focus on how to enhance user experiences, technology adoption, and, ultimately, the effectiveness of healthcare and financial services in developing countries.

Keywords: Remote Patient Monitoring, DeLone and McLean's Model, ISSM

Introduction

Currently, two prominent topics attracting interest in intelligent automation systems are Industry 4.0 and the Internet of Things (IoT). IoT is gaining traction in remote patient monitoring systems (RPM), which track patients' health using sensors and devices. These systems deliver real-time data to healthcare providers, enabling timely interventions. Service quality factors such as data accuracy, ease of use, transmission timeliness, and customer support impact user satisfaction. IoT integrates sensors, microcontrollers, internet networks, and applications to control and monitor objects remotely. Ashfaq et al (2022) highlight IoT's medical applications, including a system for monitoring older patients' health and have developed similar systems for monitoring vital signs and transmitting data via the Internet. These systems enable healthcare professionals to monitor patients' physiological data, such as heart rate, respiration, and temperature, remotely and in real-time.

In Malaysia, the government supports IoT development through technical support centers and national initiatives, aiming to harness IoT's economic potential. The National IoT Strategic Roadmap (2012-2020) guides IoT implementation, emphasizing infrastructure, research, and development. IoT applications in Malaysia span various sectors, including manufacturing, agriculture, education, healthcare, smart cities, and transportation, enhancing productivity and quality of life. The Sustainable Development Goals (SDGs) in Malaysia align with the Eleventh Malaysia Plan 2016-2020, focusing on universal health coverage, early warning systems for health risks, and research and development for vaccines and medicines. Achieving these goals requires integrating health programs and improving disease surveillance systems to enhance resilience and promote sustainable development. In alignment with the United Nations' Sustainable Development Goals (SDGs), Malaysia integrates IoT technologies to improve healthcare access, enhance early warning systems for health risks, and achieve universal health coverage. These efforts contribute to poverty reduction, economic growth, and sustainable development by ensuring that healthcare services are accessible, affordable, and of high quality.

The growing use of IoT real-time remote patient monitoring (RPM) devices has revolutionized healthcare delivery, especially for the elderly, allowing for remote health monitoring and prompt medical interventions. Ensuring high-quality service delivery is crucial for patient satisfaction and acceptance of these systems. This issue statement explores the service quality factors that impact older patients' satisfaction with RPM systems. With an increasing number of patients unfamiliar with RPM systems, educating users about their benefits and ensuring ease of use is essential. Ease of use is a critical service quality characteristic, with users preferring simple and clear instructions. Privacy concerns are significant, as health data is sensitive. Thangavel et al (2022) found that RTRPM users highly value security and data protection, emphasizing the need for robust security measures, including encryption, access controls, breach prevention, and user education to build trust.

To maximize satisfaction with RPM systems, factors such as system reliability, usefulness, responsiveness, and personalization must be considered. There is a lack of research on these factors in the context of Malaysia's healthcare sector. This study aims to investigate the relationship between service quality factors of RPM systems and user satisfaction in Malaysia, supporting the National Internet of Things Roadmap and Sustainable Development Goals (SDGs) to enhance collaboration between IoT and healthcare.

Literature Review and Hypothesis Development

RPM Technology

Remote Patient Monitoring (RPM) systems address healthcare challenges, particularly in rural communities, by leveraging information and communication technologies (ICT). According to Welkin (2023), real-time RPM allows patients to update their vital signs from home or work. Continuous monitoring aids treatment by enabling physicians to check patients' health anytime and anywhere. Study from Malasinghe et al (2019) note that RPM systems collect various physiological data, including blood pressure, body temperature, ECG, EEG, heart rate, respiration rate, oxygen levels, neurological signals, and blood glucose levels. Additional metrics such as weight, activity level, and sleep patterns are also monitored, which are particularly useful for wound treatment and sleep monitoring.

RPM systems are crucial in healthcare, offering continuous monitoring and early detection of health issues, leading to better disease management and patient outcomes. Levine et al (2020) found that RPM systems enhance patient care by enabling timely detection and treatment, reducing hospital readmission rates, and increasing patient satisfaction. These systems facilitate personalized treatments and proactive chronic illness management, optimizing medical resources and reducing costs. Connected healthcare through RPM benefits individuals with disabilities, chronic illnesses, and mobility issues, allowing them to stay home and actively participate in their care. RPM devices also reduce hospital visits and lengths of stay, reserving hospital beds for more severe cases.

Benefits and Challenges of RPM Systems

RPM integrated systems have revolutionized healthcare by improving care delivery and enabling proactive health issue prediction. IoT-enabled RPM systems have a substantial impact on healthcare, increasing accessibility and reducing costs (Shimo & Bondareva, 2022). These systems use wireless sensors, diagnostic software, and online databases to help patients with chronic illnesses maintain independence, avoid complications, and save on personal expenses. The ability of RPM to monitor and analyze physiological trends aids in the early detection of health deteriorations, thereby enhancing medical care efficiency and patient outcomes.

RPM systems also enable the early identification of serious health issues, reducing the need for costly hospital admissions. For instance, healthcare providers can monitor an insulin-dependent patient's blood sugar levels, detect hypoglycemia trends, and adjust insulin dosages accordingly (Olivencia et al., 2021). Integrating RPM with existing healthcare infrastructure improves the management of conditions like diabetes, leading to better health outcomes.

Barriers to RPM Integrated Systems in Malaysia

Despite the advantages of RPM systems, their implementation in Malaysia trails behind countries like Singapore. Key obstacles include compatibility issues with current construction practices, particularly in Industrialized Building System (IBS) projects. The Building Information Modeling (BIM) tool used for integrating RPM may not align well with Malaysia's IBS construction methods (Ern et al., 2022). Technical challenges such as software compatibility, data management, and system interoperability further hinder RPM adoption. Additionally, management barriers like a lack of awareness and understanding among

industry professionals, as well as environmental concerns about increased energy consumption and waste generation, impede progress. Financial constraints also present significant challenges.

Malaysia Government and Private Initiatives

The Malaysia Health Data Warehouse (MyHDW) serves as a central electronic repository that consolidates health information from both public and private institutions. Its primary objectives are to streamline health system operations, enhance surveillance capabilities, and facilitate research endeavors. MyHDW aims to aggregate millions of inpatient and outpatient medical records, enabling seamless transitions between primary and tertiary care by facilitating the exchange of patient records across all public health institutions (Europe, 2019).

Social influence occurs when an individual is influenced by another person's suggestion to utilize a specific technology. As described by McLeod (2021), social influence refers to situations where an individual's attitudes, beliefs, or behavior are shaped by the presence or actions of others. Within the realm of technology adoption, social influence manifests when individuals are encouraged by others to engage with self-service or self-checkout technology. McLeod (2021) categorizes social influence into four dimensions: conformity, obedience, compliance, and minority. Alalwan et al (2016) assert that social influence is closely linked to peer attitudes and behaviors. Moreover, the guidance and encouragement provided by family members, friends, or even casual acquaintances play a pivotal role in shaping an individual's perceptions and inclination toward adopting new technology. The influence of one's social circle can significantly impact the adoption and usage patterns of new technologies. According to Wu et al. (2022), societal influences affect people's perceptions and readiness to adopt new technologies, thereby serving as a potent precursor to their behavioral intentions to utilize technology (Cabrera-Sánchez et al., 2021).

Theory of Information System Success Model (ISSM)

The Information System Success Model (ISSM) serves as a conceptual framework crafted to assess and appraise the performance of information systems within businesses. It adopts a holistic approach, considering multiple facets of success and their intricate connections. Meanwhile, the Information Systems Audit and Control Model (ISACM) underscores the pivotal role of user satisfaction, system quality, and organizational impact as fundamental determinants of information systems' effectiveness. On the other hand, the DeLone and McLean model delineates six dimensions of IS success: information quality, system quality, service quality, utilization, user satisfaction, and net benefits. These dimensions are interconnected and can be classified into success factors related to usage (which influence a user's intent to use or actual utilization of the system) and outcomes (pertaining to achieving specific objectives through system utilization). This model is instrumental in the assessment of existing systems, formulation of new ones, and enhancement of current systems (Ramayah et al., 2021).

In 1980, Peter Keen, an information systems researcher, advocated for a broader perspective on IS, emphasizing its role in designing, delivering, utilizing, and impacting information technology effectively for both organizations and society at large. He underscored the necessity of evaluating IS not merely on technical grounds but also on its capacity to yield tangible

business outcomes. Keen's viewpoint underscores the multidimensional nature of IS success, encompassing user satisfaction, organizational impact, and financial gains (Qureshi, 2022). Despite criticisms regarding its complexity and the lack of a clear success definition, the DeLone and McLean model is lauded for its comprehensiveness and ability to elucidate IS success factors. The model has undergone validation and widespread adoption in research, albeit ongoing exploration into additional dimensions such as organizational impact, strategic alignment, and user engagement. The ISSM framework has found application in various studies, including assessments of user satisfaction and system utilization in health information systems (Kalankesh et al., 2020). The Information System Success Model (ISSM) consist of system quality, service quality, information quality, and trust issue.

System Quality

System quality plays a pivotal role in determining both the effectiveness of a system and the satisfaction of its users. It comprises various facets, including reliability, usability, performance, and security, all of which contribute to the overall quality of the system. In the context of a real-time RPM system, reliability pertains to its consistency in carrying out intended functions without errors or interruptions. This encompasses aspects such as data accuracy, system availability, and error tolerance. According to the findings of Kousoulou et al. (2019), the reliability of a real-time RPM system holds significant importance in ensuring user satisfaction, particularly for medical professionals who rely on real-time data for vital patient monitoring and decision-making. A dependable system is essential for instilling trust and confidence in users.

Furthermore, performance, which includes factors like speed, responsiveness, and efficiency in delivering real-time data and alerts, is another critical aspect. Users anticipate swift access to patient information, instantaneous notifications, and seamless data transmissions. Research conducted by Iancu and Iancu (2022) indicates that system performance profoundly influences user satisfaction with real-time RPM systems. A high-performance system that furnishes real-time data promptly and without significant delays enhances user satisfaction and overall user experience.$H1_0$: There is no relationship between system quality and user satisfaction with the RPM system.

H1: system quality has a significantly positive effect on user satisfaction of RPM system.

Service Quality

The utilization and user satisfaction of real-time Remote Patient Monitoring (RPM) systems in healthcare are significantly influenced by service quality. Critical aspects of service quality encompass responsiveness, empathy, assurance, dependability, and tangibles, which collectively shape users' perceptions and overall satisfaction with the services rendered. Among these, responsiveness emerges as one of the most crucial factors determining user satisfaction with real-time RPM systems. Users anticipate swift responses and assistance when interacting with the system or seeking support from healthcare providers. According to a study conducted by Kousoulou et al (2019), which delved into nurses' perspectives on remote patient monitoring, system responsiveness holds considerable sway over user satisfaction. Positive user experiences and heightened overall satisfaction are linked to prompt feedback, assistance, and efficient resolution of any issues or grievances.

Furthermore, the criteria influencing the utilization and user satisfaction of real-time RPM systems encompass perceived utility, ease of use, accuracy, reliability, and trustworthiness. Perceived utility is the most pivotal factor, followed by ease of use, accuracy, reliability, and trust. These insights underscore the importance of considering these aspects during the design and implementation phases of real-time RPM systems to enhance their utility, ease of use, accuracy, dependability, and trustworthiness, thereby elevating user satisfaction.

H2: Service Quality has a significantly positive effect on user satisfaction of RPM system.

Information Quality

The significance of information quality in health systems lies in its foundational role in facilitating effective decision-making. High information quality, characterized by desirable system performance traits, exerts a positive influence on system utilization and user satisfaction (Fitriati et al., 2020). Conversely, poor information quality can have adverse consequences and prove fatal in critical processes, such as patient care. Evidence indicates that the quality of available information directly impacts the utilization of information systems and user satisfaction with these systems.

Clinicians, as the primary users of hospital information systems (HIS), heavily rely on quality information to make informed decisions aimed at providing optimal patient care and restoring health. Effective support from HIS in achieving these objectives tends to elevate clinicians' satisfaction with the system. Furthermore, secondary users, including administrators, managers, insurers, quality auditors, accreditation bodies, and policymakers, also derive substantial benefits from high-quality information, enabling better health system management and evidence-based policymaking. Equally vital is the caliber of information for researchers, as all facets of information quality in HIS contribute to more dependable research findings and heightened user contentment. The enhancement of information quality in HIS through key enablers such as policies and governance holds the potential to further augment user satisfaction. Additionally, effective information modeling is recognized as a viable approach to enhancing information quality.

H3: Information quality has a significantly positive effect on user satisfaction of RPM system.

Trust Issues

Trust plays a pivotal role in the effectiveness of real-time Remote Patient Monitoring (RPM) systems and influences user satisfaction significantly. Users must have confidence in various aspects of the system, including its accuracy, timeliness, transparency, user-friendliness, and reliability. Without trust, users are inclined to underutilize the system and may resort to making suboptimal decisions. The accuracy of the system stands out as particularly critical in establishing trust. Users must have faith that the system provides precise information regarding the risks associated with specific transactions. Any inaccuracies may lead users to distrust the system, potentially resulting in poor decision-making (McCarthy et al., 2019).

Furthermore, timeliness holds considerable importance. Users require real-time risk information to make well-informed decisions. If the system fails to deliver timely information, users may be less inclined to depend on it, increasing the likelihood of decisions not aligning with their best interests (Kalankesh et al., 2020). Additionally, the RPM system must

guarantee the protection of users' information and privacy. Users need assurance that their data is secure and their privacy remains intact. Without trust in the system's ability to safeguard personal information, users are less likely to engage with it.$H4_1$: There is a positive relationship between trust issues and user satisfaction with the RPM system.

H4: Trust issue has a significantly positive effect on user satisfaction of RPM system.

Research Framework

Drawing from extensive literature reviews and the Information System Success Model, this study formulated a research model and hypotheses tailored to the specific circumstances under investigation. The model aligns with real-world scenarios, focusing on four dimensions of the ISSM model—system quality, service quality, information quality, and trust issues—to assess their impact on user satisfaction within the context of this study. Utilizing this framework, we will determine the format and methodology for subsequent studies. The framework suggests that users in Malaysia stand to gain significant benefits from the Real-Time Remote Patient Monitoring system, as illustrated in Figure 1.

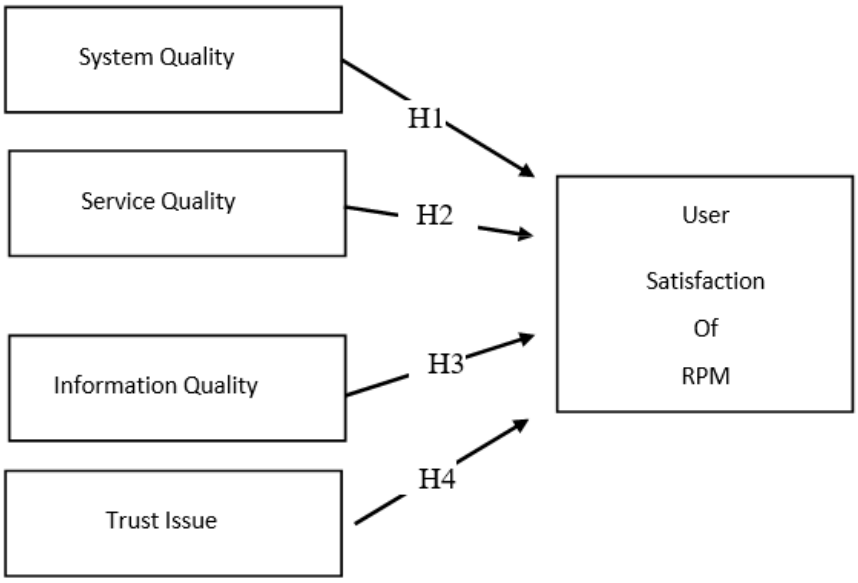

Figure 1: Theoretical Framework for this research

Methodology

This study adopted a quantitative research approach, employing an online questionnaire survey to gather data from 182 users of remote patient monitoring systems. A pilot test was conducted with five RPM users to assess the validity of the survey questionnaire and obtain feedback on its structure. Results from the pilot test indicated that all constructs achieved a Cronbach's alpha value above 0.6, signifying satisfactory reliability (Hajjar, 2018). The survey instrument comprised three sections. Section A collected demographic information about the respondents, while Section B focused on factors influencing user satisfaction with RPM systems using the dimensions of the Information System Success Model. Section C assessed user satisfaction with the RPM system based on the IS success model's elements: system quality, service quality, information quality, and trust issues. The measurement scales utilized in the study were previously validated in the literature.

Responses were recorded using a Likert scale, ranging from 1 for "strongly disagree" to 5 for "strongly agree." Prior research by Pires et al (2022) affirmed the questionnaire's effectiveness in measuring user satisfaction with RPM systems. Data analysis was performed using SPSS version 27, encompassing descriptive statistics, reliability and validity analysis, Pearson correlation, and multiple regression tests to fulfill the study objectives. Table 1 presents the demographic profile of survey participants. Findings reveal that 37.4% of respondents were male, while 62.6% were female. The majority of participants fell within the 18 to 25 age group (50.5%), followed by those aged 26 to 33 (21.4%). Malay respondents constituted the largest racial group (57%), followed by Chinese (27%) and Indian (16%). Urban residents comprised 81% of the sample, with the remainder residing in rural areas. Employment status varied, with students comprising 46.7%, followed by employed individuals at 39.6%. Daily users of RPM systems represented 50.5% of respondents, with usage frequencies decreasing from there.

Table 1
Respondents' Background

Background	Categories	Frequency	Percentage (%)
Gender	Male	68	37.4
	Female	114	62.6
Age	Below 18	5	2.7
	18-25	92	50.5
	26-33	39	21.4
	34-41	12	6.6
	42-49	12	6.6
	50 and above	22	11.9
Race	Malay	103	57
	Chinese	49	27
	Indian	30	16
Residence	Rural	35	19
	Urban	147	81
Employment Status	Retired	15	8.2
	Student	85	46.7
	Unemployed	10	5.5
	Employed	72	39.6
Average Usage of RPM	Daily	92	50.5
	Once a week	25	13.7
	Several times per week	30	16.5
	Once every two weeks	8	4.4
	Once a month	15	8.2
	Once a year	12	6.6

Reliability Analysis and Validity Test

The reliability analysis, assessed through Cronbach's Alpha, is depicted in Table 2. The values of Cronbach's Alpha for all variables fall between 0.883 and 0.952, exceeding the threshold of 0.70, which is considered significantly high. According to Kline (2000), a minimum reliability value of 0.7 is indicative of good reliability

Table 2
Reliability analysis of each variable.

Variable	Number of Items	Cronbach's Alpha
System Quality (SYQ)	5	0.922
Services Quality (SEQ)	5	0.941
Information Quality (IFQ)	5	0.948
Trust Issue (TI)	5	0.952
User Satisfaction (US)	5	0.883

Results

Overall, the data provided in Table 3 demonstrates significant and positive correlations between user satisfaction and several factors: system quality (r=0.729, p<0.01), service quality (r=0.733, p<0.01), information quality (r=0.724, p<0.01), and trust issues (r=0.720, p<0.01).

Table 3
Pearson correlation for variable of study.

	SYQ	SEQ	IFQ	TI	US
SYQ	1	.750**	.792**	.695**	.729**
SEQ	.750**	1	.771**	.737**	.733**
IFQ	.792**	.771**	1	.789**	.724**
TI	.695**	.737**	.789**	1	.720**
US	.729**	.733**	.724**	.720**	1

**. Correlation is significant at the 0.01 level (2-tailed).
SYQ=System Quality, SEQ=Service Quality, IFQ=Information Quality, TI=Trust Issue, and US=User Satisfaction

Table 4 presents the model summary for user satisfaction with Remote Patient Monitoring (RPM). The coefficient of determination (R Square) indicates that collectively, four independent variables explain 60.5% (R2 = 0.605) of the total variance in user satisfaction with RPM. This regression model, outlined in the table, explores the associations between system quality, service quality, information quality, and trust issues concerning user satisfaction. The standardized coefficients reveal that system quality ($p < 0.05$, $\beta = 0.274$), service quality ($p < 0.05$, $\beta = 0.257$), and trust issues ($p < 0.05$, $\beta = 0.256$) are all significantly linked to user satisfaction with Remote Patient Monitoring. However, the variable information quality ($p > 0.05$, $\beta = 0.107$) is deemed insignificant in relation to user satisfaction with RPM.

Table 4
Regression for Customer Intention determined.

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Std. Error**	**Beta**	**T**	**Sig.**
(Constant)	.682	.189		3.606	<.001
System Quality	.269	.077	.274	3.507	<.001
Service Quality	.239	.073	.257	3.287	.001
Information Quality	.104	.087	.107	1.189	.236
Trust Issue	.241	.073	.256	3.329	.001

a. Dependent Variable: user satisfaction.
R= 0.806. R square= 0.605. Adjusted R= 0.642. F = 82.146

Discussion

The study investigates the service quality factors that affect user satisfaction with real-time remote patient monitoring (RPM) systems and explores the causal relationships among these constructs using a proposed research framework based on DeLone and McLean's IS theories. It has been recognized that there is a correlation between system quality and user satisfaction, indicating that system quality significantly impacts user satisfaction with RPM systems. These findings align with a prior study by Al-Ogaily et al (2020) on enterprise systems (ES) in Jordan, which revealed that higher system quality enhances user satisfaction by boosting productivity and saving time on tasks. Optimal system performance is argued to be essential for achieving high levels of user satisfaction and performance, achievable through straightforward hardware, software, and error-free systems (Al-Ogaily et al., 2020).

Among all system quality attributes, "Provides information swiftly" had the highest significance, highlighting that a system's user experience significantly influences user satisfaction. Additionally, user satisfaction with RPM systems was notably influenced by the item "Find it very convenient." A previous study by Al-Nuaimi et al. (2020) examined e-services provided by five Malaysian Institutes of Higher Learning (IHL) and found that the dimensions of service quality vary depending on the user's perspective and expectations. According to the research conducted by Alexandra et al. (2021), the statement "The RPM technology is safe to use" had the highest mean among all items in the trust issue factor. Moreover, users may be less inclined to trust the system and more likely to make decisions that are not in their best interests if the system does not provide accurate information (McCarthy et al., 2019). This implies that H1, H2, and H3 are accepted.

However, H4 is rejected, indicating that information quality is the only variable that does not significantly relate to user satisfaction. The notion of information quality affecting user satisfaction in Hospital Information Systems (HIS) is supported by several studies. Fitriati et al (2020) underscore the crucial role of information quality in ensuring effective decision-making, ultimately impacting system utilization and user satisfaction. Clinicians who effectively utilize HIS information for optimal care delivery may experience higher satisfaction. Similarly, high-quality data can support better management, policymaking, and research, potentially satisfying administrators, managers, and researchers (Urbach & Muller, 2011). Nonetheless, accurately measuring both information quality and user satisfaction can be challenging. Information quality can be subjective and context-dependent, while user satisfaction may be influenced by external factors beyond the HIS itself. These measurement limitations can introduce noise and hinder the detection of significant relationships.

Conclusions

The study confirmed the significance of system quality, service quality, information quality, and trust issue, along with their impact on user satisfaction with RPM systems. Particularly noteworthy was the influence of service quality on future usage, suggesting the need for further investigation in this area. Policymakers are encouraged to prioritize user-centric design and training to ensure the effective deployment of systems. These findings also inform managerial strategies for optimizing RPM and theoretical discussions on the applicability of ISSM models in RPM contexts. Addressing the study's limitations and exploring opportunities for future research would enhance our understanding of user satisfaction and pave the way for transformative healthcare experiences in Malaysia, especially concerning non-online users and various healthcare technologies.

Significant Implications of the Research

The theoretical, managerial, and government implications of the study are examined in the implications of the study that are based on the research findings from the previous chapter.

Implication of Theoretical

This study investigated user satisfaction with remote patient monitoring (RPM) systems using the DeLone and McLean Information System Success Model (ISSM). By incorporating dimensions such as Information Quality, System Quality, and Service Quality from the model, the study evaluated their impact on user satisfaction. The findings indicated that System Quality and Information Quality were the primary drivers of user satisfaction, which diverges somewhat from the conclusions of Petter et al (2008), who highlighted the importance of Service Quality. One possible explanation for this difference is that users primarily interact with RPM systems and devices independently, diminishing the perceived significance of Service Quality. When RPM devices are intuitive and require minimal support, users may prioritize factors such as system functionality and data accuracy. Future research could explore how self-service versus provider-mediated service delivery affects user satisfaction with RPM systems. Additionally, investigating the influence of factors such as device types, user demographics, and health conditions on the importance of various ISSM dimensions would provide valuable insights. This study contributes to the theoretical understanding of RPM systems, particularly in Malaysia, where this technology is still evolving. Our findings align with the core principles of the ISSM model, with three out of four hypotheses demonstrating significant relationships and explaining 60.5% of the variance in user satisfaction. This contrasts with previous studies Fida et al (2020); Petter et al (2008), enriching the understanding of critical success factors for RPM adoption, especially in developing countries like Malaysia. Understanding user satisfaction can assist Malaysian hospitals in optimizing system design and implementation to improve patient outcomes.

Implication of Managerial

The research findings provide valuable insights for improving remote patient monitoring systems to boost user satisfaction. Malaysia has several telemedicine platforms, such as the Malaysia Health Data Warehouse (MyHDW), Naluri, Doctor-On-Call, and Artificial Intelligence in Malaysia Epidemiology (AIME). These platforms can use the study's insights to understand user satisfaction and identify areas for improvement in RPM systems. The study aimed to advance Malaysia's RPM system by integrating Internet of Things (IoT) devices, bridging the technological gap with developed nations. This move could reduce

redundant patient data and enhance care quality. While the system met key satisfaction factors like system and information quality and trust, service quality alone significantly influenced future satisfaction. This unexpected finding requires further investigation to understand the specific aspects of service quality important to Malaysian patients in RPM systems.

Implication to Government

The findings of the research offer valuable insights into enhancing remote patient monitoring systems to enhance user satisfaction. In Malaysia, there are numerous telemedicine platforms available, including the Malaysia Health Data Warehouse (MyHDW), Naluri, Doctor-On-Call, and Artificial Intelligence in Malaysia Epidemiology (AIME). These platforms can leverage the insights from the study to gauge user satisfaction levels and pinpoint areas for improvement in RPM systems. The study aimed to propel Malaysia's RPM system forward by integrating Internet of Things (IoT) devices, thereby bridging the technological divide with more developed nations. This initiative could streamline patient data and elevate the quality of care provided. Although the system fulfilled key satisfaction factors like system and information quality and trust, it was noteworthy that service quality alone significantly influenced future satisfaction. This unexpected discovery warrants further investigation to ascertain the specific aspects of service quality that are crucial to Malaysian patients in RPM systems.

Ethical Considerations

This study is voluntarily participation and the respondents agreed to take part in the study. Information gathered during this study is confidential.

Conflict of Interest

The authors declare that they have no conflict of interest.

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References

Alalwan, A. A., Dwivedi, Y. K., & Williams, M. D. (2016). Customers' intention and adoption of telebanking in Jordan. *Information Systems Management*, *33*(2), 154-178.

Al-Nuaimi, I. T. I., Mahmood, T. M., Khalid, O. W., & Alazzawi, A. K. (2020). An integrated model of the relation between E-service quality and user satisfaction in IHL. In *Journal of Physics: Conference Series* (Vol. 1529, No. 4, p. 042072). IOP Publishing.

Al-Ogaili, A. S., Alhasan, A., Ramasamy, A., Marsadek, M. B., Hashim, T. J. T., Al-Sharaa, A., ... & Audah, L. (2020). IoT technologies for tackling COVID-19 in Malaysia and worldwide: Challenges, recommendations, and proposed framework. *Computers, Materials & Continua*, *66*(2), 2141-2164.

Alexandra, S., Handayani, P. W., & Azzahro, F. (2021). Indonesian hospital telemedicine acceptance model: the influence of user behavior and technological dimensions. *Heliyon*, *7*(12).

Ashfaq, Z., Rafay, A., Mumtaz, R., Zaidi, S. M. H., Saleem, H., Zaidi, S. A. R., ... & Haque, A. (2022). A review of enabling technologies for Internet of Medical Things (IoMT) Ecosystem. *Ain Shams Engineering Journal*, *13*(4), 101660.

Cabrera-Sánchez, J. P., Villarejo-Ramos, Á. F., Liébana-Cabanillas, F., & Shaikh, A. A. (2021). Identifying relevant segments of AI applications adopters–Expanding the UTAUT2's variables. *Telematics and Informatics*, *58*, 101529.

Ern, P. A. S., Yang, W. X., Kasim, N., Osman, M. H., Adnan, S. H., Natasha, N. S., & Ali, R. (2022, May). Building information modelling (BIM) in Malaysian industrialised building system (IBS) construction projects: benefits and challenges. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1022, No. 1, p. 012020). IOP Publishing.

Fitriati, A., Pratama, B., Tubastuvi, N., & Anggoro, S. (2020). Study of Delone-Mclean information system success model: the relationship between system quality and information quality. *Journal of Theoretical and Applied Information Technology*, *98*(03), 477-487.

Hajjar, S. T. (2018). Statistical analysis: Internal-consistency reliability and construct validity. *International Journal of Quantitative and Qualitative Research Methods*, *6*(1), 27-38.

Iancu, I., & Iancu, B. (2023). Interacting with chatbots later in life: a technology acceptance perspective in COVID-19 pandemic situation. *Frontiers in psychology*, *13*, 1111003.

Kalankesh, L. R., Nasiry, Z., Fein, R. A., & Damanabi, S. (2020). Factors influencing user satisfaction with information systems: a systematic review. *Galen Medical Journal*, *9*, e1686.

Kousoulou, M., Suhonen, R., & Charalambous, A. (2019). Associations of individualized nursing care and quality oncology nursing care in patients diagnosed with cancer. *European Journal of Oncology Nursing*, *41*, 33-40.

Levine, D. M., Ouchi, K., Blanchfield, B., Saenz, A., Burke, K., Paz, M., ... & Schnipper, J. L. (2020). Hospital-level care at home for acutely ill adults: a randomized controlled trial. *Annals of internal medicine*, *172*(2), 77-85.

Malasinghe, L. P., Ramzan, N., & Dahal, K. (2019). Remote patient monitoring: a comprehensive study. *Journal of Ambient Intelligence and Humanized Computing*, *10*, 57-76.

McCarthy, J., Alexander, O., Edwards, S., Faatz, D., Peloquin, C., Symington, S., ... & Viani, K. (1800). Situational awareness. *NIST Special Publication*, 7B.

Petter, S., DeLone, W., & McLean, E. (2008). Measuring information systems success: models, dimensions, measures, and interrelationships. *European journal of information systems*, *17*(3), 236-263.

Pires, G., Lopes, A., Correia, P., Almeida, L., Oliveira, L., Panda, R., ... & Pereira, T. (2023). Usability of a telehealth solution based on TV interaction for the elderly: The VITASENIOR-MT case study. *Universal Access in the Information Society*, 1-12.

Qureshi, S. (2022). Tribute to a prodigious scholar, mentor and global thought leader: Professor Peter Keen.

Ramayah, T., May-Chiun, L., Samad, S., Ahmad, N. H., & Halim, H. A. (2021). Assessment of a Hierarchical Model Using Partial Least Squares (PLS): The Case of Enterprise Resource Planning (ERP) System Continued Usage. *Studies of Applied Economics*, *39*(10).

Thangavel, G., Memedi, M., & Hedström, K. (2022). Customized information and communication technology for reducing social isolation and loneliness among older adults: scoping review. *JMIR mental health*, *9*(3), e34221.

Welkin. (2023). *The Ultimate Guide to Remote Patient Monitoring Devices*. Welkin Health. https://welkinhealth.com/remote-patient-monitoring-devices/

World Health Organization Regional Office for Europe. (2019). Policy brief. *Pancanaka, 1*(2), 14.

Wu, W., Zhang, B., Li, S., & Liu, H. (2022). Exploring factors of the willingness to accept AI-assisted learning environments: an empirical investigation based on the UTAUT model and perceived risk theory. *Frontiers in Psychology*, *13*, 870777.