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The Unified Theory of Acceptance and Use of Technology (UTAUT) Method in Evaluating Hospital Management Information Systems

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ABSTRACT

Hospital management information systems play an important role in managing patient care together. Technology acceptance models such as the Unified Theory of Acceptance and Use of Technology (UTAUT) have proven important for predicting information technology acceptance. This literature review aims to evaluate the extended UTAUT model to predict hospital management information systems represented by behavioral intention, convenience, and ease of collaboration. The methods used in this paper are literature review, collection and analysis of scientific articles, and other scientific sources. The results of the literature review show that UTAUT can be a theoretical approach that supports hospital management information systems

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1. Introduction

The acceptance and use of information systems (IS) and information technology (IT) innovations has been a major concern in research and practice (Kamalzadeh, 2015). The concept of "health management" was first born in the United States and Canada. It specifically refers to the monitoring of health status, analysis of health data, evaluation and prediction of different populations, proposal of appropriate health plans, intervention and management of various potential risk factors, and provision of professional health guidance and services (Schretzlmaier et al., 2022). The management system for the elderly derived from telemedicine is based on the Internet of Things, the Internet of Systems and wireless body area networks, providing an online self-health management platform for the elderly to realize health information collection, health assessment, health consultation, emergency medical assistance and other functions (Cobelli et al., 2023). It has the advantages of real-time monitoring, two-way data transmission, online communication. Although the elderly health management system has been shown to have a significant physical and psychological impact on the level of health, there is still a problem of low usage rate, frequency of use, and acceptance of the health management system by hospitals.(W. Li et al., 2023)

In the current era of digitalization, information technology has become an integral part of various sectors, including the health sector (Wilson et al., 2021). Hospital Management Information System (SIMRS) is one of the implementations of information technology that aims to improve the efficiency and effectiveness of health services (Nunes et al., 2022). Evaluation of the acceptance and use of SIMRS is important to ensure that the system functions optimally and is accepted by users (Hasan et

al., 2022). One framework that is often used to evaluate technology acceptance is the Unified Theory of Acceptance and Use of Technology (UTAUT). (UTAUT). UTAUT, which was introduced by Venkatesh et al. in 2003, identifies four main constructs that influence user intention and behavior in accepting technology, namely performance expectations, effort expectations, social influence, and facilitating conditions (Kijsanayotin et al., 2009).

UTAUT has been widely applied in various research studies covering a wide range of technologies and their adoption (Venkatesh et al., 2011). Examples include user adoption of mobile banking systems, wireless LAN technology, customer acceptance of online purchasing tools, use of mobile technology, employee acceptance of online human resource information systems (HRIS) that provide benefits for self-management, user acceptance and use of emergency response systems, and many more in the Healthcare world (Sadoughi et al., 2019).

The Unified Theory of Acceptance and Use of Technology (UTAUT) is the main model widely used in understanding technology adoption in educational contexts, especially in higher education (Dwivedi et al., 2020). The proposed UTAUT model has been appropriately validated to provide a unified theoretical foundation for promoting research on information systems (IS) or IT adoption and dissemination (Fres, 2022). The four core parameters suggested by this model to directly determine health IT behavioral intention and usage behavior include performance expectancy, effort expectancy, social influence, and facilitating conditions (Kijsanayotin et al., 2009). In addition, the model assumes that factors such as age, gender, experience and willingness to use greatly moderate the effects of the main parameters (Cobelli et al., 2023). The UTAUT concept was developed through the review, integration and mapping of eight dominant theories and models consisting of (Dwivedi et al., 2020); a) Theory of Reasoned Action (TRA), b) Technology Acceptance Model (TAM), c) Motivation Model (MM), d) Theory of Planned Behavior (TPB), e) Theory of Planned Behavior (TPB), f) Theory of Planned Behavior/Technology Acceptance Model (C-TPB-TAM), g) Model of PC Utilization (MPCU), h) Innovation Diffusion Theory (IDT), i) Social Cognitive Theory (SCT).

These models and theories have been used effectively through various previous studies on technology or innovation adoption and circulation in both the ISs area and various disciplines including marketing, social health, psychology, and management science (W. Li et al., 2023; Salinero, 2016; Zhou et al., 2019).

It is hoped that the results of this literature review can be used as a reference in knowing the development of health management behavior towards interest or interest using UTAUT and appropriate for maximizing utility related to hospital information and information management in the future. However, although many hospitals have adopted SIMRS, acceptance and use of this system by users still varies. To overcome this challenge, many researchers use the Unified Theory of Acceptance and Use of Technology (UTAUT) framework to evaluate the factors that influence technology acceptance. However, there are several gaps in previous research that need to be addressed to gain a more comprehensive understanding of the application of UTAUT in SIMRS evaluation. First, previous studies often do not consider the specific context of hospitals, such as differences in organizational culture, hospital size, and medical specialties. This gap is important to address because contextual factors can influence the acceptance and use of SIMRS. This research will focus on various types of hospitals to provide a more comprehensive and relevant picture. Second, although UTAUT includes moderating factors such as age, gender, and experience, previous research rarely takes into account other factors that may be relevant in the hospital context, such as job role (physician, nurse, administration) and educational level. By considering these additional moderating variables, this research is expected to expand the UTAUT model and provide deeper insight into the factors influencing technology acceptance in the health sector. Third, many studies focus on initial adoption and acceptance of the technology, but rarely examine the long-term impact of SIMRS implementation on hospital performance and user satisfaction. This research will include a long-term evaluation to provide more comprehensive insight into the impact of SIMRS implementation. Fourth, most previous research uses a quantitative approach in evaluating technology acceptance. This research will combine

qualitative methods, such as in-depth interviews and case studies, to gain a more holistic understanding of the factors that influence SIMRS acceptance and use.

The practical benefits of this research include improving SIMRS implementation by providing practical recommendations for hospital management on how to overcome barriers to SIMRS implementation. The results of this research can also be used to design more effective training and technical support programs, based on the specific needs and challenges faced by various SIMRS users. In addition, the findings from this research can help system developers to create features that are more user-friendly and in accordance with user needs in the hospital environment.

Theoretically, this study contributes to the literature by testing and extending the UTAUT model in the specific context of hospitals, which may help in better understanding the factors influencing technology acceptance in the healthcare sector. By considering additional moderating variables relevant in the hospital context, this study may enrich the UTAUT model and provide a more comprehensive framework for future research. The combined qualitative and quantitative approach used in this research can also serve as a model for future studies that aim to understand the complexity of technology adoption in various contexts. By overcoming existing gaps and providing practical and theoretical benefits, this research is expected to contribute significantly to the development and implementation of a more effective and efficient Hospital Management Information System.

2. Methods

The methodology used in this literature review involved systematic steps to collect, assess, and synthesize research relevant to the topic at hand. These steps include: (a) Literature Search: The search was conducted through academic databases such as Google Scholar, PubMed, and IEEE Xplore with the keywords "UTAUT", "Hospital Management Information System", and "Health Technology Evaluation". (b) Selection Criteria: Articles were selected that were published within the last five years, focused on SIMRS evaluation using the UTAUT model, and were available in English or Indonesian. (c) Analysis and Synthesis: Articles that met the selection criteria were analyzed to identify key findings, methodologies used, and research results. These findings were then synthesized to provide an overview of the application of UTAUT in SIMRS evaluation.

3. Results and Discussion

When conducting research on the adoption of new technologies, researchers are often faced withthe challenge of selecting a construct from among many competing models. To address this issue, (Salinero, 2016) synthesized seven competing models and proposed the UTAUT model. In the UTAUT model, (Venkatesh et al., 2011)argue that performance expectancy (PE), effort expectancy (EE), Social influence (SI), and facilitating conditions (FC) play a significant role as direct determinants of user acceptance and usage behavior. These four constructs have been redefined based on existing models. Specifically, PE refers to the extent to which an individual believes that using the system will help them achieve gains in job performance (Venkatesh et al., 2003). EE indicates the degree of ease associated with using the system. SI refers to the extent to which an individual perceives that important others believe they should use the new system. FC reflects the extent to which an individual believes that organizational and technical infrastructure exists to support the use of the system. In addition, key moderators such as gender, age, voluntariness, and experience have been incorporated into the UTAUT model (Al-Sharafi et al., 2023; Cobelli et al., 2023).

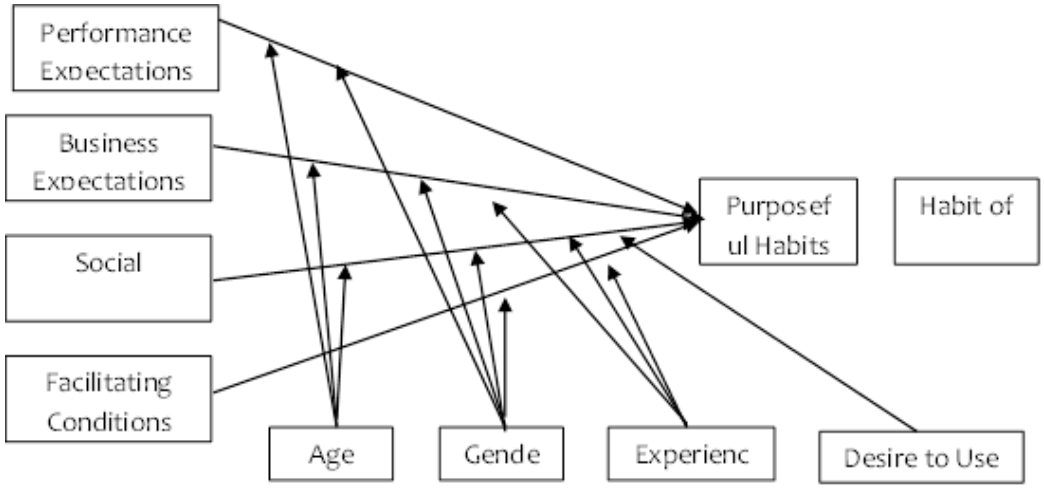

Figure 1. UTAUT MOdel

The UTAUT model has demonstrated its wide applicability through its widespread application in various fields. The model has been used to study the acceptance of various technologies, including the internet of things, artificial intelligence products, electronic health technology, electric vehicles, and others(Kijsanayotin et al., 2009; Sharifian et al., 2014).

Kijsanayotin et al. used a modified UTAUT to explore the factors influencing health IT (HIT) adoption in public health centers in Thailand. They used quantitative methods using SEM as in the previously mentioned TAM study, and the emphasis was on HIT and its model rather than the participants' views on factors influencing HIT adoption (Kijsanayotin et al., 2009).Similarly, Sharifian et al. also used UTAUT to identify factors influencing nurses' acceptance of e-health resources in Iran, again using a quantitative approach to identify factors influencing acceptance of e-health resources by testing the strength of relationships within the model. The participants' personal views on e-health acceptance were not explored (Sadoughi et al., 2019). Venkatesh et al. also used UTAUT to explore the adoption and use of e-health resources among physicians. SEM was used to predict the strength of relationships in the model and although they established relationships with the constructs with an explained variance of 44%, this compared to 76% established when using the model in previous research outside of healthcare. However, they confirmedthat UTAUT should be integrated with other theories to enrich it when adopting it into a healthcare context (Venkatesh et al., 2011).

UTAUT Performance Expectancy of Hospital Information Management Systems

Morton and Wiedenbeck (2009) presented a framework for predicting EHR adoption attitudes, in which physicians were surveyed (Mohammadi et al., 2022). This study was the first of 2 parts. The research approach was not based on the UTAUT framework; however, most of the eight constructs defined by the researchers can be categorized under the UTAUT constructs. This study utilized a quantitative research approach with a survey research instrument that used a five-point Likert scale to capture responses. The researchers collected 239 usable responses that provided data related to eight constructs: (a) management support; (b) physician engagement; (c) adequate training; (d) physician autonomy; (e) physician-patient relationship; (f) perceived ease of use; (g) perceived benefits; and (h) attitudes about EHR use. The researchers identified in the study results that ease of use was most influenced by management support, physician-patient relationship was a significant negative influence on perceived ease of use based on physicians' perception of EHR as an impediment to physician-patient relationship. Among the results, training was not statistically significant. Perceived ease of use was found to have the strongest influence on perceived usefulness (Yehualashet et al., 2021).

Positive Effect of UTAUT on Hospital Information Management System

Granlien and Hertzum (2012) examined barriers to the adoption and use of electronic medical records. The study was an analysis of EMR adoption and use two to four years after implementation. The sample included middle and lower level EMR managers. A survey questionnaire instrument was used to collect perceptions of EMR managers in one Danish healthcare region, followed by interviews in two hospital wards (Mannheim et al., 2023). The survey was designed to collect physicians' perceived acceptance of EMR andsystem-driven procedures, and managers' perceptions of adoption barriers including EMR usability and ease of use were also collected (Yin et al., 2022). The sample consisted of 232 responses out of 430 recruited, for a response rate of 54%. Response options for some surveys were organized on a seven-point Likert scale and others on a five-point Likert scale(Yasumura & Abe, 2017). (a) Performance Expectations: Most studies show that performance expectation is a significant factor affecting SIMRS acceptance. Users tend to accept and use SIMRS if they believe that thesystem will improve their performance in their daily work. The study by (Davis et al., 1989; J. Li et al., 2013) foundthat features such as quick access to patient information and efficiency in medical data management are key determinants of performance expectations. (b) Effort Expectations: Effort expectancy refers to the ease of use of SIMRS. Users are more likelyto accept a system that is easy to learn and operate. For example, research by (Jiang & Lau, 2023) shows that an intuitive interface and adequate training contribute significantly to effort expectation.(c) Social Influence: Social influence also plays an important role in SIMRS acceptance. Support from coworkers, superiors, and other medical professionals can increase the intention to use SIMRS. Research by (Simpson et al., 2021) showed that support and recommendations from hospital leaders significantly influenced the adoption of technology by medical staff. (d) Facilitation Conditions: Factors such as resource availability and technical support influencethe use of SIMRS. The study by Li et al. (2020) emphasized the importance of adequate technological infrastructure and ongoing technical support in ensuring the successful implementation of SIMRS.

4. Conclusion

The application of the UTAUT model in the evaluation of SIMRS provides valuable insights into the factors that influence user acceptance and use of technology. Performance expectation, effort expectation, social influence, and facilitating conditions are the main determinants that should be considered. to be considered in the development and implementation of SIMRS. The studies that have been conducted show that an in-depth understanding of these factors can assist hospital management in designing effective strategies to increase the adoption and use of SIMRS. Future research in this area can focus on developing a more comprehensive UTAUT model by considering the specific context of the hospital environment and user needs.

Limitations of the Study

Sample Limitations: This study may be limited by the number and type of hospitals included, which could affect the generalizability of the results. Focusing on specific hospitals with unique characteristics might not represent all types of hospitals broadly.

Research Methodology: Although a mixed-methods approach combining qualitative and quantitative data is used, constraints in time and resources may impact the depth and breadth of data collected. In-depth interviews may be limited to a small number of informants, potentially not capturing a broader range of perspectives.

Moderating Variables: While this study considers additional moderating variables such as job roles and educational levels, many other relevant factors, such as work environment, workload, and stress levels, might not be accounted for.

External Influences: External factors such as government policies, regulatory changes, and rapid technological advancements can affect the study's outcomes. This research may not fully capture the dynamic changes occurring during the study period.

Recommendations for Future Research, Expanded Sample: Future research should expand the sample to include more hospitals from various regions and types, including both private and public hospitals, as well as those with different specializations. This will enhance the generalizability of the findings.

Longitudinal Approach: Conducting longitudinal studies can track changes in the acceptance and use of Hospital Management Information Systems (HMIS) over time. This will help understand the long-term impact of HMIS implementation and shifts in factors influencing technology acceptance.

Additional Variables: Future studies should consider additional moderating variables such as work environment, workload, and stress levels, along with organizational factors like culture and leadership structure. This will provide a more comprehensive understanding of factors influencing HMIS acceptance.

Context-Specific Analysis: Further research can focus on more in-depth contextual analysis, including comparisons between urban and rural hospitals and differences in technology implementation based on hospital size and capacity.

Integration with New Technologies: With the emergence of new technologies such as telemedicine and artificial intelligence (AI), future research could explore how these technologies interact with HMIS and how their acceptance influences the overall acceptance and use of HMIS.

Policy Impact Evaluation: Future studies should evaluate how changes in government policies and healthcare regulations affect the acceptance and use of HMIS. This will help understand the macroeconomic and policy-related influences on technology implementation in hospitals.

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