



(RESEARCH ARTICLE)



Analysis of the Implementation of Zi Care Indonesia's Hospital Information System (HIS) using the Technology Readiness Index Method at Emanuel Hospital

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Abstract

Objective: This research aims to assess the readiness of staff and doctors at Emanuel Hospital for the implementation of the Zi.Care hospital information system (HIS) using the Technology Readiness Index (TRI) method.

Design/Methods/Approach: The study involved 441 staff and doctors from Emanuel Hospital. Data collection utilized a questionnaire covering demographics, psychographics, and aspects of HIS implementation readiness. The TRI method was applied for quantitative analysis to categorize readiness levels in terms of optimism, innovativeness, discomfort, and insecurity.

Findings: Initial findings indicate varying levels of readiness among staff and doctors regarding the Zi.Care HIS implementation. Optimism and innovativeness were generally high, while discomfort and insecurity were more nuanced. Respondents foresee benefits such as improved information accessibility, increased productivity, enhanced efficiency, reduced paper costs, minimized errors, improved patient safety, and higher patient satisfaction.

Originality/Value: This study contributes to existing literature by applying the TRI method specifically to assess readiness for implementing HIS in a healthcare setting in Indonesia. It adds insights into the psychological and organizational factors affecting readiness, thus enhancing understanding in healthcare IT adoption.

Practical/Policy implication: Managers should address discomfort and insecurity to ensure smooth HIS implementation, leveraging training and support programs to boost staff confidence and reduce resistance. Aligning technology adoption with regulatory mandates is crucial for enhancing healthcare delivery and patient outcomes.

Keywords: Implementation; Technology Readiness Index; Zi. Care Hospital Information System

1. Introduction

The hospital plays a crucial role in improving health status and providing healthcare services that generate a vast amount of data, necessitating efficient information technology for management (Rahimi et al., 2014). This is especially critical with the emergence of COVID-19 cases in Indonesia, confirmed on March 2, 2020, and spreading to 34 provinces by April 10, 2020. The rapid spread led the Indonesian government to implement social restrictions, including Large-Scale Social Restrictions (PSBB) regulated by Government Regulation Number 21 of 2020 to accelerate COVID-19 handling. The number of COVID-19 cases increased significantly, prompting hospitals to focus on pandemic care, reducing services for non-COVID-19 patients to minimize transmission risks in healthcare facilities. This situation requires special attention, prompting hospitals to implement information technology in healthcare, crucial for reducing

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medical errors and enhancing patient safety. Various services are offered, including internationally recognized medical records services.

Data leakage has become a major concern hindering digitalization in the healthcare industry. Many leaked medical records can be misused, resulting in significant losses for their owners. If patients' leaked data include confidential medical conditions, it can lead to social ostracization or job loss if made public (Putra & Masnun, 2022). Improperly shared medical photos can cause severe psychological impacts on patients, while leaked phone numbers and identification data are targets for exploitation.

The objective of the Hospital Information System (HIS) is to utilize computers and other communication equipment to collect, store, process, extract, and link patient care information with management information. In this system, data is stored simultaneously in a database, accessible to authorized users as needed (Abbasi Moghadam and Fayaz Bakhsh, 2014). HIS can assist hospitals in reducing medical errors, improving efficiency, cost-effectiveness, and increasing patient engagement in healthcare decisions (Yoo, Kim, Lee, Baek, & Hwang, 2013).

Previous research has shown that using HIS can lead to qualitative customer-oriented care services, cost-effectiveness, and timely access to complete and accurate information. However, its development in healthcare organizations is complex and challenging, with success and efficiency depending on several factors (Rahimi et al., 2014). Human factors play a crucial role in HIS implementation efficiency (Beuscart-Zephir et al., 2007), emphasizing user participation in choosing HIS (Rahimi et al., 2014). Medical Records Institute (2005) research indicates that user participation in HIS development as Electronic Medical Records is crucial. Users' effective ideas in designing and developing HIS ensure their commitment to implemented decisions by healthcare service managers. Therefore, healthcare service managers should thoroughly analyze and select systems based on user needs and activities (Rahimi et al., 2014). One crucial consideration in HIS implementation is user familiarity (Murray-Weir et al., 2014).

Survey results show reasons why doctors may not adopt HIS as Electronic Medical Records: initial costs, ongoing costs, and productivity loss. The initial implementation phase, known as the transition phase, often involves productivity loss and disruption during adaptation, possibly leading to technology abandonment by users. The transition phase refers to the period from initiating an innovation until routine use is achieved and typically lasts from 6 months to 1 year (Sykes et al., 2011).

Based on literature, information systems are vulnerable to data breaches, causing reluctance among staff and doctors to use information technology to safeguard hospital data. The theft of patient data from several hospitals in early 2022 caused a stir in Indonesia. Documents totaling 720 GB, including six million full names, hospital origins, patient photos, COVID-19 test results, CT scan results, and X-ray scan results, were hacked from the Ministry of Health server (Anggraini, 2023). Stolen patient data can be misused, potentially harming the owners. Patients with secret medical conditions may face social ostracization or job loss if their data becomes public (Putra & Masnun, 2022). Another reason for the low adoption of HIS may be limited computer access and insufficient computer knowledge, affecting HIS usage (Abbasi Moghadam and Fayaz Bakhsh, 2014; Laerum et al., 2001). Social influences can impact others' emotions, thoughts, or behaviors in various ways (such as persuasion, compliance, conformity, and social learning) (Wang et al., 2016). Social influence on information technology adoption and ongoing use in healthcare organizations has shown that, in the pre-acceptance stage, doctors are more likely to trust early adopters of the system than their peers in deciding whether to adopt new information technology (Hao, 2013).

Furthermore, when adopting HIS as Electronic Medical Records, vendors often add many functional and end-user features at a higher level than needed (Rusman & Suwardoyo, 2022). This results in low usage rates, durability, and neglect of information system use, eventually requesting alternative methods (Ismail, Jamil, Rahman, Bakar, Saad, & Saadi, 2010). While most general practitioners believe technology can alleviate paper-based documentation burdens, they may also be dissatisfied if the introduced system fails to meet their expectations (Tilahun and Fritz, 2015). Various challenges experienced by HIS users as Electronic Medical Records need to be addressed because Indonesian Minister of Health Regulation Number 24 of 2022 on Medical Records Article 3 mandates every healthcare facility in Indonesia to organize Electronic Medical Records. On the other hand, modern individuals may experience isolation in a busy life with scientific and technological advances. Hospitals lose outreach in identifying existing potential. Therefore, in terms of hospital development with existing technology, it, if and The at.

2. Literature Review and Hypotheses Development

2.1. Resource Based View Theory

The Resource Based View (RBV) theory was first pioneered by Wernerfelt (1984). RBV theory posits that resources and capabilities are crucial for firms because they form the foundation of competitive advantage and firm performance. The assumption of RBV theory revolves around how a company can compete with other firms by managing its resources in line with its capabilities to achieve competitive advantage.

The literature review represents the theoretical core of an article. The Literature Review aims to identify and address any gaps in the research. To achieve this, it is important to present ideas in a clear, concise, and well-developed manner. The literature review serves as the foundation for the research question, including the hypotheses that will be tested to achieve the research objective. It is recommended to use current and credible sources from reputable international journals.

2.2. Resource, Value, Process Theory

RVP (Resource, Value, Process) explains that decisions are always related to three aspects: R (Resource, the resources controlled or owned), P (Process, the business processes undertaken), and V (Values, the principles, commitments, what a company intends to do) (Christensen in Kasali, 2017). Each aspect of resources, processes, and values is considered crucial in determining the ability to respond to changes.

3. Methods

The research method employed is quantitative. This study encompasses the entire population of staff and doctors at Emanuel Hospital. With a total population of 443 employees, the author conducted random sampling to determine the sample size required for the study, ensuring it represents the entire population. The sample size calculation used the Slovin's Formula.

4. Results and discussion

4.1. Optimism among staff and doctors in the implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital

Table 1 Optimism Category of Staf and Doctor at Emanuel Hospital

Category	Frequency	Percentage
Super Low	2	1
Low	21	10.5
High	44	22
Super High	133	66.5
Total	200	100

Based on the table above, it shows that the optimism among staff and doctors in the implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital is categorized predominantly as very high at 66.5%. However, there is still 11.5% of staff and doctors categorized with low optimism levels in the implementation of the Zi.Care HIS. The implementation of the Zi.Care HIS as a digital Electronic Medical Record at Emanuel Hospital has been fairly good as indicated by the data from staff and doctors, but hospital management needs to further improve, especially considering there are still some staff and doctors with lower optimism levels.

4.2. Innovativeness among staff and doctors in the implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital

Table 2 The category of innovativeness among staff and doctors at Emanuel Hospital

Category	Frequency	Percentage
Super Low	0	0
Low	44	22
High	134	67
Super High	22	11
Total	200	100

Based on the table above, it shows that innovativeness among staff and doctors in the implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital is predominantly categorized as very high at 67%. However, there are 22% of staff and doctors categorized with low levels of innovativeness in the implementation of the Zi.Care HIS. The implementation of the Zi.Care HIS as a digital Electronic Medical Record at Emanuel Hospital has been fairly good based on the data from staff and doctors, but hospital management needs to further improve, especially considering there are still some staff and doctors with lower innovativeness levels. Emanuel Hospital management should encourage staff and doctors to be pioneers in adopting and utilizing the latest technologies, ensuring that the implementation progresses smoothly.

4.3. Discomfort among staff and doctors in the implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital

Table 3 The category of discomfort among staff and doctors at Emanuel Hospital

Category	Frequency	Percentage
Super Low	0	0
Low	141	70.5
High	58	29
Super High	1	0.5
Total	200	100

Based on the table above, it shows that Discomfort for staff and doctors in the implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital is in the dominant low category, namely 70.5% even though there are 0.5% of staff and doctors admitted. very high category for the level of Innovativeness in the Zi.Care hospital information system (HIS) implementation. The implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital is quite good and has been implemented by staff and doctors, but hospital management needs to improve further if seen based on data, there are still staff and doctors who feel uncomfortable using technology. Hospital information system (HIS). Emanuel Hospital management needs to increase the comfort of staff and doctors in using technology in their daily lives or in the world of work, who currently still think traditional methods are better.

4.4. Staff and Doctor Insecurity in the Implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital

Based on the table below, it shows that staff and doctor insecurity in the implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital is in the dominant high category, namely 59.5%, although there are 35% of staff and doctors in the low category. Insecurity level in the Zi.Care hospital information system (HIS) implementation. The implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital, staff and doctors think that data privacy is less secure. So this is important as a reference for hospital management in improving the security of patient data with the technology used to ensure the confidentiality of patient data and other hospital data.

Table 4 Category of Insecurity for Staff and Doctors at Emanuel Hospital

Category	Frequency	Percentage
Super Low	0	0
Low	70	35
High	119	59.5
Super High	11	5.5
Total	200	100

4.5. Readiness Level for Implementing the Zi. Care Hospital Information System (HIS) as a Digital Electronic Medical Record at Emanuel Hospital

Table 5 Hospital Information System (HIS) Implementation Readiness Level Category

Category	Frequency	Percentage
Super Low	1	0.5
Low	20	10
High	177	88.5
Super High	2	1
Total	200	100

Based on the table above, the readiness level for implementing the Zi. Care hospital information system (HIS) as a digital electronic medical record at Emanuel Hospital shows that the highest dominant category is 88.5%. This indicates that staff and doctors are prepared to execute and implement the Zi.Care HIS effectively. However, 10% of them appear less prepared, requiring specific attention from hospital management to optimize their implementation. Qualitative analysis also suggests that training on electronic medical records (EMR) is crucial, given its relative novelty among staff and doctors, necessitating adjustments. Addressing issues like human errors and complex user guidelines is essential to ensure comfort and proficiency in using the system. Therefore, while staff and doctors are adequately prepared, these supportive measures are necessary for the successful implementation of the Zi.Care HIS.

4.6. Optimism of staff and doctors in implementing the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital

Based on the results of the study, the implementation of Zi.Care hospital information system (HIS) in Indonesia by staff and doctors at Emanuel Hospital facilitates their work, especially in controlling and searching for medical information. Their belief that the system is useful for their work illustrates their optimism towards technology, which is the belief that this technology can increase control, flexibility and efficiency in the use of medical information. This study also shows that staff and doctors who are more optimistic about the ease and usefulness of technology tend to be more prepared and effective in implementing it. This is in line with the findings of other studies showing that optimism towards technology can facilitate its implementation and use.

4.7. Innovativeness of Staff and Doctors in Implementing the Zi.Care hospital information system (HIS) as a Digital Electronic Medical Record at Emanuel Hospital

Based on the research involving 200 respondents, the implementation of the Zi.Care Hospital Information System (HIS) as a digital electronic medical record at Emanuel Hospital has significantly changed how staff and doctors work, shifting from manual to digital methods. Despite requiring adaptation, they demonstrate a willingness to learn and adjust to this new system. Staff and doctors actively keep up with technological advancements, making them innovative in adopting Zi.Care HIS to enhance efficiency and minimize errors in the long term.

4.8. Discomfort for staff and doctors in implementing the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital

Based on the research conducted, staff and doctors at Emanuel Hospital express minimal discomfort regarding the implementation of the Zi.Care Hospital Information System (HIS) as a digital electronic medical record in Indonesia. This suggests they are generally comfortable with the implementation. According to Dabolkhar (1996), individuals with high discomfort scores feel less control and burdened by technology. Technical support significantly aids staff and doctors, who find Zi.Care HIS designed to simplify their work, as noted by Walczuch, Lemmink, and Streukens (2007), linking discomfort to perceived usefulness. The instruction manual for Zi.Care HIS at Emanuel Hospital is user-friendly, enhancing staff and doctors' readiness and supporting their work effectively. Davis (1989) posits that perceived usefulness of a system correlates with enhanced productivity and task efficiency. Maximizing the implementation of Zi.Care HIS is crucial to ensuring valid data and minimizing errors that could impact patient safety and data security. Overall, staff and doctors show good readiness in implementing this system, though improvements like additional training and user guides are essential for those facing challenges with adaptation.

4.9. Insecurity of staff and doctors in the implementation of the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital

Staff and doctors feel secure regarding the implementation of the Zi.Care Hospital Information System (HIS) in Indonesia. This is evident from the questionnaire responses indicating minimal concerns about personal privacy or security issues when using the technology. Therefore, staff and doctors are sufficiently prepared to implement the Zi.Care HIS system to its fullest potential. In discussing the interaction of staff and doctor's insecurity regarding this system's implementation, there is no worry that information from the Zi.Care HIS system, particularly patient electronic medical records, can be freely accessed or viewed by unauthorized individuals. Research by Walczuch, Lemmink, and Streukens (2007) and Ling and Moi (2007) shows that the insecurity variable negatively impacts perceptions of technology. It is further explained that low concern in implementing the Zi.Care HIS system as an electronic medical record will likely enable users to fully utilize the implemented system.

The Zi.Care HIS system in Indonesia exhibits good innovation, allowing seamless integration in hospitals as an electronic medical record system and is deemed highly secure for use. Integrated information within the system streamlines and accelerates the work of staff and doctors, fostering confidence in the system's benefits. However, there are still some staff and doctors who lack trust in the system, leading to feelings of insecurity (insecurity) toward the technology, thereby avoiding the system unless compelled. Some staff and doctors perceive the Zi.Care HIS system as complex and less user-friendly. Individuals with such perceptions seek assurances of safety and privacy before adopting new technology. There is skepticism or even disbelief that a new system will benefit users (Aisyah, Nugroho, & Sagoro, 2014). This skepticism may hinder the adoption of the Zi.Care HIS system, despite more staff and doctors trusting in its benefits. The Zi.Care HIS system is designed with robust security measures and continually improves its security and user-friendliness. The security and ease of use encourage efforts and resources to operate the system, allowing more resources to be used for other productive activities (Davis, 1989; Lewis, Agarwal, & Sambamurthy, 2003). Thus, individuals perceive the technology as safe and beneficial.

Overall, the implementation of the Zi.Care HIS system by staff and doctors is adequately prepared when considering its security. This research indicates that the insecurity of staff and doctors in implementing the Zi.Care HIS system is relatively low. Despite many staff and doctors feeling less secure, this issue requires attention for improvement. The skepticism among staff and doctors about potential data leaks and input errors remains a concern that needs to be addressed.

4.10. Level of readiness for implementing the Zi.Care hospital information system (HIS) as a digital Electronic Medical Record at Emanuel Hospital

Based on the research results, the readiness level of implementing the Hospital Information System (HIS) Zi.Care as a digital electronic medical record at Emanuel Hospital by staff and doctors shows a predominantly high category at 88.5%. This indicates that staff and doctors are prepared to execute and implement HIS Zi.Care as a digital electronic medical record. However, the analysis also indicates that around 10% of staff and doctors face difficulties in readiness to implement HIS Zi.Care as a digital electronic medical record. Although the majority of staff and doctors are ready in a good category, this 10% requires special attention from hospital management to maximize their implementation.

Qualitatively, the research results suggest that to support staff and doctors in implementing HIS Zi.Care, specific training related to Electronic Medical Records (EMR) is needed because it is still relatively new for them. In addition, some staff and doctors experience human errors and have difficulties understanding user guidelines due to their complexity, which

makes them uncomfortable using the system. Although staff and doctors are sufficiently prepared to implement HIS Zi.Care as a digital electronic medical record, certain aspects are necessary for them to implement the system effectively. These include the importance of a stable internet connection, conducting training and mentoring, simulations and evaluations, and providing manuals or instructional videos for application. These are essential needs that must be fulfilled to ensure that the implementation of HIS Zi.Care runs smoothly

5. Conclusion

Based on the data analysis and referring to the objectives of this study, the researcher concludes the following:

- The research findings indicate that 88.5% of staff and doctors feel prepared to implement the Hospital Information System (HIS) Zi.Care as a digital electronic medical record at Emanuel Hospital. However, 10% feel less prepared due to challenges such as adjusting to the new system, frequent human errors, and difficulties with complex user guidelines.
- The readiness level of optimism among staff and doctors in implementing HIS Zi.Care as a digital electronic medical record at Emanuel Hospital is predominantly very high, with 66.5% expressing high optimism and 11.5% indicating low optimism.
- The readiness level of innovativeness among staff and doctors in implementing HIS Zi.Care as a digital electronic medical record at Emanuel Hospital is predominantly very high, with 67% showing high innovativeness and 22% demonstrating low innovativeness.
- The readiness level of discomfort among staff and doctors in implementing HIS Zi.Care as a digital electronic medical record at Emanuel Hospital is predominantly very high, with 70.5% reporting high discomfort and only 0.5% experiencing low discomfort.
- The readiness level of insecurity among staff and doctors in implementing HIS Zi.Care as a digital electronic medical record at Emanuel Hospital is predominantly very high, with 59% expressing high insecurity and 35% showing low insecurity.

Overall, the implementation readiness for HIS Zi.Care at Emanuel Hospital shows positive indicators, with some areas requiring attention to ensure successful implementation, particularly in addressing discomfort and insecurity among staff and doctors.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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