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ANALYSIS OF THE LOW UTILIZATION OF MOBILE JKN ADOPTION FOR PATIENT REGISTRATION AT DUMAI GENERAL HOSPITAL IN 2025

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Abstract

Digital transformation in healthcare has become a major focus of the Indonesian government through the development of the Mobile JKN application by BPJS Kesehatan. However, at Dumai General Hospital (RSUD Dumai), the utilization rate of this application remains low. This study aims to analyze the factors contributing to the low adoption of Mobile JKN in patient registration using the Innovation Resistance Theory (IRT) by Ram and Sheth (1989), which includes five dimensions: Usage Barrier, Value Barrier, Risk Barrier, Tradition Barrier, and Image Barrier. The research applied a qualitative case study approach involving key informants consisting of both users and non-users of Mobile JKN, as well as hospital registration staff. Data were collected through in-depth interviews and field observations, then analyzed thematically. The findings show that low adoption is influenced by limited digital literacy among elderly patients (Usage Barrier), perceptions that manual registration is faster (Value Barrier), concerns about data security and technical issues (Risk Barrier), strong preference for face-to-face interactions (Tradition Barrier), and the negative image of the application due to system errors and insufficient socialization (Image Barrier).

Keywords: Mobile JKN, Innovation Resistance Theory, Hospital Services, Digital Transformation

Introduction

The rapid advancement of digital technology has significantly transformed various sectors, particularly public health services. The Indonesian government, through the Ministry of Health's Health Digitalization program, has placed strong emphasis on developing digital-based healthcare systems to enhance efficiency, accessibility, and service quality. One of the most notable innovations under this initiative is the Mobile JKN application developed by BPJS Kesehatan. The application was designed to simplify access to healthcare services for participants of the National Health Insurance (JKN) program, enabling them to register online before visiting hospitals and to obtain information about their membership status, health facilities, and medical records (BPJS Kesehatan, 2023). However, despite its potential, the actual utilization rate of Mobile JKN remains low in many regions, including at RSUD Dumai in Riau Province. Internal data show that from an average of 300 patients per day, only about 6 to 7 percent use the Mobile JKN application for registration (RSUD Dumai, 2024).

This condition illustrates a clear gap between the government's vision for digital transformation and its real implementation in healthcare facilities. Dumai is an industrial city and an international trade gateway with a population of approximately 300,000 people (BPS Kota Dumai, 2023). The high mobility and economic activity of its residents lead to increasing healthcare demands. As the main referral hospital in the region, RSUD Dumai plays a vital role in providing efficient and high-quality

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health services. However, most patients still prefer to register manually rather than through the Mobile JKN application. Several factors have been identified as contributing to this issue, including limited digital literacy among users, especially the elderly, technical obstacles such as login failures, repeated verification requests, and unstable internet connections, as well as the lack of socialization or guidance from hospital staff regarding how to use the application effectively (Widodo & Lestari, 2023; Utami et al., 2024). These issues highlight that the implementation of Mobile JKN at RSUD Dumai has not yet reached its full potential.

Previous research emphasizes that the adoption of digital technology in healthcare is not solely determined by technological readiness but also by human, social, and institutional factors. Dwivedi et al. (2021) argue that digital health transformation requires active user participation and continuous institutional support. Similarly, Sari and Putra (2023) found that the successful use of online health service applications depends on user trust, ease of use, and perceived benefits. These studies suggest that user resistance, rather than the absence of technology, often becomes the main barrier to adoption. To understand this phenomenon, the Innovation Resistance Theory (IRT) developed by Ram and Sheth (1989) provides a comprehensive analytical framework. The theory identifies five dimensions of innovation resistance: usage barrier, value barrier, risk barrier, tradition barrier, and image barrier. Resistance occurs when users perceive the innovation as difficult to use, not beneficial, risky, inconsistent with existing habits, or lacking a positive image. In healthcare contexts, these barriers are particularly relevant since patients' trust and familiarity greatly influence their decision to adopt new digital systems.

Several scholars have validated the relevance of IRT in explaining user behavior toward digital innovations. Kleijnen et al. (2004) revealed that value and risk barriers are the dominant factors that discourage consumers from adopting digital services. Heidenreich and Spieth (2013) further emphasized that psychological aspects such as age and digital literacy, as well as social norms and institutional environments, play a major role in shaping resistance. In Indonesia, the uneven level of digital literacy, limited internet infrastructure, and inadequate staff training have been shown to hinder the successful implementation of health digitalization programs (Utami et al., 2024; Ramadhan et al., 2023). These findings align with the situation at RSUD Dumai, where elderly patients often find the application difficult to use, internet access remains unstable, and hospital staff have not yet received comprehensive training to assist users.

Given this background, a research gap can be identified regarding the factors that specifically influence the low utilization of Mobile JKN at regional hospitals. While previous studies have discussed digital transformation broadly, few have focused on analyzing patient resistance to Mobile JKN using a theoretical framework such as IRT. Therefore, this study aims to explore the factors contributing to the low adoption of Mobile JKN for patient registration at RSUD Dumai through the lens of the Innovation Resistance Theory (IRT). By examining the five dimensions of IRT—usage, value, risk, tradition, and image—this study seeks to provide an in-depth understanding of patients' and hospital staff's experiences with the application.

The findings of this study are expected to contribute both theoretically and practically. Theoretically, it will strengthen the application of IRT in the context of public health digitalization in Indonesia. Practically, the research results may serve as a basis for BPJS Kesehatan and hospital management in developing strategies to enhance patient adoption of Mobile JKN. Such strategies may include providing targeted education and training for both patients and healthcare workers, improving system reliability, simplifying user interfaces, and expanding infrastructure support. Optimizing the use of Mobile JKN will not only reduce long queues and waiting times but also promote efficiency, transparency, and overall satisfaction among patients. Ultimately, increasing the utilization of Mobile JKN at RSUD Dumai is an essential step toward realizing a more inclusive, effective, and sustainable digital healthcare ecosystem in Indonesia.

Method

This study used a qualitative approach with a case study design to explore the phenomenon of the low utilization of the Mobile JKN application at Dumai Regional General Hospital (RSUD Dumai). The case study design was chosen because it allows a deep understanding of real-life experiences, perceptions, and meanings behind user behavior, rather than focusing only on numerical data. This approach also provides flexibility in collecting data through interviews, observations, and documentation, enabling a more comprehensive understanding of the factors influencing the adoption of the Mobile JKN application.

The research was conducted at RSUD Dumai, the main referral hospital in Dumai City and its surrounding areas. The participants were selected using a purposive sampling technique, where individuals were chosen based on their relevance to the research objectives. They included patients who used the Mobile JKN application, patients who still registered manually, registration officers, Mobile JKN ambassadors from BPJS Kesehatan, and hospital IT staff. The number of participants was determined by the principle of data saturation, which means that interviews were stopped once the information became repetitive and no new insights emerged.

Both primary and secondary data were used in this study. Primary data were collected through in-depth interviews, observations, and Focus Group Discussions (FGDs), while secondary data were obtained from hospital reports, BPJS Kesehatan policy documents, and relevant literature. The research referred to the Innovation Resistance Theory (IRT) by Ram and Sheth (1989), which explains that innovation resistance arises from functional and psychological barriers. The research instruments included semi-structured interview guides, observation sheets, and documentation forms designed to explore the five IRT barriers: usage, value, risk, tradition, and image.

Data collection involved in-depth interviews with users and non-users of the Mobile JKN application, passive observation of patient registration processes, and FGDs that brought together patients, staff, and BPJS representatives to discuss experiences and challenges. These techniques complemented one another and provided a rich and contextual understanding of the phenomenon (Creswell & Poth, 2021; Krueger & Casey, 2021; Sugiyono, 2022).

The data were analyzed using a qualitative thematic analysis approach following the model of Miles, Huberman, and Saldana (2018). The analysis consisted of data reduction, data display, and conclusion drawing with verification through source and method triangulation. The findings were categorized according to the five dimensions of the Innovation Resistance Theory, allowing the researcher to identify the main technical, social, and psychological factors contributing to the low utilization of the Mobile JKN application at RSUD Dumai.

Results

Dumai Regional General Hospital (RSUD Dumai) is a government-owned hospital under the Dumai City Government that plays a vital role in providing healthcare services to the local community and surrounding areas. As the main referral hospital in the coastal region of Riau, RSUD Dumai continues to enhance its service capacity, human resources, and infrastructure with support from the local government. The hospital offers various services, including outpatient and inpatient care, laboratory testing, radiology, pharmacy, and a 24-hour emergency department. In its modernization efforts, RSUD Dumai has implemented a Hospital Management Information System (SIMRS) integrated with the BPJS Kesehatan Mobile JKN application. However, challenges such as low digital literacy and technical system barriers have affected the adoption rate of the application among patients.

To support the National Health Insurance (JKN) program, RSUD Dumai is committed to improving service efficiency and quality through digitalization, despite ongoing obstacles. Based on

research findings, the main barriers to Mobile JKN adoption include limited access to digital devices, application errors, and low technological understanding among elderly patients. The study's informants consisted of both users and non-users of the application, registration officers, Mobile JKN Ambassadors, and IT staff. The findings reveal that the success of technology adoption is strongly influenced by digital literacy, perceived usefulness, and system readiness. RSUD Dumai continues to address these challenges by enhancing staff competencies, optimizing digital systems, and strengthening collaboration with BPJS Kesehatan.

Table 1. Field Findings Based on Innovation Resistance Theory (IRT) Dimensions in the Utilization of the Mobile JKN Application at Dumai Regional General Hospital

Barrier Dimension	Key Indicators	Description of Field Findings	Empirical Quotations (Informants)
Usage Barrier	Limited digital literacy, system disruptions, and adaptation anxiety	Barriers arise from elderly patients' technical inability to download and operate the application; network instability and app errors reduce user trust; staff encounter system dualism when synchronization fails.	"I don't understand how to use the app, especially downloading and filling in the data myself." (Informant 6, Non-User Patient) "Sometimes the app has an error, so I think going directly to the hospital is faster." (Informant 2, User Patient)
Value Barrier	Low perceived benefits compared to required effort	Patients perceive that using the application does not offer significant efficiency; manual registration is seen as faster and more certain. The effort to learn the app is considered disproportionate to the perceived benefits.	"If through the counter, it's done right away. Through the app, sometimes it doesn't show up." (Informant 2, User Patient) "I'm already tired of learning, but still have to re-register at the hospital." (Informant 8, Non-User Patient)
Risk Barrier	Concerns over data errors, registration failures, and information security	Users doubt the system's reliability due to frequent data delays between Mobile JKN and SIMRS; uncertainty in results causes anxiety about losing their queue number.	"I already registered on my phone, but at the hospital, the data didn't appear yet." (Informant 9, Registration Staff) "I'm afraid of filling it in wrong and failing to register." (Informant 7, Non-User Patient)
Tradition Barrier	Preference for manual administrative procedures and face-to-face interaction	Some patients prefer queuing directly at the counter because they feel safer and more assured when interacting with staff; conventional administrative traditions remain a strong social norm.	"It feels more reassuring when I see the staff directly." (Informant 8, Non-User Patient) "I'm used to manual registration, it feels more comfortable that way." (Informant 10, Non-User Patient)
Image Barrier	Negative perception toward BPJS image and association with slow bureaucracy	Some patients refuse to try the application because they associate Mobile JKN with BPJS's reputation for being complicated, slow, and unresponsive. Institutional image influences interest in digital adoption.	"If it's a BPJS app, I already get suspicious, afraid it'll be troublesome." (Informant 10, Non-User Patient) "Just hearing BPJS makes people reluctant to open the app." (Informant 11, Registration Staff)

3.1. Usage Barrier

The usage barrier is one of the key factors behind the low adoption of the Mobile JKN application at Dumai Regional General Hospital (RSUD Dumai). This barrier arises from technical difficulties, limited digital literacy, and institutional readiness. Many non-user patients, especially older adults, find the online registration process confusing and prefer manual methods. One respondent explained, “I don’t understand how to use the app, especially when I have to fill in the data myself. It’s easier to go directly to the hospital” (Informant 6, 58 years old). Another added, “My son helped me install it, but I didn’t know how to use it again, so I just went to the hospital” (Informant 8, 62 years old). These responses show that low digital confidence and fear of errors discourage patients from using the application.

For active users, the challenges mainly involve unstable system performance and frequent technical errors. Even those with basic digital skills often experience crashes or slow synchronization, which weakens their trust in the system. One user noted, “Sometimes the app suddenly crashes or won’t open, so I just go straight to the hospital. It’s faster” (Informant 2, 35 years old). Consequently, many users still verify their registration in person, treating the app as a backup rather than a primary service channel.

From the hospital’s perspective, registration staff also face problems due to incomplete integration between Mobile JKN and the hospital information system (SIMRS). When data from the app does not appear, staff must manually re-enter patient information. A registration officer mentioned, “Many patients come to the counter asking for help to open the app. It’s not that they don’t want to use it, they just aren’t familiar with it yet” (Informant 9). The IT officer added that delays often occur because of BPJS server issues or weak connectivity, which further disrupts the registration process and reduces efficiency.

In summary, the usage barrier at RSUD Dumai consists of four main dimensions: technical issues such as system instability, limited user digital literacy, psychological hesitation toward digital systems, and structural constraints related to training and coordination. These factors interact to form a complex resistance pattern that cannot be solved through technical improvements alone. Therefore, an integrative approach that enhances digital literacy, strengthens infrastructure, and improves institutional coordination is essential to increase the adoption and sustainability of the Mobile JKN application.

3.2. Value Barrier

The Value Barrier in the use of the Mobile JKN application at Dumai Regional General Hospital (RSUD Dumai) arises from users’ and non-users’ perceptions that the digital system does not provide clear advantages over manual services. Many respondents felt that the promised efficiency and convenience were not fully realized in practice. One user explained, “I already registered through the app, but at the hospital they still asked me to queue and re-enter my data. So it feels the same, only the first part uses the phone” (Informant P4, User). This shows that the functional value of the application remains unclear due to the continued reliance on manual verification.

Inconsistent system performance also contributes to this perception. Several users reported that the application sometimes works well but often fails when technical issues occur. As one said, “Sometimes the app works fast, but if the server is down, everything gets delayed. So we still feel more certain by coming directly” (Informant P2, User). For non-users, the Value Barrier is more cultural and emotional. Many prefer face-to-face registration, feeling it is safer and more reliable. “If I come to the counter, I can ask questions. If I use the phone, I’m afraid I’ll make a mistake,” said one non-user (Informant N3).

Registration and IT staff confirmed that weak system integration reduces the application’s perceived benefits. A registration officer noted, “Sometimes the data from Mobile JKN doesn’t enter

our system immediately, so patients still have to verify their data again" (Informant U1). Similarly, the IT officer mentioned that delays in BPJS servers cause frustration and decrease confidence in the system's reliability.

Overall, the Value Barrier consists of three dimensions: functional, emotional, and institutional. The functional dimension reflects the gap between expected and actual efficiency; the emotional dimension involves feelings of trust and comfort; and the institutional dimension relates to coordination and system integration. Together, these factors create a perception that the Mobile JKN app provides limited added value, thereby strengthening user resistance to adopting digital health services.

3.3. Risk Barrier

The risk barrier in using the Mobile JKN application at RSUD Dumai reflects users' concerns about potential failures, errors, or uncertainties in digital services. Many non-users expressed fear that their registration data might not be received or could be lost, leading them to prefer manual registration. One patient said, "When using the app, I'm afraid my data won't be received. I feel safer registering directly" (Informant N2). Weak internet connections and unstable app performance further increase the perception of risk and unreliability.

Among active users, risk perceptions often stemmed from direct experiences with system errors and delays. "I registered through the app, but when I arrived at the hospital, my data hadn't appeared. I still had to queue manually," explained one user (Informant P3). Such incidents create frustration and weaken user confidence in the app's accuracy and efficiency. Even registration officers acknowledged that unsynchronized data forced them to re-enter information manually, which made patients think their data was lost (Informant U1).

According to the Mobile JKN Ambassador, some users are also afraid of making mistakes while navigating the application. "They worry they'll press the wrong button and not be recorded," said one ambassador (Informant U2). IT staff confirmed that delays in BPJS server synchronization often cause data to appear late, reinforcing public distrust (Informant S1). These issues show that risk perception arises not only from technical errors but also from users' psychological anxiety and low digital confidence.

Overall, the risk barrier consists of three dimensions: technical risks such as data loss and system failure, psychological risks related to user fear and uncertainty, and institutional risks linked to weak coordination between BPJS and the hospital. These factors together strengthen resistance to digital transformation. To reduce such barriers, improving system reliability, providing user education, and ensuring transparent and responsive communication are essential to build greater trust and confidence in the Mobile JKN application.

3.4. Tradition Barrier

The tradition barrier in using the Mobile JKN application at RSUD Dumai reflects users' strong attachment to conventional ways of accessing healthcare services. Many patients, especially older ones, still prefer face-to-face registration because it feels more secure and reliable. As one patient explained, "I feel more confident when I register at the counter because I can see the staff directly. If I do it on my phone, I'm afraid it won't be processed." This shows that patients' trust is still tied to personal interaction rather than digital systems.

For elderly patients, manual registration also aligns with their limited familiarity with technology. One informant said, "I've always registered in person. I don't understand how to use a phone for that." This response reflects not only a lack of digital skills but also intergenerational dependence, where elderly patients often rely on younger family members for technology use. Even

among active users, traditional habits persist. Some still come early to confirm their online registration manually, showing that full trust in the digital system has yet to develop.

Hospital staff also contribute to this barrier. Several registration officers admitted that they rarely promote the Mobile JKN app because they fear it may confuse patients or slow down queues if technical problems occur. The Mobile JKN Ambassador added that many patients see direct service as a sign of respect, while app-based registration feels impersonal. These perceptions show that digitalization challenges not only user behavior but also established cultural expectations about healthcare interactions.

From the hospital's perspective, the persistence of manual systems further reinforces traditional habits. An IT officer noted that while the system is ready for integration, both patients and staff often prefer manual methods for convenience. Thus, the tradition barrier is behavioral, socio-cultural, and institutional. Overcoming it requires not just improving technology and digital literacy but also addressing cultural values and trust that shape how people engage with healthcare services.

3.5. Image Barrier

The image barrier in this study refers to users' negative perceptions of the Mobile JKN application and BPJS Kesehatan as its managing institution, which reduce interest and trust in using the system. This barrier arises not from technical difficulty but from perception, experience, and social influence. Many users developed negative opinions after poor first experiences, such as slow app performance or data connection failures. One patient stated, "I tried it once before, but the app was slow and didn't connect to my BPJS data. So I thought, it's useless, better to go directly to the counter" (Informant P2, User Patient). This shows that an unsatisfactory first impression created a lasting negative image of the application.

Social factors also reinforce this perception. Many patients form opinions based on others' experiences rather than their own. As one administrative officer explained, "Many patients come here saying the app is difficult or complicated, even though they haven't tried it themselves. Sometimes they just follow what others say and lose interest in using it" (Informant A1, Front Office Officer). This highlights how collective perception and shared narratives within the community strengthen the image barrier toward digital health services.

Institutional reputation further shapes public trust. Several respondents viewed BPJS Kesehatan as still bureaucratic and slow in addressing user complaints. One participant said, "Even if the system is modern but the service is still slow, it makes no difference. People will still choose to come directly so things can be done faster" (Informant P5, Non-User Patient). This statement reflects how negative institutional image can overshadow digital innovations, reinforcing skepticism toward system effectiveness.

Moreover, the symbolic dimension of the image barrier relates to users' emotional connection with digital services. Some patients perceive app-based interaction as distant and impersonal. One officer mentioned, "Some patients say using the app feels like talking to a machine, not to a person. They feel more comfortable when they can see the staff directly" (Informant A4, Administrative Officer). Overall, the image barrier illustrates that resistance to Mobile JKN adoption at RSUD Dumai is not purely technical but also shaped by social and psychological perceptions. Addressing this requires not only improving system reliability but also rebuilding trust through transparent communication and human-centered service approaches.

Discussion

4.1. Usage Barrier

The research findings indicate that most patients at Dumai Regional General Hospital (RSUD Dumai) experience barriers in using the Mobile JKN application, primarily related to the complexity of procedures and users' limited ability to operate digital features. These obstacles are particularly evident among elderly users, who often struggle to understand the registration flow, data verification, and attendance confirmation through the app. Many patients stated that the application requires complicated and non-intuitive steps, leading to confusion and reluctance to shift from manual registration methods.

The procedural complexity of the application serves as the dominant factor driving resistance. Although Mobile JKN was designed to streamline administrative processes, in practice, digital registration, data verification, and attendance confirmation are still perceived as inefficient by users. This aligns with Annisa et al. (2020), who found that overly complex digital health applications can lower users' learning ability and lead to dissatisfaction. Elderly users face significant challenges due to cognitive and motor limitations that affect their ability to understand and navigate the app (Kungurtsev et al., 2024). Similarly, Supawanhar et al. (2025) emphasize that non-intuitive procedures reinforce resistance among users who find manual methods easier and more reliable.

Preference for manual systems represents another important dimension of the Usage Barrier. Many patients, especially older adults, prefer registering at hospital counters, as direct interaction with staff is perceived as easier and reduces the likelihood of errors. This preference is not only tied to comfort but also influenced by low digital literacy and limited familiarity with technology among older adults (Simbolon et al., 2024; Supawanhar et al., 2025). Wulandari and Nugroho (2021) highlight that elderly patients who are unaccustomed to digital devices continue to rely on manual services despite the availability of digital applications. Moreover, Handayani et al. (2020) found that perceived procedural complexity in registration and usage remains a key reason for the rejection of digital health applications in Indonesia.

Technical and infrastructural factors further reinforce the Usage Barrier. Accessibility issues such as unstable internet connections and inadequate device specifications pose significant challenges for some patients, particularly those in remote areas (Sulistiyo, 2023; Utami et al., 2024). Patients lacking devices that meet minimum requirements or who struggle with application usage are at risk of registration failures, prompting them to revert to manual systems. This indicates that user resistance to digital innovations arises not only from individual limitations but also from infrastructural constraints.

Low digital literacy is another critical obstacle. Nasution (2022) states that limited digital literacy levels make patients feel unconfident in operating applications independently, leading to reliance on others for assistance. This finding aligns with the concept of perceived ease of use in the Technology Acceptance Model (TAM), which posits that ease of use significantly influences technology adoption intentions. Similarly, in the framework of Innovation Resistance Theory (Ram & Sheth, 1989), resistance arises when innovation demands high learning effort or complex procedures.

In summary, the Usage Barrier in Mobile JKN reflects a multidimensional phenomenon involving application complexity, preference for manual systems, low digital literacy, and technical and infrastructural challenges. This resistance does not merely stem from technical failure or user ignorance but rather from the interplay among application design, individual capability, social habits, and infrastructural readiness (Annisa et al., 2020; Sulistiyo, 2023; Utami et al., 2024; Handayani et al., 2020; Wulandari & Nugroho, 2021; Simbolon et al., 2024; Supawanhar et al., 2025; Kungurtsev et al., 2024; Nasution, 2022). To address these barriers, a holistic strategy is required, including simplifying the application interface, providing digital literacy education and training for patients, and strengthening technological infrastructure and institutional support so that the Mobile JKN application can be adopted more effectively and inclusively.

4.2. Value Barrier

The next obstacle in adopting Mobile JKN is the Value Barrier, referring to the perception that the application offers limited benefits compared to manual registration. Despite being designed to simplify administrative processes, patients still experience frequent errors, server downtime, and delayed data synchronization, often requiring them to queue at the registration counter (Ram & Sheth, 1989; Setiawan, 2020; Pratiwi, 2021; Hidayat & Fadhilah, 2022). These issues reduce perceived value and hinder adoption of digital health innovations.

Technical stability and system integration are crucial for perceived value. Errors, downtime, and synchronization delays frustrate users and reduce efficiency (Damanik et al., 2024; Asmara & Saimi, 2025; Suhena et al., 2024; Arnita & Yunengsih, 2024). Effective integration with hospital information systems can streamline registration, reduce manual verification, and improve patient satisfaction (Suhena et al., 2024; Syamsuddin et al., 2025; Siregar & Rossevelt, 2025; Nainggolan et al., 2025).

Digital literacy also affects perception, as patients with limited skills tend to prefer manual methods (Efektivitas Penggunaan Aplikasi Mobile J..., 2022; Hubungan kepuasan pasien peserta BPJS ke..., 2022). Improving perceived value requires user education, technical updates, feature optimization, and feedback-based improvements (Damanik et al., 2024; Asmara & Saimi, 2025; Syamsuddin et al., 2025; Suhena et al., 2024; Arnita & Yunengsih, 2024). Nonetheless, some users may still choose manual methods due to personal preference or limited device access (Suhadi, 2022; Asmara & Saimi, 2025).

The Value Barrier in Mobile JKN reflects the gap between promised benefits and actual experience, creating both functional and psychological resistance. Adoption strategies should focus on system stability, hospital integration, feature enhancement, and digital literacy to ensure the application delivers real value as an effective healthcare platform.

4.3. Risk Barrier

The research findings indicate that the Risk Barrier significantly affects the adoption of the Mobile JKN application at Dumai Regional General Hospital (RSUD Dumai). This barrier stems from patients' perceptions of financial, technical, and social risks, which lead many to prefer manual registration. Economically, patients from lower-income groups often lack smartphones with adequate specifications, and the need to purchase or upgrade devices creates additional burdens (Sulistiyo, 2023; Utami et al., 2024; Sudrajat et al., 2024). These economic and technological limitations confirm that personal resources play a critical role in adopting digital health innovations.

Technical issues further hinder adoption. Frequent application errors, server downtime, network instability, and delayed data synchronization reduce trust in the system, prompting patients to revert to manual registration to avoid administrative problems (Damanik et al., 2024; Suhadi, 2022; Fattahaq et al., 2023; Sudrajat et al., 2024). Limited internet access, especially in remote areas, exacerbates this problem. These findings support prior research showing that technical disruptions and system unreliability are major determinants of resistance to digital innovations in healthcare (Prasetiyo & Safuan, 2022).

Social factors also reinforce the Risk Barrier. Patients with low digital literacy, especially the elderly, often feel embarrassed or uncomfortable seeking help repeatedly, which discourages them from using the application (Sugiarti et al., 2024; Sulistiyo, 2023; Prasetiyo & Safuan, 2022). Negative user experiences and public opinions amplify these social risks, creating a perception that using the application is difficult, risky, and unreliable. This aligns with the concept of the Risk Barrier in Innovation Resistance Theory, where high perceived risk lowers the likelihood of adoption (Ram & Sheth, 1989; Bauer, 1960; Cunningham, 1967).

Overcoming the Risk Barrier requires a multidimensional approach. Strategies include improving application stability, enhancing integration with hospital systems, simplifying the user interface, and providing digital literacy programs for patients. These efforts reduce financial, technical, and social risks while building patient trust in Mobile JKN (Rahmawati, 2020; Santoso & Dewi, 2021; Sulistiyo, 2023; Utami et al., 2024; Sugiarti et al., 2024; Prasetiyo & Safuan, 2022; Sudrajat et al., 2024). A holistic combination of technological improvements, user education, and social support can increase adoption rates and ensure that the benefits of digital health services are accessible to a broader population.

4.4 Tradition Barrier

The study found that the Tradition Barrier is one of the dominant obstacles in the adoption of the Mobile JKN application at Dumai Regional General Hospital. This barrier refers to resistance that arises because innovation is perceived to conflict with long-established norms, habits, and practices. In the context of healthcare services, the tradition of manual registration has shaped strong behavioral patterns and trust among patients, particularly those of older age. Face-to-face interaction with registration officers provides a sense of security, allows immediate clarification of errors, and creates a perceived higher level of certainty compared to digital systems. This condition aligns with the concept of the Tradition Barrier in Innovation Resistance Theory (IRT) proposed by Ram and Sheth (1989), who emphasized that innovation is often rejected when it contradicts established social norms or habits.

Preference for manual systems is not only related to comfort but also to historical experience and limited digital behavioral acculturation. Elderly patients show high comfort levels with manual methods because they are accustomed to direct interaction, counter-based procedures, and physical documents as administrative proof. Low digital literacy strengthens this resistance, as patients face not only technical barriers but also psychological uncertainty about their ability to operate the application. Studies by Turner et al. (2020) and Lakay and Isaacs (1997) emphasize that attachment to traditional practices is not merely a matter of habit but also involves aspects of control, engagement, and users' self-confidence in administrative processes.

This traditional resistance is also supported by empirical evidence in other sectors. In the implementation of electronic health records (EHR), Kruse et al. (2016) and Barrett (2018) found that healthcare organizations often encounter resistance despite mandates or incentives, due to entrenched habits that are difficult to change. Similar tendencies are observed in the adoption of Learning Management Systems (LMS) in education, where users are reluctant to shift from conventional methods (Kim and Park, 2023). Leong et al. (2021) highlight that tradition consistently exerts a stronger influence than value, risk, image, and usage barriers, making it a key factor in assessing the success of technology adoption.

Beyond individual behavior, the tradition barrier at Dumai Regional Hospital is also influenced by organizational characteristics and institutional culture. The hospital's administrative system still maintains manual methods, legitimizing old practices and reinforcing patients' belief that the traditional way is more reliable. This finding is supported by Wijayanti (2020) and Kurniawan and Fitriani (2021), who demonstrated that long-standing institutional habits in healthcare settings often become determining factors in resistance to new technology. Thus, tradition is not merely a psychological phenomenon but also a social and institutional structure that must be considered in innovation adoption strategies.

Overcoming the Tradition Barrier requires a multidimensional approach. Effective interventions include education and outreach targeting elderly groups, personalized application training, and active patient involvement in the design and implementation of technology. Such involvement can foster a sense of ownership, enhance trust, and gradually reduce resistance (Kim and

Park, 2023; Lakay and Isaacs, 1997). Furthermore, emphasizing the tangible benefits of digital systems, such as efficiency, accuracy, and reduced waiting time, can help reshape patient perceptions and strengthen acceptance of innovation (Lu et al., 2021).

Managing the Tradition Barrier should balance respect for traditional practices with the promotion of technological adoption. Some degree of resistance is natural and serves as a social control mechanism to prevent premature technology implementation. Therefore, the Mobile JKN adoption strategy should allow flexibility during the transition, offer hybrid options temporarily, and progressively build digital literacy. Through this approach, traditional barriers can be minimized, enabling a more effective digital health innovation process without compromising patient comfort and satisfaction.

In conclusion, the Tradition Barrier in the context of Mobile JKN at Dumai Regional General Hospital reflects complex challenges arising from social habits, digital literacy, and established institutional culture. Addressing this barrier requires a holistic strategy that integrates education, training, and active patient participation in technology implementation. An approach that highlights the practical benefits of digital systems, including efficiency, accuracy, and reduced waiting time, can strengthen innovation acceptance. Consequently, resistance driven by traditional influences can be mitigated, allowing the sustainable adoption of Mobile JKN without diminishing user comfort and satisfaction.

4.5. Image Barrier

Findings from Dumai Regional General Hospital indicate that patient resistance to using the Mobile JKN application is largely influenced by negative perceptions of the application's image itself. These perceptions stem from patients' direct experiences with technical issues such as errors, server disruptions, and data synchronization delays, which create frustration and distrust. Some patients perceive Mobile JKN as impractical and believe it lacks adequate support from hospital staff, making them more comfortable using manual procedures. This phenomenon aligns with the Innovation Resistance Theory (IRT), which posits that innovations are often rejected when they carry a poor reputation or negative image in the eyes of consumers (Ram and Sheth, 1989). Such negative images are often reinforced by limited positive promotion and inadequate user education from service providers, making negative user experiences a dominant factor shaping resistance.

Beyond technical factors, digital literacy plays an important role in shaping the application's image. Patients with limited smartphone skills or low familiarity with digital applications tend to view Mobile JKN as a risk, thereby strengthening their negative perceptions (Prasetiyo and Safuan, 2022). This is supported by studies from Damanik et al. (2024) and Asmara and Saimi (2025), which show that users' technological proficiency is directly proportional to their perception of an application's usefulness and reputation. Therefore, image-related barriers are not merely technical issues but also stem from users' abilities, experiences, and trust in technology.

Negative image perceptions are also affected by interface quality and direct user experience. Giebel et al. (2024) emphasize that usability problems, such as complex interfaces, non-intuitive navigation, and confusing features, contribute to the perception that an application is ineffective. Patients facing such difficulties tend to regard the application as unreliable. Therefore, improving interface design and providing adequate support and training for both patients and hospital staff are crucial steps to enhance user experience and rebuild the application's image.

Furthermore, a negative image is also shaped by how the application is represented in the broader digital ecosystem, including app stores. Aungst et al. (2022) found that poorly presented or hard-to-access applications in digital stores can increase user confusion and frustration. This finding highlights that the image of an application is not only formed through hospital experiences but also

through user interactions with digital distribution platforms. Failure to consider this aspect can strengthen resistance even before users fully engage with the application.

Privacy and data security concerns also significantly contribute to the Image Barrier. Patients' worries about the safety of personal and health information may create hesitation in using digital applications, even when those applications technically comply with security standards (Alhammad et al., 2023). In the case of Mobile JKN, risks such as data loss, synchronization errors, or technical failures reinforce perceptions of unreliability, making patients prefer manual methods that offer a stronger sense of safety and control.

In a broader context, image-related resistance also interacts with social and cultural factors. Patients who feel unsupported by hospital staff or their social environment tend to evaluate the application negatively, whereas those more familiar with digital technology exhibit lower resistance. International research has shown that resistance to digital health technologies often arises from a combination of user experience, institutional trust, and perceived risk (Hilhorst et al., 2014; Barrett, 2018). This emphasizes that strategies to address the Image Barrier must be multidimensional, encompassing technical improvements, digital literacy education, training, and communication that enhances the application's reputation.

Overall, the image barrier represents one of the most complex factors influencing Mobile JKN adoption. Overcoming this barrier requires a holistic approach that includes improving application quality, developing user-friendly interfaces, enhancing system integration, strengthening data security, and implementing targeted socialization and education efforts. Interventions that prioritize user experience, social perception, and institutional support can build patient trust, reshape negative perceptions, and encourage wider adoption. This approach underscores that the success of digital innovation in healthcare depends not only on technical capability but also on user perception, trust, and human interaction with technology.

In analyzing patient resistance to the use of the Mobile JKN application at Dumai Regional General Hospital, this study applied the Innovation Resistance Theory (IRT), which consists of five main dimensions: Usage Barrier, Value Barrier, Risk Barrier, Tradition Barrier, and Image Barrier. To facilitate understanding and illustrate the relationship between field findings, informant quotations, IRT theory, and previous studies, all results are summarized in the following discussion matrix.

Conclusion

Based on the study on the low utilization of the Mobile JKN application at RSUD Dumai, it can be concluded that its use remains limited due to a combination of five main barriers: usage, value, risk, tradition, and image barriers, which are interrelated and reinforce patients' resistance to digital innovation. These barriers arise from patients' limited digital literacy and supporting facilities, perceptions that the application's benefits are not significant compared to manual services, concerns about data security and potential losses, ingrained habits of manual service, and a negative image of the application due to unsatisfactory experiences. The successful implementation of Mobile JKN depends not only on technology but also on the ability of RSUD Dumai and BPJS Kesehatan to adapt digital innovations to patients' needs, habits, and experiences while building trust and a positive image.

Therefore, RSUD Dumai should conduct patient education and socialization, provide supporting facilities, and increase staff involvement in assisting patients with the application. BPJS Kesehatan is recommended to improve technical aspects and user experience, strengthen customer service, and implement strategic campaigns and collaborations to enhance the application's value and image. More broadly, digital health policymakers need to support community digital literacy, establish standards for beneficial and secure applications, and consider socio-cultural aspects so that

the adoption of digital health technology can be effective, sustainable, and widely accepted. Future research can expand coverage, integrate other theories with IRT, and examine socio-cultural and regulatory factors to gain a deeper understanding of technology resistance and acceptance.

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