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Empathy-Driven MVP Design For Digital Circumcision Services In Indonesia

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Abstrak

Layanan sunat mandiri telah lama berkembang di berbagai wilayah Indonesia, terutama di daerah-daerah yang belum memiliki akses memadai terhadap fasilitas kesehatan formal. Meskipun demikian, adopsi inovasi digital pada sektor ini masih sangat terbatas, padahal kebijakan nasional telah mendorong penerapan rekam medis elektronik secara luas. Penelitian ini bertujuan merancang Minimum Viable Product (MVP) untuk layanan sunat digital dengan pendekatan berbasis empati dalam kerangka paradigma Design Science Research (DSR). Metode kualitatif eksploratif diterapkan melalui wawancara mendalam terhadap empat operator sunat mandiri yang berasal dari wilayah berbeda. Data dianalisis menggunakan kerangka peta empati enam elemen serta analisis kualitatif lintas informan guna mengidentifikasi kebutuhan pengguna secara komprehensif. Hasil penelitian mengungkap enam kebutuhan utama para operator, yaitu: komunikasi digital yang terstruktur, otomatisasi administrasi dan penjadwalan, dukungan perawatan pasca tindakan di rumah, manajemen reputasi digital, pendidikan dan peningkatan kompetensi berkelanjutan, serta integrasi nilai sosial-spiritual dalam layanan. Berdasarkan temuan tersebut, dikembangkan lima fitur inti MVP sebagai artefak DSR, meliputi: dasbor pemantauan pasien, integrasi WhatsApp API, modul testimoni dan portofolio, ruang kolaborasi dan edukasi, serta katalog layanan berbasis lokasi. Penelitian ini memberikan kontribusi pada kajian kesehatan digital dan sistem informasi dengan menghadirkan rancangan MVP yang berlandaskan bukti empiris, sekaligus menyelaraskan fungsi teknologi dengan konteks sosial dan budaya layanan kesehatan berbasis komunitas.

Kata Kunci: Sunat, Layanan Kesehatan Digital, Minimum Viable Product, Peta Empati, Design Science Research

Abstract

Independent circumcision services are widely practised across Indonesia, particularly in areas with limited access to formal healthcare facilities; however, digital innovation in this sector remains limited despite national policies promoting electronic medical records. This study aims to design a Minimum Viable Product (MVP) for digital circumcision services using an empathy-

driven approach within the Design Science Research (DSR) paradigm. An exploratory qualitative method was employed through in-depth interviews with four independent circumcision operators from different regions. Data were analysed using a six-element empathy map framework and cross-informant qualitative analysis to identify user needs. The results identify six core needs among operators: structured digital communication, automated administration and scheduling, home care support, digital reputation management, continuous education, and socio-spiritual integration. Based on these findings, five core MVP features were developed as the DSR artefact: a patient monitoring dashboard, WhatsApp API integration, a testimonial and portfolio module, a collaboration and education space, and a location-based service catalogue. The study contributes to digital health and information systems research by providing an empirically grounded MVP design that aligns technological functionality with the social and cultural context of community-based healthcare services.

Keywords: Circumcision, Digital Health Services, Minimum Viable Product, Empathy Map, Design Science Research

INTRODUCTION

1.1 Background

Circumcision is a type of healthcare that is entrenched in the medical aspects as well as the socio-religious culture of Indonesian societies. In many locations, especially those located in suburbs and rural areas with poor access to formal health care establishments, there is the emergence of circumcision services that provide indispensable healthcare services in the community context. These services utilise models for health care that place emphasis on the comfort of patients, participation of families, and cultural considerations. On the other hand, the government of Indonesia has put forward the digitalisation of its health care systems, as exemplified b y the regulation of the Ministry of Health No. 24 of 2022 regarding EMR (PERATURAN MENTERI KESEHATAN REPUBLIK INDONESIA NOMOR 24 TAHUN 2022 TENTANG REKAM MEDIS, 2022).

Despite this regulatory push, digital innovation among independent circumcision services remains limited. In practice, most operators rely on informal digital tools, particularly instant messaging applications such as WhatsApp, for patient communication, appointment scheduling, documentation, and post-procedure monitoring. Even so, these tools are not designed to support efficient processes in clinical operations or ongoing documentation of the patient process. Past work suggests digital communication can support follow-up care after the procedure and increase patient satisfaction for circumcision services, but use often happens on a disconnected and ad hoc basis without seamless integration with the patient's health information record (Aulia et al., 2023).

Such fractured digital practices have been similarly identified in other research into information systems; such fragmented information practices and the non-adoption of integrated digital solution sets are attributed to a range of factors (e.g. Technological, organizational and environmental) that exist at three levels (Religia et al., 2025). There are strong parallels with recent IS research that recognizes the increased involvement of digital

information systems in managing complex service environments such as healthcare and community settings, which require systems to be design in the context of technological, organization and user factors (Aryani et al., 2023; Hidayat et al., 2025). Prior research published in the Applied Information Systems and Management (AISM) journal has examined information system adoption, user satisfaction, trust, and system development across multiple domains, underscoring the relevance of artefact-oriented approaches in addressing socio-technical challenges in service contexts (Aryani et al., 2023; Zelfia et al., 2022).

This illustrates a core problem with existing digital health ecosystems: a disconnect in structure between national policies for digital health and practice for the services at the community level. Community-based informal circumcision service providers are typically burdened by administration, poor patient recovery monitoring and socialisation, lack of systems for the formal establishment of their reputation, and lack of integration with broader health information systems. Many existing digital solutions are modelled in formal clinical practice settings, and take little account of the contextual and cultural specifics of community or informal services (Naderbagi et al., 2024).

Given the clinical and emotional intimacy required for a circumcision procedure, there is an imperative to support such informal providers, particularly in the context of low and middle-income countries where infrastructure and health capacity limitations, low digital literacy, and the role of informal healthcare providers present additional obstacles to the uptake of digital health [8]. Studies in resource-constrained settings also indicate that digital care solutions often fail when they overlook local values and community practices (Correia et al., 2021). Without a context-aware and empathetic design approach, digitalisation initiatives risk low adoption despite regulatory and technological readiness.

From an Information Systems perspective, research on digital health adoption has predominantly employed behavioural models such as the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2012). These models emphasise constructs such as perceived usefulness, perceived ease of use, facilitating conditions, and social influence. Although widely validated, these frameworks conceptualise social influence in general terms and do not explicitly capture the socio-spiritual values that strongly shape healthcare practices in religious and community-oriented contexts. Consequently, their explanatory power may be limited when applied to healthcare services that are embedded in cultural and spiritual traditions.

At the same time, Design Science Research (DSR) has become a dominant paradigm for developing and evaluating information system artefacts in healthcare (Hevner et al., 2004; Peffers et al., 2007). DSR provides a structured process for problem identification, artefact development, and evaluation. However, empathy is often positioned merely as a supporting design technique rather than a formal mechanism for requirements elicitation within the DSR process. Empathy mapping, introduced within the Value Proposition Design framework, offers a systematic way to capture users' thoughts, feelings, actions, pains, and gains (Osterwalder, A. et al., 2014). When formally embedded into DSR, empathy mapping can translate deeply contextual user insights into actionable system requirements.

To date, the integration of socio-spiritual dimensions into TAM and UTAUT, together with the formal incorporation of empathy within DSR, has received limited scholarly attention,

particularly in the context of community-based digital health services in Indonesia. This gap presents an opportunity to advance both theory and practice by aligning behavioural adoption models with artefact-oriented system development through an empathy-driven approach.

Although telemedicine and digital health services have been widely studied and increasingly implemented in Indonesia, most existing research and applications focus on formal clinical settings, such as hospitals, clinics, and institutional teleconsultation platforms. These approaches implicitly assume standardised clinical workflows and often overlook community-based and ritual-oriented health services that are deeply embedded in local socio-cultural and spiritual practices.

Circumcision services in Indonesia represent a distinctive form of community-based healthcare, where medical procedures are inseparable from religious values, family involvement, social trust, and moral legitimacy. Despite the growing prevalence of telemedicine, academically documented digital innovations that explicitly address the socio-cultural–spiritual dynamics of ritual-based health services remain scarce. Consequently, existing digital health models often fall short of explaining or supporting technology adoption in this context.

Methodologically, prior studies applying DSR in digital health have largely treated empathy-based techniques as auxiliary design tools rather than as a systematic and formal mechanism for requirements elicitation. To date, no study has explicitly and systematically integrated an empathy-driven approach, such as empathy mapping, into the DSR framework to design a context-specific Minimum Viable Product (MVP) for community-based circumcision services in Indonesia.

This absence of context-sensitive and empathy-driven DSR studies constitutes a significant methodological and empirical gap. Addressing this gap is essential to ensure that digital health artefacts are not only technically functional but also culturally legitimate, socially trusted, and spiritually aligned with the communities they serve.

Accordingly, this study adopts the DSR paradigm to address the digitalisation challenges faced by independent circumcision services. Empathy mapping is used during the early stages of the DSR process to elicit user needs holistically and systematically, while an MVP is developed as the primary research artefact. This approach enables the examination of technology adoption not merely as a functional decision, but as a socially and spiritually informed process.

Based on the identified research gap, this study aims to: (1) identify the core needs of independent circumcision operators using an empathy map-based approach; (2) design MVP features as a DSR artefact to support community-based digital health services; and (3) explore the extension of TAM and UTAUT by incorporating socio-spiritual factors and empathy-driven insights in the context of digital health adoption.

This study contributes theoretically by extending TAM and UTAUT with socio-spiritual dimensions relevant to emerging economies and by formalising empathy as part of the requirements analysis stage in DSR. In practice, it offers design guidance for developers, healthcare practitioners, and policymakers to build culturally responsive digital health platforms that enhance service efficiency, professional credibility, and patient trust in community-based healthcare settings. By positioning empathy as a bridge between behavioural theory and

artefact design, this research strengthens the alignment between human values and information system development.

The remainder of this paper is organised as follows. Section 2 describes the research methodology. Section 3 reports the results of the empathy map analysis and user requirement identification, and discusses the proposed MVP features and their theoretical and practical implications. Finally, Section 4 concludes the paper by outlining the main findings, limitations, and directions for future research.

1.2 Related Work

In order to achieve this research aim, a number of theoretical frameworks related to technology adoption and digital system design are deployed. Rather than being viewed as standalone or complementary, this study combines the distinct contributions of various relevant theoretical perspectives, to demonstrate how these, in concert, overcome theoretical and methodological gaps within community-based digital health services. The Technology Adoption and Acceptance has been widely explored through the usage of several Technology Acceptance models, including the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Technology Acceptance Model hypothesizes that the“use of the system depends on the usefulness of the system and the ease with which the system can be used (Davis, 1989), whereas UTAUT focuses on performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2012).

Evidence using behavioural and extended adoption models in a digital service environment reveals that users’ adoption intentions and usage are influenced by a complex interplay of variables besides usefulness and ease of use. For instance, Valenora Cassandraa and Bernanda argue that using UTAUT2 combined with TAM offers more explanatory power for technology adoption within digital service contexts than using the classic models of technology adoption (Cassandra & Bernanda, 2024). While widely cited in digital health studies, many of these broad-based behavioral models mostly provide an adequate explanation on the functional and general social influences of technology use in a formal healthcare context. However, their limited ability to explain usage which are intimately embedded with cultural and religious nuances, often goes unaddressed since these types of use also involve nonfunctional yet highly influential perceived morals, beliefs, and socio-group support.

To better address these cultural/contextual peculiarities and limitations of behavioral adoption models, we integrate empathy-based user-centred design principles into the DSR process. Just as other Value Proposition Canvas and User journey map utilize Empathy Mapping technique, where "empathy mapping as a collaborative visualization tool that helped design to capture, what a user says, thinks and feels, sees, and hears and does and what are their pain points, gains (Osterwalder, A. et al., 2014). Empathy mapping, can be highly useful for uncovering the emotional, social, and spiritual aspects that dominate usage in community health settings and that typically remain hidden to quantitative adoption models. However empathy mapping has rarely been integrated in prior studies as a formal, structured tool to

generate user requirement specification, it is considered as a supportive or pilot research activity.

Within a User-Centered Design (UCD) context, Value Proposition Canvas is utilized to translate the findings from the empathy mapping stage into possible system design features. The Value Proposition Canvas is originally proposed by Osterwalder et al. To align value proposition with customer segments (Osterwalder, A. et al., 2014). In this study, the value proposition canvas functions not as a product-business model tool, but rather as an intermediary tool used for conceptual design and linking Socio-cultural user insights with design logic.

Following that, the Minimum Viable Product (MVP) concept is employed to realize this design logic into tangible technology features that could be iteratively evaluated. MVP is commonly known as "a product that includes enough value to attract and satisfy customers - or that is sufficient to provide the information required by stakeholders [16, 17]. The research uses MVP as a means to implement user empathy into a testable functional artifact rather than as a full fledge product development process approach. In order to bridge the divide between qualitative understanding and the designing of practical artifact, DSR is adopted in this research for its focus on problem identification and through solving utilizing iterative processes, such as design and evaluation of technology solutions to real world issues (Peffers et al., 2007). Unlike a Behavioral, interpretivist, descriptive or other approaches in the social science research literature that focus on 'understanding' and 'explaining', a Design Science Research seeks to develop and justify technology, artifacts, and knowledge to solve practical problems.

This implies DSR makes full use of contextual knowledge such as empathy mapping output and use it as basis for creation of technology solutions. Hence this makes the design science research a valid research paradigm to be adopted to build up and assess empathy based digital solutions in the domain of community health service since this method guarantees that qualitative socio-cultural as well as emotional insights from user empathizing exercise are transformed into concrete, and technically viable solutions. Recent studies related to digital health innovation reinforce the necessity of integrating technology adoption concepts with user-centered designs. For example, Tarhan et al. Showed that mature healthcare Telemedicine systems may improve efficiency and quality of the service (Kolukisa & Cinar, 2025).

Telemedicine adoption in LMICs is also influenced by many issues of infrastructure and socio-cultural norms. Moreover, information systems research highlights the significance of organizational factors including risk governance and IT capability, as well as user factors such as trust for the effective use of digital systems and for a sustainable digital transformation process. Yuniarto and Rahman's research in identifying risk factors that influence success of digital transformation of Indonesian SMEs pointed to critical success factors including weak information technology governance, organizational capability and digital competency (Yuniarto & Rahman, 2025). Rudy et al. (2025) identified organizational and individual level challenges in using digital platforms in a context of weak infrastructure and institutions in the Philippines.

The significance of user capacity (digital literacy), ecosystem, and individual level user Readiness for digital technologies is underscored by Kembau et al. (2025). In the context of higher education institution in the Philippines, whereas culturally appropriate intervention in

managing digital diabetes (Correia et al., 2021) is emphasized for developing an efficient yet sustainably used digital health interventions. However these kinds of studies tend to focus only on a range of factors influencing the adoptions of digital health interventions and provide merely guidance on future development of culturally suitable interventions in community based health services with ritualistic contexts, but do not present the methods of how to address cultural, spiritual and emotional particularities into meaningful artifact that is culturally sensible. In this study we address these limitations through an empathy-driven artefact design approach by linking technology adoption behaviors, empathy-based design methods and Design Science Research as an overall research paradigm to systematically develop a digitally-enabled solutions for this specific ritual based healthcare intervention. Therefore, this paper utilizes DSR, not just as a development methodology, but also as a conceptual lens, to enable systematic translation of socio-cultural and emotional insights from empathy into a testable digital solution within the context of DSR in order to achieve Design science methodology from empirical field knowledge.

METHOD

This study uses an exploratory qualitative approach. This approach was chosen because it enables a thorough examination of the research subjects' perspectives and experiences regarding independent circumcision services and the necessity of digital services. This approach is appropriate for understanding the social context from the perspective of the actors (Creswell, 2014).

The research follows the DSR framework proposed (Peffers et al., 2007), which consists of five iterative stages: (1) problem identification and motivation, (2) objective definition, (3) artefact design and development, (4) demonstration, and (5) evaluation. In this study, the empathy map is employed in stages (1) and (2) to capture user needs, while the MVP feature formulation represents the artefact design stage. The resulting prototype will serve as the basis for future demonstrations and evaluations.

The informants consisted of four independent circumcision operators from Madiun, Probolinggo, Brebes, and Martapura. Selection was carried out using purposive sampling with the following criteria: (1) having at least two years of practical experience, and (2) being active in-home care services, both digitally and conventionally. Although the number of participants was relatively small, qualitative research emphasises depth of information. Therefore, the number of four informants was deemed sufficient because the data had reached saturation for the main theme under study (Patton, 2002). All informants were informed of the study's purpose and their rights as participants. Participant consent was obtained before conducting the interviews, and participants' identities were kept confidential using anonymous codes.

Data were collected through semi-structured interviews using an empathy map framework comprising six elements: think and feel, hear, see, say and do, pain points, and gains (Osterwalder, A. et al., 2014). Interviews were conducted online with the participants' consent. All conversations were recorded and transcribed verbatim. The transcripts were then cleaned of meaningless words before analysis. The analysis process was carried out in three stages.

First, synthesising findings based on the empathy map**.** Each interview result was

analysed to find findings in six dimensions of empathy. These six dimensions are what the operator thinks and feels, hears, sees, says and does, as well as the difficulties and benefits gained from their experience with the independent circumcision services. This process refers to the user visualisation approach (Osterwalder, A. et al., 2014). Second, cross-informant qualitative synthesis was conducted across informants. To identify more comprehensive themes of need, a cross-informant qualitative synthesis was conducted across the four empathy maps. Cross-informant qualitative was used as a method to synthesise findings from several qualitative sources to obtain general patterns and interrelationships between themes (Cooper, 2010). Third, the MVP formulation is based on value propositions. After the needs theme has been formulated, the next step is to compile the value propositions. This process follows the principles of customer value design as described by Osterwalder, A. et al. (2014). Next, the MVP is developed as an initial solution that includes core features that can be tested quickly and inexpensively to validate user needs (Blank, 2012; Ries, 2011).

This three-layered analysis ensures methodological transparency by linking qualitative insights directly to artefact design decisions, aligning with DSR's principle of traceability between problem, design, and solution. This study focuses on the early stages of DSR, namely problem identification, requirements elicitation, and artefact design. Consequently, usability testing and iterative validation were not conducted at this stage. The proposed MVP should be interpreted as a design blueprint grounded in empathy-driven insights, intended for subsequent implementation, usability evaluation, and iterative refinement in future research.

RESULTS AND DISCUSSION

To build the empathy maps, in-depth interviews were conducted with four independent circumcision operators drawn from different regions. Each interview was worked through systematically using the six-element empathy map framework as the analytical guide. What follows concentrates on the patterns that emerged across operators as a whole.

3.1 Cross-Operator Empathy Map Synthesis

When the empathy maps were laid side by side, the degree of convergence was striking. Despite operating in different regions and under varying practice conditions, all four operators displayed a remarkably consistent set of professional values and operational concerns. Each one expressed a strong sense of personal responsibility toward delivering safe circumcision services a responsibility they understood not in purely clinical terms, but within a broader web of religious obligation, family expectation, and community trust. In this context, circumcision was rarely discussed as a medical procedure alone; it carried clear social and spiritual weight.

Table 1. Cross-Operator Synthesis of Empathy Map Analysis

Element	Common Pattern
Think & feel	Strong professional dedication; sense of social–spiritual responsibility; pride in independent practice; desire for change

Hear	Information mainly from peers, patients, mentors; informal channels (WhatsApp, social media, peer talks)
See	Limited facilities; importance of patient comfort; reliance on WhatsApp/social media for interaction & promotion
Say & does	Reliance on WhatsApp for communication & promotion; active in community education
Pain	Lack of patient management systems; licensing bureaucracy; no structured digital records; high workload & limited digital tools
Gain	Effective services enhance reputation, broaden reach, and strengthen social–spiritual values; digitalisation is seen as an opportunity.

At the operational level, all four operators leaned heavily on informal digital tools to keep their practices running. WhatsApp, in particular, served as the primary channel for patient communication, appointment coordination, and post-procedure follow-up — a role it was never really designed for. Operators acknowledged that the tool was convenient and familiar, but they were equally candid about its limits: no structured records, fragmented conversation histories, and administrative processes that relied entirely on manual effort.

The pain points that surfaced across operators were consistent: the absence of any integrated patient management system, a mounting administrative load, and real difficulty keeping track of post-procedure recovery, especially for patients managed at home. At the same time, operators were not passive about these frustrations. There was a shared sense that the right digital solution could make their work more efficient, raise their professional standing, and deepen patient confidence that provided it did not compromise the socio-spiritual values that give their work its meaning. These cross-operator patterns are summarized in Table 1.

3.2 Identification of Core User Needs

Drawing from the cross-operator synthesis, six needs emerged consistently enough across all four operators to be treated as shared priorities rather than individual preferences. These are not simply a list of feature requests. They reflect the underlying tensions operators navigate daily between informal practice and the demands of a growing, trust-dependent service.

1. The need for structured digital communication. Operators currently rely on undocumented WhatsApp conversations that leave no reliable record of what was discussed, agreed, or advised.
2. Automated administration and scheduling — the manual workload of managing patients, appointments, and service records consumes time and introduces errors that a structured system could largely eliminate.
3. Home care support emerged as a genuine gap. Most post-procedure recovery happens

outside any clinical setting, and operators had limited means to monitor it systematically.
4. Digital reputation management reflected a practical concern: in a sector where word-of-mouth still drives referrals, operators recognised that a credible, visible digital presence could meaningfully expand their reach and reinforce trust.
5. The need for continuous education and collaboration pointed to something beyond individual competence — operators wanted structured opportunities to learn from peers and stay current, without having to seek that out informally.
6. Socio-spiritual integration was not an add-on concern. For these operators, religious values and moral legitimacy are constitutive of the service itself, and any digital platform that ignored this dimension would likely be met with scepticism regardless of its technical merits.

Together, these six needs form the analytical foundation from which the MVP artefact was designed.

3.3 Traceability from Empathy Findings to MVP Design

One of the methodological risks in design-oriented research is what might be called a design leap — moving from qualitative findings to design decisions without making the logic of that transition explicit. To avoid this, each empathy finding was traced systematically through to a core user need, and from there to a specific MVP feature. The intent was not merely procedural tidiness but genuine transparency: a reader should be able to follow the reasoning from what operators said and felt to what was ultimately built.

To give a concrete example: the recurring frustration with unstructured patient records was not simply noted as a pain point and set aside. It directly informed the identification of automated administration as a core need, which in turn shaped the decision to develop a patient monitoring dashboard as a central MVP feature. Similarly, the heavy reliance on informal WhatsApp exchanges — practical but limiting — pointed toward structured digital communication as a need, addressed through WhatsApp API integration and standardised digital forms. The full mapping across all findings, needs, and features is presented in Table 2.

Table 2. Empathy-to-Artefact Traceability in the DSR Process

Empathy Finding (Pain/Gain)	Core User Need	MVP Feature
Unstructured patient records	Automated administration	Patient monitoring dashboard
Informal WhatsApp communication	Structured digital communication	WhatsApp API integration
Limited post-procedure monitoring	Home care support	Patient monitoring dashboard
Difficulty building public trust	Digital reputation management	Testimonials and portfolio module

Limited access to professional learning	Continuous education	Collaboration and education space
Strong socio-spiritual motivation	Socio-spiritual integration	Value-based service catalogue

3.4 Resulting MVP Artefact

To make the design logic visible beyond the tables, a BPMN-lite business process model is provided in Figure 2. Each activity in the model corresponds directly to one of the core MVP features, offering a process-level view of how qualitative insights were translated into an integrated artefact rather than a loose collection of functions.

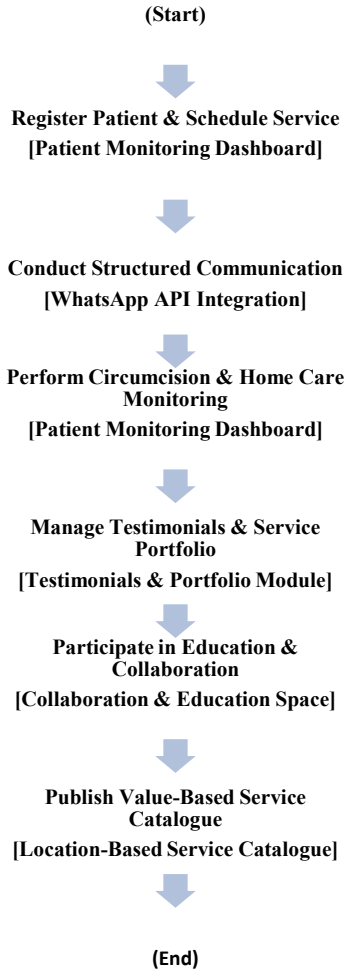

Figure 2. BPMN-lite Business Process Model

The six core user needs identified through empathy analysis were ultimately translated into five system-level MVP features. These features were designed to work together rather than as isolated modules — addressing operational efficiency, communication structure, service credibility, and socio-spiritual alignment as interconnected concerns rather than separate problems.

Discussion

The research findings reveal six key user needs that the proposed digital MVP must address. First, the need for structured digital communication aligns with the TAM, specifically the perceived usefulness (PU) construct. Operators perceive that clearer, better-documented digital communication enhances service quality and outcomes. Several recent studies in Indonesia support this: PU was found to influence intention to use telemedicine significantly (Adiwinata & Yusran, 2023); the importance of PU in teleconsultation adoption was also confirmed in a study among Jabodetabek residents (Salsabila & Sari, 2022); hospital telemedicine acceptance research emphasised PU, alongside information quality and professionalism, as key predictors (Alexandra et al., 2021); and Effendi et al. (2024) demonstrated that communication quality directly strengthens perceived usefulness in telemedicine settings.

Second, scheduling and administrative automation reduce the manual burden on operators. This finding is consistent with Shao et al. (2024), who demonstrated that telemedicine systems significantly reduced patient no-show rates by using automated reminders. From the perspective of the UTAUT (Venkatesh et al., 2012), such features improve facilitating conditions, thereby increasing the likelihood of application adoption.

Third, patient preference for home care highlights the value of pain relievers in value proposition design. Similar evidence from India suggests that home-based digital health solutions reduce barriers to access and increase comfort, particularly in pediatric and culturally sensitive care (Mahdavi et al., 2025). A recent systematic review in Sub-Saharan Africa also emphasised that, despite infrastructural and regulatory barriers, culturally adapted telemedicine models in South Africa, Kenya, and Nigeria improved acceptance and patient satisfaction (Agbeyangi & Lukose, 2025).

Fourth, the emphasis on digital reputation underscores the role of social influence in the UTAUT. Testimonials, provider responsiveness, and institutional reputation act as cues of trustworthiness for users. Recent empirical work in Indonesia shows that consumer trust in telemedicine is significantly influenced by performance expectancy, social influence, and facilitating conditions, which align with the concept of digital reputation in health platforms (Soelasih et al., 2025).

Fifth, the need for education and collaboration reflects the gain creator element in value proposition design. Platforms that integrate professional education modules not only support continuous medical learning but also enhance patient literacy. A recent scoping review on digital health in Indonesian nursing found that, while nurses increasingly recognise the importance of digital health, significant gaps remain in digital literacy, infrastructure, and structured training programmes (McKenna et al., 2025). Addressing these gaps through integrated education features in digital platforms can improve both provider preparedness and

service quality. Similarly, Nuryani et al. (2022) developed the Integrated Nursing Leadership Training (INLeT) model. This blended learning approach, which combines online and offline modules, has proven effective in boosting leadership and collaboration skills among nurse managers. These findings emphasise that embedding professional education and collaborative training modules into a telemedicine MVP can not only strengthen provider competence but also foster sustainable adoption through shared learning environments.

Sixth, the call for socio-spiritual integration underscores the need for culturally responsive digital health design. Previous studies have shown that embedding local values, such as religious and communal practices, increases trust and acceptance of Indonesian health innovations (Rochwulaningsih et al., 2023). The digital inclusion report on Indonesia emphasised that collaboration with community and religious leaders is essential to ensure telehealth access in rural and underserved areas (Drury & Lazuardi, 2021). In the context of circumcision services, socio-spiritual considerations are particularly salient, as the procedure is deeply embedded in both religious identity and cultural tradition. Designing platforms that recognise and integrate these values can therefore foster higher trust, legitimacy, and adoption. From a technology adoption perspective, these socio-spiritual considerations extend conventional TAM and UTAUT constructs by capturing value-based determinants of trust and acceptance that are not adequately represented by utilitarian or general social influence factors.

Furthermore, synthesising these six user needs within the Value Proposition Design framework clarifies the link between user insights and digital product development. Clear communication and automated administration serve as pain relievers, reducing errors and uncertainties in service delivery. Home care options and socio-spiritual integration serve as catalysts for growth, fostering trust, comfort, and cultural legitimacy. Digital reputation and education function both ways, addressing user anxieties while creating value for long-term adoption. Turning these value propositions into MVP features involves prioritising modules such as secure chat and documentation systems, automated scheduling and payments, integrated home-visit requests, testimonial and rating dashboards, professional training content, and culturally sensitive service guidelines. This ensures the MVP is not only technically feasible but also directly aligned with the real-world context of circumcision services in Indonesia.

This study introduces innovation in three keyways. First, it is the first empirical study to formally integrate empathy mapping into the requirements elicitation stage of DSR for digital circumcision services in Indonesia. Second, it extends the TAM and UTAUT by incorporating socio-spiritual factors, an underexplored dimension in digital health adoption research. Third, it operationalises user needs as gain creators and pain relievers within the Value Proposition Design framework, thus providing a structured pathway from qualitative insights to functional technological artefacts.

From a practical perspective, the findings demonstrate that structured digital communication, automated administration, home care functionality, reputation management, continuous education, and socio-spiritual integration are not merely conceptual notions but tangible design components of digital health platforms. For local startups, these insights translate into embedding culturally responsive features that accommodate the religious and

community expectations of their target audience. For healthcare practitioners and nurse managers, the study emphasises the importance of digital literacy, training, and collaborative modules in maintaining consistent service quality. For policymakers, the results underscore the importance of aligning digital health initiatives with local cultural and spiritual contexts to enhance legitimacy, trust, and adoption among underserved populations.

From an Information Systems (IS) perspective, this research contributes to the field's theoretical development in two primary ways. First, it expands IS development methodologies by integrating empathy mapping into the requirements engineering stage of DSR, enabling the systematic capture of tacit, social, ethical, and cultural user requirements that are often overlooked in traditional IS design (Muntean & Militaru, 2022). Second, it refines the TAM and UTAUT frameworks by embedding a socio-spiritual dimension that represents localised determinants of digital health technology adoption in emerging economies. This conceptual synthesis bridges behavioural adoption theories and artefact-oriented IS design, positioning empathy-driven MVP development as a DSR-based artefact that links human-centred insights with system-level implementation strategies (Weber, 2023).

CONCLUSION

This study offers clear theoretical, methodological, and practical contributions to the field of Information Systems and community-based digital health innovation. The central take-home message is that culturally embedded digital health solutions require design approaches that go beyond purely functional or utilitarian considerations. From a theoretical perspective, this study highlights the socio-spiritual dimension as a meaningful contextual factor that enriches the application of established technology adoption perspectives, particularly the TAM and the UTAUT, in ritual-oriented, community-embedded healthcare settings. Rather than proposing formal extensions to these models, the findings demonstrate how religious meaning, social trust, and moral legitimacy shape user needs and expectations in ways that are not fully captured by conventional adoption constructs.

From a methodological perspective, this research demonstrates how empathy mapping can be systematically embedded within a DSR process to support the translation of qualitative, context-sensitive user insights into a functional MVP. While the study does not claim a fully validated or generalisable framework, it offers a transferable methodological reference that can inform the design of culturally sensitive digital solutions in other community-based health service contexts.

From a practical perspective, the study identifies six core user needs (structured digital communication, administrative automation, home care support, digital reputation, continuous education, and socio-spiritual integration), and translates them into a coherent MVP blueprint. This blueprint provides actionable design guidance for system developers, healthcare practitioners, and policymakers seeking to build inclusive, trustworthy, and context-aware digital health platforms in emerging economies.

Several limitations should be acknowledged. The relatively small number of participating operators limits the generalisability of the findings beyond the studied context. However, this limitation also presents important opportunities for future research to validate and extend the proposed approach through larger, more diverse samples, comparative cross-

regional studies, and iterative evaluation cycles involving usability testing and real-world implementation.

Overall, this study positions the proposed MVP not merely as an academic artefact, but as an initial design blueprint that can be adopted, adapted, and further developed by digital health developers and community health stakeholders. By aligning technological design with social, cultural, and spiritual values, this research lays a grounded foundation for scalable and sustainable digital innovation in community-based healthcare services.

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