

USER NEEDS ANALYSIS IN HOSTCARE APPLICATION DEVELOPMENT AS A REAL-TIME DIGITAL QUEUE SYSTEM IN HEALTHCARE FACILITIES : MANAGEMENT INFORMATION SYSTEM

**Faiz Azzikri^{1*}; Rahma Laila Sabina²; Yussyfina Yuniarti³; Anadza Wafiqotul
Azizah⁴; Muhammad Fadil Rizki⁵; Taufik Rahmat Kurniawan⁶**
Universitas Muhammadiyah Bandung, Bandung, Indonesia^{1,2,3,4,5}
Email : faizzazzikri@gmail.com¹; taurahkur@umbandung.ac.id⁶

ABSTRACT

Healthcare services in Indonesia continue to face challenges in patient queue management, including long waiting times, uncertainty in service schedules, and the need for patients to arrive early to secure queue numbers. These issues reduce service efficiency and negatively affect patient satisfaction. This study aims to analyze user requirements as the foundation for developing HostCare, a real-time digital queue management application designed to improve the efficiency of healthcare services. A quantitative descriptive approach was employed using an online questionnaire distributed to 10 respondents who had previously accessed healthcare services. The collected data were analyzed using descriptive statistics to identify user problems and system requirements. The findings reveal that 70% of respondents experienced long queues, while 60% reported arriving earlier than scheduled to obtain queue numbers. All respondents (100%) expressed interest in using a digital healthcare queue management system. The most expected features include online queue registration (90%), estimated service times (50%), and automatic queue notifications (50%). Furthermore, 90% of respondents indicated their willingness to use and recommend the HostCare application if implemented. The results demonstrate that user requirements analysis provides a strong foundation for developing digital healthcare applications that align with user expectations. Therefore, HostCare has the potential to improve queue management efficiency, reduce patient waiting times, and enhance the overall quality of healthcare services.

Keywords: user requirements analysis; digital queue system; healthcare services; mobile ; HostCare

ABSTRAK

Pelayanan kesehatan di Indonesia terus menghadapi tantangan dalam manajemen antrian pasien, termasuk waktu tunggu yang lama, ketidakpastian jadwal pelayanan, dan kebutuhan pasien untuk datang lebih awal guna mendapatkan nomor antrian. Masalah-masalah ini mengurangi efisiensi pelayanan dan berdampak negatif pada kepuasan pasien. Studi ini bertujuan untuk menganalisis kebutuhan pengguna sebagai dasar pengembangan HostCare, sebuah aplikasi manajemen antrian digital real-time yang dirancang untuk meningkatkan efisiensi pelayanan kesehatan. Pendekatan deskriptif kuantitatif digunakan dengan menggunakan kuesioner online yang didistribusikan kepada 10 responden yang sebelumnya telah mengakses pelayanan kesehatan. Data yang dikumpulkan dianalisis menggunakan statistik deskriptif untuk mengidentifikasi masalah pengguna dan kebutuhan sistem. Hasil penelitian menunjukkan bahwa 70% responden mengalami antrian panjang, sementara 60% melaporkan datang lebih awal dari jadwal untuk mendapatkan nomor antrian. Semua responden (100%) menyatakan minat untuk menggunakan sistem manajemen antrian kesehatan digital. Fitur yang paling diharapkan meliputi pendaftaran antrian online (90%), perkiraan waktu pelayanan (50%), dan pemberitahuan antrian otomatis (50%). Lebih lanjut, 90% responden menunjukkan kesediaan mereka untuk menggunakan dan merekomendasikan aplikasi HostCare jika diimplementasikan. Hasil penelitian menunjukkan bahwa analisis kebutuhan

pengguna memberikan landasan yang kuat untuk mengembangkan aplikasi layanan kesehatan digital yang selaras dengan harapan pengguna. Oleh karena itu, HostCare berpotensi meningkatkan efisiensi manajemen antrian, mengurangi waktu tunggu pasien, dan meningkatkan kualitas layanan kesehatan secara keseluruhan.

Kata Kunci : Kebutuhan Pengguna; Sistem Antrian Digital; Layanan Kesehatan; Hostcare

INTRODUCTION

Digital transformation has become one of the primary strategies for improving service quality across various sectors, including healthcare. Advances in information technology have encouraged healthcare providers to adopt a wide range of digital innovations to enhance operational efficiency, service quality, and patient experiences. Technologies such as electronic health records (EHRs), telemedicine, mobile health (mHealth) applications, and digital queue management systems have increasingly been implemented to address service-related challenges that have traditionally relied on conventional approaches. The digitalization of healthcare services aims not only to streamline administrative processes but also to improve service accessibility, information transparency, and resource management efficiency, ultimately enabling healthcare providers to deliver faster, more efficient, and user-centered services (Palapessy & Susanti, 2025; Schomakers et al., 2022).

Despite the ongoing advancement of digital transformation, patient queue management remains a persistent challenge in many healthcare facilities in Indonesia. Most patients are still required to visit healthcare facilities in person to obtain a queue number, resulting in prolonged waiting times, overcrowded waiting areas, and uncertainty regarding service schedules. These conditions not only reduce patient convenience but also negatively affect the overall efficiency of healthcare service delivery. Therefore, an effective digital solution is needed to improve queue management by providing real-time service information that is easily accessible to users (Jayanto & Fachruddin, 2024; Nainggolan et al., 2025).

This issue is further supported by the market validation conducted in this study. Based on a survey involving ten respondents who had previously used healthcare services, 70% reported frequently experiencing long waiting queues, while 60% indicated that they had to arrive earlier solely to obtain a queue number. Furthermore, all respondents (100%) expressed interest in using a digital healthcare queue management system if one were available. The survey also revealed that the most desired features include online queue registration (90%), estimated waiting time (50%), and automatic notifications when a patient's turn is approaching (50%). These findings indicate a strong demand for a digital queue management system capable of providing a more practical and efficient healthcare service experience.

Previous studies have extensively investigated the use of digital technologies to improve healthcare service quality. Jayanto and Fachruddin (2024) demonstrated that implementing a

digital queue management information system significantly improved the efficiency of patient registration processes at community health centers. Similarly, Nainggolan et al. (2025) reported that the implementation of the Mobile JKN application successfully reduced patient queues and accelerated healthcare service delivery. Furthermore, Bariyah et al. (2025) concluded that optimizing queue management systems has a positive impact on patient satisfaction. Meanwhile, Schomakers et al. (2022) emphasized that the successful adoption of digital health applications is strongly influenced by users' perceived usefulness, perceived ease of use, and trust in the technology. Collectively, these studies demonstrate that healthcare digitalization contributes significantly to improving both operational efficiency and service quality.

Nevertheless, several research gaps remain. Most previous studies have primarily focused on the implementation and evaluation of digital queue management systems after their deployment in healthcare facilities. Existing studies also tend to develop systems for specific healthcare institutions without first identifying user needs as the foundation of system development. Moreover, previous research has rarely integrated user needs analysis, real-time digital queue system development, and a product development approach within a single comprehensive study. In fact, user needs analysis represents a crucial stage in ensuring that the developed system effectively addresses real-world problems while achieving a high level of user acceptance upon implementation.

Based on these research gaps, this study aims to analyze user requirements for the development of HostCare, a real-time digital queue management application for healthcare facilities. Unlike previous studies, this research places user needs validation as the primary foundation for system development, ensuring that the proposed features accurately reflect users' actual needs. The findings of this study are expected to contribute to the development of digital healthcare solutions that not only improve the efficiency of queue management but also support the delivery of healthcare services that are more effective, responsive, and user-centered.

LITERATURE REVIEW

Digital transformation has become one of the primary strategies for improving healthcare service quality through the adoption of information technology. Various innovations, including electronic health records (EHRs), telemedicine, mobile health (mHealth) applications, and digital queue management systems, have been developed to enhance operational efficiency, streamline healthcare processes, and improve patient experiences. Beyond automating administrative tasks, digitalization also supports data-driven decision-making and enhances the accessibility of healthcare services. The successful implementation of digital transformation depends on several factors, including organizational readiness, technological infrastructure, and

the ability of healthcare professionals to adopt emerging technologies (Palapessy & Susanti, 2025; Schomakers et al., 2022).

One of the most significant applications of digital transformation in the healthcare sector is the implementation of digital queue management systems. These systems enable patients to register and obtain queue numbers online, access estimated waiting times, and receive real-time notifications regarding their service status. Previous studies have demonstrated that digital queue management systems can reduce patient waiting times, improve the efficiency of registration processes, and optimize healthcare service workflows. In addition to benefiting patients, these systems also assist healthcare providers in managing service delivery more effectively, thereby contributing to continuous improvements in service quality (Jayanto & Fachruddin, 2024; Nainggolan et al., 2025; Bariyah et al., 2025).

The successful implementation of an information system depends not only on the underlying technology but also on its alignment with user needs. Consequently, user requirements analysis has become a critical stage in the software development process, particularly for healthcare applications. Previous studies have shown that perceived usefulness, perceived ease of use, and user trust are among the key factors influencing technology acceptance. The better a system meets users' needs and expectations, the greater its likelihood of being accepted and continuously used (Schomakers et al., 2022). These factors are consistent with the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), both of which emphasize the importance of users' perceptions and behavioral intentions in determining technology adoption.

The development of digital healthcare solutions should also adopt a user-centered approach, which places users at the core of every stage of the development process, from identifying user requirements to system design and product evaluation. By actively involving users throughout the development lifecycle, the resulting application is more likely to address real-world problems while improving the quality of healthcare services. This approach is considered more effective than development strategies that focus solely on technical aspects without considering users' experiences and expectations (Palapessy & Susanti, 2025; Schomakers et al., 2022).

Previous studies have consistently demonstrated that the digitalization of healthcare services improves operational efficiency, reduces patient waiting times, and enhances user satisfaction. However, most existing research has focused primarily on the implementation or evaluation of digital systems that have already been deployed in specific healthcare facilities. Studies that initiate system development through a comprehensive analysis of user requirements remain relatively limited. Therefore, this study develops the HostCare application by using the results of user requirements analysis as the primary foundation for designing a real-time digital queue

management system. This approach is expected to produce a solution that better addresses users' actual needs while contributing to the advancement of user-centered and efficient digital healthcare services.

METHODS

Method is a method of work that can be used to obtain something. While the research method can be interpreted as a work procedure in the research process, both in searching for data or disclosing existing phenomena (Zulkarnaen, W., et al., 2020).

Research Design

This study employed a quantitative descriptive approach using a survey method to identify user requirements for the development of HostCare, a real-time digital queue management application for healthcare facilities. A descriptive approach was selected because it enables the identification of users' conditions, challenges, and requirements based on data collected through questionnaires. The findings served as the foundation for designing the application's core features, ensuring that the proposed solution aligns with users' actual needs.

Research Procedure

The research was conducted through several sequential stages, beginning with problem identification and concluding with the development of a digital solution. The research procedure consisted of identifying queue management issues in healthcare facilities, conducting a literature review of national and international scientific publications, developing the research instrument in the form of a questionnaire, collecting data through respondent surveys, analyzing the survey results using descriptive statistics, and designing the HostCare application prototype based on the identified user requirements. In addition, the study included business model development and financial feasibility analysis to support the implementation of the proposed solution. (See Figure 1)

Data Collection and Analysis

This study utilized both primary and secondary data. Primary data were collected through an online questionnaire distributed via Google Forms to individuals who had previously accessed healthcare services. Short interviews were also conducted to obtain additional insights into queue management issues and user expectations. Secondary data were obtained from SINTA- and Scopus-indexed scientific journals, books, and other relevant references addressing digital transformation, digital queue management systems, and healthcare services.

The study population consisted of individuals who had previously used healthcare services. A total of ten respondents were selected using the convenience sampling technique, in which participants were chosen based on their accessibility and willingness to participate in the study. The collected data were analyzed using descriptive statistics, including percentages, frequency

tables, and charts, to identify user requirements that served as the basis for developing the HostCare application.

Product Development

The HostCare application was developed using the User-Centered Design (UCD) approach, which places users at the center of every stage of the system development process. This approach was adopted to ensure that the application meets users' needs, characteristics, and experiences, thereby increasing its potential for user acceptance upon implementation.

The development process followed the ISO 9241-210 standard and consisted of the following stages:

1. Understand the Context of Use – identifying user characteristics, the context in which the system will be used, and the challenges encountered in healthcare queue management.
2. Specify User Requirements – defining user requirements based on the survey findings and data analysis.
3. Produce Design Solutions – developing the HostCare application prototype according to the identified user requirements.
4. Evaluate the Design – evaluating the proposed design to ensure that it satisfies user requirements before further system development. (See Figure 2)

2. Business Model Validation

In addition to developing the application prototype, this study also conducted business model validation to evaluate the feasibility of implementing HostCare as a digital healthcare solution. The validation process included identifying user problems, analyzing feature requirements, developing a Business Model Canvas (BMC), conducting competitor analysis, formulating marketing strategies, and performing a financial feasibility analysis. The financial evaluation included Capital Expenditure (CapEx), Operational Expenditure (OpEx), Revenue Model, Break-Even Point (BEP), and Return on Investment (ROI). The results of this validation were used to assess the business sustainability and implementation potential of the HostCare application in healthcare facilities.

RESULT AND DISCUSSION

Respondent Characteristics

Primary data were collected through a questionnaire distributed to ten respondents who had previously used healthcare services. The respondents were selected using the convenience sampling technique, as it was appropriate for the objective of this study, which was to identify user requirements for a digital queue management system. Since all respondents had prior experience with healthcare services, they were able to provide valuable insights into existing

queue management issues and the features expected from the proposed application. (See Figure 3,4,5)

Market Validation Results

The survey results indicate that patient queues remain one of the major challenges in healthcare service delivery. A total of 70% of respondents reported frequently experiencing long waiting queues when visiting healthcare facilities. Furthermore, 60% stated that they had to arrive earlier than their scheduled appointments merely to obtain a queue number, resulting in additional waiting time before receiving medical services. (See Figure 6)

User Requirements Analysis

The survey findings reveal that users expect a digital solution capable of improving the efficiency of the queue management processes. Based on the questionnaire responses, the most requested feature was online queue registration, selected by 90% of respondents. In addition, respondents expressed a strong preference for estimated waiting time and automatic notifications when their turn was approaching, with each feature receiving support from 50% of respondents.

These findings suggest that users' expectations extend beyond simply obtaining a queue number online. They also require convenient access to real-time service information that enables them to better plan their visits. Therefore, these user requirements served as the primary basis for designing the core features of the HostCare application. (See Figure 7)

HostCare Prototype

Based on the identified user requirements, the HostCare application prototype was developed using the User-Centered Design (UCD) approach. The interface design emphasized usability, efficient queue management, and the provision of real-time healthcare service information. The prototype consists of several main interfaces, including the Login, Dashboard, Queue Registration, Queue Status, and User Profile pages. All features were designed based on user requirements identified during the market validation process. (See Figure 8)

Discussion

The findings indicate that users' primary requirements for a digital queue management system include the ability to register for a queue online, access estimated waiting times, and receive automatic notifications before their scheduled appointments. These findings are consistent with those of Jayanto and Fachruddin (2024), who reported that digital queue management systems improve the efficiency of patient registration processes. Similarly, Nainggolan et al. (2025) found that digital healthcare services can reduce patient queues and accelerate service delivery.

The findings also support the study by Bariyah et al. (2025), which demonstrated a positive relationship between optimized queue management systems and patient satisfaction. By providing real-time queue information, users are better able to estimate their arrival time, thereby minimizing unnecessary waiting time at healthcare facilities.

Unlike previous studies, the present research does not merely evaluate the implementation of an existing digital queue management system. Instead, it begins the system development process by conducting a comprehensive user requirements analysis. This approach ensures that the features of the HostCare application are designed based on actual user needs, thereby increasing the likelihood of user acceptance upon implementation. Furthermore, this development strategy is consistent with the principles of the User-Centered Design (UCD) approach, which places users at the center of the system development process.

As part of the digital startup development process, this study also validated the proposed business model by developing a Business Model Canvas (BMC), conducting competitor analysis, formulating marketing strategies, and performing financial feasibility analysis, including Capital Expenditure (CapEx), Operational Expenditure (OpEx), Revenue Model, Break-Even Point (BEP), and Return on Investment (ROI). The analysis indicates that HostCare adopts a Software as a Service (SaaS) business model, with its primary revenue streams derived from subscription fees, implementation (setup) fees, premium features, and digital promotional partnerships with healthcare providers. (See Figure 9)

CONCLUSION

Based on the findings of this study, it can be concluded that patient queue management remains a significant challenge in healthcare services, as reflected in prolonged waiting times and the need for patients to arrive early to obtain a queue number. The user requirements analysis revealed a strong interest in adopting a digital queue management system, with the most desired features including online queue registration, estimated waiting times, and real-time queue notifications. These findings served as the foundation for the development of the HostCare application using the User-Centered Design (UCD) approach.

In addition to producing an application prototype, this study demonstrates that HostCare has the potential to be developed as a digital solution for healthcare facilities, supported by a feasible business model. However, this research is limited to the stages of user requirements analysis and prototype development. Therefore, future research should focus on implementing and evaluating the application in real healthcare settings to assess its effectiveness in improving healthcare service quality.

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FIGURES

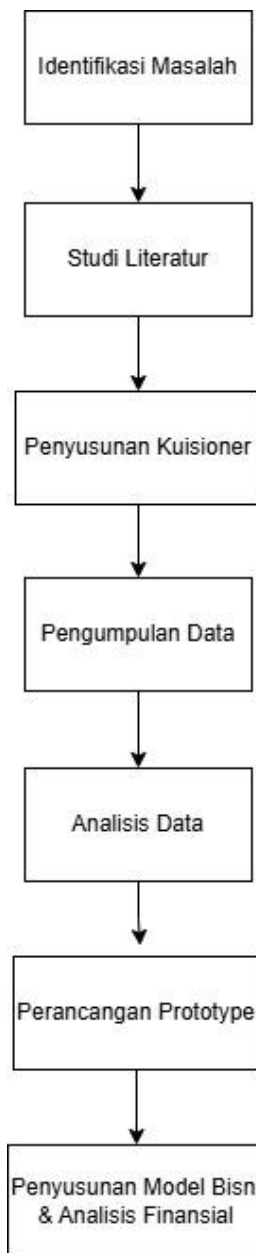


Figure 1. Research Procedure

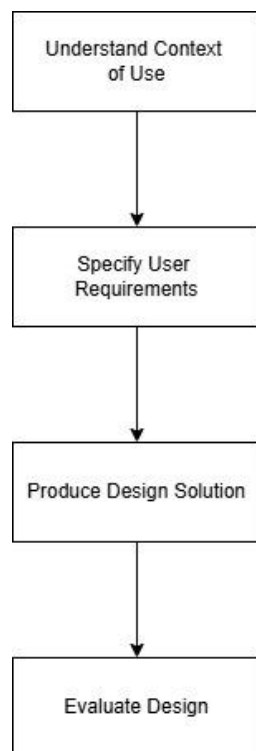


Figure 2. Product Development

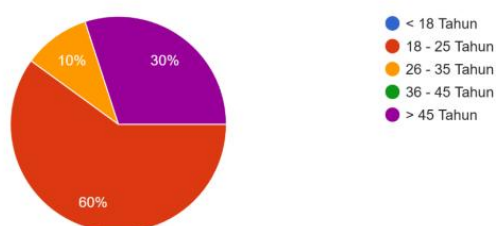


Figure 3. Respondents' Age Distribution

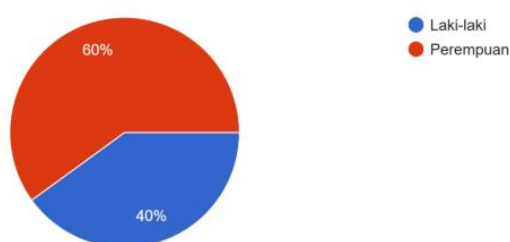


Figure 4. Respondents' Gender Distribution

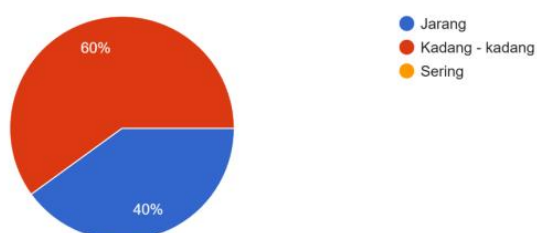


Figure 5. Frequency of Healthcare Facility Visits

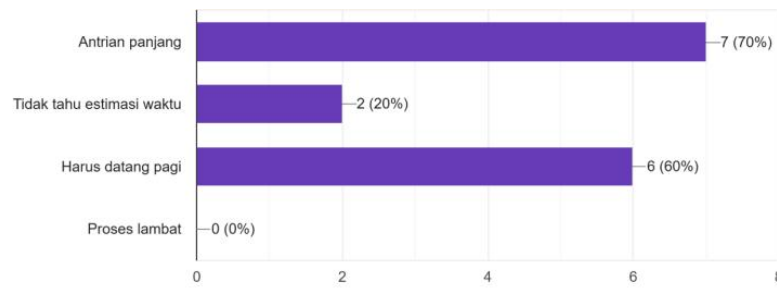


Figure 6. Percentage of Queue-Related Problems

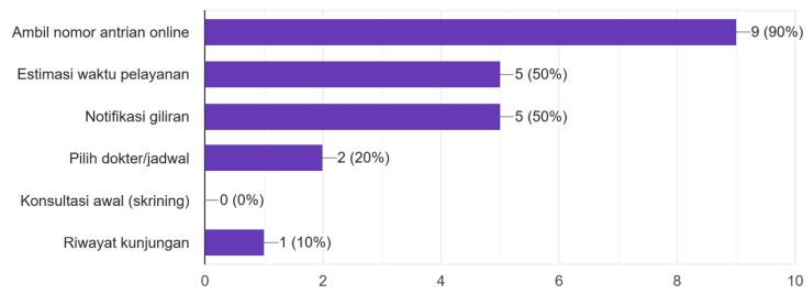


Figure 7. User-Preferred Features

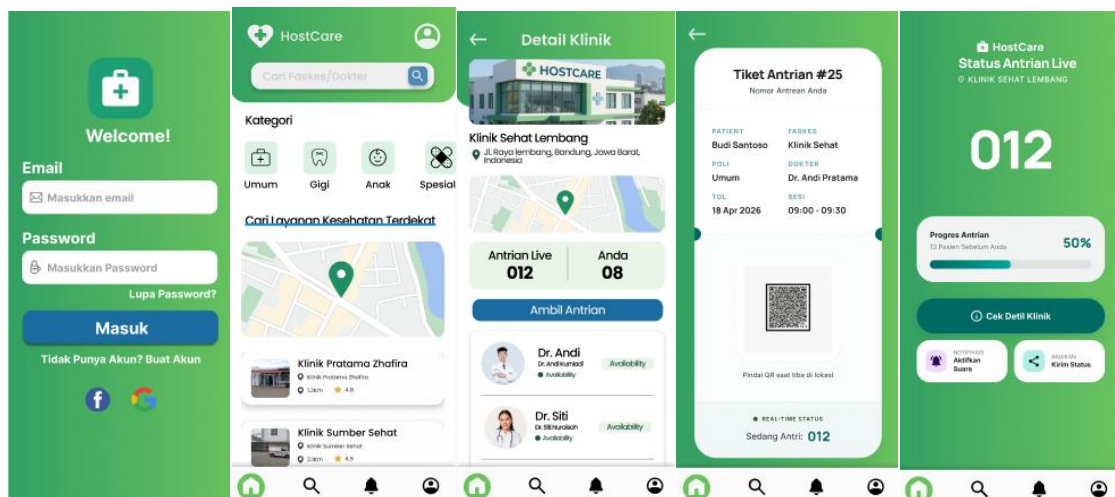


Figure 8. HostCare Application Prototype

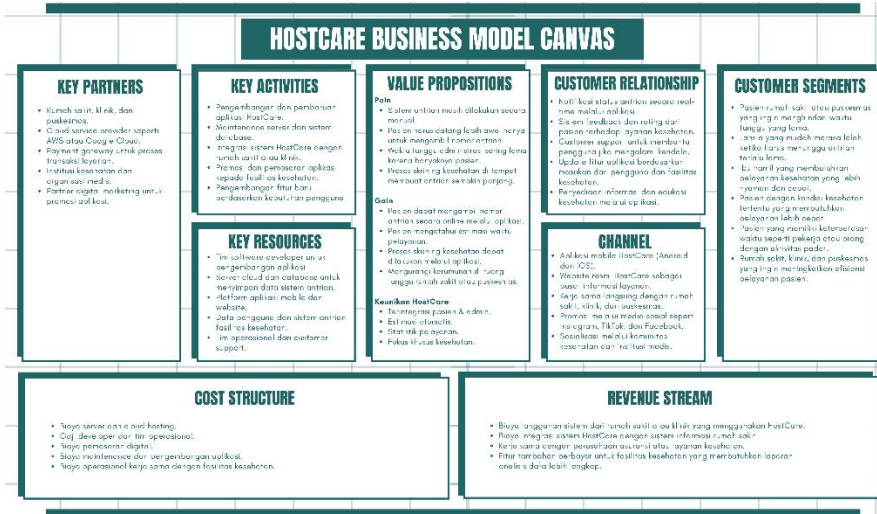


Figure 9. HostCare Business Model Canvas