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Evaluation of Patient Satisfaction with The Whatsapp Business-Based Registration System Using The Servqual Method and Design Thinking Approach at Masija Jaya Clinic

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ABSTRACT

The increasing demand for efficient and patient-centered healthcare services has encouraged healthcare facilities to adopt digital technologies to improve administrative processes, particularly patient registration systems. Manual registration systems often cause long waiting times, inefficient queue management, and decreased patient satisfaction. This study aims to evaluate patient satisfaction with a WhatsApp Business-based patient registration system using the SERVQUAL method and Design Thinking approach at Masija Jaya Clinic. This research employed a mixed-methods approach with applied research design. Data were collected through interviews, direct observation, system trials, and SERVQUAL questionnaires involving 30 patients who experienced both manual and WhatsApp Business-based registration services. Qualitative data were analyzed using the Miles and Huberman model, while quantitative data were analyzed by measuring the gap between patient expectations and perceptions across five SERVQUAL dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. The results indicate that the manual registration system produced negative service quality gaps, with the largest gap occurring in the Responsiveness dimension due to long waiting times and delayed responses. After implementing the WhatsApp Business-based system, all SERVQUAL dimensions showed significant improvements, with gap values approaching zero. The Design Thinking approach successfully supported the development of a user-centered registration system through features such as automated responses, digital queue numbers, and clearer service information. In conclusion, the integration of WhatsApp Business, SERVQUAL, and Design Thinking effectively improves registration efficiency and patient satisfaction. This study recommends further development and broader implementation of digital healthcare registration systems in primary healthcare facilities.

INTRODUCTION

The health sector is a vital part of the public service system that directly affects the quality of life of the community (Aisyah et al., 2025). In practice, health services are not only judged by the speed of medical treatment, but also by the supporting administrative system, including the patient registration process (Rohman & Marsilah, 2022). One of the common problems in primary health care facilities such as clinics is an inefficient, unorderly queue system, and causes long waiting times, which ultimately reduces patient satisfaction (Bidari et al., 2021; Pockros et al., 2021). Masija Jaya Clinic, which is located in Nabire Regency, Papua, is still implementing a manual

registration system at the counter (Enggareti et al., 2022). Under normal conditions, the system runs as it should. However, when the burden of patient visits increases, especially in the morning and early in the week, patient wait times can reach 30–40 minutes (Safdar et al., 2020; Kuiper et al., 2021). An initial survey of 30 patients showed that 40% felt the wait time was too long and 10% said the queue system was disorderly.

The development of information technology has offered many alternative solutions to improve service efficiency, one of which is through the implementation of a WhatsApp Business-based registration system (Harahap & Nasution, 2022). WhatsApp Business is a platform that is commonly used by Indonesians, and it has features such as auto-reply, scheduled messages, service catalogs, and simple integration with the healthcare system (Bariah et al., 2022; Nasution et al., 2020). By leveraging this platform, patients can register remotely (Rohman & Marsilah, 2022), receive queue numbers digitally (Perdana et al., 2019), and reduce the need to show up early just to register.

However, the success of the application of this technology does not only lie in the functionality of the system, but also in the perception of users of the quality of services received. Therefore, this study uses the SERVQUAL (Service Quality) method to evaluate five dimensions of service, namely Tangibles, Reliability, Responsiveness, Assurance, and Empathy (Alemu, 2023; Li et al., 2015; Pakurár et al., 2019; Sugiarto & Octaviana, 2021; Theresia & Bangun, 2017).

In addition, to ensure that the designed solution truly meets the patient's needs and can be implemented with a human-centered approach, a Design Thinking approach is used (Altman et al., 2018). The approach consists of five stages: Empathize, Define, Ideate, Prototype, and Test (Ingram et al., 2022), which iteratively help create innovative, user-oriented solutions (Aflatoony et al., 2021; Steyl et al., 2026). Thus, the designed registration system is not only technically functional, but also intertwined with social and emotional aspects (Cleckley et al., 2021).

Despite the increasing adoption of digital healthcare technologies, technology implementation alone does not guarantee improved service quality. Healthcare providers must evaluate whether digital systems effectively fulfill patient expectations and improve satisfaction. The quality of healthcare services is strongly influenced by users' perceptions regarding reliability, responsiveness, assurance, empathy, and tangible aspects of service delivery. Therefore, systematic evaluation methods are required to measure whether technology-based registration systems provide meaningful improvements compared with conventional systems. The SERVQUAL model developed by Parasuraman, Zeithaml, and Berry has been widely applied to assess service quality by comparing customer expectations and perceptions through five dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy.

Previous studies have demonstrated the importance of evaluating digital healthcare services from the user perspective. Research by Parasuraman et al. established that service quality is determined by the gap between customer expectations and actual perceptions, making SERVQUAL one of the most frequently applied frameworks in service evaluation. Furthermore, Ladhari (2009) emphasized that digital service accessibility contributes significantly to users' perceptions of service speed and convenience. Recent studies in healthcare technology adoption

have also shown that digital registration systems can reduce waiting times, improve communication efficiency, and increase patient satisfaction. However, many previous studies have primarily examined digital healthcare systems in hospitals or large healthcare organizations, while limited attention has been given to small-scale primary healthcare clinics that face resource limitations and different operational challenges.

In addition to service quality measurement, the success of healthcare technology implementation requires a human-centered development approach. Design Thinking has emerged as an effective approach for designing solutions based on users' actual needs and experiences. Through its stages of Empathize, Define, Ideate, Prototype, and Test, Design Thinking enables researchers and organizations to identify user problems, develop appropriate solutions, and evaluate usability before large-scale implementation. Previous research has demonstrated that combining user-centered design approaches with service quality evaluation methods can produce technology solutions that are not only functional but also aligned with user expectations. Nevertheless, limited research has integrated Design Thinking and SERVQUAL simultaneously to evaluate digital patient registration systems in primary healthcare settings.

The specific problem identified in Masija Jaya Clinic demonstrates the importance of addressing digital transformation in local healthcare services. Located in Nabire Regency, Papua, the clinic continues to use a manual registration system at the counter. Although the system operates adequately under normal conditions, increasing patient visits, particularly during morning hours and early weeks, create longer waiting times and ineffective queue management. The clinic's preliminary survey involving 30 patients found that 40% of patients perceived waiting times as excessive, while 10% reported that the queue system was disorderly. These conditions indicate a gap between existing administrative services and patient expectations regarding speed, convenience, and accessibility.

Based on these circumstances, the urgency of this research lies in the need to develop and evaluate practical digital solutions that can improve healthcare service quality, particularly in primary healthcare facilities. Many digital health innovations require significant infrastructure investment, making them difficult to implement in smaller clinics. A WhatsApp Business-based registration system provides an affordable and accessible alternative because it utilizes an existing communication platform familiar to most users. However, empirical evaluation is necessary to determine whether such a system can genuinely improve patient satisfaction and address weaknesses in conventional registration processes. Therefore, this research is important to provide evidence-based recommendations for healthcare providers seeking sustainable digital transformation strategies.

The novelty of this research is reflected in the integration of the SERVQUAL method and Design Thinking approach to evaluate and improve a WhatsApp Business-based patient registration system at a primary healthcare clinic. Unlike previous studies that commonly focus either on measuring service quality or developing digital solutions separately, this study combines both perspectives by identifying patient needs, designing a technology-based solution, implementing a prototype, and measuring service improvements through patient perceptions and

expectations. The research investigates not only whether the system functions technically but also whether it creates better service experiences through responsiveness, reliability, assurance, empathy, and tangible service improvements.

Therefore, this study aims to evaluate patient satisfaction with the WhatsApp Business-based registration system at Masija Jaya Clinic by applying the SERVQUAL method and Design Thinking approach. Specifically, this research aims to identify weaknesses in the existing manual registration system, design a patient-centered digital registration solution, measure changes in service quality after implementation, and identify challenges for future system development. The contribution of this research is expected to provide practical insights for healthcare managers, particularly primary healthcare clinics, in adopting affordable digital technologies that improve administrative efficiency and patient experience. Furthermore, this study contributes academically by expanding discussions on digital healthcare transformation through the integration of service quality evaluation and human-centered innovation approaches. The findings are expected to serve as a reference for future researchers and healthcare institutions in developing sustainable, responsive, and patient-oriented digital service systems.

METHOD

Approaches and Types of Research

This study used a mixed methods approach (combination of qualitative and quantitative), with the aim of designing and evaluating a WhatsApp Business-based patient registration system at Masija Jaya Clinic. The type of research used is applied research, with a Design Thinking approach to designing solutions and the SERVQUAL method as a user satisfaction evaluation tool.

Research Location and Time

This research was carried out at the Masija Jaya Clinic, located in Jl.CH Marthatiahau, Kalibobo Village, Nabire-Papua Regency, during the period from February to May 2025. This clinic was chosen because it still uses a manual registration system and has a high rate of patient visits, making it suitable for the implementation of communication technology-based systems.

Subjects and Objects of Research

- Research Subject:

Patients who use the registration service at the Masija Jaya Clinic, either manually or through the WhatsApp Business system are tested.

- Object of Research:

Patient registration system and its impact on service efficiency and patient satisfaction.

Population and Research Sample

- Population: all patients who registered at Masija Jaya Clinic during the study period.
- The research sample was determined through *the purposive sampling technique*, namely patients who had previously used manual registration and were willing to try the service through WhatsApp Business. The minimum number of samples is set at 30 respondents in accordance with the rules of quantitative research. (Roscoe, 1975) provides guidelines for determining the number of samples as follows: It is recommended that the sample size be

between thirty to five hundred elements. If the sample is broken down again into sub-samples, the minimum number of subsamples should be thirty

Data Collection Techniques

Data is collected through the following techniques:

- **Interview**:

The *Empathize stage* is carried out to explore the needs and experiences of patients and registration officers

- **Direct Observation**:

Used to manually view the registration process flow and compare it to the new system.

- **SERVQUAL Questionnaire**:

It was used at the evaluation stage to measure patients' perceptions and expectations of services based on the five dimensions of SERVQUAL (Tangibles, Reliability, Responsiveness, Assurance, and Empathy).

- **System Trials (Prototype and Test):**

Prototypes of the WhatsApp Business system were tested on a limited number of patients, accompanied by the collection of feedback.

Stages of Research Using Design Thinking

This research follows five stages of Design Thinking:

1. EmpathizeInterviews with patients and staff to identify challenges and needs related to the enrollment process.
2. DefineSynthesize empathy results to formulate key issues, such as: "Patients feel stressed due to long queues and unclear service information."
3. IdeateBrainstorming solutions, and finally chose a WhatsApp Business-based registration system because it is easily accessible and cost-effective.
4. Prototype The creation of the WhatsApp Business system uses the auto-reply, quick replies, and patient label features. Prototypes are tested on a limited basis.
5. TestPatients were asked to try out the new system, then provide evaluations through questionnaires and short interviews.

Data Analysis Techniques

- **Qualitative data** from interviews and observations were analyzed by **data reduction**, **data presentation**, and **conclusion drawing** methods based on the Miles & Huberman model.
- **Quantitative data** from the SERVQUAL questionnaire were analyzed by:

$$Gap = P - E$$

Calculating the **score gap** between the patient's expected (E) and perception (P) scores:

1. A negative score indicates a service that does not meet the patient's expectations, while a positive score indicates that the service exceeds expectations.
2. The gap data from each dimension was averaged to determine the dimensions that had the most effect on patient satisfaction.

Validity and Reliability

- Content Validity is maintained by adapting the SERVQUAL questionnaire from validated literature.
- Reliability was tested using Cronbach's Alpha to ensure the consistency of respondents' responses to the questionnaire.

Research Ethics

This research pays attention to ethical aspects, including:

- Maintain the confidentiality of the patient's identity.
- Use data for academic purposes only.
- Involves voluntary participation with informed consent from the study participants.

RESULTS AND DISCUSSION

Respondent Overview

This study involved 30 patients of Masija Jaya Clinic who used two registration methods, namely manual registration at the counter and WhatsApp Business-based registration. Demographic data of respondents are presented in Table 1.

Table 1 Respondent Demographic Data

Characteristics	Categories	Quantity (n)	Percentage (%)
Gender	Male	12	40%
	Women	18	60%
Age	< 20 years old	4	13%
	20–29 years old	10	33%
	30–39 years old	8	27%
	≥ 40 years old	8	27%
Frequency of Visits	First time	5	17%
	2–5 times	12	40%
	> 5 times	13	43%
Total Respondents	All categories	30	100%

This data shows that the majority of respondents are women (60%) and most are in the productive age range (20–39 years). Most respondents have used the service more than once, so they have experience comparing the quality of registrations on the two methods tested.

Service Quality Measurement Results (SERVQUAL Method)

In the SERVQUAL analysis, *the gap value* was obtained from the difference between the patient's perception (P) and expectations (E). If the gap value is negative, it means that the service received by the patient is still below expectations, so the quality of service is considered unsatisfactory. On the other hand, if the gap value is close to zero or even positive, then it shows that the service is appropriate and even exceeds the patient's expectations. Thus, the smaller the gap value, the better the quality of service that the patient feels.

In the results of this study, it can be seen that the manual registration system produces negative gaps in all dimensions, indicating a discrepancy between expectations and service reality. Meanwhile, in the WhatsApp Business registration system, the gap in all dimensions is much smaller, indicating a significant improvement in quality and service that is closer to patient expectations. The *Responsiveness* dimension has the largest gap in the manual system. This is due to the long waiting time, the delay of officers in responding to patient questions, and queues that accumulate, especially during morning rush hour. These factors make the speed of service far from the patient's expectations, resulting in the largest gap compared to other dimensions.

Manual Registration System

Based on the SERVQUAL questionnaire, the average values of expectations (E), perceptions (P), and gaps (P–E) for manual registration are as follows:

Table 2. SERVQUAL questionnaire results data, average values of expectations (E), perception (P), and gap (P–E) for manual registration

Dimensions	Expectations (E)	Perception (P)	Gap (P–E)
Tangible	4,50	4,10	-0,40
Reliability	4,60	4,20	-0,40
Responsiveness	4,55	4,00	-0,55
Insurance	4,50	4,30	-0,20
Empathy	4,55	4,15	-0,40

Interpretation: Negative gaps in all dimensions indicate that manual services have not fully met patient expectations. The largest gap is found in Responsiveness (-0.55) which indicates a delay in responding to patient requests, especially during morning rush hour.

WhatsApp Business Registration System

After the implementation of WhatsApp Business-based registration, the measurement was carried out again.

Table 3. SERVQUAL questionnaire result data, average values of expectations (E), perception (P), and gap (P–E) for WhatsApp Business registration

Dimensions	Expectations (E)	Perception (P)	Gap (P–E)
Tangible	4,50	4,45	-0,05
Reliability	4,60	4,55	-0,05
Responsiveness	4,55	4,50	-0,05
Insurance	4,50	4,48	-0,02
Empathy	4,55	4,50	-0,05

Interpretation: All dimensions have undergone significant improvements. Very small gaps (-0.02 to -0.05) indicate that the service is almost entirely in line with the patient's expectations.

Comparison of the Two Systems

Table 4. Comparison Results Data of the two systems (manual registration system and WhatsApp Business)

Dimensions	Gap Manual	Gap WhatsApp	Repairs
Tangible	-0,40	-0,05	+0,35
Reliability	-0,40	-0,05	+0,35
Responsiveness	-0,55	-0,05	+0,50
Insurance	-0,20	-0,02	+0,18
Empathy	-0,40	-0,05	+0,35

Analysis: The Responsiveness dimension saw the largest increase (+0.50), indicating that using WhatsApp Business significantly speeds up the sign-up process and reduces wait times. Other dimensions such as Tangibles, Reliability, and Empathy have also improved due to the clear design of digital service interfaces and ease of access to information.

Comparison Graph of SERVQUAL Gap Manual System and WhatsApp Business

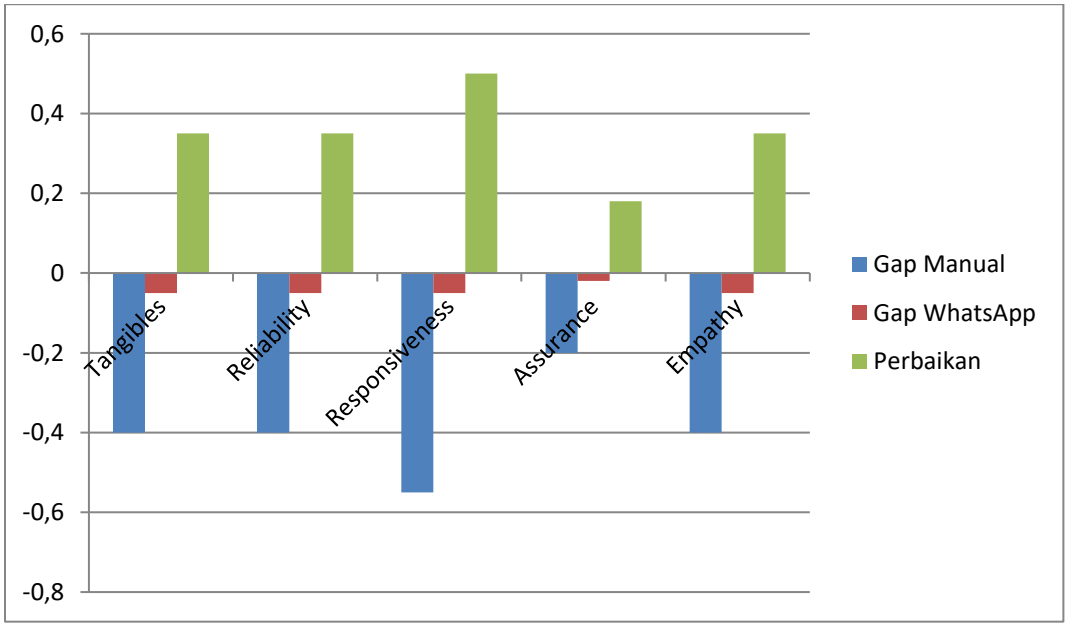

Figure 1. Graph showing the comparison of the SERVQUAL gap between the manual registration system, the WhatsApp Business-based registration system

- Blue bars → GAP Manual (all negatives).
- The red bar → WhatsApp GAP (close to zero).
- Green bar → Fix (manual GAP difference – WhatsApp).

Figure 1 shows the comparison of the SERVQUAL gap between the manual registration system, the WhatsApp Business-based registration system, and the magnitude of the improvement in each dimension of service quality.

1. The blue bar (Gap Manual) shows that across all dimensions, *the gap* value is negative, which means that the patient's perception is still below their expectations when using the manual system. The largest gap is found in the Responsiveness dimension (-0.55) which indicates low speed and responsiveness of service.
2. The red bar (WhatsApp Business Gap) shows that after the implementation of the WhatsApp Business-based registration system, the *gap value* became much smaller (-0.02 to -0.05), indicating that the patient's perception was very close to expectations.
3. The green bar (Improvement) depicts the magnitude of the improvement in service quality. The biggest improvement occurred in the Responsiveness dimension (+0.50) due to remote registration, auto-reply features, and automatic queue number delivery that reduced wait times. The Tangibles, Reliability, and Empathy dimensions each increased by +0.35, while the Assurance dimension experienced the smallest increase (+0.18) because from the beginning the level of patient trust in the officer's competence was quite high.

Overall, this graph shows that the implementation of the WhatsApp Business-based registration system has a positive impact on all dimensions of service quality, especially in terms of service speed and responsiveness.

Results of Design Thinking Stages

Empathize

Through interviews and open-ended questionnaires, problems with the manual system were found:

1. Long wait times, especially during morning rush hour.
2. The doctor's schedule information is unclear.
3. Elderly patients have difficulty filling out the registration form.
4. The queue is irregular when the number of patients is large.

Define

Key issues identified:

"Patients feel uncomfortable with the manual registration system because of long wait times, unclear information, and a lack of orderly registration flows."

Ideate

Proposed solution:

- Remote registration using WhatsApp Business.
- Digitally send queue numbers.
- Automatic addition of doctor schedule information through the system.

Prototype

The WhatsApp Business prototype was developed with:

- Auto-reply for registration.
- Quick reply for service choices.
- Automatic queue number delivery.

Test

Testing on 30 patients yielded:

- 90% of patients stated that the process was faster.
- 85% of patients stated that the information was clearer.
- Wait times are reduced by an average of 20–30 minutes.

The results of the study prove that the implementation of a WhatsApp Business-based registration system improves the quality of service in all dimensions of SERVQUAL. This finding is in line with the concept of Parasuraman, Zeithaml, and Berry (1988) that the conformity between expectations and perception is the main indicator of service quality.

The most significant improvement occurred in Responsiveness, which is the dimension of speed and accuracy of service. This is in line with the findings of Ladhari (2009) who stated that the ease of access to digital services has a positive effect on the perception of service speed.

The Design Thinking approach ensures that the resulting solution is truly user-centered. The automated queue number feature and doctor schedule information via WhatsApp has been proven to reduce patient uncertainty and increase satisfaction.

Thus, the integration of SERVQUAL and Design Thinking methods in this study shows that technology-based innovations not only improve efficiency, but also improve the overall patient experience.

CONCLUSION

The implementation of the WhatsApp Business-based patient registration system at Masija Jaya Clinic demonstrates that digital transformation can improve healthcare service quality and patient satisfaction. Based on the SERVQUAL evaluation, the manual registration system showed negative gaps across all service dimensions, indicating that patient expectations were not fully met, particularly in the responsiveness dimension due to long waiting times and delayed service responses. After implementing the WhatsApp Business-based registration system, the service quality gaps decreased significantly across all dimensions, with improvements observed in Tangibles, Reliability, Responsiveness, Assurance, and Empathy. The greatest improvement occurred in the Responsiveness dimension, indicating that digital registration through automated responses, remote registration access, and digital queue number delivery effectively reduced

waiting times and improved service speed. Furthermore, the Design Thinking approach successfully supported the development of a user-centered solution by identifying patient needs, designing appropriate features, and testing system usability. Therefore, the integration of SERVQUAL and Design Thinking provides an effective framework for evaluating and improving technology-based healthcare services, particularly in primary healthcare facilities with limited resources. Future research is recommended to expand the scope of evaluation by involving a larger number of respondents and multiple healthcare facilities to improve the generalizability of findings. Further studies may also conduct longitudinal evaluations to examine the sustainability of digital registration system implementation and its long-term impact on patient satisfaction, service efficiency, and healthcare provider performance. In addition, future researchers can explore the integration of WhatsApp Business-based systems with other healthcare information systems, such as electronic medical records, online appointment scheduling, or payment platforms, to create a more comprehensive digital healthcare ecosystem. Comparative studies between different digital healthcare platforms may also provide deeper insights into the most effective technologies for improving patient-centered services.

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