



## Building patient loyalty in the use of telemedicine applications

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### ABSTRACT

This study aims to analyze the influence of brand image and e-service quality on patient loyalty through patient satisfaction and trust in telemedicine applications. The research utilized a quantitative approach with data collected through online questionnaires distributed to patients in Jakarta who have used telemedicine services. The sample consisted of 202 respondents, and the data were analyzed using Structural Equation Modeling (SEM) via SMART PLS. The results reveal that both brand image and e-service quality significantly impact patient satisfaction, which in turn influences patient trust and loyalty. Additionally, the study confirms that patient trust mediates the relationship between patient satisfaction and loyalty. These findings emphasize the importance of improving service quality and maintaining a positive brand image to enhance patient loyalty in telemedicine platforms. The study suggests that healthcare organizations should focus on optimizing e-service quality, strengthening brand reputation, and ensuring patient satisfaction to foster long-term loyalty in the growing telemedicine sector.

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## 1. INTRODUCTION

Progress in technology information and digitalization has brought change big in various sectors, including sector health. Progress and innovation the become *e-Health*, which enables user For share as well as look for information latest, do consultation distance Far with doctors, including in *e-prescribing*, and exchanging notes medical patient, become booster main digital transformation in the Healthcare industry (Tuckson et al., 2017). One of the increasing innovation develop is service *telemedicine*, which allows patient For consult with power medical through digital platforms without must come direct to House Sick.

*Telemedicine* is the use of information and communication technology to provide and support health services, even though there is a distance between the provider and recipient of the service. (Sengupta et al., 2024). *Telemedicine* give various benefit for doctors and patients, such as reduce time and cost travel, expand access to specialist

clinical, facilitating exchange notes medical in a way more efficient, and press cost operational Health facilities (Butzner & Cuffee, 2021).

Development *Telemedicine* in Indonesia has increased significantly, with a 154% growth in the number of remote consultations in the first quarter of 2020 compared to the same period in 2019. (Koonin et al., 2020). The pandemic has been a catalyst for accelerating the adoption of this technology. However, amidst this rapid growth, there are a number of challenges that need to be overcome to ensure the sustainability of *telemedicine use*, one of which is consumer trust in the services offered. With existence limitations Where growth No evenly distributed, access limited in the area rural areas and inequality digital infrastructure creates gap new in system health (Mohan & Kumar, 2019).

In Indonesia, *telemedicine* has begun to be adopted by various health service providers, both large hospitals and small clinics. Through Minister of Health Regulation Number 20 years The Ministry of Health has issued regulations that support the implementation of *telemedicine*, including granting permits for *telemedicine platforms* and practical guidance for medical personnel in utilizing this technology. (Regulation of the Minister of Health of the Republic of Indonesia, 2019). *Telemedicine* has proven itself as an effective solution in improving access and quality of health services. Where during the COVID-19 pandemic, *telemedicine* give strong influence in give teleconsultation clinical, providing a number of article about Health, as well as to give information about medicines. Therefore that, development *telemedicine* during COVID -19 makes point criticism for *telemedicine* For increase penetration to society as well as speed up adoption its use worldwide (Alviani et al., 2023).

Digital infrastructure between urban and rural areas can be assessed as a structural factor that limits the penetration of patient loyalty to telemedicine services through a multidimensional approach, such as the availability of internet network analysis, access to technological devices, and community digital literacy. In rural areas, infrastructure limitations such as low internet speed, minimal smartphone ownership, and lack of technological understanding cause telemedicine services to be suboptimal, reducing user experience (Mohan & Kumar, 2019). This has an impact on low patient satisfaction (Aily et al., 2024) and trust in the platform, which directly affects loyalty (Ajmal et al., 2022). Studies show that guarantees of accessing consistent and responsive services due to technical constraints create a perception of unreliability, so that patients tend to return to conventional health services (Koonin et al., 2020). In addition, this inequality widens the health gap, where rural communities are increasingly marginalized from digital transformation, so the assessment must include socio-economic impacts and policy recommendations for equalizing infrastructure and technology education to build an inclusive and sustainable telemedicine ecosystem.

In its role, the hospital must maintain the quality of electronic services (*e-service quality*) according to medical standards so that *telemedicine services* remain safe and comfortable for patients. (Regulation of the Minister of Health of the Republic of Indonesia, 2020). In addition, hospitals need to strengthen a credible *brand image to ensure trust and loyalty patient*. Good virtual service quality or E-service quality can enhance patient satisfaction, as emphasized by Sudjatmoko et al. (2023), who state that the implementation of telemedicine, particularly in terms of E-service quality, requires technology or media that is easily accessible to everyone. Brand image is also one of the reason important patient Now use application telemedicine. Image is very important For telemedicine Because is tool important For influence credibility from use application This (Thirachaikul & Kortana, 2023). Build good image can give profit for telemedicine, in particular from side patient. When a application telemedicine has good reputation and good reviews from patient previously, then can give satisfaction to patient For use application telemedicine (Ajmal et al., 2022).

Patient satisfaction refers to how content a patient feels with the healthcare services provided, including comfort, convenience, and cost-effectiveness (Pogorzelska & Chlabicz, 2022). In the context of telemedicine, this satisfaction becomes even more crucial, as it directly influences the acceptance and future implementation of telemedicine services.

A key factor in patient satisfaction is trust, which is built through consistent service quality, a positive brand image, and overall satisfying experiences. This trust, however, operates uniquely in telemedicine, as it is often influenced by the relationship between the patient and the healthcare provider or organization (Velsen et al., 2016). Patient loyalty is a very important thing for every telemedicine platform (Tiara & Antonio, 2022). Loyal patients generally own strong belief to the applications they use and feel satisfied with services provided. Loyalty also creates connection term profitable length between provider services and patients, as well as become key success in maintain market share in industry telemedicine is increasingly competitive. The more tall trust from patients to telemedicine platforms so the more high trust too from the patient (Tiara & Antonio, 2022).

The aforementioned statement has been supported by prior research. For instance, studies have demonstrated a positive relationship between e-service quality and patient satisfaction (Aini & Adlina, 2023; Ajmal et al., 2022; Sukawati, 2021). Similarly, the link between brand image and patient satisfaction has been examined *satisfaction* (Ajmal et al., 2022; Durmuş & Akbolat, 2020; Sukawati, 2021). Previous research has also explored the relationship between patient satisfaction and patient trust (Listyorini et al., 2021; Liu et al., 2021; Sofia, 2023), as well as the connection between patient trust and patient loyalty (Aladwan et al., 2023; Liu et al., 2021; Sofia, 2023). Additionally, studies have investigated the relationship between e-service quality and patient loyalty (Ajmal et al., 2022; Indayani et al., 2022; Listyorini et al., 2021; Syahril et al., 2022) and between brand image and patient loyalty (Aily et al., 2024; Ajmal et al., 2022; Listyorini et al., 2021). Furthermore, patient trust has been identified as a mediator between patient satisfaction and patient loyalty (Ajmal et al., 2022).

However, research gaps remain in several areas requiring further exploration. First, although prior studies have examined the relationship between e-service quality and patient loyalty, few have specifically investigated the mediating roles of patient satisfaction and trust in this relationship, particularly within Indonesia's telemedicine industry. Second, previous studies often treat constructs as static and overlook the complexity of consumer behavior in response to digital innovations, such as misdiagnosis issues in telemedicine. Finally, much of the existing research focuses on developed countries, prompting the need to investigate this context in Indonesia a developing nation with a specific emphasis on Jakarta.

Therefore, this study aims to analyze the influence of e-service quality and brand image on patient satisfaction in Indonesia's telemedicine sector, as well as examine the mediating role of patient trust between satisfaction and patient loyalty. By mapping these variable relationships, the research is expected to provide strategic recommendations for telemedicine providers, governments, and healthcare professionals to enhance service quality, build credible brand images, and strengthen patient loyalty through trust-based approaches.

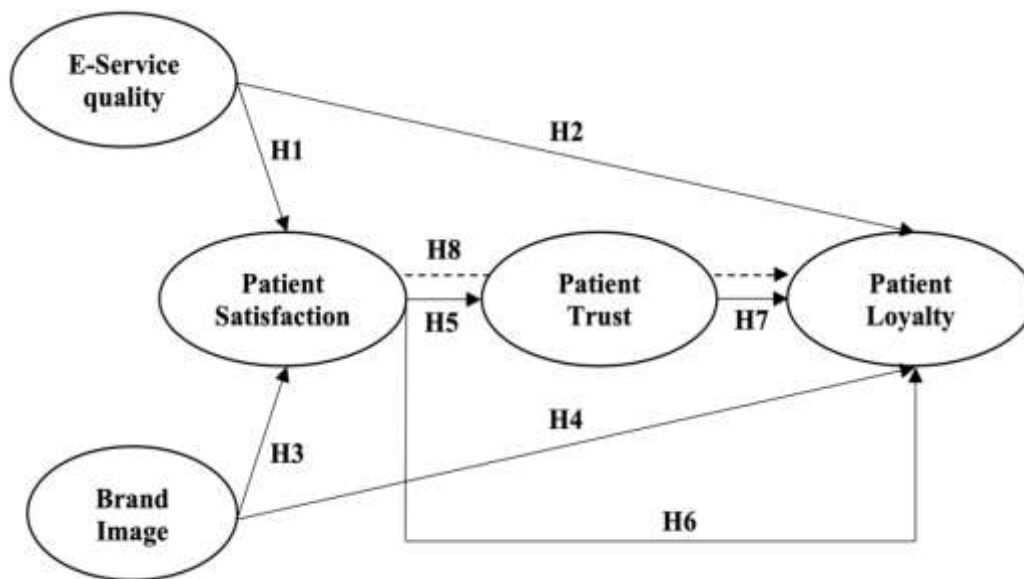
## 2. RESEARCH METHOD

This study was conducted by distributing questionnaires through online forms to patients in hospitals. The research method used a quantitative approach and the sampling technique used the probability method. The collection of this questionnaire will be carried out from October to November 2024. This study there are Exogenous, Endogenous, and Mediating variables. The Exogenous variables used in this study are

Electronic Service Quality and Brand Image. The endogenous variables used in this study are Patient Satisfaction, Patient Trust, and Patient Loyalty. And finally, the mediating variable used in this study is only one, namely Patient Trust. The measurements used for Exogenous variables, endogenous variables, and mediating variables use a Likert scale from 1 (strongly disagree) to 5 (strongly agree)

The indicators used are derived from previous research with modifications. The brand image variable is adopted from Carrol & Ahuvia (2006) and Sofia (2023) with 4 questions. The E-Service Quality variable is adopted from Dayani et al. (2022) with 8 questions. The patient satisfaction variable has 5 questions adopted from Dayani et al. and Sofia (2023). The patient trust variable has 5 questions adopted from Sofia (2023). Lastly, the patient loyalty variable is adopted from Sofia (2023) with 5 questions. The Likert scale is used to measure the values or attitudes given by respondents to a question. The number of questions or questionnaires used in this study was 28 questions.

Based on the elucidation provided in the introduction, which delineates the theoretical framework and prior research pertinent to this investigation, the researcher has established a research framework and corresponding hypothesis as outlined below:



Hypothesis:

H1: E-service quality has an influence on Patient satisfaction in telemedicine.

H2: E-service quality influences Patient loyalty in telemedicine.

H3: Brand image influences patient satisfaction in telemedicine.

H4: Brand image has an impact on patient loyalty in telemedicine.

H5: Patient satisfaction influences patient trust in telemedicine.

H6: Patient satisfaction influences patient loyalty in telemedicine.

H7: Patient trust influences patient loyalty in telemedicine.

H8: Patient trust mediates the relationship between patient satisfaction and patient loyalty in telemedicine.

### 3. RESULTS AND DISCUSSIONS

Based on from results questionnaires that have been distributed to respondents, found questionnaire that is filled out questionnaire as many as 202 respondents came from

from Jakarta. Characteristics respondents who filled in questionnaire consists of from domicile patient, type gender, age, education Lastly, the patient originate from House sick and ever use maintenance through telemedicine. Domicile that fills questionnaire most patient originate from South Jakarta as many as 85 respondents patient with presentation by 42.1% and followed by patients originate from West Jakarta as many as 59 respondents (29.2%). Then the majority who fill in Respondent is various sex Woman with presentation as much as 55.9 % , namely 113 respondents and men as many as 89 respondents (44.1%). The majority of those who filled in Respondent aged 30 – 35 years with 134 respondents 66.3% or 134 respondents . Then majority second filled in by respondents who have age 24 – 29 years as many as 61 respondents with presentation by 30.2%. The rest respondents who filled in own age over 35 years old as many as 5 respondents and aged 18 – 23 years as many as 2 respondents. The respondents who filled it out were also mostly respondents who had education final study at undergraduate level or S1 as much as 87.1% or as many as 176 respondents. Then followed by respondents who have education last high school or vocational school with percentage 12.4% or a total of 25 respondents. All respondents who completed the questionnaire were hospital telemedicine users.

Allowing identification priority in allocation source power to be able to give more optimal service to customers (Hair et al., 2019). SEM testing in study This use SMART PLS 4.0 application with total samples used as many as 202 respondents have collected previously. Requirements use SMART PLS application mark from *Loading* factor used must above 0.7 (Hair et al., 2019) . Prior to evaluating the model, the validity and reliability of the measurement tools are assessed through statistical analyses. This involves examining loading factors, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) to ensure the constructs are robust. Their research emphasizes that loadings above 0.7 ensure a construct accounts for over 50% of an indicator's variance, solidifying item reliability. Additionally, the criteria for internal consistency (Cronbach's alpha  $\geq 0.7$ ), composite reliability (CR  $\geq 0.6$ ), and convergent validity (AVE  $\geq 0.5$ ) are satisfied, further validating the constructs' reliability for analysis. The results of the data *loading Factor*.

Table 1. Loading Factor.

	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
BI		0.808	0.874	0.634
BI1	0.811			
BI2	0.772			
BI3	0.780			
BI4	0.821			
ESQ		0.930	0.943	0.673
ESQ1	0.828			
ESQ2	0.881			
ESQ3	0.819			
ESQ4	0.837			
ESQ5	0.861			
ESQ6	0.814			
ESQ7	0.789			
ESQ8	0.727			
PL		0.884	0.915	0.684
PL1	0.848			
PL2	0.849			
PL3	0.839			
PL4	0.837			
PL5	0.758			
PS		0.921	0.938	0.717
PS1	0.891			
PS2	0.844			

PS3	0.888			
PS4	0.883			
PS5	0.846			
PS6	0.715			
PT		0.859	0.898	0.640
PT1	0.828			
PT2	0.848			
PT3	0.755			
PT4	0.838			
PT5	0.723			

Validity discriminant aiming For ensure that every construct in the SEM model is really separate and measure different aspects One each other. The Fornell-Larcker method is used For test validity discriminant in the Structural Equation Modeling (SEM) model. According to Hair et al. (2021), the validity discriminant fulfilled if root square AVE value for every construct more tall than correlation between construct the with construct others . This is show that the construct described own specific and non-specific measurements overlap overlap with other constructs in the model, so increase validity the overall model used . The results of the Fornell Larcker test can seen in Table 2. Fornell Larcker.

Table 2. Fornell Larcker

Variables	Brand Image	E-Service Quality	Patient Loyalty	Patient satisfaction	Patient Trust
Brand Image	0.796				
E-Service Quality	0.211	0.821			
Patient Loyalty	0.643	0.531	0.827		
Patient Satisfaction	0.410	0.418	0.536	0.847	
Patient Trust	0.425	0.523	0.609	0.461	0.800

Based on from results , when AVE value derived from from Table 4.3 Average Variance Extracted squared No exceed results from Table 2. Fornerll Larcker. Therefore That all the construction used fulfil criteria validity. Indicator This functioning For evaluate ability prediction from the model built (Hair et al., 2019). The test results can seen in Figure 2 path coefficient diagram and Table 3. Bootstrapping and Hypothesis Results under this :

Table 3. Bootstrapping and Hypothesis Result

Variables	Direct Effect		Indirect Effect		Information
	P-Value	T-Value	P-Value	T-Value	
H1: ESQ -> PS	4,879	0,000			Supported
H2: BI -> PS	4,346	0,000	-	-	Supported
H3: PS -> PT	7,310	0,000	-	-	Supported
H4: PT -> P L	2,478	0.0 13	-	-	Supported
H5: PS -> PL	2,030	0.0 42	-	-	Supported
H6: ESQ -> PL	3,391	0.001	-	-	Supported
H7: BI -> P L	6,009	0,000	-	-	Supported
H8: PS -> PT -> PL	-	-	2,193	0,028	Supported

Note : Brand Image (BI), E-Service Quality (ESQ), Patient Satisfaction (PS), Patient Trust (PT), and Patient Loyalty (PL)

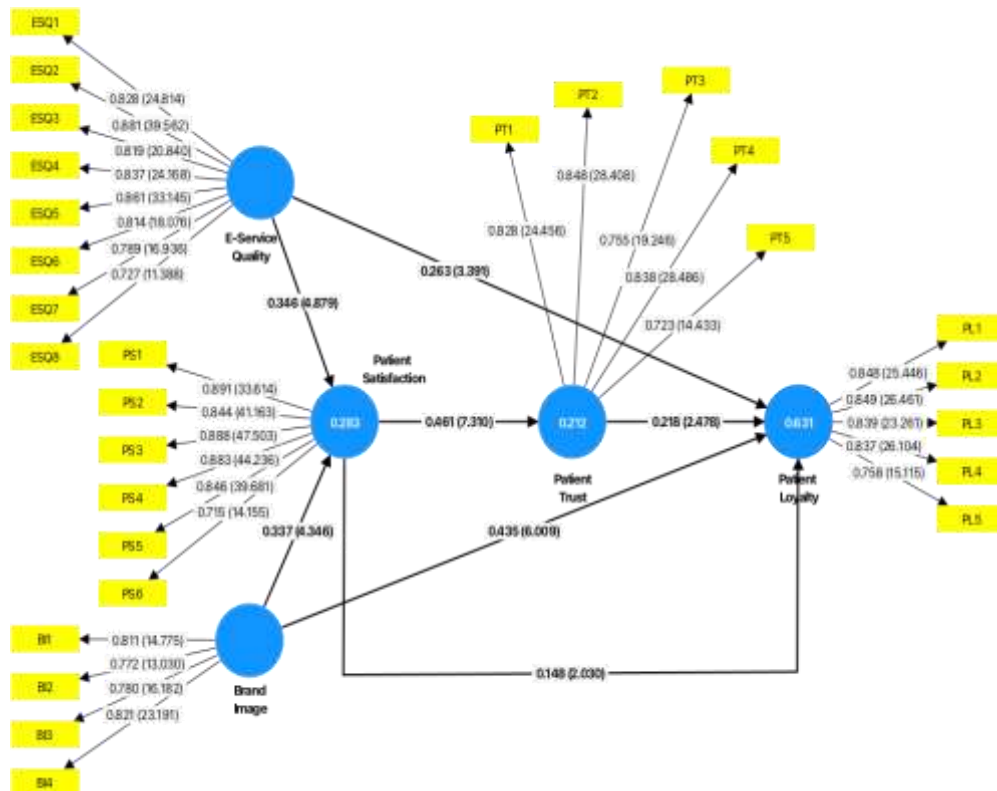


Figure 2. Outputs of PLS

Based on from results bootstrapping testing that has been done done that every hypothesis have original sample of value positive . Where the value positive This show influence from variable to other variables have an effect positive . This is in accordance with all the hypothesis that made . Then all hypothesis can accepted all with see mark from T-Value on all hypothesis on value 1.96 and while P- Value is under value 0.05. Special Hypothesis 8, researcher conclude that mediation that occurred from *patient trust* mediates connection between *patient satisfaction* with *patient loyalty* in *telemedicine*, researchers conclude that happen mediation partial. This is proven from results testing Hypothesis 5 which proves that *patient satisfaction* provides influence positive to *patient loyalty*. Therefore That without existence mediation, *patient satisfaction* has been capable give influence to *patient trust*.

This study highlights the positive impact of e-service quality on patient satisfaction, facilitated by seamless telemedicine app functionality that minimizes technical disruptions, allowing patients to focus on core services like doctor interactions. Effective and professional care through the app enhances satisfaction (Aily et al., 2024; Ajmal et al., 2022; Sudjatmoko et al., 2023; Sukawati, 2021). A strong brand image fosters trust and high service expectations, contributing to emotional comfort and satisfaction by aligning cognitive and affective patient (Aily et al., 2024; Ajmal et al., 2022; Sudjatmoko et al., 2023; Sukawati, 2021). Patient satisfaction directly strengthens trust, particularly when accurate diagnoses and effective communication meet patient needs, reinforcing perceived app reliability (Durmuş & Akbolat, 2020; Listyorini et al., 2021; Liu et al., 2021). Trust, in turn, drives patient loyalty, as confidence in doctors' commitment creates a sense of security in the app's medical efficacy (Aladwan et al., 2023; Liu et al., 2021; Sumaedi et al., 2015). Satisfaction also directly influences loyalty, with trust acting as a mediator. Positive experiences, such as responsive and accurate

care, encourage continued app use (Aily et al., 2024; Ajmal et al., 2022; Liu et al., 2021). Additionally, e-service quality evidenced by timely, high-quality responses directly boosts loyalty (Indayani et al., 2022; Listyorini et al., 2021; Syahril et al., 2022). Finally, a positive brand image, reinforced by excellent service, enhances loyalty and trust, underscoring the interconnected roles of satisfaction, trust, and brand perception in sustaining patient engagement (Listyorini et al., 2021; Sofia, 2023).

#### 4. CONCLUSION

E-service quality and brand image proven own influence significant direct to patient loyalty on the application telemedicine. Superior e-service quality, such as convenience access, speed, and reliability services, as well as positive brand image, encouraging patient For still loyal use application This is show that good experience and perception positive to brand become factor main in build patient loyalty in a way direct. To operationalize this, technical features like intuitive user interfaces (to enhance convenience), robust data security (to reinforce brand trustworthiness), and optimized access speed (to ensure service reliability) should be prioritized in telemedicine app development, aligning empirical findings with feature design.

E-service quality and brand image also have influence No direct to patient loyalty through patient satisfaction and patient trust. Good service quality increase satisfaction patient, while image trusted brand strengthen patient trust to Application. Satisfaction and Trust This become runway important in create loyalty term long. For regulators, these findings underscore the need to establish minimum quality standards for telemedicine apps, mandating measurable benchmarks in user satisfaction (e.g., response speed), trust (e.g., data privacy compliance), and loyalty (e.g., repeat usage rates) to safeguard patient outcomes. With Thus, the organization that manages application telemedicine is necessary optimize service quality, build positive brand image, as well ensure a satisfying and constructive experience trust For strengthen patient loyalty.

Manager application telemedicine should be increase e-service quality with ensure convenience access, speed response, and reliability service For increase satisfaction and patient loyalty. A longitudinal approach can also be applied For observe dynamics satisfaction , trust and loyalty patient along time . In addition , research advanced need explore factors addition like influence market competition , price services , or preference patient to feature certain . With Thus , the recommendations produced can more comprehensive and relevant for development of telemedicine business strategies in various context geographical and social.

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