

PERCEPTION OF MODERN SERVICE FEATURES AS A PREDICTOR OF PUBLIC PURCHASE INTENTION AT PHARMACIES

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ABSTRACT

The rapid development of digital technology has transformed pharmaceutical services through the integration of modern pharmacy systems, increasing the need to understand the factors influencing public adoption of pharmacy services. This study aims to examine the effects of perceived modern pharmacy features, service quality, and product quality on public interest in using pharmacy services among residents of Banyuwangi. A quantitative explanatory approach was employed using a cross-sectional survey design, with 100 respondents selected through purposive sampling based on the criteria of being at least 18 years old, residing in Banyuwangi, and having visited a pharmacy within the past six months. Data were collected through an online questionnaire and analyzed using multiple linear regression with JASP software. The multiple linear regression results indicate that the overall regression model is statistically significant ($F(3, 96) = 1043.157$, $p < 0.001$) and explains 97.0% of the variance in interest in using pharmacy services ($R^2 = 0.970$). Perceived modern pharmacy features showed a negative regression coefficient ($\beta = -1.126$, $p < 0.001$). However, the collinearity diagnostics indicated substantial multicollinearity among the independent variables, with VIF values of 173.847 for perceived modern pharmacy features, 40.399 for service quality, and 94.299 for product quality. Therefore, the individual regression coefficients should be interpreted with considerable caution because multicollinearity may compromise the stability of the estimated effects. Meanwhile, service quality ($\beta = 0.953$, $p < 0.001$) and product quality ($\beta = 1.165$, $p < 0.001$) demonstrate significant positive effects and emerge as the strongest predictors of users' interest in using pharmacy services. These findings highlight the importance of improving service quality and product quality while developing digital pharmacy features that provide distinct value to enhance user adoption and support the delivery of effective, user-centered pharmacy services.

Keywords : Modern Pharmacies; User Perceptions; Interest In Using Services; And Digital Pharmacy Services

ABSTRAK

Perkembangan pesat teknologi digital telah mentransformasi layanan farmasi melalui integrasi sistem apotek modern, sehingga meningkatkan kebutuhan untuk memahami faktor-faktor yang memengaruhi adopsi layanan farmasi oleh masyarakat. Penelitian ini bertujuan untuk menganalisis pengaruh persepsi terhadap fitur apotek modern, kualitas layanan, dan kualitas produk terhadap minat masyarakat dalam menggunakan layanan farmasi pada masyarakat Kabupaten Banyuwangi. Penelitian ini menggunakan pendekatan kuantitatif eksplanatori dengan desain survei cross-sectional, melibatkan 100 responden yang dipilih melalui teknik purposive sampling berdasarkan kriteria berusia minimal 18 tahun, berdomisili di Banyuwangi, dan pernah mengunjungi apotek dalam enam bulan terakhir. Data dikumpulkan melalui kuesioner daring dan dianalisis menggunakan regresi linear berganda dengan bantuan perangkat lunak JASP. Hasil analisis regresi linear berganda menunjukkan bahwa model regresi secara keseluruhan signifikan secara statistik ($F(3,96) = 1043,157$; $p < 0,001$) dan mampu menjelaskan 97,0% variasi minat menggunakan layanan farmasi ($R^2 = 0,970$). Variabel Persepsi terhadap fitur apotek modern menunjukkan koefisien regresi negatif ($\beta = -1,126$, $p < 0,001$). Namun, analisis diagnostik kolinearitas mengindikasikan adanya multikolinearitas yang signifikan di antara variabel-variabel independen, dengan nilai VIF sebesar 173,847 untuk

Persepsi terhadap fitur apotek modern, 40,399 untuk kualitas layanan, dan 94,299 untuk kualitas produk. Oleh karena itu, koefisien regresi individual tersebut harus diinterpretasikan dengan sangat hati-hati karena multikolinearitas dapat memengaruhi stabilitas estimasi efek. Sementara itu, kualitas layanan ($\beta = 0,953$; $p < 0,001$) dan kualitas produk ($\beta = 1,165$; $p < 0,001$) menunjukkan pengaruh positif yang signifikan serta menjadi prediktor terkuat terhadap minat masyarakat dalam menggunakan layanan farmasi. Temuan ini menegaskan pentingnya peningkatan kualitas layanan dan kualitas produk, disertai pengembangan fitur digital apotek yang memiliki nilai tambah yang jelas, untuk meningkatkan adopsi pengguna serta mendukung penyelenggaraan layanan farmasi yang efektif dan berorientasi pada kebutuhan pengguna.

Kata Kunci : Apotek Modern; Persepsi Pengguna; Minat Menggunakan Layanan; Dan Layanan Apotek Digital

INTRODUCTION

In recent years, pharmaceutical services have undergone significant transformations along with the development of digital technology and changes in consumer behavior in accessing healthcare services. The digitalization of pharmaceutical services encompasses various innovations, such as online medication ordering, digital pharmacy consultations, real-time availability of medication information, and home delivery services. This transformation contributes to increased service efficiency and consumer convenience, particularly in the context of technology-based healthcare (Bahamdan et al., 2024; Fan et al., 2024).

Modern pharmacy services can be understood as a pharmaceutical service system that integrates digital technology to improve service quality, ease of access, and user experience. In the context of technology adoption, user perceptions of digital service features play a crucial role because these perceptions influence assessments of the benefits, ease of use, and trust in the service. Research in the field of healthcare technology adoption shows that perceptions of system performance, Ease of use, and supportive conditions are key determinants in shaping the interest to use digital services ((Dwivedi et al., 2019; Ridgway et al., 2021).

Locally, Banyuwangi Regency demonstrates a growing need for efficient and accessible pharmacy services. Based on initial observations and informal interviews with the community, some common obstacles often encountered in accessing pharmacy services include long queues, uncertainty about medication availability, and limited information regarding medication use. These conditions drive the community's need for pharmacy services that not only provide pharmaceutical products but also utilize digital technology to support more effective service processes (Sartika et al., 2024; Keesara et al., 2020)).

However, most pharmacies in Banyuwangi still rely on conventional service systems. This mismatch between community needs and available services creates a gap in the quality of pharmaceutical services. Previous research has shown that digital service quality, including system reliability and ease of use, has a positive influence on consumer perceptions and

satisfaction (Blut et al., 2018). Therefore, the presence of pharmacies that adopt modern features is relevant for further study.

From a consumer behavior perspective, behavioral intention is defined as an individual's tendency to use a service based on their attitudes, perceptions, and evaluations of that service (Bosnjak et al., 2020). Empirical research has shown that positive perceptions of digital service features significantly influence interest to use technology-based services (Ridgway et al., 2021). However, empirical studies specifically examining the influence of perceptions of modern pharmacy features on interest in using services in the Banyuwangi community context are still limited.

Following various digital transformations in pharmaceutical services, service quality has become a key factor determining the success of modern pharmacy service implementation. The quality of modern pharmaceutical services is a crucial factor in determining consumer satisfaction and trust in pharmacy services. Today, pharmaceutical services are no longer limited to drug sales but have evolved into more comprehensive and patient-oriented healthcare services. This service quality encompasses various dimensions, such as speed of service, ease of digital access, and the quality of pharmacist-patient interactions, which have been shown to significantly influence user satisfaction and trust in healthcare services (Al-Dmour et al., 2025). Furthermore, research shows that a mismatch between customer expectations and the service received, such as long waiting times or suboptimal digital response, can increase risk perception and reduce public interest in utilizing technology-based pharmaceutical services (Kelly et al., 2020).

In line with the importance of service quality, pharmaceutical product quality is also a fundamental factor in shaping customer satisfaction with modern pharmacies. Product quality is not only assessed by the availability of medications, but also includes aspects of product authenticity, safety of use, and transparency of information provided to customers.

These factors have been shown to be key determinants in the decision-making process for purchasing health products at pharmacies (Gridley et al., 2020). However, various problems are still frequently encountered in the field, such as limited stock of certain medications, uncertainty regarding product authenticity, and a lack of clear information regarding dosage and usage. These conditions can increase customer dissatisfaction and reduce public trust in pharmacy services overall (Ozawa et al., 2022).

In the context of research on pharmaceutical service quality, service quality measurement generally uses the SERVQUAL instrument, which encompasses five main dimensions: tangibles, reliability, responsiveness, assurance, and empathy. This instrument is widely used to assess the gap between customer expectations and perceptions of the services received (Raza et

al., 2020). Furthermore, in the context of modern, technology-based pharmaceutical services, the Pharmacy Services Quality Scale (PSQS) was developed, specifically designed to measure the quality of pharmaceutical services, including digital services and patient-pharmacist interactions (Grew et al., 2019).

Meanwhile, pharmaceutical product quality measurements generally use the Consumer Perceived Product Quality Scale (CPPQS) approach, which assesses customer perceptions of the safety, authenticity, and added value of the healthcare products offered (Grew et al., 2019).

Furthermore, the Pharmaceutical Product Quality Assessment (PPQA) is used as a checklist for assessing pharmaceutical product quality based on aspects of completeness, authenticity, and product label information. This instrument is widely used in research to assess the quality standards of products available in modern pharmacies (Qamar & Al-Hinai, 2024). Based on these research gaps, this study aims to:

describe Banyuwangi residents' perceptions of the features of modern pharmacies; describe public interest in using Kimia Farma Pharmacy services; and analyze the influence of perceptions of modern pharmacy features, service quality, and product quality on public interest in using these services.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

a. Perception of Modern Pharmacy Features (Independent Variable 1)

Perception of modern pharmacy features refers to how individuals evaluate the benefits, ease of use, and quality of pharmacy services supported by digital technology. In the digital services literature, user perception is seen as a crucial factor influencing service acceptance and use, as it is shaped by previous experience with technology, ease of access, and the suitability of the features offered to user needs. Previous studies have shown that positive perceptions of digital-based healthcare services contribute to increased user satisfaction and trust, ultimately driving continued use of those services (Vera-Martínez, 2023).

One of the key dimensions of perceptions of modern pharmacies is ease of access. Ease of access reflects the extent to which users perceive digital pharmacy services to be accessible quickly, flexibly, and without time or location constraints, according to (Bahamdan et al., 2024). Technology-based pharmacy services allow users to access information and services anytime through digital devices, thereby reducing reliance on physical visits to the pharmacy. Research shows that ease of access is one of the main reasons consumers choose online pharmacy services, as they are perceived as more practical and efficient than conventional services (Vera-Martínez, 2023).

In addition to ease of access, digital functionality is an important dimension in shaping user perceptions of modern pharmacies (Apriliani et al., 2024). Digital functionality includes the

availability of features such as online medication ordering, digital pharmacy consultations or telepharmacies, and real-time drug availability information. These features enable users to obtain pharmaceutical services more quickly and interactively.

Research on telepharmacies shows that digital consultations with pharmacists can improve access to healthcare, especially for people with time or distance constraints, and increase efficiency in the pharmacy service process. Another dimension influencing perceptions of modern pharmacies is service quality. Service quality refers to the level of user satisfaction with the professionalism, competence, and responsiveness of pharmacists in providing services, both in person and through digital media. In the context of digital pharmacy services, service quality remains a crucial factor because the interaction between users and pharmacists plays a role in building trust. Studies show that positive perceptions of digital service quality, particularly in terms of response speed and clarity of information provided by pharmacists, are significantly associated with user trust and satisfaction (Sartika et al., 2024).

Product availability is also an important dimension in user perceptions of modern pharmacy services. Product availability reflects the availability of various types of medicines and health products needed by consumers. Digital pharmacy services generally offer a more extensive and structured product catalog, making it easier for users to search and compare products. Previous research has shown that limited drug availability can reduce user satisfaction, while perceptions of product availability positively influence the decision to use digital pharmacy services (Bahamdan et al., 2024). The final, equally important dimension is price transparency and information security.

Price transparency refers to the clarity of information regarding drug prices and service fees that users can access before making a transaction, while information security relates to the protection of users' personal and health data. In digital health services, data security is a primary concern because it directly relates to user trust. Research shows that perceptions of price transparency and information security significantly influence user interest to adopt and continue using e-pharmacy services, as these two aspects reduce perceived risk and increase security in digital transactions (Fan et al., 2024).

Overall, perceptions of modern pharmacy features are formed through a combination of various dimensions: ease of access, digital functionality, service quality, product availability, and price transparency and information security. Positive perceptions of these dimensions have been shown to increase user satisfaction and interest in using technology-based modern pharmacy services (Bahamdan et al., 2024). Therefore, understanding user perceptions is a crucial aspect in developing and optimizing digital pharmacy services to sustainably meet community needs and expectations.

b. Service quality (Independent Variable 2)

Service quality refers to the extent to which pharmacy services are able to meet or exceed customer expectations, both in conventional and digital service contexts. In modern pharmacy services, service quality plays a crucial role in shaping customer satisfaction, trust, and ultimately their interest to use the service. High-quality service reflects not only technical competence but also the ability of pharmacy staff to provide responsive, reliable, and empathetic interactions with customers.

In the context of pharmaceutical services, service quality is commonly measured using the SERVQUAL framework, which consists of five main dimensions: tangibles, reliability, responsiveness, assurance, and empathy (Raza et al., 2020; . Tangibles refer to the physical appearance of facilities and digital interfaces, reliability reflects the ability to deliver services accurately and consistently, responsiveness indicates the willingness to help customers promptly, assurance relates to the knowledge and professionalism of pharmacy staff, and empathy reflects the level of personal attention given to customers.

In modern, technology-based pharmacy services, these dimensions are further extended to include digital responsiveness, system reliability, and ease of communication through online platforms. Research shows that fast response times, clear information delivery, and professional consultation - whether conducted face-to-face or digitally - significantly influence customer satisfaction and trust in pharmacy services (Sartika et al., 2024; Rohmana & Cahyadi, 2022) . (Rohmana & Cahyadi, 2022) specifically found that online registration through WhatsApp reduced physical visits, proving that digital responsiveness is a key driver of patient trust and service quality. Poor service quality, such as delayed responses or unclear information, can increase perceived risk and reduce users' interest to adopt digital pharmacy services (Kelly et al., 2020).

Therefore, service quality is considered a key determinant in influencing users' perceptions and behavioral intentions. The better the perceived service quality, the higher the likelihood that customers will develop trust and show interest in using modern pharmacy services.

c. Product quality (Independent Variable 3)

Product quality refers to the overall assessment of pharmaceutical products based on their safety, authenticity, effectiveness, and the completeness of information provided to consumers. In the context of pharmacy services, product quality is a fundamental factor influencing customer satisfaction and decision-making when purchasing health-related products.

Pharmaceutical product quality is not only limited to the physical characteristics of the product but also includes aspects such as product authenticity, proper storage conditions,

expiration clarity, and the availability of accurate usage information. High-quality pharmaceutical products ensure patient safety and increase consumer confidence in pharmacy services. Conversely, concerns regarding counterfeit drugs, unclear labeling, or limited product availability can reduce trust and negatively affect purchase interest (Ozawa et al., 2022).

Measurement of product quality in pharmaceutical research often adopts approaches such as the Consumer Perceived Product Quality Scale (CPPQS), which evaluates customer perceptions of product safety, reliability, and value (Grew et al., 2019). In addition, the Pharmaceutical Product Quality Assessment (PPQA) is used to assess product completeness, authenticity, and labeling accuracy (Qamar & Al-Hinai, 2024). These instruments highlight that customer perception plays a central role in evaluating product quality, especially in healthcare contexts where risk considerations are high.

In modern pharmacies, product quality is also closely related to product availability and variety. A pharmacy that provides a wide range of authentic, safe, and well-documented products is more likely to be perceived positively by customers. Previous studies indicate that product completeness and reliability significantly influence customer satisfaction and their interest to reuse pharmacy services (Raza et al., 2020).

Thus, product quality serves as a critical factor in shaping customer trust and behavioral intention. The higher the perceived quality of pharmaceutical products, the greater the likelihood that consumers will choose and continue using the pharmacy service.

d. Interest in Using Services (Dependent Variable)

Interest to use a service refers to an individual's tendency to try, use, or utilize a service in the future. In the literature on digital services and technology adoption, interest to use a service is understood as a form of behavioral intention, namely, behavioral intentions that emerge after an individual evaluates the service's benefits, ease of use, and relevance to personal needs. Several studies have shown that interest to use a service is an important predictor of actual usage behavior, particularly in digital technology-based healthcare services (Ridgway et al., 2021).

In the context of digital services, interest in using a service is strongly influenced by perceptions of ease of use and the clarity of the features offered. When users perceive that a service is easy to understand, uncomplicated, and provides tangible benefits, their interest in trying and using it will increase. Research on digital services shows that perceived ease of use and perceived usefulness significantly influence the interest to use digital services, including in the healthcare and pharmaceutical sectors. In this study, interest in using a service was measured through three main aspects: interest in trying the service, perceptions of the service's suitability to personal needs, and willingness to use the service when needed (Koivisto et al., 2019).

Interest in trying a service reflects the extent to which an individual has an initial urge or desire to try modern digital-based pharmacy services. This interest usually arises when users perceive practical benefits, such as time efficiency, ease of access, and clarity of the service process. Research in digital consumer behavior shows that initial interest in a service is a crucial factor shaping usage interest, especially for new or technology-based services (Lajante et al., 2019).

The second aspect is the perceived suitability of the service to personal needs, which reflects the extent to which the service is perceived as relevant and capable of meeting an individual's needs. Service suitability can include functional aspects, such as ease of obtaining the required product, flexibility of service delivery times, and compatibility of features with the user's lifestyle. In the digital service adoption literature, service suitability to user needs has been shown to positively influence usage interest, as relevant services are perceived as more valuable and useful (Alalwan et al., 2025).

The third aspect, willingness to use a service when needed, indicates an individual's level of readiness to actually select and use a digital service in a real-life situation. This aspect reflects stronger behavioral intentions than mere interest because it relates to the likelihood of actual use. Research on digital health services shows that willingness to use services increases when users have a positive experience, understand the service features, and trust the reliability of the system used (Ridgway et al., 2021).

Overall, interest to use a service is formed through an individual's evaluation of ease of use, service benefits, and suitability to personal needs. Positive perceptions of these aspects will increase users' interest, readiness, and interest to utilize modern, technology-based pharmacy services. Therefore, interest to use the service is an important dependent variable in understanding the successful adoption of digital pharmacy services in the community.

e. Relationship Between Variables

The relationship between perceptions of modern pharmacy features and interest to use the service can be explained through the theory of digital service adoption and consumer behavior, which states that user perceptions of a service are a primary factor in shaping interest to use that service. Positive perceptions of service features such as ease of access, digital functionality, service quality, product availability, price transparency, and information security will increase users' assessment of the service's benefits and value, thereby encouraging interest in using the service in the future. In the context of digital healthcare, perceptions of service features have been shown to have a significant influence on users' behavioral intentions (Alam et al., 2020). This aligns with (Setyawan et al., 2022), who explored the Technology Acceptance Model in

health applications and found that perceived ease of use and usefulness are the primary drivers of users' intention to reuse digital health services.

Perceptions of good modern pharmacy features create a more positive user experience, especially when the service is perceived as easy to use, efficient, and tailored to the user's needs. Research on e-pharmacy services shows that ease of access and digital functionality play a crucial role in increasing user convenience, which in turn increases interest in continued service use. (Bahamdan et al., 2024) found that positive perceptions of e-pharmacy features were directly related to increased user usage interest and satisfaction.

Furthermore, service quality and product availability also strengthened the relationship between perceptions of modern pharmacy features and interest in using the service. Service quality, characterized by the responsiveness and professionalism of pharmacists, increased user trust, while product availability provided a sense of security that health needs could be met through a single service platform. Previous research has shown that trust and satisfaction derived from perceptions of service quality significantly influence interest to use digital health services (Sartika et al., 2024; Bahamdan et al., 2024). Price transparency and information security are also important factors linking perceptions of modern pharmacy features to interest in using the service. In digital healthcare, perceptions of personal data security and pricing clarity play a role in reducing perceived risk and increasing user trust. (Fan et al., 2024) stated that trust in the system and low perceived risk directly influence user interest to adopt and continue using e-pharmacy services.

Conceptually, the relationship between these two variables can be explained as follows: positive perceptions of modern pharmacy features increase perceptions of the usefulness, convenience, and reliability of the service, which then encourage users to try, use, and utilize digital pharmacy services when needed. This aligns with research findings on digital healthcare, which indicate that perceptions of service features are a key determinant of interest to use (Ridgway et al., 2021; Alalwan et al., 2025). Therefore, it can be concluded that perceptions of modern pharmacy features (independent variable) have a positive and significant relationship with interest in using services (dependent variable). The more positive user perceptions regarding ease of access, digital functionality, service quality, product availability, and price transparency and information security, the higher their interest in using modern, technology-based pharmacy services. This relationship underscores the importance of optimizing digital pharmacy service features to increase public adoption and use of services.

f. Hypothesis

H1: Perception of modern pharmacy features significantly influences interest in using services.

H2: Service quality significantly influences interest in using services.

H3: Product quality significantly influences interest in using services.

H4: Perception of modern pharmacy features, service quality, and product quality simultaneously significantly influence interest in using services.

RESEARCH 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., Amin, N. N., 2018).

Research Design

This study employed a quantitative, cross-sectional survey design to examine the relationships between perceived modern pharmacy features, service quality, product quality, and interest in using pharmacy services among residents of Banyuwangi Regency, Indonesia. Data were collected at a single point in time using a self-administered online questionnaire distributed through Google Forms. A cross-sectional design was selected because it enables researchers to examine characteristics and associations among variables at a specific point in time without longitudinal follow-up (Cho & Kim, 2026).

The data were analyzed using multiple linear regression to examine the individual and simultaneous relationships between the independent variables and interest in using pharmacy services. Since the variables were measured simultaneously and no experimental manipulation was conducted, the findings are interpreted as statistical associations rather than definitive evidence of causal relationships.

Meanwhile, the instrument used in this paper was a structured self-administered questionnaire developed from the conceptual framework and adapted from previously validated instruments. The questionnaire consisted of four constructs: Perception of Modern Pharmacy Features (6 items), Service Quality (5 items), Product Quality (5 items), and Interest in Using Services (3 items). All items were measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The score for each construct was calculated as the mean of its items; higher scores indicated more positive perceptions, higher perceived quality, or stronger interest in using services. The sources and basis of item development were as follows: Perception of Modern Pharmacy Features was adapted from Vera-Martinez (2023), Bahamdan et al. (2024), and Fan et al. (2024); Service Quality was adapted from Raza et al. (2020) and Rohmana & Cahyadi (2022); Product Quality was adapted from Grew et al. (2019) and Qamar & Al-Hinai (2024); and Interest in Using Services was adapted from Ridgway et al. (2021). The item indicators, number of items, response scale, and sources are presented in Table 1. For translated or adapted items, a forward-translation and back-translation procedure was conducted

by two bilingual translators, followed by a review of semantic, conceptual, and idiomatic equivalence before administration.

a. Sample and Population

The target population for this study consisted of adults aged 18 years or older residing in Banyuwangi Regency, Indonesia, who had visited a Kimia Farma pharmacy as a customer within the time of preceding data collection. The actual sample consisted of 100 respondents who met the study's eligibility criteria. Participants were recruited using purposive sampling, a non-probability sampling technique, because the study required respondents with recent experience of pharmacy services. Consequently, the findings describe the responses and statistical relationships observed among these 100 participants and should not be interpreted as representative estimates for all adult residents of Banyuwangi.

The inclusion criteria were: (1) residing in Banyuwangi Regency; (2) being at least 18 years old; (3) having visited a pharmacy within the previous six months; and (4) providing voluntary informed consent. Responses that did not meet the eligibility criteria or were substantially incomplete were excluded from the analysis. Duplicate submissions were also excluded when identified during data screening.

The required sample size was considered in relation to the planned multiple linear regression analysis, which included three independent variables: perceived modern pharmacy features, service quality, and product quality. Using Gpower 3.1.9.7 and an a priori power analysis for multiple linear regression with a medium effect size ($f^2 = 0.15$), a significance level of $\alpha = 0.05$, statistical power of 0.80, and three predictors, the minimum required sample size was 77 respondents. A sample of 100 respondents was therefore considered sufficient for the planned regression analysis because it exceeded the minimum requirement of 77 participants. A comparable 2025 study using multiple linear regression and the same assumptions of $f^2 = 0.15$, $\alpha = 0.05$, power = 0.80, and three predictors also reported a minimum sample size of 77 respondents.

A total of 100 eligible respondents were included in the final analysis. The use of purposive sampling means that participants were intentionally selected according to the specified eligibility criteria rather than through random selection. Therefore, although the sample size was adequate for the planned regression analysis under the stated assumptions, the findings should not be interpreted as statistically representative of all residents of Banyuwangi Regency. Non-probability sampling may limit the generalizability of findings because the probability of selection for individual members of the target population is not known (Zrineh et al., 2026).

b. Procedure

The data collection and analysis procedures in this study were carried out through several systematic stages, as described below.

Content Validity and Readability: Before the main survey, the questionnaire was evaluated through expert judgment. Three experts, two in pharmacy service management and one in research methodology, reviewed the relevance, clarity, wording, and suitability of each item for the target population. The experts used the university's instrument validation sheet and provided qualitative feedback and a "valid/needs revision" decision for each item. Based on their recommendations, several items were reworded to improve clarity and relevance. A readability test was then conducted with 10 respondents from the target population who were not included in the main study; they were asked to read and paraphrase each item. Ambiguous or unclear wording was revised before the questionnaire was distributed to the study respondents. The final instrument was declared valid by the expert panel for use in the main study.

Questionnaire Distribution and Ethical Procedures: The questionnaire was distributed online via Google Forms. An informed consent form was included, comprehensively explaining the purpose of the study, expected benefits, guarantees of data confidentiality and privacy, and the respondent's right to withdraw at any time without consequence. Respondents could continue completing the questionnaire only after agreeing to the statement.

Data Collection and Cleaning: The data collected through Google Forms was then downloaded in spreadsheet format for cleaning. Response completeness, consistency, and identification of invalid responses were checked. Incomplete or invalid responses were removed from the dataset before analysis to maintain data quality.

Statistical Data Analysis: The clean data was then imported and analyzed using JASP statistical software (Version 0.19.1). The primary analysis was multiple linear regression analysis. The analysis procedure included: (a) testing the classical regression assumptions (linearity, residual normality, and homoscedasticity); (b) constructing a multiple regression model to test the effect of each independent variables on the dependent variable; and (c) interpreting the coefficient of determination (R^2) and statistical significance (p-value) to test and answer the proposed research hypothesis (H1, H2, H3, H4).

Interpretation and Reporting of Results: The analytical output from JASP was then substantively interpreted within the research context. The findings from the hypothesis testing were systematically discussed and reported to draw conclusions that answer the research problem formulation.

RESULTS AND DISCUSSIONS

a. Independent Variable Reliability Test (Perception of Modern Pharmacy Features)

The results showed that the reliability of the six items in the perception of modern pharmacy features Scale was 0.963, with a 95% confidence interval of 0.951 to 0.973. Furthermore, all items exhibited good item-rest correlations, above 0.3, with values ranging from 0.813 to 0.972. This demonstrates good internal consistency among the items. Therefore, it can be concluded that this scale is reliable and trustworthy, as the Cronbach's alpha value exceeds the minimum threshold of 0.7 as recommended in research methodology literature (Peterson, 1994).

b. Independent Variable 2 Reliability Test (Service Quality)

The results showed that the reliability of the five items in the service quality scale was 0.949, with a 95% confidence interval ranging from 0.931 to 0.964. This value indicates that the scale's internal consistency is above the recommended threshold of 0.7 (Peterson, 1994). Furthermore, all items demonstrated strong item-rest correlations, ranging from 0.813 to 0.959, which are well above the acceptable minimum value of 0.3. These findings indicate that each item contributes significantly and consistently to the overall construct of service quality. Therefore, it can be concluded that the Service Quality scale is highly reliable, although the very high Cronbach's alpha may indicate item similarity or redundancy.

c. Independent Variable 3 Reliability Test (Product Quality)

The results showed that the reliability of the five items in the product quality scale was 0.968, with a 95% confidence interval ranging from 0.956 to 0.976. This value indicates a high level of internal consistency and exceeds the recommended minimum threshold of 0.7, suggesting that the scale is reliable. Furthermore, all items demonstrated strong item-rest correlations, ranging from 0.845 to 0.969, which are well above the acceptable minimum value of 0.3. This suggests that the items consistently measure the construct of product quality. In addition, the Cronbach's alpha values if item deleted ranged from 0.949 to 0.969, showing that removing any individual item would not substantially improve the overall reliability of the scale. Therefore, it can be concluded that the Product Quality scale is highly reliable and suitable for further statistical analysis, as all items meet the reliability criteria recommended in research methodology literature (Peterson, 1994).

d. Dependent Variable Reliability Test (Interest in Using Services)

The results indicate that the reliability of the three items in the interest in using services scale is 0.903, with a 95% confidence interval ranging from 0.865 to 0.932. This value is substantially higher than the recommended minimum threshold of 0.7 (Peterson, 1994), indicating an excellent level of internal consistency among the items. Furthermore, the item-rest correlation values range from 0.775 to 0.840, which are significantly above the acceptable threshold of 0.3. This suggests that all items have a very strong correlation with the overall scale

and contribute consistently to measuring the intended construct. Additionally, the Cronbach's alpha values if item deleted range from 0.835 to 0.889, indicating that removing any item would not meaningfully improve the overall reliability of the scale. Overall, these findings demonstrate that the Interest in Using Services scale is highly reliable and internally consistent, making it suitable for further statistical analysis.

e. Demographic Data

Based on research participant data, the number of respondents involved in this study was 100. In terms of gender, 51 respondents were male (51%) and 49 female (49%), indicating a nearly balanced gender distribution. In terms of age, respondents were relatively evenly distributed, with the 26–35 age group being the largest group, at 28 (28%), followed by 27 (27%) respondents aged 36–45, 23 (23%) respondents over 45, and 22 (22%) respondents aged 18–25. Based on the frequency of visits to Kimia Farma Pharmacy in the past six months, the majority of respondents (48%) stated they had visited the pharmacy 3–5 times. Furthermore, 27 respondents (27%) stated they visited the pharmacy more than five times, and 25 respondents (25%) visited the pharmacy once or twice, while no respondents stated they had never visited. All respondents in this study (100%) stated they resided in Banyuwangi Regency, so the study location can be considered geographically homogeneous.

Regarding primary needs when visiting the pharmacy, the most frequently mentioned needs were purchasing vitamins and supplements (21 respondents) followed by purchasing baby supplies (19 respondents) and over-the-counter medications and medical devices (17 respondents each), minor health consultations (15 respondents) and prescription medications (11 respondents). Regarding the main factors respondents considered when choosing a pharmacy, product availability was the most important factor with 20 respondents (20%), followed by proximity to home and availability of pharmacists for consultations, each chosen by 18 respondents (18%). Other factors include friendly service (17 respondents, 17%), affordable prices (15 respondents, 15%), and digital services such as online ordering and delivery (12 respondents, 12%).

f. Regression Test

The multiple linear regression analysis was conducted to examine the relationships between perceived modern pharmacy features, service quality, product quality, and interest in using pharmacy services. The overall regression model was statistically significant, $F(3, 96) = 1043.157$, $p < 0.001$, with an R^2 value of 0.970. This value indicates that the model accounts for 97.0% of the observed variance in the dependent variable in the current sample. However, the unusually high R^2 value should be interpreted cautiously. Before drawing substantive conclusions, the dataset, construct-score calculations, overlap among the independent variables,

and alignment of the dependent-variable indicators should be verified. The statistical significance of the overall model does not, by itself, establish the validity of the measurement model or the stability of the individual regression coefficients.

The regression results further show that perceived modern pharmacy features have a significant effect on interest in using services, with a standardized beta coefficient of $\beta = -1.126$, $t(96) = -4.851$, and $p < 0.001$. Although the coefficient is negative, the effect remains statistically significant. Therefore, H1 is accepted because perceived modern pharmacy features significantly influence interest in using services. However, the negative coefficient should be interpreted cautiously, as it is likely attributable to multicollinearity or conceptual overlap among the independent variables rather than indicating a true negative relationship.

Furthermore, service quality has a significant positive effect on interest in using services, with a standardized beta coefficient of $\beta = 0.953$, $t(96) = 8.512$, and $p < 0.001$. This finding indicates that higher perceived service quality is associated with greater interest in using pharmacy services. Therefore, H2 is accepted.

Similarly, product quality has a significant positive effect on interest in using services, with a standardized beta coefficient of $\beta = 1.165$, $t(96) = 6.811$, and $p < 0.001$. This result indicates that better perceived product quality significantly increases users' interest in using pharmacy services. Therefore, H3 is accepted.

Overall, the results demonstrate that perceived modern pharmacy features, service quality, and product quality simultaneously have a significant effect on interest in using services. Thus, H4, which proposes that the three independent variables simultaneously influence interest in using services, is accepted.

g. Multicollinearity Assessment

Collinearity diagnostics indicated substantial multicollinearity among the independent variables. The VIF values were 173.847 for perceived modern pharmacy features, 40.399 for service quality, and 94.299 for product quality, while the corresponding tolerance values were 0.006, 0.025, and 0.011, respectively. These values indicate that the predictors exhibit substantial multicollinearity under commonly used diagnostic criteria. VIF values above 5 are generally considered a reason for concern and warrant further investigation (Singh & Kumar, 2021). Accordingly, the individual regression coefficients should be interpreted cautiously because multicollinearity can make it difficult to distinguish the unique contribution of each predictor. The statistically significant overall regression model does not, by itself, resolve this limitation.

h. Discussion

This study examined the relationships between perceived modern pharmacy features, service quality, product quality, and interest in using pharmacy services among respondents in Banyuwangi. The overall regression model was statistically significant, $F(3, 96) = 1043.157$, $p < 0.001$, and produced an R^2 value of 0.970. Although this value indicates that the model accounts for a large proportion of the observed variance in the sample, its unusually high magnitude warrants further verification. In particular, the results should be interpreted in light of the severe multicollinearity identified among the predictors and the need to confirm that the dependent-variable indicators adequately measure interest in using services. Accordingly, the R^2 value should not be interpreted in isolation as definitive evidence of strong predictive performance.

The regression results show that perceived modern pharmacy features had a negative standardized coefficient ($\beta = -1.126$, $t(96) = -4.851$, $p < .001$). However, the collinearity diagnostics indicate severe multicollinearity, with a VIF of 173.847 and tolerance of .006 for perceived modern pharmacy features. Service quality also showed a high VIF of 40.399 and tolerance of .025, while product quality had a VIF of 94.299 and tolerance of .011. These values indicate substantial multicollinearity among the independent variables, which may make the individual regression coefficients unstable and difficult to interpret. Therefore, the negative coefficient for perceived modern pharmacy features should not be interpreted as conclusive evidence of a negative relationship with interest in using services. The individual effects of the predictors and the related hypotheses should be interpreted cautiously until the measurement items and model specification have been reviewed and the regression analysis has been re-estimated.

These findings are generally consistent with the Technology Acceptance Model (TAM) proposed by Granic and Marangunic (2019) and supported by Setyawan et al. (2022), which suggests that users' perceptions of usefulness and ease of use influence their behavioral intention to adopt technology-based services. In this study, perceived modern pharmacy features conceptually represent digital characteristics such as ease of access, online consultation, digital functionality, and information transparency that may enhance users' evaluation of pharmacy services. However, the negative regression coefficient indicates that, after controlling for service quality and product quality, the unique contribution of perceived modern pharmacy features becomes unstable. Therefore, the coefficient should be interpreted cautiously and viewed as a statistical consequence of overlapping constructs rather than evidence that modern pharmacy features reduce users' interest.

The significant positive effect of service quality supports the SERVQUAL framework (Raza et al., 2020), which emphasizes reliability, responsiveness, assurance, empathy, and

tangibles as the primary determinants of service evaluation. Similar findings were reported by Rohmana and Cahyadi (2022), who found that the effectiveness of digital healthcare services largely depends on responsive interactions and reliable service delivery. These findings indicate that high-quality pharmacy services enhance user confidence, reduce perceived risk, and ultimately increase users' intention to utilize pharmacy services.

Similarly, product quality demonstrates a significant positive influence on interest in using services. This finding is consistent with previous studies suggesting that product safety, authenticity, and information clarity are important determinants of healthcare-related decision-making (Ozawa et al., 2022; Grew et al., 2019). In pharmacy settings, where consumers often perceive relatively high health-related risks, maintaining high product quality strengthens trust and encourages continued utilization of pharmacy services.

An important finding of this study is the presence of a significant negative coefficient for perceived modern pharmacy features despite the overall model demonstrating excellent explanatory power ($R^2 = 0.970$). This pattern suggests the possible presence of multicollinearity or conceptual overlap among the independent variables. Certain dimensions of perceived modern pharmacy features, such as digital accessibility, product availability, and service convenience, may overlap conceptually with service quality and product quality. As noted by Hair et al. (2019), highly correlated predictors may produce unstable regression coefficients, resulting in changes in the magnitude or direction of regression estimates. Therefore, the negative coefficient observed in this study should be interpreted as a statistical artifact rather than evidence of an actual negative relationship.

Another important aspect concerns the reliability of the measurement instruments. All constructs demonstrated excellent internal consistency, including interest in using services (Cronbach's $\alpha = 0.903$), indicating that the measurement instruments are reliable and support the validity of the regression findings. From a practical perspective, these results suggest that pharmacy providers should prioritize improving service quality and product quality, as both variables remain robust positive predictors of users' interest in using pharmacy services. Meanwhile, modern pharmacy features remain strategically important but should be conceptually distinguished from service quality and product quality to minimize construct overlap and improve future research.

CONCLUSION

a. Conclusion

This study concludes that perceived modern pharmacy features, service quality, and product quality significantly influence public interest in using pharmacy services in Banyuwangi. The results of the multiple linear regression analysis indicate that the proposed

model is statistically significant ($F(3, 96) = 1043.157, p < 0.001$) and explains 97.0% of the variance in interest in using services ($R^2 = 0.970$), demonstrating very strong explanatory power. Individually, perceived modern pharmacy features have a statistically significant effect ($\beta = -1.126, t(96) = -4.851, p < 0.001$). Although perceived modern pharmacy features had a statistically significant negative regression coefficient, substantial multicollinearity among the predictors limits the interpretation of its individual effect. Therefore, the direction and magnitude of this coefficient should not be interpreted conclusively without further examination of the relationships among the constructs and verification of the regression model. Meanwhile, service quality ($\beta = 0.953, t(96) = 8.512, p < 0.001$) and product quality ($\beta = 1.165, t(96) = 6.811, p < 0.001$) remain significant positive predictors of users' interest in using pharmacy services.

The findings support the Technology Acceptance Model (TAM) (Granić & Marangunić, 2019), which emphasizes the importance of users' perceptions in shaping behavioral intention, as well as the SERVQUAL framework (Raza et al., 2020), which highlights service quality as a key determinant of users' evaluations and service adoption. In the context of modern pharmacy services, digital features, high-quality services, and reliable products collectively contribute to strengthening users' intention to utilize pharmacy services.

Overall, this study highlights that the transformation toward technology-based pharmacy services should not rely solely on implementing digital features. Maintaining excellent service quality and product quality remains essential for encouraging sustainable user adoption and increasing public engagement with modern pharmacy services.

b. Limitations

Despite providing strong empirical findings, this study has several limitations that should be considered. First, the use of a cross-sectional research design limits the ability to establish causal relationships between variables. Although statistically significant relationships were identified, the direction of causality cannot be confirmed because the data were collected at a single point in time (Creswell, 2014).

Second, the collinearity diagnostics revealed severe multicollinearity among the independent variables. The VIF values were 173.847 for perceived modern pharmacy features, 40.399 for service quality, and 94.299 for product quality, with tolerance values of .006, .025, and .011, respectively. These results raise concerns about the stability and interpretation of the individual regression coefficients. In particular, the negative coefficient for perceived modern pharmacy features cannot be interpreted conclusively as evidence of a negative association with interest in using services. Future analyses should review the measurement items, construct-score

calculations, and conceptual distinctions among the predictors before re-estimating the regression model.

Third, although all constructs demonstrated excellent reliability, the conceptual distinctions among perceived modern pharmacy features, service quality, and product quality may not have been sufficiently clear. Certain indicators, such as digital accessibility, responsiveness, and product availability, may simultaneously represent more than one construct, potentially affecting the precision of the measurements.

The use of a self-administered questionnaire to measure both the independent and dependent variables at a single point in time may have introduced common method bias. Such bias may distort the observed relationships among constructs measured using the same method (Baumgartner et al., 2021). However, no dedicated statistical assessment of common method bias was documented in the present analysis. Therefore, this study cannot conclude that common method bias was absent or determine the extent to which it may have influenced the findings. Future research should incorporate appropriate procedural safeguards during questionnaire design and suitable statistical assessments after data collection (Baumgartner & Weijters, 2021).

Finally, The use of purposive sampling and the inclusion of only 100 respondents from Banyuwangi Regency limit the generalizability of the findings. Because the participants were not selected through probability sampling, the sample cannot be assumed to represent all adults in Banyuwangi or other regions. Differences in pharmacy-use experience, digital literacy, healthcare access, and consumer characteristics may affect the applicability of the findings in other settings. Future studies should consider recruiting larger and more geographically diverse samples and, where feasible, using probability-based sampling to improve population-level generalizability (Andrade, 2021; Pitt et al., 2021).

Future research is encouraged to refine measurement instruments by clearly distinguishing the dimensions of each construct, employ longitudinal research designs to better assess causal relationships, and incorporate additional variables such as trust, perceived risk, digital literacy, or customer satisfaction to provide a more comprehensive understanding of users' adoption of digital pharmacy services.

c. Recommendations

Based on the findings, pharmacy providers are encouraged to prioritize improvements in service quality and product quality, as both variables remain significant positive predictors of users' interest in utilizing pharmacy services. Enhancing responsiveness, reliability, professional consultation, product authenticity, and product availability is expected to strengthen user trust and encourage continued service utilization.

Although perceived modern pharmacy features also demonstrate a statistically significant effect, the negative regression coefficient observed in the multiple regression model suggests possible conceptual overlap with service quality and product quality. Therefore, digital features such as online consultation, digital prescription management, and easy access to health information should continue to be developed while ensuring that they provide distinct value beyond service and product quality dimensions.

Future research is recommended to further refine the conceptual boundaries among perceived modern pharmacy features, service quality, and product quality to minimize construct overlap. Researchers are also encouraged to include additional explanatory variables, such as trust, satisfaction, perceived risk, or digital literacy, while expanding the study to broader geographical areas and more diverse populations to improve the generalizability and robustness of the findings.

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IMAGES AND TABLES

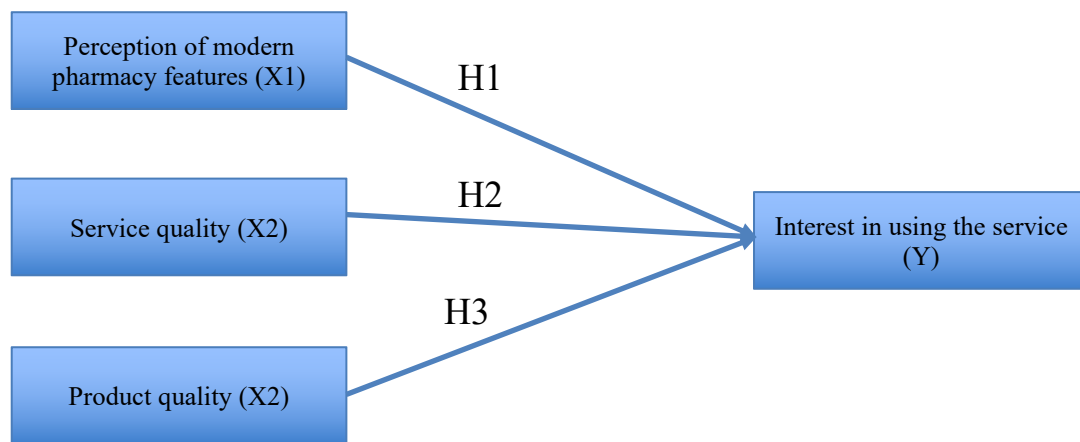


Diagram 1. Model Analysis

Table 1. Measurement Instruments

Variable	Variable Indicator	Likert Questions 1-5
Perception of Modern Pharmacy Features (Independent Variable) (Vera-Martínez, 2023).	Ease of access	1. I can access digital pharmacy services quickly.
	Digital functionality	2. The pharmacy's online platform makes it easy for me to order medication.
	Information security and price transparency	3. Prices of medicines and health products are displayed clearly and transparently.
		4. I feel my personal data is secure when using services such as digital pharmacies.
	Quality of service (responsiveness)	5. Pharmacy staff responded quickly to my inquiries through digital services.
	Product completeness	6. The pharmacy provides a wide variety of medications and health products
Service Quality (Independent Variable) (Raza et al., 2020)	Tangibles	1. The pharmacy's digital platform (application/website) looks professional and easy to use.
	Reliability	2. The pharmacy provides services as promised.
	Responsiveness	3. Pharmacy staff (chats/ online or

Variable	Variable Indicator	Likert Questions 1-5
		offline consultation) responded quickly to my questions.
	Assurance	4. Pharmacy staff have sufficient knowledge about medicines.
	Empathy	5. Pharmacy staff are attentive and understand my needs well.
Product Quality (Independent Variable) (Grew et al., 2019; Qamar & Al-Hinai, 2024)	Product Safety	1. The medicines provided by the pharmacy are safe to use.
	Product Authenticity	2. The products come from trusted and official sources.
	Information Clarity	3. Product labels include complete information (dosage, usage, side effects).
	Product Availability	4. The pharmacy provides a wide variety of health products.
	Perceived Value	5. The quality of the products matches their price.
Interest in Using Services (Dependent Variable) (Ridgway et al., 2021)	Interest in trying	1. The health products available in the application are quite comprehensive.
	Suitability to personal needs	2. The available features support my personal needs.
	Intention to use in future coming	3. I am willing to use this digital pharmacy service again.

Note: All items use a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Perception of Modern Pharmacy Features = 6 items; Service Quality = 5 items; Product Quality = 5 items; Interest in Using Services = 3 items. Construct scores are computed as the mean of the respective item scores.