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Topic Modeling Analysis of I.Saku on the Play Store using Latent Dirichlet Allocation

Aulya Dialira Zahra[1], Syamsu Alam[2], Andi Ruslan[3]
Universitas Negeri Makassar, Indonesia

Abstrak: Perkembangan dompet digital di Indonesia menunjukkan tren yang pesat, namun tidak semua aplikasi mampu mempertahankan loyalitas pengguna, termasuk i.Saku yang memperoleh rating rendah di Google Play Store. Penelitian ini bertujuan untuk mengidentifikasi faktor-faktor utama yang membentuk ulasan pengguna terhadap aplikasi i.Saku dan menyusun rekomendasi perbaikan layanan berdasarkan ulasan tersebut. Metode yang digunakan adalah pemodelan topik dengan algoritma *Latent Dirichlet Allocation (LDA) pada 3.000 ulasan pengguna yang diperoleh melalui scraping di Play Store.* Evaluasi dilakukan menggunakan coherence score untuk menentukan jumlah topik optimal, yang menghasilkan empat topik utama: (1) masalah saldo dan respons layanan pelanggan, (2) kemudahan transaksi dan fitur utama, (3) permasalahan PIN dan akses akun, dan (4) kendala login serta verifikasi. Hasil analisis menunjukkan bahwa mayoritas ulasan negatif berkaitan dengan kendala teknis dan layanan pelanggan, sementara ulasan positif didominasi oleh kemudahan transaksi. Penelitian ini memberikan wawasan penting bagi pengembang i.Saku untuk memprioritaskan perbaikan layanan berbasis isu dominan yang ditemukan dalam ulasan pengguna.

Kata-kata kunci: **i.Saku, ulasan pengguna, *Latent Dirichlet Allocation,* pemodelan topik.**

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[1] *E-mail: odyzahra12@gmail.com*
[2] *E-mail: alam.s@unm.ac.id*
[3] *E-mail: andi.ruslan@unm.ac.id (Correspondence Author)*

Topic Modeling Analysis of I.Saku on the Play Store using Latent Dirichlet Allocation

Aulya Dialira Zahra, Syamsu Alam, Andi Ruslan
Universitas Negeri Makassar, Indonesia

Abstract: *The development of digital wallets in Indonesia shows a rapid growth trend; however, not all applications can maintain user loyalty, including i.Saku, which has received a low rating on the Google Play Store. This study aims to identify the key factors shaping user reviews of the i.Saku application and to formulate service improvement recommendations based on those reviews. The method used is topic modelling with the Latent Dirichlet Allocation (LDA) algorithm applied to 3,000 user reviews from scraping the Play Store. Evaluation was conducted using coherence scores to determine the optimal number of topics, resulting in four main themes: (1) balance issues and customer service response, (2) transaction convenience and core features, (3) PIN and account access problems, and (4) login and verification obstacles. The analysis reveals that most negative reviews are related to technical issues and customer service, while positive reviews are dominated by ease of transaction. This study provides valuable insights for i.Saku developers to prioritize service improvements based on dominant issues identified in user reviews.*

Key words: ***i.Saku, user reviews, Latent Dirichlet Allocation, topic modeling.***

1. INTRODUCTION

The digital transformation in the financial sector has significantly driven the widespread adoption of digital wallets (e-wallets), in line with the increasing public preference for fast and efficient transactions(Sulistyowati et al., 2020). E-wallets are projected to become an essential component of daily economic activity in the future, as they have the potential to replace cash in digital transactions.

In Indonesia, the adoption of digital wallets has surged, particularly since the COVID-19 pandemic. Bank Indonesia reported that in 2020, e-wallet transactions reached 1.7 billion with a total value of US$28 billion(Wulandari, 2023). However, usage frequency is still dominated by monthly transactions, indicating potential for increased routine adoption through user education and service innovation.

Although dozens of e-wallet platforms are available, only a few dominate the market. For instance, i.Saku is only used by around 7% of respondents, according to a Populix survey far behind major competitors like GoPay, DANA, and OVO(Lintang, 2024). This condition indicates that i.Saku has not yet succeeded in positioning itself as a major player in the national e-wallet competition.

Furthermore, i.Saku has a 3.2 rating on the Google Play Store, which is lower than its main competitors. Given that 79% of users consider an app's rating before downloading it, this could potentially affect user loyalty(Doboaca, 2025). The low rating highlights challenges in meeting user expectations, particularly in aspects such as features, performance, and promotional offers.

The low rating and market share of i.Saku raise questions about user perceptions of the application. Therefore, this study employs a Latent Dirichlet Allocation (LDA) approach to uncover frequently mentioned topics in user reviews both complaints and praises as a foundation for service development recommendations.

The integration of LDA with rating analysis is the main strength of this research, as it allows the connection between review content and user ratings. This approach not only classifies topics but also reveals key preferences and issues influencing users to give high or low ratings.

Through this approach, the study is expected to provide data-driven recommendations based on actual user feedback to improve the quality of i.Saku's services. Moreover, the findings also contribute to the literature on the utilization of user reviews as an evaluation tool in digital product development.

2. LITERATURE REVIEW

This study uses three main theoretical foundations: Consumer Behavior Theory, Utility Theory, and Marketing Theory. These three theories are used to provide a conceptual framework for understanding how user perceptions and experiences are formed regarding the i.Saku application service, as well as how these factors influence their evaluation. Consumer Behavior Theory is used to

explain the user decision-making process and the factors that influence their choices. Utility Theory is used to examine the extent to which the application service provides value and satisfaction to users. Meanwhile, Marketing Theory is used to understand the strategies for creating and delivering relevant value in the context of digital services.

Consumer behavior theory discusses how individuals, groups, or organizations select, purchase, use, and dispose of products or services to satisfy their needs and wants (Kotler, 2002). Its development since the 1960s, as explained by Howard and Sheth in The Theory of Buyer Behavior (1969), shows a shift from the assumption of full rationality to the integration of psychological and sociological factors (Peter & Olson, 2010). Contemporary approaches, as outlined by Ariely, confirm that consumer decisions are often influenced by cognitive biases and emotions (Ariely, 2008), while O'Shaughnessy highlights the importance of subjective meaning and social context (O'Shaughnessy, 2003). By understanding consumer behavior, companies can design effective marketing strategies that are adaptive to changing trends.

Utility theory explains how individuals maximize satisfaction from the consumption of goods and services (Rahmah, 2020). Bernoulli introduced the concept of utility, which depends on satisfaction, not just monetary value (Modesti, 2024). The cardinal utility approach introduced by Jevons and Marshall allows for quantitative comparison but has been criticized for the difficulty of objectively measuring satisfaction. In contrast, the ordinal utility approach developed by Pareto and Hicks is more realistic because it only requires an order of preference (Samuelson, 1947). Criticism of this theory has emerged from findings in behavioral economics that show the influence of cognitive biases and social factors in decision-making (Mukhyi, 2017).

Marketing theory emphasizes the process of creating, communicating, and exchanging value with customers (Kotler & Keller, 2016). The concept of relationship marketing (Grönroos, 2007) underscores the importance of building long-term relationships, while Kotler and Armstrong emphasize customer value and satisfaction as indicators of strategic success (Philip Kotler, 2019). The development of digital technology has expanded this concept to digital marketing (Frost & Strauss, 2016), where consumer interaction data is used to identify needs and improve user experience (Philip Kotler, 2019). In the context of the i.Saku application, reviews on the Play Store become a strategic touchpoint that influences user perception (Lemon & Verhoef, 2016).

3. RESEARCH METHOD

This study employed a descriptive quantitative approach, focusing on the analysis of secondary data in the form of user reviews of the i.Saku application available on the Google Play Store. This approach was chosen because it enables the transformation of textual data into numerical form, allowing for objective analysis through text mining techniques. The main objective of this research is to identify dominant topics emerging from user reviews and associate them with the

given rating scores as a means of evaluating users perceptions of i.Saku's service quality.

Data were collected using web scraping techniques with the help of the google-play-scraper library in the Python programming language. The data collection targeted reviews posted within the last six months to maintain relevance with the current state of the application. The gathered data included review texts, rating scores, and upload dates. A total of hundreds of user reviews were selected using purposive sampling, with criteria such as completeness of information, clarity of narrative, and relevance to actual use of the i.Saku application.

Once collected, the data underwent preprocessing to clean and normalize the text before further analysis. This process included the removal of special characters, numbers, and punctuation marks, elimination of stopwords, tokenization, stemming, and lemmatization. Python libraries such as NLTK, Sastrawi, and Pandas were utilized to ensure the data was well-structured and ready for semantic modeling.

The main analysis technique applied in this research was Latent Dirichlet Allocation (LDA), a probabilistic unsupervised machine learning algorithm used to uncover hidden thematic structures within a corpus of text documents. This algorithm assumes that each review is a mixture of various topics and that each topic is a probability distribution over a set of words. Topic modeling was implemented using the Gensim library, with the number of topics determined through iterative testing based on coherence score values. The coherence score measures the semantic similarity between the top words in a topic and was calculated using the C_V method based on Pointwise Mutual Information (PMI), which captures statistical associations between words. The highest coherence score was selected to determine the most representative number of topics.

Following the modeling, descriptive analysis was conducted to interpret the meaning of each identified topic. The topics were then associated with specific service aspects, such as technical performance, transaction convenience, security features, or promotional effectiveness. These interpretations served as the foundation for developing practical recommendations to improve the i.Saku application in line with user expectations and needs.

Overall, this methodological framework was designed to be reproducible, efficient, and well-aligned with the study's two primary research questions: identifying dominant topics in user reviews and providing data-driven recommendations for enhancing i.Saku's digital service quality.

4. RESULTS AND DISCUSSION

This study analyzed 3,000 user review data points of the i.Saku application collected through a web scraping process from the Google Play Store using the Sort.NEWEST parameter to ensure that only the most recent reviews were considered. The data collection period ranged from March 2023 to June 2025 and

included critical elements such as usernames, rating scores (1–5 stars), review dates, and review text content.

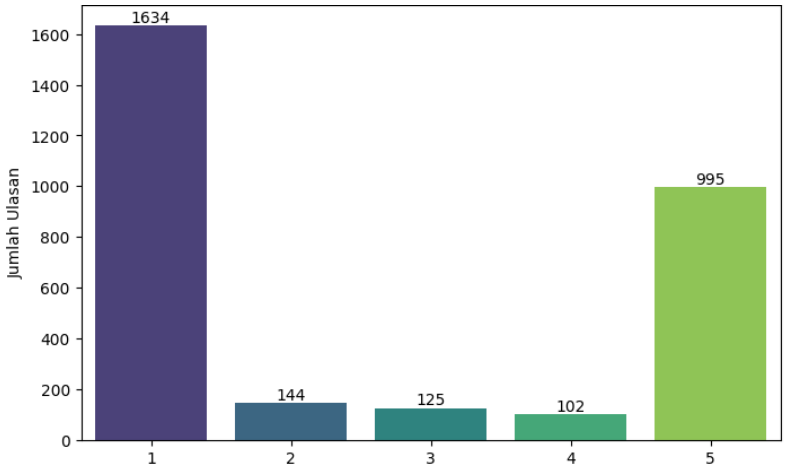

Figure 1. Review Score Distribution

As illustrated in Figure 1, the review score distribution indicates that the majority of users gave the application a very low rating, with 1-star ratings reaching 1,634 reviews or approximately 54.47% of the total. Five-star ratings came in second with 995 reviews (33.17%), while 2-, 3-, and 4-star ratings accounted for only 4.8%, 4.17%, and 3.4% respectively. This unequal distribution reveals a highly polarized perception among users: most were highly dissatisfied, while others were extremely satisfied, with few expressing neutral sentiments.

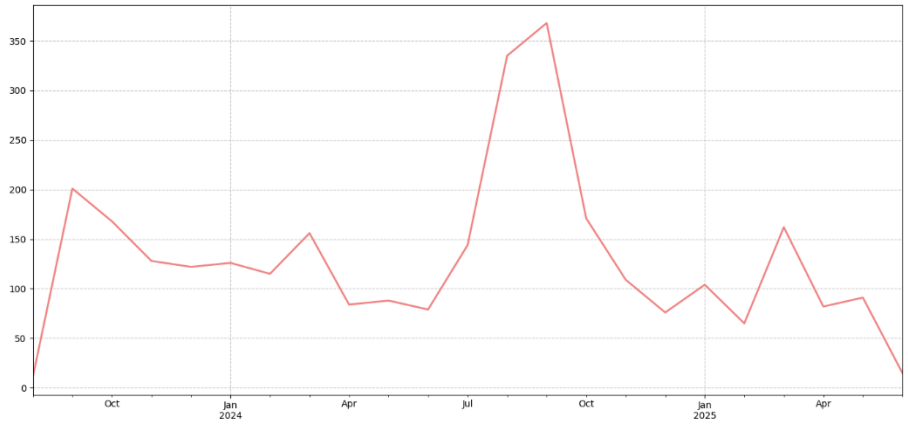

Figure 2. Monthly Review Volume

This polarization is further supported by the trend of monthly review volumes shown in Figure 2, which highlights a significant spike in August and September 2024, with each month recording over 350 reviews. Such sharp increases likely reflect user responses to major application events, such as feature updates, system disruptions, or large-scale promotions that directly impacted user experiences. After this period, the review volume declined sharply and stabilized between 60 to 150 reviews per month. These findings show that review dynamics

are highly sensitive to external events that affect i.Saku's operational performance. Hence, a deeper look into review content is necessary to understand the reasons behind user satisfaction or dissatisfaction.

Before topic modelling was conducted, all review data underwent a preprocessing phase to clean and standardize the text. This involved case folding (converting text to lowercase), removing numbers and punctuation, eliminating URLs, stopword removal, and applying stemming to reduce words to their root forms. This process ensured the text data was relevant and ready for semantic analysis.

The main analytical technique employed was Latent Dirichlet Allocation (LDA), chosen for its ability to identify hidden topic structures within large-scale textual data without requiring manual labeling. To determine the optimal number of topics, a Coherence Score metric was used, measuring the semantic consistency of words within each topic.

Table 1. Coherence Scores for Different Topic Numbers

Number of Topics	Coherence Score
2	0.5386
3	0.5549
4	0.5709
5	0.4906
6	0.4963
7	0.4823
8	0.4590
9	0.4816
10	0.4388
11	0.4657
12	0.4851
13	0.4414
14	0.4595
15	0.4332

Source : *Data processed by researchers*

As shown in Table 1, the highest Coherence Score was achieved with four topics, yielding a value of 0.5709. Beyond this point, the score dropped significantly, suggesting that adding more topics decreased semantic cohesion.

With four topics identified as the optimal configuration, the LDA process yielded four dominant topic groups within the i.Saku review dataset. Each topic consisted of key words frequently co-occurring in reviews, representing a specific theme. These topics include: Topic 1, issues with balance and customer service response (e.g., "saldo", "masuk", "cs", "top up", "respon"), Topic 2, ease of transactions and core features (e.g., "transfer", "bantu", "bayar", "indomaret"), Topic 3, problems with PIN and account access, and Topic 4, login and OTP verification issues. Generally, the first three topics predominantly reflect user complaints, while only the second topic represents a positive user experience.

Table 2. Review Count Distribution by Topic and Rating

Topik	Topic Interpretation	1 Star	2 Star	3 Star	4 Star	5 Star	Total
1	Balance Issues & Customer Service	580	41	40	19	287	967
2	Transaction Ease & Core Features	221	30	38	41	452	782
3	PIN & Account Access Issues	368	33	23	15	47	486
4	Login, Registration & Verification	465	40	24	27	208	764

Source : *Data processed by researchers*

An analysis of topic distribution by rating category in Table 2 revealed that Topics 1 and 4 were the most frequently mentioned in 1-star reviews, with 580 and 465 mentions, respectively. Conversely, Topic 2 was dominant in 5-star reviews, with 452 mentions. This suggests that balance issues and login processes are the primary drivers of dissatisfaction, while positive reviews are driven by transaction features and user-friendliness. Topic 3, related to PIN problems, also appeared mostly in negative reviews but to a lesser extent.

Beyond numerical data, the interpretation of each topic provides meaningful insights. Topic 1, balance and customer service still appeared in 5-star reviews despite dominating the 1-star category, indicating that some users may give high ratings despite reporting issues, possibly because the problems were resolved or because the app retains overall usefulness. Likewise, Topic 4 regarding login and OTP also appeared in some positive reviews. This reflects the complexity of user experiences and supports Liu's (2012) finding that sentiment and rating do not always align linearly, but are instead influenced by individual context and experience (Liu, 2012).

These findings suggest that over the past two years, most user complaints about i.Saku have stemmed from technical and customer service issues, while positive reviews are largely due to the app's effectiveness in facilitating smooth transactions. Therefore, topic modeling results offer a comprehensive overview for developers to conduct targeted evaluations and improve service quality.

Key Factors Shaping User Reviews of i.Saku Based on Dominant Topics in Play Store Reviews

Based on the topic modeling results using the Latent Dirichlet Allocation (LDA) algorithm, four main topics were identified that shape user narratives in reviews of the i.Saku application on Google Play Store, namely: issues of balance and customer service, ease of transactions and core features, PIN errors and account access, as well as login and verification issues. These four topics reflect the major dimensions that influence user perceptions toward digital services such as i.Saku. This finding is consistent with Schiffman and Kanuk (2007), who argue that consumer behavior is heavily influenced by actual experience, perception, and responses to service performance (Schiffman & Kanuk, 2007). s consistent with Schiffman and Kanuk (2007), who argue that consumer behavior is heavily

influenced by actual experience, perception, and responses to service performance [6]. This view is reinforced by Kotler and Keller (2016), who emphasize the importance of customer experience in digital marketing (Peppers et al., 2016), where each interaction point, including Play Store reviews, becomes a tangible reflection of the relationship quality between consumers and digital products.

The first topic, which relates to balance issues and customer service, appeared dominantly in low-rated reviews. Common complaints include uncredited balances, deducted funds without explanation, and slow response from customer service. This indicates that the core utility of the application as a transaction tool is not being fulfilled. Referring to the Utility Theory by Mankiw (2011), the fundamental benefit of a product drastically diminishes when its primary function fails to operate(G. Mankiw, 2011). In this context, failures in top-up processes negate the essential role of i.Saku as a reliable and efficient digital wallet.

On the other hand, the second topic ease of transactions and core features dominates five-star reviews. Words such as “easy,” “fast,” and “practical” appear repeatedly, reflecting positive user experience. Based on consumer behavior theory by Solomon (2012), customer loyalty is formed when a service delivers consistent and satisfying experiences(Solomon, 2012). In this context, i.Saku is seen as successfully fulfilling user expectations, particularly in everyday transactions such as payments at merchants or balance top-ups. This aligns with the utility principle that consumers tend to choose products that offer maximum benefit with minimal sacrifice (G. Mankiw, 2011). However, some five-star reviews also contain light criticism of certain features, which shows that consumer perception is not always linear. As explained by Schiffman and Wisenblit (2006), digital consumers are capable of expressing both appreciation and disappointment simultaneously, as they evaluate services through complex experiential dimensions (Schiffman & Wisenblit, 2006).

The third topic refers to PIN issues and account access difficulties. Many users expressed frustration over failed PIN resets or unsuccessful login attempts. In digital wallet systems, losing access to an account means losing control over personal financial assets, causing serious inconvenience. According to Mankiw (2011), when access to a service is disrupted, the utility of the application becomes essentially zero(N. G. Mankiw, 2011). In addition, user sensitivity to security aspects is discussed by Indriyani et al. (2024), who found that e-wallet users pay close attention to secure and reliable access(Indriyani et al., 2024).

The fourth topic deals with login, registration, and OTP verification issues, which frequently appear in reviews by new users. In consumer behavior theory, early user experience strongly influences the decision to continue or discontinue product usage(Schiffman & Kanuk, 2007). When users face complications during onboarding, a negative impression of the service can form from the start. This is reinforced by the findings of Irawati et al. (2025), which state that complicated login processes significantly reduce user retention in digital financial applications(Irawati et al., 2025).

Taken as a whole, these four topics illustrate the two main spectrums in i.Saku user evaluations: technical reliability and ease of use. The app is considered beneficial as long as its core features function smoothly. However, when disruptions occur, its utility quickly declines, as described in Mankiw's (2011) concept of subjective utility, where comfort and accessibility are integral components of a service's value(G. Mankiw, 2011).

Furthermore, consumer behavior in writing reviews also represents a complex form of digital communication. According to Solomon (2012), service perception is not solely formed by product functionality but also by the emotional experience during usage(Solomon, 2012). Therefore, the presence of negative content in high ratings (and vice versa) is a natural phenomenon and reflects the multidimensional nature of digital consumer evaluation.

This finding supports the study of Saputra et al. (2025), which states that topic modeling using LDA is more effective in capturing user experiences compared to conventional surveys(Saputra et al., 2025). Reviews on Play Store are organic and reflect real conditions experienced by users in practical contexts. Hence, it can be concluded that the factors shaping i.Saku user reviews are a combination of technical experience, perceived utility, and emotional expectations of the application as a whole.

Service Improvement Recommendations Based on Topic Analysis in i.Saku User Reviews

The topic modeling results using the LDA algorithm generated four primary issue groups in i.Saku user reviews: balance and customer service problems, ease of transactions and core features, PIN and account access issues, and login and verification obstacles. Based on these four themes, several strategic and actionable service improvement recommendations can be proposed. These recommendations are not only based on complaint frequency but also take into account behavior patterns, expectations, and consumer perceptions, as explained in consumer behavior theories. This approach reflects the principle of customer-oriented marketing, which prioritizes actual user experience as the foundation for developing digital services (Peppers et al., 2016). By utilizing user reviews as an insight source, i.Saku can reshape its value proposition to be more relevant to its users.

The first topic, related to balance issues and customer service—reveals the need to enhance transaction transparency and customer support responsiveness. Many reviews highlight uncredited balances or unexplained deductions, which significantly reduce user trust. According to Utility Theory, when users lose control over their funds, the primary utility of the product is also lost(G. Mankiw, 2011). Therefore, improvements such as a more reliable balance tracking system, automatic transaction notifications, real-time transaction history, and responsive customer support channels are necessary. As Solomon (2012) also asserts, trust plays a vital role in digital transactions due to the sensitivity of personal financial assets(Solomon, 2012).

The second topic ease of transactions and core features dominates five-star reviews. Users express satisfaction with simple, fast, and practical transaction experiences, especially for payments at merchants like Indomaret or topping up balances. However, these strengths can still be optimized by introducing automatic bill reminders, loyalty point integration, and more intuitive interface designs. Research shows that consistent positive experiences are key to building user loyalty(Blackwell et al., 2001). In this case, maintaining well-reviewed features while adding relevant value-added services is crucial in reinforcing a positive user perception. Still, some five-star reviews contain mild criticisms, showing that consumer perception is not always linear.

The third topic refers to issues related to PIN and account access, which often lead to user frustration due to difficulties in resetting the PIN or failed login attempts. This problem indicates the need for improvements in the verification system and clearer user guidance. For instance, adding alternative login options such as biometric authentication or OTP (One-Time Password) can enhance accessibility. In the context of Utility Theory, interruptions in access eliminate the fundamental benefit of the application, as users are unable to reach their funds(G. Mankiw, 2011). This is reinforced by the study of Muhaimin et al. (2023), which found that login failures significantly reduce users' perception of security and comfort(Muhaimin et al., 2023).

Furthermore, the fourth topic reflects login, registration, and verification obstacles frequently experienced by new users. A complex registration process can create a poor first impression, and according to Consumer Behavior Theory, the first impression greatly influences subsequent decisions to continue using a product(Schiffman & Wisenblit, 2006). i.Saku could adopt an adaptive onboarding approach, such as providing interactive guidance, usage simulations, and real-time customer support during the initial setup phase.

Overall, the strategy to improve i.Saku's service quality must take into account two primary dimensions: functional and emotional aspects. The functional aspects include features, technical reliability, and security, while the emotional aspects relate to comfort, trust, and ease of interaction. These two dimensions shape the user's perceived value of the application. Therefore, service development should not only focus on technical improvements but must also foster emotional connection and trust between users and the application.

Additionally, review data analyzed using LDA can serve as a periodic customer opinion monitoring system. According to Tondang et al. (2023), text mining can be used as a sustainable monitoring tool without the need for manual surveys(Tondang et al., 2023). By using Play Store reviews as a feedback loop, i.Saku developers can detect emerging issues, rising patterns of complaints, or user appreciation that was previously unrecognized. This strategy positions i.Saku not only as an app that responds to complaints but also as a platform that actively builds user loyalty and expands value-added experiences. These data-driven recommendations align with the concept of long-term utility, which is crucial for sustaining digital technology adoption, and serve as a vital strategy to enhance

i.Saku's competitiveness amidst the dominance of major platforms such as DANA, OVO, and GoPay.

5. CONCLUSION

Based on the topic modeling analysis using the Latent Dirichlet Allocation (LDA) method on 3,000 user reviews of the i.Saku application from Google Play Store, this study successfully identified the key issues shaping user perceptions and formulated strategic recommendations for service improvement. The findings reveal four dominant topics frequently discussed in user reviews: balance issues and customer service, ease of transactions and core features, PIN and account access problems, and login, registration, and verification challenges. These topics reflect two main dimensions in user evaluations: system reliability and ease of use. Reviews with low ratings tend to highlight technical problems such as uncredited balances, account access difficulties, or login failures, while high-rated reviews often praise the practicality and transactional convenience provided by i.Saku.

These findings suggest that user perception is influenced by their actual experiences with the service, encompassing both technical functionality and emotional comfort during usage. Accordingly, several recommendations were formulated based on topic analysis and consumer behavior principles. These include improvements to the customer service system and transparency of transaction notifications, simplification of account access and PIN reset processes, optimization of the onboarding experience for new users, and enhancement of core features that are positively received by users. These strategies are not only intended to address existing complaints but also to foster a more positive and sustainable user experience. Therefore, this study concludes that an LDA-based review analysis approach offers a richer and more realistic insight into user satisfaction and dissatisfaction, serving as a vital foundation for user-oriented decision-making in digital product development.

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