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Determinants of User Satisfaction in The Mypertamina Application With User Engagement as an Intervening Variable

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Abstract: The MyPertamina application developed by PT Pertamina aims to enhance the user experience in accessing fuel services in Indonesia. However, despite its widespread use, the application still has some shortcomings. Some users feel that the application does not fully meet their expectations, especially regarding speed, reliability, and the accuracy of the information provided. Additionally, technical issues such as bugs or errors in the application pose barriers that affect user satisfaction, which ultimately impacts the level of user engagement with the application. This study aims to examine how performance expectancy, effort expectancy, social influence, and information quality influence user satisfaction, mediated by user engagement. A survey was conducted among active users of the MyPertamina application who had made transactions using the app. Purposive sampling was used in this study because the researcher wanted to select respondents with specific characteristics, namely active users of the MyPertamina application who had made fuel and non-cash transactions. This study employed a quantitative approach using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with 130 respondents. The results showed that performance expectancy, effort expectancy, social influence, and information quality had a positive and significant impact on user satisfaction, mediated by user engagement. This study provides managerial implications for MyPertamina app developers to continuously improve the app's performance, ease of use, social influence, and the quality of information provided in order to enhance user satisfaction and engagement, thereby supporting sustained app usage. Developers should also pay attention to user feedback regarding technical issues and app quality to enhance the overall user experience.

Keywords: Effort Expectancy, Performance Expectancy, User Satisfaction, User Engagement, SEM-PLS

INTRODUCTION

The development of information and communication technology has brought significant changes to various aspects of life, including the energy sector, where the adoption of digital technology is now a crucial part of business strategy (Syamsir et al. 2022). In response to this trend, PT Pertamina, Indonesia's largest energy company, has developed the MyPertamina application to facilitate transactions and improve customer service (Prawiyogi & Anwar, 2023).

This application is designed to provide digital financial services that allow users to purchase Pertamina products, both in cash and non-cash (Afriady & Mulyandani, 2023).

To start using the MyPertamina app, users can download it from the Google Play Store for Android devices or the App Store for iPhones, reflecting the growing adoption of mobile app technology to provide easy access to services for consumers (Syamsir et al. 2022). The digitization of services in the energy sector not only expands customer reach but also increases transaction efficiency, which is increasingly relevant in the digital era (Hasanah et al. 2023). The number of MyPertamina app downloads over the past five years demonstrates a positive user response to the app.

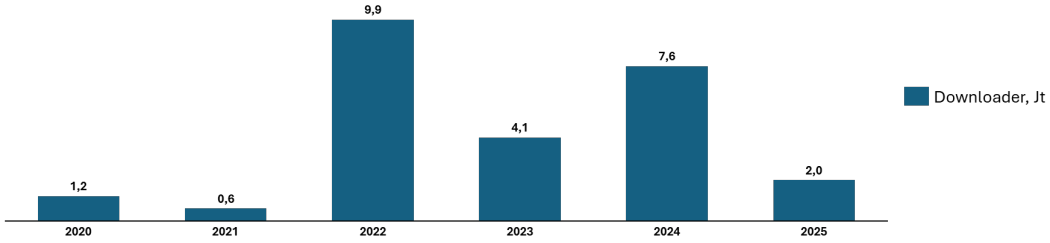


Figure 1. Number of Downloaders of the My Pertamina Application

Based on the data obtained, the average compound annual growth rate for the 2020-2025 period was 10.76%. This increase in downloads indicates positive public acceptance of the MyPertamina app. Furthermore, the number of active MyPertamina app users has also increased significantly, reaching 2.1 million users in 2022 and continuing to grow to 2.8 million by 2025.

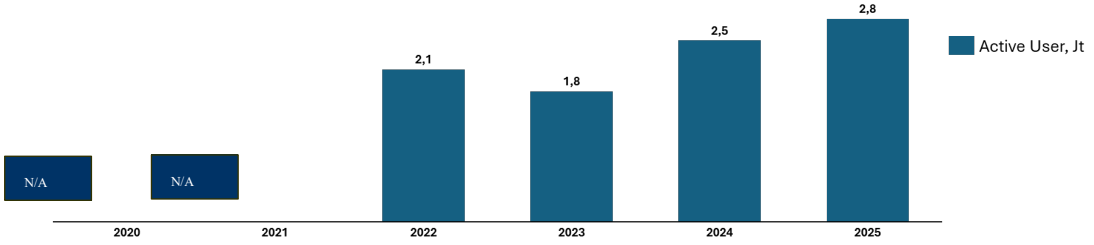
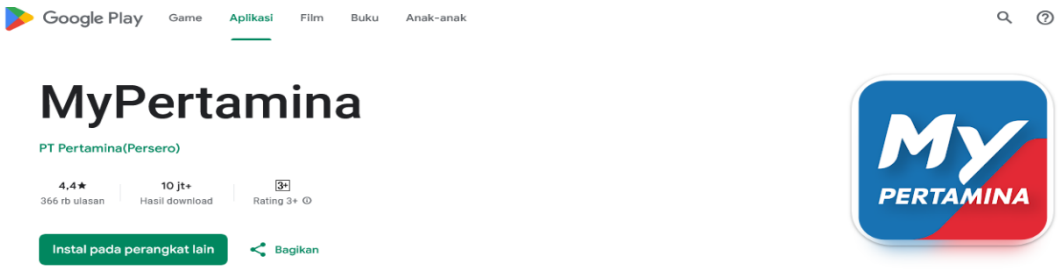


Figure 2 Number of Active Users of the My Pertamina Application

The average compound annual growth rate of active users is 5.92%. This increase in users reflects MyPertamina's success in attracting public interest in using the app for fuel purchases and other services. Despite the app's growing popularity, several challenges remain. Some users reported difficulty accessing the app, issues with the payment system, and technical glitches that impacted the user experience. Some gas stations do not yet support LinkAja, which further hinders the app's development. Furthermore, account registration issues and points not accruing despite successful transactions can also undermine user trust in the app (Chantika et al., 2024).



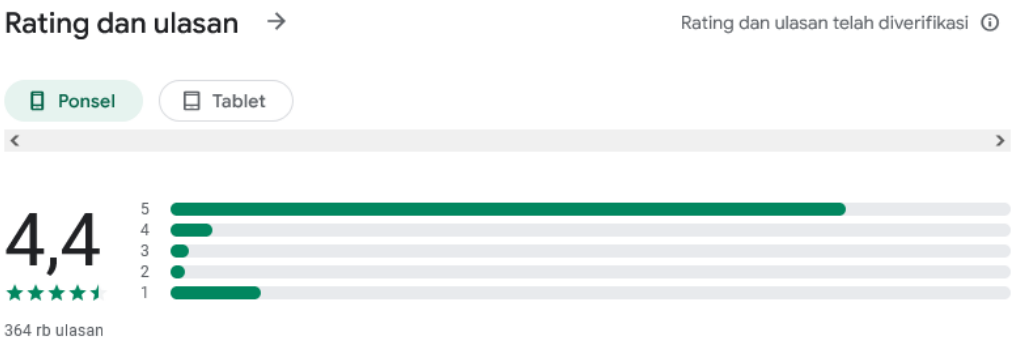


Figure 3. Google Play Store Review

Despite this, the MyPertamina app has a fairly high rating on the Google Play Store, at 4.4 out of 5 stars, with over 10 million downloads and approximately 364,000 reviews. This rating indicates a relatively high level of user satisfaction, although there are still negative reviews related to technical issues and bugs in the app (Hasanah et al. 2023). User reviews are crucial because they provide direct feedback on app performance and help developers understand user needs and expectations.

*User engagement*User engagement also plays a crucial role in determining user satisfaction and loyalty towards MyPertamina. A high rating and numerous reviews indicate that users actively engage with the app, both through transactions and feedback. A high level of user engagement indicates that the app provides significant value to them, which in turn encourages continued use (Amin et al., 2022).

However, researchers' observations indicate that some gas stations still cannot process transactions using this application, citing reasons such as broken equipment or signal interference. Furthermore, many gas station attendants do not fully understand how to operate the application, resulting in long queues and reduced transaction efficiency. This suggests that while the application is designed to simplify transactions, in practice, there are still issues in the field that reduce its intended benefits (Chantika et al., 2024).

The use of the MyPertamina app for purchasing subsidized fuel in Indonesia has also generated both pros and cons among the public. On the one hand, the app aims to ensure targeted and more efficient distribution of fuel subsidies. However, significant challenges related to accessibility and app use, particularly in remote areas with limited internet infrastructure, remain obstacles that need to be addressed (Yonada, 2024).

The Unified Theory of Acceptance and Use of Technology (UTAUT) is highly relevant for understanding the factors influencing MyPertamina app adoption. UTAUT introduces four main variables: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh, 2022). This study aims to analyze the influence of these variables on user satisfaction through user engagement as a mediating variable.

In this case, Performance expectancy refers to users' expectations of the benefits obtained from using the application. Effort expectancy relates to the level of ease of use of the application, which plays a significant role in influencing user engagement (Hossain et al., 2023). Meanwhile, social influence encompasses the influence of a user's social environment on their decision to adopt new technology, which has been shown to influence user intention and satisfaction (Fatahudin, 2020). Furthermore, information quality is a crucial factor in influencing user satisfaction and engagement (DeLone & McLean, 2003).

This research has the potential to provide new contributions by examining how these four variables interact and influence user satisfaction through user engagement, particularly in public service applications like MyPertamina. By understanding the influence of these variables, application developers can design more effective strategies to improve service quality and meet

user needs, which in turn will contribute to the sustainability and future growth of the MyPertamina application.

METHOD

This study uses explanatory research with a quantitative approach. Explanatory research is used to identify the main determinant variables that predict certain constructs, with the aim of explaining the relationship between variables that influence user satisfaction of the MyPertamina application, such as performance expectancy, effort expectancy, social influence, information quality, and user engagement. The quantitative approach was chosen because it allows the measurement and analysis of relationships between variables using numerical data from user surveys. This study also focuses on explaining the role of user engagement as a mediator that strengthens or moderates the influence of these variables on user satisfaction. By using statistical models such as Structural Equation Modeling (SEM), this study can identify and explain the causal relationship between factors that influence user satisfaction in an objective and measurable manner.

The population determined in this study were MyPertamina app users in the DKI Jakarta area who made transactions using the app. Sampling was conducted using a purposive sampling technique, where samples were taken based on certain predetermined criteria (Sekaran & Bougie, 2020). Respondent criteria included active MyPertamina app users who had used the app for fuel and non-cash transactions. The purposive sampling technique was chosen because it is in accordance with quantitative research, where respondent selection is based on relevant criteria and certain factors. According to Hair et al. (2019), sample size depends on the number of indicators used for all variables, and the sample size is calculated by multiplying the number of indicators by 5 to 10. Based on this calculation, the number of samples used was 130 respondents, which is the minimum number required for SEM analysis, in accordance with the guidelines provided by Hair et al. (2014).

In data analysis, this study used the Structural Equation Modeling (SEM) method, which is a multivariate analysis technique to build and test causal relationship models between variables. SEM allows for more in-depth analysis because it can measure direct and indirect relationships between latent variables and integrate measurement models with structural models. This study used the Partial Least Squares (PLS) approach in SEM, which is designed to maximize the variance of endogenous variables explained by exogenous variables. SEM-PLS is suitable for exploratory research, especially when the model used involves many indicators and data that does not meet the assumption of normal distribution. This study processed the data using SmartPLS version 4 software, which includes features for evaluating measurement models (validity and reliability) and structural models (relationships between latent variables).

RESULTS AND DISCUSSION

Respondent Characteristics

This section describes the demographic distribution of respondents in this study. The majority of respondents were male (63.1%), with the largest age group being between 35-44 years old (66.9%), and most had a bachelor's degree (79.2%). Most respondents came from East Jakarta (31.5%) and South Jakarta (28.5%), with the majority being married (90.8%) and working as civil servants or state-owned enterprises (BUMN) employees (83.1%). In terms of income, most respondents earned more than Rp 20,000,000 (64.6%), and the majority had used the MyPertamina application for more than 12 months (66.2%). However, despite its frequent use, most respondents (55.4%) last used the application more than a month ago, indicating varying frequency of use, with a small proportion of active users using the application in the past week (26.9%). This data provides an overview of the characteristics of respondents that influence their interactions with the application, both related to expectations of the application,

technology use, as well as social influences and daily needs that are influenced by demographics such as occupation, income, and marital status.

Measurement Model (Outer Model)

Table 1 below combines the results of convergent, discriminant, and reliability validity tests for each variable in this study. In the outer model testing stage, validity and reliability are the primary factors that must be ensured first.

Table 1. Validity and Reliability Test

Variables	Indicator	*Loading Factor*	*AVE*	*Cronbach's Alpha*	*Composite Reliability*
Performance Expectancy	PE1	0.813	0.617	0.846	0.852
	PE2	0.785			
	PE3	0.777			
	PE4	0.747			
	PE5	0.803			
Effort Expectancy	EE1	0.904	0.820	0.890	0.892
	EE2	0.914			
	EE3	0.898			
Social Influence	SI1	0.886	0.741	0.826	0.830
	SI2	0.836			
	SI3	0.860			
Information Quality	IQ1	0.888	0.785	0.932	0.936
	IQ2	0.874			
	IQ3	0.905			
	IQ4	0.899			
	IQ5	0.862			
User Engagement	UE1	0.817	0.623	0.799	0.823
	UE2	0.837			
	UE3	0.661			
	UE4	0.828			
Satisfaction	US1	0.816	0.646	0.890	0.893
	US2	0.819			
	US3	0.766			
	US4	0.762			
	US5	0.836			
	US6	0.820			

The results above demonstrate convergent validity testing, conducted by measuring factor loading values and Average Variance Extracted (AVE). Based on the test results, all indicators in the variables performance expectancy, effort expectancy, social influence, information quality, user engagement, and satisfaction have factor loading values above 0.6 and AVE above 0.5. This indicates that all indicators in this study are convergently valid, meaning they can effectively measure the intended latent variables.

In addition, a discriminant validity test was used to ensure that the indicators in each latent variable were distinct and could measure their respective constructs separately. The results of the discriminant validity test showed that the root mean square root of the AVE for each variable was greater than the correlation between the other variables, indicating that discriminant validity had been met. Variables such as effort expectancy, performance expectancy, social influence, information quality, user engagement, and satisfaction all showed appropriate values, with the root mean square root of the AVE greater than the correlation between the constructs, ensuring that each variable had clear discrimination.

Next, the reliability test was conducted by measuring the Cronbach's Alpha and Composite Reliability (CR) values. The results of the reliability test showed that the Cronbach's Alpha values for each variable, such as performance expectancy (0.846), effort expectancy (0.890), social influence (0.826), information quality (0.932), user engagement (0.799), and satisfaction (0.890), were all higher than 0.60, and the CR value for each variable was more than 0.70. This indicates that the model used in this study meets the established reliability standards, so it can be trusted in measuring the variables studied, especially in analyzing the role of user engagement in mediating the influence of performance expectancy, effort expectancy, social influence, and information quality on user satisfaction in MyPertamina application users.

Structural Model (Inner Model)

At the stage of testing the structural model (inner model), various tests are carried out to evaluate the relationship between latent variables in the research framework.

Table 2. R-Square and Q-Square

Variables	*R-Square*	*Q-Square*	Information
User Engagement	0.698	0.401	*Moderate predictive relevance*
Satisfaction	0.844	0.526	*Large predictive relevance*

The R-square test measured the strength of relationships between endogenous and exogenous variables. Based on the R-Square test results, 69.8% of user engagement can be explained by performance expectancy, effort expectancy, social influence, and information quality. Meanwhile, 84.4% of satisfaction can be explained by these five variables plus user engagement, indicating that this model is able to explain variations in both constructs quite well.

Furthermore, to assess the magnitude of the influence of a construct on the target construct, the Effect Size (f-Squared) test is used. Based on the results of the f-Squared test, most of the relationships between variables show weak influences. For example, the relationship between effort expectancy and satisfaction ($f^2 = 0.069$), and social influence with satisfaction ($f^2 = 0.042$), show small values, indicating limited influence. However, several relationships show moderate influence, such as between effort expectancy and user engagement ($f^2 = 0.175$) and information quality with satisfaction ($f^2 = 0.232$), which indicate a greater contribution in this model.

The Q-Square test was used to measure the reliability of the model in predicting the dependent variable. The Q-Square test results show that the user engagement variable has a Q^2 value of 0.401, indicating moderate predictive ability, while satisfaction has a Q^2 value of 0.526, indicating strong predictive ability. This indicates that this model has a significant contribution in predicting satisfaction and quite strong predictive relevance. While for user engagement, although the model's predictions are quite good, there is still room for further development.

Hypothesis Testing

The detailed testing of the direct and indirect influence hypotheses is presented in the following Figure and Table.

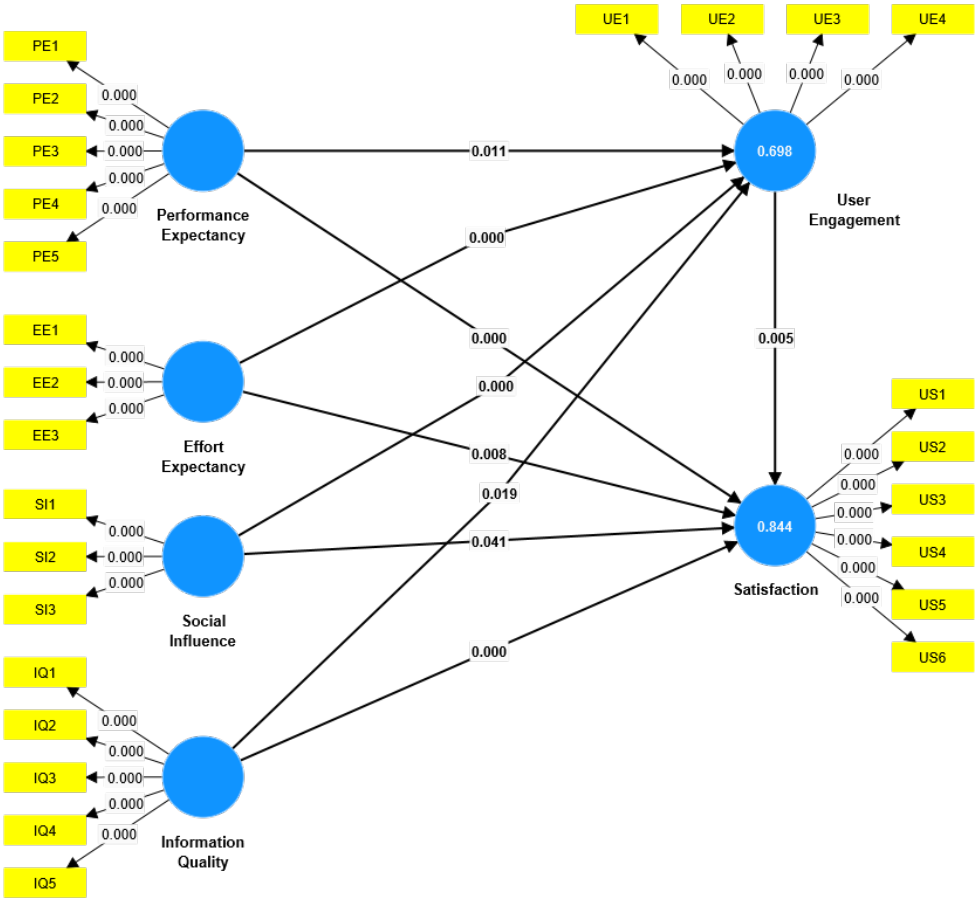


Figure 1. Path Diagram

Table 3 Hypothesis Test Results

Hypothesis	Influence	Original sample (O)	T statistics (|O/STDEV|)	P values	Information
H1	*Performance _Expectancy -> User _Engagement*	0.196	2,308	0.011	Positive and Significant
H2	*Effort _Expectancy -> User Engagement*	0.367	3,878	0.000	Positive and Significant
H3	*Social _Influence -> User Engagement*	0.246	3,781	0.000	Positive and Significant
H4	*Information _Quality -> User Engagement*	0.196	2,083	0.019	Positive and Significant
H5	*Performance _Expectancy -> Satisfaction*	0.289	5,177	0.000	Positive and Significant
H6	*Effort _Expectancy -> Satisfaction*	0.180	2,401	0.008	Positive and Significant
H7	*Social _Influence -> Satisfaction*	0.101	1,736	0.041	Positive and Significant
H8	*Information _Quality -> Satisfaction*	0.297	4,528	0.000	Positive and Significant
H9	*UserEngagement -> Satisfaction*	0.208	2,559	0.005	Positive and Significant
H10	*Performance _Expectancy -> User _Engagement -> Satisfaction*	0.041	1,653	0.049	Positive and Significant
H11	*Effort _Expectancy -> User Engagement -> Satisfaction*	0.076	2.101	0.018	Positive and Significant
H12	*Social _Influence -> User Engagement -> Satisfaction*	0.051	2.109	0.018	Positive and Significant
H13	*Information _Quality -> User Engagement -> Satisfaction*	0.041	1,646	0.050	Positive and Significant

Hypothesis 1: Performance Expectancy has a significant positive influence on User Engagement.

The first hypothesis suggests that performance expectancy has a positive effect on user engagement, meaning the higher users' expectations of app performance, the greater their engagement. This finding aligns with Chow & Legowo (2023) who stated that performance expectancy can encourage users to interact more with an app, leading to increased engagement.

Hypothesis 2: Effort Expectancy has a significant positive influence on User Engagement.

The second hypothesis states that an app's ease of use (effort expectancy) influences user engagement. The easier an app is to use without excessive effort, the higher the level of user engagement. This supports the findings of Hossain et al. (2023), which state that easy-to-use apps increase user comfort and motivation to engage longer.

Hypothesis 3: Social Influence has a significant positive influence on User Engagement.

The third hypothesis explains that social influence has a positive effect on user engagement, meaning that the influence of others, such as friends or family, can encourage someone to engage more with an app. Research by Liu et al. (2022) confirms that social recommendations play a significant role in users' decisions to use an app and engage more.

Hypothesis 4: Information Quality has a significant positive influence on User Engagement.

The fourth hypothesis suggests that clear and relevant information quality increases user engagement with an app. Alam et al. (2020) found that accurate and easy-to-understand information encourages users to engage more with an app because they perceive greater benefits.

Hypothesis 5: Performance Expectancy has a significant positive influence on Satisfaction

The fifth hypothesis states that performance expectancy has a positive effect on satisfaction, meaning that users' expectations of application performance directly increase their satisfaction. This finding is supported by Chow & Legowo (2023), who showed that application performance that meets user expectations increases their level of satisfaction with the application.

Hypothesis 6: Effort Expectancy has a significant positive influence on Satisfaction

The sixth hypothesis explains that effort expectancy has a positive influence on satisfaction, meaning the easier an application is to use, the greater the user satisfaction. Hossain et al. (2023) also emphasize that easy-to-use applications provide a better experience and lead to greater user satisfaction.

Hypothesis 7: Social Influence has a significant positive influence on Satisfaction

The seventh hypothesis states that social influence has a positive effect on satisfaction, meaning recommendations from others can increase user satisfaction. Research by Liu et al. (2022) suggests that social influence strengthens users' decision to use an app and increases their satisfaction levels.

Hypothesis 8: Information Quality has a significant positive influence on Satisfaction

The eighth hypothesis suggests that good information quality increases user satisfaction with an app. Research by Liu et al. (2022) and Hossain et al. (2023) shows that accurate and relevant information makes users feel more informed and satisfied with their app experience.

Hypothesis 9: User Engagement has a significant positive influence on Satisfaction

The ninth hypothesis suggests that user engagement has a positive effect on satisfaction, meaning that the higher a user's engagement with an application, the higher their satisfaction level. This finding is supported by research by Chow & Legowo (2023), which showed that active user engagement increases their satisfaction with an application.

Hypothesis 10: Performance Expectancy has a positive influence on Satisfaction through User Engagement

The tenth hypothesis explains that performance expectancy positively influences satisfaction through user engagement. This means that users' expectations regarding application performance increase their engagement, which in turn contributes to increased satisfaction, as stated by Hossain et al. (2023).

Hypothesis 11: Effort Expectancy has a positive influence on Satisfaction through User Engagement

The eleventh hypothesis states that effort expectancy positively influences satisfaction through user engagement. The easier an application is to use, the higher the user engagement, which in turn increases their satisfaction. Research by Hossain et al. (2023) supports this finding, showing that ease of use improves user experience.

Hypothesis 12: Social Influence has a positive influence on Satisfaction through User Engagement

The twelfth hypothesis suggests that social influence positively impacts satisfaction through user engagement. Social influence, whether from friends or the community, can increase user engagement, which in turn increases their satisfaction. Research by Liu et al. (2022) supports this view, showing that social influence strengthens user satisfaction.

Hypothesis 13: Information Quality has a positive influence on Satisfaction through User Engagement

The thirteenth hypothesis suggests that information quality positively influences satisfaction through user engagement. High information quality can increase user engagement, which in turn increases their satisfaction. This finding aligns with research by Alam et al. (2020), which demonstrated that information quality plays a significant role in increasing user engagement.

Managerial Implications

Table 4 Managerial Implications

Analysis Tools	Findings	Code	Managerial Implications	Intended
Demographic Analysis	The majority of respondents using the MyPertamina application are men (63.1%).	1	App developers should adapt the appearance and features to be more targeted towards men, including a more masculine and efficient design in terms of app usage.	MyPertamina application users
	The majority of respondents were aged 35-44 years (66.9%).	2	Features that increase time efficiency, such as fast fueling and easy transactions, should be prioritized for MyPertamina app users, most of whom are of productive age.	
Exposure Analysis	Users exposed to good app performance are more engaged.	3	Application managers should focus on improving application performance so that users who are frequently exposed to applications with optimal performance tend to be more engaged,	MyPertamina application users

Analysis Tools	Findings	Code	Managerial Implications	Intended
			which has a positive impact on user engagement.	
	Users who find an app easy to use tend to be more engaged.	4	Simplifying an app's interface to make it easier to use can reduce friction for users and increase effort expectancy and user engagement.	
PLSEM	*Performance expectancy, effort expectancy, social influence and information quality*influence on user engagement	5	Improve app performance to ensure it performs as expected by users, which will drive greater engagement. Focus on technical aspects to improve app performance to meet user expectations.	Mypertamina application users
	*Performance expectancy, effort expectancy, social influence and information quality*influence on user satisfaction	6	Simplifying the app design and improving the user experience to enhance convenience and satisfaction. Simplifying the app interface to make users feel more comfortable and satisfied with its use.	
	User engagement influences user satisfaction	7	Increase user engagement by providing more engaging and interactive content, and providing an adequate application experience to increase user satisfaction.	

The results of this study provide an in-depth understanding of the factors influencing user engagement and satisfaction with the MyPertamina app. Based on demographic analysis, the majority of MyPertamina app users are male, at 63.1%. This suggests that app managers need to adapt the design and features to better align with male preferences. A more masculine appearance and more efficient features can increase engagement among these predominantly male users. Adapting these elements to the target audience will help create a more relevant and satisfying user experience.

Furthermore, the majority of respondents were also in the 35-44 age group, accounting for 66.9%. Users in this age range are typically in a productive phase of life and have a need for time efficiency. Therefore, MyPertamina app managers should prioritize features that expedite transaction processes, such as fast fuel refills and ease of other transactions. These features will provide convenience and increase user satisfaction in carrying out daily activities using the app.

Research also shows that exposure to well-performing apps increases user engagement. Performance expectancy, or user expectations of app performance, has been shown to be a crucial factor in increasing engagement. App managers should focus on maintaining and improving app performance to ensure optimal performance, particularly technical aspects that meet user expectations. Users who perceive an app to be functioning well are more likely to use the app more frequently and engage with it more, which in turn can increase user engagement.

Furthermore, research findings reveal that effort expectancy—the ease of using an application—has a significant impact on user engagement. Users who perceive an application as easy to use are more likely to continue using and interacting with it. Therefore, simplifying the application interface and improving navigation to make it easier for users to perform various transactions can reduce friction and increase user engagement. Application managers should prioritize ease of use in their application interface design.

Finally, this study also shows that user engagement directly impacts user satisfaction. App managers must innovate by providing more engaging and interactive content to keep users engaged. By improving the overall user experience, both in terms of app performance and the content offered, user satisfaction will increase. High user satisfaction will lead to greater loyalty

to the app, which can ultimately enhance the MyPertamina app's reputation and success in the market.

CONCLUSION

The results of the study indicate that performance expectancy, effort expectancy, social influence, and information quality have a positive and significant effect on user engagement in the MyPertamina application. The higher the user's expectations of the application's performance, the easier the application is to use, the greater the social influence perceived by the user, and the better the quality of the information provided, the higher the level of user engagement with the application. These findings emphasize that application managers need to improve application performance, simplify application use, utilize existing social influence, and improve information quality to encourage user engagement.

This study also found that performance expectancy, effort expectancy, social influence, and information quality have a positive and significant impact on user satisfaction with the MyPertamina app. Users who feel the app meets their performance expectations, is easy to use, is influenced by social opinions around them, and receives quality information tend to be more satisfied with their experience using the app. Therefore, app managers need to ensure that the app meets user expectations in these aspects to improve overall user satisfaction.

The results of this study also show that user engagement has a positive and significant influence on user satisfaction in the MyPertamina application. The more engaged users are with the application, the higher their perceived level of satisfaction. This finding emphasizes the need for application developers to design features that encourage active user interaction with the application, as greater engagement is directly related to increased user satisfaction, which ultimately can strengthen user loyalty and ensure continued application usage.

Overall, the results of this study confirm that performance expectancy, effort expectancy, social influence, and information quality play a significant role in increasing user engagement and satisfaction. Therefore, to increase user engagement and satisfaction, MyPertamina app managers should focus on improving the app's quality in terms of performance, ease of use, social influence, and information quality. Furthermore, increasing user engagement has been shown to be crucial for increasing user satisfaction, which in turn contributes to the long-term sustainability of the app. By increasing user engagement, app managers can create a more satisfying experience for users, which will strengthen their loyalty to the app. This loyalty is crucial to ensure that users remain active in the MyPertamina app and do not switch to competitors' apps. Furthermore, continued improvement in user engagement will encourage positive recommendations from satisfied users, which can attract more new users.

By consistently prioritizing aspects such as performance expectancy, effort expectancy, social influence, and information quality, MyPertamina app managers can ensure the app remains relevant and meets user expectations. Improvements in all these aspects will create a better app ecosystem, which in turn will support the app's long-term growth and success in the market.

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