



The utilization of the PIECES framework to gauge user satisfaction among investors of the Bibit mutual fund application

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Abstract

In keeping up with the ever-advancing landscape of technology, numerous sectors are adapting to the ongoing changes. Capitalizing on this trend, the digital investment platform known as the Bibit mutual fund application emerged. Offering a plethora of investment options, including money markets, bonds, stocks, Sharia-compliant investments, and government securities, Bibit stands out as the most widely-used mutual fund application with a user share of 32.9%, as reported by a Populix survey. With a substantial user base, it becomes essential to employ methods for assessing user satisfaction based on the elements constituting the system. One such method that can be used for measurement and evaluation is PIECES, which stands for Performances, Information and Data, Economics, Control and Security, Efficiency, and Service. PIECES is a tool for analyzing computer-based information systems, comprising crucial points useful as guidelines for system analysis. This research adopts a quantitative approach with a correlational study design. In this study, primary data is collected through the distribution of questionnaires among 100 users of the Bibit mutual fund application within the investor community. Respondent selection is based on purposive sampling, with criteria including active or former Bibit users, a minimum of one investment transaction, and willingness to participate in the study. The findings of this research indicate that both information and data, as well as service, have a partial influence on user satisfaction.

Keywords: User satisfaction, Pieces framework, Bibit, Mutual funds, Influence.

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1. Introduction

Involvement and awareness of the Indonesian public in terms of investment are relatively low. The majority of the population is more familiar with investments in tangible assets such as gold, jewelry, land, and buildings. There are still few who are acquainted with investments in securities and the like. This is due to the prevailing negative stigma regarding investments, such as the need for significant capital, high risks, complex initial procedures and investment management, and time-consuming processes. Investment, in general, encompasses various definitions.

Investment itself is the postponement of current consumption for use in efficient production over a specific period of time, according to Hartono (2010). Meanwhile, according to Tandelilin (2010), investment refers to a commitment of a certain amount of funds or other resources made in the present with the aim of obtaining a profit in the future. Suwandi (2011) as cited in Rizal (2021), suggests that investment is a form of deferring consumption from the present to the future, where investment carries uncertainty and, therefore, requires compensation for the delay, referred to as profit or gain.

Yet, there are various investment products readily adaptable to meet our investment goals and needs, with mutual funds being a prime example. As per Article 1, paragraph 27 of the Capital Market Law Number 8 of 1995, a mutual fund is defined as a vehicle used to pool funds from the investing public for subsequent investment in a portfolio of securities by investment managers. Mutual funds are one form of investment where capital is placed into a pool of assets managed by an investment manager.

In this regard, there are three crucial elements associated with mutual funds as per Rizal (2021). Firstly, it involves the pooling of funds from the public, including funds sourced from individual investors or institutions. Secondly, there is the portfolio aspect, where the funds collected from investors are subsequently invested in various investment instruments such as stocks, government bonds, corporate bonds, money market instruments, and so forth. Thirdly, there is the investment manager who plays a pivotal role in overseeing the funds entrusted by investors. In summary, mutual funds represent a financial vehicle where funds from various sources are aggregated and then strategically invested in a diversified portfolio of financial instruments, all under the management and expertise of an investment manager (Aransyah, 2020; Baigi et al., 2020).

Mutual funds are established because investors often lack the time for monitoring, sufficient investment knowledge, or significant capital to invest directly (Faharani, 2020; Aransyah et al., 2022). Consequently, they entrust their funds to investment managers, who pool money from various investors and allocate it across multiple securities issuers. Mutual funds can be purchased through banks or asset management companies in Indonesia. There are various types of mutual funds, including money market mutual funds, fixed-income mutual funds, balanced mutual funds, and equity mutual funds.

However, as time progresses, technology advancements worldwide continue to advance (Noor et al., 2019). In Indonesia, this is evident based on research from the social media management platform HootSuite and social marketing agency We Are Social, titled 'Global Digital Report 2020.' It indicates that 64% of Indonesia's population is connected to the internet. Furthermore, the number of internet users in Indonesia has reached 175.4 million out of a total population of 272.1 million. This signifies an increase in internet users compared to 2019, which saw a growth of 25 million people or 17% (Kumpran, 2020).

To keep pace with the increasingly advanced technological developments, numerous fields, including the investment sector, have undergone changes and adjustments. Leveraging these lifestyle changes, various parties are striving to raise awareness among the younger generation

regarding investment opportunities and are implementing advancements to facilitate investment. In 2020, there was a notable growth of new investors, with a 53.47% increase compared to the total number of investors in 2019. This amounted to a growth of 590,658 new investors in 2020.

In 2020, the President Director of the Indonesia Stock Exchange (BEI), Inarno Djajadi, stated that the new investors were predominantly millennials in the age range of 18-30, totaling 411,480 SID or 70% of the total new investors in 2020 (CNBCIndonesia.com., 2021). By harnessing the large millennial population in Indonesia and the ongoing technological advancements, we can facilitate the younger generation to invest through their smartphones or laptops. On the other hand, mutual fund investments have made significant progress with the emergence of various applications that allow us to purchase and monitor our mutual fund portfolios. As a result, mutual funds have become a popular investment choice for many people. This is evidenced by an article from DailySocial.id, which cited a Populix survey ranking mutual fund investments as the top choice with a 67% (DailySocial, 2020).

Leveraging the newfound enthusiasm in the fields of technology and finance, several digital-based investment platforms have engaged in extensive promotions to attract investors to invest in their platforms. One such platform is the Bibit app, or PT Bibit Tumbuh Bersama. The Bibit app, or PT Bibit Tumbuh Bersama, is an application designed for investing in mutual fund products, officially established in 2017 and launched in early 2019. The Bibit app offers several investment options for investors, including money market funds, bonds, stocks, Sharia-compliant funds, and government securities. With these five investment choices provided by Bibit, it's no wonder that many investors are drawn to using this application.

According to Playstore, as of November 17, 2021, the Bibit app has been downloaded over 1 million times with a rating of 4.6. Meanwhile, on the Appstore, Bibit has received a rating of 4.8. Additionally, based on a Populix survey, the most preferred choice among users for a mutual fund application is Bibit, with a percentage of 32.9%, followed by Ajaib (26.4%) and Tokopedia (19.3%).

With the emergence of the Bibit app and the substantial number of downloads it has garnered, it is essential to assess user satisfaction among investors regarding the app's performance, their opinions on the features and services provided, and what improvements are necessary for enhancing its performance and ensuring sustainable development. This is carried out to maintain the sustainability of Bibit app users, both existing and potential. Enhancing the sustainability of relationships with existing users while continuously acquiring new users through a customer satisfaction approach can significantly influence market share and customer retention efforts.

Hence, there is a need for research that delves into the strengths and weaknesses of the Bibit app in terms of the composition of elements shaping the system, allowing for thorough examination and analysis. This research primarily focuses on scrutinizing Bibit due to the substantial number of app downloads and the relatively similar features it offers. It is important to note that user satisfaction is an abstract and challenging concept to measure. To analyze or evaluate a system effectively, a specific analytical model is required, which will be utilized to assess the system's performance.

One of the methods that can be used for measurement and evaluation is PIECES (Performance, Information and Data, Economics, Control and Security, Efficiency, and Service). In terms of its definition, PIECES is a tool for analyzing computer-based information systems, comprising key points that serve as guidelines or references in the analysis of the system. The PIECES Framework itself encompasses several aspects useful for evaluating a system, which are

performance, information and data, economics, control and security, efficiency, and lastly, service (Febriyanto et al., 2023; Aditya et al., 2022; Prayogi et al., 2021).

2. Hypotheses

The hypotheses for this research can be formulated as follows:

H₁: It is hypothesized that the performance (reliability) aspect partially contributes to user satisfaction with the Bibit app.

H₂: It is hypothesized that the information and data aspect partially contribute to user satisfaction with the Bibit app.

H₃: It is hypothesized that the economics aspect partially contributes to user satisfaction with the Bibit app.

H₄: It is hypothesized that the control and security aspect partially contribute to user satisfaction with the Bibit app.

H₅: It is hypothesized that the efficiency aspect partially contributes to user satisfaction with the Bibit app.

H₆: It is hypothesized that the service aspect partially contributes to user satisfaction with the Bibit app.

H₇: It is hypothesized that the performance, information and data, economics, control and security, and efficiency aspects collectively contribute to user satisfaction with the Bibit app.

3. Methodology

The type or method to be employed in this research is quantitative correlation research. Therefore, the nature of this research is quantitative correlation, which employs statistical methods to measure the relationship between two or more variables. The data collection method utilized for gathering responses is through questionnaires. In this research, there are two related variables, namely the dependent variable (Y) and the independent variable (X). The dependent variable (Y) is User Satisfaction, while the independent variable (X) is PIECES, consisting of Reliability as X₁, Information and Data as X₂, Economic factors as X₃, Control and Security as X₄, Efficiency as X₅, and Service as X₆.

3.1. Determination of Population and Sampling

Hence, the population in this research comprises investors using the Bibit app, whose exact number is unknown and can be categorized as infinite. Due to time, budget, and resource constraints, it is not feasible for the researcher to study the entire population. The sampling technique to be employed in this research is a non-probability sampling method known as Purposive Sampling. Purposive sampling involves the selection of samples based on specific criteria. In this study, certain criteria will be established for the sample selection. The research sample will consist of respondents who are currently using or have previously used Bibit, have conducted a minimum of one investment transaction, and are willing to participate as respondents. The sample size is determined using the Paul Leedy formula with a confidence level of 95% and a margin of error of 10%.

$$n = (1,96/0,1) ^ (2) (0,5) (1- 1/0,5)$$

$$n=96,04$$

$$n = 96,04 \text{ (then rounded up to 100 people).}$$

3.2. Data Collection and Analysis

The questionnaire will be distributed using Google Forms and shared with investors who use Bibit. The research questionnaire will be distributed to Bibit app users, followers of Bibit app's

social media accounts, and several community groups using the Bibit app on Telegram and other social media platforms. Data will be collected from a total of 100 respondents, in line with the required research criteria.

The respondents in this study are users of the Bibit application or individuals who have been using the Bibit application for more than 3 months. According to Paul Leedy's formula, this study requires 100 respondents. During the questionnaire filling process, 100 respondents were gathered.

Data processing was conducted using Microsoft Excel 2013, and further testing was performed using IBM SPSS version 25. The tests conducted included validity testing, reliability testing, normality testing, multicollinearity testing, heteroskedasticity testing, multiple linear regression analysis, coefficient of determination testing, T-test, F-test, and satisfaction mean testing.

To conduct an analysis of the data obtained from the distributed questionnaires, this research will utilize a Likert scale to assess user ratings in measuring the application's service quality and its impact on user satisfaction.

Table 1. Likert Scale

Responses	Criteria	Score
Strongly Agree	SA	5
Agree	A	4
Neutral	N	3
Disagree	D	2
Strongly Disagree	SD	1

3.3. Distribution of Respondent Characteristics

Table 2. Distribution of Respondent Characteristics Based on Gender

Gender	The number of respondents	Percentage
Male	39	39%
Female	61	61%

Based on the data distribution above, there are 39 male respondents and 61 female respondents.

Table 3. Distribution of Respondent Characteristics Based on Place of Origin

Place of Origin	The number of respondents	Percentage
Outside Samarinda	65	65%
Samarinda	35	35%

Based on the data distribution above, there are 65 respondents from outside Samarinda city and 35 respondents from Samarinda city.

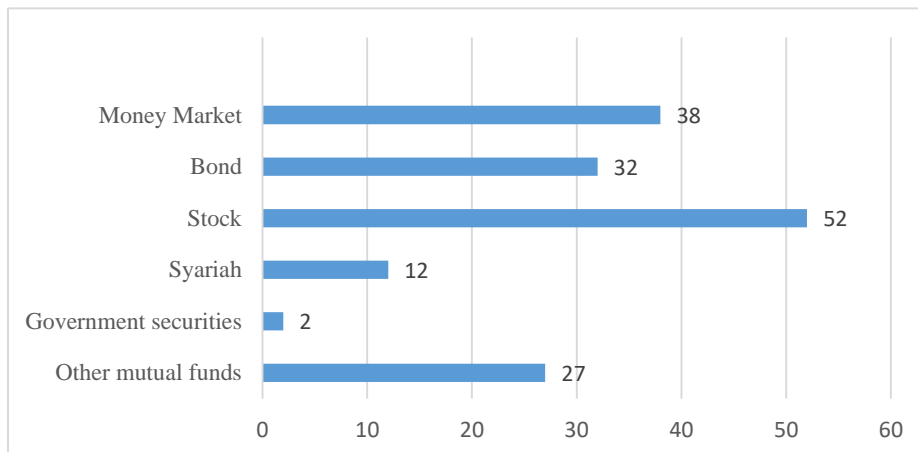


Figure 1. Distribution Chart of Respondents Based on Investment Products

Generally, investors can invest in various investment products. Based on the chart above, it is evident that stocks are among the investment products with the highest number of investors, with 52 respondents, followed by the money market with 38 investors from the sample. Bonds have 32 investors in the research sample, while Islamic investments (sharia) have 12 investors. Securities have 2 investors among the research respondents, followed by 27 respondents investing in mutual funds and others.

Table 4. Distribution of Respondents Based on Application Usage Duration

Period	The number of respondents	Percentage
Less than 1 month	19	19%
1-6 months	29	29%
6-12 months	25	25%
More than 12 months	27	27%

Table 5. Distribution of Respondent Profiles Based on Investment Amount

Investment Amount	The number of respondents	Percentage
Less than Rp.1.000.000	43	43%
Rp.1.000.000-Rp.5.000.000	40	40%
Rp.5.000.000-Rp.10.000.000	8	8%
More than Rp.10.000.000	9	9%

4. Results

4.1. Validity Test

To determine the validity of the research instrument, it can be observed that if the calculated r-value > the tabled r-value, then the instrument is considered valid. If the calculated r-value <

the tabled r-value, it can be concluded that the instrument is not valid. In this test, a significance level of 0.1 was used, which corresponds to a tabled r-value of 0.196 at a 5% significance level with $n = 100$. The results of the validity test indicate that all questions within each variable are considered valid.

Table 6. Validity Test Result

Variable	Item	R Value	R Tabel	Information
User Satisfaction (Y ₁)	Y ₁	0.455	0.196	Valid
	Y ₂	0.301	0.196	Valid
	Y ₃	1	0.196	Valid
Performance (X ₁)	X _{1.1}	0.315	0.196	Valid
	X _{1.2}	0,231	0.196	Valid
	X _{1.3}	0.340	0.196	Valid
	X _{1.4}	1	0.196	Valid
Information and data (X ₂)	X _{2.1}	0.268	0.196	Valid
	X _{2.2}	0.296	0.196	Valid
	X _{2.3}	0.211	0.196	Valid
	X _{2.4}	0.456	0.196	Valid
	X _{2.5}	0.257	0.196	Valid
	X _{2.6}	0.278	0.196	Valid
	X _{2.7}	1	0.196	Valid
Economics (X ₃)	X _{3.1}	0.261	0.196	Valid
	X _{3.2}	0.526	0.196	Valid
	X _{3.3}	1	0.196	Valid
Control and Security (X ₄)	X _{4.1}	0.268	0.196	Valid
	X _{4.2}	0.296	0.196	Valid
	X _{4.3}	0.361	0.196	Valid
	X _{4.4}	1	0.196	Valid
Efficiency (X ₅)	X _{5.1}	0.204	0.196	Valid
	X _{5.2}	0.221	0.196	Valid
	X _{5.3}	0.251	0.196	Valid

Variable	Item	R Value	R Tabel	Information
	X _{5.4}	0.201	0.196	Valid
	X _{5.5}	0.214	0.196	Valid
	X _{5.6}	1	0.196	Valid
Service (X ₆)	X _{6.1}	0.282	0.196	Valid
	X _{6.2}	0.292	0.196	Valid
	X _{6.3}	0.324	0.196	Valid
	X _{6.4}	0.410	0.196	Valid
	X _{6.5}	0.243	0.196	Valid
	X _{6.6}	0.435	0.196	Valid
	X _{6.7}	0.436	0.196	Valid
	X _{6.8}	0.294	0.196	Valid
	X _{6.9}	1	0.196	Valid

4.2. Reliability Test

Based on the results of the reliability test conducted, it can be concluded that the overall questionnaire is considered reliable because the Cronbach's Alpha value is greater than 0.6.

Table 7. Reliability Test Result

Variable	Cronbach's Alpha	Reliability	Information
User Satisfaction (Y ₁)	0.702	0.6	Reliable
Performance (X ₁)	0.674	0.6	Reliable
Information and data (X ₂)	0.719	0.6	Reliable
Economics (X ₃)	0.658	0.6	Reliable
Control and Security (X ₄)	0.623	0.6	Reliable
Efficiency (X ₅)	0.698	0.6	Reliable
Service (X ₆)	0.824	0.6	Reliable

4.3. Normality Test

If the significance value of the One-Sample Kolmogorov-Smirnov test is above 0.05, it indicates a normal distribution pattern. Based on the SPSS output in the One-Sample

Kolmogorov-Smirnov Test table, the Kolmogorov-Smirnov test statistic value is 0.073 with a significance value of 0.200. Therefore, it can be concluded that the data is normally distributed.

Table 8. Normality Test Result

		Unstandardized Residual
N		100
Normal Parameters a.b	Mean	0.000
	Std. Deviation	0.888
Most Extreme Differences	Absolute	0.073
	Positive	0.073
	Negative	-0.068
Test Statistic		0.073
Asymp. Sig. (2-tailed)		0.200c

4.4. Multicollinearity Test

After conducting the multicollinearity test, it is found that the VIF value for the performance variable is 1.732 with a tolerance value of 0.577, and the VIF value for the information and data variable is 2.751 with a tolerance value of 0.363. For the Economics variable, the VIF value is 1.346 with a tolerance of 0.743. Next, the control and security variable has a VIF value of 1.131 and a tolerance of 0.884, while the efficiency variable has a VIF value of 2.290 and a tolerance of 0.437. Finally, for the service variable, the VIF value is 2.287 with a tolerance of 0.437. Based on the tolerance value being greater than 0.10 and the VIF value being less than 10, it can be interpreted that there is no multicollinearity.

Table 9. Multicollinearity Test Result

Model	Collinearity Tolerance	Statistics VIF
(Constant)		
Perfomance	0.577	1.732
Information and Data	0.363	2.751
Economics	0.743	1.346
Control and Security	0.884	1.131
Efficiency	0.437	2.290
Service	0.437	2.287

4.5. Heteroskedasticity Test

After conducting the heteroskedasticity test using a scatter plot, it is observed that the scattered points do not form a clear pattern. Furthermore, all points are scattered above and below the value of 0 on the Y-axis. Therefore, it can be concluded that there is no heteroskedasticity issue.

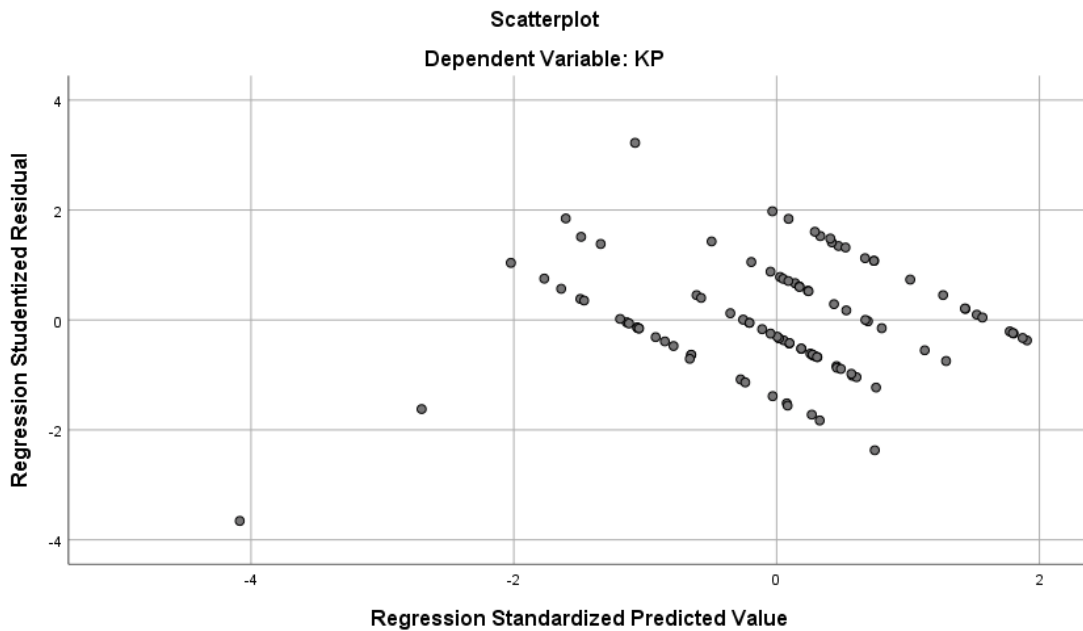


Figure 2. Heteroskedasticity Test Result

4.6. Multiple Linear Regression Analysis

Table 10. Multiple Linear Regression Analysis Test Result

Model	Unstandardized Coefficients		Standardized Coefficients Beta
	B	Std.Error	
1 (Constant)	-0.249	1.295	
Performance	0.094	0.080	0.102
Information and Data	0.226	0.056	0.440
Economics	0.091	0.056	0.125
Control and Security	-0.025	0.042	-0.042
Efficiency	0.039	0.064	0.061
Service	0.081	0.037	0.217

The following is an explanation of the results obtained from the multiple linear regression analysis:

If the constant value is -0.249, it indicates that when X₁ (Performance), X₂ (Information and Data), X₃ (Economics), X₄ (Control and Security), X₅ (Efficiency), and X₆ (Service) are constant (X = 0), the performance of variable Y is -0.249.

Moving on to variable X₁, it can be observed that the coefficient for X₁ is 0.094. This can be interpreted as follows: if there is a 1% increase in X₁, variable Y experiences an increase of 0.094.

Moving on to variable X₂, it can be observed that the coefficient for X₂ is 0.226. This can be interpreted as follows: if there is a 1% increase in X₂, variable Y experiences an increase of 0.226.

Regarding variable X₃, the coefficient for X₃ is found to be 0.091. When interpreted, this means that a 1% increase in X₃ leads to a corresponding increase of 0.091 in variable Y.

Meanwhile, for variable X₄, it is observed that the coefficient for X₄ is -,025. When interpreted, if there is a 1% increase, variable Y will actually experience a decrease of -,025.

As for variable X₅, it is noted that the coefficient for X₅ is 0,039. When interpreted, if there is a 1% increase, variable Y will experience an increase of 0,039.

Finally, for variable X₆, it is observed that the coefficient for X₆ is 0,081. When interpreted, if there is a 1% increase, variable Y will experience an increase of 0,081.

4.7. Coefficient of Determination

After testing, it is determined that the Adjusted R Square value is 0.570, which, when interpreted, means that performance, information and data, economics, control and security, efficiency, and service variables collectively influence user satisfaction by 57%. The remaining 43% can be influenced by other variables not examined in this research.

Table 11. Coefficient of Determination Result Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.772a	0.596	0.570	0.917

4.8. Partial T-Test

Table 12. Partial T-Test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	-0.249	1.295		-0.193	0.848
	Perfomance	0.094	0.080	0.102	1.175	0.243
	Information and Data	0.226	0.056	0.440	4.023	0.000

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Economics	0.091	0.056	0.125	1.634	0.106
Control and Security	-0.025	0.042	-0.042	-0.601	0.549
Efficiency	0.039	0.064	0.061	0.614	0.541
Service	0.081	0.037	0.217	2.176	0.032

Based from the table on above, it can be observed that the t-value for the performance variable is smaller than the t-table value ($1.175 < 1.985$) with a significance level of 0.243, which is greater than 0.05. Then, for the second variable, information and data, it has a t-value of 4.023, which is greater than the t-table value of 1.985, and the significance level is below 0.05, which is 0.000. Lastly, for the economics variable, the t-value is 1.634, which is smaller than 1.985, and the significance level is greater than 0.05, which is 0.106.

Next, for the control and security variable, it has a negative t-value of -0.601, which is smaller than the t-table value of 1.985, and the significance level is above 0.005, specifically 0.549. Meanwhile, for the efficiency variable, the t-value of 0.614 is smaller than the t-table value of 1.985, and the significance level is greater than 0.05, which is 0.541. Finally, for the service variable, the t-value is 2.176, which is greater than the t-table value of 1.985, and the significance level is greater than 0.05, specifically 0.032.

Based on the decision criteria in the t-test, the following conclusions can be drawn:

The performance variable has a negative partial effect on user satisfaction.

The Information and data variable has a positive partial effect on user satisfaction.

The economics variable has a negative partial effect on user satisfaction.

The control and security variable has a negative partial effect on user satisfaction.

The efficiency variable has a negative partial effect on user satisfaction.

The service variable has a positive and significant partial effect on user satisfaction.

4.9. F-Test

Table 13. F-Test

Model	F	Sig.
Regression	22.899	0.000b
Residual	-	
Total	-	

Based on the simultaneous hypothesis testing, the significance value is $0.000 < 0.005$, which means that all independent variables together have a significant influence on the dependent variable. Furthermore, the F-value is 22.899, which is greater than the critical F-value of 2.20.

This indicates that the variables of performance, information and data, economics, control and security, efficiency, and service collectively have a significant influence on user satisfaction.

5. Conclusion

After conducting the analysis and discussion, several conclusions can be drawn. The results of the tests on the six variables indicate that there are two variables for which the hypotheses are accepted: the information and data variable significantly influences user satisfaction, and the service variable significantly influences user satisfaction. Conversely, the hypotheses for the following variables are rejected: performance does not significantly influence user satisfaction, economics does not significantly influence user satisfaction, control and security do not significantly influence user satisfaction, and efficiency does not significantly influence user satisfaction.

5.1. Recommendations for Future Research

Further research can explore the reasons behind the rejected hypotheses to gain deeper insights into the factors influencing user satisfaction in those areas.

Investigate potential improvements in the performance, economics, control and security, and efficiency aspects to enhance user satisfaction.

Analyze user feedback and preferences to tailor services and information/data offerings that align with user expectations and increase satisfaction.

Conduct a longitudinal study to track changes in user satisfaction over time and assess the impact of any interventions or improvements made based on the research findings.

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