COSTING: Journal of Economic, Business and Accounting
Volume 8 Nomor 5, Tahun 2025
e-ISSN : 2597-5234

FACTORS THAT INFLUENCE CUSTOMER LOYALTY USING INTERNET BANKING WITH CUSTOMER SATISFACTION AS A MEDIATING VARIABLE (CASE STUDY OF LIVIN BY MANDIRI APPLICATION USERS)

FAKTOR-FAKTOR YANG MEMPENGARUHI LOYALITAS NASABAH MENGGUNAKAN INTERNET BANKING DENGAN KEPUASAN NASABAH SEBAGAI VARIABEL MEDIASI (STUDI KASUS PENGUNA APLIKASI LIVIN BY MANDIRI)

Yesda Prawita[1], M.Rifki Bakhtiar[2]
Fakultas Ekonomika Dan Bisnis, Universitas AKI Semarang[1,2]
121210023@student.unaki.ac.id[1], m.rifki.bakhtiar@gmail.com[2]

ABSTRACT

This study aims to analyze the effect of security, transaction costs, and service features on customer loyalty with customer satisfaction as a mediating variable in the Livin' by Mandiri application. Primary data was collected through questionnaires distributed to application users, while secondary data was obtained from literature studies and related reports. The analysis was conducted using the Sobel Test to test the mediating role of customer satisfaction. The results show that security and service features have a positive and significant effect on customer satisfaction and loyalty, while transaction costs have no significant impact. In addition, customer satisfaction was shown to mediate the relationship between security and service features to loyalty, but did not mediate the relationship between transaction costs and customer loyalty. The implication of this study confirms that Bank Mandiri needs to improve security standards and innovate service features to maintain user loyalty.
***Keywords**: Security, Transaction Costs, Service Features, Customer Satisfaction, Customer Loyalty*

ABSTRAK

Penelitian ini bertujuan untuk menganalisis pengaruh keamanan, biaya transaksi, dan fitur layanan terhadap loyalitas nasabah dengan kepuasan nasabah sebagai variabel mediasi pada aplikasi Livin' by Mandiri. Data primer dikumpulkan melalui kuesioner yang disebarkan kepada pengguna aplikasi, sementara data sekunder diperoleh dari studi pustaka dan laporan terkait. Analisis dilakukan menggunakan Uji Sobel untuk menguji peran mediasi kepuasan nasabah. Hasil penelitian menunjukkan bahwa keamanan dan fitur layanan berpengaruh positif dan signifikan terhadap kepuasan dan loyalitas nasabah, sementara biaya transaksi tidak memiliki dampak signifikan. Selain itu, kepuasan nasabah terbukti memediasi hubungan antara keamanan dan fitur layanan terhadap loyalitas, tetapi tidak memediasi hubungan antara biaya transaksi dan loyalitas nasabah. Implikasi dari penelitian ini menegaskan bahwa Bank Mandiri perlu meningkatkan standar keamanan serta inovasi fitur layanan guna mempertahankan loyalitas pengguna.
Kata Kunci: Keamanan, Biaya Transaksi, Fitur Layanan, Kepuasan Nasabah, Loyalitas Nasabah

INTRODUCTION

The development of information technology has changed the banking sector, including the presence of mobile banking applications that support digital transactions. One of the innovations developed by Bank Mandiri is the Livin' by Mandiri application designed to facilitate customer access to digital transactions. In 2023-2024, Livin' recorded significant growth, with total transactions reaching 600 million (up 45% from the previous year) and more than 25 million users. Transaction value also increased by 45%, reaching Rp 725 trillion. These figures show the rapid digitization trend in Indonesia's banking sector.

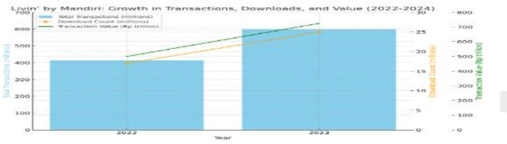


Figure 1. Livin by Mandiri Growth Chart

The graph above shows the positive growth of Livin' by Mandiri in total transactions, number of downloaders, and transaction value, reflecting the trend of digitalization in the banking industry. Bank Mandiri has successfully developed products according to the evolving needs of customers. Livin' by Mandiri facilitates banking transactions through practical features such as balance inquiry, transfer, payment, credit purchase, and cardless cash withdrawal. The app also enables new account opening online with e-KTP, supporting digital transformation in the banking sector and increasing accessibility of financial services in Indonesia.

Although Livin' by Mandiri has grown rapidly, there are various challenges faced in maintaining customer loyalty. According to Januarti & Suyatno, (2022), consumer loyalty includes consumer loyalty to companies, brands or products. Organizations try to anticipate customer loyalty as their willingness to repeatedly use services in the future (Kurniawati et al., 2024). Bloemer 1998 also explains that loyalty to banks is very important to retain customers and face competition. A decrease in customer loyalty can occur due to various factors, especially service quality and customer satisfaction, both of which play an important role in increasing bank competitiveness (Januarti & Suyatno, 2022).

Several studies show that internet banking has a significant contribution to customer loyalty. Research by V. Shankar et al., (2003) in a study conducted by Usman et al., (2024), showed that customer satisfaction plays an important role in creating a positive relationship between service quality, price, and loyalty in the mobile banking sector. Customers who are satisfied with the service will be more likely to be loyal because the value received matches their expectations. When a product or service can meet expectations in the long term, the level of satisfaction and loyalty will increase. Customer satisfaction is a feeling felt by consumers after feeling between what they have received and the expectations they want. Customers will feel satisfied if the value provided by the product or service can satisfy customers for a long time (Arif & Syahputri, 2021). From these various studies, it can be concluded that internet banking not only facilitates transactions, but also plays an important role in building and maintaining customer loyalty through improving service quality, security, and customer satisfaction.

Security factors, transaction costs, and service features are also crucial elements in determining customer satisfaction and loyalty. According to Rahayu & Susanti in Putra & Triwardhani, (2023) security is a way to avoid exploitation by irresponsible parties, both in the environment and data system security. Based on research cited by Usman et al., (2024) found that security positively affects customer trust in electronic banking, while according to Suci & Dahlan, (2023) security in using an application is a sense of security in providing personal information and feeling confident that their personal data will not be disseminated and it is said that customers will feel safe and trust when a system is easy to learn or use. Therefore, researchers conclude that security plays an important role in building the trust needed to maintain customer loyalty.

Besides security, transaction costs are also a factor considered by customers. Costs are the economic sacrifices made by customers to receive benefits from a service (Pipit Muliyah, et al, 2020). In the context of mobile banking, transaction fees that are considered reasonable will affect customer satisfaction, while fees that are perceived as high can reduce their loyalty (Wulandari, et al 2022).

Service features are one of the important factors in building consumer trust in deciding whether to conduct transactions online or not (Heny Agustina, 2017). According to Wahyu Prastiwi Umaningsih & Dewi Kusuma Wardani (2020), features are components that can enhance the functionality of a product. Because features can be the reason consumers choose a product, for marketers, features are the basis for differentiating their product from others. The more sophisticated the service features available in the m-banking application, the more it will affect customer satisfaction in using it for transactions (Makmuriyah & Vanni, 2020). Based on various previous studies, varied results were found regarding factors such as transaction cost security and service features on customer satisfaction and loyalty.

The research conducted by Wulan Suci & Dahlan (2023) proves that security has a significant impact on customer satisfaction in using mobile banking, while the study by N. E. Sari & Oswari (2020) shows the opposite result.

According to Wulandari, et al (2022), transaction costs have a significant impact on customer satisfaction, but according to research by Utama (2020), transaction costs have a negative impact on customer satisfaction. Based on the research conducted by Meileny (2020), service features can influence customer satisfaction. This is in contrast to the research conducted by N. Wahyuningsih & Janah (2018), which found that services have a negative impact on customer satisfaction.

The research conducted by Agiesta et al., (2021) proves that customer satisfaction has a significant impact on customer loyalty, in contrast to the study conducted by A. C. M. Sari & Lestariningsih, (2021), which found that customer satisfaction does not influence customer loyalty. According to Hidayati (2023), security has a positive effect on customer loyalty, but according to research conducted by Fish (2020), security does not affect customer loyalty.

According to Wulandari, et al (2022), transaction fees significantly affect customer loyalty, as supported by their research. According to Fitriani (2016), features and services have a significant impact on customer loyalty, but according to research conducted by Bagaskara (2023), features and services do not have an impact on customer loyalty.

Based on that background, it is important for Bank Mandiri to gain a deeper understanding of the factors that can enhance customer loyalty. Through this research, it is expected to identify security factors, costs, and service features that significantly influence customer satisfaction and loyalty, so that Bank Mandiri can enhance its competitiveness in facing competition in the digital era. Therefore, this research is titled "Factors Affecting Customer Loyalty Using Internet Banking with Customer Satisfaction as a Mediating Variable (Case Study of Livin' by Mandiri Application Users)."

RESEARCH METHOD

This research uses a quantitative approach with a causal design to examine the relationship between independent variables (security, transaction costs, and service features), mediating variable (customer satisfaction), and dependent variable (customer loyalty). The qualitative approach is a research method that focuses on studies in natural conditions at specific locations or on specific events. This approach uses appropriate steps and procedures to systematically and thoroughly collect data (Urohmah Shifa, 2023). This approach was chosen because it is suitable for identifying the influence of these variables in a measurable and objective manner.

Type of Data

The data to be used in this research consists of primary data and secondary data. Primary data in the form of interview results from researchers with informants from PT. Bank Mandiri (Persero) Tbk, which is the object of the research, and obtained from observations and the distribution of online questionnaires. Secondary data in the form of secondary data was obtained from various literature sources such as scientific journals, annual reports, previous research articles, and data from the official Bank Mandiri website containing information about the development of the Livin' by Mandiri application usage.

Data Collection Techniques

Primary data collection was conducted through a questionnaire instrument distributed to users of the Livin' by Mandiri application. This questionnaire is designed with closed and open-ended questions to measure the factors influencing customer loyalty in using internet banking, with customer satisfaction as a mediating variable.

The collection of secondary data was obtained through literature studies that included scientific journals, books, and reports related to internet banking, customer loyalty, and customer satisfaction. Secondary data were also obtained from official reports of Bank Mandiri and other reliable sources relevant to this research.

Data Management Method

Data processing in this study was conducted using statistical analysis techniques to examine the factors influencing customer loyalty in using internet banking, with customer satisfaction as a mediating variable. The data obtained from the questionnaire were analyzed using descriptive and inferential statistical methods, such as regression analysis and mediation tests, to understand the relationship between the research variables.

In addition, triangulation techniques are used to enhance the validity and reliability of the research results by comparing various secondary data sources and references related to internet banking as well as customer loyalty and satisfaction. This research approach emphasizes testing relevant theories through the analysis of empirical data from users of the Livin' by Mandiri application.

The researchers will measure the extent of the influence of factors such as trust, ease of use, and service quality on customer loyalty, considering satisfaction as a mediating variable. The results of this analysis will provide insights into strategies that can be implemented by Bank Mandiri to enhance customer satisfaction and loyalty in the use of internet banking.

RESULTS AND DISCUSSION

Data from the questionnaire is outlined to describe the respondents' profiles and the distribution of the research variables. Based on the research results, respondents by age can be seen in the table below.

Table 1. Characteristics based on gender

Jenis kelamin	Frekuensi	Persentase
Laki – laki	94	57%
Perempuan	71	43%
Total	**165**	**100%**

Source: Primary data processed, 2025

The table shows that the majority of Livin' by Mandiri app users in this study are men (57%, 94 respondents), while women make up 43% (71 respondents).

Based on the results of the research, respondents by age can be seen in the table below.

Table 2. Characteristics based on age

Umur	Frekuensi	Persentase
17 - 26	77	46,7%
27 - 36	47	28,5%
37 - 46	36	21,8%
57 tahun keatas	5	3%
Total	**165**	**100%**

Source: Primary data processed, 2025

The majority of Livin' by Mandiri app users in this study are aged 17-26 years (46.7%, 77 respondents), followed by the 27-36 years age group (28.5%), 37-46 years (21.8%), and 57 years and above (3%). Based on the research results, respondents categorized by job type can be seen in the table below:

Table 3. Characteristics based on the highest level of education

Pendidikan Terakhir	Frekuensi	Persentase
SMA/Sedejarat	66	40%
Diploma/D3	22	13,3%
Sarjana/S1	73	44,2%
Magister/S2	4	2,4%
Doktor/S3	0	0%
Total	**165**	**100%**

Source: Primary data processed, 2025

The majority of Livin' by Mandiri app users in this study have a Bachelor's degree (44.2%, 73 respondents), followed by high school/equivalent (40%), Diploma/D3 (13.3%), and Master's degree (2.4%). Based on the research results, respondents categorized by job type can be seen in the table below:

Table 4. Characteristics based on occupation

Pekerjaan	Frekuensi	Persentase
Pelajar/ Mahasiswa	59	35,8%
Pegawai Negeri	27	16,4%
Pegawai Swasta	57	34,5%
Wirausaha	10	6,1%
Lainnya	12	7,3%
Total	**165**	**100%**

Source: Primary data processed, 2025

The majority of Livin' by Mandiri app users in this study are students/university students (35.8%, 59 respondents) and private employees (34.5%). Other respondents consist of civil servants (16.4%), entrepreneurs (6.1%), and other professions (7.3%). Based on the research results, respondents categorized by job type can be seen in the table below:

Table 5. Characteristics based on duration of use

Lama Penggunaan	Frekuensi	Persentase
< 1 Tahun	31	18,8%
3 Tahun	88	53,3%
4 – 6 Tahun	43	26,1%
> 7 Tahun	3	1,8%
Total	**165**	**100%**

Source: Primary data processed, 2025

The majority of Livin' by Mandiri app users in this study have been using it for 3 years (53.3%) and 4–6 years (26.1%). Meanwhile, users with a duration of less than 1 year reached 18.8% and more than 7 years at 1.8%.

Descriptive Analysis

Table 6. Respondents' Responses to Variable X1

variabel Keamanan (X1)	STS	TS	N	S	S	Total
Keamanan Sistem	19	34	38	46	28	165
Kepastian keamanan layanan	1	3	41	68	52	165

Menjamin keamanan dan kerahasiaan	1	2	24	75	63	165
Informasi pribadi dijamin dan dilindungi	0	3	19	70	73	165
Tidak akan menyalahgunakan informasi pribadi pelanggan	1	2	19	70	73	165

Source: Primary data processed, 2025

Based on the respondents' responses to the security variable (X1), the majority agree that the Livin' by Mandiri application system is safe and guarantees the security of services and the confidentiality of user data. Respondents also stated that the information provided is guaranteed and protected, and not misused by the application. Thus, overall, respondents have a high level of trust in the security of the Livin' by Mandiri application.

Table 7. Respondents' Responses to Variable X2

Variabel Biaya Transaksi (X2)	STS	TS	N	S	SS	Total
Keterjangkauan harga	7	35	41	55	27	165
Kesesuaian harga dengan kualitas produk	2	4	47	72	40	165
Kesesuian harga dengan manfaat	15	31	36	50	33	165
Daya saing harga	12	37	44	42	30	165

Source: Primary data processed, 2025

Berdasarkan tanggapan responden regarding the transaction cost variable (X2), the majority agree that the Livin' by Mandiri application offers system security and certainty in transaction services. Respondents also tend to agree with the security guarantees and information protection within the application. This shows that users have confidence in the transaction fee aspects applied by the Livin' by Mandiri application.

Table 8. Respondents' Responses to Variable X3

Variabel Fitur dan Layanan (X3)	STS	TS	N	S	SS	Total
Kelengkapan fasilitas transaksi	1	2	26	76	60	165
Kesesuaian fasilitas dengan kebutuhan	0	2	25	76	62	165
Keamanan fasilitas dari virus komputer	5	21	46	57	36	165
Biaya penggunaan fasilitas	2	1	32	81	49	165
Ketersediaan fitur khusus pada internet banking	0	5	25	65	70	165

Source: Primary data processed, 2025

Based on the respondents' feedback on the feature and service variable (X3), the majority of users agree that the Livin' by Mandiri application provides comprehensive transaction facilities that meet their needs. In addition, respondents also assessed that this application guarantees the security of facilities from computer viruses and offers reasonable usage fees. The availability of special features in the application also received positive support from the majority of respondents. This indicates that the features and services provided by Livin' by Mandiri have met the expectations of its users.

Table 9. Respondents' Responses to Variable Y1

Variabel Kepuasan Nasabah (Y1)	STS	TS	N	S	SS	Total
Bukti fisik	0	3	23	78	61	165
Keandalan	1	4	24	77	59	165
Daya tanggap	1	5	26	72	61	165
Jaminan	1	5	26	74	59	165
Empati	1	4	27	76	57	165

Source: Primary data processed, 2025

Based on the respondents' responses to the security variable (X1), the majority of users agree that the Livin' by Mandiri application has trustworthy physical evidence and reliability in its use. In addition, respondents also rated that this application is responsive in addressing user needs and provides good security guarantees. The aspect of empathy in the application's service also received a positive response, indicating that Livin' by Mandiri is considered capable of meeting its users' expectations in terms of security.

Table 10. Respondents' Responses to Variable Y2

Variabel Loyalitas	STS	TS	N	S	SS	Total

Nasabah (Y2)						
Merasa puas terhadap manfaat produk	1	3	17	77	67	165
Memilih setia dalam menggunakan produk	1	2	34	69	59	165
Memilih tetap memprioritaskan produk dan layanan	0	2	42	62	59	165

Source: Primary data processed, 2025

Based on the respondents' feedback on the Customer Loyalty variable (Y2), the majority of users agree that the Livin' by Mandiri application has a good security system. In addition, the assurance of service security and the guarantee of user data confidentiality also received positive responses, indicating that user trust in this application is quite high. This indicates that security aspects play an important role in building customer loyalty towards Livin' by Mandiri.

Reliability Test

Table 11. Reliability Test

Variabel	Nilai Cronbach Alpha	Nilai Standarisasi	Keterangan
Keamanan (X1)	761	0,6	Reliabel
Biaya Transaksi (X2)	690	0,6	Reliabel
Fitur Layanan (X3)	693	0,6	Reliabel
Kepuasan Nasabah (Y1)	833	0,6	Reliabel
Loyalitas Nasabah (Y2)	792	0,6	Reliabel

Source: Primary data processed, 2025

Based on the table above, it can be concluded that all indicators of each research variable have a Cronbach's Alpha value above 0.60. This indicates that all variables in this study meet the reliability criteria, so the instruments used can be considered consistent and reliable for measuring the variables being studied.

Validity Test

Validity tests are used to assess the accuracy of a measuring instrument in measuring the intended construct. A survey is considered valid if each question item included can be used to clarify and identify what can be measured by the survey. In this study, the degrees of freedom (df) were calculated using the formula df = n - 2, with n = 165, resulting in df = 163 and a critical r table value of 0.1528. The criteria for testing validity are as follows:

1. If the calculated r value > 0.1528, then the question or variable is declared valid.
2. If the calculated r value < 0.1528, then the question or variable is declared invalid.

The results of the validity test calculations for each variable are presented in the following validity test table.

Table 12. Validity Test

Indikator	R hitung	R Table	Keterangan
Keamanan (X1)			
X1.1	0,309	0,1528	Valid
X1.2	0,630	0,1528	Valid
X1.3	0,672	0,1528	Valid
X1.4	0,690	0,1528	Valid
X1.5	0,688	0,1528	Valid
Biaya Transaksi (X2)			
X2.1	0,760	0,1528	Valid
X2.2	0,488	0,1528	Valid
X2.3	0,800	0,1528	Valid
X2.4	0,789	0,1528	Valid
Fitur Layanan (X3)			
X3.1	0,756	0,1528	Valid
X3.2	0,730	0,1528	Valid
X3.3	0,515	0,1528	Valid
X3.4	0,684	0,1528	Valid
X3.5	0,754	0,1528	Valid
Kepuasan Nasabah (Y1)			
Y1.1	0,769	0,1528	Valid
Y1.2	0,751	0,1528	Valid
Y1.3	0,742	0,1528	Valid
Y1.4	0,777	0,1528	Valid
Y1.5	0,835	0,1528	Valid
Loyalitas Nasabah (Y2)			
Y2.1	0,809	0,1528	Valid
Y2.2	0,867	0,1528	Valid
Y2.3	0,845	0,1528	Valid

Based on the table, all indicators have a calculated r value > 0.1528, so the questionnaire is declared valid and can be used as a research instrument.

Normality Test

The normality test is conducted to examine whether the residuals in the regression are normally distributed. The testing was conducted using the Normal P-P Plot and the One-Sample Kolmogorov-Smirnov Test. Data is said to be normal if the Kolmogorov-Smirnov significance value > 0.05, the histogram distribution forms a bell shape, and the plot distribution on the P-P Plot follows the diagonal line. On the other hand, if the plot forms a random pattern, the data is considered non-normal.

One-Sample Kolmogorov Smirnov Test

			Unstandardized Residual
N			165
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		.41448660
Most Extreme Differences	Absolute		.054
	Positive		.054
	Negative		-.052
Test Statistic			.054
Asymp. Sig. (2-tailed)			.200[c,d]
Monte Carlo Sig. (2-tailed)	Sig.		.694[e]
	99% Confidence Interval	Lower Bound	.682
		Upper Bound	.706

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.
e. Based on 10000 sampled tables with starting seed 2000000.

Figure 2. One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			165
Normal Parameters[a,b]	Mean		.0000000
	Std. Deviation		.47182498
Most Extreme Differences	Absolute		.062
	Positive		.054
	Negative		-.062
Test Statistic			.062
Asymp. Sig. (2-tailed)			.200[c,d]
Monte Carlo Sig. (2-tailed)	Sig.		.536[e]
	99% Confidence Interval	Lower Bound	.523
		Upper Bound	.549

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.
e. Based on 10000 sampled tables with starting seed 299883525.

Sumber: Data primer yang diolah, 2025

Figure 3. One-Sample Kolmogorov-Smirnov Test

Based on the above test, it can be concluded that the Kolmogorov-Smirnov significance values, assisted by Monte Carlo calculations, are 0.694 for equation 1 and 0.536 for equation 2, which means it can be concluded that since they are greater than 0.05, the data above is normally distributed.

Uji Normalitas Histogram

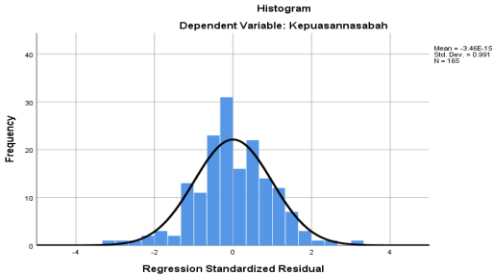


Figure 4. Histogram persamaan 1

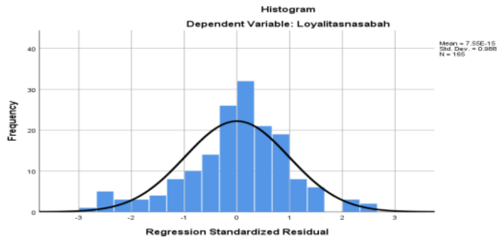


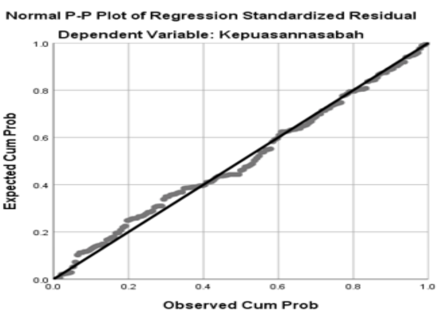
Figure 5. Histogram persamaan 2

Source: Primary data processed, 2025

In the normality test, the histogram shows a normally distributed pattern, resembling a bell curve in both equations.

Normal P-P Plot Graph Test

Figure 6. P-P Plot graph of equation 1



Sumber: Data primer yang diolah, 2025

Figure 7. P-P Plot graph of equation 2

In the normality test P-plot image, the point distribution aligns with the line, indicating that both equations can be concluded to be normally distributed.

Heteroscedasticity Test

The heteroscedasticity test examines the inequality of residual variance in linear regression and is met if the significance value of the independent variable > 0.05 against Abs-Residual.

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.810	.177		4.583	.000
	Keamanan	-.025	.051	-.047	-.498	.619
	Biayatransaksi	-.049	.028	-.149	-1.747	.082
	Fiturlayanan	-.055	.044	-.117	-1.238	.217

a. Dependent Variable: ABS_RES1

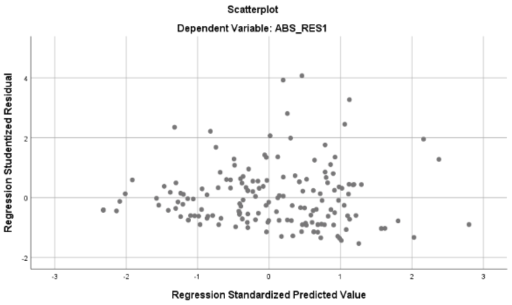


Figure 8. Heteroscedasticity of equation 1

The calculation results show that security dominates customer satisfaction, with all variables having a significance of ≥ 0.05, thus no heteroscedasticity occurs.

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.481	.202		2.384	.018
	Keamanan	-.011	.061	-.018	-.179	.858
	Biayatransaksi	-.100	.032	-.268	-3.135	.002
	Fiturlayanan	.075	.061	.142	1.238	.217
	Kepuasannasabah	-.008	.055	-.016	-.142	.887

a. Dependent Variable: ABS_RES2

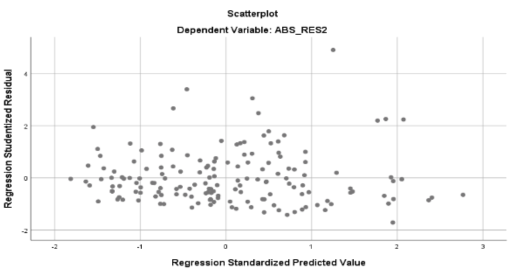


Figure 9. Heteroscedasticity of equation II

Source: Primary data processed, 2025

The calculation results show that service quality dominates user satisfaction, with all variables having a significance of ≥ 0.05, thus no heteroscedasticity occurs.

Multicollinearity Test

According to Ghozali Siregar (2023), multicollinearity can be tested with the tolerance value and Variance Inflation Factor (VIF). If VIF < 10 and tolerance > 0.10, then multicollinearity does not occur. Conversely, if VIF > 10 and tolerance < 0.10, then the data experiences multicollinearity.

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	.315	.287		1.099	.273		
	Keamanan	.346	.083	.274	4.185	.000	.647	1.546
	Biayatransaksi	-.020	.045	-.026	-.441	.660	.803	1.246
	Fiturlayanan	.623	.072	.566	8.694	.000	.655	1.527

a. Dependent Variable: Kepuasannasabah

Figure 12. Multicollinearity Test Equation I

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	-.063	.288		-.217	.828		
	Keamanan	.302	.087	.222	3.467	.001	.583	1.714
	Biayatransaksi	-.022	.046	-.026	-.476	.635	.802	1.247
	Fiturlayanan	.200	.087	.169	2.304	.023	.446	2.243
	Kepuasannasabah	.548	.079	.509	6.950	.000	.447	2.237

a. Dependent Variable: Loyalitasnasabah

Sumber: Data primer yang diolah, 2025

Figure 13. Multicollinearity Test Equation II

The test results on equations 1 and 2 show no multicollinearity, as all independent variables have a VIF value ≤ 10 and tolerance ≥ 0.10. Thus, there is no multicollinearity between the independent variables and the dependent variable.

Simultaneous Test (F Test)

According to Imam Ghozali in K. Krisnando (2020), the F test determines the simultaneous effect of independent variables on the dependent variable. If F calculated > F table and significance < 0.05, then the independent variable has a significant effect. On the other hand, if the calculated F < table F and significance > 0.05, then there is no significant effect.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.866	3	11.622	66.412	.000[b]
	Residual	28.175	161	.175		
	Total	63.041	164			

a. Dependent Variable: Kepuasannasabah
b. Predictors: (Constant), Fiturlayanan, Biayatransaksi, Keamanan

Figure 14. Simultaneous equation test 1

Source: Primary data processed, 2025

The test results show that service features, transaction costs, and security significantly affect customer satisfaction, with an F value of 66.412 and a significance of 0.000 < 0.05.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	45.132	4	11.283	64.375	.000[b]
	Residual	28.043	160	.175		
	Total	73.176	164			

a. Dependent Variable: Loyalitasnasabah
b. Predictors: (Constant), Kepuasannasabah, Biayatransaksi, Keamanan, Fiturlayanan

Figure 15. Simultaneous equation test II

Source: Primary data processed, 2025

The test results show that customer satisfaction, transaction costs, security, and service features significantly influence customer loyalty, with an F value of 64.375 and a significance of 0.000 < 0.05.

Partial Statistical Test (t-test)

The t-test is used to examine the influence of each independent variable (security, transaction costs, and service features) on customer satisfaction (Y1) in equation 1, as well as on customer loyalty (Y2) in equation 2. The testing was conducted at a significance level of 0.05. If the significance value t > 0.05, then there is no significant effect, whereas if < 0.05, there is a significant effect of the independent variable on the dependent variable.

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.315	.287		1.099	.273
	Keamanan	.346	.083	.274	4.185	.000
	Biayatransaksi	-.020	.045	-.026	-.441	.660
	Fiturlayanan	.623	.072	.566	8.694	.000

a. Dependent Variable: Kepuasannasabah

Figure 16. Partial statistical test of equation 1

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.063	.288		-.217	.828
	Keamanan	.302	.087	.222	3.467	.001
	Biayatransaksi	-.022	.046	-.026	-.476	.635
	Fiturlayanan	.200	.087	.169	2.304	.023
	Kepuasannasabah	.548	.079	.509	6.950	.000

a. Dependent Variable: Loyalitasnasabah

Figure 17. Partial statistical test of equation II

The results of the hypothesis testing show that the variables of security and service features have a significant impact on customer satisfaction, while transaction costs do not have a significant impact. Additionally, security, service features, and customer satisfaction also have a significant impact on customer loyalty, while transaction costs do not have a meaningful effect. This indicates that customer satisfaction and loyalty are more influenced by security factors and service quality compared to transaction costs.

Coefficient of Determination Test

The coefficient of determination test measures the extent to which the model can explain the dependent variable. The value of $R^2 < 0.6$ indicates that the independent variables do not sufficiently explain the dependent variable, while a value close to 1 indicates that the independent variables provide almost all the information needed to predict the dependent variable.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.744[a]	.553	.545	.41833

a. Predictors: (Constant), Fiturlayanan, Biayatransaksi, Keamanan
b. Dependent Variable: Kepuasannasabah

Figure 18. Test the coefficient of determination for equation 1

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.785[a]	.617	.607	.41865

a. Predictors: (Constant), Kepuasannasabah, Biayatransaksi, Keamanan, Fiturlayanan
b. Dependent Variable: Loyalitasnasabah

Figure 19 Test the coefficient of determination for equation II

The analysis results show that in equation 1, the variables of security, transaction costs, and service features contribute 54.5% to the satisfaction of Livin' by Mandiri customers, while 45.5% is influenced by other factors. In equation 2, these variables together with customer satisfaction contribute 60.7% to customer loyalty, with 39.3% influenced by other variables.

Regression Model Equation 1

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.315	.287		1.099	.273
	Keamanan	.346	.083	.274	4.185	.000
	Biayatransaksi	-.020	.045	-.026	-.441	.660
	Fiturlayanan	.623	.072	.566	8.694	.000

a. Dependent Variable: Kepuasannasabah

Figure 20. Regression model equation 1

Based on the equation model above, the following equation is obtained:

$$Z = 0{,}315 + 0{,}346 + -0{,}020 + 0{,}623 + e1$$

The regression constant value of 0.315 indicates that if all independent variables (security, transaction costs, and service features) are valued at zero, customer satisfaction has a baseline value of 0.315. The security variable has a positive regression coefficient of 0.346, which means that an increase of one unit in this variable will increase customer satisfaction by 0.346, assuming other variables remain constant. Meanwhile, the transaction cost variable has a negative coefficient of -0.020, so a decrease of one unit in this variable will increase customer satisfaction by 0.020. Meanwhile, the service feature variable has a positive coefficient of 0.623, which means that an increase of one unit in this variable will increase customer satisfaction by 0.623, assuming other variables remain unchanged.

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.063	.288		-.217	.828
	Keamanan	.302	.087	.222	3.467	.001
	Biayatransaksi	-.022	.046	-.026	-.476	.635
	Fiturlayanan	.200	.087	.169	2.304	.023
	Kepuasannasabah	.548	.079	.509	6.950	.000

a. Dependent Variable: Loyalitasnasabah

Sumber: Data primer yang diolah, 2025

Figure 21. Regression model equation II

Based on the equation model above, the following equation is obtained:

$$Y = -0{,}063 + 0{,}302 + -0{,}022 + 0{,}200 + 0{,}548 + e2$$

The regression constant value of -0.063 indicates that if all independent variables (security, transaction costs, service features, and customer satisfaction) are valued at zero, then customer loyalty will be valued at -0.063. The security variable has a positive regression coefficient of 0.302, which means an increase in this variable will increase customer loyalty by 0.302. Meanwhile, transaction costs have a negative coefficient of -0.022, so a decrease of one unit in this variable will increase customer loyalty by 0.022. The service feature variable has a positive coefficient of 0.200, indicating that an increase in this variable will enhance customer loyalty by 0.200. Additionally, customer satisfaction also has a positive impact with a regression coefficient of 0.548, which means that the higher the customer satisfaction, the higher their loyalty.

Route Diagram

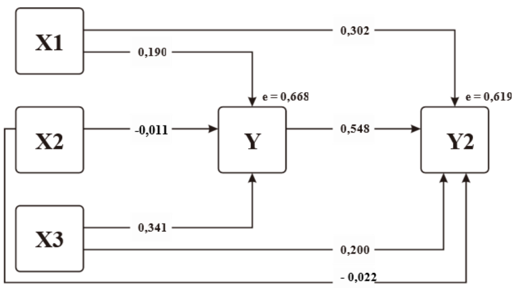


Figure 22. Route Diagram

The security variable (X1) has an influence on customer loyalty of 0.302 and on customer satisfaction of 0.190.

In addition, the error value (e_1) for customer satisfaction is 0.668, while the error value (e_2) for customer loyalty is 0.619.

The transaction cost variable (X2) has an impact on customer loyalty of -0.022 and on customer satisfaction of -0.011. Additionally, the error value (e_1) for customer satisfaction is 0.668, while the error value (e_2) for customer loyalty is 0.619.

The service feature variable (X3) has an influence on customer loyalty of 0.200 and on customer satisfaction of 0.341. Additionally, the error value (e_1) for customer satisfaction is 0.668, while the error value (e_2) for customer loyalty is 0.619.

The customer satisfaction variable (Y2) has an effect on customer loyalty of 0.054, with an error value (e_1) on customer satisfaction of 0.668 and an error value (e_2) on customer loyalty of 0.619.

Sobel Test

The ability of the mediating variable as a mediator in a relationship is tested using the Sobel Test. Decisions are made based on the t-statistic value, where if the t-statistic < 1.97, the relationship between the independent and dependent variables is difficult to control, whereas if the t-statistic > 1.97, the relationship is easier to control.

Table 13. Sobat Test

Variabel	thitung		tTable	Keterangan
X1 → Y1 → Y2	3,573	>	1,97	Mampu memediasi
X2 → Y1 → Y2	-0,443	<	1,97	Tidak mampu memediasi
X3 → Y1 → Y2	5,412	>	1,97	Mampu memediasi

Discussion of Research Results

The research results show that security and service features have a significant impact on customer satisfaction and loyalty, while transaction costs do not have a significant impact. Good security increases customer satisfaction (p = 0.000; t = 4.185) and customer loyalty (p = 0.001; t = 3.467), with satisfaction acting as a mediator that strengthens this influence (t = 3.573 > 1.97). Service features also play an important role in increasing customer satisfaction (p = 0.000; t = 8.694) and customer loyalty (p = 0.023; t = 2.304), and have proven to be a mediator in the relationship between satisfaction and loyalty (t = 5.412 > 1.97). On the contrary, transaction fees do not affect customer satisfaction (p = 0.660; t = -0.441) or customer loyalty (p = 0.635; t = -0.476), and do not act as a mediator (t = -0.443 < 1.97). These findings confirm that customer satisfaction (p = 0.000; t = 6.950) is the main factor in building loyalty, with security aspects and service features as key elements that need to be improved to maintain the loyalty of Livin' by Mandiri users.

CONCLUSION

Conclusion

This research analyzes the influence of security, transaction costs, and service features on customer loyalty with customer satisfaction as a mediating variable in the Livin by Mandiri application. The research results show that security and service features have a positive and significant impact on customer satisfaction and loyalty, while transaction costs do not significantly affect either. Customer satisfaction has proven to be a mediator that strengthens the relationship between security and service features towards loyalty, but this does not apply to transaction costs. These findings confirm that to enhance loyalty, companies need to focus on improving security and service features rather than just adjusting transaction costs.

Suggestion

Based on the conclusion, there are several recommendations for Bank Mandiri and the public. Bank Mandiri is advised to strengthen the security of the Livin' by Mandiri application through data protection and dual authentication to enhance customer trust. In addition, the development of innovative features and the evaluation of transaction costs to remain competitive need to be carried out to enhance user comfort and loyalty. For the public, it is recommended to utilize the service features optimally to support more efficient transactions. Meanwhile, further research can expand the scope to other digital banking applications and combine qualitative methods to understand the psychological and emotional aspects that influence customer satisfaction and loyalty.

LITERATURE

Agiesta, W., Sajidin, A., & Perwito. (2021). The Influence of Service Quality and Customer Satisfaction on Customer Loyalty in Bandung Raya Local Area.*Jurnal Ilmiah MEA (Manajemen, Ekonomi, Dan Akuntansi)*, *5*(2), 1653–1664.

Amalia, P., & Hastriana, A. Z. (2022). The Influence of Usefulness, Ease of Security, and M-Banking Features on Customer Satisfaction in Transactions at Bank Syariah Indonesia (Case Study of BSI KCP Sumenep). *Islamic Sciences, Sumenep*, *1*, 70–89.

Arif, M., & Syahputri, A. (2021). The Influence of Brand Image and Product Quality on Customer Loyalty with Consumer Satisfaction as a Intervening Variable at Home Industry. *Journal of International Conference Proceedings*, *4*(2), 398–412. https://doi.org/10.32535/jicp.v4i2.1274

Artina, N. (2021). The Influence of Perceived Benefits, Perceived Ease of Use, Trust, and Service Features on Customer Satisfaction Levels in Using E-Money in the City of Palembang.*Jurnal Ilmiah Ekonomi Dan Bisnis Universitas Multi Data Palembang*, *11*(1), 120–131.

Azeis, T. A. (2023). THE INFLUENCE OF FEATURE COMPLETENESS, EASE OF USE, AND LOW TRANSACTION COSTS ON USER SATISFACTION WITH THE IPOT MOBILE APPLICATION (Case Study of FEBI Students at UIN Raden Mas Said Surakarta). *Repository.Usd.Ac.Id*, 1–19. https://eprints.iain-surakarta.ac.id/6493/1/SKRIPPSI_195211267.pdf

Bagaskara, P. M. (2023). THE INFLUENCE OF SERVICE FEATURES AND EFFECTIVENESS ON CUSTOMER LOYALTY WITH SATISFACTION AS AN INTERVENING VARIABLE IN E-PAYMENT TRANSACTIONS AT BSI MOBILE.*Tesis*.

Bakhtiar, M. R., Kartika, E., & Listyawati, I. (2022). Factors influencing the interest of customers using internet banking at Bank Syariah Mandiri. *Al Tijarah*, *6*(3), 156–167. https://doi.org/10.21111/tijarah.v6i3.5696

Dewi Kusuma Wardani, A. R. F. (2022). The Influence of Security Perception on E-Banking User Loyalty with Trust as an Intervening Variable (Case Study on BNI Bank E-Banking

Customers). *JPDSH Jurnal Pendidikan Dasar Dan Sosial Humaniora*, *1*(8), 1665–1672. https://bajangjournal.com/index.php/JPDSH

Hasyim, H., Hutahaean, H. B., Situmorang, R., & Devima, S. (2023). The Use of BRImo M-Banking on the Ease of Banking Transactions of BRI Bank Customers in Medan City *Business and Investment Review (BIREV)*, *1*(5), 2986–7347. https://lgdpublishing.org/index.php/birev

Hidayati, R. N. (2023). The Influence of Service Quality, Security, and Trust on Customer Loyalty with Customer Satisfaction as a Moderating Variable (An Empirical Study on BSI Mobile Users in Purwokerto).*Fakultas Ekonomi Dan Bisnis Islam Universitas Islam Negeri Prof. K. H. Saifuddin Zuhri Purwokerto*, 15.

Iba.Zainuddin, W. A. (2021). REGRESSION ANALYSIS AND PATH ANALYSIS FOR BUSINESS RESEARCH USING SPSS 29.0 & SMART-PLS 4.0. *Book*, *July*, 1–11. http://fe.unisma.ac.id/MATERI AJAR DOSEN/EKOMETRIK/AriRiz/MA Uji Normalitas.pdf%0Ahttps://adalah.co.id/uji-asumsi-klasik/

Januarti, O., & Suyatno, S. (2022). The Influence of Livin By Mandiri Service Quality on Customer Satisfaction and Loyalty of PT Bank Mandiri in Banjarmasin During the Covid-19 Pandemic.*Jurnal Bisnis Dan Pembangunan*, *11*(2), 1–13. https://doi.org/10.20527/jbp.v11i2.14996

Khofifah Indar Mawar Sari, Weny Rosilawati, & Syamsul Hilal. (2024). The Influence of Sharia Financial Literacy, Digital Marketing, and Brand Image on Customer Loyalty at Bank Syariah Indonesia. *Pajak Dan Manajemen Keuangan*, *1*(4), 51–66. https://doi.org/10.61132/pajamkeu.v1i4.391

Kurniawati, M., Fadhilah, M., & Ningrum, N. K. (2024). The Impact of Service Quality and Customer Trust on Customer Loyalty Mediated by Customer Satisfaction in GOJEK Transportation Services. *International Journal of Economics Development Research*, *5*(4), 3257–3271. https://doi.org/10.37385/ijedr.v5i4.6156

MAKMURIYAH, A. N., & VANNI, K. M. (2020). ANALYSIS OF FACTORS AFFECTING CUSTOMER SATISFACTION IN USING MOBILE BANKING SERVICES (Case Study on Customers of Bank Syariah Mandiri in Semarang City).*Eduka : Jurnal Pendidikan, Hukum, Dan Bisnis*, *5*(1), 37. https://doi.org/10.32493/eduka.v5i1.6362

NIRWANA. BQ ELOK. (2021). THE INFLUENCE OF TRUST LEVEL, SECURITY, EASE OF USE, AND FEATURE AVAILABILITY ON INTEREST IN USING THE NTB SYARIAH BANK MOBILE BANKING SERVICE FOR ONLINE SHOP PAYMENTS. In *Pharmacognosy Magazine* (Vol. 75, Issue 17).

Novialdi, F. R. (2022). *Fahri Rahmat Novialdi, 2022 THE INFLUENCE OF LIQUIDITY,*

PROFITABILITY, AND LEVERAGE ON DIVIDEND POLICY IN MANUFACTURING COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE FOR THE PERIOD 2014 – 2018, Universitas Pendidikan Indonesia | repository.upi.edu | perpustak.

Nurul Hidayati Murtafiah, Putri Intan Yulianti, Imam Nurjaman, & Ridwan. (2023). Basic Concepts of Organizational Structure. *Jurnal Penelitian Progresif*, *3*(1), 1–8. https://doi.org/10.61992/jpp.v3i1.97

Putra, D. A., & Triwardhani, D. (2023). The Influence of Trust, Security, and Service Quality on Customer Satisfaction of Shopee in Solok City. *Journal of Young Entrepreneurs*, *2*(2), 78–93. https://ejournal.upnvj.ac.id/index.php/jye%0A

Putri, N. I., Ghafur, A., & Arifin, M. S. (2024). The Influence of Perceived Ease of Use and Trust on Customer Satisfaction in Using the Adiraku Fintech Application of PT. Adira Finance Syariah Satellite Balung. *Jurnal Tabarru' : Islamic Banking and Finance*, *7*(1), 91–99. https://journal.uir.ac.id/index.php/tabarru/article/view/16667

Sari, A. C. M., & Lestariningsih, M. (2021). The Influence of Promotion and Consumer Trust on Consumer Loyalty Through Customer Satisfaction of the Shopee Application (A STUDY ON STIESIA SURABAYA STUDENTS).*Jurnal Ilmu Dan Riset Manajemen*, *10*(5), 1–17.

SIREGAR, N. I. (2023). *TOWARDS USER SATISFACTION OF MOBILE BANKING BASED APPLICATION AT BANK MANDIRI KCP MEDAN THESIS BY: NOVIA IRAYANA SIREGAR FACULTY OF ECONOMICS AND BUSINESS UNIVERSITY OF MEDAN AREA MEDAN THESIS BY: NOVIA IRAYANA SIREGAR*.

Suci, F. C. W., & Dahlan, K. S. S. (2023). The Effect Of Security And Trust On Mobile Banking Customer Satisfaction Mediated By Convenience Factors. *Journal of Social Science (JoSS)*, *2*(10), 888–902. https://doi.org/10.57185/joss.v2i10.144

Sudhartio, L., Yulfiswandi, & Anzarika, R. (2024). Analysis of Factors Influencing Loyalty with Satisfaction as a Mediator among Priority Customers of Bank Syariah Indonesia in the Riau Islands. *Jurnal Ekonomi Bisnis, Manajemen Dan Akuntansi (JEBMA)*, *4*(1), 302–320. https://doi.org/10.47709/jebma.v4i1.3566

Suriani, N., Risnita, & Jailani, M. S. (2023). The Concept of Population and Sampling as Well as Participant Selection in the Context of Educational Scientific Research. *Jurnal IHSAN : Jurnal Pendidikan Islam*, *1*(2), 24–36. https://doi.org/10.61104/ihsan.v1i2.55

Tampubolon, M. (2023). Qualitative Research Method. *Metode Penelitian Kualitatif*, *3*(17), 43. http://repository.unpas.ac.id/30547/5/BAB III.pdf

Umaningsih. Wahyu Prastiwi, W., & Dewi Kusuma. (2020). The Influence of Perceived Ease of Use, Service Features, and Security on the Intention to Use E-Money.*Jurnal Akuntansi Dan*

Ekonomi, *21*, 113–119. https://doi.org/10.29407/jae.v5i3.14057

Urohmah Shifa. (2023). Character Building of Student Discipline Through Pancasila and Citizenship Education Learning in Class IV C SDN Taktakan 1.*Skripsi*, 1–7.

Usman, O., Iselmi, P. A., & Fidhyallah, N. F. (2024). Factors affecting loyalty in mobile banking: A case study on BSI mobile customers. *International Journal of Applied Economics, Finance and Accounting*, *18*(1), 180–191. https://doi.org/10.33094/ijaefa.v18i1.1341

Wahyuningsih Desi, N. L. (2022). THE INFLUENCE OF EASE OF USE AND SECURITY ON CUSTOMER LOYALTY TO THE DANA E-WALLET APPLICATION. *Jurnal Pendidikan Ekonomi*, *7*(3), 434–445. http://jurnal.stkippersada.ac.id/jurnal/index.php/JPE JURKAMI Volume 7, Nomor 3, 2022%0ADEWAN

Wahyuningsih, F., & Rojuaniah. (2023). The Influence of System Quality and Service Quality on Loyalty Mediated by Customer Satisfaction Among Users of the Bank BSI Syariah Mobile Banking Application.*Jurnal Manajemen Bisnis Dan Organisasi*, *2*(2), 16–26. https://doi.org/10.58290/jmbo.v2i2.114

Widianingsih, D. (2023). *The Influence of Ease, Usefulness, Benefits, and Service Features on the Decision to Use the BSI Mobile Application (Case Study of BSI Mobile Users in Ngawi Regency)*. 1–97.

Wulandari, Nur Dwi. Ginting, Paham. Gulton, P. (2022). *The Impact of Online Banking and Bank Fees on Customer Loyalty at PT Bank XXX (Persero) Tbk, Branch XXX, with Customer Satisfaction as a Mediator*.*9*, 50–67.