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The effect of e-service quality on customer satisfaction and customer loyalty: A study on mobile banking application in Indonesia

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Abstract

In the current globalization, technology and information are one of the most rapidly developing aspects of world life. Technological advances facilitate customers and companies in many fields, one of which is in banking sector. Some banking transactions that can be done via the internet or online include fund transfers, payment of electricity/water bills and e-commerce, investment and top-up of credit/data packages. In the last 5 years from January 2018 to April 2023, digital banking transactions in Indonesia grew by 158% as, for instance, seen in the growth of BNI Mobile Banking users in February 2023 reaching 14.03 million users. This number jumped 25% (YoY) when compared to the same period of the previous year by 11.22 million users. The effectiveness and efficiency of e-service quality in facilitating online shopping, buying, and delivery processes define its interaction with services. This concept encompasses two main dimensions: utilitarian and hedonistic. The utilitarian aspect focuses on practical elements such as security, privacy, and user-friendliness, while the hedonistic dimension is more subjective and individualized, emphasizing the enjoyment and emotional satisfaction derived from the shopping experience, rather than merely accomplishing a task. This aspect highlights the potential for pleasure and emotional value in both the process of shopping and the use of purchased items. This research used the PLS-SEM approach. The results of the analysis in this study revealed a number of variables that can optimally improve e-service quality and customer loyalty for BNI mobile banking in Indonesia.

Keywords: E-service quality; hedonistic; utilitarian; customer satisfaction; customer Loyalty; PLS-SEM

1. Introduction

In the current globalization age, technology and information are one of the most rapidly developing aspects of world life. Technological advances here facilitate customers and companies in many fields, one of which is in banking sector. Some banking transactions that can be done via the internet or online can include fund transfers, payment of electricity/water bills and e-commerce, investment and top-up of credit/data packages. Digital banking transactions in Indonesia grew by 158% in the last 5 years from January 2018 to April 2023 (Ahdiyat, 2023).

The data from Bank Indonesia (BI) revealed that digital banking transactions in the country hit a value of approximately 4.3 quadrillion Rupiah (precisely 4,264.8 trillion Rupiah) in April 2023. This figure encompassed various types of digital banking activities as defined by the Financial Services Authority (OJK), including both internet and mobile banking transactions. According to OJK Regulation Number 12/POJK.03/2018, digital banking services are defined as the electronic banking services that are enhanced by optimizing customer data usage. While monthly usage shows some variations in which the overall long-term trend indicates a growing adoption of digital banking services in Indonesia (Fig. 2). Since its establishment on July 5, 1946, Bank BNI has been prepared to become a circulation bank or central bank. According to the Top Brand Index in 2023, Bank BNI was ranked at the fourth place in the Banking and Finance category as a bank that has customers with BNI Taplus savings products reaching 7.30% of the entire population in Indonesia.

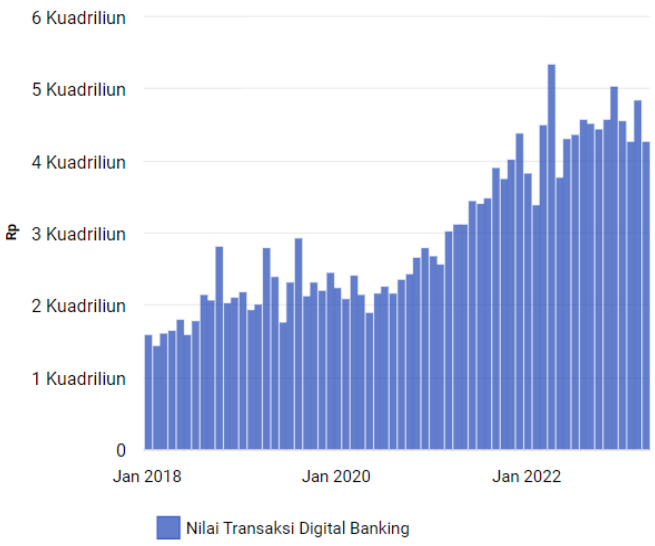

Fig. 1. Digital Banking Transactions Value in Indonesia
(Source: Ahdiyat, 2023)

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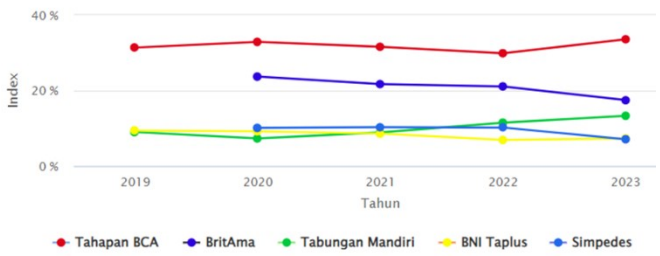

Fig. 2. Top Brand Index graphs
(Source: Top Brand Index, 2023)

Nama Brand	2019	2020	2021	2022	2023
BNI Taplus	9.40	9.20	8.60	6.90	7.30
BritAma	-	23.70	21.70	21.10	17.50
Simpedes	-	10.10	10.30	10.20	7.10
Tabungan Mandiri	9.00	7.30	8.90	11.50	13.30
Tahapan BCA	31.40	32.90	31.60	29.90	33.60

Fig. 3. Bank Customer Growth
(Source: Top Brand Index, 2023)

The use of these savings products is in line with the transformation carried out by BNI to support going digital by continuing to innovate and improve its banking services through leading-edge and user-friendly technology. One of them can be seen in the growth of BNI Mobile Banking users in February 2023 reaching 14.03 million users. This number jumped 25% (YoY) when compared to the same period in the previous year with 11.22 million users. Meanwhile, the number of BNI Mobile Banking transactions also increased in February 2022 showing 104,013,906 transactions made, and in February 2023 the number of transactions increased by 9.8% to 114,214,069 transactions (bni.co.id, 2023).

This has made Bank BNI strive to improve the quality of its mobile banking services by thoroughly analyzing customer needs to ensure that the products have met the customer needs, identified unspoken customer needs, and became the basis for compiling product specifications (Ulrich & Eppinger, 2012). Bank BNI must have knowledge of how to make their customers satisfied, especially in relation to e-service quality and mobile banking.

E-service quality in its interaction with services is the degree to which a service effectively and efficiently facilitates the shopping, purchasing and delivery processes of products and services (Parasuraman, 2005). E-service quality can be defined by the overall evaluation of customers regarding the good quality of electronic services provided to customers in online markets (Santos, 2003). According to Parasuraman (2005), e-service quality has five core dimensions: reliability, responsiveness, assurance, empathy, and tangibles. There are other additional dimensions for the development of service quality as the recovery of quality, including fulfillment, efficiency, privacy, and system availability (Zeithaml & Malhotra, 2002). The validation of the e-service quality construct with some modifications can be used to measure the quality of internet banking and mobile banking services.

Most research on mobile banking has concentrated on factors affecting attitudes towards it and its implementation (e.g. Ali Raza et al., 2020 and Arcand & Promtep, 2016). However, few studies have examined the utilitarian and hedonistic aspects of mobile banking service quality. The utilitarian dimension relates to practicality and logic, emphasizing efficient and sensible product introduction. In contrast, the hedonistic dimension is more personal and subjective with a focus on enjoyment rather than functionality. This aspect highlights the potential emotional satisfaction and pleasure derived from using the product for transactions. The emotional component significantly contributes to the hedonic value, positioning mobile devices as entertainment tools (Rejman et al., 2022).

Furthermore, to find out customer needs, an identification of needs for BNI mobile banking is required. Identification using Voice of Customer (VoC) is obtained by approaching the target respondents to find out what needs are considered. The collection of attributes of needs can be identified through the development of VoC through two stages: finding the sources of customer characteristics using original answers and sorting out the attributes of customer needs as a reference/determination of what customers want and need (Mazur, 1996).

The Voice of the Customer (VoC) will be adapted to fit within specific dimensions to address customer satisfaction. According to Kotler & Keller (2016), customer satisfaction is determined by how well a product's perceived performance aligns with customer expectations. Satisfaction levels vary based on this alignment: customers are dissatisfied when product performance falls short of expectations, customers are satisfied when it meets expectations, and very customers are satisfied or delighted when it surpasses expectations. Customer satisfaction is crucial as it offers marketers and business owners' measurable data to guide business management and improvement efforts. (Ali Raza et al., 2020).

Based on this background, the research aims to investigate what customer satisfaction is and what attributes of needs should be prioritized to increase customer satisfaction, especially in a mobile banking application. This research is primarily aimed at analyzing the effect of e-service quality on customer satisfaction and customer loyalty in Bank BNI mobile banking by involving utilitarian and hedonic dimension. In addition, this research also aims to identify the relationship between the variables in the model and evaluate how customer needs can affect customer satisfaction and customer loyalty.

2. Methodology

For its methodology, this research used Partial Least Square Structural Equation Model (PLS-SEM). The SEM method was used to build a measurement model to analyze the effects of service quality on BNI mobile banking in determining the company's service performance and knowing the factors determining this success in supporting the performance of mobile banking products.

This research consisted of five (5) stages to be conducted.

1) Initial Stage of Research

In the initial stages of research, the research themes and topics were determined based on literature studies. In addition, research was carried out to formulate the background, identify problems, problem formulation, research objectives, as well as determine research boundaries and methodology as initial

concepts before conducting research. By so doing, it could be completed on time in a structured and systematic manner. The literature study covered was regarding e-service quality and Structured Equation Modeling (SEM).

2) Preparing a Conceptual Model

At this stage, the conceptual model development process was carried out by selecting and defining variables based on a thorough review of relevant literature studies. This stage involved the analysis of existing literature to identify key theories, concepts, and previous research findings related to the research topic. These variables were then integrated into a conceptual model designed to reflect the relationships and dynamics between various factors studied. Furthermore, from this conceptual model, this stage continued with the formation of well-structured hypothesis points. This hypothesis aimed to answer research questions and test the relationship between variables. Thus, it was important in determining the research methods and analysis techniques to be used.

3) Data Collection and Processing

At this stage, the data required for the research were collected subjectively through questionnaire. The data to be take referred to primary data consisting of qualitative and quantitative data. Next, data processing was carried out by screening and cleaning data. Initial data processing allowed researchers to obtain a dataset that is clean, organized, and ready to be analyzed in more detail, thereby providing valid and reliable results for the research.

4) Data Analysis

After initial data processing, the next stage was to use the PLS-SEM statistical method via SmartPLS 3 software to determine significance and produce an equation model. In the analysis stage, interpretation was also carried out from the processing results obtained based on literature studies both qualitatively and quantitatively.

5) Final Stage of Research

After all stages of the research were carried out, conclusions were made based on the results obtained from the research. Then, suggestions for improvement and recommendations for both parties related to further research were given as well.

Related theories that were used as references in the research were also explored. The literature study included theories about customer satisfaction, mobile banking and dimensions that might affect the quality of BNI mobile banking. Furthermore, concepts about SEM were also briefly discussed.

2.1. Customer needs

Customer needs analysis is a process to obtain information, models, and specifications about the product the customers want. Requirement analysis is part of the product requirements process whose role is to bridge the gap that often occurs between the level of requirements in engineering and product design.

2.2. Customer satisfaction

Customer satisfaction is the extent to which perceived product performance meets buyer expectations (Kotler & Keller, 2006).

2.3. Dimensions

E-service quality, in relation to services, is defined by Parasuraman et al. (2005) as the degree to which a service effectively and efficiently supports the processes of shopping, buying, and delivering products and services. The study's utilitarian dimension encompasses security/privacy and practicality, including usability and ease of use. For this research, utilitarian variables were employed as per Rejman et al. (2022). In contrast, the hedonistic dimension is more individualized and subjective than its utilitarian counterpart, focusing more on pleasure and enjoyment rather than task accomplishment. As described by Babin et al. (1994), this dimension reflects the potential emotional satisfaction and pleasure derived from both shopping for and using products.

2.4. Structured equation modeling (SEM)

Structural Equation Modeling (SEM) is a statistical model that aims to explain the relationship occurred between several variables by looking at the structure of the reciprocal relationship expressed as a set of equations (Hair et al., 2014).

3. Results and Discussion

This study aims to examine the effect of e-service quality on customer satisfaction and customer loyalty in the study of Mobile Banking Bank BNI in Indonesia. The conceptual model for this research is illustrated as follows (Fig. 4).

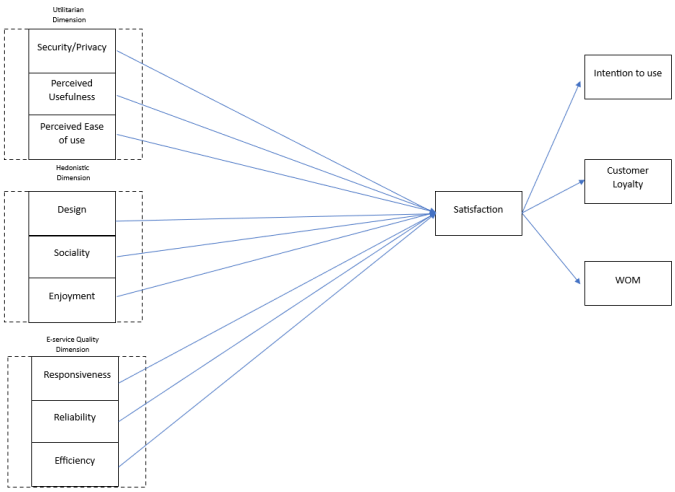

Fig. 4. Conceptual model

3.1. Determination of variables, indicators, and statements

Based on the literature study, the latent variables and research indicators were explored and examined. In this research, 13 variables and 41 indicators were determined in which the security/privacy variable had 3 indicators with code (SE); perceived usefulness had 4 indicators with code (PU); perceived ease of use had 3 indicators with code (PE); design had 4 indicators with code (DS); sociality had 4 indicators with code (SC); enjoyment had 3 indicators with code (EN); and responsiveness had 3 indicators with code (RS); reliability had 3 indicators with code (RL); efficiency had 3 indicators with code (EF); intention to use had 3 indicators with code (IU);

WOM had 2 indicators with code (WO); customer loyalty had 2 indicators with code (CL); and satisfaction had 4 indicators with code (SF). Table 1 is a summary of the variables and indicators contained in the conceptual model.

Table 1. Variables and Indicators of Research

Variable	Indicator	Statements
Security/Privacy	SE	I think the personal information I provide in Mobile Banking is well protected.
		I think online transactions made through Mobile Banking are safe.
		I think the confidentiality and privacy of my personal information is guaranteed when I transact in mobile banking.
Perceived Usefulness	PU	The productivity of my banking transaction activities has increased on Mobile Banking.
		Using Mobile Banking services will make it easier for me to make transactions.
		Mobile banking will be useful for my banking transactions.
		The effectiveness of my banking activities is improved in Mobile Banking.
Perceived Ease of Use	PE	Overall, BNI Mobile Banking is very easy to use.
		In BNI Mobile Banking, you can easily find what you are looking for.
		Navigation of features on BNI Mobile Banking application is easy to find.
Design	DS	The design (e.g. color, font size, graphics, and animation) of BNI Mobile Banking is professional.
		The design of BNI Mobile Banking application is creative.
		Overall, the design of the BNI Mobile Banking app is visually appealing.
		BNI Mobile Banking features are diverse and easy to find.
Sociality	SC	I can chat online with Customer Service when I need them in BNI Mobile Banking.
		BNI offers relevant customer testimonials on Mobile Banking.
		There are many features for shopping in BNI Mobile Banking.
		BNI Mobile Banking application provides notification after transaction.
Enjoyment	EN	Mobile Banking BNI is fun.
		Mobile Banking BNI is pleasant.
		Mobile Banking BNI is enjoyable.
Responsiveness	RS	Customer Service gives a quick response in serving customers.
		The offers given are true to each promo.
		The offer given is clear in accordance with the terms of the promo.
Reliability	RL	BNI Mobile Banking has a trustworthy image.
		BNI Mobile Banking has a stable service when transacting.
		Customer Service can answer questions from customers.
Efficiency	EF	BNI Mobile Banking is fast to access or when opening the application.
		The features contained in BNI Mobile Banking are in accordance with the grouping of customer needs.
		BNI Mobile Banking is fast in the transaction process.
Intention to Use	IU	I will be using BNI Mobile Banking in the near future.
		When I have banking business, I will immediately use BNI Mobile Banking.
		As much as possible, I will utilize BNI mobile banking for banking activities.
WOM	WO	I am willing to recommend the use of BNI Mobile Banking to anyone who asks me for advice.
		I am willing to invite my friends to start and continue using BNI Mobile Banking.
Customer Loyalty	CL	I would like to convey positive things about BNI Mobile Banking to others.
		I intend to continue using BNI Mobile Banking.
Satisfaction	SF	I am satisfied with BNI Mobile Banking products and services overall.
		The relationship to do business on BNI Mobile Banking is something I have wanted to maintain for a long time.
		In general, I am very satisfied with my relationship with Bank BNI, especially on BNI Mobile Banking.
		Doing business with this BNI Mobile Banking service makes me a loyal customer.

3.2. Demographic profile of respondents

The data obtained in the survey showed 186 respondents out of 155 target respondents, as the minimum number of samples required for the study. The data were then subjected to an initial checking stage to avoid respondents' answers containing missing values. 183 respondents were obtained and then analyzed based on their demographic profile according to the validated questions, including gender, age, type of work, how long they have used BNI mobile banking, how often they

use BNI mobile banking within 1 month, and the usefulness of BNI mobile banking. The demographics of all research respondents are explained in this section. Table 3.5 summarizes the demographic profile of respondents from the study.

Table 2. Demographic profile of respondents

No	Characteristics	Category	Number of Respondents	Percentage (%)
1	Gender	Men	94	50,50%
		Women	92	49,50%
2	Age	15- 25 years	56	30,10%
		26-34 years	70	37,60%
		35-45 years	45	24,20%
		>45 years	15	8,10%
3	Job Type	Civil Servant	43	23,10%
		Private Employee	79	42,50%
		Pengusaha/Wiraswasta	36	19,40%
		Others	28	15,10%
4	How long has it been using BNI Mobile Banking	<6 months	12	6,50%
		6 months – 1 year	60	32,30%
		1 year – 2 year	50	26,90%
		> 2 years	64	34,40%
5	Frequency of using BNI Mobile Banking in 1 month	1-3 times	41	22%
		4-6 times	65	34,90%
		7-10 times	55	29,60%
		>10 times	25	13,40%
6	Usability of BNI Mobile Banking	Interbank transfer	60	32,30%
		Paying for household needs (electricity, water, etc.)	50	26,90%
		E-Wallet (isi Gopay, Ovo, Linkaja, etc)	41	22%
		Paying for Shopping in E-Commerce	24	12,90%
		Others	11	5,90%

3.3. Model design

Model design was carried out for data processing. The structural model and measurement model were formed based on a conceptual model consisting of latent variables and indicators. Fig. 5 and Fig. 6 below show the structural models of this study before and after re-specification.

As shown in table above, there were 20 (twenty) indicators that were invalid, namely SE3, PU1, PU3, PU4, PE2, PE3, DS1, DS2, DS4, SC2, SC4, EN1, RS1, RS3, RL1, RL2, EF3, IU1, SF2, and SF4. The convergent validity test by analyzing the loading factor value was used to determine each correlation between indicators and variables to describe the extent to which each indicator had a construct relationship to the variable itself; in this case, the loading factor value must be> 0.7 (more than 0.7) (Hair, et al, 2017). So, it can be concluded that respecification was needed to get a good overall model fit. Any invalid indicators were removed and were not included in further analysis for modeling respecification using only 21 (twenty-one) variables. The following figure shows the structural model that has been respecified.

3.4. Composite reliability and AVE

The composite reliability test was conducted to measure the consistency of indicators in measuring the construct or variable they described. In this case, Hair et al. (2017) evaluated the composite reliability (CR) value> 0.7 and the average variance extracted (AVE) value> 0.5 (Hair et al., 2017). The reliability test results can be seen in Table 3.

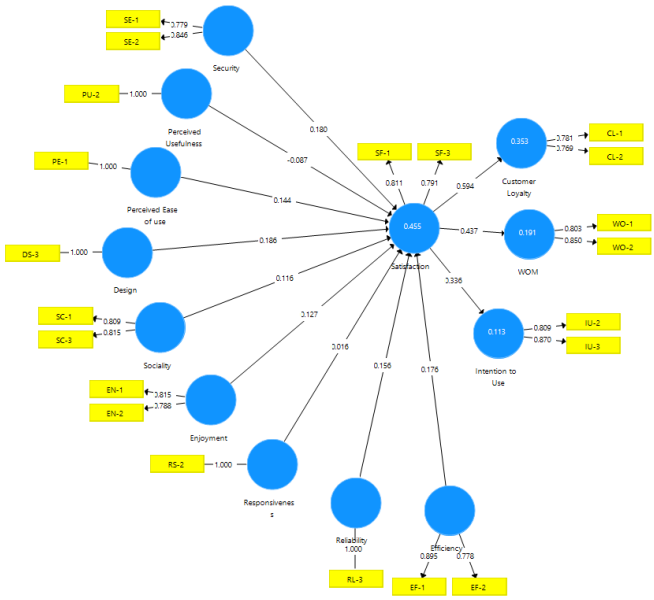

Fig. 5. Structural Model

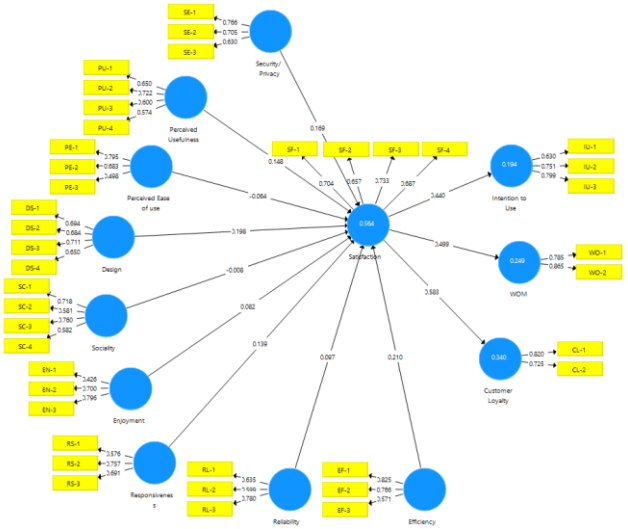

Fig. 6. Structural Model After Respesification

Table 3. CR and AVE

Variable	*Composite Reliability (CR)*	Critical Value	Results Evaluation	*Average Variance Extracted (AVE)*	Critical Value	Results Evaluation
CL	0.750	0,7	Valid	0.600	0,5	Valid
DS	1.000		Valid	1.000		Valid
EF	0.825		Valid	0.703		Valid
EN	0.782		Valid	0.642		Valid
IU	0.828		Valid	0.706		Valid
PE	1.000		Valid	1.000		Valid
PU	1.000		Valid	1.000		Valid
RL	1.000		Valid	1.000		Valid
RS	1.000		Valid	1.000		Valid
SF	0.782		Valid	0.642		Valid
SE	0.796		Valid	0.661		Valid
SC	0.795		Valid	0.659		Valid
WO	0.812		Valid	0.684		Valid

Based on the test results, all variables met the required CR and AVE criteria. Therefore, there was no improvement to the validity and reliability values. So, there was no removal of invalid indicators as described in the validity test.

3.5. Hypothesis testing

Testing the t-statistic value and p-values is an indicator in testing the hypothesis. The significant level of the relationship between constructs was done by bootstrapping in SmartPLS 3. Table 4 presents the result of the procedure in SmartPLS 3.

Table 4. Bootstraping Results of Evaluation Model

Hypothesis	*T statistics*	P values	Evaluation
H1: SE → SF	2.057	0.040	Significant
H2: PU → SF	1.128	0.260	Not Significant
H3: PE → SF	1.967	0.050	Significant
H4: DS → SF	2.242	0.025	Significant
H5: SC → SF	1.364	0.173	Not Significant
H6: EN → SF	1.418	0.157	Not Significant
H7: RS → SF	0.167	0.867	Not Significant
H8: RL → SF	1.864	0.063	Not Significant
H9: EF → SF	2.170	0.030	Significant
H10: SF → IU	5.067	0.000	Significant
H11: SF → WO	5.639	0.000	Significant
H12: SF → CL	9.357	0.000	Significant

In the evaluation in the effect of exogenous variables on significant endogenous variables or the relationship between constructs, it can be seen that the absolute value of t-statistics was >1.96 and p-value < 0.05. Table 4 shows that the security/privacy (SE), perceived ease of use (PE), design (DS), efficiency (EF) variables had a significant effect on satisfaction (SF), and satisfaction (SF) variable had a significant effect on the intention to use (IU), WOM (WO), customer loyalty (CL) variables. Thus, 5 constructs: perceived usefulness (PU), sociality (SC), enjoyment (EN), responsiveness (RS), and reliability (RL had a significant effect since they had absolute t-statistics < 1.96 and p-value > 0.05.

3.6. Research hypothesis analysis

In PLS SEM, the analysis of the relationship between the proposed variables needs to be understood within the theoretical framework of the research. This analysis aims to test whether the proposed research hypothesis can be accepted or rejected based on the results of statistical analysis. Based on testing the relationship between variables in the model, out of a total of 12 designed hypotheses, 7 hypotheses were accepted including H1, H3, H4, H9, H10, H11, and H12. The acceptance of 7 hypotheses was based on statistical analysis where the t-statistic value was greater than 1.96 and the p-values were not greater than 0.05 (Hair et al., 2014). The details of the explanation of the relationship between variables based on the results of hypothesis testing can be described as follows:

1) *H1: Security / privacy (SE) has a significant positive effect on satisfaction (SF)*

   Based on the results of data processing, the relationship between the security / privacy (SE) variable and satisfaction (SF) had a p-value of 0.040, indicating that SE had a significant positive impact on SF. The positive influence value was obtained from the results of the path coefficient value of 0.180, which indicated a strong positive influence.

   This then can make the company able to take some steps to improve the security/privacy aspect of BNI mobile banking as a form of quality evaluation carried out continuously. In other words, the increasing value of the security/privacy (SE) variable is in line with the increase in satisfaction (SF). Therefore, security/privacy (SE) can be involved in the implementation of BNI mobile banking products in the company. Thus, it can make a continuous improvement in products and procedures to achieve excellence, efficiency, sustainability and competitiveness in companies in Indonesia.

2) *H3: Perceived ease of use (PE) has a significant positive effect on satisfaction (SF)*

   Based on the results of data processing, the relationship between the perceived ease of use (PE) variable and satisfaction (SF) had a p-value of 0.050, indicating that PE had a significant positive impact on SF. The positive influence value here was obtained from the results of the path coefficient value of 0.144, which indicated a strong positive influence.

   This then can make the company able to take steps to improve the perceived ease of use aspect of BNI mobile banking as a form of quality evaluation carried out continuously. In other words, the increasing value of the perceived ease of use (PE) variable is in line with the increase in satisfaction (SF). Therefore, security/privacy (SE) can be involved in the implementation of BNI mobile banking products in companies.

3) *H4: Design (DS) has a significant positive effect on satisfaction (SF)*

   Based on the results of data processing, the relationship between the design (DS) variable and satisfaction (SF) had a p-value of 0.025, which meant that DS had a significant positive impact on SF. The positive influence value was obtained from the results of the path coefficient value of 0.186 indicating a strong positive influence.

   This then can make the company able to take steps to improve the design aspect of BNI mobile banking as a form of quality evaluation that is carried out continuously. In other words, the increasing value of the design (DS) variable is in line with the increase in satisfaction (SF). Therefore, design (DS) can be involved in the implementation of BNI mobile banking products in the company.

4) *H9: Efficiency (EF) has a significant positive effect on satisfaction (SF)*

   Based on the results of data processing, the relationship between the efficiency (EF) variable and satisfaction (SF) had a p-value of 0.030, showing a significant positive impact of EF on SF. The positive influence value was obtained from the results of the path coefficient value of 0.176 that indicated a strong positive influence.

   This can make the company able to take steps to improve the efficiency aspect of BNI mobile banking as a form of quality evaluation carried out continuously. In other words, the increasing value of the efficiency (EF) variable is in line with the increase in satisfaction (SF). Therefore, efficiency (EF) can be involved in the implementation of BNI mobile banking products in companies.

5) *H10: Satisfaction (SF) has a significant positive effect on intention to use (IU)*

   Based on the results of data processing, the

relationship between the satisfaction (SF) variable and intention to use (IU) had a p-value of 0.000. It showed that SF had a significant positive impact on IU. The positive influence value was obtained from the results of the path coefficient value of 0.336 revealing a strong positive influence.

This then can make the company able to take steps to increase customer satisfaction enabling the intention to use of customers for BNI mobile banking to increase continuously. In other words, the increasing value of the satisfaction (SF) variable is in line with the increase in Intention of Use (IU).

6) *H11: Satisfaction (SF) has a significant positive effect on WOM / Word of Mouth (WO)*

Based on the results of data processing, the relationship between the satisfaction (SF) variable and WOM / Word of Mouth (WO) had a p-value of 0.000, which meant that SF had a significant positive impact on WO. The positive influence value was obtained from the results of the path coefficient value of 0.437, which indicated a strong positive influence.

This can make the company able to have steps to improve marketing in terms of Word of Mouth because customers can easily believe based on testimonials or experiences from stories of people around them and can go throughout Indonesia regarding the use of BNI mobile banking for making it sustainable. In other words, the increasing value of the satisfaction (SF) variable is in line with the increase in WOM / Word of Mouth (WO).

7) *H12: Satisfaction (SF) has a significant positive influence on customer loyalty (CL)*

Based on the results of data processing, the relationship between the satisfaction (SF) variable and customer loyalty (CL) had a p-value of 0.000. It meant that SF had a significant positive impact on CL. The positive influence value was obtained from the results of the path coefficient value of 0.594 that showed a strong positive influence).

Then, it enables the company to take steps to increase customer loyalty purposely to maintain customer loyalty towards BNI mobile banking. In other words, the increasing value of the satisfaction (SF) variable is in line with the increase in customer loyalty (CL).

These results have also confirmed findings from previous studies, i.e. Rejman et al. (2022) for H1, H3, H4, H10, H11 and Ali Raza et al. (2020) for H9 and H12.

3.7. Total effect analysis

The total effect described the overall influence exerted by the independent variable on the dependent variable, which included both direct and indirect effects. To determine whether these effects were significant, the analysis was conducted by utilizing the bootstrapping method as a statistical resampling technique. Furthermore, in Table 5, important variables were found that had a significant impact on various aspects such as intention to upgrade, ways to continuous improvement, and customer required usability.

Table 5. Total Effect Evaluation

Variable	*Total Effect*	P values	Evaluation
SE → SF	2.057	0.040	Significant
PU → SF	1.128	0.260	Not Significant
PE → SF	1.967	0.050	Significant
DS → SF	2.242	0.025	Significant
SC → SF	1.364	0.173	Not Significant
EN → SF	1.418	0.157	Not Significant
RS → SF	0.167	0.867	Not Significant
RL → SF	1.864	0.063	Not Significant
EF → SF	2.170	0.030	Significant
SF → IU	5.067	0.000	Significant
SF → WO	5.639	0.000	Significant
SF → CL	9.357	0.000	Significant

Table 5 shows that based on the total effect value, 7 (seven) construct paths had a significant effect and 5 (five) construct paths had an insignificant effect on satisfaction (SF). Furthermore, there were 7 (seven) positive relationships to satisfaction (SF), including the variables security/privacy (SE), perceived ease of use (PE), design (DS), and efficiency (EF), intention to use (IU), WOM (WO), and customer loyalty (CL).

4. Conclusion

This research was conducted to analyze the effect of e-service quality on BNI mobile banking customer satisfaction and loyalty in Indonesia. The model and data developed were based on literature studies and primary reference research, namely research by (Rejman et al., 2022; Ali Raza, et al., 2020) previously conducted. The model was built by integrating the utilitarian dimension, hedonistic dimension and e-service quality dimension. The conceptual model was used to empirically analyze the influence of quality and customer satisfaction to obtain influential variables to make it applicable to the company's mobile banking. The main method in this research involved Partial Least Square Structural Equation Modeling (PLS-SEM).

The results showed that 7 (seven) variables had a direct/significant influence on BNI mobile banking performance on service quality and customer loyalty, namely: security/privacy (SE), perceived ease of use (PE), design (DS), efficiency (EF), intention to use (IU), WOM (WO), customer loyalty (CL). However, 5 (five) variables did not have a significant effect on organizational performance, including the variables perceived usefulness (PU), sociality (SC), enjoyment (EN), responsiveness (RS), reliability (RL).

This relationship showed that increasing the value of these factors (i.e. security/privacy, perceived ease of use, design, and efficiency) will increase customer satisfaction in using BNI mobile banking. The increased level of customer satisfaction consequently will increase customer loyalty, intention to use and word of mouth.

The practical implication of this finding is to optimize these aspects while designing a mobile banking application, especially BNI mobile banking. For example, the application must be capable of guaranteeing the security and privacy of its users. It also requires an appealing and professional design, with efficient features and easy to use since these aspects have significant influences on customer satisfaction.

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