

Satisfaction and Loyalty of Banking Customers in Indonesia

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Abstract—Improved customer satisfaction and loyalty are essential metrics in increasing a company's revenue and profit in the banking industry. This research aims to determine the effect of satisfaction on loyalty among bank customers in Indonesia. The study was conducted by face to face interview method (F2F) among 1910 bank customers in eight metropolis in Indonesia (2019). The sampling method used a random sampling followed by a booster sampling approach. The analysis was conducted using the Structural Equation Modeling (SEM) by WarpPLS approach. The results show that satisfaction positively and very significantly affects loyalty.

Keywords—Structural Equation Modelling (SEM), WarpPLS

I. INTRODUCTION

Customers are the subjects who buy products or services to meet their needs. Consumer behavior will determine their decision whether they will buy, when to buy, where to buy and how they will buy a product or service. Customer needs are dynamic and they may change depending on several factors that influence them. This means that companies need to adapt to the dynamics of the customer needs by observing what factors influence them [1].

An example of the service industry in Indonesia is the banking industry. Data from the OJK (Financial Services Authority, Republic of Indonesia) shows that the number of commercial banks in Indonesia for March 2020 is 110 and there are 1,537 what are called Bank Perkreditan Rakyat or the Rural Banks. This indicates there is very high competition among banking industry players. The situation has triggered banks to compete for acquiring and retaining as many customers as possible according to their respective target markets.

Therefore, understanding customer needs and measuring how satisfied they are with the products and services offered is very important. When customers are satisfied with the products or services they have purchased and used, the customers will be loyal to the company's products and services therefore they will be loyal to the company. This is proven by previous research in the following industries: banking [2–8], airlines [9], education [10], entertainment [11], food [12–14], hospital [15], hotel [16], manufacture [17], retail [18–21], shipping [22–23], telecommunication [24–27]. Those research conclude that customer satisfaction has a significant positive effect on customer loyalty. On the other hand, there are other studies in the banking industry that show customer satisfaction (using the variable of tangibles, reliability, responsiveness, and empathy) has no effect on customer loyalty [28]. Therefore, it becomes interesting to observe how the effect of customer satisfaction

on customer loyalty in the banking industry in Indonesia context.

This aim of the study is to analyze the relationship between customer satisfaction and customer loyalty. The relationship between customer satisfaction and customer loyalty in this study is assumed to be linear. Data was collected using face to face interview method using a structured questionnaire to 1910 bank customers. The study was conducted in 8 major cities in Indonesia (Jakarta, Bandung, Semarang, Surabaya, Makassar, Medan, Pekanbaru, and Palembang) using random and booster sampling techniques. The analysis used the Structural Equation Modelling (SEM) method with the WarpPLS approach.

The discussion about the methodology is provided in Section 2. The results and discussion are displayed in Section 3 whilst the conclusion is in Section 4.

II. METHOD

WarpPLS analysis is the development of PLS (Partial Least Square) analysis [29]. PLS analysis can be used when: (1) the theoretical basis of the model design is weak or a theoretical basis has not been found, (2) indicators are formative, (3) are used to confirm the theory or to perform hypothesis testing, (4) does not require many assumptions and (5) the sample size can be large or small. By considering that WarpPLS is a development of PLS, the aforementioned also applies to WarpPLS. In this study, the data normality assumption was not considered in the analysis. Therefore, this research was conducted using the WarpPLS analysis approach.

2.1. Previous Study

A comparison between previous and proposed research, in the banking industry about the relationship between customer satisfaction and customer loyalty, is shown in Table 1.

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TABLE 1.
PREVIOUS AND PROPOSED RESEARCH

Source	Notes	Satisfaction	Loyalty	Source	Notes	Satisfaction	Loyalty
Hayati, 2020	Consumer satisfaction as a mediating variable between the image of micro banking and consumer relations with consumer loyalty.	Overall satisfaction, company's constant fulfillment of customer's expectation, interesting experience and not overlooking company	Word of mouth (WOM), repurchase, identification				
Djajanto, 2019	The research analyzed the impact of relationship marketing on customer value, customer satisfaction, and loyalty. The respondents were 160 banking customers in Malang and Surabaya city (Indonesia) The research using PLS analysis.	The author implicitly informed the customer satisfaction's such as relationship marketing	The author not explicitly informed the customer loyalty's indicator but implicitly such as relationship marketing and communicating with customers in a timely manner, customer commitment to repurchase preferred products	AI-maslam, 2015	Analyze the relation between customer expectation, price fairness, customer satisfaction and customer loyalty towards services of banks. The research was conducted in Syria.	The author implicitly informed the customer satisfaction's indicator but 4 items (such as how the products and services provided by a company meet or exceed customer expectations)	choice (banking services), recommend the bank to someone, remain with the same bank even if fees increase marginally The author implicitly informed the customer loyalty's indicator but 10 items (such as behavioral and attitudinal approaches, cognitive approaches).
Yilmaz, 2018	Observed the service dimensions of SERVQUAL (tangibles, reliability, responsiveness, assurance, and accessibility, ATM service) and relationship between satisfaction and loyalty of customer.	Satisfied to work with the bank, happy to use bank's services, customers have a good and positive impression about the bank	The customers will prioritize the bank when they have to choose a bank in the future, continue to prefer products and services of the bank, continue to prefer the bank (despite some minor cases).	Koduah, 2015	The findings revealed a significant positive relationship between customer satisfaction and customer loyalty.	Tangibles, reliability, responsiveness, and empathy	Cognitive, affective, conative and action
Rifai, 2016	This research observed effect of variable of customer value, support systems and customer's products knowledge to customer satisfaction and its impact on customer engagement.	Service product, product performance, customer expectation, customer needs,	Customer engagement using variables: loyalty, positive word of mouth, feedback, product of choice.	Dhurup, 2014	The research observed customer perceptions of the quality of technology-based banking service and the relationship with customer satisfaction and loyalty. The survey was conducted in South Africa among internet banking customers.	The author implicitly informed the customer satisfaction's indicator such as service provider meeting or exceeding customer's expectation, customer overall satisfaction	The author implicitly informed the customer loyalty's indicators but 6 items (such attitudinal and behavioral approaches).
Sindwani, 2016	Relationship between dimensions of the technology based self-service banking (TBSSB) service quality, customer	Satisfaction of TBSSB services, product offered and overall	Positive things about the bank to other people, encourage friends and relatives to do business with the bank, expect to do more business with the bank in future, consider the bank as the first	Proposed Study	Relationship between satisfaction and loyalty among banking customers in Indonesia.	Promotion, services, channel, product, value, processing, staff, physics, emotion and social among the banking product/services.	Churn behavior, repurchase, continue to make payment transactions/purchase products using bank's debit card/ATM/credit card, willing to pay more to get banking product and service, defending the bank against negative WOM, willing to wait longer to get new products or services of the bank, willing to spend money, sacrifice time and energy to participate in bank's promotion, remain to

Source	Notes	Satisfaction	Loyalty
			use the products and services of the bank, using bank products and services voluntarily, frequently find out the information about the product and services.

2.2. Customer Satisfaction

Customer satisfaction is about relationship between the customer of a product or service and the provider of the product or service. Customer satisfaction is the degree to which a customer perceives that an individual, firm or organization has effectively provided a product or service that meets their needs in the context in which the customer is aware of and or using the product or service [30].

In recent years, there has been an increasing interest in the service marketing mix which aims to achieve the maximum outcomes in terms of customer satisfaction and retention that allow firms, including banks, to be competitive over time. The literature review reveals that the concept of marketing mix with the additional three P's of service marketing, i.e., people, process and physical evidence, have been increasingly used by different industries.

The importance of research on these P's strategy is undoubted. Since all these correlation values for service marketing mix elements of product, place, promotion, price, people, process and physical evidence to customer satisfaction are high (higher than 0.5) showing that these service marketing mix elements have higher strength of associations with customer satisfaction [31].

As marketing activities become more sophisticated in the banking sector, greater attention needs to be directed towards product, price, place, promotion, people, physical evidence, and process in formulating their marketing strategy. These attributes is applied and customized based on the moment of truth among customer and banking's employees. The attributes provided in this research are as follows: (1) Promotion, (2) Services, (3) Channel, (4) Product, (5) Price, (6) Processing, (7) Staff, (8) Physical, (9) Emotion, (10) Social.

2.3. Customer Loyalty

Customers who remain loyal to the company are likely to engage in favorable word-of-mouth behavioral responses. In addition, the company may be able to cross-sell to these customers or even charge them with a premium price [32]. Hence research measured word-of-mouth communications and intention to churn from the product in the future.

Customer loyalty was classified into two categories [33]:

1. Loyalty based on inertia, where a brand is bought out of habit merely because this takes less effort and the consumer will not hesitate to churn to another brand if there is some convenient reason to do so.
2. True brand loyalty, which is a form of repeat purchasing behavior reflecting a conscious decision to continue buying the same brand, and it must be

accompanied by an underlying positive attitude and a high degree of commitment toward the brand.

Those studies are used as a consideration in making variables in this research and customized in the banking industry. The variables which applied in this research consist of (1) Churn behavior, (2) Repurchase, (3) Continue to make payment transactions/purchase products/services using the bank's debit card / ATM/credit card, (4) Willing to pay more to get banking products and services, (5) Defending the bank from negative WOMs, (6) Willing to wait longer to get new products or services from the bank, (7) Willing to spend money, sacrifice time and energy to participate in the bank's promotion, (8) Remain to use the products and services of the bank, (9) Using bank products and services voluntary, (10) Frequently find out the information about the product and services.

2.4. Relationship between Satisfaction and Loyalty

The aforementioned various research result in a significant relationship between customer satisfaction and customer loyalty. Therefore, the relationship between the two latent variables in this study also assume the relationship.

2.5. SEM (Structural Equation Modelling)

SEM is an integrated analysis between confirmatory factor analysis, path analysis, and simultaneous equation modelling [34]. There are several variables in SEM analysis, among others:

1. Latent Variables

Latent variables are variables that cannot be observed directly, such as loyalty and customer satisfaction. SEM has 2 types of latent variables, namely the endogenous and exogenous.

(1) Endogenous variables are variables that are influenced by other variables in a model (i.e., dependent variables). The mathematical notation of the endogenous variable is η .

(2) Exogenous variables are variables that are not influenced by other variables in the model (i.e., independent variables). The mathematical notation of the exogenous latent variables is ξ .

2. Indicators

Indicators are variables that can be observed or can be measured directly and they are used to measure latent variables (i.e., variables that cannot be measured directly).

In a SEM analysis, the theoretical basis used as a reference for the model formation must be robust. In addition, there are several assumptions in a SEM analysis, and these include all linear relationships, no outliers, and the assumption of normality. Also in a SEM analysis, the indicators formed must be reflective.

2.6. SEM (Structural Equation Modeling) with the WarpPLS Approach

The WarpPLS analysis is a development of the PLS analysis [29]. PLS is a non-parametric statistical method and produces good solutions eventhough the data do not spread normally [35]. This study did not consider the normality assumption as required by the SEM analysis. Therefore, this study uses SEM analysis with the WarpPLS approach.

The WarpPLS analysis steps are as follows [29], [35]:

(1) Designing the Structural Model (the Inner Model)

The inner model designing in the WarpPLS analysis is creating a relationship among latent variables. WarpPLS analysis allows for exploratory relationship analysis.

(2) Designing the Outer Model

This stage is to determine whether a variable has an indicator with reflective or formative nature. This stage is important because an incorrect measurement model will result in wrong results of analysis. The basis used for designing the outer model includes the theory, previous empirical research, or if they do not exist, it can be in the empirical, incisive, and rational research conditions.

(3) Building the Path Diagram

After the steps 1 and 2 are carried out, then results of the modelling the inner and outer models are shown as the diagram paths.

(4) Conversion of the Path Diagram into an Equation System

The equation system in the WarpPLS analysis, among other, consists of the measurement model (the outer model), the structural model (the inner model) and weight relations. The explanation of the measurement model, structural model and weight relations in WarpPLS are as follows [29], [36]:

(a) The Measurement Model (the outer model)

There are two groups of measurement models, namely, the measurement models for exogenous variables and endogenous variables. The reflective indicator model can be formulated as in equations (1) and (2).

$$\mathbf{x} = \mathbf{A}_x \boldsymbol{\xi} + \boldsymbol{\delta}_x \quad (1)$$

$$\mathbf{y} = \mathbf{A}_y \boldsymbol{\eta} + \boldsymbol{\varepsilon}_y \quad (2)$$

While the formative indicator model can be written in equation (3) and (4).

$$\boldsymbol{\xi} = \mathbf{A}_x \mathbf{X}_i + \boldsymbol{\delta}_x \quad (3)$$

$$\boldsymbol{\eta} = \mathbf{A}_y \mathbf{Y}_i + \boldsymbol{\varepsilon}_y \quad (4)$$

where:

p : number of endogenous variable indicators (indicator Y)

q : number of exogenous variable indicators (indicator X)

m : number of latent variables

\mathbf{x} : matrix of indicator of exogenous variables

($\boldsymbol{\xi}$)(order: $qx1$)

\mathbf{y} : matrix of indicators of endogenous variables

($\boldsymbol{\eta}$)(order: $px1$)

\mathbf{A}_x : matrix of *loading factors* of exogenous variable s
(order: qxm)

\mathbf{A}_y : matrix of *loading factors* of endogenous variables
(order: pxm)

$\boldsymbol{\xi}$: matrix of exogenous latent variables ($\boldsymbol{\xi}$)(order: $mx1$)

$\boldsymbol{\eta}$: endogenous latent variable matrix($\boldsymbol{\eta}$)(order: $mx1$)

$\boldsymbol{\delta}_x$: matrix of measurement errors of endogenous variables (order: $px1$)

$\boldsymbol{\varepsilon}_y$: matrix of measurement errors of exogenous variables (order: $qx1$)

(b) The Structural Model (the Inner Model)

Structural models aim at examining the underlying or formulating relationships among variables based on the theory.

The form of the structural model matrix displayed in equation (5).

$$\boldsymbol{\eta} = \mathbf{B}\boldsymbol{\eta} + \mathbf{F}\boldsymbol{\xi} + \boldsymbol{\zeta} \quad (5)$$

where:

\mathbf{B} : matrix of coefficients of loading factors for endogenous factors to other endogenous variables (ordo: mxm)

\mathbf{F} : matrix of coefficients of loading factor for exogenous variables to endogenous variables (ordo: mxn)

$\boldsymbol{\zeta}$: matrix of error in structural model (ordo: $mx1$)

(c) Weight Relation

Weight relation is an estimation of the latent variable value. The inner and outer model provide the specifications following the weight relation in PLS algorithm using the equations (6) and (7).

$$\boldsymbol{\xi}_b = \sum k_{kb} w_{kb} x_{kb} \quad (6)$$

$$\boldsymbol{\eta}_i = \sum k_{ki} w_{ki} x_{ki} \quad (7)$$

where:

w_{kb} and w_{ki} : k weights are used to generate estimation of the latent variables $\boldsymbol{\xi}_b$ and $\boldsymbol{\eta}_i$.

The estimation of latent variable data is a linear aggregate of indicators which its weight values are obtained through the estimation procedure in the WarpPLS analysis.

(5) Parameter Estimation

There is the estimation parameter of outer and inner model [29]. Algorithm analysis of the outer model is the process of calculating data of the latent variable sourced from indicator data. The outer model algorithm that is suitable for the reflective indicator model is the PLS mode A [37]. Information about the PLS mode A algorithm can be seen in a previous research [38]. This study used the PLS mode A algorithm because the indicators which form the latent variables of customer satisfaction and loyalty are reflective indicators.

One of the inner model algorithms that can be used in the WarpPLS analysis is the linear algorithm [29]. The inner model algorithm in this study used the linear algorithm because the model of the relationship among the latent variables in this study is assumed to be linear.

2.7. Goodness of Fit

The goodness of fit for the outer and inner models is described as follows.

(1) Outer Model

The measurement model and the outer model development involves testing the validity and reliability of the research instruments. There are several validity tests on the indicators as follow:

(a) Convergent Validity for Each Indicator

Convergent validity can be seen based on the correlation coefficient values between the reflective indicator scores and the latent variable scores. In

factor analysis, this can be seen in the factor loading values [29]. When the number of indicators ranges from 3 to 7, the factor load values ranging from 0.5 to 0.6 is considered sufficient as meeting the convergent validity. In addition, a significant loading factor limitation can also be done by considering different sample sizes [35]. When the sample size is 100, for example, the factor load is considered significant when the loading value is more than 0.55. Meanwhile, when the sample size is 350, the loading is considered significant when the value is more than 0.30. This study used a sample size of 1910, therefore, the indicator is considered to meet the convergent validity when the loading factor value is more than 0.30.

(b) Discriminant Validity for Each Indicator

Discriminant validity can be observed from the loading and cross-loading values [29]. The indicators are considered to meet the discriminant validity when the loading value of each indicator on the relevant variable is greater than the cross-loading values on the other latent variables.

While the discriminant validity and reliability tests of the questionnaire were conducted as follows:

(a) Discriminant Validity of the Questionnaire

The testing of discriminant validity of the questionnaire was carried out by comparing the square root of the average variance extracted (AVE) value of each latent variable with the correlation between the latent variable in question and other latent variables. The AVE equation is as in equation (8) [37].

$$AVE = \frac{(\sum \lambda_i^2)}{(\lambda_i^2) + \sum var(\delta_i)} \quad (8)$$

where:

λ_i : loading factor values of *i*-th indicators

δ_i : measurement error of *i*-th indicators

If the square root of AVE value is greater than its correlation value, then the questionnaire meets the discriminant validity [29].

(b) Reliability Checking of the Questionnaire

This can be tested using 2 methods as follows:

(1) Composite Reliability

A questionnaire is considered to have good composite reliability when the value (ρ_c) is ≥ 0.70 [29]. The equation of composite reliability is provided in formula (9) [37].

$$\rho_c = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum var(\delta_i)} \quad (9)$$

where:

λ_i : loading factor value of *i*-th indicator

δ_i : measurement error of *i*-th indicator

(2) Cronbach's Alpha

This Cronbach's Alpha is used to check the questionnaire reliability using the equation (10) [29].

$$r_{ca} = \left(\frac{n}{n-1} \right) \left(1 - \frac{\sum_{j=1}^k s_j^2}{s_t^2} \right) \quad (10)$$

where:

r_{ca} : Cronbach's Alpha reliability coefficient

s_j^2 : the variance score of the *j*-th item

s_t^2 : the variance of the total score

The questionnaire is considered reliable when the Cronbach's Alpha value is more than 0.6 [39].

(2) Inner Model

Before testing the hypothesis and drawing the conclusions, the model should meet the criteria of Goodness of Fit. If one or two of the Goodness of Fit are met, the model can still be used. The Goodness of Fit in the inner model is shown in Table 2 [29].

TABLE 2.
GOODNESS OF FIT

No	Goodness of Fit	Cut off Fit
1.	Average Path Coefficient (APC)	$p < 0.05$
2.	Average R-Squared (ARS)	$p < 0.05$
3.	Average adjusted R-Squared (AARS)	$p < 0.05$
4.	Average full collinearity VIF	Acceptable if ≤ 5 , ideally ≤ 3.3
6	Tenenhaus GoF (GoF)	Small ≥ 0.1 , medium ≥ 0.25 , large ≥ 0.36
7.	Sympson's paradox ratio (SPR)	Acceptable if ≥ 0.7 , ideally = 1
8.	R-squared contribution ratio (RSCR)	Acceptable if ≥ 0.9 , ideally = 1
9.	Statistical suppression ratio (SSR)	Acceptable if ≥ 0.7

2.8. Hypothesis Testing

Testing the hypothesis of parameter estimation was carried out using the resampling method [29]. One of the most frequently used resampling methods is the Bootstrap resampling method. The application of the resampling method allows data to be free from distribution assumptions or does not require normal distribution assumptions. Based on several previous studies, using 100 bootstraps can provide a convergent estimated parameter. Therefore, the hypothesis testing in this study used the Bootstrap resampling method of 100 times.

The statistical hypothesis in this study is as follows:

(1) The hypothesis of the outer model:

$H_0: \lambda_i = 0$ (*i*-th indicator is not significant)

$H_1: \lambda_i \neq 0$ (*i*-th indicator is significant)

where:

$i = x1, x2, x3, x4, x5, x6, x7, x8, x9, x10, y2, y4, y5, y6, y7, y10$

(2) The hypothesis of the inner model:

$H_0: \gamma_1 = 0$ (Customer satisfaction has no significant effect on customer loyalty)

$H_1: \gamma_1 \neq 0$ (Customer satisfaction has significant effect on customer loyalty)

The test is carried out using the t statistical test as in equation 6 [40]

$$t = \frac{\hat{\lambda} - \hat{\lambda}_0}{s_{\hat{\lambda}}/\sqrt{n}} \text{ and } t = \frac{\hat{\gamma} - \hat{\gamma}_0}{s_{\hat{\gamma}}/\sqrt{n}} \quad (11)$$

where, s : the standard deviation

If the p-value of the t-test statistic is ≤ 0.10 ($\alpha = 10\%$), it is considered weakly significant. If the p-value is ≤ 0.05 ($\alpha =$

5%), it means significant, and if $p\text{-value} \leq 0.01$ ($\alpha = 1\%$), it is highly significant result [29].

2.9. Data

Data collection used face to face interview (F2F) method in 2019. The respondents were (1) bank customers who had had bank saving accounts for more than 1 year, (2) the middle-up class (family expenses per month of more than IDR 2 millions where the monthly expenses are used for daily needs and exclude expenses for installments, purchasing high value items such as cars, houses, etc. and own a certain number of items in their household) (3) aged 21-55 years old, (4) of high school education level and higher, (5) and had visited branch office and conducted e-channel transactions at least once in past 6 months, (6) were the decision-makers or influencers in selecting their bank accounts. The number of samples was 1910, taken from 8 major cities of Indonesia (Jakarta, Bandung, Semarang, Surabaya, Makassar, Medan, Pekanbaru and Palembang). The sampling method combined a random sampling technique and adding with booster samples so that selected banks had minimal 50 respondents. The number of respondents for the random sampling is 1004, while the booster sampling resulted in 906 respondents.

2.10. Variables

This study used some latent variables and indicators as presented in Table 3.

TABLE 3.

LATENT VARIABLES AND INDICATORS

Latent Variables	Satisfaction (X)	Loyalty (Y)
Indicators	<i>X1 : Promotion</i>	<i>Y1: Churn behavior</i>
	<i>X2 : Services</i>	<i>Y2: Repurchase</i>
	<i>X3: Channel</i>	<i>Y3: Continue to make payment transactions / purchase products / food using bank's debit card / ATM / credit card</i>
	<i>X4:Product</i>	<i>Y4: Willing to pay more to get banking product and service</i>
	<i>X5: Price</i>	<i>Y5: Defending the bank from negative WOM</i>
	<i>X6: Processing</i>	<i>Y6: Willing to wait longer to get new products or services from the bank</i>
	<i>X7: Staff</i>	<i>Y7: Willing to spend money, sacrifice time and energy to participate in the bank's promotion</i>
	<i>X8: Physical</i>	<i>Y8: Remain to use the products and services of the bank</i>
	<i>X9: Emotion</i>	<i>Y9 : Using bank products and services voluntarily</i>
	<i>X10: Social</i>	<i>Y10: Frequently find out the information about the products and services</i>

2.11. Research Methodology

The analysis steps in this study were as follows:

- (1) Performed structural model specifications, measurement models, and formed the path diagrams.

- (2) Converted the path diagram into an equation system.
- (3) Estimated the outer model and inner model.
- (4) Did the goodness of fit evaluation.
- (5) Conducted the hypothesis testings.

III. RESULTS AND DISCUSSION

The structural modelling (the inner model) in this study is based on the description in Section 1.3. Based on the theory, it is shown that there is a significant positive relationship between customer satisfaction and customer loyalty. Each latent satisfaction variables and loyalty variables (the outer model) have 10 reflective indicators. The results of the inner and outer model can be described in the path diagram as shown in Figure 1.

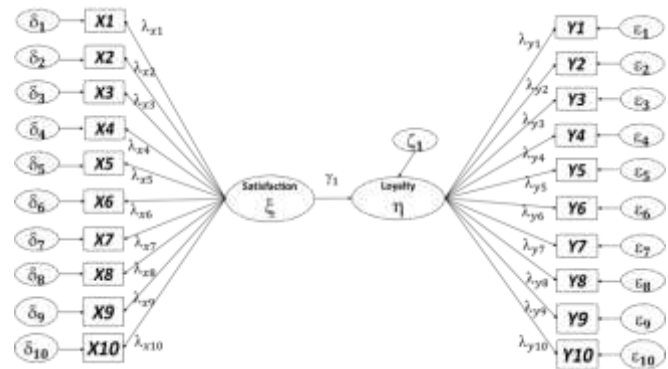


Figure. 1. Path Diagram

From the path diagram in Figure 1, the following equations can be derived:

(1) Outer Model

$$\begin{aligned}
 X1 &= \lambda_{x1} \text{Satisfaction} + \delta_1 & Y1 &= \lambda_{y1} \text{Loyalty} + \varepsilon_1 \\
 X2 &= \lambda_{x2} \text{Satisfaction} + \delta_2 & Y2 &= \lambda_{y2} \text{Loyalty} + \varepsilon_2 \\
 X3 &= \lambda_{x3} \text{Satisfaction} + \delta_3 & Y3 &= \lambda_{y3} \text{Loyalty} + \varepsilon_3 \\
 X4 &= \lambda_{x4} \text{Satisfaction} + \delta_4 & Y4 &= \lambda_{y4} \text{Loyalty} + \varepsilon_4 \\
 X5 &= \lambda_{x5} \text{Satisfaction} + \delta_5 & Y5 &= \lambda_{y5} \text{Loyalty} + \varepsilon_5 \\
 X6 &= \lambda_{x6} \text{Satisfaction} + \delta_6 & Y6 &= \lambda_{y6} \text{Loyalty} + \varepsilon_6 \\
 X7 &= \lambda_{x7} \text{Satisfaction} + \delta_7 & Y7 &= \lambda_{y7} \text{Loyalty} + \varepsilon_7 \\
 X8 &= \lambda_{x8} \text{Satisfaction} + \delta_8 & Y8 &= \lambda_{y8} \text{Loyalty} + \varepsilon_8 \\
 X9 &= \lambda_{x9} \text{Satisfaction} + \delta_9 & Y9 &= \lambda_{y9} \text{Loyalty} + \varepsilon_9 \\
 X10 &= \lambda_{x10} \text{Satisfaction} + \delta_{10} & Y10 &= \lambda_{y10} \text{Loyalty} + \varepsilon_{10}
 \end{aligned}$$

(2) Inner Model

$$\text{Loyalty} = \gamma_1 \text{Satisfaction} + \zeta_1$$

Once the equation system had been made, then the parameter estimation in WarpPLS analysis was conducted. The algorithm for parameter estimation of the outer model in this study used PLS mode A because the nature of the indicator model is reflective. Meanwhile the parameter estimation algorithm in the inner model used the linear algorithm because the relationship model between the latent variables of satisfaction with loyalty is assumed to be linear. Next, checking on the goodness of fit on the WarpPLS analysis both on the outer model and the inner model is carried out with approaches as explained in Sections 3.1, 3.2, 3.3, and 3.4.

3.1. Outer Model at All Indicators

3.1.1. Convergent Validity for All Indicators

The validity test was carried out using the convergent validity test and the discriminant validity test through the output results of combined loadings and cross loadings. Results of the combined loading and cross-loadings are shown in Table 4.

Based on the results in Table 4, it can be concluded that the loading value on the *Y1* indicator is less than 0.30. This means that the convergent validity of the indicators has not been fulfilled.

TABLE 4.
COMBINED LOADING AND CROSS LOADING RESULT BY ALL INDICATORS

Indicators	Satisfaction	Loyalty	p-value
X1	0.788	0.082	<0.001*
X2	0.805	-0.017	<0.001*
X3	0.791	0.019	<0.001*
X4	0.832	0.034	<0.001*
X5	0.782	0.047	<0.001*
X6	0.798	-0.037	<0.001*
X7	0.806	-0.096	<0.001*
X8	0.759	-0.062	<0.001*
X9	0.843	-0.049	<0.001*
X10	0.772	0.057	<0.001*
Y1	-0.155	-0.102	<0.001*
Y2	-0.111	0.507	<0.001*
Y3	0.072	0.616	<0.001*
Y4	-0.295	0.438	<0.001*
Y5	-0.196	0.535	<0.001*
Y6	-0.267	0.497	<0.001*
Y7	-0.303	0.431	<0.001*
Y8	0.193	0.666	<0.001*
Y9	0.203	0.512	<0.001*
Y10	-0.048	0.594	<0.001*

*) Significance in $\alpha = 0.05$

3.1.2. Discriminant Validity for All Indicators

Table 2 shows that the loading values of all indicators are higher than the cross-loading values. For example, the value of loading *X1* (0.788) > cross-loading (0.082) as well as the loading value *Y2* (0.507) > cross-loading (-0.111). Therefore, the discriminant validity of all indicators had been met.

3.1.3. Discriminant Validity for the Questionnaire

Evaluation of the convergent validity for the questionnaire was carried out by comparing the square root of Average Variance Extracted (AVE) value of each latent variable with the correlation between latent variables to other variables as shown in Table 5.

In the Table 5, it is shown that the value of the square roots of AVE (Average Variance Extracted), the values in parentheses, the value in the satisfaction variable (0.798) and the loyalty variable (0.578) is greater than the correlation value between the satisfaction variable and loyalty (0.444). Thus, it can be said that the discriminant validity of the questionnaire has been fulfilled.

TABLE 5.
SQUARE ROOTS AVE AND CORRELATION COEFFICIENT BY ALL INDICATORS

	Satisfaction	Loyalty
Satisfaction	(0.798) (p-value : 1.000)	0.444 (<0.001)
Loyalty	0.444 (<0.001)	(0.512) (1.000)

3.1.4. Results of Questionnaire Reliability Testing

The reliability test was carried out using the Composite Reliability Coefficient and Cronbach's Alpha Coefficients as displayed in Table 6.

TABLE 6.
COMPOSITE RELIABILITY COEFFICIENT AND CRONBACH'S ALPHA COEFFICIENTS BY ALL INDICATORS

Variable	Composite Reliability Coefficient	Cronbach's Alpha Coefficients
Satisfaction	0.946	0.937
Loyalty	0.749	0.724

Table 6 shows that the Composite Reliability Coefficient is more than 0.70. Therefore, the latent variables in the questionnaire have met the composite reliability. In addition, the Cronbach's Alpha Coefficients is more than 0.6. Therefore the latent variables in the questionnaire was shown to have met the reliability of internal consistency.

Based on the convergent validity test, *Y1* indicator's had not been fulfilled. Therefore, the indicator was not included in the further analysis. Then, validity and reliability tests of the valid indicators needed to be re-run using "the found valid indicators" (excluding *Y1*) as explained in Section 3.2.

3.2. Outer Model at Valid Indicators

3.2.1. Convergent Validity in Valid Indicators

Results of combined loading and cross-loadings on valid indicators are shown in Table 7.

TABLE 7.
COMBINED LOADING AND CROSS-LOADING RESULT BY VALID INDICATORS

Indicators	Satisfaction	Loyalty	p-value
X1	0.789	0.085	<0.001*
X2	0.805	-0.020	<0.001*
X3	0.790	0.017	<0.001*
X4	0.832	0.034	<0.001*
X5	0.782	0.049	<0.001*
X6	0.798	-0.038	<0.001*
X7	0.805	-0.101	<0.001*
X8	0.759	-0.063	<0.001*
X9	0.842	-0.055	<0.001*
X10	0.773	0.065	<0.001*
Y2	-0.112	0.521	<0.001*
Y3	0.085	0.610	<0.001*
Y4	-0.303	0.462	<0.001*
Y5	-0.196	0.545	<0.001*
Y6	-0.273	0.516	<0.001*
Y7	-0.311	0.453	<0.001*
Y8	0.211	0.646	<0.001*
Y9	0.216	0.505	<0.001*
Y10	-0.048	0.603	<0.001*

*) Significance in $\alpha = 0.05$

From the results in Table 7, it is shown that the loading values on all indicators are more than 0.30 and the p-value is less than 0.001 (less than $\alpha = 0.01$). Thus the convergent validity of these indicators has been fulfilled.

3.2.2. Discriminant Validity in Valid Indicators

As shown in Table 7, the loading values of all satisfaction and loyalty indicators are greater than the cross-loading levels. Thus, it can be said that the discriminant validity of all indicators has been fulfilled.

3.2.3. Discriminant Validity for All Valid Indicators (Questionnaire)

Convergent validity for the questionnaire was carried out by observing the outputs in Table 8.

TABLE 8.
SQUARE ROOTS AVE AND CORRELATION COEFFICIENT BY VALID INDICATORS

	Satisfaction	Loyalty
Satisfaction	(0.798) (<i>p-value</i> : 1.000)	0.441 (<i><0.001</i>)
Loyalty	0.441 (<i><0.001</i>)	(0.544) (1.000)

Table 8 presents that the square root of AVE value in the satisfaction variables (0.798) and the loyalty variables (0.544) is higher than the correlation value between the satisfaction and loyalty variables (0.441). This suggests that the discriminant validity of the questionnaire has been fulfilled.

3.2.4. Reliability Testing for All Valid Indicators (Questionnaire)

Reliability testing of the questionnaire using the valid indicators is shown in Table 9.

TABLE 9.
COMBINED LOADING AND CROSS LOADING RESULTS BY VALID INDICATORS

Variable	Composite Reliability Coefficients	Cronbach's Alpha Coefficients
Satisfaction	0.946	0.937
Loyalty	0.788	0.743

The Composite Reliability Coefficient is higher than 0.70 (See Table 9). Therefore, the latent variables in the questionnaire have met the composite reliability. Moreover, the Cronbach's Alpha Coefficients are greater than 0.6. Hence the validity and reliability tests of the instrument have been fulfilled. So, the WarpPLS analysis can be continued in the next step.

3.3. The Inner Model

The model should have a acceptable Goodness of Fit before interpreting results of the hypothesis testing. And the results of the fit model are shown in Table 10.

TABLE 10.
OUTPUT OF GOODNESS OF FIT

No	Goodness of Fit	Cut off Fit	Output	Note
1.	Average Path Coefficient (APC)	$p < 0.05$	0.441 $P < 0.001$	Good
2.	Average R-Squared (ARS)	$p < 0.05$	0.195 $P < 0.001$	Good
3.	Average adjusted R-Squared (AARS)	$p < 0.05$	0.194 $P < 0.001$	Good
4.	Average full collinearity VIF (AFVIF)	Acceptable if ≤ 5 , ideally ≤ 3.3	1.242	Ideal
6	Tenenhaus GoF (GoF)	small ≥ 0.1 , medium ≥ 0.25 , large ≥ 0.36	0.301	Medium
7.	Sympson's paradox ratio (SPR)	Acceptable if ≥ 0.7 , ideally = 1	1.000	Ideal
8.	R-squared contribution ratio (RSCR)	Acceptable if ≥ 0.9 , ideally = 1	1.000	Ideal
9.	Statistical suppression ratio (SSR)	Acceptable if ≥ 0.7	1.000	Ideal

The analysis results (See Table 10) show that the Goodness of Fit of all measures have met the criteria. Based on the SPR, RSCR, SSR and AFVIF values, it is shown that the model is ideal. While the APC, ARS and AARD values show that the the model is good whilst the GoF displays that the model is medium. This confirms that the model formed is acceptable.

3.4. Hypothesis Testing

Hypothesis testing on analysis of warpPLS was carried out using the t-test statistics. The hypotheses on the outer and inner models are discussed in Sub Section 3.4.1 and 3.4.2.

3.4.1. Results of Statistical Testing of Hypothesis for the Outer Model

From the results at Table 7, measurement models for the outer model can be derived as follows:

(12)

$$\begin{aligned}
 X1 &= 0.789 \text{ Satisfaction} + \delta_1 \\
 X2 &= 0.805 \text{ Satisfaction} + \delta_2 & Y2 &= 0.521 \text{ Loyalty} + \varepsilon_2 \\
 X3 &= 0.790 \text{ Satisfaction} + \delta_3 & Y3 &= 0.610 \text{ Loyalty} + \varepsilon_3 \\
 X4 &= 0.832 \text{ Satisfaction} + \delta_4 & Y4 &= 0.462 \text{ Loyalty} + \varepsilon_4 \\
 X5 &= 0.782 \text{ Satisfaction} + \delta_5 & Y5 &= 0.545 \text{ Loyalty} + \varepsilon_5 \\
 X6 &= 0.798 \text{ Satisfaction} + \delta_6 & Y6 &= 0.516 \text{ Loyalty} + \varepsilon_6 \\
 X7 &= 0.805 \text{ Satisfaction} + \delta_7 & Y7 &= 0.453 \text{ Loyalty} + \varepsilon_7 \\
 X8 &= 0.759 \text{ Satisfaction} + \delta_8 & Y8 &= 0.646 \text{ Loyalty} + \varepsilon_8 \\
 X9 &= 0.842 \text{ Satisfaction} + \delta_9 & Y9 &= 0.505 \text{ Loyalty} + \varepsilon_9 \\
 X10 &= 0.773 \text{ Satisfaction} + \delta_{10} & Y10 &= 0.603 \text{ Loyalty} + \varepsilon_{10}
 \end{aligned}$$

In addition, the output in Table 7 also shows that the p-value of the t-test statistic is less than 0.001, less than $\alpha = 0.01$. This confirms that the indicators of the latent variables of satisfaction and loyalty are valid in measuring the two latent variables.

To observe which indicators are strongest in describing the latent variables, one needs to look into the loading factor values. The greater the factor loading value, the stronger the indicator reflecting a variable. From the structural equation, it is found that the X9 (*emotion*) indicator is the most important satisfaction indicator as well as the Y8 indicator

(remain to use the products and services of the bank) for the loyalty indicator.

3.4.2. Results of Hypothesis Testing for the Inner Model

Results of the hypothesis testing using the WarpPLS approach are shown in Figure 2.

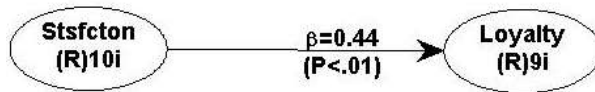


Figure 2. The Results of the Model Testing

Further, from the results a structural model based on Figure 2 can be formulated as follows:

$$Loyalty = 0.44 \text{ Satisfaction} + \zeta_1 \quad (13)$$

In addition, Figure 2 also shows that the p-value on the t-test statistics is less than 0.01 (i.e., less than $\alpha = 0.01$). Therefore, a conclusion can be drawn that there is a significant positive relationship between the satisfaction variable and the loyalty variable. This means that when a customer is satisfied with the products or services provided by the bank, the customer will be very loyal to the bank and vice versa.

One theory that explains the relationship between customer satisfaction and customer loyalty is the disconfirmation between customer expectation and perceived performance [41]. When customers see the performance matches their expectation, they are satisfied with the service provider. However, when a company fails to meet their customers' expectation, they are dissatisfied and likely not to continue with the provider. On the other hand, when they find the service as above their expectation, they experience 'delight' and are highly likely to be loyal.

Studies show that customer satisfaction has relationship with customer loyalty [42]. At certain low levels of satisfaction customers will be likely to defect. On the other extreme, if the customers are highly satisfied they become loyal even to the emotional level. In between, there are levels, where the impact of improved satisfaction only marginally increases customer loyalty.

Customer loyalty obviously links to greater sales and profitability since customers with real loyalty have both the positive attitudes toward the brand they loyal to and the behavior of repeat buying the product or service from the company, not to mention other non transaction benefits they offer to the company.

This research shows that customer satisfaction is still influential to customer loyalty in the banking industry in Indonesia. Therefore, it is important for banks to satisfy customers in the important aspects that determine customer satisfaction. The results of this study support the theory and the aforementioned research which affirm the positive relationship between the two variables.

IV. CONCLUSION

Based on the research results, it can be concluded that there is a very significant positive relationship (highly significant

level) between customer satisfaction and customer loyalty among the Indonesian bank customers.

This research only analyzed the relationship between satisfaction and loyalty. However, in the next research other latent variables, which might influence loyalty could be explored.

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