# Application of Interaction Methods and Multigroup Analysis in Structural Equation Modeling Using the Warppls Approach (Study On Bank X Housing Loans)

*Mamlu'atul Marchamah*[*], *Adji Achmad Rinaldo Fernandes, Solimun, Atiek Iriany and Ni Wayan Surya Wardhani*

Department of Statistics, Faculty of Mathematics and Natural Sciences, Brawijaya University, 65145 Indonesia

**Abstract:** This study aims to determine the role of the moderating variable of mindfulness as the effect between service quality and lifestyle on willingness to pay and on time to pay House Ownership Credit Bank X customers. The moderating variable analysis uses two approaches, namely the interaction method and multigroup analysis. This study uses primary data obtained from questionnaires regarding the variables of service quality, lifestyle, mindfulness, willingness to pay, and on time to pay distributed to house ownership credit Bank X customers with a sampling technique using purposive sampling. The analysis technique uses SEM to examine the effect of the relationship with the help of WarpPLS software. The results of the analysis obtained the role of moderating variables using two approaches. In the interaction method approach, mindfulness proved not to function as a moderating variable. Meanwhile, in the multigroup analysis variable mindfulness was proven to be a moderating variable.

## 1 Introduction

The house is one of the main needs of every human being. In the current era of globalization, technological developments are progressing very rapidly, the impact is that people's living standards have also increased, so the need for human life is increasing [1]. The desire to have a decent place to live has become a priority and expectation for everyone. Therefore, to meet the human need for a place to live, the bank provides a solution to the community, namely by providing Home Ownership Credit facilities [2]. House ownership credit is one of the credit service facilities provided by banks to customers to meet their needs in the form of housing. With the provision of a mortgage by the bank, there will be the possibility of risks faced. Therefore, to reduce risk, the bank must be more selective and careful in providing loans to customers through an attitude assessment. The assessment is meant by associating the variables of Service Quality, Lifestyle, and Mindfulness with Willingness to Pay (willingness to pay) and On-Time to Pay [3]. In overcoming these problems, statistical analysis that can be used is SEM analysis with the WarpPLS approach. Structural Equation Modeling (SEM) is a multivariate analysis carried out to identify the relationship between latent variables or unobservable variables that are carried out simultaneously [4].

SEM is a combination of a system of equations, path analysis, regression analysis, and factor analysis. SEM analysis modeling can be analysed using Partial Least Square (PLS), Generalized Structured Component Analysis (GSCA), and WarpPLS approaches [5]. Latent variables are variables that cannot be measured directly, they must go through the constituent components, namely items, indicators, and dimensions. In addition, there are types of variables that are included in endogenous variables and exogenous variables, namely moderating variables, and mediating variables. Moderating variables are variables that function as reinforcement or attenuators between the effect of predictor and response variables [6]. Besides that, some variables function as intermediaries between exogenous variables and endogenous variables called

---

[*]Corresponding author e-mail: miramrchmh10@student.ub.ac.id

mediating variables [7]. In general, the effect of the moderating variable is indicated by the interaction (multiplication result) between the independent variable and the moderating variable in explaining the dependent variable [8]. One that can be used to analyse the presence of moderating variables in SEM analysis. According to Rigdon et al., in Wijanto, the methods in SEM that can be used to overcome the case of this moderating variable are the interaction method and multigroup analysis [9]. Ping explains the concept of the interaction method which states that a single indicator of a moderating variable is a form of multiplication between the exogenous latent variable indicator and the moderating variable indicator [10]. On the other hand, unlike the interaction method, the multigroup analysis method is done by dividing the data into groups based on the specified category. Categories are made by calculating the average score of the variables then those with scores below the average are made into a low group and those above the average are made into a high group [4].

Research related to the analysis of moderating variables using the interaction method and multigroup analysis, namely those studied by Kusuma, shows the results that the interaction method is more suitable to be used to determine the effect of moderating variables in the form of continuous variables compared to the multigroup analysis method [11]. Research related to the variable of willingness to pay is researched by Lovihan, this study finds out the relationship between service quality and willingness to pay taxes [12]. The results of this study state that tax officials are required to provide friendly, fair, and firm services always to taxpayers to foster public awareness about the responsibility to pay taxes [13]. As expected in this study, to minimize the mortgage risk faced by banks, improving the mortgage service system, creates a high willingness of customers to pay for mortgages. Based on the description above, this study aims to determine the role of the moderating variable of mindfulness as the effect between service quality and lifestyle on willingness to pay and on time to pay house ownership credit Bank X customers. One way to determine the role of the moderating variable is using the method of interaction and multigroup analysis on the Structural Equation Modeling WarpPLS approach.

## 2 Literature Review

### 2.1. SEM with WarpPLS Approach

SEM analysis WarpPLS is the development of *Partial Least Square* (PLS) analysis. PLS analysis was developed by Herman Wold to be an alternative to situations when the theoretical basis for the design of the model is weak or some indicators do not meet the reflective measurement model, so it is formative [4]. SEM PLS is a causal modeling approach that aims to maximize the variance of the latent response variable that can be explained by the predictor latent variable [13].

PLS analysis is *powerful* because it can be applied to all types of data, does not require many assumptions, and can be used on small to large samples [7]. PLS can be applied to structural models that are not recursive and indicators on latent variables are formative, reflective, or mixed. In addition, if the structural model to be analyzed is not recursive and the latent variable has formative, reflective, or mixed indicators, then one of the appropriate methods to be applied is WarpPLS [4]. WarpPLS is a method and *software* package program developed by Ned Kock to analyze variant-based SEM or PLS models. Software is also equipped with moderating variable analysis with an interaction variable approach.

### 2.2. Analysis of Moderating Variables with Interaction Methods

The analysis of moderating variables with the interaction method approach is a regression analysis that involves moderating variables in building a relationship model [14]. The moderating variable in question is to make the moderating variable an explanatory variable and add its interactions. Graphically the path diagram for the interaction method can be seen in Figure 1.
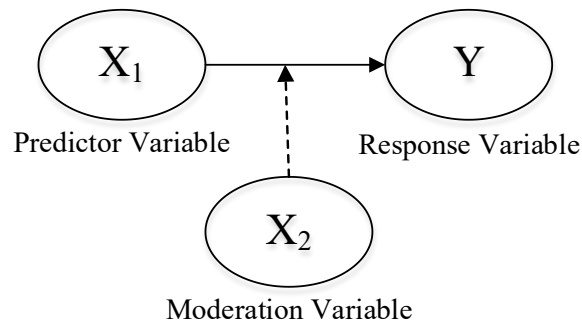


**Fig 1:** Conceptual Model of Interaction Method
Source: Solimun [4]
Path diagram in Figure 1. can be converted into Equation (1) as follows.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_1 X_2 + e \tag{1}$$

Description:

$Y$        : endogenous variable

$X$        : exogenous variable

$\beta$        : coefficient of effect of exogenous latent variable on endogenous latent variable

$X_1 X_2$    : interaction between variables exogenous with moderating variable

$e$        : error vector *inner model*

### 2.3. Approach *Multigroup Analysis*

Approach Multigroup analysis was used to assess the effect of moderating variables. In multigroup analysis, if the moderating variable is nonmetric moderation, the sample data is divided into groups according to the categories in the variables used to make the groups [15]. Meanwhile, if the moderating variable is metric moderation, the sample data is divided into groups based on the factor scores of the moderating variable indicators. Generally, the group will be divided into two, namely the low group and the high group. Observations with scores above the average are classified as high groups, while observations with scores below the average scores are classified as low groups [16].

According to Solimun a variable is said to be moderating if there is a significant difference in the path coefficients in the two groups (eg low and high) [4]. This test can be done using Fisher's test, where the test statistics are as follows.

$$Z = \frac{b_{G1} b_{G2}}{SE_{b-diff}} \tag{2}$$

Explanation:

$b_{G1}$       : group path coefficient 1

$b_{G2}$       : group 2 path coefficient

$SE_{b-diff}$ : *error* combined

The calculation *standard error* is carried out with the following formula.

$$SE_{b-diff} = \sqrt{SE_{b_{G1}}^2 + SE_{b_{G2}}^2} \tag{3}$$

The interpretation of the results of the analysis of moderating variables using the *multigroup* is as follows:

1) If the path coefficient in group 1 (low) is significant, while in group 2 (high) it is not significant, then *mindfulness* is a moderating variable, whereas in the low group the effect is stronger (significant).

2) If the path coefficients in groups 1 (low) and 2 (high) are both significant, while the Fisher test is significant, then the *mindfulness* variable is the moderating variable. If the path coefficient in the low group is larger, then in the low group the effect is stronger.

If the path coefficients in groups 1 (low) and 2 (high) are both significant, but the Fisher test is not significant, or the path coefficients in groups 1 (low) and 2 (high) are both insignificant, then the *mindfulness* is not a moderating variable.

## 3    Results and Discussions

### 3.1. Research Data

The data used in this study are primary data regarding service quality, lifestyle, mindfulness, willingness to pay, and on time to pay. Data obtained through questionnaires distributed to respondents who have been determined. Respondents in this study were customers of subsidized house ownership credit Bank X in Sidoarjo City.

The research instrument uses a Likert to measure the variables used. The sampling technique used is purposive sampling. Purposive sampling is a sampling technique that is adjusted based on certain characteristics or conditions that are the same

as the population. The sample used in this study was 100 house ownership credit Bank X customers in 2021.

3.2. Relationship between Variables

This study used 3 exogenous variables, namely Service Quality ($X_1$), Lifestyle ($X_2$), and Mindfulness ($X_3$) as moderating variables. In addition, it also uses 2 endogenous variables, namely *Willingness to Pay* ($Y_1$) and On-Time to Pay ($Y_2$). The path diagram for this research is presented in Figure 2.
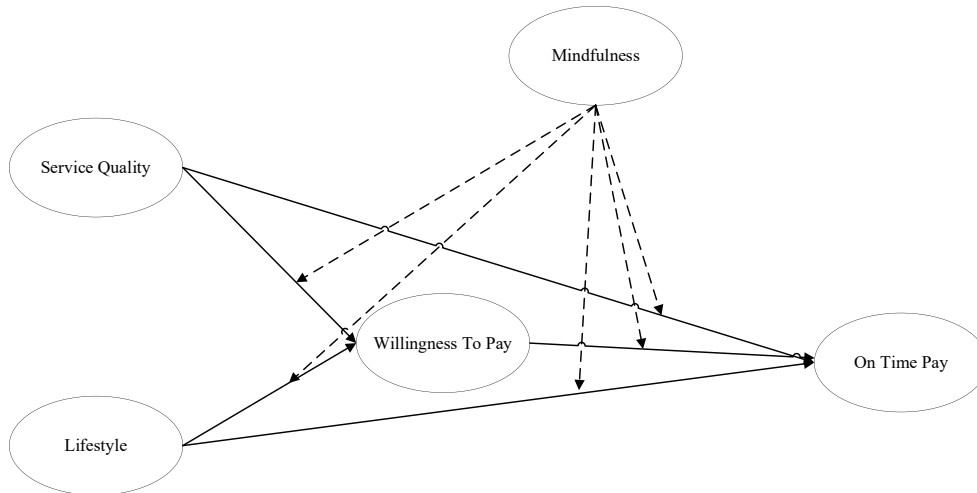


**Fig 2:** Research Model

## 3.3. Data Analysis Method

The steps taken in this study are as follows.
1. Determine the population and sample.
2. Determine the variables and indicators that make up the variables.
3. Designing research instruments.
4. Conducting trials of research instruments.
5. Check the validity and reliability of the research instrument.
6. Collecting data by distributing questionnaires to predetermined respondents.
7. Change the indicator score data into variable score data using the average score.
8. Perform analysis using the interaction method.
   a. Designing structural models and measurement models.
   b. Construct path diagrams.
   c. Convert path diagrams to systems of equations for the inner and outer models.
   d. Estimating parameters: Inner model and Outer model.
   e. Evaluating the model: Goodness of Fit. f) Testing the hypothesis using the bootstrap resampling method.
9. Conducting analysis using multigroup analysis method.
   a. Divide the sample into the high group and low group based on the average score of the moderating variable.
   b. Testing the hypothesis using the bootstrap resampling method.
   c. Perform a comparison of different groups' tests (Fisher test).
10. Interpretation of results.

3.4. Evaluation of the Measurement Model

In the SEM analysis of the WarpPLS approach, the measurement model or outer model can be evaluated using convergent validity and composite reliability [17]. Convergent validity was measured using the loading value for each indicator on the research variables [18]. The indicator is said to be valid if the resulting loading value is greater than 0.3, then the indicator is considered to meet convergent validity. Table 1 is the outer loading table of the research variables.

**Table 1. Value Outer Loading**

| Variable | Indicator | Loading Factor | p-value |
|---|---|---|---|
| Quality of Service ($X_1$) | Reliability ($X_{1.1}$) | 0.758 | <0.001 |
| | Responsiveness ($X_{1.2}$) | 0.551 | <0.001 |
| | Assurance ($X_{1.3}$) | 0.742 | <0.001 |
| | Empathy ($X_{1.4}$) | 0.680 | <0.001 |
| | Tangibles ($X_{1.5}$) | 0.747 | <0.001 |
| Lifestyle ($X_2$) | Activity ($X_{2.1}$) | 0.681 | <0.001 |
| | Interests ($X_{2.2}$) | 0.769 | <0.001 |
| | Opinion ($X_{2.3}$) | 0.818 | < 0.001 |
| Mindfulness ($X_3$) | Nonreactivity ($X_{3.1}$) | 0.712 | < 0.001 |
| | Observing ($X_{3.2}$) | 0.671 | <0.001 |
| | Act with awareness ($X_{3.3}$) | 0.723 | < 0.001 |
| | Nonjudging ($X_{3.4}$) | 0.745 | < 0.001 |
| | Describing ($X_{3.5}$) | 0.764 | <0.001 |
| Willingness to Pay ($Y_1$) | Consultation ($Y_{1.1}$) | 0.654 | <0.001 |
| | Required documents ($Y_{1.2}$) | 0.592 | <0.001 |
| | Method and place of credit payment ($Y_{1.3}$) | 0.631 | <0.001 |
| | Payment deadline ($Y_{1.4}$) | 0.691 | <0.001 |
| | Allocation of funds ($Y_{1.5}$) | 0.673 | <0.001 |
| On Time Pay ($Y_2$) | Always pay on time ($Y_{2.1}$) | 0.854 | < 0.001 |
| | Always ontime monthly payments ($Y_{2.2}$) | 0.854 | < 0.001 |

Source: Research Results (2022)

Based on Table 1 below, the loading factor resulting in each research indicator is greater than 0.3, and the p-value <0.05. So, it can be concluded that the indicator is valid, which means it meets the criteria of convergent validity. The results of the composite reliability are presented in Table 2 below.

**Table 2. Value of Composite Reliability**

| Variable | *Composite Reliability* |
|---|---|
| Quality of Service ($X_1$) | 0,826 |
| Lifestyle ($X_2$) | 0,802 |
| *Mindfulness* ($X_3$) | 0,846 |
| *Willingness to Pay* ($Y_1$) | 0,784 |
| On-Time to Pay ($Y_2$) | 0,843 |

Source: Research Results (2022)

Based on Table 2. the *composite reliability* for each latent variable is greater than 0.7. criteria *composite reliability* is met, meaning that the indicators of all latent variables have good reliability.

3.5. Evaluation of Structural Model

The structural model (inner model) is evaluated by looking at the Goodness of Fit value using the rule of thumb criteria. The Goodness of Fit value in the WarpPLS analysis can be seen in Table 3.

### Table 3. Results of Model Fit and Quality Indices

|     | *Model Fit and Quality Indices* | Fit Values | Fit Criteria | Description |
|-----|-------------------------------|------------|--------------|-------------|
| 1   | Average path coefficient (APC) | 0.193; p=0.011 | p-value < 0.05 | Criteria Fulfilled |
| 2   | Average R-squared (ARS) | 0.782; p<0.001 | p-value <0.05 | Criteria met |
| 3   | Average adjusted R-squared (AARS) | 0.767; p<0.001 | p-value < 0.05 | Criteria Fulfilled |
| 4   | Average block VIF (AVIF) | 2.171 | Accepted if $\leq 5$; | Criteria Fulfilled |
| 5   | Average full collinearity VIF (AFVIF) | 3.545 | Accepted if $\leq 5$; | Criteria Fulfilled |
| 6   | Tenenhaus GoF (GoF) | 0.749 | Small $\geq 0.1$; medium $\geq 0.25$; large $\geq 0.36$ | Criteria Fulfilled |
| 7   | Sympson's paradox ratio (SPR) | 0.750 | Accepted if $\geq 0.7$ | Criteria Fulfilled |
| 8   | R-squared contribution ratio (RSCR) | 0.987 | Accepted if $\geq 0.9$ | Criteria met |
| 9   | Statistical suppression ratio (SSR) | 1.000 | Accepted if $\geq 0.7$ | Criteria Fulfilled |
| 10  | Nonlinear bivariate causality direction ratio (NLBCDR) | 0.792 | Accepted if $\geq 0.7$ | Criteria Fulfilled |

Source: Research Results (2022)

Based on Table 3 below, all the criteria for the model fit and quality indices are met. Therefore, it can be said that the Goodness of Fit is fulfilled so that it can be continued in hypothesis testing.

3.6. Hypothesis Testing

**Direct Effect**

There are twelve direct effect paths in this research. The test results using WarpPLS software are presented in Table 4.

### Table 4. Path Coefficient Value

| No. | Predictor | Variable Response Variable | Path Coefficient | *p-value* | Information |
|-----|-----------|----------------------------|------------------|-----------|-------------|
| 1.  | Quality of Service ($X_1$) | *Willingness to Pay* ($Y_1$) | 0.348 | <0.001 | Significant |
| 2.  | Lifestyle ($X_2$) | *Willingness to Pay* ($Y_1$) | 0.605 | <0.001 | Significant |
| 3.  | *Mindfulness* ($X_3$) | *Willingness to Pay* ($Y_1$) | 0.109 | 0.132 | Not Significant |

| No. | Predictor | Variable Response Variable | Path Coefficient | *p-value* | Information |
|---|---|---|---|---|---|
| 4. | Quality of Service (X$_1$) | Timely Pay (Y$_2$) | -0.006 | 0.478 | Not Significant |
| 5. | Lifestyle (X$_2$) | Timely Pay (Y$_2$) | 0.127 | 0.097 | Not Significant |
| 6. | *Mindfulness* (X$_3$) | On Time to Pay (Y$_2$) | 0.140 | 0.075 | Not Significant |
| 7. | *Willingness to Pay* (Y$_1$) | On Time to Pay (Y$_2$) | 0.746 | <0.001 | Significant |
| 8. | *Mindfulness* (X$_3$) * Quality of Service (X$_1$) | *Willingness to Pay* (Y$_1$) | 0.049 | 0.311 | Not Significant |
| 9. | *Mindfulness* (X$_3$) * Lifestyle (X$_2$) | *Willingness to Pay* (Y$_1$) | 0.057 | 0.281 | Not Significant |
| 10. | *Mindfulness* (X$_3$) * Quality of Service (X$_1$) | On-Time Paying (Y$_2$) | -0.061 | 0.267 | Not Significant |
| 11. | *Mindfulness* (X$_3$) * Lifestyle (X$_2$) | On Time Paying (Y$_2$) | -0.0 25 | 0.402 | Not Significant |
| 12. | *Mindfulness* (X$_3$) * *Willingness to Pay* (Y$_1$) | On-Time to Pay (Y$_2$) | 0.045 | 0.324 | Not Significant |

Source: Research Results (2022)

Based on the test in Table 4., it was found that the relationship with a *p-value < of* 0.05 was significant, meaning that the direct effect between variables is significant. While the relationship that has a *p-value* > 0.05 is declared insignificant, meaning that the direct effect between variables is not significant.

**Indirect Effect**

In addition to the direct effect between variables in the model, there are indirect effects that occur between exogenous variables and endogenous variables. The indirect effect is presented in Table 5.

**Table 5. Hypothesis Testing Indirect Effect**

| Variable | | Path Coefficient | *P-value* |
|---|---|---|---|
| Exogenous | Endogenous | | |
| Quality of Service (X$_1$) | On-Time to Pay (Y$_2$) | 0.260 | < 0.001 |
| Lifestyle (X$_2$) | On Time to Pay (Y$_2$) | 0.451 | <0.001 |
| *Mindfulness* (X$_3$) | On-Time to Pay (Y$_2$) | 0.081 | 0.122 |

Source: Research Results (2022)

Based on the test in Table 5, the results show that the relationship that has a *p-value* < 0.05 is significant, meaning that the indirect effect between variables is significant. While the relationship that has a *p-value* > 0.05 is declared insignificant, meaning that the indirect effect between variables is not significant.

3.7. Analysis of Moderating Variables with Interaction Methods

Moderating variables can be classified into 5 types, namely absolute moderation, pure moderation, quasi-moderation, homologies moderation (potential moderation), and predictor moderation (moderation as an explanation). The results of the

analysis test are presented in Table 6. as follows.

**Table 6. Analysis of Moderating Variables**

| Relationship | | | Description |
|---|---|---|---|
| $X_1X_3{\rightarrow}Y1*$ | $X_1{\rightarrow}Y_1**$ | $X_3{\rightarrow}Y_1*$ | Potential Moderation |
| $X_2X_3{\rightarrow}Y_1*$ | $X_2{\rightarrow}Y_1**$ | $X_3{\rightarrow}Y_1*$ | Potential Moderation |
| $X_1X_3{\rightarrow}Y_2*$ | $X_1{\rightarrow}Y_2*$ | $X_3{\rightarrow}Y_2*$ | Potential Moderation |
| $X_2X_3{\rightarrow}Y_2*$ | $X_2{\rightarrow}Y_2*$ | $X_3{\rightarrow}Y_2*$ | Potential Moderation |
| $Y_1X_3{\rightarrow}Y_2*$ | $Y_1{\rightarrow}Y_2**$ | $X_3{\rightarrow}Y_2*$ | Potential Moderation |

Source: Research Results (2022)

Information:

(*)        : The relationship is not significant

(**)       : The relationship is significant.

Based on Table 6. Can be proved that the variable of moderating *mindfulness* is proven not to function as a reinforcement or a weakener relationship between exogenous variables to endogenous variables. Thus the moderating variable is said to be a potential moderating variable.

3.8. Analysis of Moderating Variables with Multigroup Analysis

A variable is said to be moderating or not see if there is a significant difference in the path coefficients in the two groups. The results of these tests were carried out using Fisher's test with results that can be seen in Table 7.

**Table 7. Difference Test Results in Group 1 and Group 2**

| Correlation between Pathway | Coefficient Path Group 1 | Coefficient Path Group 2 | *p-value* | Description |
|---|---|---|---|---|
| $X_1{\rightarrow}Y_1$ | -0,174 * | 0,372** | 0,002 | Not Moderating Variable |
| $X_2{\rightarrow}Y_1$ | 0,293 ** | 0,658 ** | 0,029 | Moderating Variable, Group 2 is stronger |
| $X_1{\rightarrow}Y_2$ | 0,329 ** | 0,142 * | 0,310 | Moderating Variable, Group 1 is stronger |
| $X_2{\rightarrow}Y_2$ | 0,343 ** | 0,125 * | 0,235 | Moderating Variable, Group 1 is stronger |
| $Y_1{\rightarrow}Y_2$ | -0,080* | 0,734 ** | 0,000 | Not Moderating Variables |

Source: Research Results (2022)

Description:

(*)        : A not significant relationship

(**)       : Significant relationship

Based on Table 7 mindfulness acts as a moderating variable in the relationship between lifestyle on *willingness to pay,* service quality on punctuality to pay, and lifestyle on-time pay.

The Effect of Service Quality on Willingness to Pay. The path coefficient in group 1 is negative and not significant, the path coefficient in group 2 is positive and significant, and the Fisher test is significant. Thus, the role of mindfulness in the relationship between service quality and willingness to pay is not as moderating.

The Effect of Lifestyle on Willingness to Pay. The path coefficient in group 1 is positive and significant, the path coefficient in group 2 is positive and significant, and the Fisher test is significant. Thus, the role of mindfulness in the

relationship between lifestyle and willingness to pay is as a moderator. Where mindfulness has a stronger moderating effect in group 2 with a path coefficient of 0.658.

The Effect of Service Quality on Timely Pay. The path coefficient in group 1 is positive and significant, the path coefficient in group 2 is positive and insignificant, and the fisher's test is not significant. Thus, the role of mindfulness in the relationship between service quality and on time to pay is as a moderator. Where mindfulness has a stronger moderating effect in group 1 with a path coefficient of 0.329.

The Effect of Lifestyle on Time to Pay. The path coefficient in group 1 is positive and significant, the path coefficient in group 2 is positive and insignificant, and the fisher's test is not significant. Thus, the role of mindfulness on the relationship between service quality and timely payment is not moderating. Where mindfulness has a stronger moderating effect in group 1 with a path coefficient of 0.343.

The Effect of Willingness to Pay on Time to Pay. The path coefficient in group 1 is negative and not significant, the path coefficient in group 2 is positive and significant, and the Fisher test is significant. Thus, the role of mindfulness on the relationship between willingness to pay and on time to pay is not a moderating one.

3.9. Comparison of Interaction Methods with Multigroup Analysis

Data analysis using the interaction method approach and multigroup analysis can be seen in Table 8. Based on Table 8. below, the analysis of moderating variables in the multigroup analysis method has a significant effect although it also has an insignificant effect on several relationships between variables. Therefore, it can be concluded that the multigroup analysis method is better used in terms of knowing the effect of moderating variables than the interaction method.

**Table 8. Comparison of Interaction Methods with Multigroup Analysis**

| Relationship | Interaction Method | Multigroup Analysis | |
|---|---|---|---|
| | | Grup 1 | Grup 2 |
| | $R_1^2= 0,87$ $R_2^2= 0,69$ | $R_1^2= 0.06$ $R_2^2= 0.26$ | $R_1^2= 0.80$ $R_2^2= 0.67$ |
| $X_1 \rightarrow Y_1$ | Not Signifikan | Not significant | |
| $X_2 \rightarrow Y_1$ | Not significant | Significant, Strengthen | |
| $X_1 \rightarrow Y_2$ | Not significant | Signifikant, Weaken | |
| $X_2 \rightarrow Y_2$ | Not significant | Significant, Weaken | |
| $Y_1 \rightarrow Y_2$ | Not significant | Not significant | |

Source: Research Results (2022)

## 4   Conclusions and Suggestiond

Based on the results that have been described, the conclusions of this study are as follows.

1) The results of the analysis of the moderating variable with the interaction method approach showed that mindfulness was proven not to function as a moderating variable. It can be seen from the relationship between interaction variables on endogenous variables is not significant, as well as the direct effect of exogenous variables (moderation) on endogenous variables is not significant, and the direct effect of exogenous variables on endogenous variables can be significant or insignificant.

2) The results of the analysis of moderating variables using a multigroup analysis can be seen that mindfulness has proven to be a moderator of the relationship between lifestyle on willingness to pay, service quality on punctual payment, and lifestyle on punctual payment. Meanwhile, the relationship between service quality and willingness to pay and willingness to pay on time to pay proved that mindfulness is not a moderating variable.

## Acknowledgement

# References

[1] Raharjo, K., Nurjannah, N., Solimun, S., & Fernandes, A. A. R. *The influence of organizational culture and job design on job commitment and human resource performance*. Journal of Organizational Change Management. (2018).

[2] Fernandes, A. A. R. *Moderating effects orientation and innovation strategy on the effect of uncertainty on the performance of business environment*. International Journal of Law and Management. (2017).

[3] Fernandes, S., & Rinaldo, A. A. R. A. A. *The mediating effect of service quality and organizational commitment on the effect of management process alignment on higher education performance in Makassar, Indonesia*. Journal of Organizational Change Management. (2018).

[4] Solimun, Fernandes, AAR & Nurjannah. Multivariate Statistical Methods: Structural Equation Modeling (SEM) WarpPLS approach. Malang: UB Press. 2017.

[5] Fernandes, A. A. R., & Taba, I. M. Welding technology as the moderation variable in the relationships between government policy and quality of human resources and workforce competitiveness. Journal of Science and Technology Policy Management. (2018).

[6] Kenny, D. *Moderator Variables: Introduction.* Online Tutorials. 2004.

[7] Solimun. Partial Least Square-PLS Method. CV Citra Malang: Malang. 2010.

[8] Benny Hutahayan, A. A. R. F. S. N. Comparison of use of Linkage in Integrated Cluster with Discriminal Analysis Approach. International Journal of Advanced Science and Technology, **29(3)**, 5654 - 5668. (2020).

[9] Wijanto, SH. *Structural Equation Model With Lisrel 8.8.* Graha Ilmu. Yogyakarta. 2008.

[10] Ping, RA Parsimonious Estimating Technique for Interaction and Quadratic Latent Variables. *Journal of Marketing Research*. **32**. 1995.

[11] Kusuma, FA Comparison of Effects of Moderating Variables Using Interaction and *Multigroup Analysis Methods* on *Structural Equation Modeling*. Thesis. Faculty of Mathematics and Natural Sciences Universitas Brawijaya. 2009.

[12] Lovihan, S. The effect of awareness of paying taxes, knowledge and understanding of tax regulations, and service quality on the willingness to pay mandatory taxes for individuals in the city of Tomohon. *Journal of Accounting and Auditing Research "Goodwill"*, **5(1)**. 2014.

[13] Sholihin, M., & Ratmono, D. *SEM-PLS Analisis Analysis with WarpPLS 7.0: for Nonlinear Relationships in Social and Business Research*. Andi Publisher. 2013.

[14] Fernandes, A. A. R., Budiantara, I. N. I., Otok, B. W., & Suhartono. Reproducing Kernel Hilbert space for penalized regression multi-predictors: Case in longitudinal data. International Journal of Mathematical Analysis, 8(40), 1951-1961. (2014).

[15] Purbawangsa, I. B. A., Solimun, S., Fernandes, A. A. R., & Rahayu, S. M. (2019). Corporate governance, corporate profitability toward corporate social responsibility disclosure and corporate value (comparative study in Indonesia, China and India stock exchange in 2013-2016). Social Responsibility Journal, **16(7)**, 983-999.

[16] Fernandes, A. A. R., Hutahayan, B., Arisoesilaningsih, E., Yanti, I., Astuti, A. B., & Amaliana, L. Comparison of curve estimation of the smoothing spline nonparametric function path based on PLS and PWLS in various levels of heteroscedasticity. In IOP Conference Series: Materials Science and Engineering. **Vol. 546, No. 5**, p. 052024. 2019.

[17] Fernandes, A. A. R. Investigation of instrument validity: Investigate the consistency between criterion and unidimensional in instrument validity (case study in management research). International journal of law and management. (2017).

[18] Sumardi, S., & Fernandes, A. A. R. The influence of quality management on organization performance: service quality and product characteristics as a medium. Property Management, **38(3)**, 383-403. (2020).