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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/14534
DOI URL: http://dx.doi.org/10.21474/IJAR01/14534

RESEARCH ARTICLE

STRUCTURAL EQUATION MODELING ANALYSIS STUDENT SATISFACTION AND LOYALTY

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Manuscript Info

Manuscript History
Received: 15 February 2022
Final Accepted: 18 March 2022
Published: April 2022

Key words:-
SEM, Goodness of fit Index, Latent Variable, Confirmatory

Abstract

This study aims to analyze and test the structural equation model of student satisfaction and loyalty as well as analyze and examine the influence of factors that influence student satisfaction and loyalty. The variables in this study are the image of the university, lecturer competence and service quality, student satisfaction and loyalty. This study also examines and analyzes the direct and indirect effects of the dependent variable on the independent variable of student satisfaction and loyalty as a mediating variable. The sample in this study were USNI students. The number of respondents who participated in this study were 370 respondents. Based on data analysis, the confirmatory factor that the value of the university image indicator, lecturer competence and service quality is greater than 0.5 is valid to reflect the latent variable. The results of the overall model fit test using the X2 (chi-square) test obtained a value of 2133.54, p-value of 0.000 and RMSEA = 0.076. Based on the model suitability test, testing the research hypothesis through the structural model, the results showed that the image of the university, lecturer competence and service quality had an effect of 89% on student satisfaction. In the second model, higher education institutions, lecturer competence, service quality and satisfaction have an influence of 82% on student loyalty.

Introduction:-

Preliminary:

Digital transformation affects all types of businesses, from start-ups to small and medium-sized enterprises to global enterprises. Companies must be responsive and agile enough to provide customers with the right service experience and value. Digitally transformed businesses provide the experience customers really want instead of relying solely on traditional products or services.

The Covi pandemic has accelerated the transformation of the world of education from face-to-face to online learning and digital literacy. Based on the BPS survey in 2020, 73 out of 100 educational institutions have changed the way they operate, both in administrative services and in the learning process. Digital transformation refers to the process and strategy of using digital technology to drastically change the way businesses operate and serve customers. This is a challenge given the absence of certain standards in optimizing the online learning process. Given these challenges, it is necessary to conduct an analysis of student satisfaction and loyalty on a regular basis, so that the institution knows what things need to be improved and improved. Or what things need to be improved or what factors need to be added.

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Theoretical Basis:
Structural equation modeling, hereinafter referred to as SEM, is a statistical modeling technique that is highly cross-sectional, linear and general in nature. Included in this SEM are factor analysis, path analysis and regression.

Structural equation modeling (SEM) is a common and very useful multivariate analysis technique that includes special versions of a number of other analytical methods as special cases. The next definition says that Structural equation modeling (SEM) is a statistical technique used to build and test statistical models which are usually in the form of causal models. SEM is actually a hybrid technique which includes confirmatory aspects of factor analysis, path analysis and regression which can be considered as special cases in SEM. The main requirement for using SEM is to design and build a hypothetical model consisting of a structural model and a measurement model in the form of a path diagram. SEM is a statistical technique that allows the testing of a series of simultaneous relationships.

SEM Path Chart:
The SEM path diagram serves to show the pattern of relationships between the variables studied. In SEM the pattern of relationships between variables will be filled with observed variables, latent variables and indicators. Based on the pattern of relationships between variables, SEM can be broken down into two sub-sections, namely: measurement models and structural models.

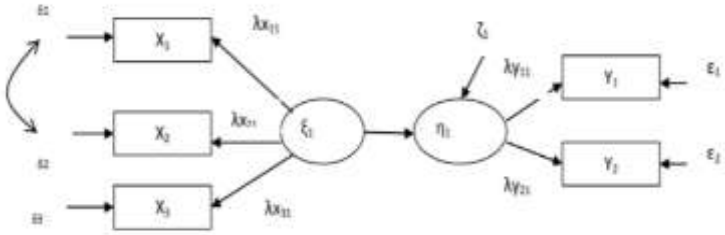


Figure 1:- SEM jalur path diagram

Model Fit Test (Goodness of Fit):
The model fit test is seen based on the goodness of fit value obtained by the model. Assessing goodness of fit is the main goal in SEM, namely wanting to know to what extent the hypothesized model fits or fits the sample data.

Factor Analysis
Factor analysis is a statistical analysis that aims to reduce the dimensions of the data by stating the original variable as a linear combination of a number of factors, so that a number of factors are able to explain as much as possible the diversity of data contained in the original variable. The general form of the factor analysis model is as follows:

$$Xj = \lambda_{j1}F_1 + \lambda_{j2}F_2 + \ldots + \lambda_{jr}F_r + \varepsilon_j \text{ , } j = 1, 2, k$$

Confirmatory Factor Analysis:
Confirmatory factor analysis is a factor analysis technique in which the factors formed are based on known or predetermined theories and concepts along with what variables can measure each formed factor. The confirmatory factor analysis technique is carried out by calculating the value of the loading factor (λi) which is similar to the value of the regression coefficient (βi), namely the loading factor between the indicator variables and the formed latent variable (Fj). The loading factor (λi) was tested using the T test by showing a good level of significance, meaning that the indicator variable (Xi) was significantly proven as an indicator of the relevant latent variable. In confirmatory factor analysis, a model that describes the relationship between indicator variables X1, X2,... .,Xk with latent variables is called the measurement model.

Path Analysis:
Path analysis is used to analyze the pattern of relationships between variables with the aim of knowing the direct or indirect relationship of a set of independent variables (exogenous) to the dependent variable (endogenous). In path analysis, the relationship between variables is expressed in a system of equations called structural equations. These equations can then be described in a diagram called a path diagram. The path coefficient expresses a direct relationship between exogenous and endogenous variables, whose magnitude is denoted by ij, where i represents the effect, and j represents the cause. The path coefficient can be calculated using the following formula: $\gamma_{ij} = R^{-1}\left(r_{ij}\right)$

where R−1 is the inverse correlation matrix between exogenous variables in the analyzed model and rij is the correlation coefficient between exogenous and endogenous variables in the analyzed model. The following is an illustration of the path diagram

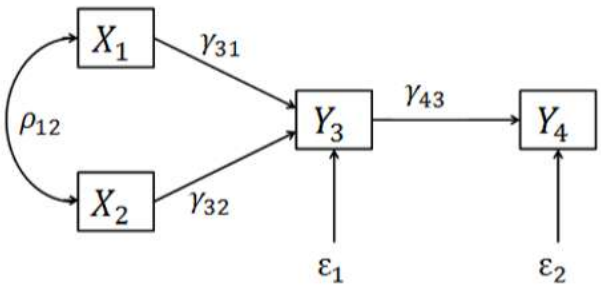


Figure 2:- Illustration of a path diagram

Research Methods:-

The object of this research is the University of Satya Negara Indonesia (USNI). While the research subjects are lecturers and students. The number of samples taken is based on the Slovin criteria with a 5% precision level. The number of respondents is 370 students.

Types of Data and Data Collection Techniques: The data in this study are primary data in the form of respondents' answers. The data collection method was carried out using a survey through a structured questionnaire via googleform.

Research Variables: The variables in this study were classified into exogenous variables and endogenous variables. Exogenous variables are University Image (X1), Lecturer Competence (X2) and Service Quality (X3). Endogenous variables are student satisfaction (Y1), student loyalty (Y2). All variables are measured using a Likert scale that has a weight from 1 to 5, with alternative answers from Strongly Disagree (STS) score 1, Disagree (TS) score 2, Neutral (N) score 3, Agree (S) score 4, and Strongly Agree (SS) score 5.

Data Analysis:

Research Instrument Quality Test

The validity test was carried out using the Product Moment Correlation with the help of SPSS 17. The research instrument was said to be valid if the significance value was less than 5%. The research instrument is said to be reliable if the Cronbach Alpha value is greater than 0.5 (Azwar, 1997). Furthermore, the data is processed by Lisrel to obtain the SEM model and confirmatory factors for the variables.

Results of Analysis and Discussion:-

SEM analysis. Confirmatory Factor Analysis

Confirmatory factor analysis aims to confirm whether the observed variables (indicators) are measures or reflections of latent variables. Following are the results of the confirmatory factor analysis of each variable.

Confirmatory Factor Analysis of Higher Education Image Variables, Lecturer Competence and Service Quality

The university image variable is measured by 7 indicators, lecturer competence and service quality is measured by 8 indicators. The results of the confirmatory factor analysis of the three variables are shown in the image below.

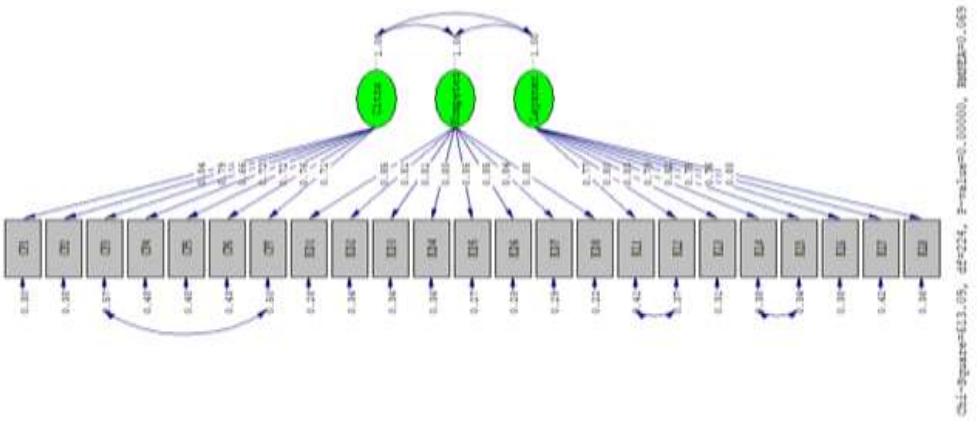


Figure 3:- CFA Test for Higher Education Image, Lecturer Competence and Service Quality.

The results of the confirmatory factor analysis i show that the loading factor value of all indicators of university image, lecturer competence and service quality is greater than 0.5 so it can be concluded that all indicators are valid to reflect latent variables.

Confirmatory Factor Analysis of Student Satisfaction and Loyalty Variables.
The satisfaction variable is measured by 8 indicators and the student loyalty variable is measured by 9 indicators. The results of the confirmatory factor analysis of the trust variable are as follows.

From the confirmatory factor analysis above, it can be seen that the loading factor value of all indicators of student satisfaction and loyalty is greater than 0.5, only the LM5 indicator on the student loyalty variable is less than 0.5 so that the item is removed and recalculated.

After removing the LM5 indicator on the student loyalty variable, the entire loading factor value is greater than 0.5, so it can be concluded that all indicators are valid to reflect the latent variable.

Testing Construct Reliability (CR) and Variance Extracted (VE) for Exogenous and Endogenous Variable Models

The variance extracted (VE) value for the university image is 0.555 which is greater than 0.5, which indicates that 55.5% of the information contained in the seven indicators can be reflected through the latent variable of the college image. Then the value of construct reliability (CR) of 0.897 is greater than 0.7. This means that the seven indicators have a good level of consistency in measuring the latent variable of higher education image.

The variance extracted (VE) value for lecturer competence is 0.700, which is greater than 0.5, which indicates that 70% of the information contained in the eight indicators can be reflected through the latent variable of lecturer competence. Then the value of construct reliability (CR) of 0.949 is greater than 0.7. This means that the eight indicators have a good level of consistency in measuring the latent variable of lecturer competence.

The variance extracted (VE) value for service quality is 0.633, which is greater than 0.5, which indicates that 63.3% of the information contained in the eight indicators can be reflected through the latent variable of service quality. Then the value of construct reliability (CR) of 0.932 is greater than 0.7. This means that the eight indicators have a good level of consistency in measuring the latent variables of service quality.

The variance extracted (VE) value for student satisfaction is 0.634, which is greater than 0.5, which indicates that 63.4% of the information contained in the eight indicators can be reflected through the latent variable of student satisfaction. Then the value of construct reliability (CR) of 0.932 is greater than 0.7. This means that the eight indicators have a good level of consistency in measuring the latent variable of student satisfaction.

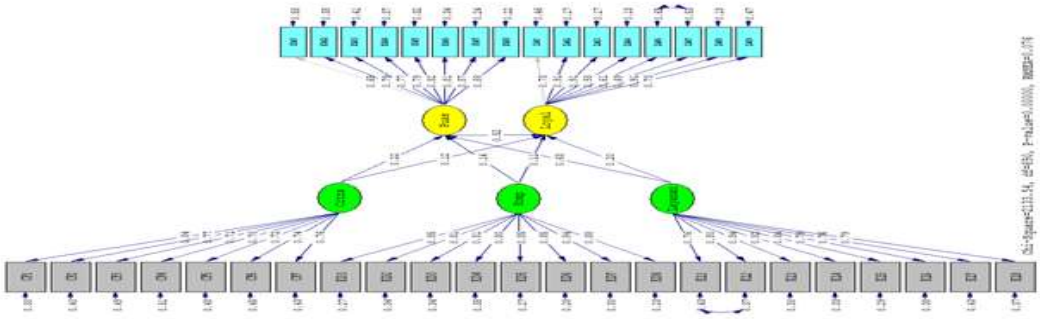
The variance extracted (VE) value for student loyalty is 0.656, which is greater than 0.5, which indicates that 65.6% of the information contained in the eight indicators can be reflected through the latent variable of student loyalty.

Then the value of construct reliability (CR) of 0.937 is greater than 0.7. This means that the eight indicators have a good level of consistency in measuring the latent variable of student loyalty.

Full Model Test

After confirmatory factor analysis has been carried out for each exogenous and endogenous variable, then it is necessary to estimate the full structural model. The full estimation analysis of the structural model describes the relationship between latent variables and can be done if the measurement model has been analyzed through confirmatory factor analysis. This is because each indicator can be used to define a latent construct. The estimation results of the full structural model are presented in the following figure

Figure 4:- Results of Full Structural Model (Standardized)



The full test of the SEM model is carried out with two kinds of tests, namely the suitability of the model and the significance of causality through regression coefficients. The full SEM model test is used to see the feasibility of the model or the suitability of the model. The fit indices of the model used are not different from those in the confirmatory factor analysis. The results of the overall model fit test using the X2 (chi-square) test obtained a value of 2133.54, p-value of 0.000 and RMSEA = 0.076. When referring to the RMSEA value, it has met the fit criteria as well as other fit indicators such as the normed-chi-square NFI, NNFI, CFI, RFI, AGFI and PNFI have shown goodness of fit. After testing the suitability of the model, then the research hypothesis is tested through the structural model. From the results of data processing that the image of the university, lecturer competence and service quality have an influence of 89% on student satisfaction. In the second model, it can be seen that college, lecturer competence, service quality and satisfaction have an influence of 82% on student loyalty.

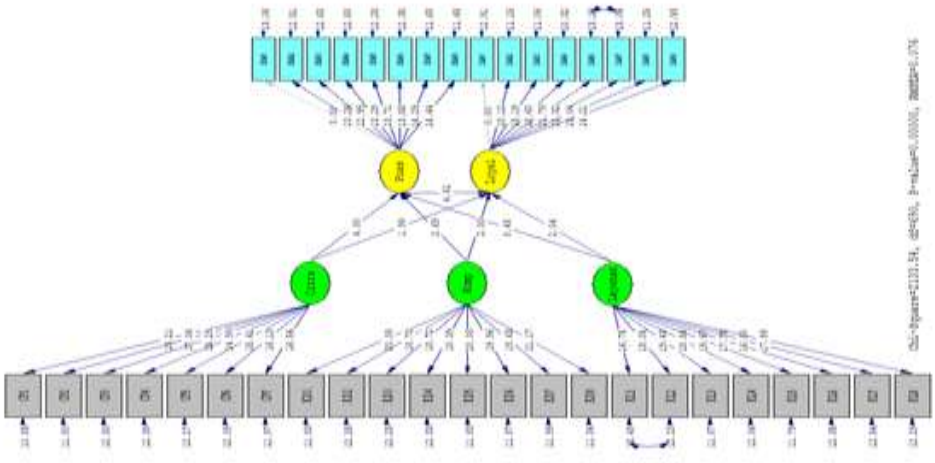


Figure 5:-Results of Full Structural Model (T-value)

Hypothesis Test:

The hypothesis of the Effect of Higher Education Image on Student Satisfaction is accepted, which is indicated by the t-statistic value of 4.00> 1.96 (5% significance level) which means that the test results are significant. Path coefficient and statistical test can be seen the path coefficient of the university image variable on student satisfaction

is 0.22 with a positive direction. That is, the better in managing the image of the university will increase student satisfaction.

The hypothesis of the influence of lecturer competence on student satisfaction is accepted as indicated by the t-statistic value of 2.69 > 1.96 (significance level 5%). Student satisfaction is 0.14 in a positive direction

The level of student satisfaction with service quality is 0.63. The hypothesis of the influence of service quality on student satisfaction is accepted, which is indicated by the t-statistic value of 8.43 > 1.96 (5% significance level) which means that the test results are significant.

The hypothesis of the Effect of College Image on Student Loyalty is accepted, which is indicated by the t-statistic value of 1.99 > 1.96 (significance level 5%) which means that the test results are significant. The path coefficient of the college image variable on student loyalty is 0.12 with the direction positive.

The hypothesis of the influence of lecturer competence on student loyalty is accepted, which is indicated by the t-statistic value of 2.00 > 1.96 (significance level 5%) which means that the test results are significant. The path coefficient of the variable competence of lecturers on student loyalty is 0.11 in a positive direction. That is, the better the competence of lecturers in higher education will increase student loyalty.

The hypothesis of the influence of service quality on student loyalty is accepted, which is indicated by the t-statistic value of 2.04 > 1.96 (significance level 5%) which means that the results. The path coefficient of the service quality variable on student loyalty is 0.20 in a positive direction. This means that the better the quality of service provided by the university, the higher the student loyalty.

Mediation Effect Test:

The Effect of Higher Education Image on Loyalty through Student Satisfaction.

Based on the results of processing the total path coefficient of the college image variable on loyalty through student satisfaction of 0.23 with a positive direction. That is, the better the image of the university mediated by student satisfaction will increase student loyalty. Student satisfaction is able to mediate the relationship between university image and student loyalty and its function is declared as partial mediation because the t-count value of college image on student loyalty is 3.02 and after adding the satisfaction variable, it remains significant at 3.30 and does not become zero.

The Influence of Lecturer Competence on Loyalty Through Student Satisfaction:

Based on the results of processing the total path coefficient of the variable competence of lecturers on loyalty through student satisfaction of 0.18 in a positive direction. That is, the better the competence of lecturers mediated by student satisfaction will increase student loyalty. Student satisfaction is able to mediate the relationship between lecturer competence and student loyalty and its function is declared as partial mediation because the t-count value of lecturer competence on student loyalty is 2.00 and after adding the satisfaction variable, it remains significant at 2.32 and does not become zero.

The Effect of Service Quality on Loyalty Through Student Satisfaction.

Based on the processing results, it can be seen that the total path coefficient of the service quality variable on loyalty through student satisfaction is 0.53 in a positive direction. That is, the better the quality of service mediated by student satisfaction will increase student loyalty. Student satisfaction is able to mediate the relationship between service quality and student loyalty and its function is declared as partial mediation because the t-count value of service quality on student loyalty is 2.04 and after adding the satisfaction variable, it remains significant at 4.04 and does not become zero.

Conclusions And Suggestions:-

Conclusion:-

Based on the results of the data analysis of the confirmatory factor analysis results that the factor values of all indicators of higher education image, lecturer competence and service quality are greater than 0.5 so it can be concluded that all indicators are valid to reflect latent variables. The results of the overall model fit test using the X2 (chi-square) test obtained a value of 2133.54, p-value of 0.000 and RMSEA = 0.076. Based on the model suitability

test, testing the research hypothesis through the structural model, the results showed that the image of the university, lecturer competence and service quality had an effect of 89% on student satisfaction. In the second model, it can be seen that universities, competence lecturers, service quality and satisfaction have an influence of 82% on student loyalty.

Suggestion:-

From the results of testing the effect of Mediation involving the intervening variable of student satisfaction between institutional image, lecturer competence and service quality with student loyalty (single mediation), the results of the college image variable on loyalty through student satisfaction are 0.23 with a positive direction, the variable competence of lecturers on loyalty through satisfaction students are 0.18 with a positive direction, the variable of service quality on loyalty through student satisfaction is 0.53 with a positive direction, it is suggested to further improve the competence of lecturers and the image of the university and improve the quality of service to students.

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