Impact of E-Service Quality on Satisfaction With E-Learning Usage at PT LSP XYZ

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ABSTRACT

PT LSP XYZ is a company that operates in the field of professional certification. Currently, there has been a fluctuation in the number of participants in professional certification, particularly in e-learning development, which has affected customer satisfaction. If this issue is not addressed promptly, it will negatively impact customer satisfaction levels. This research aims to assess the expectations and reality of the services provided by the company to customers using the Servqual method. Additionally, it aims to analyze the factors that influence customer satisfaction with LSP XYZ. The findings of this research can then be used to develop recommendations for improving customer satisfaction levels at LSP XYZ, utilizing the Structural Equation Modeling (SEM) analysis tools.

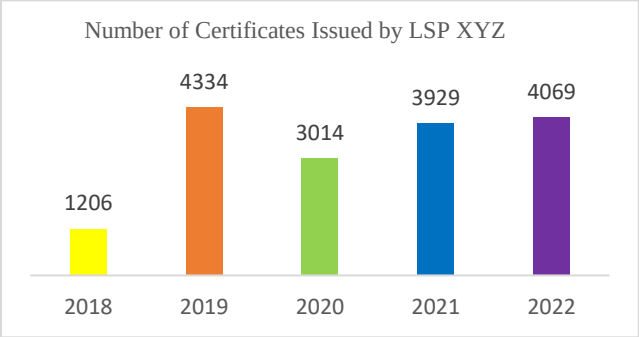
Keywords: Customer satisfaction; SEM; Service quality

I. INTRODUCTION

The XYZ Professional Certification Institute is a training and certification center specifically aimed at HR professionals. The aim is to be able to manage human resources more optimally, thus having an impact on community development. This institution also utilizes a distance and offline e-learning system. This e-learning system is used to facilitate remote certification exams. This can enhance a company's trust and credibility in a particular industry, while also providing added value to customers through the provision of useful information and skills.

Efficiently organizing the development of the quality of human resources in Indonesia with professional technology certification can be seen as a smart solution for maintaining sustainable economic and business development in the era of global competition. This development involves treating human resources as "intellectual assets", which are important factors supporting productivity and a competitive advantage for companies. Company development requires the rapid adoption of information technology, with the latest software and hardware appearing in a matter of months. In the realm of information technology-related services, such as the Internet, each service or function is incorporated into the system. This provides comfort and convenience in accordance with the user's preferences. Currently, the Internet is widely used by users to support various activities, including e-banking, e-gov, e-commerce, and e-learning.

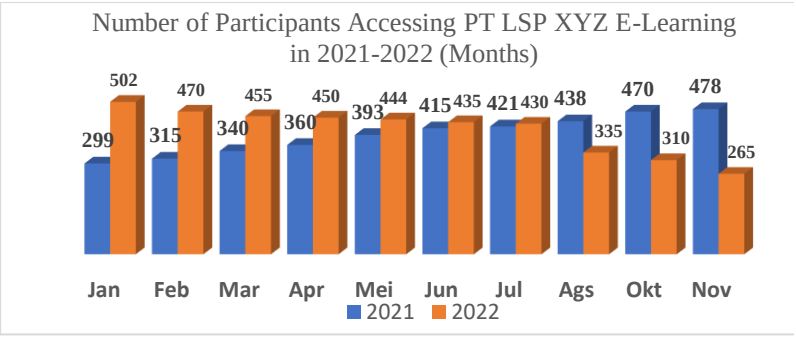
Rapid technological advancements have brought about significant changes in business practices and the field of science. Therefore, it becomes necessary to reorient the business concepts used in order to maintain a company's competitive advantage.



Source: LSP XYZ internal data

Figure 1. Number of certificates issued by LSP XYZ from year to year.

The figure above shows the number of certificates issued by LSP from year to year.



Source: LSP XYZ Internal Data

Figure 2. Number of Participants Accessing PT LSP XYZ E-Learning in 2021-2022 (By Months)

Figure 2 shows the e-learning access of certification participants from January to November 2021-2022. These participants were registered with PT LSP XYZ. Based on the data, it can be observed that the number of participants who received certificates in 2021 was lower than in 2022. However, in 2021, the number of participants per month increased, while in 2022, there was a decrease. This decrease can be attributed to the quality of service and user satisfaction with the e-learning platform at LSP XYZ. Consequently, the decrease in the number of participants can have an impact on customer satisfaction levels both currently and in the future.

Customer satisfaction refers to the customer's response when their actual experience with a product or service deviates from their previous expectations. The quality of the goods or services offered plays a crucial role in determining customer satisfaction, and companies prioritize quality as a measure of competitive advantage. Companies that fail to improve their service quality will face complex problems. Generally, dissatisfied customers tend to share their negative experiences with others, resulting in significant losses due to customer dissatisfaction.

Hence, it is the responsibility of every company operating in the field of goods or services to plan, organize, implement, and control a service quality system that ensures customer satisfaction and fosters loyalty towards the company's services.

Improving service quality is a fundamental concept in marketing theory and application and is a key objective of business activities. Service quality is evaluated based on customer experiences with the products or services provided. This evaluation relies on customer perceptions of user experience or value, which contribute to the achievement of customer goals.

One of the factors influencing e-learning user satisfaction is service quality. Good service quality can serve as a competitive advantage for service companies, as it is crucial for success.

II. LITERATURE REVIEW

E-Service

Candra (2020) defines service quality as creating customer satisfaction, the quality of a product offered must be in good condition or what is called defect-free, where the quality in question can provide benefits to customers.

According to Zeithaml et al. (2018), e-service quality is a consumer process in evaluating whether the quality of electronic services provided is appropriate and meets consumer expectations or not, this is considered important because it can influence the success of a company based on internet technology. In this study, the ESERVQUAL dimensions used refer to the study by Raza et al. (2020).

E-Service quality is one of the determining factors in the existence of a customer-oriented company or industry, especially in the midst of increasingly strong competition. Customers will more easily turn to similar industries with quality that they feel is better.

Service is a form of totality in the form of features and characteristics of a product or service that depend on its capabilities as an effort to obtain satisfaction of stated or implied needs (Kotler & Keller, 2018).

Service quality is a The servqual method is a method commonly used to measure the level of service quality by finding the gap between the expectations and perceptions of service users. According to Gunawan (2022), there are five measurement dimensions used in the servqual method, namely:

1. Tangibles (measurable evidence), describing physical facilities, equipment, and the appearance of personnel and the presence of users
2. Reliability refers to the ability to provide promised services accurately and reliably.
3. Responsiveness, namely the willingness to help customers and provide appropriate attention

4. Assurance (guarantee), is a polite and knowledgeable employee who provides a sense of trust and confidence.
5. Empathy (empathy), includes individual care and attention to users. The dimensions used in the ServQual method can be seen in Figure 5 below.

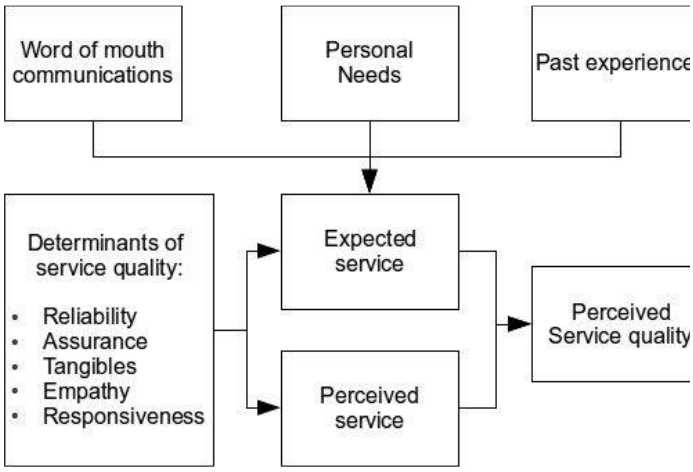


Figure 3. ServQual Model

The Servqual score for each pair of questions for each customer can be calculated based on the following formula according to Parasuraman, 2022 as follows:

SERVQUAL SCORES = PERCEPTION SCORES – EXPECTATION SCORES

Data collection technique
Data Types and Sources

Data that has a specific purpose and use is obtained using scientific methods which are called research methods (Sugiyono, 2015). According to Creswell & Creswell (2018), research methods are divided into three, namely quantitative, qualitative, and mixed. Quantitative methods are used in this research because this method is a method that uses data in the form of numbers which can be processed and analyzed using mathematical or statistical calculations (Sekaran, 2016). This research uses two types of data sources in the form of primary and secondary data.

Primary Data

Primary data is data collected directly by researchers for specific research purposes (Sekaran, 2016). In this research, primary data was used obtained from professional certification participants at LSP XYZ through a questionnaire distributed using Google Forms.

Secondary Data

Secondary data is data available at the company. This data can be obtained from bulletins, government publications, and published and unpublished information from inside and outside the organization (Sekaran, 2016) Population, and Sample

Population

Population is a generalized area consisting of objects or subjects with certain qualities and characteristics determined by researchers to study and draw conclusions (Sugiyono, 2015). Sekaran (2016) defines a population as a group of people, events, or things that researchers are interested in studying.

Sample

The sample is part of the population used for research (Sekaran, 2016. The sample is also defined as part of the number and characteristics of the population (Sugiyono, 2015). This research uses a non-probability sampling technique which is a sampling technique limited to certain types of people.
These people are those who are considered capable of providing information according to the researcher's wishes, because they are the only ones who have that information or because they meet the criteria set by the researcher (Sekaran, 2016). The sample criteria in this study were participants who were professionally certified with the condition that the certificate had been issued.

Structural Equation Modeling analysis based on Partial Least Square was used in this research because it does not require a large sample size. The minimum recommended sample is 30 to 100 respondents (Ghozali, 2014).

SEM

Structural Equation Modeling is used as an analysis technique in this research. This technique is measured using the SmartPLS.3.0 program. Research using SEM makes it easier for researchers to obtain answers to questions that have a regression. .dimensional (Ferdinand, 2016). SEM PLS is used in this research because it is more directed towards a predictive model. Analysis using SmartPLS has the advantage of not having to use a large number of samples, the indicators used do not have to be reflective, the data used does not have to be normally distributed in a multivariate manner, and the conditions for determination do not have to be met. Another advantage of Smart PLS is its ability to process data for both formative and reflective SEM models. By using this analysis, researchers can

avoid inadmissible solutions and indeterminacy factors (Ghozali, 2014).

The PLS evaluation model is based on non-parametric prediction measurements. According to Ghozali, there are three stages of SEM analysis using SmartPLS, namely: a. Evaluation of the measurement model

This evaluation is the first stage in SEM analysis using SmartPLS.

Convergent Validity Test

This test is carried out by looking at the factor loading values for each construct indicator. A correlation is said to meet convergent validity if the loading factor value shown is > 0.7 for confirmatory research and between 0.6–0.7 for exploratory research. Besides that, the average variance inflation factor value

Discriminant Validity Test

This test needs to be carried out on reflective indicators by comparing the values in the cross-loading table.

a. Reliability Test

This test was carried out as proof of the accuracy, precision, and consistency of the instrument in measuring the construct (Ghozali, 2014). Cronbach's Alpha and Composite Reliability can be used to measure reflective indicators. The measure of construct reliability assessment is seen from the composite reliability value, namely > 0.70. Reliability testing with Cronbach's Alpha will give a lower value so it is more advisable to use composite reliability.

b. Structural Model Evaluation

This evaluation was carried out by conducting an R-squared test (R2) and a significance test through path coefficient estimation (Ghozali, 2014). Changes in the R2 value in the inner model are used to assess the substantive influence of the independent latent variable on the dependent latent variable. So you can see a picture of the relationship between latent variables based on substantive theory.

c. Hypothesis testing

Hypothesis testing is carried out through the bootstrapping process in the SmartPLS 4.0 program so that the relationship between the influence of exogenous variables on endogenous variables can be obtained by comparing t-statistic values and t-table values. A significant influence between variables can be seen when the t-statistic value exceeds the t-table value, namely >1.96. An insignificant effect can be seen when the t-statistic value is below the t-table value, namely <1.96. Apart from confirming the theory, the explanation of the relationship between latent variables can also be explained in the full SEM model (Ghozali, 2014).

III. RESEARCH METHOD

This research aims to evaluate customer satisfaction at PT LSP XYZ using a combination of secondary data and primary data. Initial secondary data is used to assess customer satisfaction, while primary data is collected through questionnaires. The analytical methods that will be used are descriptive analysis and Structural Equation Modeling (SEM) to test the proposed hypothesis. To ensure the validity and reliability of the data, convergent validity, and discriminant validity methods will be used. Service quality will be measured by calculating the gap between customer expectations and perceptions of the services provided. SEM analysis will be carried out using Sem-Pls 3.0 software.

Next, the research will focus on the Impact of E-Service Quality on Satisfaction with the Use of E-Learning at PT LSP XYZ. The research methods that will be used are Service Quality (Servqual) and Structural Equation Modeling (SEM). The research sample will be taken from professional certification participants at LSP XYZ who have obtained a certificate. The research model will analyze how the factors in the Servqual dimensions influence the level of customer satisfaction with e-learning. The operational definition of service quality will be considered from the Servqual dimensions. The research hypothesis will include the influence of Servqual dimensions on customer satisfaction and customer loyalty. The questionnaire design will contain research attributes that will be distributed to respondents.

IV. RESULTS

General Description of Research Locations

XYZ Professional Certification Institute (LSP) is a professional certification institution that has obtained a license from the National Professional Certification Agency (BNSP) to provide competency certification in the field of Human Resources Management. The founding or supporting institutions of the XYZ Professional Certification Institute (LSP) include the Indonesian Ministry of Manpower, Indonesian Economic Doctors Association (IDEI), East Java Province KADIN, Merdeka University Malang, East Java Indonesian Entrepreneurs Association (APINDO), 17 August 1945 University

Surabaya, and the East Java National Board for Professional Certification (BNSP).

Respondent Characteristics

The purpose of this analysis is to determine the characteristics of respondents in general, where the respondents in this study were professional certification participants who had issued certificates with a total of 98 respondents. The sampling period was carried out for 3 weeks, namely 1 – 25 February 2024. This analysis provides simple information about the respondent's condition such as gender, age, highest level of education, and position.

Characteristics of Respondents Based on Gender

Respondent characteristics based on gender were grouped into 2 groups, namely men and women. This distribution can be seen in Table 1 and Figure 4.

Table 1. Characteristics of Respondents Based on Gender

Gender	Amount	Percentage (%)
Man	59	60.21
Woman	39	39.79
Amount	98	100

Data Source: Primary Data, 2024

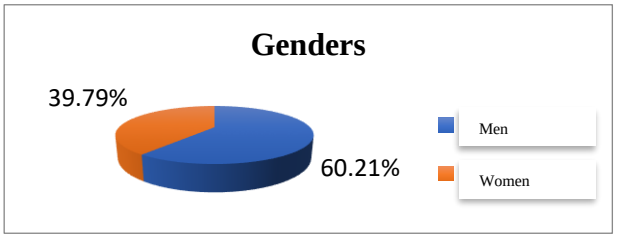


Figure 4. Percentage of Respondent Characteristics Based on Gender

Based on the data available in Table 1 and Figure 4, information was obtained that the largest number of respondents were male respondents, namely 60.21%. This was because the majority of professional certification participants at that time were male.

Characteristics of Respondents Based on Age

Respondent characteristics based on age were divided into 5 groups, namely less than 17 years, 17 – 25 years, 26 – 35 years, 36 – 45 years, and over 46 years. The age grouping is based on age categories according to the Ministry of Health.

Table 2. Characteristics of Respondents Based on Age

Age	Amount	Percentage (%)
<17 years	0	0.0%
17 – 25 years	1	1.0%
26 – 35 years	40	40.8%
36 – 45 years old	52	52.0%
>46 years	5	6.1%
Amount	98	100

Data Source: Primary Data, 2024

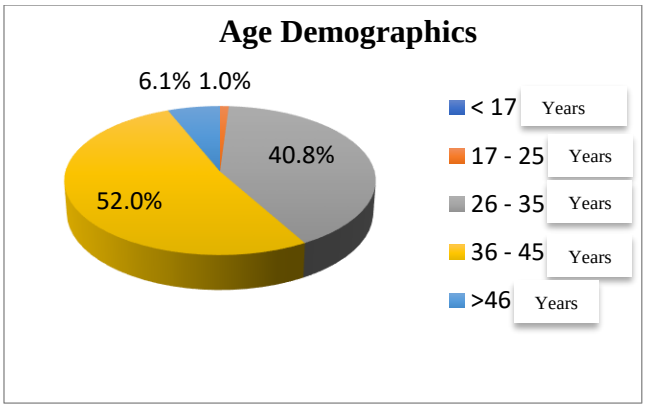


Figure 5. Characteristics of Respondents Based on Age

So from Figure 5 and Table 2, it can be seen that the segmentation of PT LSP XYZ is that the majority of professional certification participants aged 36 - 45 years are 52%.

Characteristics of Respondents Based on Last Education

In this section, the characteristics of respondents are based on their last education which is grouped into SMA, D3, S1, and Postgraduate according to Table 3.

Table 3. Characteristics of Respondents Based on Last Education

Last education	Amount	Percentage (%)
High School/Equivalent	0	0
D3/Equivalent	8	8.2
S1/Equivalent	60	30.6
S2/S3	30	61.2
Amount	98	100

Data Source: Primary Data, 2024

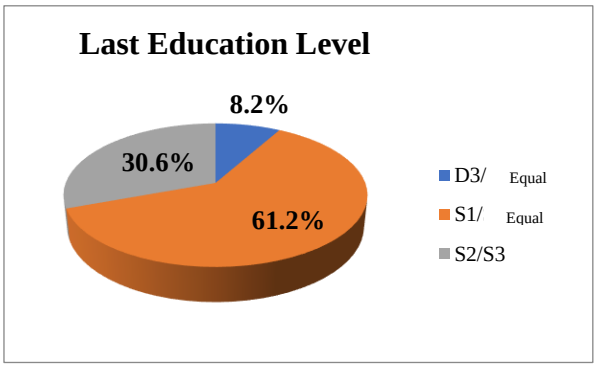


Figure 6. Characteristics of Last Educational Level

From Figure 6, it can be seen that the majority of respondents were Bachelor/Equivalent graduates at 61.2%. In the second position, the respondent is a Masters/S3 graduate. There are around 8.2% of respondents who are D3/equivalent graduates.

Servqual Analysis

Servqual analysis to find out the gaps that occur. The steps at this stage begin by calculating the average for each attribute of each respondent regarding consumer perceptions and expectations. Then, based on the average results, the difference between the average perception attributes and consumer expectations is calculated. Based on these calculations, three possible values will be obtained. The value of the calculation result can be negative, zero, or positive. If the gap is positive, then the customer's perception has exceeded the customer's expectations. Furthermore, if the value is zero, the customer's perception is in line with customer expectations. Meanwhile, if the value is negative, there are gaps and problems in the service attributes because customer perceptions still cannot satisfy expectations.

Table 4. SERVQUAL GAP Analysis Results

Dimensions	No	Average Per Item		*Gap*	Average Per Dimension Item		SERVQUAL Score
		Perception	Hope		Perception	Hope	
Tangible	1	3.36	3.93	-0.57	3.47	3.87	0.40
	2	3.40	3.94	-0.54			
	3	3.54	3.81	-0.27			
	4	3.74	3.85	-0.10			
	5	3.54	3.81	-0.27			
	6	3.23	3.90	-0.66			
Reliability	7	3.41	3.64	-0.23	3.47	3.82	0.35
	8	3.47	4.10	-0.63			
	9	3.45	3.82	-0.37			
	10	3.45	3.85	-0.40			
	11	3.47	3.67	-0.20			
	12	3.57	3.84	-0.27			
	13	3.54	3.70	-0.16			

Responsiveness	14	3.71	4.07	-0.36	3.53	3.88	0.35
	15	3.32	3.96	-0.64			
	16	3.62	3.83	-0.20			
	17	3.51	3.95	-0.44			
	18	3.49	3.78	-0.29			
Assurance	19	3.31	3.91	-0.60	3.44	3.89	0.45
	20	3.27	3.76	-0.49			
	21	3.61	4.00	-0.39			
	22	3.57	3.89	-0.32			
Empathy	23	3.59	3.90	-0.31	3.48	4.02	0.53
	24	3.32	3.93	-0.61			
	25	3.47	4.05	-0.58			
	26	3.57	4.07	-0.50			
	27	3.50	4.02	-0.52			
	28	3.44	4.12	-0.68			

There are five dimensions of service quality that are used as indicators for this research, namely tangible, reliability, responsiveness, assurance, and empathy. These five indicators all have negative values, namely the perceived value is lower than the expected value. So in general the quality of e-learning services at PT LSP XYZ can be said to have not met customer expectations. For this reason, it is necessary to make efforts to improve the quality of e-learning services at the institution. In the assurance and empathy dimensions, the SERVQUAL score reached -0.45 and -0.53. In each dimension, of course, there are items regarding respondents' perceptions and expectations that need to be addressed and prioritized by professional certification institutions, namely related to security when conducting e-learning, not misuse of personal data, learning can run smoothly, and the need to provide feature to find out information about learning through e-learning well. As well as the empathy dimension that needs to be addressed regarding the e-learning learning process, complete e-learning learning features, serving to learn participants' complaints swiftly, and easy to access.

Structural Equation Modeling (SEM) Analysis

In this analysis, respondents were given a questionnaire to provide statements of whether they agreed or not when assessing statements regarding each attribute in the latent variable. Then the answers of all respondents will be processed using the Structural Equation Modeling (SEM) method.

Evaluation Results of the Measurement Model (Outer Model)

Data processing in this research uses the SEM-PLS Smart PLS 3.0 application. The data that has been filled in by the respondent is combined into 1 in a CSV (Comma Separated Values) type data tabulation. This data processing is to determine the model form, loading factors, and significance of each latent variable. Data processing using SEM-PLS is carried out by running the data repeatedly so that the validity and reliability values are met. There are 3 measurement criteria for assessing the Outer model, namely Convergent Validity, Discriminant Validity, and Composite Validity.

Convergent validity with reflective indicators can be seen from the correlation between the indicators and their construct values. An indicator with a loading factor value is said to be valid/reliable if it has a correlation value above 0.7, however, for research in the initial stages of developing a measurement scale, a loading value of 0.5 to 0.6 is considered sufficient (Chin, 1998 in Ghozali, 2014). However, if the resulting value is not >0.5 then the indicator is declared invalid and the indicator must be removed from the model so data processing (running data) must be carried out again. From the results of phase 1 SEM-

PLS data processing, the following modeling and data were produced:

Table 5. Outer Loading Value

	Assurance	Empathy	Satisfaction	Loyalty	Reliability	Responsiveness	Tangibles
X1.1							**0.853**
X1.2							**0.776**
X1.3							**0.913**
X1.4							**0.876**
X1.5							**0.808**
X1.6							**0.882**
X2.1					**0.885**		
X2.2					**0.848**		
X2.3					**0.853**		
X2.4					**0.898**		
X2.5					**0.836**		
X2.6					**0.884**		
X3.1						**0.777**	
X3.2						**0.710**	
X3.3						**0.873**	
X3.4						**0.843**	
X3.5						**0.856**	
X3.6						**0.786**	
X4.1	**0.760**						
X4.2	**0.833**						
X4.3	**0.891**						
X4.4	**0.881**						
X5.1		**0.834**					
X5.2		**0.836**					
X5.3		**0.897**					
X5.4		**0.867**					
X5.5		**0.705**					
X5.6		**0.750**					
Y1			**0.734**				
Y2			**0.923**				
Y3			**0.861**				

Z1				**0.905**			
Z2				**0.968**			

From the results of SEM-PLS data processing in the table above, it is found that all indicators are valid/have met the factor loading value of >0.5.

Apart from evaluating factor loading values, construct validity can also be assessed by looking at the AVE (Average Variance Extracted) value, where the AVE value is able to show the ability of the latent variable value to represent the original data score. The greater the AVE value indicates the higher its ability to explain the value of the indicators that measure latent variables. The AVE cut-off value used is 0.50 where a minimum AVE value of 0.50 indicates a good measure of convergent validity, meaning that the probability of an indicator in a construct entering another variable is lower (less than 0.50) so that the probability of the indicator converging and entering in constructs whose value in the block is greater than 50%. convergent validity value. The following are the AVE values resulting from SEMPLS data processing:

Table 6. Average Variance Extracted (AVE) Value

	Average Variance Extracted (AVE)
Tangibles	***0.885***
Reliability	***0.746***
Responsiveness	***0.774***
Assurance	***0.710***
Empathy	***0.761***
Satisfaction	***0.711***
Loyalty	***0.878***

From Table 6 above, it can be seen that the SEM-PLS data processing in the test produces an AVE value for each variable that can be declared good because it meets the requirements with a value of more than 0.5. This shows that the latent variable can explain more than 50% of the variance in the indicators. So from Table 4. and Table 5, it can be concluded that all indicators and constructs in the model have met the Convergent Validity test criteria.

Next, a discriminant validity test is carried out, to test whether the indicators of one construct are not highly correlated with indicators of other constructs. The discriminant validity of the measurement model with reflective indicators is assessed based on the cross-loading of the measurement with the construct. If the construct's correlation with the measurement item is greater than the measure of the other construct, it indicates that the latent construct predicts the measure in the block better than the measure of the other block.

Another method for finding discriminant validity is to compare the square root value of the AVE (√AVE) of each construct with the correlation value between the construct and other constructs (latent variable correlation). The model has sufficient Discriminant Validity value if the AVE root for each construct is greater than the correlation between the construct and other constructs which can be seen in Table 8.

Table 7. Discriminant Validity Value

	Assurance	Empathy	Satisfaction	Loyalty	Reliability	Responsiveness	Tangibles
Assurance	***0.843***						
Empathy	*0.050*	***0.701***					
Satisfaction	*0.304*	*0.529*	***0.843***				
Loyalty	*0.208*	*0.145*	*0.310*	***0.937***			
Reliability	*0.272*	*0.608*	*0.948*	*0.313*	***0.739***		
Responsiveness	*0.240*	*0.605*	*0.963*	*0.296*	*0.958*	***0.745***	

Tangibles	*0.144*	*0.729*	*0.630*	*0.218*	*0.729*	*0.744*	***0.759***

The table above shows the discriminant validity values. It can be concluded that all constructs in the estimated model have met the Discriminant Validity test criteria. The last thing to do in the Outer Model evaluation is to carry out a Composite Reliability test. The Composite Reliability Test is a better method compared to the Cronbach alpha value in testing reliability in the SEM model. Composite reliability which measures a construct can be evaluated with two types of measures, namely internal consistency and Cronbach's alpha (Ghozali, 2014: 75). Cronbach's alpha tends to be a lower bound estimate in measuring reliability, while composite reliability does not assume reliability, while composite reliability is a closer approximation assuming more accurate parameter estimates (Ghozali, 2014: 76). The interpretation of composite reliability is the same as Cronbach's alpha where a limit value of 0.7 and above is acceptable. Below are presented the results of composite reliability and Cronbach's alpha from SEM-PLS data processing:

Table 8. Composite Reliability and Cronbach alpha

Dimensions	***Cronbach Alpha***	***Composite Reliability***
Tangibles (X1)	0.755	*0.721*
Reliability (X2)	*0.837*	*0.877*
Responsiveness (X3)	*0.824*	*0.876*
Assurance (X4)	*0.865*	*0.907*
Empathy (X5)	*0.782*	*0.761*
Customer Satisfaction (Y)	*0.791*	*0.880*
Loyalty (Z)	*0.870*	*0.935*

From Table 8. it can be seen that the research model is considered reliable because the Composite Reliability and Cronbach's Alpha values for all variables are at values above 0.7. Thus, it can be concluded that the four variables have reliable reliability because they meet the Composite Reliability test criteria.

Structural Model Evaluation Results (Inner Model)

There are several stages in evaluating the relationship between constructs. This can be seen from the path coefficient which describes the closeness of the relationship between constructs. The sign in the path coefficient must be in accordance with the hypothesized theory, to assess the significance of the path coefficient it can be seen from the t-test (critical ratio) obtained from the bootstrapping process (resampling method).

The next step is evaluating R2, the explanation is the same as R2 in linear regression where the size of the endogenous variable can be explained by the exogenous variable. Chin (1998) in Sarwono (2014: p. 23) explains, "the limiting criteria for the R2 value are in three classifications, namely 0.67 as substantial; 0.33 as moderate and 0.19 as weak". Changes in the R2 value are used to see whether measuring exogenous latent variables on endogenous latent variables has a substantive effect. From the results of SEM-PLS data processing, the R2 values obtained are as follows:

Table 9. R-square table

	R-square
Satisfaction	0.957
Loyalty	0.869

Table 9, shows that the satisfaction construct can be explained by the dimensional variables tangible, reliability, responsiveness, assurance, and empathy, amounting to 0.957 or 95.7%, while the remaining 4.3% is explained by other variables outside the research model. The table also shows that the loyalty construct can be explained by 0.869 or 86.9% by the dimensions of tangible, reliability, responsiveness, assurance, and empathy, while the remaining 13.1% is explained by other variables outside the research model.

Structural Model

This sub-chapter explains the results of Structural Equation Modeling (SEM) analysis using SmartPLS 4.0 software (Figure 4.4) as follows:

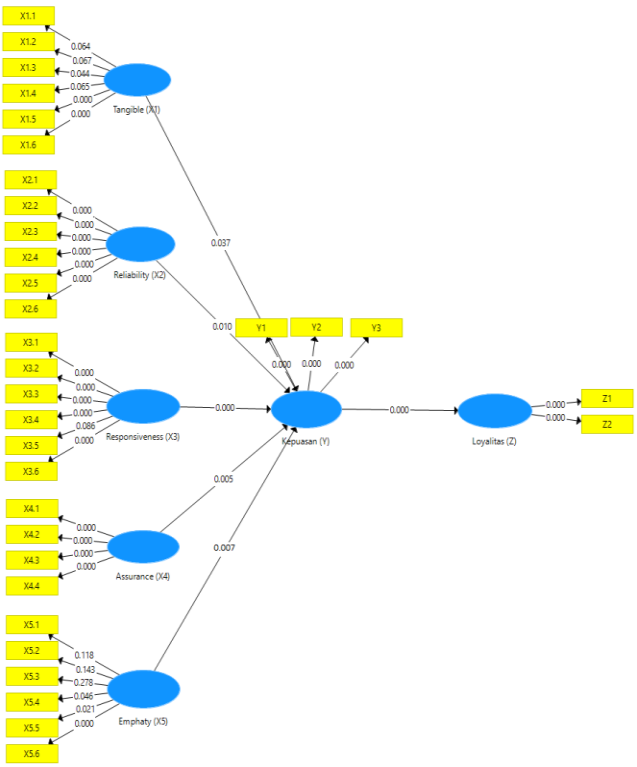


Figure 7. Research Model

Hypothesis testing

Hypothesis testing is carried out by looking at the p-value of the relationship between variables. The p-value significance value used in this research is <0.05. If the p-value is greater than 0.05 then the hypothesis will be rejected, while if the p-value is smaller than 0.05 then the hypothesis will be accepted. The arrow (à) shows the direction of influence between one variable and another.

Table 10. Hypothesis testing

Hypothesis	Influence	*Standardized Coefficient*(β)	*P-value*	Information
H1	*Tangibles* equation→Satisfaction	0.200	0.023	Significant
H2	*Reliability* →Satisfaction	0.315	0.007	Significant
H3	*Responsiveness* →Satisfaction	0.798	0,000	Significant
H4	*Assurance*→Satisfaction	0.056	0.006	Significant
H5	*Empathy* →Satisfaction	0.003	0.007	Significant
H6	Satisfaction→Loyalty	0.310	0,000	Significant

DISCUSSION

1. Tangibles Have a Positive Influence on Customer Satisfaction

Tangibles have a significant positive influence on satisfaction (H1). Based on the results of SEM analysis, the tangible latent variable (X1) has a standardized coefficient (β) value of 0.200 and a p-value of 0.023 < α (0.05), where the direction of the influence shown is positive. This proves that hypothesis 1 is accepted. The tangible latent variable has a positive direct influence of 0.200 and contributes to creating e-learning user satisfaction at PT LSP XYZ if the tangible aspect can be improved by PT LSP.

Tangible variables contained in PT LSP include good grammar and easy-to-understand (X1.4), image icons according to each feature (X1.5), and a login display that looks neat and attractive. If you look at the factor loading of each attribute in the tangible dimension (Table 4.5), the features used in the e-learning learning display are neat and not confusing (X1.3) and have the highest factor loading value, namely 0.913, which means this attribute is considered the most influential when compared with other

attributes in creating e-learning user satisfaction at PT LSP XYZ. Following up on these findings, professional certification bodies need to review internal capabilities in paying attention to tangible aspects that may not yet be a priority for developing e-learning services at PTS LSP XYZ in the future.

2. Reliability Has a Positive Influence on Customer Satisfaction

Reliability has a significant positive influence on satisfaction (H2). Based on the results of SEM analysis, the latent variable reliability (X2) has a standardized coefficient (β) value of 0.315 and a p-value of 0.007 < α(0.05), where the direction of the influence shown is positive. This proves that hypothesis 2 is accepted. The latent variable reliability has a positive direct influence of 0.315 and contributes to creating e-learning user satisfaction at PT LSP XYZ if the reliability aspect can be improved by PT LSP.

The reliability dimensions contained in PT LSP XYZ include e-learning learners, namely regarding the existence of information regarding complete e-learning -learning is up to date X2.4, information regarding e-learning is accurate X2.5, and the information shown is not confusing X2.6. If you look at the factor loading of each attribute contained in the reliability dimension (Table 4.5), information regarding up-to-date e-learning X2.4 has the highest factor loading value, namely 0.898, which means that this attribute is considered the most influential when compared to other attributes in creating e-learning user satisfaction at PT LSP XYZ. Following up on these findings, professional certification bodies need to review internal capabilities in paying attention to tangible aspects that may not yet be a priority for developing e-learning services at PTS LSP XYZ in the future. Proofread version:

3. Responsiveness Has a Positive Influence on Customer Satisfaction

Responsiveness Has a Significant Positive Influence on Satisfaction (H3). Based on the results of SEM analysis, the latent variable responsiveness (X3) has a standardized coefficient (β) value of 0.798 and a p-value of 0.000 < α(0.05), indicating a positive influence. This confirms the acceptance of hypothesis 3. The latent variable responsiveness has a direct positive influence of 0.798, contributing to the creation of e-learning user satisfaction at PT LSP XYZ if the responsiveness aspect can be improved by PT LSP.

The dimension of responsiveness contained in PT LSP X3.3 can be accessed anywhere and at any time. X3.4 is able to connect e-learning users with X3.5 customer service and quickly provide information on network problems. Looking at the factor loading of each attribute contained in the responsiveness dimension (Table 4.5), the variable with the highest factor loading value is fast response time, which is 0.873. This means that this attribute is considered the most influential in creating satisfaction for e-learning users at PT LSP XYZ.

4. Assurance has a positive influence on customer satisfaction

Assurance Has a Significant Positive Influence on Satisfaction (H4). Based on the results of SEM analysis, the latent variable assurance (X4) has a standardized coefficient (β) value of 0.056 and a p-value of 0.006 < α(0.05), indicating a positive influence. This confirms the acceptance of hypothesis 4. The latent variable assurance has a direct positive influence of 0.056, contributing to the creation of e-learning user satisfaction at PT LSP XYZ. If the assurance aspect can be improved by PT LSP.

The assurance dimensions contained in PT LSP find out information about complete e-learning X4.4. Looking at the factor loading of each attribute contained in the assurance dimension (Table 4.5), the variable with the highest factor loading value is e-learning. As long as it is used, it is always safe without any data misuse, which amounts to 0.891. This means that this attribute is considered the most influential when compared to other attributes in creating e-learning user satisfaction at PT LSP XYZ. Several aspects that are still not a priority for respondents need to be developed in the future to improve the quality of e-learning services.

5. Empathy has a positive influence on customer satisfaction

Empathy has a significant positive influence on satisfaction (H5). Based on the results of SEM analysis, the latent variable empathy (X5) has a standardized coefficient (β) value of 0.003 and a p-value of 0.007 < α(0.05), where the direction of the influence shown is positive. This proves that hypothesis 5 is accepted. The latent variable empathy has a positive direct influence of 0.003 and contributes to creating e-learning user satisfaction at PT LSP XYZ. If the empathy aspect can be improved by PT LSP, the dimensions of empathy contained in PT LSP XYZ include e-learning learners' ease in the process of e-learning learning activities, convenience of using the X5.4 e-learning system, easy access to X5.5 e-learning users, and the e-learning learning process provided

according to the needs of X5 users. Factor loading is a value that shows that the attribute with the highest value has a higher influence on the dimension compared to other attributes. In the dimension of empathy, the highest loading factor is serving complaints from e-learning participants well at 0.897. There are several aspects that have not become a priority for respondents, so it is necessary to develop the quality of e-learning services in the future.

Satisfaction has a positive influence on customer loyalty (H6). E-learning user satisfaction has a significant positive influence on customer loyalty (H6). Based on the results of SEM analysis, the latent variable loyalty (Z) has a standardized coefficient (β) value of 0.310 and a p-value of $0.000 < \alpha(0.05)$, where the direction of the influence shown is positive. This proves that hypothesis 6 is accepted. The latent variable satisfaction has a positive direct influence of 0.310 and contributes to creating e-learning user loyalty at PT LSP XYZ. If the satisfaction aspect can be improved by PT LSP, e-learning user satisfaction at PT LSP (Y3). Factor loading is a value that shows that the attribute with the highest value has a higher influence on the dimension compared to other attributes. In the dimension of empathy, the highest loading factor is e-learning user satisfaction with e-learning learning facilities at 0.923. There are several aspects that have not become a priority for respondents, so it is necessary to develop the quality of e-learning services in the future.

V. CONCLUSION

Conclusion

Based on the research analysis, several conclusions can be drawn as follows:

1. The SERVQUAL score level was -0.45 and -0.53, specifically in the dimensions of assurance and empathy. In each dimension, there are items that address respondents' perceptions and expectations. These issues should be prioritized and addressed by professional certification institutions. They include ensuring security during e-learning, preventing the abuse of personal data, enabling smooth learning experiences, and providing features to access information about e-learning effectively. Additionally, improvements are needed in the empathy dimension, such as enhancing e-learning features, promptly addressing participants' complaints, and ensuring easy accessibility.

2. Based on the analysis of SEM results, it can be concluded that tangible, reliability, responsiveness, assurance, and empathy have a positive and significant impact on e-learning user satisfaction at PT LSP XYZ. Customer satisfaction, in turn, has a positive and significant effect on customer loyalty.

Suggestion

Suggestions for PT LSP XYZ

PT LSP XYZ should focus on maintaining the quality of services provided to customers and promptly address important attributes to enhance customer satisfaction scores. As a professional certification institution, it is crucial to continuously strive towards providing the best service to customers to ensure their ongoing participation in the professional certificate program. Frequent promotions can also be implemented to attract more certification participants.

Suggestions for Further Research

For future research, it is recommended to increase the number of respondents, incorporate additional variables, and utilize alternative analysis methods to further enhance the measurement of customer satisfaction scores.

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