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The Effect of Service Quality on Customer Satisfaction in Three Campuses of UniSZA

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The main objective of this study is to adopt the existing model for assessing the effect of service quality on customer satisfaction and apply it to the UniSZA library. The data was collected through online surveys and quota sampling across three campuses: Gong Badak, Kuala Terengganu, and Tembila. This critical assessment has been conducted to increase the validity of the measurement model through common method variance method and various of discriminant validity using partial least squares path modeling (PLS-PM). The results from PLS-PM indicate that the service quality influenced the customer satisfaction in all campuses. Post-hoc analysis has been continued to make a comparison on PLS parameter estimates across groups. The analysis of this research revealed that all campuses significantly differ in customer satisfaction. The findings provided by this study will grant the policy makers a significant insight into how to boost the quality of service in the campus libraries.

Key words: *Service Quality, Customer Satisfaction, PLS-PM, Post-Hoc Analysis.*

Introduction

Service quality models and their usability to education sector is considered a a prominent construct across research fields in in Malaysia (Parasuraman, Zethmal, & Berry, 1988; Afthanorhan et al., 2019). These questions have become more prominent as Malaysia is progressively becoming a popular study destination in Asian region due to a growth in the use of the English language, unique experience, sobering life and inexpensive accommodation. According to QS Asia News Network (January 4, 2018), the country has already attained a total of 172,886 international students and is expected to increase to 250,000 international students by 2025. Many Malaysian universities have enhanced the quality of services provided

by their to meet the needs of the rising student population. Most theories and constructs regarding the quality of services were developed and tested entirely in other regions such as Europe and North America. Thus, it is unknown whether the theory, measures, construct and their relationships presented in existing research models are applicable outside these contexts.

Although many applied researchers have called for an extensive examination into the usability of these theories in Malaysia, very few studies have done so. In Malaysia, 21 government institutions were recognized for the purpose of this study. Of these 21 institutions, 4 clusters were determined based on the public image of these institutions. The four clusters are categorized as: research, comprehensive, Islamic, and convergent institution. For the Islamic institution, three universities were identified as USIM, UniSZA, and UIA. Among Islamic universities, only UniSZA is based in the Eastern region. For this reason, this study will focus on the Eastern region for the purpose of this research.

It is important to examine these models across the different campuses in Malaysia. This is because previous researchers have assumed the concepts and established models from the European region are relevant to Malaysia with no actual assessment of research models. This postulation can lead to an invalid hypothesis that is widely refereed to for managerial decisions.

The aim of this study is to examine the suitability of service quality and customer satisfaction constructs to Islamic institution such as Universiti Sultan Zainal Abidin (UniSZA). This study makes adjustments on service quality and customer satisfaction constructs so that it meets the Islamic institution context. This research puts forward these models by determining their suitability and validates them across the campuses. Further, this study will assess their applicability in Terengganu, Malaysia, Kuala Terengganu, Gong Badak, and Tembila campus.

The objectives of this research are to validates whether a service quality and customer satisfaction model can be conceptualized across three campuses in Terengganu state. Furthermore, this study is also interested in exploring whether the items in service quality and customer satisfaction construct can be profoundly compared across three campuses. Therefore, metric equivalence using Levene test will be used to analyse the data. Additionally, this study examines the relationships between a service quality model which is applicable across campuses and put forward to test them on the customer satisfaction construct.

Lately, there has been an enormous amount of research in examining the relationship between the quality of services and customer satisfaction. Very little of this research has focussed on Islamic institutions. This research paper will begin by reviewing the literature on the conceptualization and operationalization of service quality and customer satisfaction construct. Next, the research methodology is explained extensively. This will be followed by an analysis of the Levene test, Partial Least Squares Path Modeling (PLS-PM) and IPMA. Finally, the

research findings are discussed to assess the theoretical and practical implications of this research.

Theory and Hypotheses

Service Quality and Customer Satisfaction Construct

Service quality construct was introduced by Gronroos (1984). Gronroos stated that service quality is reflected by two dimensions: functional quality and technical quality. The functional quality refers to the delivery processes of staff in a service. Technical quality refers to customer perception after they have received a service. Generally, it means the interaction between a service's employee and a customer would create a customer's view of the service provided. Some researchers defined this as the interaction quality dimension.

The research on service quality was amplified when Parasuraman et al. (1988) proposed five dimensions of quality of services. More precisely, the five dimensions are represented by tangibles, reliability, responsiveness, assurance and empathy These elements are then framed as a survey instrument, namely, SERVQUAL. This survey was initially developed to compare the customer perception and expectation on service quality provided by firms (Sivakumar, Li, & Dong, 2014; Artha & Mulyana, 2018; Awoonor-Aziaku, 2017; Baran & Yilmaz, 2018; Begashaw & Tafesse, 2017; Caifen et al. 2018; Chang, 2017). As such, the SERVQUAL scale is utilized to measure the difference of expectation and performance by customers. This scale was criticized by Cronin & Taylor (1992), Park & Yi, (2016), Babakus & Boller, (1992) and Gong & Yi (2018) due to its lack of efficacy regarding expectations-performance gap for assessing the service quality construct.

TAn alternative scale was introduced to cater for the limitations of SERVQUAL. The SERVPERF scale was designed to be better than the conventional scale of SERVQUAL because it has a well-grounded basis in terms of the theoretical knowledge which addressed performance measure. Regarding this concern, Pak & Yi (2016) compared the scales and concluded that SERVPERF is truly more efficient than SERVQUAL when the effect of performance on customer satisfaction is larger than expectation-performance on customer satisfaction.

These developments did not address all problems according to Rust & Oliver (1994) and Brady & Cronin (2001). They critically reviewed some of the recent enhancements to the service quality construct by hypothesising that the service quality construct can be evaluated by three dimensions. These three dimensions were defined as customer-employee interaction, the outcome, and the physical environment. These claims were supported by Dabholkar (1996) who argue that service quality is distinct, but highly correlated to each other. From these perspectives, Brady & Cronin (2001) adopt this measure by proposing the hierarchical service

quality model. That is, the higher order component analysis is the best option when examining the hierarchical service quality model. Thus:

H_1: Service Quality has significant effect on Customer Satisfaction

Methods

Sample and Procedures

Data for this study was collected through online surveys. The surveyswere disseminated to customers in each of the three campuses: Kuala Terengganu, Gong Badak, and Tembila. One of the non-probability sampling methods that was used to generate samples was to select representatives of the population in terms of education, category and gender. The quota sampling is selected as the best sampling method for this study. Kuala Terengganu, Gong Badak, and Tembila served as the campuses of study because they share similar culture that represents Islamic institutions in Malaysia. The research findings established that differences between campuses with similar culture permits us to make a more convincing argument than performing study with different culture. According to Podsakof (2015), research with different culture could lead to capitalization of the chance effect which biases the result and tends to limit the generalizability of findings.

The unit of analysis of this study is the customers using the UniSZA Library services. The respondents were approached using an e-mail obtained from library records and they were asked to participate in a survey. All the information provided by the responses was kept confidential. Respondents were told about the purpose of this investigation. As this survey was conducted across three campuses within one state, the two versions of the questionnaire were administered. The survey is written in English and Bahasa Malaysia whose majority of the respondents are the local.

The demographic of the samples is presented in Table 1. The total sample for this study was 1,043 people from all campuses. Specifically, the sample consists of 318 Tembila, 517 Gong Badak and 208 Kuala Terengganu valid responses. The total sample for this study is quite high because the population of students, academic and non-academic staff was large. It is estimated that, in total, the population across the campuses is more than 10,000 people. Furthermore, this study uses Krejcie & Morgan's approach to obtain the minimum number of samples from each campus.

Instrumentation

As the survey was conducted across three campuses and includes both local and international respondents, a bilingual version of the questionnaire was administered. The original

questionnaire was written in English, but then a translation to Bahasa Malaysia was added below the English sentences . The questionnaire was translated by bilingual people whose native language was English and Bahasa Malaysia. These two versions were then compared for clarity purpose. It was found that no item contains specific cultural context in terms of language (Brislin, 1980). After that, the scale of measurement for each item in the survey was evaluated by the expert of measurement. The purpose of this method is to understand the usefulness of a Likert scale on each item. All concepts in the survey were measured using a 5-point Likert scale, ranging from 1= strongly disagree to 5=strongly agree.

The service quality questions were adopted from Brady & Cronin (2001) and then customized in terms of the Islamic context and library setting. More specifically, the performance of service quality was measured by three dimensions that assessed the library staff, library collection and facilities.

Data Analysis

Descriptive Statistics

Table 1: Respondent Profile

		Frequency	**Percent**
Gender	Male	267	25.6
	Female	776	74.4
Campus	Tembila	318	30.5
	Gong Badak	517	49.6
	Kuala Terengganu	208	19.9
Category	Undergraduate Students	950	91.1
	Postgraduate Students	65	6.2
	Academic Staff	26	2.5
	Non Academic Staff	2	2
Frequency went to Library	< 2 times a week	392	37.6
	3-4 times a week	425	40.7
	5-7 times a week	166	15.9
	8 times a week and above	60	50.8

Common Method Variance

Common method variance, (CMV) or, common method bias, is one of the methodological sources of measurement error which has the potential to affect the validity of the construct as well as their interrelationship of constructs in a model. In the current study, several techniques were used to assess the CMV in terms of both procedural and statistical perspectives. The

purpose of using these techniques is to minimize the detrimental potential effects. In terms of the procedural perspectives, the researcher sought to construct an effective questionnaire in which a) questions were concise with the topic related; b) double barrelled and ambiguous questions were avoided; c) respondents were informed about confidentiality of their responses to avoid the response bias; d) respondents were informed about the question meaning; e) some negative items were designed to detect the clarity of responses; and f) respondents were informed to be honest with their responses. These measures would be expected to reduce the method of bias. In the questionnaire development, all items were verified by the three experts in the fields of management area, language, and measurement scale.

In terms of the statistical perspectives, Harman's single factor test was used. All the variables underwent an exploratory factor analysis with an unrotated factor and eigenvalue exceeds one, accounted 33% of the overall variance. According to Podsakoff et al. (2003), this is much lower than the 50% of the total variance. Although Harman's single factor is widely applied in across a multitude of research fields (Wu et al., 2016), its usefulness was criticized for detecting CMV (Fuller et al., 2016). Due to this issue, the other two methods were introduced including common latent factor and marker construct. The common latent factor cannot be employed with PLS-PM due to composite nature. Wamba et al. (2017) and Santos-Vijande, Lopez-Sanchez & Rudd (2016) suggested the marker variable is recommended over Harman single factor when executed with PLS-PM. However, we did not designate an unrelated marker variable in the questionnaire. The newest method post-hoc marker variable is used for this study (Wamba et al., 2017). To do this, the smallest correlated item to the model's item was used as proxy for marker variable. According to Henseler et al. (2014), the value of composite loading in the model is rely on the correlation between variables. The lowest composite loading implies the lowest correlation in the respective construct.

Following to these recommendations, the two items were taken from Facilities and Library Collection and eliminated due to poor composite loadings. The mean of product moment of correlation was assessed using SPSS software between the marker variable and other items of the model was 0.095 and 0.121, indicating minimum evidence of CMV. Furthers, the correlations between constructs and marker variable were used to estimate the structural path of this study by comparing the effect of both with and without the presence of marker variable, implementing the PLS-PM method. The result obtained without the presence of marker variables indicates that there is no significant difference between the structural path and when the marker variable is included and excluded. Overall, it can be conclude that the detrimental effect of CMV is not strong enough to bias the results of this study.

PLS-PM Technique

The current exploratory study addressed mainly the testing of the newly developed version of the Service Quality construct as well as Customer Satisfaction construct. Therefore, its predictive performance rather than the theory testing (confirmation) of its original version is to be taken for estimation. The use of Partial Least Squares Path Modeling (PLS-PM) is the best choice due to its appropriate prediction power. These research hypotheses will be explored the using ADANCO 2.0 software (Henseler & Dijkstra, 2015; Zainol et al., 2019; Afthanorhan et al., 2019). PLS-PM was one of the variance-based technique that is regarded as the most fully developed in various researches disciplines, for instances in marketing, management, business, tourism and entrepreneurship. Many prior studies have explored an array of service quality factors influencing customer satisfaction using PLS-PM method. Only few of these cases have been used in terms of the institute Islamic perspective. In the current study, a more comprehensive view of analysing the SEM models PLS-PM for will be used for the purpose of analysis.

Measurement Model

The standard procedure for SEM analysis is to warrant the scale validity and reliability of the model. The adequacy of the measurement model and structural model is done by gauging the fitness index and coefficient of determination. Standardized Root Mean Residual (SRMR) represents the fitness index to assess the suitability of the model with data at hand. The lower value of SRMR, the better the adequacy of model with data which usually recommended below 0.08. In this case, the value of SRMR produced is 0.0630 which is significantly lower than of recommended value.

The reliability of the model was tested with the composite reliability coefficients above the threshold value of 0.70 (see Table 2). The item within each construct therefore produces high internal consistency as all items remaining are above 0.70 of composite loading. For the convergent validity, the Average Variance Extracted (AVE) was employed in confirmatory composite analysis which is part of an analysis to PLS-PM. The findings show that most item have a standardized composite loading that significantly exceeds the the minimum requirement of 0.70 after exclude two items from Facilities and Library Collection construct for CMV purpose. Subsequently, after eliminated the two items from the model, none of the construct AVE were experiences below the cut-off of 0.50. Based on this, it confirms the convergent validity of the measurement model as the values are fall in the range between 0.7093 and 0.7913. Thus, the amount of variance captured from their item is higher than the amount of error variance for these constructs. Table 3 presents the convergent validity results.

Table 2: Construct Reliability

Construct	Dijkstra-Henseler's rho (ρ_A)	Jöreskog's rho (ρ_c)	Cronbach's alpha(α)
Service Quality	0.8775	0.9191	0.8681
Customer Satisfaction	0.8981	0.9241	0.8966

Following the standard practice of SEM analysis, the discriminant validity is established by comparing the square root of AVE with construct correlation (Fornell & Larcker, 1981). As shown in Table 4, in all cases the square root of AVE on the diagonal (bold values) larger than the construct correlation coefficients. Further, in order to examine the multicollinearity problems, the absolute correlation between the constructs should be lower than of 0.85, as suggested by Afthanorhan et al. (2019). Therefore, one conclusion can be made that all measurement model is presumed to have discriminant to each other. This also implies that all items from each latent variable in the research model is unique and differ significantly from other latent variable items (Hair et al. 2014; Esfandiar et al., 2019). However, given that Fornell & Larcker approach has always been subject debatable due to lack of discriminant validity when employed with PLS-PM (Farrel, 2010). The heterotrait-monotrait (HTMT) ratio of correlations is recommended for PLS-PM (Henseler, Ringle, & Sarstedt, 2015) as also applied here.

Table 3: Convergent Validity

Construct	Average variance extracted (AVE)
Service Quality	0.7913
Customer Satisfaction	0.7093

The HTMT ratio was recognized as one of the new methodological advances in PLS method (Carrion et al., 2016) yielded from the combination of heterotrait-heteromethod and monotrait-heteromethod. These two methods were assessed for different purpose in the model. Heterotrait-heteromethod is used for the correlation between construct in the model and monotrait-heteromethod is used for the correlation between variable in the same construct. The results computed for each pair of the models' two constructs indicate that the HTMT values of all construct does not reach the maximum threshold of 0.85 (Zainol et al., 2019; Franke & Sarstedt., 2019). In additions, the HTMT $_{interface}$ was also employed to estimate the bootstrap confidence interval with 4,999 of resampling procedure in ADANCO 2.0. The findings obtained for Service Quality and Customer Satisfaction indicate that correlation value is below than 1.0. Therefore, the results obtained from these three criteria (Fornell-Larcker, HTMT$_{.85}$ and HTMT $_{interface}$) confirms the discriminant validity of the constructs.

Table 4: Heterotrait-Monotrait Ratio method

Construct	Service Quality	Customer Satisfaction
Service Quality		
Customer Satisfaction	0.8392***	

Table 5: Fornell – Larcker method

Construct	Service Quality	Customer Satisfaction
Service Quality	0.7913	
Customer Satisfaction	0.6924	0.7093

Structural Model

Regarding to the structural model practice, the PLS-PM is applied to analyse the coefficient of determination, R^2 ,and path coefficients. The PLS-PM method need bootstrap procedure to generate the standard error of path coefficients because the limitation of estimator used that is ordinary least squares (McDonald & Ho., 2002; Ronkko & Evermann, 2013; Aimran et al., 2017). Following the research of Henseler, Hubona, & Ray (2016) and Sarstedt et al. (2019), the 4,999 of resampling is recommended to bolster the level of accuracy and consistency of an estimates. In the common practice, the Stone-Geisser's Q^2 and goodness of fit (GoF) are tested to validate the redundancy of endogenous construct and model validity. But these measures are proven not substantiate adequate in PLS-PM (Henseler & Sarstedt., 2013; Henseler & Dijkstra, 2015). Thus, this study does not apply these assessments in structural model.

Finally, the coefficient of determination, R^2 is utilized to explain the total variance of the model. Considering the R^2 values, 69.2% variance of Customer Satisfaction has been explained by Service Quality. This value lies at the satisfactory levels since it is larger than 0.10 as suggested by Hair et al. (2014) and Falk & Miller (1992). Nonetheless, the moderate portion of 30.8% of unexplained variances indicate that other significant factors beyond the scope of this study can be carried on, increasing explanatory power of customer satisfaction construct.

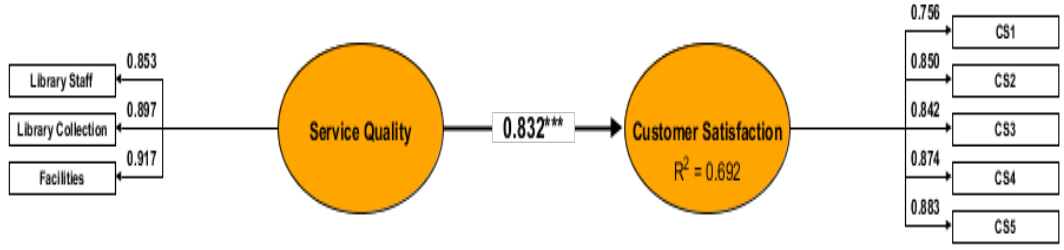
Direct Effect

After the assessment of measurement and structural model has been validated, the subsequent step is to examine the research hypotheses. The results from PLS-PM method provide solid support for unexplored hypothesis at significant level of 0.01 (Service Quality → Customer Satisfaction: $\beta = 0.8321$, $t = 61.50$, p-value = 0.000). Specifically, the Service Quality has a relatively strong effect on Customer Satisfaction with standardized regression weight of 0.8321 which is larger than half of the total effect of 0.50. The result for direct effect is shown in Table 6 and Figure 1.

Table 6: Direct Effect

Effect	Original coefficient	Standard bootstrap results				
		Mean value	Standard error	t-value	p-value (2-sided)	p-value (1-sided)
Service Quality -> Customer Satisfaction	0.8321	0.8323	0.0135	61.5	0.0000	0.0000

Figure 1. Structural Model



Post Hoc Analysis

To fulfil the objective of this study, the post-hoc analysis is necessary to investigate further about the student satisfaction across campuses. Based on the literatures review, the researchers developed a taxonomy of statistical methods and derived the conclusion from one method. Therefore, this study extends the existing research by providing the most comprehensive study to present research using post hoc analysis at Table 7.

Table 7: Multiple Comparisons

Total_Satisfaction LSD						
(I) Rcampus	(J) Rcampus	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Kuala Terengganu	Gong Badak	-.060	.060	.320	-.18	.06
	Tembila	.187*	.065	.004	.06	.31
Gong Badak	Kuala Terengganu	.060	.060	.320	-.06	.18
	Tembila	.247*	.052	.000	.14	.35
Tembila	Kuala Terengganu	-.187*	.065	.004	-.31	-.06
	Gong Badak	-.247*	.052	.000	-.35	-.14
*. The mean difference is significant at the 0.05 level.						

From this result, students from Kuala Terengganu and Gong Badak do not have significant differentiation in their responses regarding the library services. Their perception is similar about the service quality provided by library. However, students from Tembila had higher differentiation regarding their perception on quality of services compared to other two campuses. This means that the students from Tembila are not satisfied with the service quality from library. From these different perspectives, it can be said that this is due to the different services provided across campuses. Therefore, the management team from UniSZA should focus on the Tembila campus to enhance the quality of services provided by the library, whilst maintaining the quality of service on the other.

Discussion

This paper empirically tested how service quality provided by UniSZA Library influenced customer satisfaction. The test is more comprehensive when the post-hoc is implemented to examine the exact different effect between the three campuses of UniSZA. The critical assessment had been conducted by implementing the measurement model using CMV method and various discriminant validity to boost the level of measurement validity. The procedure of this PLS-PM method is complicated because the Service Quality construct is treated as a higher abstraction of the component level to represents three sub-constructs Library Staff, Library Collection and Facilities. In this instance, the two-stage approach is executed on Service Quality construct as highly suggested by Khan et al. (2019) and Becker, Ringle, & Sarstedt., (2018).

The results highlight the fact that service quality significantly influenced the customer satisfaction construct. An explanation for this result might be that the students and staff from UniSZA had a good experienced with the service provided by library, causing them to down-play the critical factors as opportunities. A simple analysis of this study may not adequate to explain the entire data and model, suggesting that post-hoc analysis can be a substantial technique for dealing with multiple levels in the same model. Numerous researchers have called for this routine to provide more information for the managerial decisions and also suggest that it excel in terms of explanatory power. The results show that all groups are significantly different from zero.

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