Assessing the effects of service quality on customer satisfaction

Asyraf Afthanorhan*, **Zainudin Awang, Norfadzilah Rashid, Hazimi Foziah and Puspa Liza Ghazali**

Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin (UniSZA), Malaysia

CHRONICLE	ABSTRACT
	A constant concern of academic institutions has been to improve the customer satisfaction in university libraries. The service quality within academic library context is pivotal for satisfying customers by meeting the customers' needs to create loyalty amongst customers. This research uses LibQual to analyze the gap between customer's perception and expectation, concerned with the services at the University Sultan Zainal Abidin (UniSZA) Library. There are six dimensions in service quality; namely general services, search for materials, library collection, staff, environment and environment, considered for this empirical research. The purpose of this paper is to 1) know service quality dimensions that satisfy the customers and 2) to observe the impact of service quality on customer satisfaction. The research methodology is carried out using a questionnaire survey distributed among 170 samples through simple random sampling. The data obtained was analyzed by using covariance-based structural equation modeling and importance-performance analysis. The results suggest that quality of service had a significant impact on customer satisfaction. Among the service quality dimensions, library environment and general service were viewed as high importance and strong performance index. Implication for research and practice resulting from these findings were also discussed.

1. Introduction

Education is a very significant tool that is functional in the developing and developed countries to succeed. It is important to note that the education can mitigate most of the challenges and difficulties faced in life. The knowledge that is obtained through education can assist the students to provide more information which can improve their knowledge that can be used for their future opportunities. As such, the library university was functioned for this purposes so that it could help students collect the necessary information through the library services. A university library can be defined as the heart of the learning public that provides a comfortable place for academicians, practitioners and applied researchers to do their research projects and to advance their knowledge (Kiran, 2010). With an emphasis on ease of use for educational purposes, the students are more absorbed in collecting the information through library resources such as internet, books, and magazine articles. The staff library instantly need to address the quality of their services and how the user satisfaction can be improved. The importance of such service

* Corresponding author.
E-mail address: asyrafafthanorhan@unisza.edu.my (A. Afthanorhan)

is continuously addressed by the researchers to measure service qualities in library through adopting the well-known tool, SERVQUAL (Parasuraman et al., 1988). The SERVQUAL model is widely adopted in marketing (Cronin & Taylor, 1994; Buttle, 1996), business (Babakus & Boller, 1992), health services (Babakus & Mangold, 1992), tourism (Tribe & Snaith, 1998; Afthanorhan et al., 2017), education (Arambewela & Hall, 2006) and information systems (Jiang et al., 2002).

Alternatively, the library service quality measurement tool, LibQUAL was also popular to assess the service quality and customer satisfaction. It was developed using the SERVQUAL methodology basis (Lincoln, 2002) which limited for library services (Cook, 2001; Greenwood et al., 2011). A strategy of continuous improvement with regard to quality is important and should be implemented in rigor research (Petruzzellis et al., 2006). The research published concurred that quality of service provides a superior antecedent of customer satisfaction and implying that service quality can influence customer satisfaction (Cronin & Taylor, 1992; Ruyter et al., 1997; Bloemer & Poiesz, 1989; Spreng & Mackoy, 1996). Based on their views, customer satisfaction is deserved to receive a treatment as an outcome of the research. The level of customer satisfaction can be determined to assess the level of quality of service. Other than customer satisfaction, some of the researchers defined customer satisfaction as a mediator construct which means it was not treated as the final study. For this example, Caruana et al. (2000) proposed a mediational model that links service quality to customer loyalty through customer satisfaction. It is perhaps one of the most important constructs in services management (Aziz et al., 2016) and marketing (Siddiqi, 2011; Kim et al., 2004; Chang et al., 2009). An important reason for the interest in customer loyalty by researchers results from the belief that this has a benefit effect on service performances.

In Malaysia, university libraries are more interested in obtaining MS ISO 9001: 2000 certification to evaluate the performance of library commitment (Kiran, 2010) which is one of the requirements for Quality Management System (QMS). The purpose of the QMS is to identify the customer needs and focuses on their needs to measure the customer satisfaction. In other words, the customer satisfaction would reflect the performance of academic institutions. Therefore, this study intends to examine what the main impact and performance in service quality is and further investigates the relationships between customer satisfaction and service quality. This research model is constructed via the use of LibQual theory which is suitable for academic library context. The following section presents an overview of the literature review related to library service quality. This is followed by an overview of the research methodology associated with research design, sampling frame, questionnaire design and the statistical used. The results are presented with vigorous discussions related to each research objective and hypothesis and finally, we conclude the findings.

2. Literature Review

The study investigates every service provided by university library based on the established theories of customer satisfaction and service quality. The following section consists of literature review on relevant topic for further discussion and thus develops the research hypotheses.

2.1 Service Quality

Service quality was defined as "the global evaluation or attitude of overall excellence of services" (Parasuraman et al., 1985). In other words, it is the difference between customer perception or expectation of service delivered by service organizations using confirmation/disconfirmation theory. Meanwhile, the expectation could be considered in terms of what a service would offer (Boulding et al., 1993). The service quality actually has been studied in many years across different fields such as banking industry, school education, credit card companies and telecommunication companies. The results showed that service quality had their own dimension such as reliability, responsiveness, competence, understanding, courtesy, communication, access, security, credibility and tangibility (Nitecki & Hernon, 2000). Later on, these 10 dimensions were evaluated and cut down into five dimensions as tangibility, reliability,

responsiveness, assurance, and empathy (Parasuraman et al., 1988). These new dimensions were verified by Parasuraman et al. (1988) and it was called as SERVQUAL scale for assessing service quality.

2.2 Library Service Quality (LibQUAL)

LibQual was a prominent theory that was developed based on conceptual framework on SERVQUAL scale (Rehman, 2012). It was modified and refined for academic library context as its five dimensions (i.e.: reliability, responsiveness, tangibility, assurance and empathy) were not defined suitable in academic library context (Nitecki, 1995; Cook & Thompon, 2000; Cook et al., 2001). The topic on library service quality was researched rigorously by Martensen and Gronholdt (2003) which found that electronic resource, collection books or publication, technical facilities, library staff, and library environment are the key determinants in library context. Other than that, Hernon et al. (1999) conducted an exploratory factor analysis on over 100 variables and revealed that the dimensions of library service can be extended using the previous ones by inclusion the guidance, waiting time taken, time management, library building and environment, technical facilities and time of data delivery. It seems that the research scope on library service quality can be broaden in many perspective which depends on customer expectations. Using this theory, Musyoka and Chirchir (2013) investigated all possible factors that had a great impact on library performance by applying a questionnaire survey. It was found that library collection and physical facilities were expected as the most important issues in determining the customer satisfaction.

2.3 Customer Satisfaction

Customer satisfaction was defined as "the level of a person felt state resulting from comparing a product's perceived performance" (Kotler et al., 1996). As this current study focused on investigating the customer satisfaction of library, it is defined as "the levels of quality of service performances that reach the customer expectation". This survey will give a benchmark to the service library officer and then give an ideas on how to improve the quality of services provided to meet library users' requirementd. Westbrook (1980) suggested that multi-items scale for measuring customer satisfaction are needed besides lowering measurement errors and improving the scale reliability. His suggestion could be tailored with the use of Covariance-Based Structural Equation Modeling (CBSEM) as would apply in the current study. Fornell et al. (1996) proposed American Customer Satisfaction Index (ACSI) to evaluate and enhance the performance of firms, industries and economic sectors. They found that ACSI had three antecedents: perceived quality, perceived value and customer expectation which consisted 15 items. Some of these items were used and re-defined in terms of the library context.

2.4 Service Quality and Customer Satisfaction

Quantitative researchers have sought to link service quality with customer satisfaction. For this example, several previous researchers such as Bolton and Drew (1991), Boulding et al. (1993), Wang and Shieh (2006), Sweeney et al. (1999), Chenet et al. (1999), Ennew and Binks (1999), Taylor (1997) and Ruyter et al. (1997) showed how the service quality could be predicted by customer satisfaction. Cronin et al. (2000) employed CBSEM technique to study customer satisfaction in service environment. They contemplated that these discussions have dominated the service literature that assist them to identify the relationships among these constructs. Based on this, the policy makers could determine the level of satisfaction among the customers by inspecting the service quality effectiveness.

3. Methodology

3.1 Research Framework

Based on the previous section, the theoretical framework for the current study was developed as exhibited in Fig. 1. The main objective of this study is to discuss the impact of the six dimensions of service quality on customer satisfaction. These six dimensions were extracted from the LibQual theory considered as the best choice for the academic library context. As a result of various modification and refinements the

LibQual theory measures library service quality through 40 items or questions on six dimensions: General Services (GS), Search for materials in Library (SML), Library Staff (LS), Library Collection (LIBC), Facilities (Fac), and Library Environment (LIBE). The customer satisfaction constructs do not rely on multi-dimensional construct for assessing its behavior. It consists of seven questions related to the level of customer satisfied with the quality of service provided. Moreover, the importance of customer satisfaction attempting to comprehend whether or not library provides satisfactory services and reach customer expectation.
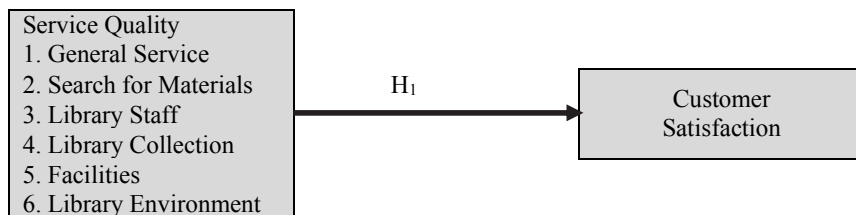

Fig. 1. Research Framework

3.2 Research Design

Library customer in the study are faculty, undergraduate and postgraduate students, academic and non-academic staff who use every service provided in the University Sultan Zainal Abidin (UniSZA) library. A cross-sectional survey was conducted by distributing the questionnaire survey which was validated during the pre-test and pilot study. A questionnaire survey was applied due to its convenience and effectiveness to investigate the performance of UniSZA library. At the end of the questionnaire, the respondents were asked about their satisfaction and suggestion for library improvement. We delivered the questionnaires directly among the library staff and collected 195 random samples for data analysis purposes. Among them, some questionnaires were excluded in the study due to incomplete survey or careless answers that would lead to have a great impact on estimation method (McNeish, 2017). Finally, 170 samples for data analysis were retained, with a valid response rate of 87.17%.

3.3 Questionnaire Design

The GS dimension consists of eight questions related to access, information, user friendly, duration for self-check machine and borrowed items in information access. The SML dimension addresses (through five questions) on the usefulness of Computer Assisted Searching Systems (OPAC) in information systems. The LS dimension focuses (through six questions) on courtesy, knowledge and helpfulness of library staff in providing information to customer in need. The LIBC emphases (through six questions) on the adequacy of electronic collection or resources and updated materials for customer references. The Fac stresses (through eight questions) on technical services (example: printing and photocopy service) and computer in delivering customer services. Lastly, the LIBE comprises of seven questions related to safety, comfortable and modern equipment of library that inspires study and learning. The customers rate all LibQual items on 1 (very low) to 10 (very high) scales for how much the degree of their agreement towards the performance of the library service quality (Awang et al., 2016).

3.4 Methods

The psychometric properties of the two main constructs were evaluated by employing the method of confirmatory factor analysis and structural analysis using Analysis Moment of Structure (AMOS 21.0; Arbuckle, 1995). Those constructs were tested simultaneously in one confirmatory factor model to assess the construct reliability and validity (Afthanorhan et al., 2018). CBSEM is a well-known technique for their tendency to handle multiple items and constructs at the same times which also take into account various forms of measurement error, correlated measurement errors and construct reliability (Al-Mhasnah et al., 2018; McIntosh et al., 2014). Its strength could benefit to applied researchers that interest the complex modeling (Awang et al., 2015) such as mediation (Aimran et al., 2017a), moderation (Aimran et al. 2017b), latent class analysis (Afthanorhan et al., 2017) and higher order model (Aziz,

Afthanorhan, & Awang, 2016). Moreover, this technique could help the applied researchers determine the quality of measurement model by assessing their global fitness (example: CFI, IFI, TLI, NFI, and AGFI). To further discuss about this operationalization, the Importance-Performance Analysis (IPA) was performed. The IPA can help the applied researchers make a decision about the strength and weakness of library service quality for improvements.

4. Analysis and Results

Table 1 provides descriptive statistics including means and standard deviation for each item.

Table 1
Mean and Standard Deviation for each item

Construct	Mean	Standard Deviation
General Service		
I can access the UniSZA Library Portal from anywhere.	8.5765	1.0919
I can access Unisza Library Portal 24/7.	8.9765	1.1302
UniSZA Library provide up to date information.	5.7824	1.0232
Library Portal is user friendly.	6.0412	1.1582
Online Search System (WebOPAC) is accessible from outside.	5.4235	1.0755
Duration for self-check machine transaction is appropriate.	5.2588	1.1321
The allowable number of borrowed items is suiting my need.	5.0294	1.1379
Maximum allowable duration of borrowed item is suitable to my need.	4.8588	1.1003
Search for Material in Library		
I use Computer Assisted Searching System (OPAC) for my needed materials	8.5235	1.0835
OPAC give an accurate display of item location	3.2294	1.0263
OPAC displays an easy to understand the information	3.4588	1.0094
OPAC allows online reservation	4.4882	0.9560
OPAC displays direction that is easy to follow	5.7117	1.1117
Library Staff		
Provide an accurate answer to an enquiry	6.0412	1.0455
Proficient in information searching	6.1824	1.0915
User friendly	5.9824	1.1278
Assisting me in finding the needed information	5.6294	1.1085
Guiding me of how to search for the information	5.0294	1.1380
Always ready to help	5.8412	0.9568
Library Collection		
Books are arranged accordingly on the right shelf	5.9941	1.0291
Materials are easy to retrieve	5.4647	1.0329
Library collection is up to date	5.3588	1.0745
Library collection is adequate	5.0235	1.0767
Provided library academic materials meet my needs	4.8529	1.0751
Library provides leisure reading materials suitable to me.	6.6059	1.0949
Facilities		
Printing Service	5.4706	1.0330
Photocopy Service	5.0647	1.1622
Scanner Services	5.9529	1.0648
OPAC Terminal	6.0765	1.0769
Number of discussion room	5.5588	0.9908
Duration of discussion room usage	5.2882	1.1223
Computer lab facility	5.0706	1.1231
Library Environment		
Safe	7.2529	1.1150
Sufficient Signage	7.5588	1.1303
Suitable lightning for learning	4.6706	1.0422
Library opening hours are adequate	5.7882	1.0388
Comfortable reading area	5.9529	1.0136
Adequate seating	6.1353	1.1458
Clean toilet	5.9471	1.1055
Customer Satisfaction		
I am satisfied with the quality of service provided by the UniSZA Library	3.5235	1.0614
I am satisfied with the collection provided by UniSZA Library	3.2353	1.0337
I am satisfied with the facilities provided by UniSZA Library	4.5765	1.1081
I am satisfied with the environment provided by UniSZA Library	4.4647	1.0941
I will continue using the UniSZA Library	5.8353	0.9893
I will recommend my friends to make full use of the UniSZA Library	5.9941	1.1842
In general, I am satisfied with the UniSZA Library	6.2059	1.0314

The highest mean score for GS subscale is from item 2; item 1 from SML subscale, item 2 from LS subscale; item 7 from LC subscale; item 4 from Fac subscale; and item 2 from LE subscale. For the customer satisfaction construct, item 7 carry the highest mean score.

4.1 Confirmatory Factor Analysis Results

This study consists one research hypothesis related to the service quality and customer satisfaction. In this case, the service quality has six dimensions, specifically considered it as second order or higher order construct. Meanwhile, the customer satisfaction construct was considered as first order construct which would not rely any dimension for determining its behavior. In confirmatory factor analysis, we followed the procedures outlined by Anderson and Gerbing (1988) and Awang (2015). As such, the measurement fitness was determined by calculating the proportion of Chi-square values (Kline, 2015; Westland, 2015; Hair et al., 2012). Mcintosh et al. (2014) stated that the Chi-square can explain the difference predictor and observed value with the appropriate degree of freedom. However, the Chi-square statistic is sensitive to sample size or observations (Gerbing & Anderson, 1992; Hoyle, 1995) which means small sample may not relevant being tested in the research project. Because of this problem, a selection of fit indices was also reported for evaluation purposes using RMSEA (Steiger, 2007), CFI (Bentler, 1990) and IFI (Bollen, 1989). This model was tested on the whole sample (n = 170). The model was constructed based on research framework (see Fig. 1). Testing was accomplished through CBSEM via the use of AMOS (Arbuckle, 1995). The CBSEM has two parts: 1. Measurement model and 2. Structural Model which both models are compulsory for empirical analysis purposes. The measurement model would be conducted using the confirmatory factor analysis to determine the measurement fitness. The result for the measurement fitness and regression weight are reported in Table 2 and Table 3.

Table 2

Construct Reliability and Validity

Construct	Value
Chisquare/df	$1.297 < 3.0$
RMSEA	$0.042 < 0.08$
CFI	$0.958 > 0.95$
IFI	$0.958 > 0.90$
TLI	$0.955 > 0.90$
Service Quality (6 components)	
Construct Reliability	$0.980 > 0.70$
Average Variance Extracted	$0.890 > 0.50$
Parameter Estimates	$0.93 - 0.95$
General Service (GS; 8 items)	
Construct Reliability	$0.928 > 0.70$
Average Variance Extracted	$0.648 > 0.50$
Parameter Estimates	$0.78 - 0.88$
Library Staff (LS; 6 items)	
Construct Reliability	$0.900 > 0.70$
Average Variance Extracted	$0.601 > 0.50$
Parameter Estimates	$0.71 - 0.83$
Search for Materials in Library (SML; 5 items)	
Construct Reliability	$0.842 > 0.70$
Average Variance Extracted	$0.573 > 0.50$
Parameter Estimates	$0.66 - 0.83$
Library Collection (LIBC; 6 items)	
Construct Reliability	$0.896 > 0.70$
Average Variance Extracted	$0.633 > 0.50$
Parameter Estimates	$0.81 - 0.84$
Library Environment (LIBE; 7 items)	
Construct Reliability	$0.908 > 0.70$
Average Variance Extracted	$0.623 > 0.50$
Parameter Estimates	$0.75 - 0.86$
Facilities (Fac; 8 items)	
Construct Reliability	$0.922 > 0.70$
Average Variance Extracted	$0.629 > 0.50$
Parameter Estimates	$0.78 - 0.84$
Customer Satisfaction (7 items)	
Construct Reliability	$0.902 > 0.70$
Average Variance Extracted	$0.570 > 0.50$
Parameter Estimates	$0.70 - 0.82$
Discriminant Validity	
Correlation between Service Quality and Customer Satisfaction	0.51
Service Quality (square root average variance extracted)	$0.944 > 0.51$
Customer Satisfaction (square root average variance extracted)	$0.755 > 0.51$

Table 2 shows the results of the measurement model by inspecting their construct reliability and validity, average variance extracted, factor loading, construct correlation and discriminant validity. Given all those assessments, each model needs to be satisfied first to ensure the result obtained for hypothesis testing can be trusted (Hu & Bentler, 1999; Afthanorhan et al., 2014). The fitness indexes as CFI, IFI and TLI indicate that the model has adequate fit. However, the model consists several poor item loading with lower than the acceptable value (loading < 0.60; Kline, 2016). The poor loading could affect the construct reliability and eventually cannot proceed to structural model for hypothesis testing. Modification were made to the model to try and provide a more satisfactory loading by removal the poor loading or non-significant loadings. This included item 3 from the SML subscale, item 5 from the GS subscale, item 7 from the FAC subscale, item 4 from the LIBC subscale and item 5 from LIBE subscale. According to Hair et al. (2017) and Awang et al. (2015), the deletion items should not be higher than 20% of the total item to ensure that the improvement in fit were not due to the capitalization on chance (Haynes et al., 2000; Rönkkö, 2014). Based on this procedures, all of the item loadings are significant and all are above 0.60. Additionally, the convergent and discriminant validity are calculated manually. Both validities are satisfied as average variance extracted per construct was above 0.50 and the value of construct correlation was lower than square root of average variance extracted (Fornell & Larcker, 1981; Henseler et al., 2014). This validity could verify on how much distinct the role for each construct.

4.2 Structural Model

The previous section showed that the construct reliability and validity were acceptable, that is, the chosen core questions for each construct reflects a single underlying construct. Fig. 2 shows the estimated model for the UniSZA Library, which focuses on service quality and customer satisfaction. In evaluating the estimated model, it is normal in statistical method to assess the overall model fit, that is, how strength the correspondence construct in predicting the outcome research. An overall model fit measure is the coefficient of determination (R^2) or sometimes it is recognized as squared multiple correlation. R^2 measures the proportion of the total variation in the effect construct explained by the variation of the predictor construct. By evaluating the estimated model as shown in Fig. 2, we achieved a high level of explanatory power. According to Cohen (1992), the large effect of R^2 is indicated when above 0.26 or 26%. In this case, the model is able to explain 0.284 or 28.4% of what drives customer satisfaction. Meanwhile, 0.716 or 71.6% of variance could be explained by other predictor construct. For the other six subscales, the model also provides a very good explanation which are above 0.80 or 80%, and the findings indicate good support for the develop model. The relationships between construct are shown in Fig. 2.
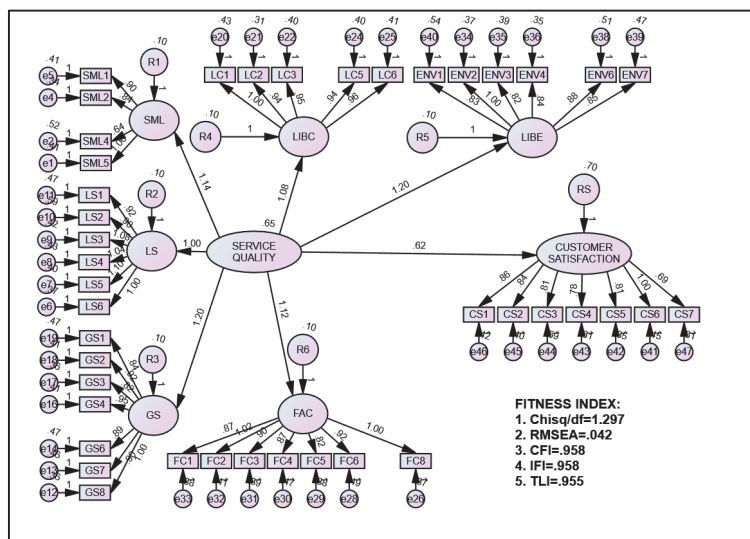

Fig. 2. Estimated Model

Table 3
Regression Weight

			Estimate	S.E.	P	Result
CUSTOMER SATISFACTION	←	SERVICE QUALITY	.619	.100	***	Significant

Based on the direct effect in Table 3, we find that the service quality had significant impact on customer satisfaction. Specifically, the probability of getting a critical ratio as large as 6.221 in absolute value is less than 0.001. In other words, the regression weight for service quality in the prediction of customer satisfaction is significantly different from zero at the 0.001 level (two-tailed). As is shown, the beta estimate between service quality and customer satisfaction is very high ($\beta = 0.619$) which is greater than 0.50 indicating that this predictor construct is very importance to increase the level of customer satisfaction. In order to elaborate further the potential of service quality construct, the IPA is performed. This technique is very useful in priority and strategy development for decision maker (Martensen & Gronholdt, 2003). The estimated direct effect (from Table 3) and performance indexes can be combined by categorizing each of the determinants into an importance-performance map as shown in Fig. 3.

4.3 Importance-Performance Analysis (IPA)

Fig. 3 shows the performance index for each construct that is estimated by a weighted average of scores from the corresponding item, rescaled from the original 10 point scale to a 0 to 100 point scale. The reason for this purposes is to sketch a clear picture about the performance index for each construct. The formula for performance index is given by: [(original value – minimum value) / (maximum value – minimum value)] × 100%. Meanwhile, the importance construct is determined by the estimated direct effect. The importance and performance index were placed at *y-axis* and *x-axis* that can be interpreted in managerial useful ways. Each subscale may be placed in one of the four cells in the map. The upper-right cell is where the importance is high and performance is strong. It presents the strength area and therefore the library should maintain the good work. The upper-left cell is where importance is high, but the performance is weak. Thus, it suggests that the library needs some improvements. The lower-right cell is where the performance is strong but the importance is low. This suggests that the library maintains the good work on the least importance issues. Lastly, the lower-left cell represents the importance is low and performance is weak. It means that this area should be ignored due to lack of importance and performance issue.
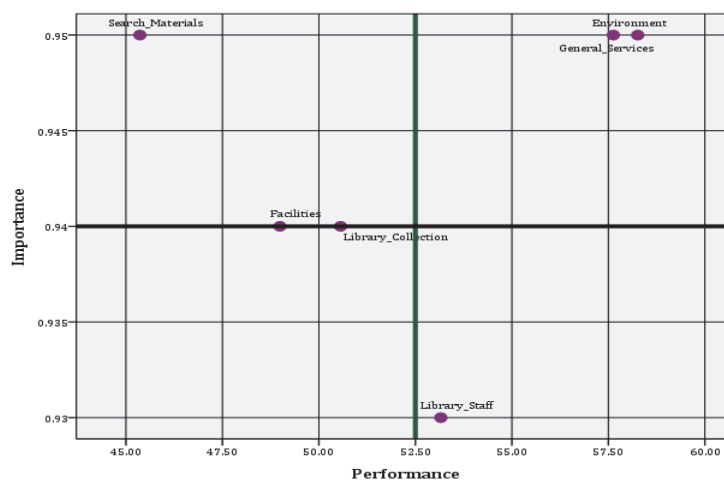

Fig. 3. Importance –Performance Map

LIBE and GS can be perceived as an area of strength for the UniSZA Library when it comes to create the quality of services. Customer generally believes that online systems, duration of borrowed item, ease

of use, safety, comfortable area, suitable lighting for learning are adequate informs for customers. This study found that the performance index for LIBE and GS have achieved more than 55%. The SML, Fac, and LIBC represent some threats to the service quality in UniSZA Library. The customer achieved great importance to this area, but reached low performance index. The library management should take affirmative action that can improve this area. Meanwhile, LS achieved high performance index but has low impact. Therefore, it is important that the library staff should keep an eye on this area to maintain it as an area of strength.

5. Conclusion and Discussion

The present study has examined UniSZA Library users via questionnaire survey, attempted to find out the customer importance on every service provided. The results showed a positive relationship between the service quality and the customer satisfaction. Thus, Hypothesis 1 was supported. Another research objective has found out that environment and general service were important and performance index. Meanwhile, the factor of search for material, facilities and collection were achieved high importance but low performance index indicating that the customer believe these factors were important but needed some improvement to enhance their performance. Other than that, the library staff were seemed achieved high performance but low importance. This is because the customers were more interested in getting the information by their own. Moreover, based on the suggestion from customers, they think UniSZA Library needs to improve the following issues such as providing more updated books and other publications, computer lab, printing and photocopy service. Based on these suggestions, the performance index for library collection, facilities and search materials can be increased.

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