

Service Quality of Self-Checkout Technology in Malaysian Hypermarket: A Case Study in Johor

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Abstract—The revolution of retailing has been transformed into a new era where technology and human meets. The modern retail environment offers a new kind of services to customer impressively. The purpose of this research is to examine service quality attributes on self-checkout technology and its influence on customer satisfaction and reuse intention. The survey items are adapted from previous literature, and a mall intercept survey via convenient sampling was employed. The findings from 176 data were analyzed using IBM-AMOS to test the hypotheses. Control has a positive significant result with service quality. Ease of use and enjoyment have a negative significant result with service quality while speed and reliability have an insignificant result. Service quality has a strong positive effect on customer satisfaction as well as customer satisfaction with reuse intention. Thus, retail developers could tackle the correct path to make more comprehensive strategies through retail technology innovation to meet customer demand.

Index Terms—Service Quality; Self-Service Technology; Retailing.

I. INTRODUCTION

The retail industry has been an intense transformation over the past decades. The retail industry revolution is bringing in the new area of connectivity between human and technology. With a growing implementation of self-service technologies within the service sectors, human-technology interaction is quickly becoming a topic of interest in delivering service [1]. Retailers to use technology to amplify and enhance the core human elements of retail [2]. One of the efficient technological advances that support daily business operations is a self-checkout machine. This technology is an effort to reduce traffic and drive time. There is nothing more frustrating than getting caught in a long line-up at the till. Ultimately, condensed self-checkout times provide better service to the customer.

Self-checkouts have already started to diffuse into the retail environment in those western countries while there is a small scale of self-checkout implementation pioneer in the Malaysia retail environment. Despite the surge in the number of domestic supermarkets, there is an explosion of international retailers enter Malaysia. Retailers could not afford by taking any risks in this competitive business environment, especially if they do not see any benefits being derived from self-checkout towards their operation and sales improvement. Since self-checkout is a relatively new technology in the way it is used in Malaysia, enormous costs will be incurred for machine installation and research and development tags. Customers and employees may meet a

complete overhaul of new technology with resistance until they are familiar with the technology.

Although self-checkout has been slow to catch on, it can allow rapid diffusion if customers become more accustomed to using the aid of technology when they shop. Therefore, it is vital for retailers to gauge customer comfort in term of service quality provided by self-service technology. There is little published data on the topics regarding self-checkout technology in Malaysia's supermarket. Thus, the purpose of this research is to examine the service quality model on self-checkout technology and its influence on customer satisfaction and reuse intention in Malaysia supermarket.

II. LITERATURE REVIEW

The present study is an attempt to test on Dabholkar's attribute based model [3] on technology-based self-service option. It is based on a cognitive approach to decision making. The attribute-based model is proposed based on what customers would expect when associated with self-service technology in order to form an expectation of service quality [3]. The scenario of this research is to test self-checkout technology in the supermarket which is similar to Dabholkar's research on the touch screen and verbal ordering in fast food restaurant.

Dabholkar (1996) has operationalized the service quality of technology-based self-service using five attributes namely speed of delivery, ease of use, reliability, enjoyment, and control [3]. Speed is defined to reduce delivery time [4]. In this research context, speed could be a determinant of service quality as customers are always frustrated by the cashier's waiting line. Time taken for unproductive waiting could contribute to the insufficient cashier or high traffic during peak time. Hence, it would be interesting to see if customers would evaluate the quality of service positively with the speedy checkout process. The second attribute is ease of use which has been described as the degree to which a person believes that using a particular mode would be free of effort [5] and reduce social risk [3]. Thus, customers save their effort in term of learning new features could mean that the technology is easy to use. Reliability refers to the accuracy of the service [6]. The lower the risk that the self-service technology to be not functioning well, the higher the reliability of the technology. Next, enjoyment is the amount of fun arises from interacting with a self-service option. Dabholkar [3] found that customers would use technology if it looked to be enjoyable. The last attribute controls. Bateson and Hui [7] define control in self-service context as the

amount of leverage that a customer feels he/she has over the process or outcome. It is expected that the higher the amount of control given by a self-service technology option, the higher the service quality posited.

Service quality is consistently viewed in the literature as a distinct relationship with customer satisfaction [8-9]. Churchill and Surprenant [10] found that if customers perceive superior service quality, they will feel satisfied. These empirical literatures demonstrate the causal relationship between these two constructs. Also, the relationship between customer satisfaction and behavioral intention has been addressed in several literatures [11-12]. Cronin and Taylor [13] also addressed the relationship between service quality, customer satisfaction with the formation of reuse intention. However, most of the literature that proposed the relationship between these three constructs, the nature of service quality are based on general services in that service environment instead of self-service technology option. The following hypotheses were formulated accordingly:

- H1: Speed has positive effect on service quality.
- H2: Ease of use has positive effect on service quality.
- H3: Reliability has positive effect on service quality.
- H4: Enjoyment has positive effect on service quality.
- H5: Control has positive effect on service quality.
- H6: Service quality has positive effect on customer satisfaction.
- H7: Customer satisfaction has positive effect reuse intention.

Figure 1 shows the research model based on the literature review.

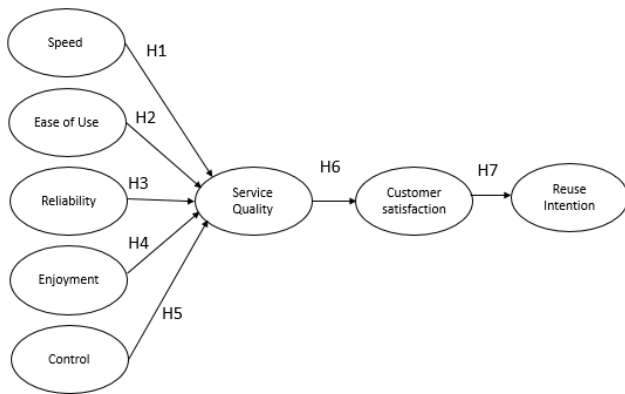


Figure 1: Research Model

III. METHODOLOGY

The target population of this study is in Tesco KSL City, Johor Bahru where the supermarket has newly implemented the self-checkout system. A survey method was used to gather the information that was required for this research. A seven-point Likert scale was used, ranging from 1 (strongly disagree) to 7 (strongly agree). Items in the questionnaires were adapted from previous literature [3, 9]

The data were obtained using a structured questionnaire. The minimum sample size was estimated using G power software based on the F test using effect size (0.15), alpha (0.05) and power (0.80). The G power estimated to obtain a minimum of 92 sample respondents. A minimum sample size of 200 is appropriate for conducting SEM [14]. Therefore, an

initial target sample offset at 250 respondents to avoid insufficient data after data treatment. Convenient sampling was used where consumers that have completed their shopping through the self-checkout lane were invited to participate in the survey. Each respondent used an average of five to eight minutes to complete the questionnaires. The data collection process consumed 3 weeks which from 4th week of March 2017 until the 2nd week of April 2017. A total of 250 questionnaires were distributed, 213 data were collected back. Although the survey was conducted with full assistance from the enumerators, the response rate was 85% due to some respondents lost their interest to continue answering the questions. After data screening process, a final of 176 data was used for final analysis. Since the final data do not fulfill the minimum requirement for conducting SEM, bootstrapping of 500 or 1,000 is needed before analysis [15]

The statistical analysis method used in this research were confirmatory factor analysis using IBM-AMOS version 23 software to assess convergent and discriminant validity and to achieve goodness of fit. Next, structural equation modelling was conducted using the same software to test the significant of each path in the measurement model to access the reliability of specific items of the measure.

IV. ANALYSIS AND DISCUSSION

The 176 data reported that most respondent's age was from 15-24 years old (54%) while the gender was dominated by a female (63%) and Chinese customers (77%). For education level, the high school has the highest percentage (72%) as the survey locations are located near to several secondary schools. Accordingly, 48% of the customer has the knowledge of self-checkout while 52% does not. Most customers visit the supermarket once a week (56%) with an average of less than 10 shopping items (85%) on groceries (82%). However, the frequency of self-checkout low. Customers will use self-checkout sometime (45%) when the cashier's line was too long for them to queue.

The process of the evaluation of the research model was started by checking the common method variance (20.01%) which is below 50% [16]. Although the data collection was conducted by using one mall intercept method, there is no bias in this research as the target respondents with self-checkout experience were qualified for the study. The analysis was proceeded by doing confirmatory factor analysis which is used to test indicators. 36 items with 8 constructs were drawn as a figure in IBM-AMOS version 23, and a bootstrap of 2000 sample was performed as the number of collected data were too small for structural model analysis. Hair et al. suggested that the measurement model with factor loading below 0.5 were dropped and modification indices more than 20 were inspected and removed until stable goodness of fit index achieved [17]. 36 items were reduced to 24 items to achieve the requirement of the goodness of fit index.

Next, confirmatory factor analysis is conducted to access convergent validity and discriminant validity. Convergent validity refers to the degree to which two measures of the construct is theoretically related. The convergent validity is confirmed when the AVE ranged from 0.547 to 0.781 (>0.5) as shown in Table 1 and CR range from 0.780 to 0.912 (>0.7) as shown in Table 2 [17]. The discriminant validity to test whether the measurements that are not supposed to be related are actually unrelated. This is confirmed when all the square

root of the average variance extracted is greater than the correlation of others constructs [18].

Table 1
Result of Factor Loading, Average Variance Extracted (AVE) and Composite Reliability (CR) in Measurement Model

Construct	Items	Factor Loading	AVE	CR
Speed	SPE1	0.873	0.696	0.872
	SPE2	0.775		
	SPE3	0.851		
Ease of Use	EOU1	0.606	0.547	0.780
	EOU2	0.730		
	EOU3	0.861		
Reliability	REL1	0.817	0.781	0.877
	REL2	0.946		
Enjoyment	ENJ1	0.736	0.710	0.878
	ENJ2	0.787		
	ENJ3	0.984		
Control	CTL3	0.969	0.729	0.841
	CTL4	0.721		
Service Quality	SQ1	0.758	0.606	0.859
	SQ2	0.675		
	SQ3	0.829		
	SQ4	0.841		
Customer Satisfaction	CS1	0.750	0.619	0.830
	CS2	0.819		
	CS3	0.790		
Reuse Intention	PI1	0.798	0.722	0.912
	PI2	0.816		
	PI3	0.928		
	PI4	0.850		

Notes: AVE= average variance extracted, CR=composite reliability

Table 2
Discriminant Validity

	CTL	SPE	ENJ	REL	EOU	SQ	CS	RI
CTL	0.854							
SPE	0.103	0.834						
ENJ	0.813	0.138	0.843					
REL	0.068	0.603	0.209	0.884				
EOU	0.006	0.592	0.171	0.625	0.740			
SQ	0.003	0.012	-0.325	-0.051	-0.228	0.778		
CS	0.118	0.142	0.052	0.011	-0.112	0.254	0.787	
RI	-0.281	0.207	-0.378	0.084	0.002	0.473	0.291	0.850

Notes: Diagonals represent the square root of the average variance extracted while the other entries represent the correlations

The test of the feasibility of structural equation modelling was tested in the same way as confirmatory factor analysis. The result of the structural model shows that the goodness of fit has demonstrated the cut-off value. It can be said that it has completed the requirements of full model testing. The result from the path coefficient and its significant (Table 3) depicts the acceptance or rejection of hypotheses. The hypotheses were supported with a significant level of 0.05.

Speed and reliability do not have a significant effect on service quality. H1 and H3 do not support. Ease of use and enjoyment have a negative significant effect on service quality. H2 and H4 supported. While H5, H6, and H7 are supported where control has a positive significant effect on service quality, service quality has a positive significant effect on reuse intention, and customer satisfaction has a positive significant effect on reuse intention.

The first stage of analysis has an attempt to determine which service quality attributes are important in evaluating a self-checkout service quality from customers; perception. The result validates the findings of previous research that control has a positive significant effect on service quality. Taking full control of the technology tend to increase the service quality of self-checkout. Majority of the respondents in this research are the age range from 15-24 (54%). These

Gen Y has delayed social development as many of their interactions are digital [19]. They do not like to interact with a human. Customers feel safe and have privacy especially during the payment process.

Table 3
Path Coefficient and its Significant.

Hypothesis	Estimate	Estimate	S.E	CR	P
H1	SPE→SQ	0.088	0.094	0.936	0.349
H2	EOU→SQ	-0.344	0.168	-1.988	0.047
H3	REL→SQ	0.168	0.100	1.686	0.092
H4	ENJ→SQ	-0.920	0.194	-4.753	0.00
H5	CTL→SQ	0.822	0.207	3.965	0.02
H6	SQ→CS	0.255	0.081	3.148	0.00
H7	CS→RI	0.417	0.115	3.619	0.00

However, the research conducted in the context of negative effect presented contradictory findings. Ease of use and enjoyment have a negative significant effect on service quality. This can be explained by some customers are still depend on human interaction. Even though the self-service technology has the high ease to use, they need an employee to assist in some part of the checkout process.

The next findings also contrast with previous findings. Speed and reliability were insignificant with self-checkout technology. This is probably due to the characteristic of the majority of respondents. Gen Y is impatience and enthusiastic about technology so they can master technology in short time frame easily.

The results also confirm the relationship between service quality, customer satisfaction, and reuse intention. Service quality has a positive relationship with customer satisfaction. Also, customer satisfaction has a positive relationship with reuse intention. This result is consistent with previous research [20-22], [1].

V. CONCLUSION

Retail technology has become a center of attention for the retailer in upgrading their service quality, especially in developing countries. The competition in this industry has direct impacts on economic and social welfare [23]. This study has attempted to determine the service quality attributes and its effect on customer satisfaction and reuse intention. The level of service quality is determined by the level of satisfaction of customers. There are some other factors influence the decision to reuse other than customers' perception of their satisfaction. Given that self-checkout technology could be an aid for increasing customer satisfaction at the checkout terminal, which the attributes of service quality of self-checkout will influence the reuse intention. This study, therefore, will help in understanding customers' behavior on the usage of new technology.

The important finding of self-checkout service quality is the control attributes. This allows retailers or service provider to shape their strategies in a more comprehensive way to serve the customer in this new era. Retailers should focus on improving the controllability of customers' shopping experience. This study has identified the latest customers' in store expectation which indirectly help retailers in providing better services. Also, this research can act as a guideline for developing countries like Malaysia to decide on the investing of new technology in the retail industry.

The insignificant and negative relationship of service quality attributes of self-checkout technology is a novel finding in this research. This provides opportunities for

researchers to explore this relationship in depth to reveal the reasons whether the different culture in developing countries, the different nature of customers' behaviour. Ultimately, the effect of self-checkout service quality on customer satisfaction is significant and can bring a positive effect on customers' reuse intention of self-checkout when customers have the control during the whole process of the shopping. Thus, investing in the installation if self-checkout is going to be profitable for the firm as customers intend to use them voluntarily. This study is contributing to the field of service quality in retailing. Retailers can enhance the service quality provided by retail technology, ultimately the goal of the organization will be achieved by satisfying the customer for long term duration. The result of this study could use as references in the decision-making procedures for top management of the firm [24].

The data was collected from one location only, and the results could not apply to the whole population in Malaysia. To date, Malaysia has only installed self-checkout in two of the hypermarket in west Malaysia while this research has focused on the case in one location of Malaysia which is in Johor Bahru, extended research should apply in Putrajaya. This is to investigate customer behavior in more depth in Malaysia to better understanding customers' perception of new technology. This research also provides a new research direction for the researcher to explore and analyze the effect of new technology implementation in developing countries.

ACKNOWLEDGMENT

The authors are grateful to Centre of Research and Innovation Management (CRIM) and Universiti Teknikal Malaysia Melaka (UTeM) for the financial and technical support for this study.

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