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Impacts of service quality on customer satisfaction: Study of Online banking and ATM services in Malaysia

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***Abstract*—This study tries to identify the effects of services offered by Malaysian banks through online media and ATMs on customer satisfaction. 500 students from different universities in Malaysia including University of Malaya, University Kebangsan Malaysia, University Putra Malaysia, Multimedia University Malaysia and Limkokwing University chosen as a sample frame of the study.**

Questionnaires are distributed among them and they are asked to respond to questions which ask about their perception as well as experience for their banks.

Two analyses are employed to fully reflect the effect of online and ATM services on their satisfaction level. The first one was service quality model which compares the difference between satisfaction and expectation level in order to find out which dimensions need to be improved.

Second analysis was Two-Way ANOVA analysis which tried to identify the relationship between demographic factors and the study's outcome. Finally, the study determined which factors have the most effect and which factors have the least effect on customer satisfaction level.

***Index Terms*—ATM, Customer satisfaction, Online banking, Service quality.**

I. Introduction

This study will provide the background of the research area. It contains general concept of the Internet banking, automated teller machine (ATM), evolution of Internet banking in Malaysia, customer satisfaction and service quality.

II. Evolution of E-banking In Malaysia

The Internet is a new way to deliver banking services. At first, online banking services demanded some facilities such as computer and software to offer their services. It was introduced in 1980s. Development in information technology and telecommunication have resulted a revolution in Malaysian banking industry. This revolution in the Malaysian banking sector started since 1970s. One of the most important changes that took place in Malaysia was the introduction of Automated Teller Machines, ATM, in 1981. After presence of ATM, Tele-banking and PC- banking were introduced in 1990s. The next step of this revolutionary process was the internet banking. On June 1st, 2000, Malaysian Central bank or Bank Negara Malaysia (BNM) allowed all domestic banks to offer a full range of products and services over the internet to their customers. Finally, on June 15, 2000, Malayan banking Berhad (Maybank), the largest domestic bank in terms of asset has become the first bank to offer internet banking service in Malaysia through its own portal, www.maybank2u.com. This service offered many financial services to customers. Customers were able to pay their bills, check their balance and transfer money to other accounts. It provided daily customer support service via email as well as telephone line from 6 A.M to 12 midnight. Another domestic bank is the Hong Leong bank that introduced internet banking in December 2000 and it provides not only all previously Phone banking services but also offers the option of accessing to all history transaction on its websites, www.hlbb.hongleong.com.my. They also provide customer service via email and telephone line that is available daily from 7am to 11 pm. Third bank that offered internet banking in Malaysia was Southern Bank. (Southern bank later acquired by Bumiputra Commerce Bank. Then, these two banks along with CIMB Investment Bank created a universal bank which is currently called CIMB Bank). Alliance bank is another bank which offered internet banking toward the end of 2001 via www.alliancebank.com.my. A recent inspection about the Malaysian bank's websites indicates that all domestic banks which were called anchor banks have a website and offer online banking services. Others banks are Am bank, AFFIN, Public, EON and RHB Bank Berhad in Malaysia.

III. ATM And Evolution in Malaysia

ATM is the abbreviation of automated teller machine which acts as a teller in a bank who takes and gives money over the counter and it was the first well known machines to provide electronic access to customers. With the appearance of automated teller machine, banks are able to serve customers outside the banking hall because ATMs are placed inside or near the banks and also outside the banks such as shopping malls, restaurant, airports or any places that people may gather. ATM is designed to manage the most important function of bank. ATM services includes some function such as cash withdrawal, balance enquiry, bill payment, cash and cheque deposit, saving and credit account. With appearance of ATMs, some limitation of time and geographic location has been resolved. ATMs undoubtedly are one of the most popular delivery ways for banking services in Malaysia. [1].

IV. Customer Satisfaction And Service Quality

Customer satisfaction is a crucial topic to success in any business either traditional or online [4]. Customer satisfaction is more critical in internet companies because

customers demand a high quality products or services and if they are unsatisfied, it is easy for them to move away to another site and leave those companies forever. Thus, the internet companies need to know the customer's requirements for satisfactory level. Some parameters of customer's satisfaction include numbers of clicks needed to find what they want, amount of information they need, response time and speed of webpage.

Service quality has found as one of the significant factors in distinguishing services and products. Service quality is an important tool to measure customer satisfaction [7]. There is a close relationship between service quality and customer satisfaction. Customer satisfaction can be protected by providing products or services with high quality [2]. One of the famous tools to assess customer satisfaction is SERVQUAL model by [11] but this model cannot be used in internet banking because it has different service delivery process. E-SERVQUAL model is developed by [11] to cover all customers' communication on websites.

V. Literature Review

E-service quality can be explained as an overall customer evaluation about e-service delivery in the marketplace which is virtual [8]. One of the main reasons for the improvement of e-services quality is that customers have the opportunity to access the company's website from different places around the world and will be able to compare the company's service with others company's offering. So, online customers' expectation is higher than traditional customers [8]. On the other hand, companies have the opportunity to attract and develop the relationship with customers from anywhere. Delivering high e-service quality is important but there is some problem in how it can be defined and how it can be measured. There are different methods to study about electronic services. Each of these methods employs different dimensions to conduct the research. For instance, one the methods use 5 dimensions for its study. The explanation of five dimensions of service quality changes when customers deal with technology instead of service personnel [6]. Traditional SERVQUAL model evaluate and measure the performance of firms and businesses that did not use online facilities to run their business but E-SQ is an instrument similar to the SERVQUAL model that developed for measuring the quality of online services. E-SQ introduced to cover all aspects when customers confront with a Website: The extent to which a Website facilitates shopping, purchasing and delivery. There are a lot of studies on measuring the e-service quality. For instance, reference [5] develops nine dimensions of e-service quality and this scale was called WEBQUAL with these dimensions: Information, interactivity, trust, response time, website design, intuitiveness, flaw, innovativeness. References [3], [9], [10] identify difference between dimension of online service satisfaction and dissatisfaction. Dimensions are Quick response to enquiries, comfortable navigation and trustworthiness. References [6],[11] conducted a research on e-service quality based on earlier research on traditional service quality and developed an E-S-QUAL scale based on 7 dimensions. They later extended their research and created another model with 11 dimensions that are: Trustworthiness, quick response, accessibility, flexibility, comfortable navigation, efficiency, assurance, security, site design, price information and customization. This model resembles a lot to SERVQUAL instrument, but it has new dimensions that related to online services. In this model, reliability, responsiveness, assurance, access, assurance and customization are also the quality dimensions of the traditional SERVQUAL model but there are some new dimension that related to technology such as comfortable navigation, efficiency and design of the web pages.

VI. Research Questions

1. How does reliability of online banking and ATM services affect the level of customer satisfaction in Malaysia
2. What is the relationship between customer satisfaction and security level of online banking and ATM services in Malaysia?
3. How do convenience and ease of use from online banking services and ATMs affect the level of customer satisfaction
4. What is the relationship between costs of online and ATM transaction with the level of customer satisfaction?
5. What are the overall strength and weakness dimensions of online and ATM services in Malaysia?

VII. Research Objectives

Based on questionnaire that will be distributed among 500 respondents, this study will be fulfilled the following objectives:

1. To find the strength and weakness dimensions of Online Banking and ATM services in Malaysia.
2. To study the most important dimensions of quality services offered by Online Banking systems and ATMs that affects the satisfaction level of customers in Malaysia.

VIII. Determining Service Quality Perception And Experience

In this research, perceived service quality model, which is the difference between customer's expectation and satisfaction, is used as a research strategy. Respondents should complete two different types of questions. One category asks questions based on their perception or expectation of a service delivered to them and another category asks them some questions bases on their satisfaction or experience. So SQ introduces service quality whereas P and E introduce perception and expectation respectively.

Service quality = perceived – experience

SQ: Service Quality, P: Customers' Perception, E: Customers' Expectation. So, (P – E = SQ), is a scale to examine the expectation or perception of a customer about the quality of specific product or service (SQ).

1. Negative Q indicates that there is a gap in service quality.
2. Positive Q indicates that the satisfaction level of consumers is higher than their expectation.

IX. Two –way ANOVA Analysis

Second strategy which used in this strategy is Two-Way ANOVA analysis in order to find out the connection between some independent variables and dependent variables of the study. Independent variables which are chosen include:**IV1: Age, IV2: Gender, IV3: Race, IV4: Marital status and IV5: Education level.**

Study divides the outcome or dependent variables into two categories of satisfaction and expectation. For instance, ANOVA analysis will find the relationship between race (independent variable) and reliability of bank (dependent variable or outcome) from two aspects of satisfaction and expectation. Dependent variables include E-SERVQUAL dimensions as well as SERVQUAL dimensions. ANOVA analysis tries to find out whether each of independent variables like age and race has significant impact on outcomes such as reliability, access, trust, privacy and so on. Furthermore, it will identify which of the components of independent variable has the most and the least impact on output. For instance, it identifies that among races, Malaysian has the most and Indian has the least satisfaction level on the privacy of online transactions.

X. Sample Frame And Data Collection

In this research, a sample size of 500 students from different Malaysian universities including MMU, UPM, UM… was taken. (All students have bank account.)
Primary data are used as a collection method. It includes data through a questionnaire with customers of online banking and ATM services in Malaysia. This study attempts to collect data randomly. Therefore, the questionnaires distributed among students with different level of educations. The special target for collecting data is students in different universities in Malaysia.

XI. Discussion And Conclusion

After summarizing all demographic, perception and expectation information, gaps of online banking and ATM services in Malaysia are found. 3 out of 11 dimensions of E-SERVQUAL model are found unable to respond customers' need. These dimensions are responsiveness, customization, and flexibility for E-SERVQUAL model which was applied for online banking system in Malaysia. Therefore, Malaysian anchor banks are required to improve their services related to these dimensions in order to fulfill the customers need. On the other hand, tangible and responsiveness dimensions out of 5 dimensions of SERVQUAL model are found unable to fulfill the respondents demand as well. So, ATM services related to these dimensions need for further enhancement to satisfy customers.

XII. Summary of Servqual Model Results

A sample size of 500 students in Malaysian university was targeted that results a respond rate of 97%. In other words, 486 questionnaires were returned. One of the sections of the questionnaire related to the demographic information of the respondents. It includes age, gender, race, education level, and marital status as well as online banking and ATM user background. 87 percent of the respondents are among the age group of 18 to 29 years followed by 9.9 percent for the age group of 30 to 39 years. 3.1 percent of the respondents are between 40 to 60 years old. Gender of the respondents is approximately same. 49.4 percent of the respondents are male whereas 50.6 of them are female. Race was another factor that was surveyed in questionnaires. 29.6 percent of the respondents are Chinese followed by 22.8 percent of Malaysian, 19.3 percent of Iranian and 9.3 percent of Indians. The largest proportion of the respondents is from races other than these three nations. Education level was another section of the questionnaires. 45.1 percent of the respondents are studying for degree whereas 25.3 percent of them are studying for Master's degree followed by 15.4 and 14.3 percent of the respondents who are studying for Diploma and PHD degree consecutively. 88.3 percent of the respondents are single whereas 11.7 of them are married. Respondent background is another section of demographic part where some information such as frequency of internet banking and ATM usage as well as duration of internet banking usage collected. 33.3 percent of the respondents claimed that they use online banking facilities monthly whereas 29 percent of them use online banking less often. 27.8 percent of the respondents use online banking weekly followed by 9.9 percent of the respondent with daily frequency of online banking usage. Respondents' usage is mostly for paying bills, checking balance and transferring money. Frequency of ATM service usage was another section in demographic part. 55.6 percent of the respondents claimed that they use ATM services on a weekly basis for withdrawal and cash deposit whereas 19.8 percent of them use it monthly. 14.8 percent of the respondents use ATM services less often whereas 9.9 percent of them use it daily. Duration of online banking and ATM services was the last section of demographic part. 52.5 percent of the respondents claimed that they use online banking facilities less than a year whereas 24.7 percent of them use online banking services between 1 to 2 years. 13 percent of the respondents use online banking services between 2 to 3 years followed by 9.9 percent of the respondents who use online banking services between 3 to 5 years. For duration of ATM services, 22.8 percent of the respondents claimed that they use ATM services less than a year while 21.6 percent of them use ATM services between 1 to 2 years followed by 21 percent of the respondents with 2 to 3 years of using ATM services. The amount of respondents who use the service between 3 to 5 years and more than 5 years were the same which was 17.3.

The structure of questionnaires for online banking services was based on E-SERVQUAL model with 11 dimensions in order to discover any gap in online banking services in Malaysia. These dimensions consist of ease of navigation, trust or assurance, privacy, responsiveness, reliability, customization, aesthetic design, efficiency, access, flexibility, and price knowledge. For first dimension which was ease of navigation, three questions were asked and the overall difference of this dimension results a positive mean which is 0.8048. The customer satisfaction mean was 2.8007 and their expectation mean was 1.9959.

Second dimension for measuring the impacts of service quality on customer satisfaction for online banking services was trust or assurance. This dimension also indicates a positive difference of 0.7161. The customer satisfaction mean was 2.81485 while their expectation mean was

2.09875. Privacy was third dimension which asked from respondents. Customer satisfaction in this dimension exceeds their expectation indicating a positive difference. The customer satisfaction mean was 3.13 but their expectation was 2.3333. The fourth dimension among 11 dimensions that results a negative overall result was responsiveness. It indicates that customer expectation from this aspect exceeds their perception. In other words, their expectations were not fulfilled well. The overall difference was -0.7037 and their satisfaction and expectation means were 2.4012 and 3.1049 respectively. Fifth dimension in the questionnaires was reliability. Respondents answered to this dimension well implying that the overall difference mean for this dimension was 0.8138. Customer perception from this dimension was higher than what they expect. Customer satisfaction and expectation means were 3.0607 and 2.2469 respectively. Another dimension in E-SERVQUAL model for online banking services that results a negative result was customization. The overall difference mean was -0.5432 and customer satisfaction and expectation mean were 2.3889 and 2.9321 respectively. Aesthetic design was another dimension of the questionnaires. This dimension also fulfills the demand of respondents in term of delivering services. The customer satisfaction mean for this dimension was 2.9434 whereas their expectation was 2.3806. The overall difference was 0.5628. Eighth dimension of E-SERVQUAL model measures the efficiency of online banking systems in terms of delivering services. This dimension fulfills the respondents demand as the overall difference mean was positive. The customer satisfaction mean was 2.9166 whereas the respondent expectation mean for this service was 2.2129. The overall difference was 0.7037. Access was the ninth dimension of E-SERVQUAL model. The overall difference for this dimension was 0.4527 indicating that respondent's expectations are completely fulfilled. The customer satisfaction mean was 2.7058 whereas their expectation was 2.2531. Flexibility was another dimension which did not satisfy the respondents. The overall mean difference was -0.6893 indicating that the respondents expectation was higher than perception. The respondent's satisfaction and expectation were 2.1543 and 2.8436 respectively. The last dimension of E-SERVQUAL model also results a negative difference implying that respondents are not satisfied in this area. Customer's satisfaction and expectation means were 2.2469 and 3.1132 respectively. The overall mean difference was -0.8663. After measuring the impact of service quality on customer satisfaction in online banking area, the study focused on ATM services in Malaysia. For this area, the study used SERVQUAL model to exploit the impact of service quality on customer satisfaction. This model consists of 5 dimension including reliability, assurance, tangible, empathy, and responsiveness. Reliability was the first dimension which was asked in questionnaires. The results indicated that respondents were satisfied in term of reliability of ATM services. Respondent's satisfaction and expectation means were 2.7462 and 2.12 respectively. The overall mean difference was 0.6262. Second SERVQUAL dimension the study used was assurance. This dimension also satisfied the ATM user's demand. The respondent's satisfaction and expectation means were 2.8237 and 2.1811 respectively indicating a positive mean difference of 0.6426.

First dimension among 5 SERVQUAL dimensions which was not able to satisfy the respondent's demand was tangible. The mean difference of this tangible that extracted from questionnaires was negative. The overall mean difference was -0.4039 and the respondent's satisfaction and expectation means were 2.3127 and 2.7166 respectively.

Empathy was another dimension in questionnaires which fulfills the respondent's perception. The overall mean difference was 0.6368 whereas respondent's satisfaction and expectation means were 2.9228 and 2.286 respectively.

Responsiveness was the second dimension among 5 SERVQUAL dimensions which was not able to satisfy the respondent's demand. The overall mean difference was -0.7223 which was negative. It implies that the respondent's expectation exceeds their perception. The respondent's satisfaction and expectation means were 2.2345 and 2.9578 respectively.

XIII. Summary of Two Way Anova Analysis Results

Ease of Navigation: Results of Two-Way ANOVA analysis on satisfaction level indicates that among independent variables, race and marital status have Sigma value less than 0.05 implying these independent variables have significant impact on satisfaction level of online users related to the ease of navigation. Education level, age and gender don't have significant impact on satisfaction level. Therefore, the lower the mean of a component of independent variable, the higher the satisfaction level for that component. For instance, mean equals to 2.5 shows the higher satisfaction level than mean equals to 4.5. Estimated marginal mean for race table shows the lowest mean for Malaysian which is 2.321 and the highest mean for Indian which is 2.760. It implies that Malaysian are more satisfied with the easiness of navigation in banks' website whereas Indian have the lowest satisfaction level related to the easiness of navigation in banks' website. Estimated marginal mean for marital status shows the mean of 2.709 for single group and 2.438 for married group. It indicates that married online customers are more satisfied than single online customers regarding to the easiness of navigation in banks' website. On the other hand, results of Two-Way ANOVA analysis on expectation level indicates that among independent variables, age and marital status have Sigma value less than 0.05 that imply these independent variables have significant impact on expectation level of online users related to the ease of navigation. Race, gender and education don't have significant impact on expectation level. In estimated marginal mean table for age shows the lowest mean of 1.915 for the age group of 18-29 and the highest mean of 2.311 for the age group 40-60. It means that the age group of 18-29 has more expectation from ease of navigation in bank's website but the age group of 40-60 has the lowest expectation level to the ease of navigation in bank's website. Estimated marginal mean for marital status shows the mean of 2.035 for single group and 1.941 for married group. It means married group have more expectation than single group in ease of navigation in bank's website.

Trust/Assurance: Result of Two-Way ANOVA analysis on satisfaction level indicates that all of the independent variables have Sigma value more than 0.05 it means there is no relationship between independent variables and outcomes. The same as the result of Two-Way ANOVA on satisfaction, the result of Two-Way ANOVA on expectations shows that

there isn't any relationship between independent variables and outcomes.

Privacy: After the analysis, we found out gender and age, independent variables have Sigma value less than 0.05. It means that these independent variables have significant impact on satisfaction of online users in relation to privacy of bank's website. Race, marital status and education level don't have significant impact on satisfaction. Estimated marginal means table for gender shows females have mean of 2.915 and males have means of 3.07. It means that females user are more satisfied than males users in privacy of bank's website. Estimated marginal means table for age shows the lowest mean 2.807 for the age group of 18-29 and the highest mean 3.447 for age group 30-39. So, the online users of age group 18-29 are more satisfied with privacy of bank's website than the online users of age group 30-39. On the other hand, the result of Two-Way ANOVA on expectation of online users release that education level is the independent variable with Sigma value less than 0.05. Therefore, education level of online users has significant impact on expectation level of the privacy of bank's website. Other independent variables don't have significant impact on expectation level. Estimated marginal means table for education level shows online users with degree levels have the lowest mean of 1.990 and online users with PhD level have the highest mean of 2.644. These findings indicate that online users with degree level have more expectations on the privacy of bank's website but online users with PhD have the lowest expectation on the privacy of bank's website.

Responsiveness: Based on Two-Way ANOVA analysis, age and race are independent variables with Sigma value less than 0.05. So, age and race of online users have significant impact on satisfaction level of bank's website. In estimated marginal means table for age of online users, we can see the lowest mean 2.127 for age group of 30-39 and the highest mean 2.90 for age group 40-60. So, the age groups of 30-39 are more satisfied with responsiveness of bank's website whereas the age groups of 40-60 have the lowest satisfaction on responsiveness of bank's website. Estimated marginal means table for race of online user shows the lowest mean for Malaysian which is 1.827 and the highest mean for others races which is 2.554. It implies that Malaysian users are more satisfied on responsiveness of bank's website whereas others race have the lowest satisfaction on responsiveness of bank's website. Results of Two-Way ANOVA analysis on expectations of online users shows that race of online users have significant impact on satisfaction level of online users in relation to responsiveness of bank's website because the Sigma values for race are less than 0.05. According to estimated marginal means table, the lowest mean for Indian which is 2.469 and the highest mean for Chinese which is 2.933. It implies that Indian have more expectations on responsiveness of bank's website whereas Chinese have the lowest expectation.

Reliability: Results of Two-Way ANOVA analysis on satisfaction level of online users related to reliability of bank's website shows that there isn't any independent variable with Sigma value less than 0.05. It implies that there isn't any relationship between independent variables and outcomes. However, the results of Two-Way ANOVA analysis on expectation shows age, race, marital status and education level are independent variables with Sigma value less than 0.05. Thus, these independent variables have significant impact on expectation level on reliability of bank's website. Gender is the only independent variable with Sigma value more than 0.05 and it doesn't have significant impact on expectation level of reliability of website. Estimated marginal means table for age shows the lowest mean which equals to 2.125 for the age group of 18-29 and the highest mean which equals to 2.867 for the age group of 40-60. So, online users of age group 18-29 have more expectation than online user age group of 40-60 on reliability of website. Race estimated marginal means table shows the lowest mean for Malaysian which is 1.764 and the highest mean for Indian which is 2.439. Therefore, Malaysian users have more expectation on reliability of bank's website whereas Indian users have the least expectation on reliability of website. In estimated marginal means for marital status, married users have lower mean 2.167 than single users with the mean 2.230. It implies that married users have more expectation on reliability of website than single users. According to estimate marginal means table for education level, online users with degree level have the lowest mean and PhD level users have the highest mean. Degree level online users have more expectation on reliability of website but PhD level users have the lowest expectation on reliability of bank's website.

Customization: Results of Two-Way ANOVA analysis on satisfaction of online users on customization of bank's website indicate that gender and race are independent variables with Sigma value less than 0.05. Therefore these variables have significant impact on satisfaction of customization website. Estimated marginal means table for gender shows female users have lower mean which is 2.146 than male users mean which is 2.430. It means female users are more satisfied with customization of bank's website than male users. In estimated marginal means table for race, Malaysian users have the lowest mean which equals to 1.582 and Indian users have the highest mean which equals to 2.594. These findings indicate that Malaysian users are more satisfied with customization of website whereas Indian users have the lowest satisfaction on customization of bank's website. Although, the results of Two-Way ANOVA analysis on expectation level of customization of bank's website indicate that all independent variables gender, age, race, marital status and education level have Sigma value less than 0.05. Thus, all of the independent variables have significant impact on expectation level of website's customization. Estimated marginal means table for gender shows the lowest mean for female users which equals to 2.553 and the highest mean for male users which equals to 2.793. So, female users have more expectation on customization of bank's website while male users have the lowest expectation. The estimated marginal means table of age on expectation indicates the age groups of 18-29 have the lowest mean equals to 2.663 and the age groups of 40-60 have the highest mean equals to 2.733. It states the age groups of 18-29 have more expectation of customization of website whereas the age groups of 40-60 have the lowest expectation on customization. According to estimated marginal means table for race on expectation Indian users have the lowest mean and Chinese users have the highest mean, thus, Indian users have the most expectation on customization of website but Chinese users have the least expectation on customization. From estimated marginal means table for marital status, indicate that married users have lower mean than single users. The mean of married users is 2.480 and the mean of single users is 2.787. Married

users have more expectation on customization of bank's website than single users. Finally, estimated marginal means table for education level of online users on expectation of customization of bank indicate that PhD users have the lowest mean that is equal to 2.554 and diploma users have the highest mean that is equal to 2.893. So, PhD users have more expectation on customization of website whereas diploma users have the lowest expectation on customization of website.

Aesthetic Design: Results of Two-Way ANOVA analysis on satisfaction of aesthetic design shows that age, marital status and education level are among the independent variables with Sigma value less than 0.05. It indicates that age, marital status and education level have significant impact on satisfaction of online users related to aesthetic design of bank's website.

Estimated marginal means table for age indicates that online users with the age of 18-29 have the lowest mean which is equal to 2.678 and online users with the age of 40-60 have the highest mean which is equal to 3.247. So, the age groups 18-29 of online users are more satisfied with the aesthetic design of bank's website but the age groups 40-60 of online users have the lowest satisfaction on aesthetic design of website. In estimated marginal means table for satisfaction level of marital status, single users have lower mean than married users. Therefore single users have more satisfaction on aesthetic design of website than married users. Estimated marginal means table for satisfaction on education level of online users shows users who have diploma level have the lowest mean and users with PhD level have the highest mean on aesthetic design of website. So users with diploma degree are more satisfied from design of website while users with PhD level have the lowest satisfaction on aesthetic design. On the other hand, the results of Two-Way ANOVA analysis on expectation level of online users related to aesthetic design of bank's website indicate that age and race are among independent variables which have significant impact on expectation level since their Sigma values are less than 0.05. From estimated marginal mean table for age of online users, indicates that age group of 18-29 have the lowest mean which is equal to 2.202 and the age group of 40-60 have the highest mean which is equal to 3.067. Therefore, online users with the age of 18-29 have more expectation from aesthetic design of website but online users with the age of 40-60 have the lowest expectation from design of website. Estimated marginal means table for race shows the lowest mean which is equal to 1.951 for Malaysian users and the highest mean which is equal to 2.474 for others races. Thus, Malaysian users have more expectation from aesthetic design of website whereas others races have lowest expectation.

Efficiency: Results of Two-Way ANOVA analysis on satisfaction level of efficiency of bank's website indicate that age and education level have Sigma value less than 0.05, therefore, these independent variables have significant impact on satisfaction level of efficiency of website.

According to estimated marginal means table for age of users, the mean of age group of 30-39 is the lowest mean and the mean of age group 18-29 is the highest mean. So, online users with the age of 30-39 are more satisfied with the efficiency of bank's website whereas online users with the age of 18-29 have the least satisfaction from efficiency of website. Estimated marginal means table for education level of online users on satisfaction level indicate that user with diploma level have the lowest mean which equals to 2.548 and users with master level have the highest mean which equals to 2.837. Thus, users with diploma level are more satisfied with the efficiency of bank whereas users with master level have the lowest satisfaction. The results of Two-Way ANOVA analysis on expectation level of efficiency indicate that race and marital status are independent variables with Sigma value less than 0.05. It means that race and marital status have significant impact on expectation level on efficiency of website. In estimated marginal means table for race, Malaysian users have the lowest mean which is equal to 1.805 and Iranian users have the highest mean which is equal to 2.403. Therefore, Malaysian users have more expectation from efficiency of bank's website while Iranian users have the lowest expectation from efficiency. At last, estimated marginal means table for marital status shows the mean of single users are less than the mean of married users. So, single users have more expectation on efficiency of website than expectation level of married users.

Access: After analysis on satisfaction level of online users on accessibility of bank's website, we found out some independent variables such as age, race and marital status have Sigma value less than 0.05, thus these variables have significant impact on satisfaction level of accessibility of website. Estimated marginal means table for age shows the lowest mean for age group 40-60 and the highest mean for age group 30-39. It means users in age group 40-60 have the most satisfaction level on accessibility of website whereas users in age group 30-39 have the least satisfaction level on accessibility of bank's website. In estimated marginal means table for race, we can see the lowest mean for Malaysian users and the highest mean for others races. Mean of Malaysian users equal to 2.230 and the mean of others users equal to 2.661. So, Malaysian users are more satisfied from accessibility of website and others races have the lowest satisfaction from accessibility of website. Estimated marginal means table for marital status, indicates the lower mean for married users than single users. It means married users are more satisfied from accessibility of bank's website than single users. On the other hand, the result of Two-Way ANOVA analysis on expectation level of online users on accessibility of bank's website shows the only independent variable which has significant impact on expectation level is the race of users. Estimated marginal means table for race of online users on expectation level indicate that Malaysian users have the lowest mean and Iranian users have the highest mean. Therefore, Malaysian users have the most expectation on accessibility of website while Iranian users have the least expectation on expectation level of accessibility of website.

Flexibility: The result of Two-Way ANOVA analysis on satisfaction and also on expectation shows there isn't any independent variables with Sigma value less than 0.05. So, there isn't any relationship between independent variables and outcomes on satisfaction and expectation of online users related to the flexibility of bank's website.

Price Knowledge: The results of Two-Way ANOVA analysis on satisfaction level of online users on price knowledge of bank's website indicate that age and race are independent value with Sigma value less than 0.05. Age and race have significant impact on satisfaction level of online users related to price knowledge. Estimated marginal means table for age shows the lowest mean which is 2.010 for the

age group 30-39 and the highest mean which is 2.367 for the age group 40-60. Therefore, online users with the age of 30-39 are more satisfied from price knowledge of bank's website while online users with the age of 40-60 have the lowest satisfaction. In estimated marginal means table for race, Malaysian users have the lowest mean and Iranian users have the highest mean on satisfaction level of price knowledge. Thus, Malaysian users have the most satisfaction on price knowledge of website and Iranian users have the least satisfaction. On the other hand, the result of Two-Way ANOVA analysis on expectation level of online users related to the price knowledge of bank's website shows that race, marital status and education level are independent variables which have significant impact on expectation level. Since these variables have Sigma value less than 0.05. Estimated marginal means table for race indicate that Indian users have the lowest mean and Iranian users have the highest mean on expectation level. So, Indian users have the most expectation from price knowledge of website whereas Iranian users have the lowest expectation from bank's website. In estimated marginal means table for marital status, single users have lower mean than married users. It means that single users have more expectation from price knowledge of website than married users. Finally, estimated marginal means table for education level of expectation of online users indicate that user with diploma level have the lowest mean and users with master have the highest mean. Therefore, users with diploma have the most expectation and users with master have the lowest expectation from price knowledge of bank's website.

ATM Reliability: Results of Two-Way ANOVA analysis on satisfaction level indicate that race is the independent variable with Sigma value less than 0.05. It means race has significant impact on satisfaction level of ATM users related to reliability of transaction. Estimated marginal means table for race shows that Malaysian users have the lowest mean and others races have the highest mean. So, Malaysian users are more satisfied on reliability of ATM transaction whereas others races have the lowest satisfaction on reliability of ATM transaction. On the other hand, the result of Two-Way ANOVA analysis on expectation level of ATM users indicate that among independent variables gender, age and race have significant impact on expectation level on reliability of transaction. In estimated marginal means table for gender, female ATM users have the lowest mean and male ATM users have the highest mean, so female users have more expectation on reliability of ATM transaction than male users. Estimated marginal means table for age indicate that ATM users in the age groups 30-39 have the lowest mean and the age groups of 40-60 have the highest mean. Therefore, ATM users in the age group of 30-39 have the most expectation from reliability of transaction and the age groups of 40-60 have the least expectation. The mean of Malaysian ATM users is the lowest mean in estimated marginal means table for race and the highest mean is belong to Chinese users. So, Malaysian users have the most expectation and Chinese users have the lowest expectation from reliability of ATM transaction.

ATM Assurance: After analysis, we found out race and marital status is among independent variables with Sigma value less than 0.05. It implies that race and marital status have significant impact on satisfaction level of ATM users on assurance of transaction. According to estimate marginal means table for race, Malaysian users have the lowest mean and others race have the highest mean. Therefore, Malaysian users are more satisfied in assurance of transaction whereas others users have the least satisfaction on assurance of ATM transaction. Estimated marginal means table for marital status of ATM users shows the lowest mean which is equal to 2.523 for married users and the highest mean which is equal to 2.623 for single users. Thus, married users are more satisfied with assurance of ATM transaction than single users. The results of Two-Way ANOVA analysis indicate that race, age and education level are independent variables which have significant impact on expectation level of ATM users. Gender and marital status don't have significant impact on expectation of ATM users related to assurance of transaction. The age group of 30-39 has the lowest mean and the age group of 40-60 has the highest mean that implying the age group of 30-39 has the most expectation on assurance of ATM transaction while the age group of 40-60 has the least expectation. Estimated marginal means table for race of ATM users shows the lowest mean for Malaysian users and the highest mean for Indian users. So, Malaysian users have more expectation from assurance and Indian users have the lowest expectation from assurance of ATM transaction. In estimated marginal means table for education level, ATM users with diploma have the lowest mean and PhD level users have the highest mean that indicates diploma level users have more expectation from assurance of transaction while PhD level users have the least expectation.

ATM Tangible: The result of Two-Way ANOVA analysis indicates that age is the independent variable which has significant impact on satisfaction level of ATM users on tangibility. Others independent variables don't have significant impact on satisfaction of ATM users. Estimated marginal table for age shows the lowest mean for the age group 30-39 and the highest mean for the age group of 40-60. It indicates that the age group 30-39 has the most satisfaction on tangibility of ATM while the age group 40-60 has the least satisfaction. Results of Two-Way ANOVA analysis indicate that age, race, marital status and education level have significant impact on expectation of ATM users on tangible facilities. Gender is the only independent variable without significant impact on expectation. In estimated marginal means table for age, age group of 40-60 has the lowest mean (2.346) and the highest mean (2.562) belongs to the age group of 30-39. So, ATM users in the age groups of 40-60 have more expectation on tangible facilities whereas the age groups of 30-39 have the least expectation. Malaysian users have the lowest mean which is equal to 2.235 and other races have the highest mean which is equal to 2.648. These findings indicate that Malaysian users have more expectations on tangible facilities of ATM while others races have the least expectation. In estimated marginal means table for marital status, married users have lower mean than single users. The mean of married users is 2.428 and the mean of single users is 2.563. Therefore, married users have more expectation on tangible facilities than single users. According to estimated marginal means table for education level, users with diploma level have the lowest mean which is equal to 2.291 and the highest mean which is equal to 2.624 is related to the users with master level. Thus, users with diploma degree have the highest expectation while users with master degree have the lowest expectation.

ATM Empathy: Results of Two-Way ANOVA analysis on satisfaction indicate that race and education are independent variables with Sigma value less than 0.05. Race and education are among independent variables which have significant impact on satisfaction of empathy category.

Estimated marginal means table for race shows Malaysian users have the lowest mean which is equal to 2.520 and others races have the highest mean which is equal to 2.853 implying Malaysian users are more satisfied with the empathy category while others races are less satisfied. ATM users with diploma degree have the lowest mean which is equal to 2.369 and ATM users with master degree have the highest mean which is equal to 2.852. ATM users with diploma degree are more satisfied on empathy category whereas ATM users with master degree are less satisfied on empathy category. The results of Two-Way ANOVA analysis on expectation, age, marital status and education level are the independent variables with Sigma value less than 0.05 implying they have significant impact on expectation of empathy category.

Estimated marginal means table for age shows the lowest mean which equals to 1.989 for the age group of 30-39 and the highest mean which equals to 2.7 for the age group of 40-60. Therefore, ATM users in the age group 30-39 have more expectation from empathy category while ATM users in the age group 40-60 have the least expectation on empathy. In estimated marginal means table for marital status indicate that single users have lower mean than married users. The mean of single users is 2.136 while the mean of married users is 2.164, so single users have more expectation than married users. ATM users with diploma degree have the lowest mean which is equal to 1.921 and ATM users with master degree have the highest mean which is equal to 2.306. ATM users with diploma degree have more expectation on empathy category whereas ATM users with master degree have the least expectation.

ATM Responsiveness: Results of Two-Way ANOVA analysis indicate that gender, age and education level of ATM users are independent variables with Sigma value less than 0.05. It means that gender, age and education level of users have significant impact on satisfaction level on responsiveness of ATM users. Age and marital status are among independent variables without significant impact on satisfaction of responsiveness of banks related to ATM problems.

Estimated marginal means table for gender shows that female users have lower mean which is equal to 2.025 and male users have higher mean which is equal to 2.183. These finding imply that female users are more satisfied in responsiveness.

In estimated marginal means table for age, the age group of 30-39 has the lowest mean of 1.987 while the age group of 40-60 has the highest mean of 2.683. It indicates that the age groups of 30-39 are more satisfied in responsiveness of bank whereas the age groups of 40-60 are less satisfied. ATM users with degree level have the lowest mean of 1.780 and users with PhD level have the highest mean of 2.379. Therefore, ATM users with degree level are more satisfied on responsiveness of bank related to ATM problems. The result of Two-Way ANOVA analysis on expectation level indicate that gender and education level are independent variables with Sigma value less than 0.05 implying these variables have significant impact on expectation level of ATM users on responsiveness of bank. In estimated marginal means table for gender indicate that female users have lower mean that is equal to 2.526 than the mean of male users that is equal to 2.688. So, female users have more expectation on responsiveness of bank related to ATM problems than male users. ATM users with diploma degree have the lowest mean of 2.211 and ATM users with master degree have the highest mean of 2.786. Therefore, ATM users with diploma level have the most expectation on responsiveness whereas ATM users with master level have the least expectation on responsiveness of banks related to ATM problems. Results of Two-Way ANOVA analysis are summarized in two tables. First table shows the relationship between dependent and independent variables which is based on the highest satisfaction level. Second table shows the relationship between dependent and independent variables which is based on the lowest expectation level.

TABLE I. HIGHEST SATISFACTION OF OUTCOMES FOR DIFFERENT DEMOGRAPHIC FACTORS

DV/IV	Race	Degree	Gender	Age	Marital Status
Ease of navigation	Indian	-	-	-	Single
Trust	-	-	-	-	-
Privacy	-	-	Male	30-39	-
Responsiveness	Other	-	-	40-60	-
Reliability	-	-	-	-	-
Customization	Indian	-	Male	-	-
Aesthetic Design	-	PhD	-	40-60	Married
Efficiency	-	Master	-	18-29	-
Access	Other	-	-	30-39	Single
Flexibility	-	-	-	-	-
Price Knowledge	Iranian	-	-	40-60	-
ATM Reliability	Other	-	-	-	-
ATM Assurance	Other	-	-	-	Single
ATM Tangible	-	-	-	40-60	-
ATM Empathy	Other	Master	-	-	-
ATM Responsiveness	-	PhD	Male	40-60	-

TABLE II. : LOWEST EXPECTATION OF OUTCOMES FOR DIFFERENT DEMOGRAPHIC FACTORS

DV/IV	Race	Degree	Gender	Age	Marital Status
Ease of navigation	-	-	-	18-29	Married
Trust	-	-	-	-	-
Privacy	-	Degree	-	-	-
Responsiveness	Indian	-	-	-	-
Reliability	Malaysian	Degree	-	18-29	Married
Customization	Indian	PhD	Female	18-29	-
Aesthetic Design	Malaysian	-	-	18-29	-
Efficiency	Malaysian	-	-	-	Single
Access	Malaysian	-	-	-	-
Flexibility	-	-	-	-	-
Price Knowledge	Indian	Diploma	-	-	Single
ATM Reliability	Malaysian	-	Female	30-39	-
ATM Assurance	Malaysian	Diploma	-	30-39	-
ATM Tangible	Malaysian	-	-	40-60	Married
ATM Empathy	-	Diploma	-	30-39	Single
ATM Responsiveness	-	Diploma	Female	-	-

After summarizing all demographic, perception and expectation information, gaps of online banking and ATM services in Malaysia are found. 3 out of 11 dimensions of E-SERVQUAL model are found unable to respond customers' need. These dimensions are responsiveness, customization, and flexibility for E-SERVQUAL model which was applied for online banking system in Malaysia. Therefore, Malaysian anchor banks are required to improve their services related to these dimensions in order to fulfill the customers need. On the other hand, tangible and responsiveness dimensions out of 5 dimensions of SERVQUAL model are found unable to fulfill the respondents demand as well. So, ATM services related to these dimensions need for further enhancement to satisfy customers.

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