CONSTRUCTING A CUSTOMER SATISFACTION MODEL FOR A UTILITY SERVICE INDUSTRY USING PARTIAL LEAST SQUARES APPROACH

JASTINI MOHD JAMIL
MOHD. KAMAL MOHD. NAWAWI
RAZAMIN RAMLI

SCHOOL OF QUANTITATIVE SCIENCES
COLLEGE OF ART AND SCIENCES
UNIVERSITI UTARA MALAYSIA
2014

ABSTRACT

The purpose of this research is to explore the effect of Image, Customer Expectation, Perceived Quality and Perceived Value on Customer Satisfaction, and to investigate the effect of Image and Customer Satisfaction on Customer Loyalty of mobile phone provider in Malaysia. The result of this research is based on data gathered online from international students in one of the public university in Malaysia. Partial Least Squares Structural Equation Modeling (PLS-SEM) has been used to analyze the data that have been collected from the international students' perceptions. The results found that Image and Perceived Quality have significant impact on Customer Satisfaction. Image and Customer Satisfaction ware also found to have significantly related to Customer Loyalty. However, no significant impact has been found between Customer Expectation with Customer Satisfaction, Perceived Value with Customer Satisfaction, and Customer Expectation with Perceived Value. It is hoped that the findings may assist the mobile phone provider in production and promotion of their services.

Keywords: Customer Satisfaction, Customer Loyalty, Mobile phone provider, Partial Least Squares.

PENGAKUAN TANGGUNGJAWAB
(Disclaimer)

Kami, dengan ini, mengaku bertanggungjawab di atas ketepatan semua pandangan, komen teknikal, laporan fakta, data, gambarajah, illustrasi, dan gambar foto yang telah diutarakan dalam laporan ini. Kami bertanggungjawab sepenuhnya bahawa bahan yang diserahkan ini telah disemak daripada aspek hakcipta dan hak keempunyaan. Universiti Utara Malaysia tidak bertanggungjawab terhadap ketepatan mana-mana komen, laporan dan maklumat teknikal dan fakta lain, dan terhadap tuntutan hakcipta dan juga hak keempunyaan.

We are responsible for the accuracy of all opinions, technical comments, factual reports, data, figures, illustrations and photographs in the article. We bear full responsibility for checking whether material submitted is subject to copyright or ownership rights. The Universiti Utara Malaysia does not accept any liability for the accuracy of such comments, reports and other technical and factual information and copyright or ownership right claims.

Ketua Penyelidik:
Mohd Kamal Mohd Nawawi

Ahli-ahli:
Jastini Mohd Jamil
Razamin Ramli

ACKNOWLEDGEMENTS

First and foremost, we would like to extend our sincere thanks to Universiti Utara Malaysia for providing this research grant, thus making this research possible. The School of Quantitative Sciences has provided the support and equipment we have needed to produce and complete our research.

We attribute our appreciation also to our colleagues and friends who had provided guidance and ideas as well as encouragement that has definitely encourage us to complete this research, without their encouragement and effort this report, would not have been completed or written.

We also wish to express our gratitude to the officials and other staff members of Research and Innovation Management Center of UUM who rendered their help during the period of our research work. Last but not least we wish to avail ourselves of this opportunity, express a sense of gratitude and love to our beloved family for their manual support, strength, help and for everything.

Table of Contents

List of Tables

List of Figures

List of Appendices

List of Abbreviations

ACSI	=	American Customer Satisfaction Index
AVE	=	Average Variance Extracted
CB-SEM	=	Covariance Based Structural Equation Modeling
CFA	=	Confirmatory Factor Analysis
CSI	=	Customer Satisfaction Index
CUEX	=	Customer Expectation
CUSA	=	Customer Satisfaction
CUSL	=	Customer Loyalty
ECSI	=	European Customer Satisfaction Index
GAIS	=	Government Administration Information System
IMAG	=	Image
LV	=	Latent Variable
MCMC	=	Malaysia Communication Multimedia Commissions
ML	=	Maximum Likelihood
PERQ	=	Perceived Quality
PERV	=	Perceived Value
PLS	=	Partial Least Squares
PLS-SEM	=	Partial Least Squares Structural Equation Modeling
SCSB	=	Swedish Customer Satisfaction Barometer
SEM	=	Structural Equation Modeling
UUM	=	Universiti Utara Malaysia

CHAPTER ONE
INTRODUCTION

1.1 Background

In recent years, the concept of customer satisfaction and customer loyalty has attracted much attention. Satisfaction could be defined as a customer post-purchase evaluation of a product or service, whereas loyalty has been defined as a long-term commitment to repurchase involving both repeated patronage and a favorable attitude (Flavian & Gunaliu, 2006; Dick & Basu, 1994).

A critical issue for the continued success of companies is its capability to retain its current customers and make them not to move to other companies (Dekimpe, Steenkamp, Mellens, & Vanden Abeele, 1997). One of the ways for the company to make sure that their customers do not switch to another company by trying to maintain customer satisfaction. The higher customer satisfaction can lead to a stronger competitive position resulting in a higher market share and profit (Fornell, 1992). Customer satisfaction is also generally assumed a significant determinant of repeat sales, positive word-of-mouth, and customer loyalty. Satisfied customers return and buy more, and they tell other people about their experiences (Fornell, Johnson, Anderson, Cha, & Bryant, 1996).

According to Kotler (2003), satisfaction and loyalty is the main thing in the era of increasing competition. In such a competitive situation, the company started paying more attention to customer satisfaction and loyalty, so that marketers today are not just concentrating on the product and increase sales volume but more concentrated maintain good relationships with customers, without the loyalty, a company will not be able to survive in the competition. Recruiting new customers will be more expensive for the company, so the company is better trying to keep the loyalty of customers (Kotler, 2003). Loyal customers build business by buying more, paying

premium prices, and providing new referrals through positive word-of-mouth over time (Ganesh, Arnold, & Reynolds, 2000). In fact, companies in telecommunication are losing 2-4% of their customers monthly; disloyal customer can amount to millions of lost revenue and profit (Achour, Md Said, & Boerhannoeddin, 2011).

The mobile phone sector was selected for this research for two reasons: Firstly, because the competition in this industry results in dynamic product developments and an increasing demand for the product. Secondly, for the Malaysia telecommunications industry, the mobile services segment mainly drives growth rate. Data from Malaysia Communication and Multimedia Commission (MCMC, 2011), the number of cellular phone subscribers has risen to 34,456 million as of 2011 with the penetration rate of 121% versus 119.2% in 2010. The high penetration rate as reported by MCMC is mainly driven by convenience, affordability and in keeping with changing lifestyles in the country. In Malaysia, there are four main mobile service providers such as Celcom, Maxis, DiGi and U-Mobile. With the increase of number mobile phone users, it is certainly very advantageous for the providers to get many customers, not only used by Malaysians but also foreigners in Malaysia.

Based on data from Tourism Malaysia Annual Report 2011, Malaysia had been visited by more than 24.7 million tourists which an increase of 0.4% from 2010 which was about 24.6 million tourists (Osman & Sentosa, 2013). According to the Economic Report 2010/2011 by the Finance Ministry, there were 1.8 million registered foreign workers in Malaysia (Mohamed, SPR & Yacob, 2012). In the Education environment, according to Ministry of Higher Education Malaysia have almost 90,000 international students in 2010 where this amount will keep increasingly year-by-year.

With the large number of foreigners in Malaysia, it is very interesting to identify what are the most important factors that affecting mobile phone users in determining which provider that used. In addition, not many studies uses foreigner as samples in determining customer satisfaction index for mobile phone provider users especially

in Malaysia context. A growing body of research shows that customer's cultural background affects their service consumption experiences, including service expectations, evaluations, and intention (Zhang, Beatty, & Walsh, 2008). However, a deeper understanding of the different viewpoints of how customers from different cultures evaluate various types of services is necessary for theoretical advancement and for more customer-focused industry practices (Lin, Nguyen, & Lin, 2013). This research aims to investigate foreign customers' evaluation perception of Malaysia mobile phone sector through their consumption experiences. To further facilitate the present study, we focused on mobile phone provider and international students as foreign consumers in Malaysia. This research used international students in Malaysia as subjects who constitute a homogeneous group from the point of view of their occupational life stage where they come from variety of countries, different economic backgrounds and stay in Malaysia for a period to study.

Based on these empirical evidences, it is interesting in this research to investigate what are the factors that affecting customer satisfaction and loyalty of mobile phone provider in Malaysia by using international students' perceptions in Universiti Utara Malaysia (UUM) as a sample. The populations of all international students in UUM are 1650, the population is made up of students from various countries, and most of them come from Asia, Middle East and Africa in that other. This enables responses from people with different perceptions due to perhaps cultural variation.

Customer Satisfaction Index (CSI) model is a structural model based on the assumption that the satisfaction customers are influenced by several factors, such as perceived quality, perceived value, customer expectation, and company image. These models also predict the results of customer satisfaction such as customer loyalty (Johnson, Gustafsson, Andreassen, Lervik, & Cha, 2001). According to Fornell (Fornell et al., 1996; Fornell, 1992), CSI has been used as a model indicator of national economic measurement. Furthermore, CSI also a very useful indicator in measuring business performance of the micro level because it is based on experience from the customer's consumption. The model of the European Customer Satisfaction Index (ECSI) has been adapted in this research. ECSI model will be used as a

baseline to investigate all the relationships between variables. It is believed that the usage of ECSI model may yield an accurate depiction of the perception and behavior of the mobile phone provider users, provide recommendations for practitioners, and offer valuable insight for future research. Some of the researcher adapt ECSI model in their study such as Jallow (2013) investigate customer satisfaction in Taiwanese mobile phone sector; Zaim, Turkyilmaz, Tarim, Ucar, and Akkas (2010) in Turk Telecom company. Another researchers such as Dachyar & Noviannei (2012) in their study used same variable with ECSI in the hypothesis model of customer satisfaction index telecommunication industry in Indonesia.

Structural Equation Modeling (SEM) is one of the multivariate techniques, which combined factor analysis and multivariate regression that enable the researcher to simultaneously examine a series of interrelated dependence relationship among the measured variables and latent construct as well as between several latent construct. There are common statistical approaches for structural model estimation. The most prominent SEM technique is the Maximum Likelihood (ML) based covariance structure analysis method (Bollen, 1989). The second is Partial Least Squares (PLS) based variance analysis method develops by Wold (1982, 1985). In this research, a PLS is used to analysis data, since the PLS can work with a few observations and many variables with discrete, continues or binary data (Turkyilmaz & Ozkan, 2007). PLS is suggested as a powerful estimation technique for CSI studies and recently very popular among CSI researchers (Samimi & Mohammadi, 2011; Kritensen & Eskildsen, 2010; Turel & Serenko, 2006; Fornell, 1992). In addition, Yeniay and Goktaz (2002) in their research, to compare popular regression methods with the partial least square method, found that partial least square regression yields somewhat better results in terms of the predictive ability of models obtained when compared to other prediction methods.

1.2 Problem Statement

The communications industry is extremely dynamic and is characterized by intense competition. Most of the telecommunication companies continually seek new

products and services. New products and technologies are being introduced at a rapid pace. These changes have enabled the traditional wireless carriers, local exchange carriers, and cable companies offer similar services and blur the lines of their industries.

The telecommunications industry in Malaysia to be a rapidly growing sector in accordance with the global advancement, especially the mobile telecommunications market. Researching the background of the Malaysia telecommunications sector, the competition can be seen as a major factor by the telecom service provider company. Besides Telecom Malaysia (TM), Four big companies already operating in Malaysia, namely Celcom, DiGi, Maxis and U-Mobile.

Competition between mobile providers is getting stronger nowadays by reductions in the price, more attractive call tariff packages and lower SMS tariffs, etc. It also argued that this competition has been to the benefit of customers not only in terms of lower prices, but also in terms of quality of services. Expenditure on capital to enhance service coverage and quality of service and the introduction of initiatives to better manage relationships with customers are both further evidence of this competition. This situation makes telecommunication service providers pay less attention on or ignore other factors that might affect customer satisfaction and loyalty (Chang & Chong, 2011).

Some researchers were investigated factors that influence of customer satisfaction index of mobile phone provider on Malaysian such as (Loke, Taiwo, Salim, & Downe, 2011; Chang & Chong, 2011; Rahman, Haque, & Ahmad, 2010). Not many researchers use the foreigners in determining customer satisfaction index especially in Malaysia mobile phone sector. To exist in the competition the mobile phone provider must retain their existing customers and reach the maximum number of new customers. This research try to investigate foreign customers' perception of mobile phone provider in Malaysia through their consumption experiences, and focused on international students as foreign customers because they live in Malaysia for a certain period of study. According to the aim of the Ministry of Higher Education in

Malaysia is to attract 95,000 international students to study in Malaysia by 2010 (Rasli, Shekarchizadeh, & Iqbal, 2012).

Because of this competition, customer satisfaction plays an important role in the retention of the existing customers in the telecommunication industry (Salleh & Mahmood Gelaidan, 2012), it is important to emphasize that accomplishing customer satisfaction has been argued as the primary goal for most service company in order to achieve a long term relationship with both the present and potential customers at a profit (Agarwal, Erramilli, & Dev, 2003).

Anderson, Fornell, and Lehmann (1994) said that customer satisfaction has a direct influence on the company's market share, it could improve its profits. In addition, Anderson et al. (1994) conducted a study of Swedish firms and stated that there is a significant relationship between expectations, perceived value and customer satisfaction. Furthermore, McDougall and Levesque (2000) mentioned that perceived value is an important factor of customer satisfaction. This call has been supported by several researchers such as Turel and Serenko (2006) and they indicated in their research of mobile services in Canada that the degree of perceived value is a necessary factor affecting customer satisfaction.

In the other hand, Pizam and Ellis (1999) explained that the gap that may exist between the customers' expected and perceived service quality is an important factor of customer satisfaction. Moreover, Gronholdt, Martensen, and Kristensen (2000) indicated that an image is an important component of customer satisfaction. For the companies, image is a result of being reliable, qualified and innovative, having contributions to society, and adding reputation to its customers. Image refers to the brand name and the kind of association customers get from the product or service company (Andreassen & Lindestad, 1998).

Customer loyalty is about retaining customers, which means earning more. Various researchers have already shown that companies need to focus on customer retention more than grabbing new customers. It is more difficult retaining a customer than it is

getting a new one. Building loyalty to the company is very important, it is also not only a simple function for department of marketing, but is a philosophy and a way of thinking for how attract customers and how satisfaction them even loyalty, and this is the responsibility of all staff in the company (Achour et al., 2011). In order to attract new subscribers and as well as to retain the current customer, mobile service provider need to know the effect between customer satisfaction and customer loyalty so steps can be undertaken to keep these customers (Ismail, 2009). A number of studies have found that customer satisfaction is the most important factor for enhancing customer loyalty (Mokhtar & Maiyaki, 2011; Zaim, Turkyilmaz, Tarim, Ucar, & Akkas., 2010; Turkyilmaz & Özkan, 2007). Even studies conducted in Malaysia by Wen and Hilmi (2011) showed that the customer satisfaction was found to have significant positive effects on customer loyalty.

Moreover, the relationship between the images on the customer loyalty also still interests to be discussed. So far, there has been little a discussion about the relationship between the images on the customer loyalty. A number of studies have found that the company image has significant and positive effects on customer loyalty (Sun & Han, 2010; Ismail, 2009; Turkyilmaz & Özkan, 2007).

The mobile telecommunications services sector is an emerging industry in Malaysia; arguably, existing evidence has shown that very few studies have been conducted on this topic in Malaysia. Investigating this topic would provide both the academic and practitioners' ideas about customer satisfaction and customer loyalty in the Malaysia telecommunication sector. Based on the highlighted earlier gaps with respect to the previous researches. This research is a response to the calls by previous researchers on the need to determine the most important factors could truly affect customer satisfaction and customer loyalty of mobile phone providers in Malaysia.

1.3 Research Objectives

The objectives to carry out in this research are as below:

1. to investigate the effect of image, customer expectation, perceived value and perceived quality on customer satisfaction
2. to investigate the effect of image and customer satisfaction on customer loyalty
3. to modify a Customer Satisfaction Index (CSI) model to fit with international student perception on customer satisfaction of Malaysia mobile phone sector

1.4 Research Questions

This research will be focusing on answering the following questions:

1. Is there any significant relationship between customer expectation and the customer satisfaction?
2. Is there any significant relationship between perceived quality and the customer satisfaction?
3. Is there any significant relationship between perceived value and the customer satisfaction?
4. Is there any significant relationship between image and the customer satisfaction?
5. Is there any significant relationship between customer satisfaction and the customer loyalty?
6. Is there any significant relationship between image and the customer loyalty?
7. Is there any significant relationship between customer expectation and the perceived quality?
8. Is there any significant relationship between perceived quality and the perceived value?
9. Is there any significant relationship between customer expectation and the perceived value?
10. Is there any significant relationship between image and the customer expectation?

1.5 Significance of the Research

This research aims to investigate the effect of Image, Customer Expectation, Perceived Quality and Perceived Value on Customer Satisfaction, and to investigate the effect of Image and Customer Satisfaction on Customer Loyalty, among mobile phone provider in Malaysia based on international student's perceptions in UUM.

This is very important in several ways. Firstly, through the finding of the research, mobile telecommunication service provider will gain the insight information of customer's perception of their services. It will provide the opportunity for them to enhance their service towards gaining customer satisfaction thus retains their customers' and at the same time attract new customers. Secondly, with this information, they can also improve their company performance as well as to maintain their market share. Lastly, for other researchers, the expected results of this research can be used as a reference for future research and knowledge of the factors behind customers' behavior in selecting and maintaining their mobile phone provider.

1.6 Scope of the Research

This research focuses on mobile phone providers in Malaysia, which has four major players at time of writing: Celcom, DiGi, Maxis and U-Mobile. The research sample will be selected from all international students in UUM based on stratified random sampling. The data for this research was collected during the period from May 2013 until June 2013.

Based on literature review, the scope this research uses the European Customer Satisfaction Index (ECSI) model as a baseline to investigate all the relationships between each variable. Variable Image, Customer Expectation, Perceived Quality and Perceived value are the antecedents of overall Customer Satisfaction while the Customer Loyalty is the consequence.

1.7 Limitations of the Research

All researches have their limitation and it is no exception in this research. Firstly, the sample size is considered small; this research is only focus to the international student in UUM area. Therefore, the finding of the research is unable to be generalized for the whole population of foreigner as a Malaysia mobile phone provider user. Secondly, to obtain the data, researchers used an online questionnaire that is sent via email of the respondents, and the feedback from the respondent was not optimal. Therefore, it is necessary to find the other ways to make respondents easy to answer and send back the questionnaire.

1.8 Outline

This research is divided into five chapters that have been prepared following the systematic writing.

CHAPTER ONE: INTRODUCTION

This chapter is an introduction that outlines the research background, problem statement, research objectives, and research questions, followed by significance of the research, scope of the research and limitations of the research.

CHAPTER TWO: LITERATURE REVIEW

This chapter reviews the literature that includes relevant theories and support the analysis and problem solving are included in this research. This chapter also contains a description of the variables to be tested in this research, as well as research models to be tested.

CHAPTER THREE: METHODOLOGY

This chapter contains a description of the research method that consists of the research framework, sample and population, instrument, data collection's procedure and data analysis as follows.

CHAPTER FOUR: DATA ANALYSIS AND RESULTS

This chapter discusses the characteristics of respondents, the results of testing the validity and reliability of the instruments used, regression test results, and analysis of data that contains a description of the data processing and interpretation of the results.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATION

This chapter is the conclusion and recommendation of research results

CHAPTER TWO
LITERATUR REVIEW

2.1 Introduction

This chapter reviews the literature that includes relevant theories and support the analysis and problem solving are included in this research. This chapter also contains a description of the variables to be tested in this research, as well as research models to be tested.

2.2 Customer Satisfaction Indices (CSI)

The Customer Satisfaction Index (CSI) model is a structural model built on the assumptions that customer satisfaction is caused by some factors such as perceived quality (PERQ), perceived value (PERV), customer expectation (CUEX), and image (IMAG). These factors are the antecedents of overall satisfaction. The model also estimates the results of satisfaction or dissatisfaction. These results of customer satisfaction are consequences factors such as complaints or loyalty of customers (Johnson et al., 2001). Each factor in the CSI model is a latent construct operationalized by multiple indicators as enunciated by Fornell (1992); Chien, Chang, and Su (2003).

Swedish Customer Satisfaction Barometer (SCSB) created in 1989, was the first national CSI (Fornell, 1992), and with data collected from 130 companies from 32 Swedish industries. In 1992, the German customer satisfaction barometer was also introduced, conducted for 52 industry sectors in Germany (Mayer & Dornach, 1996). The American Customer Satisfaction Index (ACSI) developed in 1993 by Claes Fornell, who is also the founder of SCSB. The ACSI survey is conducted for seven

main economic sectors, 35 industries, and more than 200 companies with revenues totaling nearly 40 percent of the US GNP (Fornell et al., 1996). The European Customer Satisfaction Index (ECSI) developed by the European organization for quality and European foundation for quality management, was first introduced in 1999 across 11 European countries (Eklof & Westlund, 2002).

The original SCSB model contains two primary antecedents of customer satisfaction: perceived performance and customer expectation. Both antecedents are expected to have a positive effect on satisfaction. The consequences of satisfaction in the SCSB model are derived from Hirschman's (1970) exit-voice theory, which describes the results of dissatisfaction. The customer either exits (stop buying from the firm), or voices its complaint to the firm in an effort to receive restitution. It is expected that an increase in satisfaction should decrease complaints and increase customer loyalty (Fornell, 1992; Anderson et al., 1994).

The ACSI model builds upon the original SCSB model specifications adapted in the distinct characteristics of the United States economy (Figure 2.1).

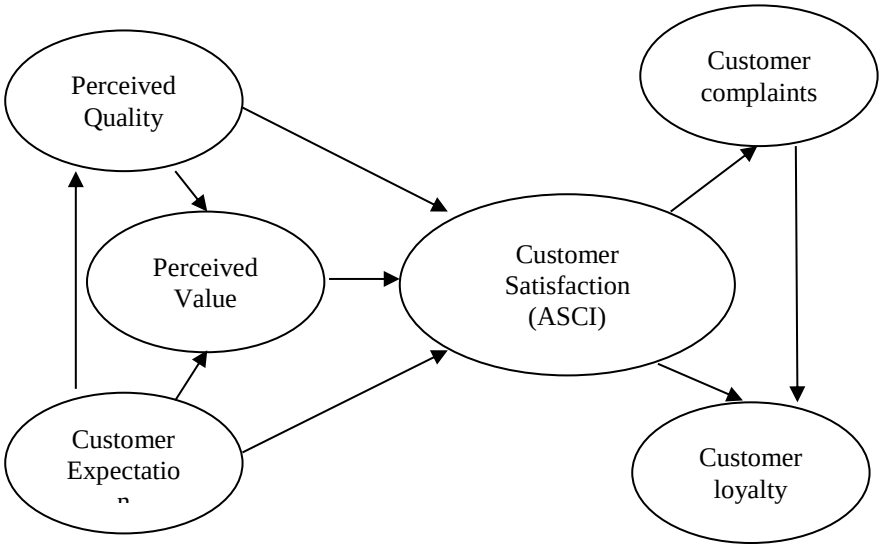


Figure 2.1: The American Customer Satisfaction Index (ACSI) Model

The main differences between the original SCSB model and ACSI model are the addition of the perceived quality component, as distinct from perceived value, and the addition of other measures for customer expectations. The ACSI model predicts that as both perceived value and perceived quality increase, customer satisfaction should also increase (Anderson et al., 1994). For the consequences, as in the SCSB, it is expected that when customer satisfaction increase then loyalty increase and complaint decrease (Fornell et al., 1996).

The ECSI, a modified adaptation of the ACSI model, considers the European economy as a whole, and thus, CSI scores of the countries can be compared with each other and with the European average (Eklof & Westlund, 2002). In the ECSI model, customer expectation, perceived quality, perceived value, customer satisfaction, and customer loyalty constructs are modeled the same as in the ACSI. There are two differences between the ACSI and ECSI models. First, the ECSI model does not include the complaint behavior construct because of satisfaction. Secondly, the ECSI model incorporates company image as a latent variable in the model. In the ECSI model, the company image is expected to have a direct effect on customer expectation, satisfaction and loyalty (Grigoroudis & Siskos, 2004).

2.3 Theoretical and Conceptual Model

The ECSI constitutes the framework of this research, based on a Structural Equation Modeling (SEM) comprising the antecedents and consequences of customer satisfaction. Shown in Figure 2.2, the left sided factors (that is; image, customer expectation, perceived quality, and perceived value) are the ancient of the customer satisfaction while the right sided factor (that is; customer loyalty) is the consequence.

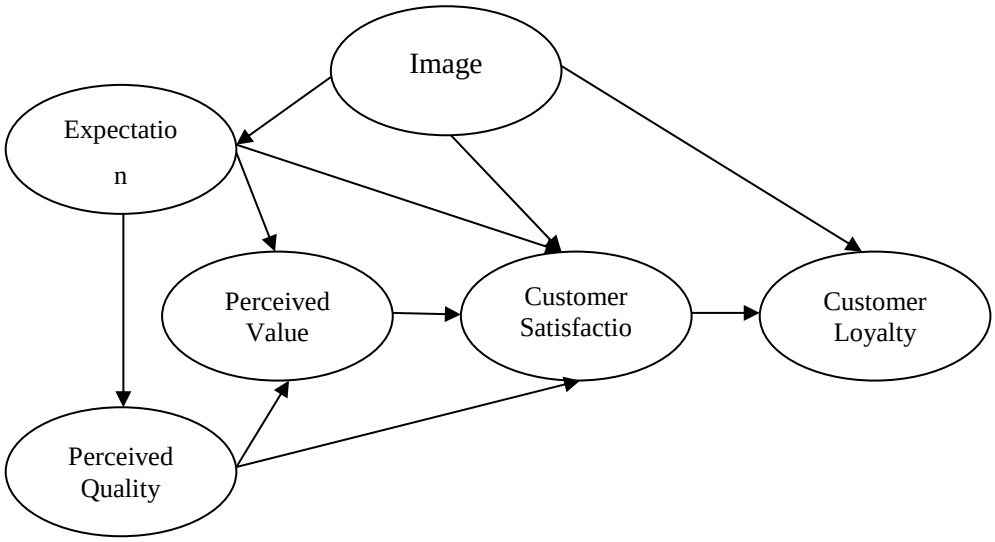


Figure 2.2: The European Customer Satisfaction Index (ECSI) Model

2.3.1 Customer Satisfaction

Satisfaction can be defined as the extent of the emotional reaction from a service experience (Oliver, 1980). Buchanan (1985) said the positive feelings of contentment results from the satisfaction of the felt or unfelt need of the individual. It can also be defined as an evaluative summary of direct consumption experience, based on the discrepancy between prior expectation and the actual performance perceived after consumption (Yi, 1990).

Customer satisfaction is totally focused on the services provided and perceived by the customers; if there is a high similarity between perceived and provided services, then the customer satisfaction level is very high. That directly leads to high customer loyalty for providers or vice versa. There are many benefits for a provider that has a high customer satisfaction level: they get a high market share and become capable of keeping and maintaining customers (Fornell, 1992).

Based on the above discussion, customer satisfaction can be defined as a customer's overall experience to an evaluation of the service that is received from the mobile phone providers.

2.3.2 Customer Expectation

Customer expectations are an important component of a customer, because in purchasing activities, customers always expect the products they buy according to what they expected or wanted. Expectations are the results of prior experience with the company's products. This construct evaluates customer expectations for overall quality, for product and service quality, and for the fulfillment of personal needs (Turkyilmaz & Özkan, 2007). According to Bayol, de la Foye, Tellier, and Tenenhaus (2000), customer expectations relate to the prior anticipations of the said product in the eyes of the customer. Such expectations are the result of active company or product promotion as well as hearsay and prior experience of the product or provider.

Many companies use a variety of ways to retain customers, one of which is to ensure the quality of products and services to meet consumer expectations. Fulfilling expectations will create satisfaction for consumers. Customer expectations construct is expected to have a direct and positive relationship with customer satisfaction (Zaim et al., 2010).

In this research, customer expectation indicate previous consumption of the customer experience with a company's products or services, including experience from marketing and information by word of mouth

2.3.3 Perceived Quality

In recent years, there has been a growing importance of service quality and customer satisfaction in business and academia such as Sureshchandar, Rajendran, and Anantharaman (2002); determined that the balance of power between service quality and customer satisfaction with an emphasis on these two constructs is the concept that is different from the view of customers.

It is also observed that customer satisfaction is also dependent on perceived quality and has a positive role toward this dependence. Hence, proper care should be taken

while formulating any long-term policy for customer satisfaction. At least for building profits, customer satisfaction is a main determinant (Aydin, Özer, & Arasil, 2005). Furthermore, perceived quality is the limit up to which the product or service provided the necessary needs of customer with more satisfaction. Zeithaml and Bitner (1996); indicated that both service quality and customer satisfaction have some things in common; satisfaction is generally observed as a wider concept than service quality assessment; thus, perceived service quality is a component of customer satisfaction.

Perceived quality is then based on market evaluation of recent consumption experience. This construct appraises customization and reliability of a given product or service. Customization is the degree to which a product or service meets a customer's requirements, and reliability is the degree to which a firm's offering is reliable, standardized and free from defects (Fornell et al., 1996).

Oliver (1993) reported that service quality is a causal antecedent of customer satisfaction, because service quality is viewed at a transactional level and satisfaction is viewed to be an attitude. Dabholkar, Thorpe, and Rentz (1995); Zeithaml et al. (1996) reported that the service quality divisions are related to overall service quality and or customer satisfaction. Fornell et al. (1996) expressed that satisfaction is a consequence of service quality. Hurley and Estelami (1998), argued that there is a causal relationship between service quality and satisfaction, and that the perceptions of service quality affect the feelings of satisfaction. Perceived quality is often measured through three measures: overall quality, perceived reliability and the extent to which a product or service meets the customer's needs. Customer perceptions of quality are the single greatest predictor of customer satisfaction.

Based on the above discussion perceived quality can be defined as the overall judgment of the service quality which is received from the mobile phone providers.

2.3.4 Perceived Value

Heinonen (2004) defines perceived value as the customer's overall assessment of the usefulness of a product based on perceptions on what is received and what is given. Companies are able to increase customer satisfaction by creating customer value through many ways, such as by providing customers with comparative net value, effectiveness, efficiency, and differentiation of services, which can be delivered via logistics (Langley & Holcomb, 1992).

Cottet, Lichtle, and Plichon (2006), studied the impact of value on customer satisfaction. Results of their research reveal that perceived values are positively related to customer satisfaction. Perceived value is measured through two questions: overall price given quality and overall quality given price. Although perceived value is important for the first purchase decision, it usually has somewhat less impact on satisfaction and repeat purchase.

Moreover, Zeithaml (1988) stated that customers who perceive that they receive value for money are more satisfied than customers who do not perceive they receive value for money. Anderson et al. (1994); Ravald and Gronroos (1996); McDougall and Levesque (2000) find that perceived value is the significant determinant of customer satisfaction. Turel and Serenko (2006) in their investigation of mobile services in Canada suggested that the degree of perceived value is a key factor affecting customer satisfaction.

Based on the above discussion perceived value can be defined as overall of service quality related to the price paid and service received.

2.3.5 Image

The image construct appraises the fundamental image of the company. Image applies to the brand name and the type of association customer get from the product or company (Andreassen & Lindestad, 1998). Gronholdt et al. (2000) indicated that image is an important component of customer satisfaction. For the companies, image

is a result of being reliable, professional and inventive, having contributions to society, and adding good reputation to its customers. It is expected that image has a positive effect on customer satisfaction. Andreassen and Lindestad (1998) posited that image through a filtering effect, impacts a customer evaluation of service quality, value, and satisfaction. In other words, image creates a halo effect on customer satisfaction. Consumers who develop a positive mental scheme with a brand will tend toward high customer satisfaction through a halo effect where all things associated with the brand are similarly valued. Image is a result of a customer's overall consumption experiences (Nguyen & Leblanc, 2001). The same mechanism is available for overall satisfaction. Since customer satisfaction and image measures are collected simultaneously, customers' consumption experiences, which can be summarized as satisfaction, naturally effect the evaluations of image (Johnson et al., 2001).

In this research image refers to the brand name and kind of associations customers get from product or service provider.

2.3.6 Customer Loyalty

Loyalty has been defined as a long-term commitment to repurchase involving both repeated patronage and a favorable attitude (Butt & de Run, 2009). True customer loyalty is created when the customer becomes an advocate for the organization, without incentive. Customer loyalty refers to the tendency of customers to stay with a certain business or product brand over another when seeking to meet a particular needs (Deng, Zhang, Zhao, Lu, & Wei, 2009).

Customer loyalty is one of the most important elements in marketing and it shows how much the provider can afford to practice the loyalty program among its customers. Furthermore, customer loyalty will generate positive word-of-mouth and it will be a great advantage to company as it acts as free promotion to them (Ismail, 2009). Loyalty is measured by repurchasing intention, price tolerance and intention to recommend products or service to others, it is expected that better image and

higher customer satisfaction should increase customer loyalty (Anderson & Fornell, 2000). Customer loyalty, the ultimate factor in the model, is another important construct that should be taken into account. The findings show that customer satisfaction and company image have positive and significant effects on customer loyalty. Customer satisfaction is found to be the most important factor for enhancing customer loyalty (Turkyilmaz & Özkan, 2007).

In this research, customer loyalty can be defined as consequence factors of customer satisfaction.

2.4 A Reviews of SEM Technique

One of the most important methods of empirical research is Structural Equation Modeling (SEM). It has been applied in various fields such as in psychology (MacCallum & Austin, 2000), in management (Williams, Edwards, & Vandenberg, 2003), and in marketing (Baumgartner & Pieters, 2003). SEM is divided into two parts: a variance-based structural equation modeling, known as Partial Least Squares Structural Equation Modeling (PLS-SEM) and Covariance Based Structural Equation Modeling (CB-SEM) as implemented in, for example, LISREL, AMOS, and EQS.

This research has proposed PLS technique approaches to determine the relationship between each variable and calculating the customer satisfaction index.

2.4.1 The Basic Concept of PLS-SEM

PLS-SEM is formally defined by two sets of linear equation: the inner model (or structural model) and the outer model (or measurement model). The inner model specifies the relationships between latent variables, whereas the outer model specifies the relationships between a latent variable and its manifest variables (indicator variables). A latent variable which never appears as dependent variable is called an exogenous variable. Otherwise, it is called an endogenous variable. The combination of inner and outer models leads to a complete partial least squares

model. Figure 2.3 depicts an example of a PLS-SEM model. It consists of two exogenous (ξ_1 and ξ_2) and two endogenous (η_3 and η_4) variables. The exogenous (ξ_1) and endogenous (η_j) latent variables are operational through the measurable indicator variables x_{jh} and y_{jh} respectively (h-th manifest variable related to the j-th latent variable).

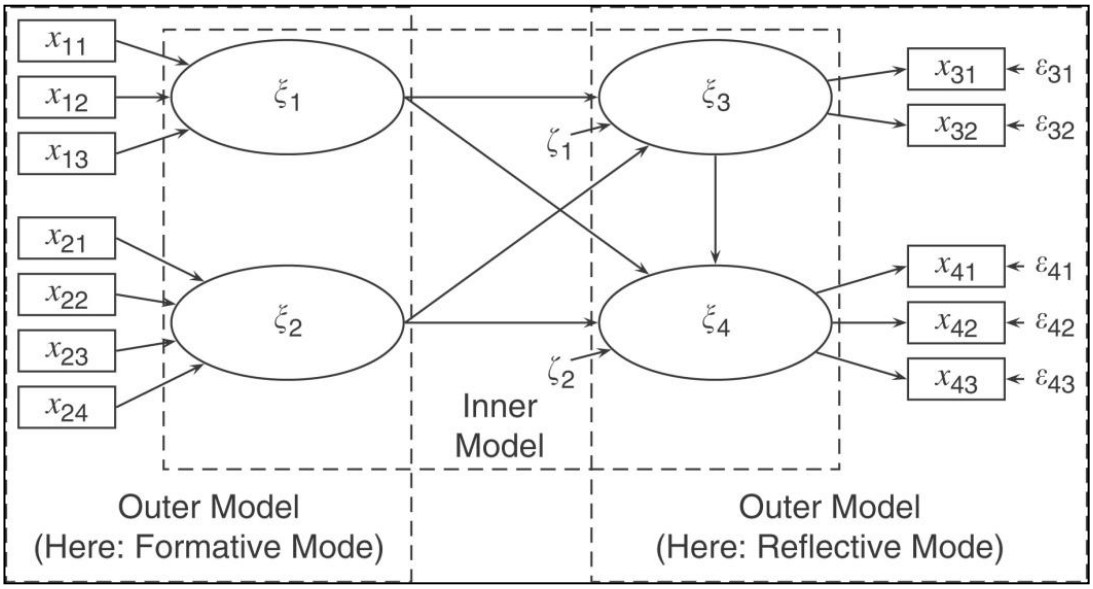


Figure 2.3: The Example of Partial Least Squares (PLS) Model (Henseler, Ringle, & Sinkovics, 2009)

The inner model for relationships between exogenous latent variable and endogenous latent variable can be written as:

$$\eta_j = \gamma_{ji}\, \xi_i + \zeta_j \qquad (2.1)$$

Where ξ and η is the vector of exogenous and endogenous latent variables. Respectively that latent variable *i* explains latent variable *j*, γ denotes the matrix of coefficients of their relationships, and ζ represents the inner model residuals. The inner model for relationships between two endogenous latent variables can be written as:

$$\eta_j = \beta_{ji}\, \eta_i + \zeta_j \qquad (2.2)$$

Where η is the vector of endogenous latent variables that latent variable *i* explains latent variable *j*, β denotes the matrix of coefficients of their relationships, and ζ represents the inner model residuals.

PLS-SEM includes two different kinds of outer models: reflective and formative measurement models (Diamantopoulos, Riefler, & Roth, 2008). The reflective has causal relationships from the latent variables to the manifest variables in its block. Thus, each manifest variable in a certain measurement model is assumed to be generated as a linear function of its latent variables and the residual ε. Each manifest variable, x_{jh} is related to its exogenous latent variable (ξ_j) by a linear function, given as follows:

$$x_{jh} = \lambda_{jh}\, \eta_j + \delta_{jh} \tag{2.3}$$

Where λ represents the loading (pattern) coefficients while δ are measurement errors, while each manifest variable (y_{jh}) is related to its endogenous latent variable (ηj) by a linear function, given as follows:

$$y_{jh} = \lambda_{jh}\, \eta_j + \varepsilon_{jh} \tag{2.4}$$

Where λ represents the loading (pattern) coefficients while ε are measurement errors. For PLS-SEM, these errors have no distribution requirements. The formative measurement model has causal relationships from the manifest variables to the latent variable. For those blocks, the linear relationships are given as follows:

$$\xi = \Pi_x\, X_x + \varepsilon_x \tag{2.5}$$

Where Π_x represents the regression coefficients while ε_x are the residuals from the regression models. Reflective indicators are considered to be the effects of the latent variables. In other words, the latent variables cause or form the indicators (Chin, 2010). All reflective indicators will change accordingly when the latent variable changes (Bollen, 2011). Consequently, all reflective indicators should correlate positively.

2.4.2 The Basic Concept of CB-SEM

CB-SEM and PLS-SEM analysis are essentially two different approaches to the same problem. Both start from the same set of theoretical and measurement equations but differ in how they approach the parameter estimation problem. Assume a structural equation model with a set of latent exogenous variables (ξ_i) measured by indicators x_i and associated measurement error δ_i, and a set of latent endogenous variables (η_j) measured by indicators y_j and associated measurement error ε_j. If all

latent variables in the model are assumed to be measured by reflective indicators, this structural equation model results in the following set of theoretical and measurement equations that describe the relationships of the structural and measurement model, respectively:

$$\eta = \beta \eta + \Gamma \xi + \xi \quad (2.6)$$

$$x = \Lambda_x \xi + \delta, \text{ and} \quad (2.7)$$

$$y = \Lambda_y \eta + \varepsilon \quad (2.8)$$

starting with this set of equation, covariance-based approaches such as LISREL estimate a vector of model parameters θ, so that the resulting covariance matrix predicted by the theoretical model $\Sigma = \Sigma(\theta)$ is as close as possible to the sample covariance matrix S. this estimation is usually conducted using maximum likelihood, with the likelihood function $F = \log |\Sigma| - \log |S| + \text{tr} (S\Sigma^{-1}) – k$, where $|A|$ denotes the determinant of A, tr (A) is the sum of the diagonal elements of A, and k is the total number of manifest variables (indicators). As discussed, for example, by Long (1983), this likelihood function depends only on the vector of independent parameters θ, which consist of the free and constrained elements of Λ_x, Λ_y, β, and Γ, as well as Φ, Ψ, Θ_δ, and Θ_ε, respectively. If determined using ML estimation, the estimated vector of the model parameters resulting from CB-SEM is asymptotically efficient within the class of consistent estimators and can be considered optimal in that it is the most precise for large sample (Godambe, 1960)

Number of indicators per construct: as Long (1983) notes, CB-SEM requires a minimum number of indicators to ensure model identification because the sample covariance matrix S must include at least as many non-redundant elements as the number of parameters to be estimated by the model. Baumgartner and Homburg (1996) go even further and state that every latent variable should be measured using at least three to four indicators to ensure meaningful result, furthermore, the general consensus seems to be that an increase in the number of indicators is associated with positive effects. For example, Velicer and Fava (1987) show that more indicators decrease the risk of improper solutions. Marsh, Hau, Balla, and Grayson (1998) show that more indicators per factor lead to more proper solutions, more accurate parameter estimates, and greater reliability. These findings, however, are true only

up to a certain limit, because too many indicators lead to excessive power for goodness-of-fit tests (MacCallum, Browne, & Sugawara, 1996), which in turn may significantly limit the usefulness of CB-SEM (Haenlein & Kaplan, 2004)

Sample size: sufficient sample size is necessary for both ML-based and GLS-based CB-SEM to ensure model identification because CB-SEM requires the sample covariance matrix S to be positive –definite, which is only guaranteed when the sample size exceeds the number indicators (Long, 1983). Additionally, a minimum sample size is required to generate results of sufficient accuracy due to the asymptotic property of ML estimation. Consistent with this found, Gerbing and Anderson (1985) show that the standard error of model estimates decrease with increasing sample size. As a rule of thumb, sample size should exceed 200 cases in most situations (Boomsma & Hoogland, 2001), and several strategies have been recommended if the available sample size falls below this threshold, including item parceling (e.g., Marsh et al., 1998; Nasser & Wisenbaker, 2003) or the use of alternative estimation techniques such as unweighted least squares (Balderjahn, 1986). Yet these strategies can be associated with significant risks (e.g., Kim & Hagtvet, 2003) or may not be applicable in all situations.

Distribution of indicators: as already highlighted by Joreskog (1967), ML-based CB-SEM requires that the observed variables have multinormal distribution. In reality, however, it is unlikely that empirical research will achieve this goal (Micceri, 1989). Therefore, several authors have investigated the behavior of ML-based CBSEM with non-normality distributed indicators, and it has been shown that in this case, standard errors in CB-SEM tend to be inflated (Babakus, Ferguson, & Jöreskog, 1987). As with responses to the problem of limited sample size, item parceling (Bandalos, 2002) and alternative estimation techniques (Sharma, Durvasula, & Dillon, 1989) have been recommended as cures for non-normally distributed input data.

Indicator loadings: badly operationalized constructs represent a problem for any type of empirical analysis, as they hinder the construction of theoretical knowledge. Therefore, a set of items used for construct operationalization should be both reliable

and valid (Churchill, 1979). Construct reliability can be expressed as a function of indicator loadings, and higer average loadings coincide with higher reliability (Gerbing & Anderson, 1985). Because reliability pertains to the share of variance caused by (undesired) random error, high loadings are generally preferred over low ones, with respect to variability in the loadings of indicators that belong to the same construct, the case becomes less clear. Assuming constant average loadings (i.e., $\lambda_1 + \lambda_2 = 2\lambda$ for two indicators), the average variance extracted (Fornell and Larcker, 1981), which is measure of construct validity, will be minimal if the loadings are equal for all indicators of the same construct. Therefore, unequal loadings should be preferred over equal ones because they lead to higher validity. This statement also fits with the opinion that an overly high degree of item homogeneity should be avoided because it may indicate item redundancy (Boyle, 1991)

2.4.3 Comparison of PLS-SEM and CB-SEM

According to Gefen, Straub, and Boudreau (2000), in several parts the CB-SEM approach differs from the PLS-SEM approach. These approaches differ in the objectives, assumptions, and the fit statistics they produce (Gefen et al., 2000). The CB-SEM is based on the developments of Joreskog and Goldberger (1972) and Wiley (1973). It typically uses a Maximum Likelihood (ML) function to minimize the difference between the sample covariance and those predicted by the theoretical model. In contrast, the PLS-SEM algorithm minimizes the variance of all the dependent variables instead of explaining the covariance. Table 2.1 below summarizes the characteristics of the PLS-SEM approach and compares it with CB-SEM, adapted from Chin and Newsted (1999).

Table 2.1: Comparison of PLS-SEM and CB-SEM (Jamil, 2012)

Feature	**PLS-SEM**	**CB-SEM**
Objective	Prediction-oriented	Parameter-oriented
Approach	Variance-based	Covariance-based
Assumption	Predictor specification (non-parametric)	Multivariate normal distribution and independent observations (parametric)
Parameter estimates	Consistent as indicators and sample size increase	Consistent
Latent variable scores	Explicitly estimated	Indeterminate
Epistemic relationship between an LV and its measures	Can be modeled in either formative or reflective measurement models	Only with reflective models
Implications	Optimal for prediction accuracy	Optimal for parameter accuracy
Model complexity	Large complexity	Small to moderate complexity
Sample size	Power analysis based on the portion of the model with the largest number of predictors. Minimal recommendations range from 30 to 300 cases	Ideally based on a power analysis specific model. Minimal recommendations range from 200 to 800

2.4.4 The Approach of SEM Technique in CSI Studies

This section discusses the use of PLS-SEM for satisfaction studies that have been published in the literature. Researchers have shown that the Customer Satisfaction Index (CSI) can serve as a predictor of profitability and market value (Hsu, Chen, & Hsieh, 2006). The CSI model is a structural model based on the assumption that customer satisfaction is caused by factors such as perceived quality, perceived value, the expectation of customers, and the image of the firm. The Swedish Customer Satisfaction Barometer (SCSB), reported in 1989, was the first published national CSI (Fornell, 1992). In 1992, the German customer barometer was introduced. The American Customer Satisfaction Index (ACSI) was published in 1993 by Claes Fornell. A modified adaptation of the ACSI model is the European Customer

Satisfaction Index (ECSI), which was first introduced in 1999 (Eklöf et al., 1999). This model has been used as reference for this research.

For the first time in Iran, PLS Path Modeling was used in the research for measuring Customer Satisfaction Index (CSI) in the Iranian tile industry, and found that PLS is one of the best methods for measuring structural models including customer satisfaction index models (Samimi & Mohammadi, 2011). Sang, Lee, and Lee (2010), in their study have investigated factors the influencing end-user acceptance and use of the Government Administration Information System (GAIS) in Cambodia. They used a structural equation modeling with Partial Least Squares (PLS) approach for analysis of data collected from a survey among 112 public officers in 12 ministries. Furthermore, their study had offered a vital contribution to the existing knowledge and literature of the PLS application. Johnson, Herrmann & Gustafsson (2002), proposed and tested a number of modifications and improvements to the ACSI model specification using a PLS-SEM. Hsu et al. (2006), explored the suitability of SEM for measuring a CSI model. By conducting robustness testing of both CB-SEM and PLS-SEM on a CSI model for Taiwan, their results showed that 1) if the model contains reflective outer relations, a PLS-SEM is more suitable to estimate parameter and 2) if the purpose of the study is to derive accurate regression coefficients, the CB-SEM can often achieve better results. Turel and Serenko (2006), choose PLS in their research to investigate customer satisfaction on mobile service in Canada because PLS is suitable for both exploratory and confirmatory research, places less restriction on the data, and requires smaller sample sizes

Turkyilmaz and Özkan (2007) employed PLS-SEM to develop and implement a satisfactory model for the Turkish mobile phone sector. From the results, they concluded that satisfaction is mostly affected by perceived value – when the customer perceives that the quality of the product is worth the money that they pay for it, their satisfaction increases. In addition, a methodological design for PLS-SEM-based satisfaction studies have been presented by Kristensen and Eskildsen (2010), who provided a step-by-step account of how to conduct the design for a

customer satisfaction model using PLS-SEM. According to these authors, one of the first things to be considered when planning a satisfaction study would be the practical aspect of data collection. This is likely to involve the design of a questionnaire and would certainly relate to the sampling method. Apart from data collection, the size of the collected data set should also be taken into account. They suggested a sample size of around 250 is generally sufficient for overall customer satisfaction studies, using a 10-point Likert-type scale.

A comparative study of CB-SEM and PLS-SEM for modeling customer satisfaction data was conducted by Sanchez-Franco and Manuel (2006). The authors used Monte Carlo simulation to compare the two estimation methods, and applied the European Customer Satisfaction Index (ECSI) model, comprising six latent variables, as a baseline for the study. In the simulation, the ability of each method to adequately estimate the inner model coefficients and the indicator loadings was analyzed for bias and precision. Their results showed that PLS-SEM estimates are generally better than CB-SEM, both in term of bias and precision.

A similar study was conducted by Hulland (1999), who also used a series of Monte Carlo simulations. He compared the effects of various design factors on path estimation accuracy from both PLS-SEM and CB-SEM. The design factors were: the estimation approach (PLS-SEM versus AMOS); sample size (50, 100, 200, 500 and 1000); number of measurement items per construct (2, 4 and 6); and correlations among the independent constructs (low versus high). His results showed that PLS-SEM produced more accurate regression coefficients estimates when sample sizes were less than 500 and measures per latent variables were less than four. CB-SEM estimates broke down more frequently under conditions where sample sizes were less than 100, data distribution was extreme and with only two measures per latent variable. From the above mentioned advantages, this research will use PLS-SEM to analyze the structural model of the CSI of mobile phone provider in Malaysia among international students perceptions.

2.5 The Approach of CSI Studies in Malaysia: International Students Perceptions

This section discusses about the research used international student perceptions to determining customer satisfaction index in Malaysia. Some of the studies focus on Malaysia education sector such as Chew, Ismail, & Eam (2010) investigate factors affecting choice for education destination, this research is conducted using a sample of 300 international students in UUM, and the finding is the levels of satisfaction among students for the six factors measured through mean shows that students are slightly satisfied. Those factors are service, social, physical infrastructure, reputation of lecturer, economy and recognition of certificate factor. Another researchers, Rasli, Shekarchizadeh, & Iqbal (2012) try to see the perception of service quality in higher education among the perspective of Iranian students in Malaysia universities. This study used 163 Iranian postgraduates who were selected based on stratified sampling on the top five public universities in Malaysia. This research tries to understand the phenomenon for Iranian students to change their preference from studying in universities in the West to those in the East, particularly Malaysia. This study find that the postgraduate students from Iran in five top ranked Malaysia universities have negative perceptions of education service quality in their universities, as their expectations were not met in the performance of education services. In the case of Malaysia universities, the Iranian students may consider Western universities in America and Europe as a general class for higher education, and benchmark Malaysia universities with these institutions, which are very well established.

Mokhtar & Maiyaki (2011), in their research to investigate the relationship between service quality and customer satisfaction on customer loyalty with regard to mobile phone usage among the international student in UUM, they are around 341 students randomly such Asia, Middle East and Africa. The results show that both service quality and customer satisfaction significantly affect the level of customer loyalty of mobile phone users in Malaysia.

2.6 Conclusion

In this chapter, the theoretical framework formed the relationship between indicators and factors that relate to satisfaction and customer loyalty. Topic discussion is divided into three main parts: the customer satisfaction indices, theoretical and conceptual models, the review of SEM technique, and the approach of CSI studies among international students perceptions.

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This chapter describes research design and methodology used in this research. As has been discussed in Chapter Two, the PLS-SEM is adopted in this work. We will investigate the factors affecting customer satisfaction and customer loyalty of mobile phone provider in Malaysia based on international students perceptions in Universiti Utara Malaysia (UUM). Hence, this chapter describes the methodology that will be used to accomplish this purpose. Including research framework, sample and population, instrument, sampling technique, data collection's procedure and data analysis as follows.

3.2 Research Framework

Based on the literature review, the European Customer Satisfaction Index (ECSI) model will be used in this research as a baseline to investigate all the relationships between each factor as shown in Figure 3.1.

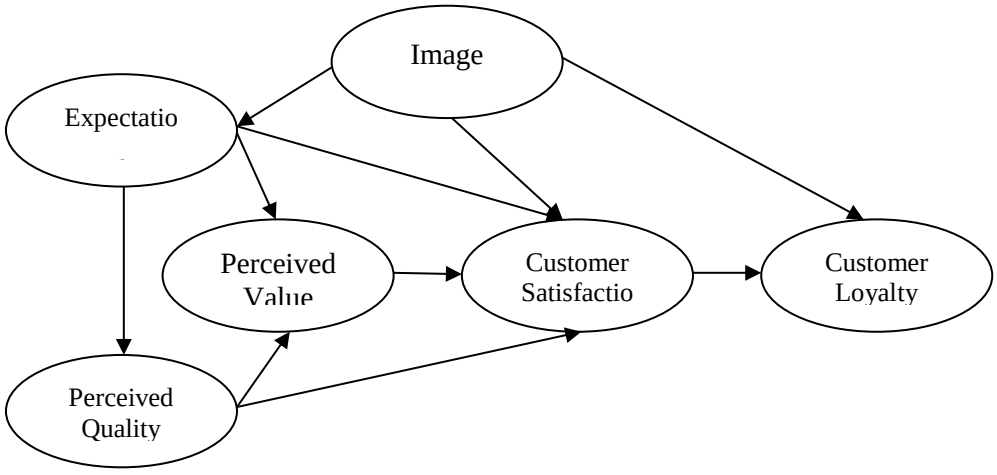


Figure 3.1: The European Customer Satisfaction Index (ECSI) Model

The ECSI model is a structural model based on the assumptions that customer satisfaction is caused by some factors such as perceived quality, perceived value, expectation of customers, and image. These factors are the antecedents of overall customer satisfaction. The model also estimates the results when a customer is satisfied or not. These results of customer satisfaction are consequences factors such as complaints or loyalty of customers (Johnson et al., 2001). Each factor in the ECSI model is a latent construct, which is operationalized by multiple indicators (Fornell, 1992; Chien et al., 2003).

Table 3.1: Latent Variables and their Corresponding Manifest Variables

Latent variables	Observable (manifest) variables
Expectations (CUEX)	CUEX1 : expectations for fulfillments of personal needs
	CUEX2 : expectations for overall quality
	CUEX3 : expectations for product quality
	CUEX4 : expectations for service quality
Perceived Quality (PERQ)	PERQ1 : for service quality
	PERQ2 : for product quality
	PERQ3 : for reliability and accuracy provided
	PERQ4 : technical product quality
	PERQ5 : for customer services
	PERQ6 : overall product quality
	PERQ7 : overall services quality
Perceived Value (PERV)	PERV1 : value of customer services
	PERV2 : value of product and services
	PERV3 : value of product
	PERV4 : value of the security and level correctness provided
	PERV5 : value of the availability provided
	PERV6 : overall service value
Image (IMAG)	IMAG1 : being professional
	IMAG2 : customer relations
	IMAG3 : add value to user
	IMAG4 : being reliable
	IMAG5 : overall perception of image
Customer Satisfaction Index (CUSA)	CUSA1 : overall satisfaction
	CUSA2 : fulfillments of expectations
	CUSA3 : compare with ideal
Customer Loyalty (CUSL)	CUSL1 : price tolerance
	CUSL2 : recommendation to others
	CUSL3 : repurchase intention

The ECSI model consists of the aforementioned constructs that are based on well-established theories and approaches in customer behavior. The constructs in this model are unobservable (latent) variables indirectly described by a block of observable variables which are called manifest variables or indicators. The constructs and their observable items are given in Table 3.1.

3.3 Sample and Population

The population in this research is all international students in Universiti Utara Malaysia that are around 1650 international students. The questionnaires were randomly distributed to 320 respondents as per suggested by Sekaran (2003) with the comparison population size in Table 3.2 to using the stratified random sampling.

Table 3.2: Table for Determining Sample Size from a Given Population (Sekaran, 2013)

N	**S**	**N**	**S**	**N**	**S**	**N**	**S**	**N**	**S**	**N**	**S**
10	10	**85**	70	**220**	140	**440**	205	**1200**	291	**4000**	351
15	14	**90**	73	**230**	144	**460**	210	**1300**	297	**4500**	354
20	19	**95**	76	**240**	148	**480**	214	**1400**	302	**5000**	357
25	24	**100**	80	**250**	152	**500**	217	**1500**	306	**6000**	361
30	28	**110**	86	**260**	155	**550**	226	**1600**	310	**7000**	364
35	32	**120**	92	**270**	159	**600**	234	**1700**	313	**8000**	367
40	36	**130**	97	**280**	162	**650**	242	**1800**	317	**9000**	368
45	40	**140**	103	**290**	165	**700**	248	**1900**	320	**10000**	370
50	44	**150**	108	**300**	169	**750**	254	**2000**	322	**15000**	375
55	48	**160**	113	**320**	175	**800**	260	**2200**	327	**20000**	377
60	52	**170**	118	**340**	181	**850**	265	**2400**	331	**30000**	379
65	56	**180**	123	**360**	186	**900**	269	**2600**	335	**40000**	380
70	59	**190**	127	**380**	191	**950**	274	**2800**	338	**50000**	381
75	63	**200**	132	**400**	196	**1000**	278	**3000**	341	**75000**	382
80	66	**210**	136	**420**	201	**1100**	285	**3500**	346	**1000000**	384

Note: ***N*** is population size
S is sample size

This technique is used when a population from which a sample is to be drawn does not constitute a homogenous group; stratified sampling technique is generally applied in order to obtain a representative sample. Under stratified sampling the

population is divided into several sub-populations that are individually more homogeneous than the total population, (the different sub-populations are called 'strata') and then we select items from each stratum to constitute a sample. Since each stratum is more homogenous than the total population, we are able to get more precise estimates for each stratum and by estimating more accurately each of the component parts; we get a better estimates of the whole. In brief, stratified sampling result is more reliable (Kothari, 1985).

3.3.1 Description of the Sample

The procedure to select the sample is as followed:

1. List down number of all international students according to courses

Table 3.3: List of Students According to Courses

Course	**Number of student**
PhD/DBA	606
Master	258
Undergraduate	786
Total	1650

2. Calculate the proportion in each courses needed from the population

Proportion $= \frac{n}{N}$

$= \frac{320}{1650} = 0.194$

n = Number of sample size suggested by Sekaran (2003)

N = Number of international students in Universiti Utara Malaysia (UUM)

For example, course PhD/DBA = 606 x 0.194 = 117.6 or 118 sample

Table 3.4: Sample Size of Students According to Courses

Course	**Number of student**
PhD/DBA	118
Master	50
Undergraduate	152
Total	320

3. Select the proportionate sample

   From the Table 3.4, 118 students will be selected from 606 PhD/DBA students, 50 students will be selected from 258 Master students, and 152 students will be selected from 786 Undergraduate students. Each selection is conducted randomly.

3.4 Instrument

This research is conducted in particular to the international student of Universiti Utara Malaysia (UUM). The instrument used for this research is a set of questionnaire that comprises of three main sections: the first section, the demographic characteristics of the respondents, these characteristics are gender, college, age, and nationality. The second section of the questionnaires is about the provider that used. The third sections of the questionnaires are about the variables that influence on customer satisfaction and customer loyalty. There are 28 questions in this section, four questions for customer expectations, and seven questions for perceived quality, five questions for image, six questions for perceived value, three questions for customer satisfaction and three questions for customer loyalty.

3.4.1 Pilot Test

The questionnaires was pre-tested with 50 users of mobile phone consist of international students at the UUM; the purpose this pre-tested is to revise the questionnaire. According to Cavana, Dalahale and Sekaran (2001), a questionnaire should be piloted with a reasonable sample of respondents who come from the target population or who closely resemble the target population. 50 international student respondents are chosen for the pilot test randomly in UUM in order to determine the reliability to measure the variable for this research before performing data collection in order to achieve the objectives.

According to Cavana et al. (2001), the reliability of a measure the extent to which the measure is without bias (error free). The reliability of a measure indicated the

stability and consistency with which the instrument measures the concept and helps to assess the goodness of a measure. Consistency reliability or Cronbach's alpha measures how well a set of items (or variables). Cronbach's alpha is computed in term of the average inter correlations among item measuring concept. The closer the reliability coefficient gets to 1.0 the better.

Table 3.5: Pilot Test Reliability Output

Type	**Reliability Output**	**Cronbach's Alpha**
Expectation	4 items	0.769
Perceived quality	7 items	0.929
Image	5 items	0.935
Perceived value	6 items	0.905
Customer satisfaction	3 items	0.873
Customer loyalty	3 items	0.687

In general, reliability that less than 0.60 are considered to be poor, those in the 0.7 range are acceptable and those over 0.8 are good. The result of the reliability test is shown in the above Table 3.5. The questionnaire that was revised can be seen in Appendices.

3.4.2 Online Questionnaire

This research used online questionnaire to obtain the data, that distributed to email respondent. The questionnaire can be accessed by using this link: https://docs.google.com/forms/d/17kuIMLuMRsPiMCUQhNNPLZiiK1zuzuHqji8enBi_QMs/viewform

The Likert scales for measuring all constructs were adapted from Fornell et al. (1996). In measures of customer satisfaction, the skewness of the frequency distributions is a serious threat to validity (Anderson and Fornell, 2000). In order to avoid that problem, a ten-point Likert-type scale was used because it enables respondents to make better discriminations (Andrew, 1984).

3.5 Data Collection Technique

The questionnaires were personally distributed and administered by the researcher. This method was possible since the researcher's access to the respondents, was by sending the survey online via respondent's email, and then receiving the response immediately after the respondents had completed the survey.

3.6 Confirmatory Factor Analysis (CFA) with Partial Least Squares (PLS)

The psychometric properties of the constructs were tested using confirmatory factor analysis (CFA) using Smart PLS 2.0 M3. Smart PLS is similar to PLS-Graph and is a component-based path-modeling program based on partial least squares (PLS). This research chose PLS path modeling because PLS makes fewer demands on the underlying data distribution and sample size compared to covariance-based structural equation modeling (Kuechler, McLeod, & Simkin, 2009). Because of these advantages, PLS path modeling is being widely used to analyze survey data (Verhagen & Dolen, 2009; Kuechler et al., 2009; Gefen & Straub, 2005).

This research applied PLS modeling to validate the constructs of all variables to test relationship between the variable. Straub, Boudreau, and Gefen (2004) specify that reliability and construct validity are mandatory validities for instrument measurement. While reliability is an issue of measurement within a construct, construct validity has to do with measurement between constructs. Convergent validity and discriminant validity are components of construct validity (Straub et al., 2004). Thus, examined reliability, convergent validity, and discriminant validity for the constructs. Reliability is used to evaluate the internal consistency of a construct.

CFA analysis of PLS provides the values for Cronbach's alpha and composite reliability for each construct. The cutoffs for Cronbach's alpha and for composite reliability in CFA are both 0.70 (Straub et al., 2004), Thus, the variable scales demonstrate adequate reliability. Convergent validity can be examined through CFA within PLS modeling.

The three criteria recommended by Fornell and Larcker (1981) for establishing convergent validity are:

1. All indicator factor loadings should be significant and exceed 0.707 so that over one half of the variance is captured by the latent construct (Gefen & Straub, 2005; Straub et al., 2004).
2. Construct reliabilities should exceed 0.70.
3. Average variance extracted (AVE) by each construct should exceed 0.50.

For testing the discriminant validity, Gefen and Straub (2005) recommend two criteria:

1. The square root of AVE for a construct should be larger than their corresponding inter-construct correlation coefficients (alternatively, each AVE should exceed the corresponding squared inter-correlations).
2. The within-construct item loadings should exceed the inter-construct cross loadings by at least 0.10.

3.7 Data Analysis Technique

In this research, PLS-SEM is used to analyze the data from questionnaire. The PLS path diagram is used to determine the relationship between variables and value expectation, perceived quality, perceived value, the image of the customer satisfaction index. PLS-SEM was also used to determine which variables are the most dominant influence on customer satisfaction and customer loyalty. It is also used analysis of Goodness of Fit, which is to measure the influence of variable expectation, perceived value, perceived quality and image of the customer satisfaction index. Goodness of Fit models use the R^2 measure latent dependent variable with the same interpretation of Q^2 regression predictive relevance of structural models, measures how well the value of observations generated by the model and the estimation of parameters.

This research chose PLS as the primary data analysis technique because of the following reasons (Haenlein & Kaplan, 2004).

1. PLS is a variance-based technique that is oriented towards the predictive aspects (variance explanation) of the model;
2. PLS requires minimal demands in term of sample size; and
3. PLS does not assume multivariate normality and it takes into account the measurement error when assessing the structural model.

3.7.1 Unidimensionality Checking of Blocks

Before starting to analyze the path model, unidimensionality of each construct in the proposed model was checked. Unidimensionality check is necessary when the manifest variables are connected to their latent variables in a reflective way (Tenenhaus, Vinzi, Chatelin, & Lauro, 2005). There are tools available for the unidimensionality check of a block: Cronbach's α and Composite reliability. A block is essential unidimensional when Cronbach's α and Composite reliability values are larger than 0.7 (Tenenhaus et al., 2005).

3.7.2 Outer Model Measurement

For the assessment of validity, two validity subtypes are usually examined: the convergent validity and the discriminant validity.

Convergent validity signifies that a set of indicators represents one and the same underlying construct, which can be demonstrated through their unidimensionality. Fornell and Larcker (1981) suggest using the Average Variance Extracted (AVE) as a criterion of convergent validity. An AVE value of at least 0.5 indicates sufficient convergent validity, meaning that a latent variable is able to explain more than half of variance of its indicators on average (e.g., Gotz, Liehr-Gobbers, & Krafft, 2009).

Discriminant validity is a rather complementary concept: Two conceptually different concepts should exhibit sufficient difference (i.e. the joint set of indicators is expected not to be unidimensional). In PLS path modeling, two measures of discriminant validity have been put forward: The Fornell-Larcker criterion and the cross-loadings. The Fornell-Larcker criterion (Fornell & Larcker, 1981) postulates

that a latent variable shares more variance with its assigned indicators than with any other latent variable. In statistical terms, the AVE of each latent variable should be greather than the latent variable's highest squared correlation with any other latent variable. The second criterion of discriminant validity is usually a bit more liberal: The loading of each indicator is expected to be greater than all of its cross-loadings (Chin, 1998; Gotz et al., 2009). Although the Fornell-Larcker criterion assesses discriminant validity on the construct level, the cross-loadings allow this kind of evaluation on the indicator level. In summary, a reliable and valid reflective measurement of latent variables should meet all the criteria as listed in Table 3.6.

Table 3.6: Assessing Reflective Measurement Model

Criterion	**Description**
Composite reliability (ρ_c)	$\rho_c = (\Sigma\lambda_i)^2 / [(\Sigma\lambda_i)^2 + \Sigma Var(\varepsilon_i)]$, where λ_i is the outer (component) loading to an indicator, and $Var(\varepsilon_i) = 1 - \lambda_i^2$ in case of standardized indicators. The composite reliability is a measure of internal consistency and must not be lower than 0.6
Indicator reliability	Absolute standardized outer (component) loadings should be higher than 0.7
Average variance extracted (AVE)s	AVE = $(\Sigma\lambda_i)^2 / [(\Sigma\lambda_i)^2 + \Sigma Var(\varepsilon_i)]$, where λ_i is the outer (component) loading to an indicator, and $Var(\varepsilon_i) = 1 - \lambda_i^2$ in case of standardized indicators. The everage variance extracted should be higher than 0.5
Fornell-Larcker criterion	In order to ensure discriminant validity, the AVE of each latent variable should be higher than squared correlations with all other latent variables. Thereby, each latent variable shares more variance with its own block of indicators than with another latent variable representing a different block of indicators.
Cross-loadings	Cross-loadings offer another check for discriminant validity. If an indicator has a higher correlation with another latent variable than with its respective latent variable, the appropriateness of the model should be reconsidered.

3.7.3 Inner Model Measurement

Reliable and valid outer model estimations permit an evaluation of the inner path model estimates. The essential criterion for this assessment is the coefficient of

determination (R^2) of the endogenous latent variables. Chin (1998) describes R^2 values 0.67, 0.33, and 0.19 in PLS path models as substantial, moderate, and weak, respectively. If certain inner path model structures explain an endogenous latent variable by only a few (e.g., one or two) exogenous latent variables, moderate R^2 may be acceptable. However, if the endogenous latent variable relies on several exogenous latent variables, the R^2 value should exhibit at least a substantial level. Lower results, on the contrary, cast doubts regarding the theoretical underpinnings and demonstrate that the model is incapable to explain the endogenous latent variable(s).

3.8 Conclusion

Chapter Three has described the research methodology used in the research. Research design and data collection methods have been described precisely. Data collection procedures described in outline and process measurement has been developed to achieve the objective.

CHAPTER FOUR
DATA ANALYSIS AND RESULTS

4.1 Introduction

A sampling of 320 questionnaires was collected from 1650 mobile phone service users of international students in Universiti Utara Malaysia (UUM). The questionnaires has been sent by email on May of 2013, then after one month, we had 165 returned as of June 2013. The rate of response for the questionnaire was 51.6% of the 165 basic questionnaires returned. We had to leave out ten for which some questions had not been answered, thus leaving the number of valid questionnaires at 155. According to Saunders, Lewis, and Thornhill (2003), for the online questionnaire likely response rate is 30% reasonable within organizations.

4.2 Respondents profiles

The questionnaires were distributed online to all international student in Universiti Utara Malaysia (UUM). As shown in Table 4.1, the subjects were 104 (67.1%) male and 51 (32.9%) female respondents. The analysis shows that, respondents' level of education was 46 (29.7%) with undergraduate degree, 32 (20.6%) master's degree, 77 (49.7%) with PhD and DBA. Regarding the country of respondent and their current provider that used as shown in Figure 4.1 and Figure 4.2, the finding shows that 71 (45.8%) respondent from Asia, 47 (30.3%) from Middle East and 37 (23.9%) from Africa. 67 (43.2%) responded they used Maxis, 24 (15.5%) used Celcom, 60 (38.7%) used DiGi and four (2.6%) used U-Mobile.

Table 4.1: Profiles of Respondents (N=155)

Variables		Frequency	Percentage (%)
Gender	Male	104	67.1
	Female	51	32.9
College	COB	74	47.7
	CAS	44	28.4
	COLGIS	37	23.9
Education	Undergraduate	46	29.7
	Master	32	20.6
	PhD/DBA	77	49.7
age	less than 20 years old	12	7.70
	21 - 30 years old	78	50.3
	31 - 40 years old	45	29.0
	41 years old above	20	12.9
Country	Asia	71	45.8
	Middle East	47	30.3
	Africa	37	23.9
current provider	Maxis	67	43.2
	Celcom	24	15.5
	DiGi	60	38.7
	U-Mobile	4	2.60
connect to the provider	less than 1 year	24	15.5
	1-3 years	76	49.0
	3-6 years	50	32.3
	6 years above	5	3.20

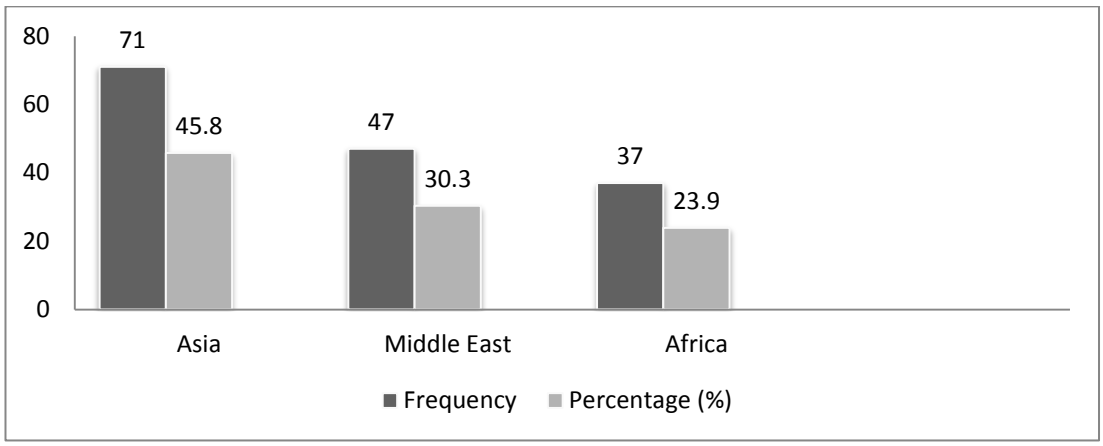


Figure 4.1: Total Frequency and Percentage Respondent based on Their Country

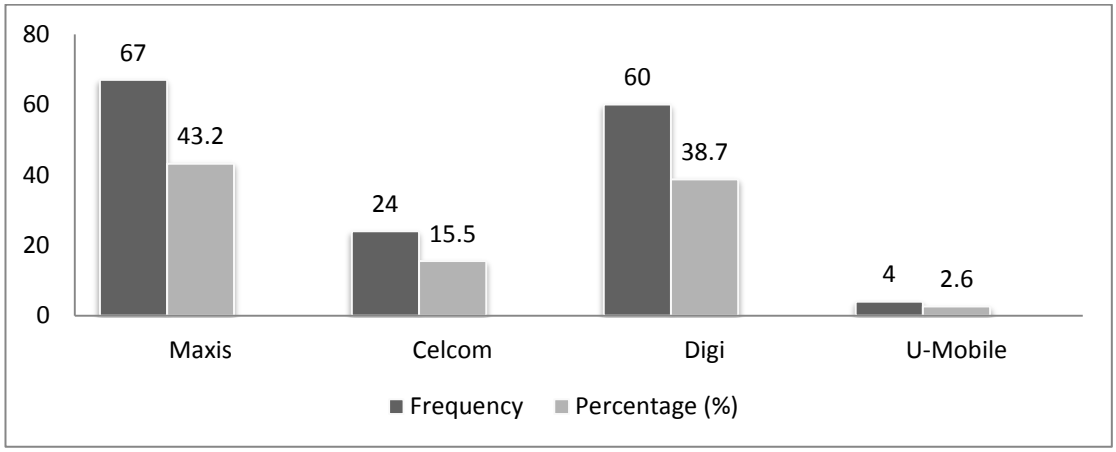


Figure 4.2: Total Frequency and Percentage Respondent based on Current Provider that Their Use.

4.3 PLS Estimation

Structural Equation Modeling (SEM) is a statistical technique for testing and estimating causal relations using a combination of statistical data and qualitative causal assumptions between observed and latent variables. It combines features of factor analysis and multiple regressions for studying both the measurement and the structural properties of theoretical models (Demirbag, Koh, Tatoglu, & Zaim, 2006). SEM is formally defined by two sets of linear equations called the inner model and the outer model. The inner model specifies the relationships between observed or latent variables, and the outer model specifies the relationships between latent variables and their associated observed or manifest variables (Lin & Tseng, 2006; Peng, Fan, & Hsu, 2004; Gefen et al., 2000).

Manifest variables can be related of their latent variables in two ways: reflective and formative. In customer satisfaction index of Malaysia mobile phone sector model, manifest variables are related to their latent variables in a reflective way in which manifest variables are viewed as being affected by the same underlying construct. Reflective indicators are typical for classical factor analysis models (Chin, 1998).

There are two common statistical approaches for structural model estimation. The most prominent SEM technique is the ML-based covariance structure analysis

method (Bollen, 1989). The second approach is Partial Least Squares (PLS) based variance analysis method developed by Wold (1982,1985). These two distinct methods of SEM differ in terms of objectives, statistical assumptions and the nature of the fit statistics they produce (Gefen et al., 2000). The main concern of PLS is, in general, related to the explanatory power of the path model along with the significance level of the standardized regression weights. In contrast, the objective of ML-based method is to show that the complete set of paths in the model is reasonable, and the operationalization of the theory is corroborated and not disconfirmed by the sample data. These two methods also differ with respect to the type of relationship they support between the observed variables and their associated latent constructs (that is, outer model). PLS supports two types of relationships, formative and reflective, whereas ML-base method supports only reflective indicators (Fornell & Bookstein, 1982).

Although ML-based method has been widely adopted as a powerful approach and has been used for parameter estimation in most applications of structural modeling, there are some situations where PLS approach is superior to the ML-based method. ML based method is poorly suited to deal with small data samples and can provide non-unique or otherwise improper solutions in some cases (Hulland, 1999). Moreover, the data from customer research often do not satisfy the requirements of multi-normality and internal scaling for ML estimation. More fundamentally, two serious problems often interfere with meaningful covariance structure analysis: inadmissible solutions and factor indeterminacy (Fornell & Cha, 1994; Wold, 1985). PLS method can work with a few observations and many variables with discrete, continuous or binary data. Because of the above mentioned advantage, PLS is suggested as a powerful estimation method for CSI studies by Fornell (1992). Therefore, the structural model customer satisfaction index of Malaysia mobile phone sector is analyzed using PLS method as that of ACSI and ECSI.

PLS procedure uses two-stage estimation algorithm to obtain weights, loadings, and path estimates. In the first stage, an iterative scheme of simple and/or multiple regressions contingent on the particular model is performed until a solution

converges on a set of weight used for estimating the latent variables scores (Chin, 1998). Some several methods have been developed to calculate the outer weights such as Mode A, Mode B, Mode C. In Mode A, the outer weight is a regression coefficient in the simple regression of a manifest variable on its inner estimated latent variable. In Mode B, the weight is a regression coefficient vector in the multiple regression of inner estimated latent variable on its manifest variables. Mode A is appropriate for a block with a reflective measurement model, and Mode B for a formative one. Mode C represents a specific case of Mode B (Tenenhaus et al., 2005). The PLS algorithm starts with arbitrary selected initial weights, and is iterated until convergence. Once the outer weights are estimated, results of the latent variables are calculated as weighted mean of manifest variables. The second stage involves the non-iterative application of ordinary least squares regression for obtaining loadings, path coefficients, mean scores and location parameters for the latent and manifest variables (Chin, 1998).

The latent variables and their related observable variables used in the structural model customer satisfaction index of Malaysia mobile phone sector are given in Table 4.2, and shown in Figure 4.3.

Table 4.2: Model Variables, Parameter and Relations

Latent variable and inner model equations	**Manifest variable**	**Outer model equations**
ξ_1 Image (IMAG)	x_{11} IMAG1	$x_{1i} = \lambda_{1i}\xi_1 + \delta_{1i}$
	x_{12} IMAG2	
	x_{13} IMAG3	
	x_{14} IMAG4	
	x_{15} IMAG5	
η_1 Expectations (CUEX) $\eta_1 = \gamma_{11}\xi_1 + \xi_1$	y_{11} CUEX1	$y_{1i} = \lambda_{1i}\eta_1 + \varepsilon_{1i}$
	y_{12} CUEX2	
	y_{13} CUEX3	
	y_{14} CUEX4	
η_2 Perceived Quality (PERQ) $\eta_2 = \beta_{21}\eta_1 + \xi_2$	y_{21} PERQ1	$Y_{2i} = \lambda_{12i}\eta_2 + \varepsilon_{2i}$
	y_{22} PERQ2	
	y_{23} PERQ3	
	y_{24} PERQ4	
	y_{25} PERQ5	
	y_{26} PERQ6	
	y_{27} PERQ7	
η_3 Perceived Value (PERV) $\eta_3 = \beta_{32}\eta_2 + \xi_3$	y_{31} PERV1	$y_{3i} = \lambda_{3i}\eta_3 + \varepsilon_{3i}$
	y_{32} PERV2	
	y_{33} PERV3	
	y_{34} PERV4	
	y_{35} PERV5	
	y_{36} PERV6	
η_4 Customer Satisfaction Index (CUSA) $\eta_4 = \gamma_{41}\xi_1 + \beta_{41}\eta_1 + \beta_{42}\eta_2 + \beta_{43}\eta_3 + \xi_4$	y_{41} CUSA1	$y_{4i} = \lambda_{4i}\eta_4 + \varepsilon_{4i}$
	y_{42} CUSA2	
	y_{43} CUSA3	
η_5 Customer Loyalty (CUSL) $\eta_5 = \gamma_{51}\xi_1 + \beta_{54}\eta_4 + \xi_5$	y_{51} CUSL1	$y_{5i} = \lambda_{5i}\eta_5 + \varepsilon_{5i}$
	y_{52} CUSL2	
	y_{53} CUSL3	

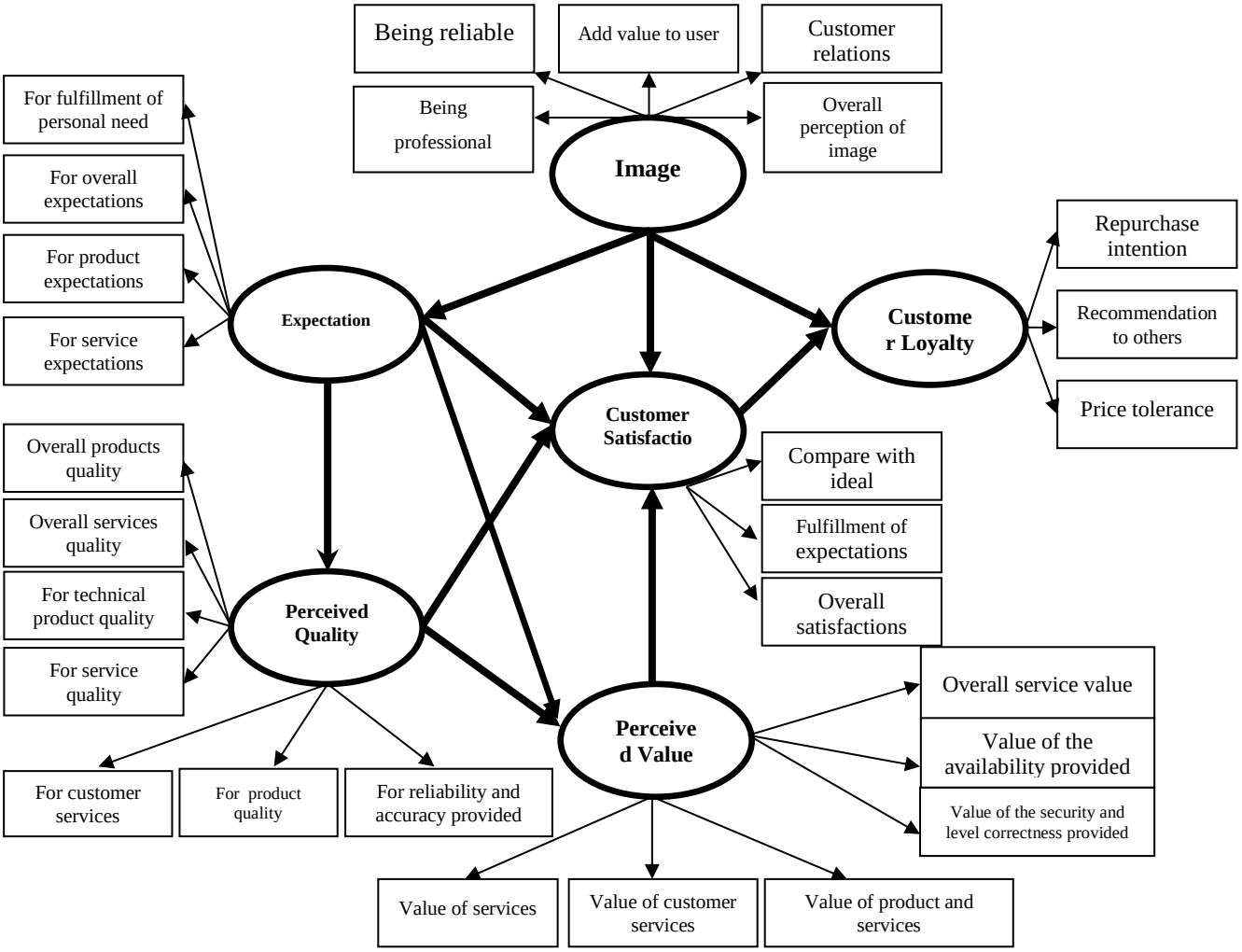


Figure 4.3: Latent Variables and their Related Manifest in the Customer Satisfaction Index of Malaysia Mobile Phone Sector Model

4.4 Unidimensionality Checking of Blocks

Before starting to analyze the path model, unidimensionality of each construct in the proposed model was checked. Unidimensionality check is necessary when the manifest variables are connected to their latent variables in a reflective way (Tenenhaus et al., 2005). There are tools available for the unidimensionality check of a block: Cronbach's α and Composite reliability. A block is essential unidimensional when Cronbach's α and Composite reliability values are larger than 0.7 (Tenenhaus et al., 2005).

In Table 4.3, the statistics for checking the unidimensionality of each block are given. Cronbach's α and Composite reliability test values of each block are greater than 0.80. These results lead us to accept the unidimensionality of all blocks.

Table 4.3: Unidimensionality Check of the Blocks

Block	Number of indicators	Cronbach's α	Composite reliability
IMAG	5	0.9119	0.9343
CUEX	4	0.8497	0.8992
PERQ	7	0.9020	0.9222
PERV	6	0.8849	0.9126
CUSA	3	0.9029	0.9393
CUSL	3	0.8849	0.8830

4.5 Results of PLS Estimation

4.5.1 Outer Model Results

The outer model (or measurement model) defines how each block of indicators is related to their latent variable. The outer model estimation results (that is, outer weights and loadings) are given in Table 4.4.

In PLS, individual item reliability is assessed by examining the loading of the manifest variables with their respective construct. A rule of thumb employed by many researchers is to accept items with loadings of 0.70 or more, which implies that there is more shared variance between the construct and its manifest variable than error variance (Dwivedi, Choudrie, & Brinkman, 2006; Hulland, 1999; Carmines & Zeller, 1979; Keiser, 1974). In PLS estimation, communality measures the shared variance between the manifest variable and related latent variable (that is, capacity of the manifest variable to describe the related latent variable) (Fornell & Cha, 1994)

Table 4.4: Outer Model Results

Latent variable	Manifest variable	Outer weight	Loadings
IMAG	IMAG1	0.2076	0.8156
	IMAG2	0.2290	0.8618
	IMAG3	0.2379	0.8484
	IMAG4	0.2391	0.8671
	IMAG5	0.2474	0.9059
CUEX	CUEX1	0.2916	0.8210
	CUEX2	0.2842	0.7785
	CUEX3	0.2928	0.8194
	CUEX4	0.3323	0.9012
PERQ	PERQ1	0.2061	0.7954
	PERQ2	0.1557	0.7694
	PERQ3	0.1567	0.7522
	PERQ4	0.1395	0.7282
	PERQ5	0.1915	0.7793
	PERQ6	0.1885	0.8588
	PERQ7	0.2155	0.8616
PERV	PERV1	0.2405	0.8211
	PERV2	0.2022	0.8120
	PERV3	0.1940	0.7424
	PERV4	0.1578	0.6969
	PERV5	0.2196	0.8467
	PERV6	0.2322	0.8548
CUSA	CUSA1	0.3663	0.8969
	CUSA2	0.3650	0.9319
	CUSA3	0.3615	0.9165
CUSL	CUSL1	0.2257	0.6313
	CUSL2	0.4502	0.9473
	CUSL3	0.4625	0.9320

In this research, the loadings between manifest variables and their related latent variable are relatively large and positive. All the loadings except loading of PERV4 and CUSL1 are greater than 0.70. The loading of PERV4 and CUSL1 are 0.6969 and 0.6313, respectively. Due to the lowest outer loading of PERV4 and CUSL1, both manifest variables were removed. Overall, from 28 of outer loadings six manifest variables had been eliminated (PERQ2, PERQ3, PERQ4, PERV3, PERV4, CUSL1), due to the low of their loadings' value and in order to get the valid results.

According to Fornell and Larcker (1981), *convergent validity* of the reflective constructs can be examined by its average communality (i.e. Average Variance Extracted). A construct's average communality should be, at least, higher than 50% (0.5) to guarantee more valid variance explained than error in its measurement (Fornell, 1992). In the customer satisfaction index of Malaysia mobile phone sector model, the average communality scores of IMAG, CUEX, PERQ, PERV, CUSA, and CUSL are 0.7400, 0.6909, 0.7331, 0.7317, 0.8376 and 0.9195, respectively. All scores are acceptable. In other word, the correlations between each reflective construct and its indicators that are supposed to measure it are high.

Discriminant validity, the traditional methodological complement to convergent validity, represents the extent to which measures of a given construct differ from measures of other constructs in the same model. In PLS, one criterion for adequate discriminant validity is that a construct should share more variance with its measures than it shares with other constructs in a given model. In order to test for discriminant validity, a matrix of loading and cross-loadings was constructed in Table 4.5. By using this matrix, the loadings of an item with its associated factor (or construct) to its cross-loadings were compared. All items had higher loadings with their corresponding factors in comparison to their cross-loadings. Therefore, it was concluded that there is some confidence in the discriminant validity of the measures and their corresponding constructs.

In addition, to assess discriminant validity, average communality measure should be greater than the variance shared between the construct and other constructs in the model. In Table 4.6, while the diagonal elements (in italic) are the square root of the variance shared between the constructs and their measures (average communality), the off-diagonal elements are the correlations among constructs. Average communality measures of the blocks are greater than the variance shared with other blocks, which means all the six reflective constructs are both conceptually and empirically distinct from each other.

Table 4.5: Matrix of Loadings and Cross-Loadings.

	CUEX	**CUSA**	**CUSL**	**IMAG**	**PERQ**	**PERV**
CUEX1	***0.8209***	0.5391	0.4109	0.5592	0.5987	0.5465
CUEX2	***0.7730***	0.4991	0.4093	0.5925	0.5485	0.4658
CUEX3	***0.8247***	0.5450	0.3397	0.4886	0.6736	0.6335
CUEX4	***0.9012***	0.6255	0.4432	0.6195	0.6950	0.6079
CUSA1	0.5701	***0.8962***	0.7038	0.7319	0.7125	0.6837
CUSA2	0.6448	***0.9325***	0.6304	0.7839	0.8052	0.7462
CUSA3	0.6149	***0.9166***	0.6453	0.7467	0.7671	0.7288
CUSL2	0.4487	0.6865	***0.9577***	0.6706	0.5486	0.5241
CUSL3	0.4749	0.6961	***0.9601***	0.7013	0.5932	0.5452
IMAG1	0.5428	0.5997	0.5738	***0.8159***	0.6750	0.6368
IMAG2	0.5808	0.7356	0.5524	***0.8617***	0.7247	0.7096
IMAG3	0.5489	0.7095	0.6807	***0.8478***	0.6333	0.6680
IMAG4	0.5839	0.7194	0.6698	***0.8675***	0.7054	0.6532
IMAG5	0.6582	0.7701	0.5975	***0.9059***	0.7165	0.6750
PERQ1	0.6914	0.7008	0.4928	0.6363	***0.8579***	0.7525
PERQ5	0.6693	0.6416	0.4871	0.6365	***0.8098***	0.6928
PERQ6	0.5510	0.7261	0.5295	0.7261	***0.8600***	0.6912
PERQ7	0.6836	0.7777	0.5314	0.7496	***0.8950***	0.7644
PERV1	0.6628	0.7206	0.4496	0.6442	0.7694	***0.8618***
PERV2	0.4784	0.6217	0.4827	0.6322	0.6181	***0.8055***
PERV5	0.5892	0.6373	0.4318	0.6382	0.7639	***0.8792***
PERV6	0.5845	0.7048	0.5472	0.7423	0.7394	***0.8731***

Table 4.6: Communality and Square of Correlation between Latent Variables

Latent variable	**IMAG**	**CUEX**	**PERQ**	**PERV**	**CUSA**	**CUSL**
IMAG	***0.8602***					
CUEX	0.6788	***0.8312***				
PERQ	0.8028	0.7596	***0.8562***			
PERV	0.7768	0.6807	0.8484	***0.8553***		
CUSA	0.8242	0.6666	0.8324	0.7863	***0.9152***	
CUSL	0.7156	0.4818	0.5957	0.5577	0.7209	***0.9589***

4.5.2 Inner Model Results

Simple/multiple regression coefficients for each endogenous latent variable, *p*-value and R^2 statistics are shown in Figure 4.4.

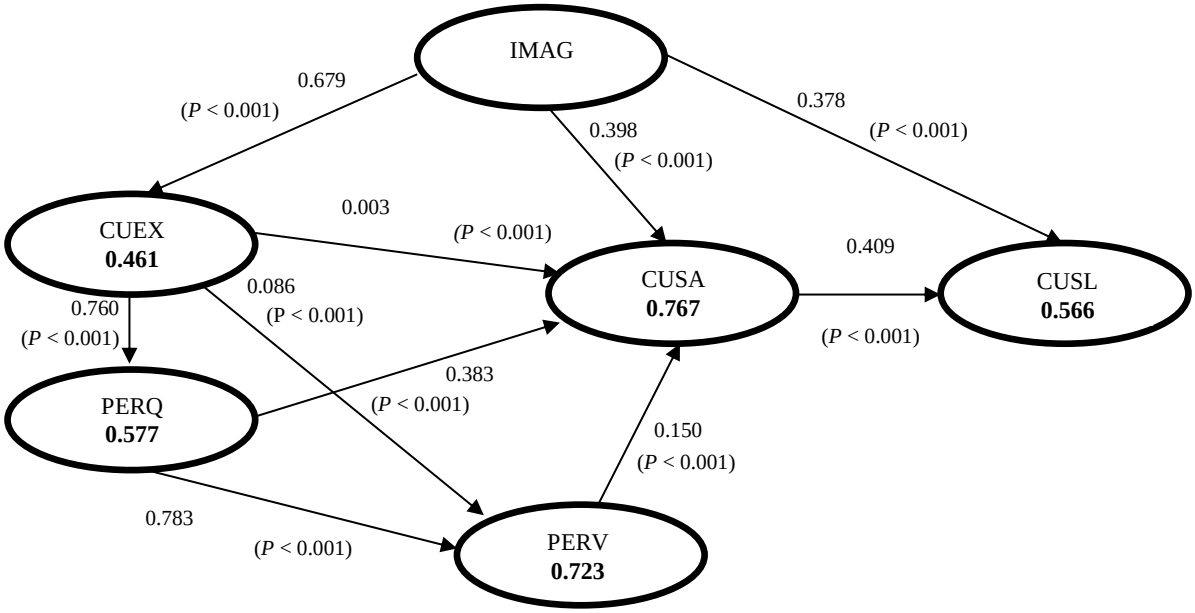


Figure 4.4: Path Diagram of Regression Coefficient the Customer Satisfaction Index of Malaysia Mobile Phone Sector Model

The causality scores in Figure 4.2 show the various structural regressions of the customer satisfaction index of Malaysia mobile phone sector model. The path coefficients, given on the lines, are the standardized regression coefficients with their significant levels (*p*-values in parenthesis). The R^2 values, given in the circles, are the fraction of the total variance of the dependent variable that is explained by its regression model. It is important to notice that all the relationships between the latent variables in the model are positive. Therefore, for each regression scores, an increase in the value of an independent latent variable will also increase the value of related dependent latent variable.

According to regression relationships for customer satisfaction (CUSA), image (IMAG) and perceived quality (PERQ) have significant impact on customer satisfaction with the value are 0.398 and 0.382, respectively. In addition, non-significant impact for perceived value (PERV) and customer expectation (CUEX)

value are 0.150 and 0.003, respectively. The R^2 measure for customer satisfaction is 0.767. This means that the regression model can explain 77% of the total variance in satisfaction.

A particular attention should be paid to customer loyalty (CUSL) construct since it is the ultimate factor in the model. Image and customer satisfaction are the independent latent variables of this constructs with the regression coefficient values of 0.378 and 0.409, respectively, ($p < 0.001$). The R^2 measure of this regression model is 0.566, which can be considered as satisfactory. Other noticeable strong relationship exists between company image and customer expectation with the value is 0.679, with the R^2 measure of this regression model is 0.461, which is means moderate. The value of relationship customer expectation and perceived quality with is 0.760; with the R^2 measure of this regression model is 0.577, which is means moderate. The value of relationship perceived quality and perceived value is 0.783, and non-significant impact for the relationship between customer expectation and perceived value with the regression coefficient of this relationship is 0.086. The R^2 measure of this regression model is 0.723, which is means substantial.

4.5.2.1 Relationship Inter-Variable Results

Values of the relationship between variables are given in Table 4.7.

Table 4.7: Path Coefficients (Mean, STDEV, T-Values)

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**Standard Error (STERR)**	**T Statistics (|O/STERR|)**
CUEX -> CUSA	0.0035	0.0070	0.0818	0.0818	0.0425
CUEX -> PERQ	0.7596	0.7653	0.0491	0.0491	15.4854
CUEX -> PERV	0.0859	0.0830	0.0914	0.0914	0.9396
CUSA -> CUSL	0.4090	0.4101	0.1655	0.1655	2.4713
IMAG -> CUEX	0.6788	0.6840	0.0681	0.0681	9.9631
IMAG -> CUSA	0.3978	0.3904	0.1248	0.1248	3.1883
IMAG -> CUSL	0.3785	0.3795	0.1558	0.1558	2.4286
PERQ -> CUSA	0.3832	0.3749	0.1231	0.1231	3.1143
PERQ -> PERV	0.7831	0.7833	0.0885	0.0885	8.8500
PERV -> CUSA	0.1499	0.1636	0.1076	0.1076	1.3927

Based on Table. 4.7 show that the relationship between CUEX with CUSA was non-significant with the T-statistics of 0.0425 (< 1.96). The value of original sample estimate was positive for 0.0035, which indicates that the relationship between CUEX with CUSA is positive. Thus, in this research, it can be concluded that customer expectation has positive relationship but non-significant impact on customer satisfaction. Customer expectations indicate previous consumption of the customer experience with a company's products or services, including experience from marketing and information by word of mouth. In this research indicates that customer expectation not affecting to customer satisfaction. This finding was similar with the previous studies, which indicated that there was non-significant relationship between the customer expectation and the customer satisfaction (Zaim et al., 2010; Turkyilmaz & Özkan, 2007; Turel & Serenko, 2006; Johnson et al., 2001; Bayol et al., 2000).

The relationship between CUEX with PERQ was significant with the T-statistics of 15.4854 (> 1.96). The value of original sample estimate was positive for 0.7596, which indicates that the relationship between CUEX with PERQ is positive. Thus, in this research, it can be concluded that customer expectation has positive relationship and significant impact on perceived quality. This indicates that the customers have more expectation on the quality of services and products from mobile phone provider. This finding was similar with the previous studies such as Chang and Chou (2008); Turel and Serenko (2006), Expectations have positive effect on perceived quality of mobile services; therefore, as the level of perceived expectations increases, the level of perceived quality also increases (Chang & Chou, 2008; Turel & Serenko, 2006).

The relationship between CUEX with PERV was non-significant with the T-statistics of 0.9396 (< 1.96). The value of original sample estimate was positive for 0.0859, which indicates that the relationship between CUEX with PERV is positive. Thus, in this research, it can be concluded that customer expectation has positive relationship but non-significant impact on perceived value. This show that the expectations of the

customer before using a product or a service provider is not assessed based on the price to be paid, but any other factors that more important than perceived value. This result is in line with research by Zaim et al. (2010); Johnson et al. (2001); and Fornell et al. (1996), reported that the relationship between customer expectation and perceived value is unclear.

The relationship between CUSA with CUSL was significant with the T-statistics of 2.4713 (> 1.96). The value of original sample estimate was positive for 0.4090, which indicates that the relationship between CUSA with CUSL is positive. Thus, in this research, it can be concluded that customer satisfaction has positive relationship and significant impact on customer loyalty. Customers who are satisfied, tend to use products and services from a same provider, it will affect the intention to buy more and become loyal customers. This finding was similar with the previous studies such as by Zaim et al. (2010); Chang and Chou (2008); Aydin and Özer (2005); and Bayol et al. (2000). Thus, as the level of customer satisfaction increases, the level of customer loyalty increases

The relationship between IMAG with CUEX was significant with the T-statistics of 9.9631 (> 1.96). The value of original sample estimate was positive for 0.6788, which indicates that the relationship between IMAG with CUEX is positive. Image becomes increasingly important, not only about brand name but also as a differentiator with others and it is also as a customer perception. This perception is including all aspect that provider given to. A good image is related to good performance that offered from provider. Thus, in this research, it can be concluded that image has positive relationship and significant impact on customer expectation. This result is in line with research by Zaim et al. (2010); Sun and Han (2010), thus, a strong corporate image would create higher customer expectation.

The relationship between IMAG with CUSA was significant with the T-statistics of 3.1883 (> 1.96). The value of original sample estimate was positive for 0.3978, which indicates that the relationship between IMAG with CUSA is positive. Thus, in this research, it can be concluded that image has positive relationship and significant

impact on customer satisfaction. Provider that have good image in the customer's perception can give satisfaction to the customers. This finding was similar with the previous studies such as by Zaim et al. (2010); Sun and Han (2010); and Bayol et al. (2000)

The relationship between IMAG with CUSL was significant with the T-statistics of 2.4286 (> 1.96) The value of original sample estimate was positive for 0.3785, which indicates that the relationship between IMAG with CUSL is positive. Thus, in this research, it can be concluded that image has positive relationship and significant impact on customer loyalty. A good image can give effect to customer in process of decision-making to purchase a product or service that increases of customer loyalty. This result is in line with research by Sun and Han (2010); and Bayol et al. (2000)

The relationship between PERQ with CUSA was significant with the T-statistics of 3.1143 (> 1.96). The value of original sample estimate was positive for 0.3832, which indicates that the relationship between PERQ with CUSA is positive. Thus, in this research, it can be concluded that perceived quality has positive relationship and significant impact on customer satisfaction. Perceived quality is a customer's evaluation about the service quality which is received from the mobile phone provider. A good quality of products and services that offered by provider that give impact to customer satisfaction. This result confirmed the previous studies that found positive relationship between the service quality and customer satisfaction (Sun & Han, 2010; Zaim et al., 2010; Turel & Serenko, 2006; Aydin & Özer, 2005; Bayol et al., 2000)

The relationship between PERQ with PERV was significant with the T-statistics of 8.8500 (> 1.96). The value of original sample estimate was positive for 0.7831, which indicates that the relationship between PERQ with PERV is positive. Thus, in this research, it can be concluded that perceived quality has positive relationship and significant impact on perceived value. This means that customer will tolerate with the price paid for good quality of products or service received. This finding was

similar with the previous studies such as by Chang and Chou (2008); Turel and Serenko (2006).

The relationship between PERV with CUSA was non-significant with the T-statistics of 1.3927 (< 1.96). The value of original sample estimate was positive for 0.1499, which indicates that the relationship between PERV with CUSA is positive. Thus, in this research, it can be concluded that perceived value has positive relationship and non-significant impact on customer satisfaction. Perceived value is often defined as the level of perceived quality of a product or service relative to the price paid by the customer. The perceived value is a measure of quality based on price. In this research shows that customer satisfaction of provider is not determined based on the value or price of a product or service.

Based on the value of original sample, the highest values that affecting customer satisfaction is image that is 0.3978. it shows that the image has an influence on customer satisfaction. Further, the variable that affecting customer loyalty is customer satisfaction with the highest value of the original sample estimate is 0.4090.

4.6 Index Scores for Mobile Phone Sector

The index scores of the latent variables are calculated as the weighted average of manifest variables pertaining to their own block. Then the CSI scores are calculated as following:

$$\text{CSI} = \frac{\sum_{i=1}^{3} w_4 y_{4i}}{\sum_{i=1}^{3} w_{4i}} \times 10 \qquad (4.1)$$

Where *y* is the manifest variable related to latent CSI, and *w* is the unstandardised outer weight between latent variable and related centered manifest variable.

Considering the survey data from 155 mobile phone customer on international student in UUM, the customer satisfaction index score for Malaysia mobile phone

industry is found 66.94 (for 0-100 scale). The other latent variable scores are shown in Figure 4.5.

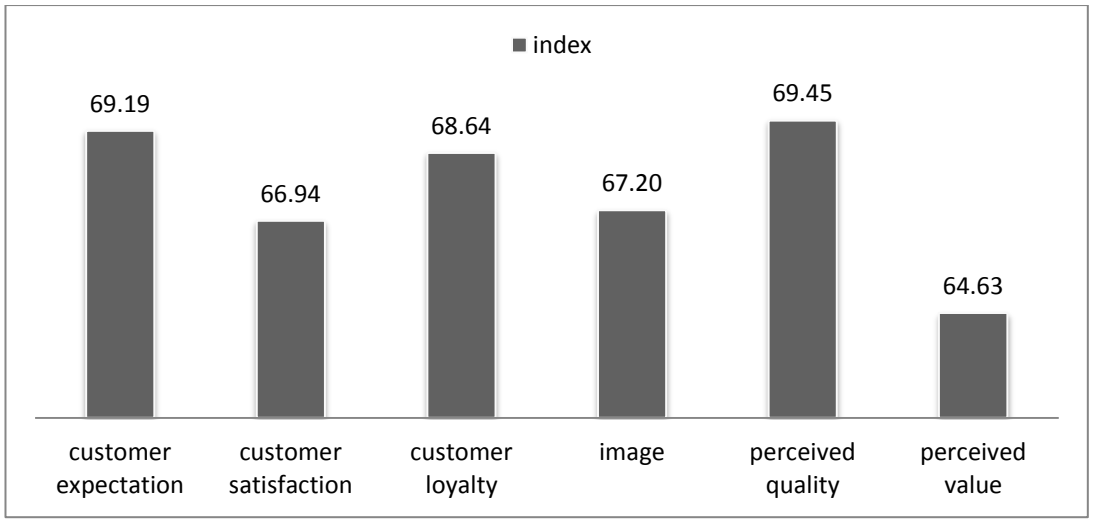


Figure 4.5: Index Scores for Malaysia Mobile Phone Sector

The results show that the quality level of products they perceived is very high with the value is 69.45. On the other hand, the mobile phone users' expectation is also very high with the value is 69.19. The lowest score of the customer satisfaction index of Malaysia mobile phone sector model is perceived value with the score is 64.63, which shows the price/quality and quality/price evaluation. Since, mobile phone firms are known as leading firms for technological products their image is expected to be high. Image score for Malaysia mobile phone sector is 67.20. Customer loyalty score is found to be 68.64. Loyal customers are those who keep buying from the same company, recommend to others, and have price tolerance.

4.7 Conclusion

The structural model customer satisfaction index of Malaysia mobile phone sector was analyzed using the Partial Least Squares-Structural Equation Modeling (PLS-SEM) method. The general applicability of a CSI model depends on the reliability and validity of the modeling results (Chan, Hui, Lo, Siu, Tso, & Wu, 2003). Reliability and validity the customer satisfaction index of Malaysia mobile phone sector model was assessed by checking unidimensionalty of the blocks, individual

item reliability, convergent validity and discriminant validity. All test results are found to be satisfactory. The primary objective of PLS is the minimization of error (or maximization of variance explained) in all dependent constructs, which can be measured by R^2 values of structural models. The R^2 value for customer satisfaction is 0.767. This result satisfies the crucial requirement for validity of structural model (i.e. predictive power).

From the results for customer satisfaction index of Malaysia mobile phone sector, we can conclude that customer satisfaction is mostly affected by image followed by perceived quality. As it is mentioned above, image refers to the brand name and kind of associations customers get from product/company. Image is one of the most important components of the customer satisfaction model. For the companies, image is a result of being reliable, professional and innovative, having contributions to society, and adding prestige to its customers.

Customer loyalty, the ultimate factor in the model, is another important construct that should be taken into account. The findings show that customer satisfaction and company image have positive and significant effect on customer loyalty. Customer satisfaction is found to be the most important factor for enhancing customer loyalty. Thus, as the level of customer satisfaction increases, the level of customer loyalty increases. The research concluded that if Malaysia's mobile services industry wants to effectively increase customer loyalty among international student, it should work out a way to improve customer satisfaction.

Finally, for the relationship between other variables, this research find that strong relationship exist between image with customer expectation, customer expectation with perceived quality, perceived quality with perceived value. On the other hand, non-significant impact was found between customer expectation with customer satisfaction, customer expectation with perceived value and perceived value with customer satisfaction.

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter represents a conclusion of whole research project. This is the final part of the whole project. In this chapter, the chapter starts with conclusions based on the research objectives from Chapter One. Recommendations will be presented after the conclusions section.

5.2 Conclusions

As competition is increasing among the companies, especially in the mobile market today, this market has become extremely competitive and the service providers are moving aggressively to attract customers by offering attractive promotions and services. Therefore, the service providers should take the necessary action for them to know the effects that will make customers satisfied in order to be able to retain customer loyalty in the telecommunication service. The findings of this research are very informative for mobile phone provider to attract users of Malaysia mobile phone provider especially for foreigner or international student in Malaysia. In addition, result of this research will help the mobile service provider to shave their products and services policies in such a way that would maximize customer satisfaction and maintain their customer in order to achieve higher market share.

In this research, we examined the relationship among the constructs of the customer satisfaction index model of Malaysia mobile phone sector. The PLS-SEM technique was used for testing the framework of the relationship among the constructs.

The analysis results show that image of the company has the highest impact on customer satisfaction. As it is mentioned above, image refers to the brand name and

the kind of associations customers get from the product/company. Image is one of the most important components of the customer satisfaction model. One implication of these findings for managers is to assess image as part of an assessment of perceptions of customer satisfaction. A positive image makes it easier for organizations to communicate effectively, and it makes people more perceptive to favorable word-of-mouth messages. It is very important for organizations to have a clear and favorable image (Kang & James, 2004). A good image can positively affect a company's sales and market share (Shapiro, 1982), and the establishment and maintenance of a loyal relationship with customers (Nguyen & LeBlanc, 2001). As reported by Keller and Aaker (1997), a strong image can be used to increase communication efficiency. De Ruyter and Wetzels (2000) state that the image is an information cue that consumers use to judge matters such as credibility, perceived quality and purchase intentions. Additionally, some researchers affirm that an image builds the reputation of the company and that a favorable image leads to a positive corporate reputation in the minds of the public (Alessandri, 2001).

The result also revealed that customer satisfaction and image ware significantly related to loyalty. In addition that the highest score among constructs was found between customer satisfaction and customer loyalty as a score a 0.437. Thus, as the level of customer satisfaction increases, the level of customer loyalty increases. The research concluded that if the provider wants to effectively increase customer loyalty, it should work out a way to improve customer satisfaction.

In a similar vein, significant positive direct impact between perceived quality with customer satisfaction, image with customer expectations, customer expectation with perceived quality, and perceived quality with perceived value. Non-significant impact between customer expectations with customer satisfaction, customer expectation with perceived value, and perceived value with customer satisfaction

Finally, all the variables of CSI model such as in the framework Chapter Three is suitable for a new Customer Satisfaction Index (CSI) model for international student perception of Malaysia mobile phone sectors, except for the link of customer

expectation with customer satisfaction, customer expectation with perceived value, and perceived value with customer satisfaction, because their relationship have weak and non-significant impact.

Above all, an understanding of direct effect by the key factors that affecting the customers perception in mobile phone provider will put the practitioner in a better position to design appropriate strategies to deal with marketing practices that will enhance the benefit of the provider.

5.3 Recommendations

From this study, the researcher recommends a few approaches that could be taken to improve customer satisfaction and customer loyalty of Malaysia mobile phone provider. First, future research employs larger sample size from diverse locations. The number of respondent can be increased to cover all foreigners in Malaysia in order to be more representative. The increase of respondents can be done by sending the questionnaires through internet to target respondent. Second, this customer satisfaction index of Malaysia mobile phone sector model can be tested for Malaysian as a sample, so it can be used as a comparison in this research, and the model should be tested periodically so we can get the appropriate model for Malaysian mobile phone sector. Third, in the future, the research can be expanded to examine from a marketing point of view. Finally, results this research can be share in the conference, to give more information to other people and especially for the Malaysia mobile phone provider.

REFERENCES

Achour, M., Md Said, N. P., & Boerhannoeddin, A. (2011). Customer loyalty: The case of mobile phone users in Universiti Utara Malaysia. *International Journal of Management Studies (IJMS)*, *18*(2), 43-66.

Agarwal, S., Erramilli, M. K., & Dev, C. S. (2003). Market orientation and performance in service firms: Role of innovation. *Journal of Services Marketing*, *17*(1), 68-82.

Alessandri, S. W. (2001). Modeling corporate identity: A concept explication and theoretical explanation. *Corporate Communications: An International Journal*, *6*(4), 173-182.

Anderson, E. W., & Fornell, C. (2000). Foundations of the American customer satisfaction index. *Total Quality Management*, *11*(7), 869-882.

Anderson, E. W., Fornell, C., & Lehmann, D. R. (1994). Customer satisfaction, market share, and profitability: Findings from Sweden. *The Journal of Marketing*, 53-66.

Andreassen, T. W., & Lindestad, B. (1998). Customer loyalty and complex services: The impact of corporate image on quality, customer satisfaction and loyalty for customers with varying degrees of service expertise. *International Journal of Service Industry Management*, *9*(1), 7-23.

Andrews, F. M. (1984). Construct validity and error components of survey measures: A structural modeling approach. *Public Opinion Quarterly*, *48*(2), 409-442.

Aydin, S., & Özer, G. (2005). National customer satisfaction indices: An implementation in the Turkish mobile telephone market. *Marketing Intelligence and Planning*, *23*(5), 486-504.

Aydin, S., Özer, G., & Arasil, Ö. (2005). Customer loyalty and the effect of switching costs as a moderator variable: A case in the Turkish mobile phone market. *Marketing Intelligence and Planning*, *23*(1), 89-103.

Babakus, E., Ferguson Jr, C. E., & Jöreskog, K. G. (1987). The sensitivity of confirmatory maximum likelihood factor analysis to violations of measurement scale and distributional assumptions. *Journal of Marketing Research*, 222-228.

Balderjahn, I., (1986). The robustness of LISREL unweighted least squares estimation against small sample size in confirmatory factor analysis models, in Classification as a tool of research, W. Gaul and M. Schader, Eds. Amsterdam: North-Holland publishing company

Bandalos, D. L. (2002). The effects of item parceling on goodness-of-fit and parameter estimate bias in structural equation modeling. *Structural Equation Modeling*, *9*(1), 78-102.

Baumgartner, H., & Homburg, C. (1996). Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing*, *13*(2), 139-161.

Baumgartner, H., & Pieters, R. (2003). The structural influence of marketing journals: A citation analysis of the discipline and its subareas over time. *Journal of Marketing*, *67*(2), 123-139.

Bayol, M. P., de la Foye, A., Tellier, C., & Tenenhaus, M. (2000). Use of PLS path modeling to estimate the European consumer satisfaction index (ECSI)

model. *Statistica Applicata-Italian Journal of Applied Statistics, 12*(3), 361-375

Bollen, K. A. (1989). *Structural equations with latent variables.* New York: Wiley.

Bollen, K. A. (2011). Evaluating effect, composite, and causal indicators in structural equation models. *MIS Quarterly, 35*(2), 359-372.

Boomsma, A., & Hoogland, J. J. (2001), The robustness of LISREL modeling revisited, in structural equation models: Present and future, R. Cudeck and S. du Toit and D. Sorbom, Eds. Chicago: Scientific Software International

Boyle, G. J. (1991). Does item homogeneity indicate internal consistency or item redundancy in psychometric scales?. *Personality and Individual Differences*, *12*(3), 291-294.

Buchanan, T. (1985). Commitment and leisure behavior: A theoretical perspective. *Leisure Sciences*, *7*(4), 401-420.

Butt, M. M., & de run, E. C. (2009). Modelling customer satisfaction in cellular phone services. *Jurnal Kemanusiaan, 13.*

Carmines, E.G. and Zeller, R.A. (1979), Reliability and Validity Assessment, Sage University Paper Series on Quantitative Applications in the Social Sciences No. 7-17, Sage, Beverly Hills, CA.

Cavana, R. Y., Delahaye, B. L., Sekaran, U. (2001). *Applied Business Research Qualitative and Quantitative Methods*. Milton: John Wiley.

Chan, L. K., Hui, Y. V., Lo, H. P., Siu, K. T., Tso, G. K., & Wu, M. L. (2003). Consumer satisfaction index: New practice and findings. *European Journal of Marketing*, *37*(5/6), 872-909.

Chang, P. K., & Chong, H. L. (2011). Customer satisfaction and loyalty on service provided by Malaysian telecommunication companies. *Electrical Engineering and Informatics (ICEEI).* 1-6.

Chang, S. C., & Chou, C. M. (2008). Factors affecting the satisfaction of China's mobile services industry customer. *Dept. of Business Administration, National Cheng Kung University*, *1*.

Chew, F. C., Ismail, R., & Eam, L. H. (2010). Factors affecting choice for education destination: A case study of international students at Universiti Utara Malaysia. *The Third International Conference on International Studies*. 1-10.

Chien, T. K., Chang, T. H., & Su, C. T. (2003). Did your efforts really win customers' satisfaction?. *Industrial Management and Data Systems*, *103*(4), 253-262.

Chin, W. W. (2010). How to write up and report PLS analyses. In V. E. Vinzi, W. W. Chin, J. Henseler, & H. Wang (Eds.), *Handbook of partial least squares: Concepts, methods, and applications* (pp. 655-690). Berlin: Springer.

Chin, W. W., & Newsted, P. R. (1999). Structural equation modeling analysis with small samples using partial least squares. In R. H. Hoyle (Eds.), *Statistical Strategies for Small Sample Research* (pp. 307-341). Sage: Thousand Oaks.

Chin, W. W., (1998). The partial least squares approach for structural equation modeling. In Marcoulides GA (Eds.), *Modern Methods for Business Research* (pp. 295-336). London: Lawrence Erlbaum Associates.

Churchill Jr, G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 64-73.

Cottet, P., Lichtlé, M. C., & Plichon, V. (2006). The role of value in services: A study in a retail environment. *Journal of Consumer Marketing*, *23*(4), 219-227.

Dabholkar, P. A., Thorpe, D. I., & Rentz, J. O. (1995). A measure of service quality for retail stores: Scale development and validation. *Journal of the Academy of Marketing Science*, *24*(1), 3-16.

Dachyar, M., & Noviannei, M. (2012). Customer satisfaction index telecommunication industry in Indonesia. *World Academy of Science, Engineering and Technology*. 69

De Ruyter, K., & Wetzels, M. (2000). The role of corporate image and extension similarity in service brand extensions. *Journal of Economic Psychology*, *21*(6), 639-659.

Dekimpe, M. G., Steenkamp, J. B. E., Mellens, M., & Vanden Abeele, P. (1997). Decline and variability in brand loyalty. *International Journal of Research in Marketing*, *14*(5), 405-420.

Demirbag, M., Koh, S. L., Tatoglu, E., & Zaim, S. (2006). TQM and market orientation's impact on SMEs' performance. *Industrial Management and Data Systems*, *106*(8), 1206-1228.

Deng, Z., Zhang, J., Zhao, L., Lu, Y., & Wei, K. K. (2009). Customer satisfaction and loyalty of mobile services. In *Mobile Business, 2009, ICMB 2009, Eight International Conference on* (pp. 115-119). IEEE

Diamantopoulos, A., Riefler, P., & Roth, K. P. (2008). Advancing formative measurement models. *Journal of Business Research, 61*(12), 1203-1218

Dick, A. S., & Basu, K. (1994). Customer loyalty: Toward an integrated conceptual framework. *Journal of the Academy of Marketing Science*, *22*(2), 99-113.

Dwivedi, Y. K., Choudrie, J., & Brinkman, W. P. (2006). Development of a survey instrument to examine consumer adoption of broadband. *Industrial Management and Data Systems*, *106*(5), 700-718.

Eklöf, J. A., & Westlund, A. H. (2002). The pan-European customer satisfaction index programme-current work and the way ahead. *Total Quality Management*, *13*(8), 1099-1106.

Eklöf, J. A., Hackl, P., & Westlund, A. (1999). On measuring interaction between customer satisfaction and financial results. *Journal of Total Quality Management*, *10*(4), 514-522.

Flavián, C., & Guinalíu, M. (2006). Consumer trust, perceived security and privacy policy: Three basic elements of loyalty to a web site. *Industrial Management and Data Systems*, *106*(5), 601-620.

Fornell, C. (1992). A national customer satisfaction barometer: The Swedish experience. *The Journal of Marketing*, 6-21.

Fornell, C. and Cha, J. (1994), Partial least squares, in Bagozzi, R.P. (Ed.), *Advanced Methods of Marketing Research* (pp. 52-78). Cambridge: Blackwell.

Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research*, 440-452.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 39-50.

Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., & Bryant, B. E. (1996). The American customer satisfaction index: nature, purpose, and findings. *The Journal of Marketing*, 7-18.

Ganesh, J., Arnold, M. J., & Reynolds, K. E. (2000). Understanding the customer base of service providers: An examination of the differences between switchers and stayers. *The Journal of Marketing*, 65-87.

Gefen, D., & Straub, D. (2005). A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example. *Communications of the Association for Information Systems, 16*(1), 91–109.

Gefen, D., Straub, D. W., & Boudreau, M. C. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information Systems*. *7*(7), 1-78

Gerbing, D. W., & Anderson, J. C. (1985). The effects of sampling error and model characteristics on parameter estimation for maximum likelihood confirmatory factor analysis. *Multivariate Behavioral Research*, *20*(3), 255-271.

Godambe, V. P. (1960). An optimum property of regular maximum likelihood estimation. *The Annals of Mathematical Statistics*, *31*(4), 1208-1211.

Gotz, O., Liehr-Gobbers, K., & Krafft, M. (2009). Evaluation of structural equation models using the partial least squares (PLS) approach. In: V. Esposito Vinzi, W. W. Chin, J. Henseler & H. Wang (Eds), *Handbook of partial least squares: Concepts, methods, and applications.* Berlin: Springer (in print)

Grigoroudis, E., & Siskos, Y. (2004). A survey of customer satisfaction barometers: Some results from the transportation-communications sector. *European Journal of Operational Research*, *152*(2), 334-353.

Gronholdt, L., Martensen, A., & Kristensen, K. (2000). The relationship between customer satisfaction and loyalty: Cross-industry differences. *Total Quality Management*, *11*(4-6), 509-514.

Haenlein, M., & Kaplan, A. M. (2004). A beginner's guide to partial least squares analysis. *Understanding statistics, 3*(4), 283-297

Heinonen, K. (2004). Reconceptualizing customer perceived value: The value of time and place. *Managing Service Quality*, *14*(2/3), 205-215.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing, 20*(1), 277-319

Hirschman, A. O. (1970). *Exit, voice, and loyalty: Responses to decline in firms, organizations, and states* (Vol. 25). Harvard university press.

Hsu, S-H., Chen, W-H., & Hsieh, M-J. (2006). Robustness testing of PLS, LISREL, EQS and ANN-based SEM for measuring customer satisfaction. *Total Quality Management, 17*(3), 355–371.

Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal*, *20*(2), 195-204.

Hurley, R. F., & Estelami, H. (1998). Alternative indexes for monitoring customer perceptions of service quality: A comparative evaluation in a retail context. *Journal of the Academy of Marketing Science*, *26*(3), 209-221.

Ismail, S. (2009), the Effect of Customers' Satisfaction towards Customer Loyalty among Mobile Telecommunication Providers in Malaysia, *Thesis Master of Administration: University Utara Malaysia.*

Jamil, J. M. (2012). Partial Least Squares Structural Equation Modelling with incomplete data: An investigation of the impacy of imputation methods. *Thesis of School of Management: University of Bradford*

Jamil. J.M., & Shaharanee, I. N. M. (2014). Estimating Partial Least Squares (PLS) With Incomplete Data. In the Proceedings of the 1st International Conference on the Analysis & Mathematical Applications in Engineering (AMEAS2014), Curtin University Malaysia, Malaysia, January 19-22, 2014.

Johnson, M. D., Gustafsson, A., Andreassen, T. W., Lervik, L., & Cha, J. (2001). The evolution and future of national customer satisfaction index models.*Journal of economic Psychology*, *22*(2), 217-245.

Jallow, M. (2013). Customer satisfaction in Taipei mobile phone sector. *African Journal of Business Management, 7*(6), 372-380.

Johnson, M. D., Herrmann, A., & Gustafsson, A. (2002). Comparing customer satisfaction across industries and countries. *Journal of Economic Psychology, 23*(6), 749–769.

Jöreskog, K. G. (1967). Some contributions to maximum likelihood factor analysis. *Psychometrika*, *32*(4), 443-482.

Joreskog, K. G., & Goldberger, A. S. (1972). Factor analysis by generalized least squares. *Psychometrika, 37*, 243-260.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, *39*(1), 31-36.

Kang, G. D., & James, J. (2004). Service quality dimensions: An examination of Grönroos's service quality model. *Managing Service Quality*, *14*(4), 266-277.

Keller, K. L., & Aaker, D. A. (1997). Managing the corporate brand: The effect of corporate marketing activity on consumer evaluations of brand extensions, *Marketing Science Institute* (No. 97-106). Cambridge, MA: Working Paper Report.

Kim, S., & Hagtvet, K. A. (2003). The impact of misspecified item parceling on representing latent variables in covariance structure modeling: A simulation study. *Structural Equation Modeling*, *10*(1), 101-127.

Kothari, C. R., (1985). *Research Methodology Methods and Techniques*. New Delhi: Wiley

Koter, P. (2003). *Marketing Management* (11th ed). Upper Saddle River: Prentice Hall.

Kristensen, K., & Eskildsen, J. K. (2010). Design of PLS-Based Satisfaction Studies. In V. E. Vinzi, W. W. Chin, J. Henseler, & H. Wang (Eds.), *Handbook of partial least squares: Concepts, methods, and applications* (pp. 247-278). Berlin: Springer.

Kuechler, W.L., McLeod, A., & Simkin, M.G. (2009). Why do not more students major in IS?. *Decision Sciences Journal of Innovative Education, 7*(2), 463–488.

Langley, C. J., & Holcomb, M. C. (1992). Creating logistics customer value. *Journal of Business Logistics, 13*, 1-1.

Lin, C., Nguyen, C., & Lin, B. (2013). Impact of cultural differences on foreign customers' perceived local services. *Journal of Services Marketing*, *27*(6), 6-6.

Lin, C., & Tseng, H. (2006). Identifying the pivotal role of participation strategies and information technology application for supply chain excellence. *Industrial Management and Data Systems*, *106*(5), 739-756.

Loke, S. P., Taiwo, A. A., Salim, H. M., & Downe, A. G. (2011). Service quality and customer satisfaction in a telecommunication service provider. *International Conference on Financial Management and Economics*, *11*. 24-29.

Long, J. S (1983). *Covariance structure models: An introduction to LISREL*. Beverly Hills: Sage Publications.

MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology, 51*, 201–226.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*, *1*(2), 130.

Marsh, H. W., Hau, K. T., Balla, J. R., & Grayson, D. (1998). Is more ever too much? The number of indicators per factor in confirmatory factor analysis. *Multivariate Behavioral Research*, *33*(2), 181-220.

McDougall, G. H., & Levesque, T. (2000). Customer satisfaction with services: Putting perceived value into the equation. *Journal of Services Marketing*, *14*(5), 392-410.

MCMC, (2011). *Consumer Satisfaction Survey 2011*. Retrieved from http://www.skmm.gov.my/Resources/Statistics/Consumer-Satisfaction-Survey.aspx

Meyer, A., & Dornach, F. (1996). The German customer barometer: Quality and satisfaction–Yearbook of customer satisfaction in German 1995. *German Marketing Association ev and German Post AG, Dusseldorf*.

Micceri, T. (1989). The unicorn, the normal curve, and other improbable creatures. *Psychological Bulletin*, *105*(1), 156.

Ministry of Higher Education Malaysia (Data represents January 2010 to December 2010). Retrieved from http://www.moe.gov.my/

Mittal, B., & Lassar, W. M. (1998). Why do customers switch? The dynamics of satisfaction versus loyalty. *Journal of Services Marketing*, *12*(3), 177-194.

Mohamed, R. K. M. H., SPR, C. R., & Yacob, P. (2012). The impact of employment of foreign workers: Local employability and trade union roles in Malaysia. *International Journal of Academic Research in Business and Social sciences*, *2*(10).

Mokhtar, S. S. M., & Maiyaki, A. A. (2011). The relationship between service quality and satisfaction on customer loyalty in Malaysia mobile communication industry. *School of Doctoral Studies European Union*, 32.

Nasser, F., & Wisenbaker, J. (2003). A Monte Carlo study investigating the impact of item parceling on measures of fit in confirmatory factor analysis. *Educational and Psychological Measurement*, *63*(5), 729-757.

Nguyen, N., & LeBlanc, G. (2001). Image and reputation of higher education institutions in students' retention decisions. *International Journal of Educational Management*, *15*(6), 303-311.

Oliver, R. L. (1977). Effect of expectation and disconfirmation on post exposure product evaluations: An alternative interpretation. *Journal of Applied Psychology*, *62*(4), 480.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 460-469.

Oliver, R. L. (1993). Cognitive, affective, and attribute bases of the satisfaction response. *Journal of Consumer Research*, 418-430.

Olson, J. C., & Dover, P. A. (1979). Disconfirmation of consumer expectations through product trial. *Journal of Applied Psychology*, *64*(2), 179.

Osman, Z., & Sentosa, I. (2013). Mediating effect of customer satisfaction on service quality and customer loyalty relationship in Malaysian rural tourism. *International Journal of Economics Business and Management Studies*, *2*(1), 25-37.

Peng, K. F., Fan, Y. W., & Hsu, T. A. (2004). Proposing the content perception theory for the online content industry–a structural equation modeling. *Industrial Management and Data Systems*, *104*(6), 469-489.

Pizam, A., & Ellis, T. (1999). Customer satisfaction and its measurement in hospitality enterprises. *International Journal of Contemporary Hospitality Management*, *11*(7), 326-339.

Rahman, S., Haque, A., & Ahmad, M. I. S. (2010). Exploring influencing factors for the selection of mobile phone service providers: A structural equation modeling (SEM) approach on Malaysian consumers. *African Journal of Business Management. 4*(13). 2885-2898.

Rasli, A., Shekarchizadeh, A., & Iqbal, M. J. (2012). Perception of service quality in higher education: Perspective of iranian students in Malaysia universities. *International Journal of Economics and Management, 6*(2). 201-220

Ravald, A., & Grönroos, C. (1996). The value concept and relationship marketing. *European Journal of Marketing*, *30*(2), 19-30.

Salleh, S. B. M., & Mahmood Gelaidan, H. (2012). Factors affecting customer satisfaction of mobile services in Yemen. *American Journal of Economics*, *2*(7), 171-184.

Samimi, A. J., & Mohammadi, R. (2011). Measuring customer satisfaction index (CSI) in Iranian tile industry using PLS path-modeling technique. *Middle-East Journal of Scientific Research, 8*(1), 141-149

Sánchez-Franco & Manuel, J. (2006). Exploring the influence of gender on the web usage via partial least squares. *Behavior and Information Technology*, *25*(1), 19–36.

Sang, S., Lee, J. D., & Lee, J. (2010). E-government adoption in Cambodia: A partial least squares approach. *Transforming Government: People, Process and Policy*, *4*(2). 138-157.

Saunders, M., Lewis, P., & Thornhill, A., (2003), *Research methods for business students*. Harlow: Prentice Hall.

Sekaran, U. (2003). *Research methods for business* (4th eds). Hoboken, NJ: John Wiley & Sons

Shapiro, C. (1982). Consumer information, product quality, and seller reputation. *The Bell Journal of Economics*, 20-35.

Sharma, S., Durvasula, S., & Dillon, W. R. (1989). Some results on the behavior of alternate covariance structure estimation procedures in the presence of non-normal data. *Journal of Marketing Research*. 26 (2), 214 - 221.

Straub, D., Boudreau, M. C., & Gefen, D. (2004). Validation guidelines for IS positivist research. *Communications of the Association for Information Syatems, 13*(24), 380–427.

Sun, T. S., & Han, X. (2010). Refinement of the customer satisfaction index for mobile phone service in China. *Service Systems and Service Management (ICSSSM), 2010 7th International Conference on* (pp. 1-6). IEEE.

Sureshchandar, G. S., Rajendran, C., & Anantharaman, R. N. (2002). The relationship between service quality and customer satisfaction–a factor specific approach. *Journal of Services Marketing*, *16*(4), 363-379.

Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005). PLS path modeling. *Computational Statistics and Data Analysis*, *48*(1), 159-205.

Turel, O., & Serenko, A. (2006). Satisfaction with mobile services in Canada: An empirical investigation. *Telecommunications Policy*, *30*(5), 314-331.

Türkyilmaz, A., & Özkan, C. (2007). Development of a customer satisfaction index model: An application to the Turkish mobile phone sector. *Industrial Management and Data Systems*, *107*(5), 672-687.

Velicer, W. F., & Fava, J. L. (1987). An evaluation of the effects of variable sampling on component, image, and factor analysis. *Multivariate Behavioral Research*, *22*(2), 193-209.

Verhagen, T., & Van Dolen, W. (2009). Online purchase intentions: a multi-channel store image perspective. *Information & Management*, *46*(2), 77–82.

Wen, C. H., & Hilmi, M. F. (2011). Exploring service quality, customer satisfaction and customer loyalty in the Malaysian mobile telecommunication industry. *Humanities, Science and Engineering (CHUSER), 2011 IEEE Colloquium on* (pp. 733-738). IEEE.

Wiley, D. E. (1973). The identification problem for structural equation models with unmeasured variables. In A. S. Goldberger, & O. D. Duncan (Eds.), *Structural equation models in the social sciences*. New York: Seminar.

Williams, L. J., Edwards, J., & Vandenberg, R. J. (2003). A review of advanced applications of structural equation techniques in organizational behavior and human resources management research. *Journal of Management, 29*, 903-936.

Wold, H. (1982), Soft modeling: the basic design and some extensions, in Jo¨reskog, K.G. and Wold, H. (Eds), *Systems Under Indirect Observation* (pp. 1-54) Part 2. Amsterdam: North Holland Press.

Wold, H. (1985), Partial least squares, in Kotz, S. and Johnson, N.L. (Eds), *Encyclopedia of Statistical Sciences* (pp. 581-91) Vol. 6. New York, NY: Wiley

Yeniay, A., & Goktas, A. (2002). A comparison of partial least squares regression with other prediction methods. *Hacettepe Journal of Mathematics and Statistics, 31,* 99-111

Yi, Y. (1990). A critical review of consumer satisfaction. *Review of Marketing*, *4*(1), 68-123.

Zaim, S., Turkyilmaz, A., Tarim, M., Ucar, B., & Akkas, O. (2010). Measuring customer satisfaction in Turk telekom company using structural equation modeling technique. *Journal of Global Strategic Management*, *7*, 89-99.

Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *The Journal of Marketing*, 2-22.

Zeithaml, V. A., & Bitner, M. J. (1996). *Services Marketing*. New York: McGraw Hill.

Zhang, J., Beatty, S. E., & Walsh, G. (2008). Review and future directions of cross-cultural consumer services research. *Journal of Business Research*, *61*(3), 211-224.

APPENDIX (RESEARCH QUESTIONNAIRES)

Dear Students,

These questionnaires are constructed and distributed for the purpose of obtaining information related to the research on "Investigate factors affecting customer satisfaction and customer loyalty of Malaysia mobile service provider among international students' perceptions".

We do require supports from all of you to fully participate in the research by providing the required information. We solemnly promise that all the information given be treated as strictly private and confidential.

Thanks you for your cooperation.

Your sincerely,

Mohd Kamal Mohd Nawawi
Jastini Mohd Jamil
Razamin Ramli
Email: jastini@uum.edu.my

Please check the box or write down your answers for the following questions

SECTION A: Demographic characteristic

Gender: ☐ Male ☐ Female

College: ☐ CAS ☐ COB ☐ COLGIS

Level of study: ☐ Undergraduate ☐ Master ☐ Ph.D/DBA

Your age: ☐ 15 – 20 years ☐ 21 – 25 years ☐ 26 – 30 years

☐ 31 – 40 years ☐ 41 – 50 years

Nationality: _____ (please write your nationality)

SECTION B: General characteristic

- Which is your mobile telephone provider? (If you regularly use more than one mobile telephone provider, think about the one you have had more frequent contact with during the last year)

  ☐ Maxis ☐ Celcom ☐ DIGI ☐ Others _____

- How long have you been a customer of "your mobile telephone provider"?

  Since year: _____ (please write down here)

SECTION C

➢ **CUSTOMER EXPECTATIONS**

Now I ask you to think about your own expectation on your mobile telephone provider, based on previous experience, using the scale where 1 means "not at all satisfied" and 10 means "very satisfied"

- Your expectations of the technical service offered by the company (cards delivery and additional connection when necessary), etc.?

Not at all satisfied **very satisfied**

1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

- Your expectations on functioning when you pick up the phone (ability to connect to other people domestically and abroad, availability of the telephone net, roaming, stability and quality of connection, etc.)?

Not at all satisfied **very satisfied**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- Your expectations on customer service (waiting-time when contacting the telephone company, opening hours at their help service, information about number, etc.)?

Not at all satisfied **very satisfied**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- Your overall expectations considering all aspects you find important by a telephone provider.?

Not at all satisfied **very satisfied**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

➢ **PERCEIVED QUALITY**

Now I will ask you a few questions your experience concerning the quality of functions and services during the last year, offered by your provider. Use the scale where 1 means "very low quality" and 10 "very high quality". How do you perceive:

- The quality of the personal service and advice offered by the personnel of your mobile telephone provider?

Very low **very high**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- The quality of the range of services offered from your telephone provider (voice connection, internet, data transmission, pay card arrangement, voice mail, etc.)?

Very low **very high**

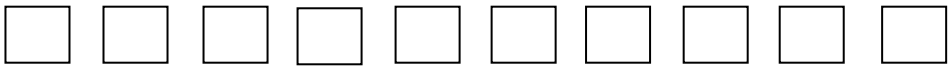
1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- The reliability and accuracy (standing orders processed in accordance with instructions, accuracy of statements, etc.)

Very low **very high**

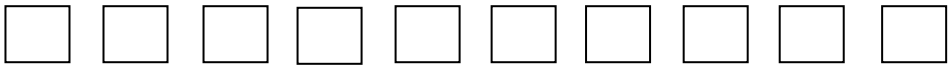
1 2 3 4 5 6 7 8 9 10



- The technical quality of the functions offered (clearness of the line, coverage, roaming, accessibility, etc.)?

Very low **very high**

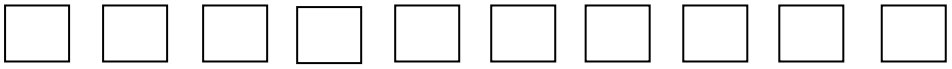
1 2 3 4 5 6 7 8 9 10



- The quality concerning the availability of the customer service (waiting time etc.)?

Very low **very high**

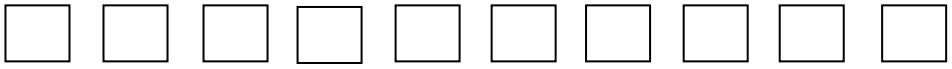
1 2 3 4 5 6 7 8 9 10



- The "overall quality" of the phone products (functions) offered by your mobile telephone provider?

Very low **very high**

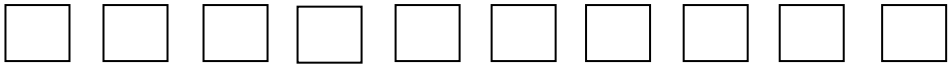
1 2 3 4 5 6 7 8 9 10



- The "overall quality" of the services offered by your mobile telephone provider?

Very low **very high**

1 2 3 4 5 6 7 8 9 10



➢ **PERCEIVED VALUE**

Consider the personal service and technical functions you have access to from your mobile telephone provider. How do you rate this in relation to the prices charged (costs of subscription and usage charges taken together). Use the scale 1 meaning "very low value for money", and 10 "very high value for money". How do you perceive"

- The value of the customer service and advice supplied by the personnel of the provider (opening hours, friendliness, speed of responding, etc.)

Very low value for money — **very high value for money**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- The value of product and services (coverage, subscriptions)?

Very low value for money — **very high value for money**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- The value of the range of services offered from your telephone provider (voice connection, internet, data transmission, pay card arrangements, voice mail, etc.)?

Very low value for money — **very high value for money**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- The value of the security and level of correctness performed by your mobile telephone provider (accurate billing, good specifications of charges, etc.)?

Very low value for money — **very high value for money**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- The value of the availability of the customer service (waiting time etc.)?

Very low value for money — **very high value for money**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- The "overall value" of the service at your mobile telephone provider in relation to the total costs of the facility?

Very low value for money **very high value for money**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

➢ **IMAGE**

Think about the general image of your telephone provider in society in terms of mobile services. How do you consider your provider to be generally rated and perceived among people in terms of…

- …the image of being a technically advanced, professional company with good national and international coverage?

Not at all satisfied **very satisfied**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- …the image of providing excellent customer service?

Not at all satisfied **very satisfied**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- …the image of offering good value for money to the customers?

Not at all satisfied **very satisfied**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- …the image of being a reliable telephone company?

Not at all satisfied **very satisfied**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- …the overall image of the telephone company?

Not at all satisfied **very satisfied**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

➢ **CUSTOMER SATISFACTION**

- Considering all your experience of your mobile telephone provider, how satisfied are you? (Use the scale where 1 means "not satisfied" and 10 means "very satisfied".

Not at all satisfied **very satisfied**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- To what degree do you consider that your telephone provider presently fulfils all your expectations? Use the scale where 1 means "fulfilled much less than expected" and 10 means "fulfilled much more than expected"

Much less Than expected **much more than expected**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

- How close are the services offered by this provider to your ideal mobile services?

Very far From ideal **very close to ideal**

1 2 3 4 5 6 7 8 9 10

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

➢ **CUSTOMER LOYALTY**

- Imagines your provider decides to increase price, while other providers are not doing so, how tolerances are you of price difference for changing your provider?

Not at all tolerance **very tolerance**

1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

- Would you recommend products or services from this provider to a friend or relative?

Definitely not **definitely**

1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

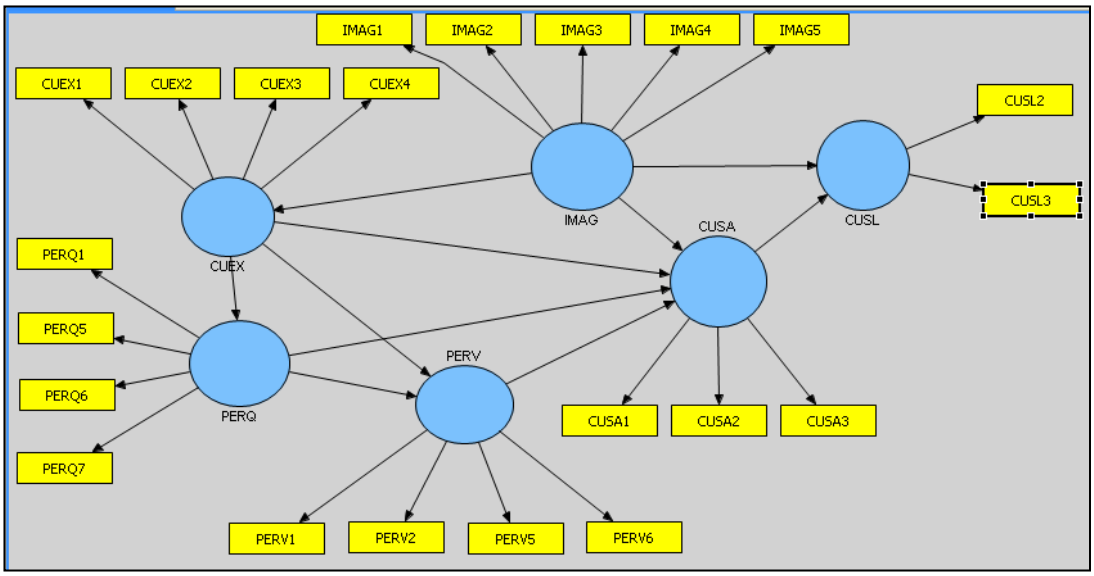
- How likely are you to use or purchase products or services again?

Very unlikely **very likely**

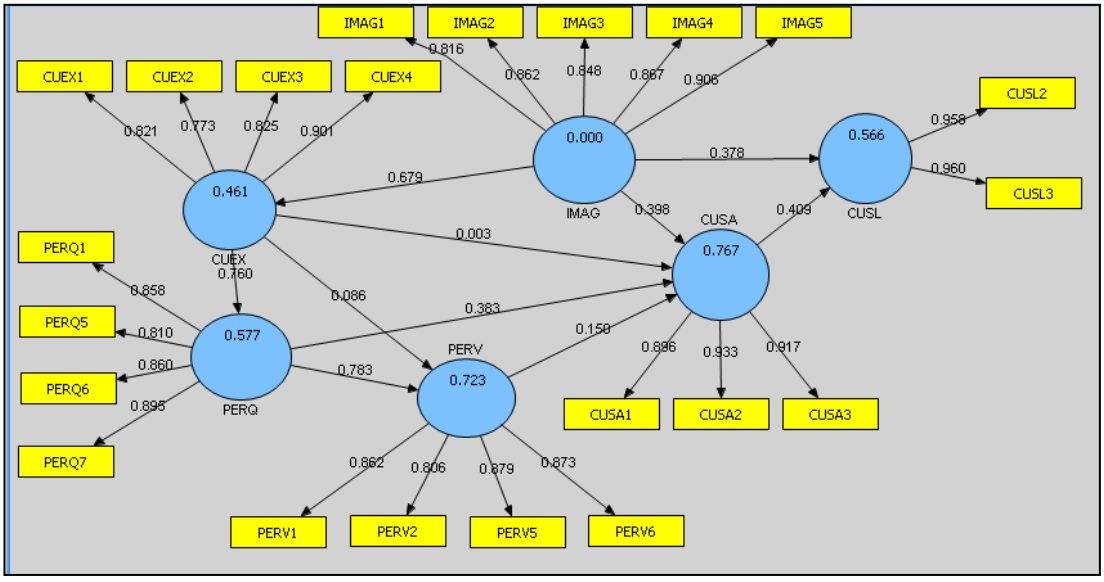
1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Thank you for your cooperation and participation

MODEL AND VALUE OF CUSTOMER SATISFACTION INDEX OF MALAYSIA MOBILE PHONE SECTOR AFTER ELIMINATING SOME OF MANIFEST VARIABLES



Latent Variables and Their Related Manifest in Customer Satisfaction Index of Malaysia Mobile Phone Sector Model after Eliminating Manifest Variables (PERQ2, PERQ3, PERQ4, PERV3, PERV4 and CUSL1)



The Value Interrelationship between all Variables after Eliminating Manifest Variables (PERQ2, PERQ3, PERQ4, PERV3, PERV4 and CUSL1)

Value of Cronbach's α and Composite reliability after Eliminating Manifest Variables (PERQ2, PERQ3, PERQ4, PERV3, PERV4 and CUSL1)

Block	Number of indicators	Cronbach's α	Composite reliability
IMAG	5	0.9119	0.9343
CUEX	4	0.8497	0.8991
PERQ	4	0.8782	0.9165
PERV	4	0.8775	0.9159
CUSA	3	0.9029	0.9393
CUSL	2	0.9125	0.9581

Value of Outer Weight and Outer Loadings after Eliminating Manifest Variables (PERQ2, PERQ3, PERQ4, PERV3, PERV4 and CUSL1)

Latent variable	Manifest variable	Outer weight	Loadings
IMAG	IMAG1	0.2085	0.8159
	IMAG2	0.2286	0.8617
	IMAG3	0.2365	0.8478
	IMAG4	0.2405	0.8675
	IMAG5	0.2471	0.9059
CUEX	CUEX1	0.2913	0.8209
	CUEX2	0.2733	0.7730
	CUEX3	0.3047	0.8247
	CUEX4	0.3310	0.9012
PERQ	PERQ1	0.2998	0.8579
	PERQ5	0.2798	0.8098
	PERQ6	0.2762	0.8600
	PERQ7	0.3115	0.8950
PERV	PERV1	0.3130	0.8618
	PERV2	0.2588	0.8055
	PERV5	0.2935	0.8792
	PERV6	0.3021	0.8731
CUSA	CUSA1	0.3638	0.8962
	CUSA2	0.3678	0.9325
	CUSA3	0.3612	0.9166
CUSL	CUSL2	0.5139	0.9577
	CUSL2	0.5289	0.9577