LEVEL OF SERVICE QUALITY OF SME LABORATORY SERVICES ON CUSTOMER EXPECTATION

BY

YEOW LIANG MING

(S-GSM0215/12)

Research proposal submitted in Partial Fulfillment of the requirements for the degree of Master of Business Administration

UNIVERSITI SAINS MALAYSIA

DEC 2015

ACKNOWLEDGEMENT

There are many individuals whom I would like to thank for their underlying support and guidance that made it possible for me to complete this MBA thesis. First of all, my sincere gratitude goes to my beloved family, to my parents for giving me life in the first place and for unremitting love and encouragement to pursue my studies.

I am greatly indebted to my supervisors, Prof. Madya Hj Noor Nasir bin Kader Ali, for his stimulating information, encouragement and providing much-needed assistance in all time of research and writing the thesis. I could not complete the thesis without his help. From the bottom of my heart, it is really my honour to have him as my supervisors, Thank you.

In addition, this thesis would not have been complete if it was not for a group of individuals whom I truly am grateful for having in my life. My deepest thank you goes out to my lecturers of AGW621 Research Methodology, Dr. Yudi for his guidance and comments. Last but not the least; my appreciation goes out to my dear friend, my study group members as well as classmates whom had been there from the very beginning; Chong Fong Yin and Yew Shu Qi, thank you.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRAK

Dalam persekitaran perniagaan kini, syarikat-syarikat perkhidmatan makmal perlu memahami dan mengukur jangkaan pelanggan berdasarkan perspektif pelanggan dalam usaha untuk mengurangkan jurang dalam kualiti perkhidmatan mereka. Objektif kajian ini adalah untuk mengkaji hubungan antara kualiti perkhidmatan makmal dan jangkaan pelanggan di Malaysia dikaitkan oleh budaya. Salah satu cabaran terbesar yang dihadapi oleh makmal komersial SME hari ini adalah keperluan untuk membangunkan model perniagaan baru yang mementingkan kepada memenuhi jangkaan pelanggan.

Satu kajian kuantitatif dengan menggunakan soal selidik berstruktur yang diadaptasi daripada kajian sebelum ini dengan menggunakan persampelan bertujuan melalui Borang Google dan format salinan cetak pengedaran langsung kepada 150 pelanggan makmal di Malaysia.Statistical Package for the Social Sciences (SPSS) dan Partial Least Square (PLS) telah digunakan untuk menganalisis data. Responsif merupakan faktor yang penting bagi jangkaan pelanggan, diikuti oleh kebolehpercayaan, laporan ujian, tangibility, sikap dan tingkah laku kakitangan makmal. Di samping itu, jarak kuasa boleh menyederhanakan kesan tangibility dan jangkaan pelanggan. Kajian in boleh digunakan untuk merangka pelan yang lebih sempurna untuk makmal komersial SME bagi membantu dalam pembangunkan strategi perniagaan dan memilih pendekatan yang lebih sesuai. Ia juga digunakan untuk mengurangkan jurang jangkaan pelanggan mengenai kualiti perkhidmatan makmal.

ABSTRACT

In current business environment, laboratory service companies need to understand and measure the customer expectations based on customers' perspective in order to reduce the gaps in their service quality. The objective of this study is to examine the relationship between lab service quality and customer expectation in Malaysia moderated by culture. One of the biggest challenges facing by SME commercial laboratory today is the need to develop new business models that stress on meeting the customer expectation.

A quantitatve study, using self-administered structured questionnaire adapted from previous studies, are issued using purposive sampling via Google Form and hardcopy format direct distribution to 150 laboratories' customers in Malaysia. Statistical Package for the Social Sciences (SPSS) and Partial Least Square (PLS) were used to analyse the data. Responsiveness is strong factor influence customer expectation, followed by reliability, test report, tangibility, laboratory staffs attitude and behaviour. In addition, power distance does moderate the effect of tangibility and customer expectation. The research findings can be used to formulate better plan for SME commercial laboratory to help in developing business strategy and selecting best fit approach to apply and to reduce the gap of customer expectation on laboratory service quality.

CHAPTER 1: INTRODUCTION

1.1 Introduction

This chapter covers the background of study, research problems, research objectives and research questions. It then continued with significant of the study, definition of variables and a brief summary of the remaining chapters in this research proposal.

1.2 Background of the Study

Service-driven economy is becoming very important due to the growth rate and size of service sector which have nominated the world economy. The main indicator of country's economy progress is determined by the service sector's contribution and key growth to their Gross Domestic Product (GDP) (Chen *et al*., 2012). Service organizations are vary in size from Small Medium Enterprises (SMEs) to Multinational Companies (MNCs) and are well distributed locally, nationally and globally (Chen *et al*., 2012). The study of service quality is crucial to improve the competitive advantage of an organization.

Management in the service industry is facing the pressure improve their services delivery quality with the limited financial and constraint resources (Juna *et al.,* 2013). Service organizations need to understand and measure the customer expectations based on customers' perspective in order to reduce the gaps in their service quality (Juna *et al.,* 2013). This essential information then will assist the management team in identifying proper strategies and plans to narrow down service quality gaps. A critical decision has to

be made with their scarce resources to re-strategize their plan in order to focus on customer expectation.

With the goal of sustaining long term relationships with their customers, many organizations have re-strategized their corporate strategy and plan to retain the customers in the competitive business environment (Chen *et al.* 2012). Preserving their long term customer relationships requires that these businesses measure the service quality appropriately based on the customers' expectation.

In the service sector, service quality is defined as how well service provider can meet customer requirements and expectations. The point of contact between the front-line personnel and customer is one of the most important encounters in delivery excellent service quality (Juna *et al.,* 2013). Customer expectations are derived from various sources such as the information pertaining to a product or services from their previous encounter, word-of-mouth, publicity communication, expert opinion and marketing advertisements by competitors and personal needs finding (Michael *et al.*, 2013).

Service quality is a major influence on customer satisfaction as customers buy products or services and on whether they continue to do so. As a result, accurate and reliable instruments that assess service quality are of interest to companies whose revenues come in whole or part from service delivery. Currently the most popular and ubiquitous service quality instrument is SERVQUAL (Parasuraman *et. al*., 1988; Aaron and Roger, 2013). SERVQUAL has five important service quality dimensions like

tangibility, reliability, empathy, responsiveness and assurance to evaluate customers' expectation and satisfactory (Parasuraman *et. al*., 1988).

SERVQUAL model is evaluating the proposition that service quality can be quantified as the gap between services rendered as per customers' expectation and the performance perceive in actual scenario. Customers will base on their previous service expectations from an excellent company as a benchmarking guideline and then evaluate the performance they perceive they received from a specific company. Service quality is calculated as the difference in the two scores where better service quality results in a smaller gap (Ramayah, 2011).

Meanwhile, Vinaysing *et al.* (2015) has developed a new tool of measurement, LabSERV which is customized to laboratories industry. The fundamental of LabSERV is an extension of SERVQUAL by adapting the five existing SERVQUAL like tangibility, reliability, empathy, responsiveness, assurance and supplemented with another three new mentioned dimensions (Vinaysing *et al.*, 2015). The unique of this tool is emphasizing on the importance of three new dimensions, namely technology, test report and turnaround time (Vinaysing *et al.*, 2015). Those dimensions are crucial and will influence customers' expectation on laboratory service quality (Vinaysing *et al.*, 2015).

Commercial laboratory is an organizational which provides service analysis for clinical testing, food product analysis i.e. nutritional labelling, environmental testing, chemical evaluation and other testing. It accepts samples from the corporate companies

and public. Such a laboratory mostly has been certified in one or more categories of accreditation like ISO/IEC17025, ISO 15189 or OECD GLP. The accreditation is recognised locally in Malaysia as well as internationally.

The commercial laboratories provide the testing services as stated in Table 1.1 to manufacturers, exporters and importers for regulatory compliance, product quality control and product development purposes. The laboratories need to have sophisticated analysis equipments and competent staff to carry out the tests. Most of the companies prefer to outsource their testing to external accredited laboratories in Malaysia.

In Malaysia, there are lots of regulatory requirements as stated in Table 1.2 which the companies need to comply with. Most of the companies will send the testing samples to commercial laboratory to meet the related regulations and acts. The commercial laboratories are important to support the industries' needs. The regulation requirements like Food Regulation 2014, Environmental Quality Regulation (Clean Air) 2013 and Industry Code of Practice on Indoor Air Quality, 2010 has been amended to control the incidents of environmental pollutions and food adulteration in Malaysia. The laboratories have to improve their capabilities to support the needs of the industries.

Table 1.1: Fields of Testing Categorized by Department Standards Malaysia

Field of Testing	**Field of Calibration**	**Field of Medical Testing**
Chemical	Heat and Temeprature	Cytopathology
Biological	Electrical	Histopathology
Electrical	Dimensional	Chemical Pathology
Thermal	Acoustic and vibration	Haematology
Mechanical/Physical	Radioactivity	Medical microbiology
Non-destructive	Optical and Photometric	Medical microbiology (Virology)
Radioactivity	Mass and Mass Related Quantities (density, pressure, force, torque, hardness, viscosity, flow & volume)	Cytogentics
Bioefficacy of Household Pesticides		
Toxicity		
Veterinary		
Genetically modified organism (GMO)		
Electromagnetic Compatibility (EMC)		
Nucleic Acid		
Forensic Science		
Information Technology		
Security Testing		
Software Testing		

Source : *Skim Akreditasi Makmal Malaysia (SAMM) JSM Portal (*www.jsm.gov.my*)*

Table 1.2: Summary of Regulatory Requirements need to be complied by Industries in Malaysia

Type of Industries	**Regulatory Requirements**
Toys, Food, Beverage, Medical, Chemical, Packaging, Electrical Appliances, Furniture, Household Products, Garment, Electronic Products, Automotive, Oil and Gas, Plantations, Production and Processing of Ferrous Metal	➢ Environmental Quality (Clean Air) Regulation 2014. ➢ USECHH Regulation, 2000 ➢ Factory and Machinery Act, 1976. ➢ Classification, Labelling and Safety Data Sheet of Hazardous Chemicals Regulations, 2013. ➢ Industry Code of Practice on Indoor Air Quality, 2010
Food, Beverage , Food Packaging, Vegetables, Fruits	➢ Food Act 1983 ➢ Food Regulations 2014
Medicine, Food Supplements	➢ Poison Act 1952

Recently, Ministry of Health Malaysia (MOH) has taken the action and seized approximately RM10million of adulterated food supplements for the past 3 years (Mohammad, MOH). This unethical business has become common in Malaysia. They are using social media like Facebook to promote their products. Trend in food supplements adulteration are male sex stimulants, female slimming products, steroid and pain killer. For sex stimulant product, it will be mixed the control substances under Poison Act 1952 like sildenafil, tadalafil and verdanafil with natural product such as Tongkat Ali, ginseng and goji (Mohammad, MOH). The finished product like instant coffee powders, tablets and candy were claimed as natural ingredients which were supported to treat erectile dysfunction. These products will cause negative health effect to public if the authority did not take the necessary actions against them.

The laboratories will become important partners in this business ecosystem to support manaufacturers, importors and authorities to ensure that the products are well tested and no comtamination or adultered products in the market. Consumers will feel confident and no worry to purchase the end-products in the marketplace.

Figure 1.1: Example of Aduterated Food Supplements Products in Malaysia (Mohammad, MOH)

The cultural values are the factors which will shape individual behavior. Referring to Pia (2011) study, culture of a country will moderate the relationship of the customer

service quality expectations. The findings have indicated different cultural values will influence customer service quality expectation (Pia, 2011).

The study from Karen and Boo (2007) on Malaysian Generation Y has confirmed that power distance has significant negative relationship to all dimensions of service quality. According to Hofstede (2005) indicated that the power distance declines as the education levels increase. Meanwhile, individualism dimension did not show significant relationship with any service quality dimensions as proven in the study (Karen and Boo, 2007).

1.3 Research Problems

Recently, there have been various foodstuffs adulterated incidents occurred in Malaysia either intentionally or accidentally and those foods are unsafe for human consumption (Abdul *et al.*, 2015). Food manufacturers and importers may involve in this unethical practice of adulteration. This problem may happen at every level of the food chain from raw ingredients, processing to retailing shops. Foods were adulterated with the cheaper harmful chemicals and toxic artificial colourants in order to gain higher profit margin (Abdul *et al.*, 2015).

On the one hand, some food suppliers were using rotten perishables and turned into unhealthy foods (Abdul *et al.*, 2015). The foods were sold and served to consumers in an unhygienic atmosphere. The unhygienic and unsafe food is seriously affecting public health by causing chronic and acute diseases. Despite unethical of the unsafe

processing and adulteration of foodstuffs in Malaysia, the commercial laboratories is assisting regulatory authorities like Ministry of Health Malaysia (MOH) to combat the current food safety problems which persist in Malaysia. Due to limited capacity of government laboratories to evaluate the market product, the accredited commercial laboratories have been appointed by MOH to analyse the market products which are submitted by MOH Enforcement Officers. The accurate and reliable laboratory testing results are important for further enforcement decisions.

Meanwhile, the manufacturers or importer will require immediate or fast response from commercial laboratories to make further decision to release their goods or products to the market. The operational cost will be reduced if the laboratory testing results can meet their required timelines. Meanwhile, the manufacturers can control their products quality from raw ingredients, in-process and finished products. This will support to reduce the product failure and maintain the quality of finished products.

The importers need to comply with regulation requirements like Food Act 1983 which the samples have to be tested by the accredited laboratory and the test reports have to submit to MOH. The testing report is crucial for authority to allow the goods to be cleared from the Royal Malaysian Customs (RMC). The timely response from commercial laboratory is critical for the importers. This will help them to reduce the cost of withholding at RMC.

Business trade has been considered the main driver to push the growth rate of the food safety testing market especially in developing countries like Malaysia. Since, they have to meet and achieve the quality standards or regulations of the importing countries. So, business ecosystem in Malaysia has to be filling up with the capable and competent commercial laboratories to support the Malaysian industries.

The trade barrier has been faced by local manufacturers in Malaysia to compliance to imported countries' requirements like recently the banned of edible bird's nest to China due to failure to meet China Bird's Nest Standard Requirements of nitrate at 30 ppm level (Quek *et al*, 2015). The industry suffered huge losses following the ban since 80% of the bird's nests from Malaysia were exported to China (Quek *et al*, 2015).

Under the commitment of World Trade Organization on General Agreement on Trade in Services (GATS), Malaysia has agreed to liberalize Malaysia's services sector (The Economic Planning Unit, 2010). The continual global liberalization of services is posing various challenges to local Malaysian organization especially service sector to compete with the global players. SMEs laboratories in Malaysia need to accept the fact of globalization and they have to meet the highest service quality of world standards. So, service quality is critical to improve the competitiveness against global players.

The market trend has indicated that food safety testing market value worth USD16.1 billion by year 2020, at CAGR of 7.4% from 2015 (Markets and Markets, 2015). The market growth rate will focus in developing countries such as Asia-Pacific

Region countries. Due to the globalization and the shift in quality living standards, these essential factors have increased the demand for food safety testing (Markets and Markets, 2015).

There are total 732 laboratories were accredited by Standards Malaysia and 606 laboratories are actively playing their roles in the market on 31st August 2015. But, the current laboratories are not able to cater to the sudden surge of demands, due to recent trade barriers, food scandal issues and regulatory requirements. Commercial laboratories' customers started to find alternative sources to fulfil their testing needs. Most of the customers are sending their testing samples to neighbouring countries like Singapore, Taiwan and Hong Kong. Since then, SME commercial laboratories need to compete with MNC laboratories like SGS, Intertek and others, in order for them to survive in the competitive environment.

On the other hand, national culture also widely confirmed by researchers that it will influence on customer behaviour and service quality expectation (Pia *et. al.*, 2013). Although many researchers have confirmed on the relationship between national culture and service quality expectation, there is yet to have the study look into service quality with Malaysian culture as moderator effect on customer expectation in SME industry.

Hence, this study is conducted to investigate the problem statements as stated above and to examine customer expectation on SME commercial laboratory service quality dimensions by using LabSERV tool. At the same time, it is to examine whether

the Malaysian culture will moderate the relationship between laboratory service quality and the customer expectation.

1.4 Research Objectives

The study attempts to achieve two objectives as follows:

1. To examine the relationship between lab service quality and customer expectation.
2. To examine whether Malaysian culture moderates the relationship between lab service quality and customer expectation.

1.5 Research Questions

Refer to the research objectives, the study attempts to answer the following research questions.

1. Does laboratory service quality influence on customer expectation?
2. Does Malaysian culture moderates the relationship between laboratory service quality and customer expectation?

1.6 Significance of the Study

Theoretically, this study contributes to the field of literatures on customer expectation, lab service quality and Malaysian culture, especially for SME commercial laboratory. With this study, it will extend the theory of lab service quality in commercial laboratory industry. This will provide a platform for the future researcher to further explore in others business services sector.

Practically, the findings from this study will be useful to help Malaysian services companies especially SME commercial laboratory on useful information of how important is the customers' expectation to the organization in order to manage well on the gap through the service quality that they have adopted. Therefore, this study able to confirm on the proposed relationship of variables are valid in the extent of SME commercial laboratory industry.

The continual global liberalization of services is also posing various challenges to local Malaysian companies (The Economic Planning Unit, 2010). With the adoption of effective service quality, the SME companies in Malaysia are able to improve their competitive advantage against MNC global players.

On the other hand, through the finding of this study, it helps to serve as a guideline to the organizational through the proper planning and implementation of service quality that will eventually improve the customers' expectation.

1.7 Definition of Terms

The variables of this study are defined in the following to meet the purpose of understanding the concepts and further discussion in the study.

1.7.1 Small Medium Enterprise

SME manufacturing industry is classified based on their annual sales turnover less than RM50 million or the employment headcounts more than 200 (SME Corp., 2013). Meanwhile, for the services and other sector, the definition of SMEs are companies which have the full-time employment less than 75 or their annual revenue turnover less than RM20 million (SME Corp., 2013).

1.7.2 Commercial Laboratory

Commercial laboratory can be defined as private laboratories which are providing the testing services either to individual or corporate companies. The coverage of the testing services can be from chemical testing, biological analysis, clinical services, environment analysis, calibration, food testing and others. For corporate customers, the testing services are required due to compliance to regulations, quality control, product development and others.

1.7.3 Laboratory Accreditation ISO/IEC17025 and ISO15189

Accreditation is the procedure to assess conformity level of competence which is stipulated in ISO Standards Criteria. In Malaysia, the authority body, Department of Standards Malaysia (DSM) which is under Ministry of Science, Technology and Innovation (MOSTI) is the only party appointed to carry out the assessment for both ISO/IEC17025 and ISO15189.

1.7.4 Customer Expectation

Customer expectation is based on their knowledge or previous experience of value proposition toward a service with the same or similar service provider. The expectation is formed either consciously or unconsciously prior to the transaction of actual service. The information was gathered through many sources like word-of-mouth, referral, previous service encounter, discussion, advertisement and others. As customer starts to receive more relevant information, the expectation will be refreshed and updated continuously in a customer's mind.

1.7.5 Lab Service Quality

SERVQUAL model is covered five dimensions as follow:

- Tangibles: physical facilities, equipment, and appearance of personnel;
- Reliability: ability to perform the promised service dependably and accurately;
- Responsiveness: willingness to help customers and provide prompt service;
- Assurance: knowledge and courtesy of employees and their ability to inspire trust and confidence;
- Empathy: caring, individualized attention provided to customers

The latest research did by Vinaysing, (2015) whereby a modified SERVQUAL model with eight service quality dimensions has been developed to evaluate the expectation of customer for clinical lab and the new tool has been termed as LabSERV. Based on LabSERV, there are total eight service quality dimensions, namely technology,

test report, turnaround time, tangibility, reliability, responsiveness, communication, laboratory staff attitude and behavior.

1.7.6 Culture

Under Hofstede's framework, cultural dimensions were examined and found to influence and affect customers' expectation on the service quality (Karen and Boo, 2007). The definition of cultural dimensions is stated below:

Cultural dimension	Definition
Masculinity/ femininity	Degree to which emotional roles are distributed between the genders Masculine cultures' values are competitiveness, assertiveness, materialism, ambition, and power, whereas feminine cultures place more value on relationships and quality of life
Individualism/ collectivism	Degree to which a culture emphasizes individual, as opposed to collective (i.e. group), achievements, and relationships
Uncertainty avoidance	Degree to which people in a culture feel threatened by uncertainty, unstructured situations, and ambiguity
Long-term orientation	Degree to which a culture embraces long-term values and traditions vs quick gratification and short-term needs; rooted in Confucian philosophy
Power distance	Degree to which members of institutions and organizations accept that power is distributed unequally

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter constitutes of the literature review of the underlying theories of service quality, customers' expectation and culture variables. The purpose of this chapter is to understand on the study of independent variables (service quality), modulator variables (Malaysian culture) and dependent variable (customers' expectation) on how they contribute to the study. Based on the literature reviews, a research framework is proposed and hypothesis of the research model is developed and showed in the end of the chapter.

2.2 Underlying Theories

Resource based theories focus on an establishment ability to achieve competitive advantage to enhance their resources whereby the strength of the establishment is able to achieve the criteria of valuable, rare, costly to imitate and non substitutable (Barney, 1991). Resources are the important inputs to an organization. It can be divided into two inputs, namely tangible input resources (property-based) and intangible input resources (knowledge- based) (Johan and Dean 2003). Both resources are critical to provide sustainable competitive advantage to the organization. These resources will support to differentiate the organization from the competitors.

SME commercial laboratories need to manipulate and take advantage of both resources to create value-added strategies. Management of commercial laboratory should respond to new movement of opportunities and environmental changes. The actions like knowing what quality expectation of customers are; will improve knowledge-based

resources by reducing the gap within the organization and customers. The resources will be utilized effectively and directly will improve business performance.

With service quality framework, the organization will able to gauge the overall satisfaction of customers. Extensive empirical studies have proven that the service quality is important elements to facilitate and configure the resources toward targeted performance. It is a main source to improve business performance (Saari *et al.*, 2011). Knowledge-based resources including customer feedback information, supplier relationship, internal technical knowledge sharing and laboratory information management system are the critical elements in the service quality.

The valuable knowledge and capabilities need to be converted into valuable output that able generate the profitability to the firm. These intangible assets are important resources that improve effectiveness of the knowledge-based resources in the firm and subsequently will create a positive impact to organizational performance (Ahmad *et al*, 2010). Knowledge based theory focuses on the effectiveness of the knowledge transfer to strengthen the competency of the firm to meet the needs and expectations of customers (Ahmad *et al*, 2010).

Customer satisfaction and expectation in laboratory testing is essential for commercial laboratory industry survival. Customer expectations have been measured and studied in multiple areas. There are lot of theories that based on customer expectation and satisfaction for example Person-Situation-Fit model, Evaluation Congruity Theory,

Dissonance and Contrast Theory (Dmitrovic *et al*., 2009), Equity Theory, Attribution Theory (Jackson, 1996), Expectancy-Disconfirmation Paradigm (Pizam & Milman, 1993), Importance-Performance model, Value-Percept Theory and Comparison Level Theory.

Hofstede theory established five dimensions of national culture: power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation (Satyabhusan *et al.,* 2009). The theory covers in several fields as a paradigm for research, particularly in cross-cultural psychology, international management, and cross-cultural communication (Satyabhusan *et al.,* 2009). It continues to be a major resource in cross-cultural fields. It has inspired a number of other major cross-cultural studies of values, as well as research on other aspects of culture, such as social beliefs (Satyabhusan *et al.*, 2009). Researchers have investigated linkages between national cultural values and service quality expectations. They have discovered strong associations between power distance and individualism, and the five service quality elements (Satyabhusan *et al.,* 2009).

SERVQUAL framework is a popular used model in service quality measurement to evaluate satisfaction level of service quality in all types of industries such as retailing, restaurant, insurance sector, medical industry and tourism industry (Bouranta *et al*., 2009; O'Cass & Carlson, 2012; Rajaratnama *et al*., 2014). SERVQUAL is a generic tool for evaluating service quality. The framework has supported commercial laboratory to

identify the gap of the service quality within overall service expectations (E) and customer perception to a service provider (P), (Wu *et al*., 2014; Yasser, 2014).

2.3 Laboratory Service Quality

Numerous researchers have studied on the relationship between service quality toward customers' expectation and it had been confirmed and validated the relationship between service quality and customers' expectation (Albert *et al.*, 2014; Yasser 2014; Michael *et al*., 2013). But, the studies are limited to certain service sectors like banking, medical tourist and telecommunication (Albert *et al.*, 2014; Yasser 2014; Michael *et al*., 2013).

Service quality has become one of the most important studies which caught the attention of both researchers and managers over the past few years. It can be considered a major study especially for service marketing (Yasser, 2014) and also has been identified as one of the important subject in service management (Rajaratnama *et al*., 2014).

There are two schools of thought on service quality. Both theories and understandings are view in different perspective. The European school of service quality led by Gronroos (1983, 1990) is focusing on the fact of the technical/functional of quality framework. The definition of service quality is the evaluation of outcome processes, where the customers will compare the expectations with the perceived service.

Meanwhile, the American school of thought proposed a conceptual framework of SERVQUAL model by Parasuraman *et al.* (1988). The interpretation of service quality is based on five dimensions and has been attempted to be quantified in a measurable scale which includes reliability, assurance, tangibility, responsiveness and empathy (Parasuraman *et al.* 1988). The limitation of Gronroos's framework is lacking of tangible dimension or physical environment where the service is being served or exchanged. Parasuraman's model is able to fill up the Gronroos's limitation of service delivery which is important in service quality empathy (Parasuraman *et al.* 1988).

Nevertheless, few researchers are disagreed with SERVQUAL fundamental model that simply measuring attitude of customer expectation rather than evaluating the performance-based measurement on service quality. Due to intangible nature of evaluation, it has forced few researchers to abandon the SERVQUAL model when measuring service quality (Rajaratnama *et al*., 2014). They have concluded that service performance is the critical customers' expectation antecedent (Yasser, 2014).

However, despite tremendous arguments in the service quality model, SERVQUAL remains the most preferred framework to evaluate service quality measurement across different industry. The relationship within service quality and customer expectation was proven under SERVQUAL and it is still the most relevant and effective measurement at this moment (Yasser, 2014).

There are five service quality dimensions which included reliability, assurance, tangibility, responsiveness and empathy (Parasuraman *et al.* 1988) are commonly used in most of the studies. On top of these five dimensions, other researchers have included other related dimensions in the study as listed in following Table 2.1.

Table 2.1: Illustrates SERVQUAL Model undertaken in the healthcare sector

Authors	**Service quality dimensions**
Ladhari (2008)	Assurance, tangibility, responsiveness, nursing staff attitude, personal beliefs and values
Yesilada and Direktor (2010)	Tangibility, empathy, reliability and confidence
Gunawardane (2010)	Tangibility, convenience, physician concern, non-physician (staff) concern, access to services, staff expertise, personal care, professionalism
Atinga *et al*. (2011)	Communication, patient-provider relationship, waiting time, environment
AL-Majali and AL-Hashem (2012)	Reliability, responsiveness, courtesy/kindness, materialistic behaviour
Pai and Chary (2012)	Physical environment and infrastructure, personnel quality, image, trustworthiness, support, process of clinical care, communication, relationship, personalization, administrative processes
Nouri *et al.* (2013)	Assurance, tangibility, empathy, responsiveness, communication

The SERVQUAL model has been widely adapted in many studies in varies service sector such as restaurant, healthcare, insurance, education, telecommunication and banking (Wu *et al*., 2014; Yasser, 2014). However, Vinaysing (2015) has developed a new instrument of measurement, LabSERV which is based on the extension of SERVQUAL by adapting the five SERVQUAL dimensions and supplement with another three new dimensions, namely technology, test report and turnaround time. According to Vinaysing, these three dimensions are crucial for a medical laboratory measurement and argue that the need to have industry-specific measurement for service quality (Vinaysing *et al*., 2015). From the study by Vinaysing, LabSERV has proven to have relationship with customer satisfaction. The model is suitable to be used for laboratories services. The justification of eight new dimensions in LabSERV is stated below:

2.3.1 Technology

Technology in the commercial laboratory sector is an important aspect for customers to evaluate the capability and the performance of the laboratory service. Due to new testing method development, the criteria to have better lower detection limit to analyse the targeted compounds become challenging, so analytical capabilities are crucial and it is solely depended on technological capability (Vinaysing *et al*., 2015).

The regulatory requirements like Food Act 1983 are to ensure that public health is well protected. The act has listed out the controlled chemical residue in the food like pesticides residue in vegetables to have at a level as lower as part per million (ppm).

Technology is used as common consensus to evaluate the capability of an analytical laboratory (Burtis, 1987). Performance and quality of a laboratory were enhanced by owning the latest technology facilities and equipment in diagnosing and analyzing (Boyde *et al*., 1997).

In lab service, technology is refers to hardware for advancement of facilities and instruments and software in information technology. Advancement of facilities and instruments is co-related to lower detection limit, preciseness of true result and user friendly (robotic effect). Information technology is refer to harnessing of customer data, where all the relevant information shall traceability either the historical data for sample received date, completion date, calculation, instrument used etc. Investment in technology facilities service assessment and improvement process is essential (Dutton and Starbuck, 2002).

Service organizations are relying on a wider variety of technology-based media for providing customer support (Burke, 2002; Ray et al., 2005). Beyond voice telephone calls, which are still the most frequent means of customer service communication, firms are also using e-mail and instant messaging (a.k.a. "chat"). E-mail, in its most basic and prevalent form, is defined here as the sending of text-based messages of virtually any length that can be read and responded to in an asynchronous (non real-time) manner. Instant messaging, or chat, is defined here as the sending and receiving of short, text-