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MASTER'S THESIS

DEVELOPING A SERVICE QUALITY MEASURING FRAMEWORK FOR AN ENVIRONMENTAL CONSULTING COMPANY.

Examiners:
1st: Ville Ojanen, Associate Professor, Docent
2nd: Kalle Elfvengren, Associate Professor

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ABSTRACT

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The provision of high service quality to customers have been proven to have a positive influence on a company's growth, therefore it is essential for companies to measure the quality of services they offer to their customers. Based on this, the LCA Consulting Company has the interest in adopting a suitable measuring framework that will generate accurate findings to aid in restructuring the company's model to fit the requirements of their clients.

Prior to this, the main aim of this research was to propose a framework that the LCA Consulting Company can use to measure their service quality level. Also, to recommend a suitable tool the company can use in collecting data, the type of questions to be formulated and also suitable analytical tools the company can use in interpreting gathered data. The study adopted the constructive method as its research design and used literature analysis and interview to answer the research questions. Literature Analysis was extensively used in the research.

In conclusion, a three-dimensional service quality measurement framework was recommended to the company. This framework passed Kasanen et. al. (1993)'s weak market test of validity thus its recommendation. Additionally, the use of questionnaires was recommended in the data collection process where a single item response scale including a one item response scale can be used in formulating the questions. The P-E approach and Dominance Analysis were the two analytical tools that were proposed to the company to analyse and interpret data. The findings reflect the business process of the company thus will generate quality information when used. Furthermore, it is considered as a general framework any environmental consulting company can employ.

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1. INTRODUCTION

The service sector over the years have experienced rapid expansion in its growth (Robledo, 2001) especially in the economies of the EU (Miles, 2005). In Finland, the service sector's contribution to GDP grew by 6.8% from 2005 to 2015 (World bank, 2016). A fraction of the service industry, the Knowledge-Intensive Business Services (KIBS) is recognized to be amongst the fast-growing sector in the economies of the European Union (Strambach, 2008). The growth rate of management consulting firms (a type of KIBS) in Finland in the year 2011 increased to 14% (Poór, et. al., 2012). According to Soriano (2001), a firm (client) may pursue the services of KIBS firms based on reasons such as seeking advice to clarify whether decisions they take/have taken is an appropriate initiative and also seeking assistance in solving a specific or common issue they have encountered.

Firms in the KIBS sector are said to be at the ''front line'' (Strambach, 2008) where both their essential resource for production and a product/solution is knowledge (Gallouj, 2002; Miles, 2001). Some examples of KIBS firms include banks, software firms and business management consultants. As a result of the rapid growth in the service industry, there exist a high level of competition amongst the firms. Therefore, to gain a higher competitive advantage and improve the performance of a business, a company must provide quality value to its clients (Grönroos et. al., 2011; Lisch, 2014). Robledo (2001) supported this argument by concluding that, quality has emerged as the most important factor for ''strategic management''.

1.1 Background

A primary objective of most firms is to offer high quality services to customers (Li et. al., 2003). According to research, service quality has a significant influence on the performance level of a company, its costs, customer satisfaction and loyalty and revenue (Seth et. al., 2005). The quality of service a firm offers helps differentiate itself from its competitors by providing effective and efficient quality value such as providing an efficient delivery process to its customers (Black et. al., 2001).

Zeithaml et. al. (1990) defines service quality to be the level of difference between what customers anticipate they will receive (in terms of service offering) and what they actually received. The assessment of service quality is not only on the products and services the

company provides but also includes the elements involved in the entire production and delivery process.

Robledo (2001) concludes that the urgent and growing need for developed firms to offer higher service quality attaches high significance to the evaluation of the level of quality services they provide and their consequent operations. In order for a firm to achieve a higher competitive advantage over its competitors, thus improve the service quality it offers to clients, it ought to collect feedback from its customers (Seth et. al., 2005), hence companies should not only emphasize on delivering high quality offerings but also investigate how their clients perceive their services (That is, whether clients are satisfied or not about offerings a company provides). This will aid them to identify what their customers actually want. Customers make such assessment based on laid down elements that are classifications of stated specification (Robledo, 2001).

Seth et. al., (2005) also suggests that, essential elements associated with managing the service quality of a firm is for the firm to have a fair idea about the service quality concept and its influential elements, possess an efficient evaluation and response structure, efficient ‘’implementation system’’ and a functional ‘’customer care system’’.

1.2 Research problem, objectives and questions.

There exist different mediums through which an organisation can accumulate the feedback of its clients. Some examples are by the use of questionnaires, interview, observation and/or through a feedback box where clients can express their opinions. However, there exist certain challenges relating to measuring and selecting the appropriate service quality measuring tool (Black et. al., 2001). Some companies have available customer information such as customer feedback data but lack the intelligence of interpreting such data (Keogh et al., 1996). The right questions, therefore, ought to be asked in order to generate the right results and in addition, suitable analytical tools are needed to accurately analyse and interpret the results in order to develop strategies that reflects the true voice of the customers. Therefore, in dealing with issues relating to selecting an appropriate measuring tool, organisations should identify which quality measuring tool is suitable for them to evaluate all aspects of their services (Black et. al., 2001).

As earlier mentioned, the service sector, particularly the KIBS industry is growing at a rapid rate (Strambach, 2008). An example is the KIBS consulting sector that provide sustainability as a service to its clients. As a result of the growing awareness of the depletion of the planet, many companies and organisations are contributing to its restoration by integrating sustainable strategies into their business processes thus seeking advice and insights from third parties on how to be sustainable. Finnish companies in particular are highly ‘’investing’’ in sustainability due to their decision to be accountable to the management of the environment and people (Routti, 2014). This at the long run will positively affect the growth of their business. Therefore, quality is an essential instrument in the business model of such companies that provide sustainable advice due to the large size in the market of organizations that seek sustainable advice. Also, Threatt (2000) mentioned that the effort of consulting firms to provide quality service is essential for their ‘’survival’’ and thus must be of high priority in their business strategy.

Additionally, according to Patterson et. al. (1997), since the solution they offer are in the form of projects where these projects are said to be discontinuous, firms ought to prioritise satisfying their clients in order to earn the loyalty of clients and sustain a long-lasting relationship with them.

The LCA Consulting Company, a KIBS firm is a spin-off company from the Lappeenranta University of Technology, Finland. They offer professional sustainable advice to their clients in the field of waste, environment and energy management. Currently, the company has not implemented any official quality measuring tool. They analyse their customer’s satisfaction level based on the fact that their clients are loyal. That is, they keep coming back for more services; thus the need for a laid-down framework/approach for gathering feedback from their clients based on the services they offer and also accurately interpret such results to meet the needs of their clients.

Therefore, the main aim of this thesis is to develop a framework that the LCA Consulting Company can use in measuring its service quality offerings. Additionally, the following are sub objectives this thesis plans to achieve.

- To identify the essential service quality determinants, customers expect in a service delivery process.

- To recommend suitable customer feedback collection method(s) for the company.
- To propose various types of questions that the company can use in gathering customer satisfaction information.
- To propose various ways obtained customer data can be analysed, evaluated and reported.

In order to fulfil the above-stated objectives, the following are the research questions formulated.

1. What are the most utilised service quality measurement models implemented in service companies?
    a. What are the essential service quality determinants customers expect in a service delivery?

2. How can LCA Consulting firm measure their service quality offerings to customers?
    a. What service quality measurement framework is suitable for LCA Consulting?
    b. What customer feedback collection method is suitable for LCA?
    c. What type of questions should be asked in the customer satisfaction survey?
    d. How should obtained customer data be analysed, evaluated and reported?

1.3 Research scope, gap and delimitation.

Prior to the research question, this research tends to analyse the literature on already-existing service quality measuring models and use such models as a yardstick to propose a framework that will be suitable for the company, taking into consideration the services the case company offers and the activities involved in its business process (that is, from creating a service to delivering the service to their client). Also, a literature review on the respective topics: service quality determinants customers expect in a service delivery, the various customer satisfaction data gathering methods, types of questions that are used in a customer satisfaction research and analytical tool for reporting customer satisfaction data will be made. On the other hand, regular interviews will be conducted with the project manager of the company to know the type of services they offer and also the activities involved in the creation to the delivering of service packages/solutions. This is to aid in answering their respective research questions.

There exist a vast number of literature on service quality measuring models which provide the essential determinants for a high-quality service and aids companies evaluate their quality service offerings. Some examples of developed service quality models are the SERVQUAL (Service Quality) and Gap model developed by Parasuraman et al. (1985; 1988), Cronin and Taylor's (1992) SERVPERF (Service Performance) model, Haywood-Farmer's (1988) Attribute service quality model and Philip et.al.'s (1997) PCP (Pivotal, Core and Peripheral) attribute model.

The above-mentioned models, amongst others, have been applied and tested in various types of service firms (mostly collectively) such as the banking, hospitality, education and consulting firms. This thesis narrows its scope by focusing on consulting firms (specifically environmental consulting firms) by first studying their business process and services and then proposing a suitable framework for such industry hence adds to already-existing, but limited works such as Yoon et. al. (2004) and Patterson et. al.'s (1997) study. Additionally, this thesis provides suggestions on how data can be collected, what types of questions to ask and how collected data can be analysed and interpreted.

In relation to delimitation, in the empirical part, gaining information from the company's clients such as their expected and perceived expectations from service delivered to them thus the essential qualities they expect in a service offering will add to the accuracy of the framework that will be developed at the final stage of the thesis rather than investigate into secondary information which mostly relates to the collectively analysis of customers of various types of services.

1.4 Research methodology

In other to accurately answer the research questions, the study follows the qualitative research and is primarily based on literature review. Keywords that helped in the search for literature includes KIBS, service quality, service quality models, measuring service quality, customer satisfaction and customer satisfaction survey. Most of the literature is collected from the Lappeenranta University of Technology's Finna database which contains the collection of several databases. Additionally, the study adopts a single-case study but specifically uses the constructive method as a research strategy. The constructive research method is the development of models or diagrams to solve a practical problem therefore based on its

definition, the method is suitable for this study. This thesis in adopting the constructive approach uses the six steps in conducting a constructive research, which is proposed by Kasanen et. al. (1993).

Furthermore, an interview with the project manager of the case company is conducted but on a regular basis through mediums, face-to-face and sending of questions by email, to get to know more about the company, its service offerings and its business process. This will aid in successfully designing a framework specifically for that industry. Furtherly, a weak market test proposed by Kasanen et. al. (1993) will be conducted with the project manager to test the validity of the proposed framework.

1.5 Research structure

The structure of this research is explained in the table below.

Table 1: Research structure

INPUT ⇒	CHAPTER ⇒	OUTPUT
Purpose for research	**1.Introduction**	Research scope, gap, questions and methodology.
Existing literature relevant to the research area	**2. Service quality in KIBS**	Theoretical development and understanding of the research topic and its related research areas.
Acquiring in-depth literature to answer the respective research questions	**3. Measuring service quality**	Literature analysis of respective topics such as existing service quality measuring models.
Background of case company	**4. Description of the Case Company: LCA Consulting Company**	Services offered by the case company and types of customers they serve.
Research design and methodology	**5. Developing a service quality measuring framework**	The concept of the adopted method and justification for the use of the selected research design
Evaluation and analysis of results	**6. Results**	Presentation of findings
Summary of findings	**7. Summary**	summary of findings and answering of research questions

2. SERVICE QUALITY IN KIBS

Customers are more interested in the benefits they will derive from a service rather than the service itself offered to them. Therefore, it is important for firms to deliver high quality solutions that keenly satisfy the needs of their clients and creates value for them (Grönroos, 2000).

An essential ingredient for KIBS firms to gain a higher competitive level and record steady growth in their business is to provide high-quality service to their clients (Robledo, 2011; Benazić et.al, 2012). Also, firms in such industries play an essential function in the business process of its clients. They are responsible for monitoring the business of their clients and also developing new business opportunities for them (Hirvonen et. al., 2001) thus it is essential for KIBS firms to produce quality value.

There exist several scholars (such as Lieu et. al., 2006; Michel et. al., 2009; Benazić et. al., 2012 and Lisch, 2014) that have recognized the need for service companies to provide high quality offerings to their customers hence it is important to discuss this concept and its related scope extensively. The rest of this chapter firstly defines KIBS firms, its characteristics and classifications. Additionally, what value creation is and the activities involved in a service process is also discussed. Further in this chapter, service quality and its determinants, customer satisfaction and the link that exist between service quality and customer satisfaction, and to other elements such as purchase intention are discussed.

2.1 KIBS (Knowledge Intensive Business Service) firms

KIBS firms are private companies that belong to a subset of the service industry and are considered as very innovative (Toivonen, 2004; Hertog, 2002; Liu, 2012). Miles et al. (1995: 18) defines KIBS firms as firms that offer services which consist of ‘’economic activities’’ that are meant to ‘’result in the creation, accumulation or dissemination of knowledge’’. Examples of KIBS firms include management, technical and financial consulting. (Miles et al. 1995; Strambach 2000; Koch et.al., 2008).

Over the years, various researchers have categorized the services/firms in the KIBS industry for easy evaluation. The widely known categorisation is that of the International Standard Industry Classification (ISIC) which classified the sector and its activities under the

categories, Technical KIBS (T-KIBS) and Professional KIBS (P-KIBS). The T-KIBS ranges from 72.1 to 74.3 and they are: ‘’hardware consultancy’’ (72.1), ‘’software consultancy and supply’’ (72.2), ‘’data processing’’ (72.3), ‘’database activities’’ (72.4), ‘’maintenance and repair of office, accounting and computing machinery’’ (72.5), ‘’other computer-related activities, research and experimental development on natural sciences and engineering’’ (73.1), ‘’architectural and engineering activities and related technical consultancy’’ (74.2) and ‘’technical testing and analysis’’ (74.3) whilst the P-KIBS ranges from 73.2 to 74.4 and they are: ‘’research and experimental development on social sciences and humanities’’ (73.2), ‘’legal, accounting, book-keeping and auditing activities, tax consultancy and market research’’ (74.1) and ‘’advertising’’ (74.4). (Nählinder, et. al., 2002). This classification is also said to be the yardstick on which other scholars developed their classification (United Nations, 2008).

The KIBS firm adopts experienced knowledge as their input to produce services as their output to other companies both in the public and private sectors by presenting their solutions to them through the use of a ‘’cumulative learning processes’’. The output produced is either initially derived from the information and expertise which is offered to their clients or employ their expertise to provide services which serve as intermediary inputs to their customer-acquired expertise and information creation actions. (Miles et al. 1995). Knowledge is acquired internally and/or externally from universities, research and public institutions (Den Hertog, 2000; Koch et. al., 2008). Also, they are mostly SMEs or young companies (Koch et. al., 2006) and mostly located in major cities where majority of their potential customers are located (Toivonen, 2004; Koch et. al.,2006; Illeris et. al., 1993).

Furthermore, this sector over the years have recorded an increase in the total number of employees. Countries that belong to the EU-25 from the years 1994 to 2004 detected a 7.9% increase in employment in the KIBS sector (European Commission, 2007).

There exist difficulties in defining this industry therefore to curtail such difficulties, a vivid description of a company's operations should be initially made (Zieba, 2013).

2.1.1 Value Creation

The nature of value creation and how it is created gained attention in management and marketing research during the periods of the 1990s-2000s (Grönroos, 2008). The KIBS firms create value for their clients therefore the extent of quality value is considered as a key drive to customer satisfaction and loyalty (Woodall, 2003). Based on this, this section discusses value creation according to two known perspective, the service and customer dominant perspective.

The conceptualization of value creation is said to be complicated. In an attempt to omit this complexity, authors like Vargo et.al. (2004) have explained the concept from a service dominant logic whilst authors like Heinonen (2004) have proposed a value model which is centred on the conceptualization of value, based on customer experiences.

In the context of service dominant logic (S-D), value creation is defined as a co-creation process where both the service provider and customer participate in it. It is considered as an ‘’all-encompassing process’’ because the process involves the responsibilities and activities of the actors (company, customers and others) thus create no differences between them. (Grönroos et. al., 2011; 2013). On the other hand, the customer- dominant logic (C-D) defines and creates value focusing on customers (Voima et. al., 2010). This logic also expanded its scope to include benefit and sacrifice aspects of value creation in addition to the results and process perspective (Heinonen, 2004). The C-D logic compared to the S-D logic is highly recognized (Grönroos et. al., 2013; Grönroos, 2008).

The comparison between the nature of value creation based on an all-encompassing process and value creation in value-in-use (customer sphere) is shown in the diagram below. It also shows how the two concepts contravene each other. Combining the two concepts is considered as theoretically not feasible (Grönroos, 2011; Grönroos et. al. 2013).

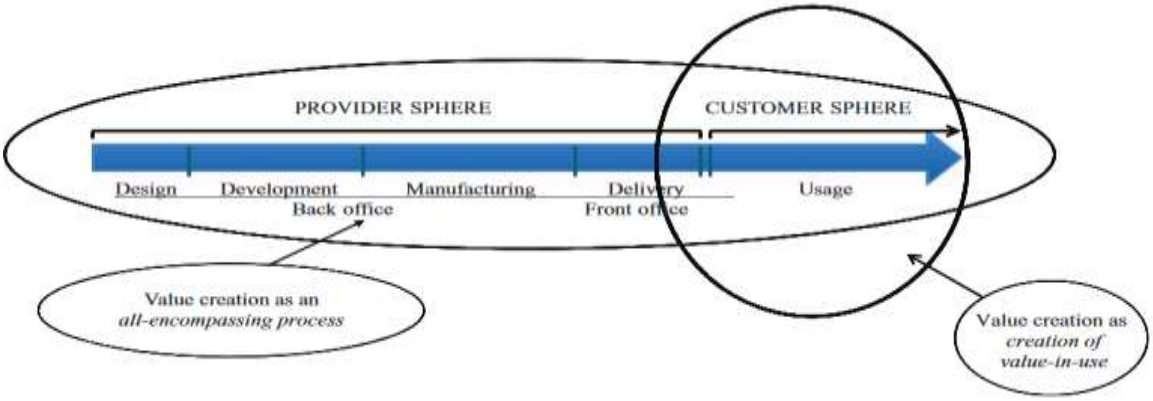


Figure 1: Comparison between value as an ‘’all-encompassing’’ process and value-in use in value creation (Grönroos, 2011 pp.283).

The rest of this section discusses the how, where and when value is created under the two-above mentioned logic. This is presented in the table below.

Table 2: Difference between the service and customer dominant logic of value creation.

	Service-dominant logic	**Customer-dominant logic**
How	The service provider offers resources/value to customers by marketing such value and also manage the value creation process whereas the customers continue the process by utilising the value (Grönroos, 2008; Grönroos et. al., 2013; Voima et. al., 2010).	Value formation does not only involve an effective process. Value can also be created by customers without even noticing it (Voima et. al., 2010).
Where	Value is developed in a resource sphere which is managed according to the company’s setting (Voima et. al., 2010).	Value can be created in various known and unknown areas (such as geographical and mental) (Voima et. al., 2010).

When	The time frame is not fixed and it is determined by the company (Voima et. al., 2010).	The time period is longer and flexible for change (Voima et. al., 2010).

2.1.2 Activities in a service process

This section discusses the stages/activities involved in the service process, specifically, from when a client seeks the assistance of a service firm to the final stage of developing and presenting the service/solution to its clients.

According to Wolfson et. al. (2015), the activities of a service depends on a range of ‘’assets, processes and activities’’. Johansson et. al. (2004) stated that in professional services, human skills are highly required. In designing a service delivery system, the amenity where the service is produced, the process involved in service delivery (Ramaswamy, 1996), people and technology (Heskett,1987) are also considered. In the discussion of the Customer-dominant value creation (see section 2.1.1), we identified that the people involved in producing a service are both the producer and customer whereas the value is created in a visible and/or invisible setting. This section focuses on the activities involved in the service process.

Ponsignon et. al. (2011) proposed a process relating to how service is produced; right from the clients presenting their needs to the delivering of the service/solution to the client. This is seen in the figure below.

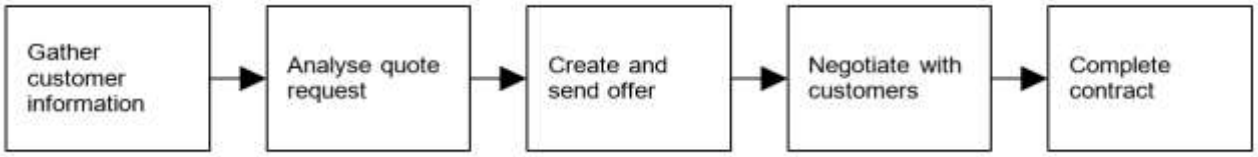


Figure 2: Activities in a service process (Ponsignon et. al., 2011).

Based on figure 2, customers are involved in the first (gather customer information) and fourth (negotiation with customers) stages of production whilst during the analysis of quote request, creating and sending an offer and completing contract stages, customers are not involved in such activities.

Although there exists a general activity in a service process, the activities proposed are intended to be dynamic and flexible in order to meet the requirements of each client (Ponsignon et. al., 2011).

2.2. Dimensions/Determinants of Service Quality

The theory and practicality of service quality have attracted the interest of researchers, managers and practitioners for the past two decades. This is because of the positive influence service quality has on the performance and profitability level of businesses, the satisfaction and loyalty of customers and the market share of an economy. (Seth et. al., 2005; Leonard et.al., 1982; Hui et. al., 2011; Hu et. al., 2009). Bitner (1990) stated that the provision of high-quality service will enhance the loyalty of customers. In addition to Bitner's (1990) conclusion, Fornell (1992) and Reichheld et. al. (1990) also stated that when companies provide high-quality service to customers, the customers are more likely to go back for more and thus can result in a 100% increase in the profitability level, even if about 5% of customers return for more offers. The positive relationship between the quality of service and customer's desire to repurchase from a firm is also discussed by Boulding et. al. (1993). They argued that as a result of the mentioned effect, customers will be willing to recommend the firm to other potential customers. This, in turn, can also increase the profit level of the company.

Therefore, the quest by companies to improve service quality has become an essential feature required to gain competitive advantage and remain active (Hu et. al., 2009). According to Watson (n. d.), in Leonard et.al. (1982), dating history to current time, it shows that some years back quality was less considered in the business model of companies. In the manufacturing world, when a product developed some defects, the manufacturing team that developed the product was in charge of correcting those issues. The success of businesses was analysed with indicators such as a high/low deficiency rate in the business, the number of flaws for every thousand units and the extent to which products do not correspond to its stated features. The indicator, quality was less used. However, in recent years, quality is considered as an essential measurement in business as a result of its validation in the improvement of performance and profitability of businesses.

‘’Made in Japan’’ goods have over the years been of high demand than ‘’Made in the USA’’ goods not because of the poor quality of American products but because the Japanese and other competitive manufacturers like the Europeans have improved the quality of their products. These competitors for about 20 years have dedicated their effort to improving the quality of their products to establish a strong export market. To achieve a successful implementation of quality in a business strategy, the aim, to provide quality should not only be on the individual level but the organization as a whole. The management teams in companies are advised to be transparent and implement strategies that will enhance the quality of their offerings. Also, they ought to put more effort in enhancing their capabilities to evaluate decisions, lifecycle and the structures that affect the quality of a product. (Leonard et.al., 1982).

There exists endless study on the nature of the service quality concept such as its definition, measurement and processes involved in gathering data; as well as other cases relating to the concept (Seth, et. al., 2005). However, the concept is said to be ‘’elusive and abstract construct’’, in which there exist complexities in its definition and measurement as a result of its distinct features (intangibility, inseparability and heterogeneity) (Cronin et. al., 1992).

In the goods market, Crosby (1979) defines quality as "conformance to requirements" whilst in the service market it is defined as a measure of how effective a service firm delivers its offerings, corresponding to the expectations its customers have when service is offered to them (Lewis et. al., 1983). Simply put, service quality is the difference between what customers expect in a service offering and what they actually experience (Parasuraman et. al., 1985; Hui, 2011). What customers expect in a service and what they actually receive are different in the minds of customers and this was concluded based on a parametric and nonparametric studies that were conducted (Threatt, 2000), however, there is less literature on how the evaluation of service quality happens (Brown et. al., 1989).

Customers recognize service quality to be a component of the ‘’magnitude and direction of the gap between expected service and perceived service” (Parasuraman et al., 1985: 46). However, Grönroos (1988) argues that how customers judge quality is in a much-expanded dimension than the service providers. This implies that, when defining quality in a company, service providers should evaluate and incorporate the way consumers also define it in order

not to waste time, effort and resources in formulating strategies that will not yield accurate outcome. In addition, it will aid service providers to identify the suitable way of analysing customer's perception. (Grönroos,1988; Fehl, 2006).

It can be observed that the rise or fall of a service firm is influenced by the behaviour, skills and competence of its service provider thus they are not only important to customers but they represent their company in the eyes of customers (Arasli et. al., 2005).

According to Oliver (1981), customers express their satisfaction/dissatisfaction for a product or service after the offering is purchased. Setó-Pamies (2012) also states that the expression for an offering is developed by the positive/negative differences between what customers expect in an offering and their actual experience, thus most research on customer satisfaction adopts ''conformity/disconformity'' concept along with the expectations of customers as their yardstick. With this framework, customers compare their experiences with a service to criteria such as their expectations. Conformity exist when, what customers experienced is equal to the set of criteria developed whilst disconformity exists when what customers experienced does not meet the established criteria of the customer. In addition to this, a customer is said to experience a positive conformity when the service he/she received exceeds his/her expectation about the service, whilst a customer is said to experience a negative disconformity when the service received is not what he/she expected.

Li et. al. (2003) states that a firm can accomplish high service quality by firstly identifying the characteristics of services and its related process. The characteristics of services should be evaluated to identify the essential features based on the indicators used in enhancing quality in a steady way, also taking into consideration the restrictions on finite resources.

There exist two generally recognized conceptualizations that identifies what needs to be measured in a service firm. They are the Nordic perspective which explains service quality dimensions with overall terms namely the technical and functional quality (formulated by Grönroos 1982; 1988) and the American perspective which utilizes attributes to characterize customer's service encounter (formulated by Parasuraman et. al., 1988). Attributes such as reliability, responsiveness and empathy. (Brady et. al., 2001).

The rest of this section discusses the determinants/dimensions of service quality suggested by various scholars/researchers.

The Nordic Perspective of Service Quality Dimensions

Grönroos (1982; 1988) proposed two types of service quality dimensions which can be applicable to various service settings. They are the technical and functional quality dimensions. The technical quality is based on what customers receive or obtain after the production process and interaction with suppliers have ended whilst the functional quality refers to the process in which service is delivered and it is also evaluated on the experiences customers attain during the production and consumption process, which occurs simultaneously. Functional quality is considered to be more emphasized on because as compared to the technical quality, it creates more value to customers. Firms in a competitive market can create similar technical solutions, however, to gain a more competitive advantage over competitors, a firm must improve its interaction with customers (functional quality). The technical qualities include professionalism and skills on the part of the service provider and its employees, whilst Attitudes and Behaviour, Accessibility and Flexibility, Reliability and Trustworthiness, Recovery and Reputation and Credibility constitute functional qualities.

The American Perspective of Service Quality Dimensions

Parasuraman et. al. (1985) in the Gap model originally identified 10 service quality determinants which can be applicable in various service settings. They are ‘’reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/knowing and tangibles’’. The model was later re-examined and re-defined to consist of only five determinants of which the attribute, reliability is considered as the most important (Parasuraman et. al., 1988). The five dimensions are:

1. Reliability: evaluated on how firms operate accurately and dependably.
2. Responsiveness: it relates to the willingness to assist customers and provide quick service.
3. Tangibles: evaluated on the availability of physical facilities and machines in addition, the appearance of contact personnel are also evaluated.
4. Assurance: refers to the knowledge, good manners portrayed and also how trustworthy and confident a service provider and its employees are.
5. Empathy: Evaluated on the level of care and attention given to customers.

Additionally, the study was centred on five service providers which included the retail banking industry and securities brokerage.

Day et. al.'s (1992) service quality dimensions

Day et. al.'s (1992) research centred on the managers and clients belonging to professional firms. They identified four criteria clients consider when selecting and assessing a service provider's offering. They are:

1. The experience, know-how and ''competence'' of the service provider.
2. The level of understanding a service provider has in relation to the needs and business desires of its clients.
3. The service provider's ''relationship and communication skills'' with clients.
4. The tendency of a service provider to keep promises in relation to the ''contractual and administrative requirements''.

Szmigin's (1993) service quality dimensions

The study was based on business-business services and identified three service quality dimensions namely the hard quality (refers to the structure, strategy and systems of a service provider), soft quality (relates to the skills and employees of service firms) and the outcome quality (refers to a service company's ability to achieve its goal).

Rust et. al.'s (1994) service quality dimensions

Also, Rust et. al. (1994) proposed three dimensions that affect the service quality of a firm. They are the service product which deals with the features of services being offered, the service environment which involves the arrangement or atmosphere needed for services to be offered and the service delivery which describes the way service is provided to customers.

Sonne's (1999) service quality dimensions

In another study by Sonne (1999), she stated that the quality of service in consulting firms are influenced by the perceived hard process quality (includes competence, tangibles and reliability (technical)), perceived soft process quality (includes reliability, responsiveness, access and security) and client factors (resources, support from management and communication). However, the findings of the study showed that hard process quality (more

specifically competence) has a significant influence on the quality of consulting services whilst client factors has a lesser effect.

Tang et. al.'s (2003) service quality dimensions

They proposed 8 service dimensions applicable in measuring service quality of engineering consulting firms. They are:

1. Professionalism of service: Measures the professional quality of services offered and behaviour of service provider to client.
2. Competitiveness of service: Measures the level of education of the service provider and also the former projects completed by the firm.
3. Timeliness of service: Measures how effective the service firm meet deadlines and tackle client's complaints.
4. Quality of design: Measures the methodology used in the project/solution.
5. Degree of innovation.
6. Completeness of other consideration such as environmental issues.
7. Availability of support to the client.
8. Supervision at implementation stage.

Gounaris' (2005) service quality dimensions

The researcher also proposed four dimensions to measure service quality in B2B services. They are:

1. Potential quality: Customers evaluate the service firm's capability to perform the service before the service process actually begins.
2. Hard quality: Customers evaluate what the service provider develops during the service process.
3. Soft quality: Customers evaluate how the service provider performs its services during the service process.
4. Output quality: Customers evaluate the solution offered to them.

Table 3 is a continuation of the service quality dimensions proposed by researchers. That is, it presents the summary of other researchers' conclusion on the attributes that constitute the determinants of service quality. The five popularly known Parasuraman et. al.'s (1985) dimensions of service quality are used as the main unit of comparison in the table, however,

additional dimensions proposed by the respective scholars and their case study is stated in the ‘’comment’’ column of the table.

Brady et. al. (2001) states that the American perspective is the most widely used in research, whereas, Kang et. al. (2004) states that, the works from European philosophers over the years have affected the research on the dimensions of service quality. However, Grönroos (1990) suggest that, service quality is defined on various dimensions thus there exist no generally accepted literature on the dimensions of service quality. Also, there exist no literature that concludes that either one of the perspective or both is a more suitable approach, or whether the two concepts have characteristic similarities (Brady et. al., 2001).

Table 3: Summary of service quality dimensions proposed by different scholars.

Authors	Reliability	Responsiveness	Assurance	Empathy	Tangibles	Comment
Harte et. al., 1995	x		x	x	x	Based on existing literature that focused on service firms such as accounting, management consulting and general service firms. Timeliness was used in place of responsiveness and an additional determinant, fees (offering ‘’value for money’’) was introduced.
Lim et. al., 2000	x	x	x	x	x	Study was focused in the healthcare sector. However, a sixth dimension was identified; the accessibility and affordability dimension.
Lam, 2002	x	x	**x**	x	x	Study focused on a Chinese banking company. Six dimensions were deduced; empathy was divided into empathy 1(tacit understanding of customer needs) and empathy 2 (convenient operating hours).
Yoon et. al., 2004	x	x	x	x		Focus was on IT consulting services in Korea. Two additional dimensions were introduced- process and education dimensions.
Saxby et. al., 2004	x		x			Research was centred on accounting firms
Jabnoun et. al., 2005	x					Research was focused on UAE conventional and Islamic banks.

						Three new dimensions were discovered; personal skills, values and image dimension.
Arasli et. al., 2005	**x**	x		x	x	Study was focused on the Greek Cypriot bank industry. Based on their empirical testing, responsiveness and empathy was seen to be loaded on the same dimension. That is, they are considered as one dimension (responsiveness-empathy dimension).
Choudhury, 2013	**x**				x	Based on Indian retail banking industry. The other determinants are behaviour and convenience.

The determinants of service quality will also be furtherly discussed in the service quality models' section (chapter 3) of this thesis. This is because most of the models discussed in that section also include its recommended service quality dimensions.

2.3 Relationship between Service Quality and Customer Satisfaction.

Providing solutions to the problems of customers thus satisfying their business-related needs is an essential goal in every business/organization because satisfied customers is a key to the growth of a business (Gilbert et. al., 2006). According to Setó-Pamies (2012), many researchers have discussed the concept of customer satisfaction because it is an important indicator of customer loyalty. Retaining customers is more of a drive to increase profitability rather than gaining new ones to replace the lost customers (Bhargava et. al., 2013). The expenses involved in acquiring a new customer is ten times more, in comparison with the expenses involved in retaining a satisfied customer (Gitomer, 1998). In addition, information gathered about the satisfaction level of customers assist the service company to restructure its strategies (Edvardsson et. al, 1996) during its decision-making process (Voss et al, 2004), as well as encourage employees to effectively perform their functions (Grönroos, 2000).

There exist complexities in the literature relating to the relationship that exist between the concepts, service quality and customer satisfaction (Harr, 2008). Researchers such as Bitner (1990), Bolton et.al. (1991a) and Parasuraman et. al. (1988) have contributed to this argument by determining the differences between the two concepts. Identifying the

differences between the two concepts is important because it helps service providers in their decision-making process as to whether to concentrate on enhancing their business performance in order to satisfy their customers or ensure they provide high-quality service offerings (Harr, 2008).

Zeithaml et al. (2006) stated that the concept of service quality is a subset of the customer satisfaction concept. That is, service quality centres particularly on the elements of service (Harr, 2008).

The majority of argument in relation to explaining the link that exist between service quality and customer satisfaction is based on if the satisfaction of a customer is an ‘’antecedent’’ of service quality or occurs after a company provides high-quality service (Harr, 2008).

Researchers such as Bitner (1990) and Bolton, et.al. (1991b) argue that customer satisfaction is an ‘’antecedent’’ of service quality. That is, to attain a high service quality, companies should emphasize on satisfying their customers.

However, researchers such as Setó-Pamies (2012), Cronin et.al. (1992), Rust et. al. (1994), Ekinci (2004), González et. al. (2005), Ojo (2010), Lee et.al. (2005), DeRuyter et al. (1997) and Hu et. al. (2009) make their stand on the notion that, service quality strongly influences customer satisfaction thus service quality is an antecedent of customer satisfaction.

Iacobucci et. al. (1995) discusses three perspectives that can help conclude if two concepts are different in meaning or similar and thus can be treated as ‘’one construct’’. They are the ‘’constructs’ unique positions in nomological networks, conceptual orthogonality, and the uniqueness via structural equations modeling’’.

The ‘’constructs’’’ unique positions in nomological networks states that ‘’if two network concepts share all theoretical antecedents and consequences’’, they are referred to as ‘’structurally equivalent’’ or ‘’logically Isomorphic’’. However, referring to the concepts as ‘’unique’’ would be inaccurate because it lacks empirical validity. Quality and satisfaction are both defined based on customer’s expectations and experiences, thus can be considered as ‘’structurally equivalent’’ and ‘’not unique’’, therefore other determinants influencing these

concepts ought to be ‘’both conceptualised’’ and evaluated in order to identify if the two concepts should be differentiated. (ibid).

In relation to the ‘’conceptual orthogonality’’ perspective, two theories are dependent on each other if they are both derived from the same origin. In relation to quality and satisfaction, they can be differentiated if hypothesized. For instance, a ‘’high-quality product’’ can lead to the satisfaction/dissatisfaction of customers. However, emerging issues relating to testing the hypothesis empirically can occur. (ibid).

The third perspective talks about the use of the ‘’structural equations modeling’’ to test the uniqueness of both theories. The structural equations modeling is used to present ‘’empirical evidence’’ to support the validity of a ‘’construct’’. Nevertheless, during the model’s usage, its flaws are not considered. (ibid).

As a result of the need for more empirical test and/or use of different suitable models in identifying the relationship between the two above-mentioned concepts, Iacobucci et. al. (1995) contributes to this discussion by identifying customers thought on the relationship between them. That is, whether they perceive them to be identical or different. Based on their analysis, they concluded that quality and satisfaction is a single construct,

Furthermore, Sureshchandar et.al. (2002), Oliver (1981) and Agbor (2011) also argued that the concepts are similar. According to Sureshchandar et.al. (2002), they are affiliated hence an effect in one concept may influence the other in the same way whilst Oliver (1981) suggest that although service quality and customer satisfaction are of different form, they are also related.

In another sphere, both service quality and customer satisfaction is concluded to have an impact on various indicators in business growth such as customer loyalty, purchase intentions (such as customers keep coming back for ‘’more’’) (Yap et. al., 2007; Iacobucci et. al., 1995; Cronin et. al., 1992; Anderson et.al., 1993; Boulding et al., 1993; Lee et. al., 2005). This can be seen in the figure below which was obtained from Iacobucci et. al. (1995: 280).

Figure 3: Customer satisfaction and service quality as predictors of customer purchasing intentions.

According to the figure above, both service quality and customer satisfaction are defined by the expectations and experiences of customers which then affects the purchase intentions of customers (loyalty of customers). That is a decision as to whether/not to purchase additional services from the same firm. (Iacobucci et. al., 1995).

On the other hand, Cronin et. al.'s (1992) study on whether service quality and customer satisfaction influences purchase intention showed that, purchase intention is strongly influenced by customer satisfaction than service quality.

In a general conclusion, whether the two concepts are identical, different or one occurs as a result of the other, both concepts are seen as essential to the development and sustainability of a firm's growth. However, more scholars agree to the statement that service quality is an antecedent of customer satisfaction. Thus, the higher quality services firms provide, the more satisfied customers are.

On the other hand, in relation to measuring service quality and/or customer satisfaction, most scholars adopt the expectation-experience factor as shown in figure 3 thus can be stated that certain satisfaction-measurement models can be used in the measurement of service quality but with caution.

3. MEASURING SERVICE QUALITY

''If you are not measuring it, you are not managing it'' (Kessler, 1996).

As compared to consumer purchasing services, the quality of purchased goods is evaluated by their tangible characteristics such as the package, colour and model of the product whilst intangible features evaluate services. As a result of the intangible nature of services, it is complicated on the part of the firm in identifying how customers feel about their services. (Parasuraman et al., 1985).

A continuous issue in the service quality literature is how to measure the quality of a firm's service. That is, which element of quality should be evaluated and with what approach should the analyst implement (Sliwa et. al., 2011). Companies decision to measure service quality is essential because as stated earlier, it serves as a good instrument to gain more profit and a higher competitive advantage over competitors.

According to Kessler (1996), companies that are growing consistently thus improving their business performance are known for their focus on offering high service quality to their customers and collecting information from customers such as what their actual needs are. Thus, the reason for the quote made by Kessler (1996) (see above for quote). Additionally, Hayes (1992) states that a company gaining information about its customer's expectations and experiences, will aid the company to make better and appropriate decisions since the information collected will provide information as to whether companies are providing value based on their customers' requirements or not. According to Keuc (2014), companies undertake this initiative in order to gather information about the nature of customers, identify the company's weaknesses and competitive advantage elements.

Churchill et. al. (1982) states that, measuring how customers perceive a product/service is evaluated after the customer has utilized the offering. However, Mittal et. al. (1999) suggests that during the assessment stage, qualities that the consumers experienced nearer to when the evaluation exercise takes place has a much more effect on how customers will rate the offerings than qualities that were experienced much later.

Sliwa et. al. (2011) distinguishes between existing service quality measurement models by their approach to collect data and develop the models. They are, the models that are related to the ‘’user-based paradigm’’ and uses questionnaires to gain information and the models that gain information from groups excluding the users of the offerings and gather information through different means other than the use of questionnaires. Most of the models for the past two decades have been developed under the user-based paradigm that adopts questionnaires to gather information.

This chapter is in three parts. The first part discusses existing service quality models developed by various scholars whereas the second part discusses techniques/approaches used to collect customer data including the various types of questions that can be used in a research. The third part then discusses the various ways collected customer information can be analysed and interpreted.

3.1 Service Quality Models

This section discusses existing service quality models and their criticisms.

SQM (Service Quality Model) 1: The Perceived Service Quality Model (Nordic Model) (Grönroos, 1988)

As stated earlier, the scholar developed a two-dimensional service quality model, the technical/outcome dimension which relates to what customers receive and the functional/process dimension which relates to how offerings are delivered to customers (Grönroos 1988; Parasuraman et al. 1985; Kang et.al., 2004).

In further studies by Grönroos (1988), he suggested that experience in quality does not only determine the nature of service quality (that is, if service quality is good, bad or neutral) but also the inclusive of traditional marketing strategies. Quality is recognized as good when the experienced quality is equal to what the customers expected (the expected quality). This is seen in the figure 4. Also, he considered a firm’s image essential to service quality concept. According to Kang et.al. (2004), a firm’s image has a positive effect on the customer’s experience (that is based on the interaction and operations of the firm). Figure 4 shows the Nordic model.

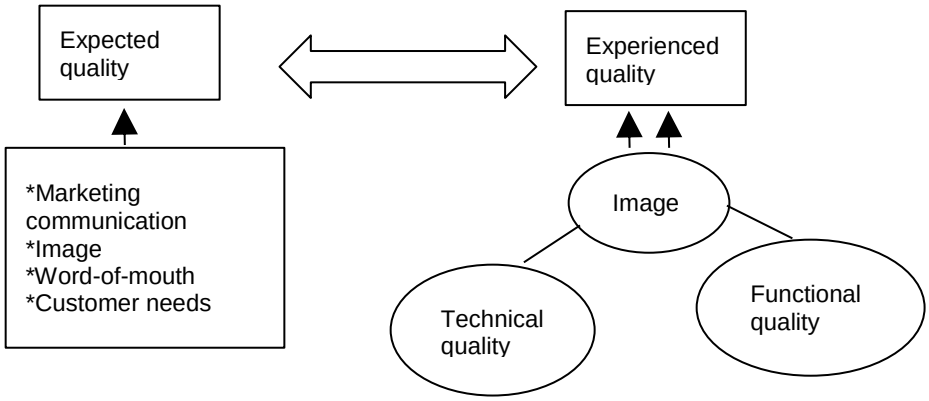


Figure 4: The perceived service quality model (Grönroos 1988: 12).

This model has been successfully employed by various researchers in their study such as Aldlaigan et. al. (2002), Roy et. al. (2005) and Kang et. al. (2004) However it centred on just one service industry (the cell phone industry) to gain information (Kang et. al., 2004). Additionally, according to Polyakova et. al. (2015), the model does not provide a realistic evaluation measure thus it is perceived to lack ‘’operationalisation’’. The model also failed to provide ways in which the technical and functional quality can be measured (Seth et. al., 2005).

SQM 2: Gap model and SERVQUAL model (Parasuraman et al., 1985; 1988)

Parasuraman et al. (1985; 1988) defined service quality as the difference between the expectation of customers about an offering and the experiences they actually gained. The Gap model was developed in 1985 based on four service industries and ten dimensions of service quality were developed. They include reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/knowing the customer, and tangibles. The Gap model is shown in figure 5.

Where:

Gap 1 is the gap between customer expectation and management perception.

Gap 2 is the gap between management perception and the specifications of a service quality.

Gap 3 is the gap that exist between the requirements of service quality and service delivery.

Gap 4 is the gap that exist between the service delivery process and external communications of the service provider.

Gap 5 is the gap between customer's expected and experienced service

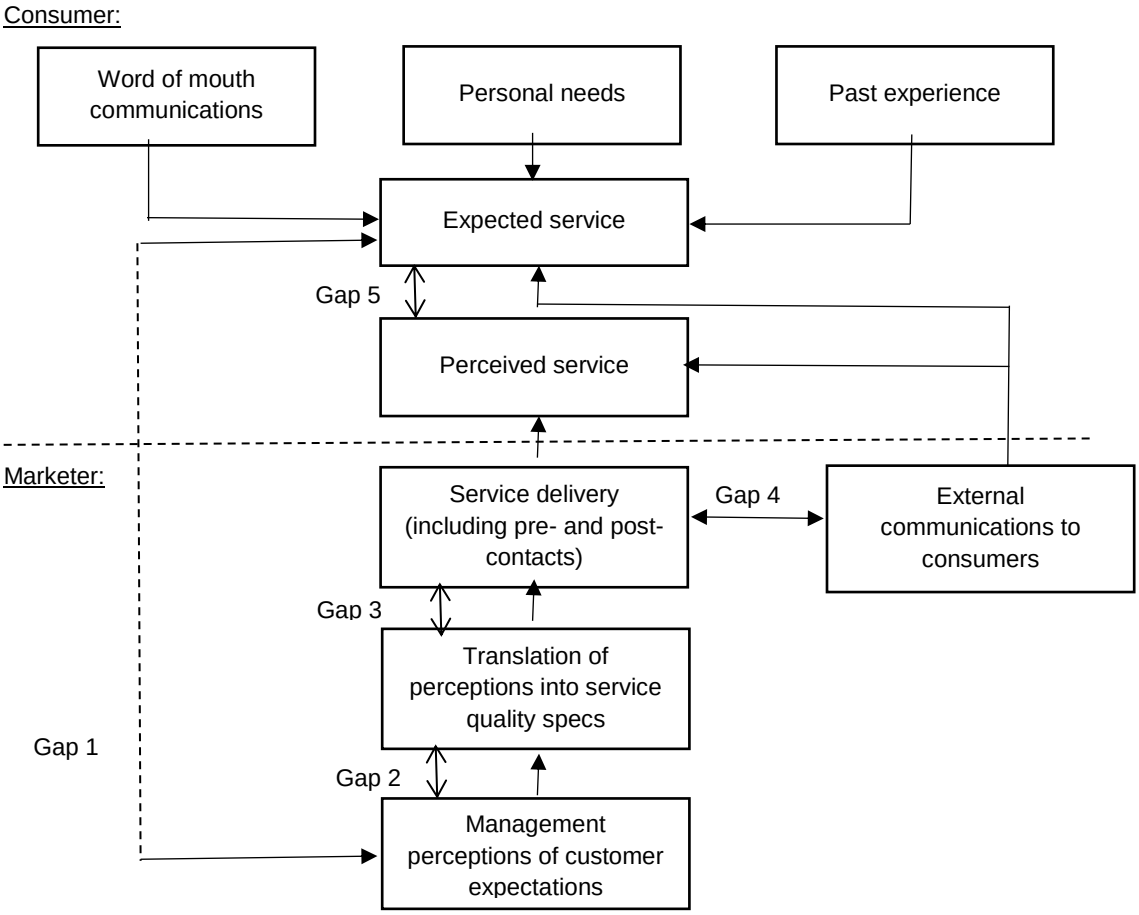


Figure 5: The Gap model (Parasuraman et. al., 1985: 44)

In 1988, the scholars revisited the Gap model and introduced the SERVQUAL model which was developed on a 22-item scale and the ten dimensions were reduced to five namely, tangibles, reliability, responsiveness, assurance and empathy. The SERVQUAL model is shown in the figure below (deduced from Polyakova et. al., 2015).

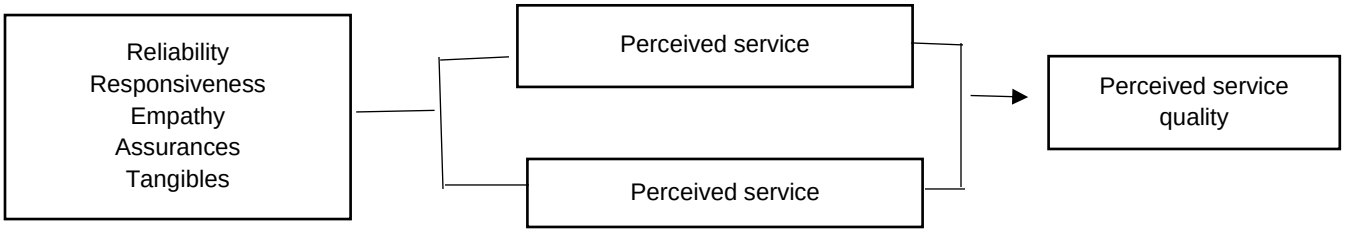


Figure 6: The SERVQUAL model

A firm can either evaluate its service quality by collecting information based on each of the five determinants of service quality, by deriving the average scores of the different dimensions or generate an overall service quality, by deriving the average scores of all the five dimensions (Parasuraman et. al., 1988).

Furthermore, the model was revisited again in 1991 by the developers and the following modifications were made:

1. The dimension, tangible which was considered a ‘’unidimensional’ model is divided into two sub dimensions; physical facilities/equipment and employees’/communication materials.
2. Responsiveness and assurance seem similar in the ‘’five-factor solution’’ but different in the ‘’six-factor solution’’. Responsiveness also has a ‘’sizeable cross loading’’ on reliability.

In conclusion, excluding the division of the tangible dimension, the revised scale still reflects the five dimensions originally discussed in the original model. However, researchers can slightly adjust the ‘’wording’’ of these dimensions to suit particular contexts. (Parasuraman et. al., 1991).

The SERVQUAL model has been used to measure the quality of services in the retail banking industry (Lau et. al., 2013; Lam, 2002; Arasli et al., 2005; Banerjee et. al., 2012) and also in the healthcare industry (Rashid et. al., 2009; Purcărea et. al., 2013; Rohini, et. al., 2006; Headley et. al., 1993), however, the model does not cover all service aspects (Parasuraman et. al., 1988). Also, it emphasizes on the process involved in delivering service to customers but not the result generated from the service encounter (Mangold et. al., 1991; Kang et. al., 2004) and additionally, the proposed service dimensions are said to be overlapping (Ladhari, 2008; Getty et. al., 1994; Lapierre et. al. 1996).

Even though there exist a vast number of criticism surrounding this model, it is considered to have a ‘’more diagnostic purpose’’ (Carrillat et. al., 2007). According to Ladhari’s (2008) study on examining the criticisms and contribution to the SERVQUAL model that has been pointed out for the past 20 years, he concluded that the model aside its criticisms is still an essential tool in the service quality logic.

SQM 3: SERVPERF model (Cronin et. al., 1992)

This model was developed because of the arising issues involved in the use of the SERVQUAL model. The model is referred to as a ‘’performance-based approach’’ (Cronin et. al., 1992) thus suggest that performance, excluding customer’s expectations only measures service quality based on the five service dimensions proposed by the SERVQUAL model. It is considered to be an accurate model in terms of it being reliable and predictable. Also, in contrast to the SERVQUAL model, the SERVPERF model is said to explain more variation in the service quality measurement of firms and this was concluded based on the survey conducted in four industries. (Cronin et. al., 1992; Polyakova et. al., 2015; Seth et. al., 2005).

However, the industries used as case studies were mainly of low service interactive nature and also the model is suitable for business retailing entities where services are the main source of value creation (Cronin et. al., 1992; Polyakova et. al., 2015).

The SERVPERF model is shown in the figure 7 and it was deduced from Polyakova et. al. (2015).

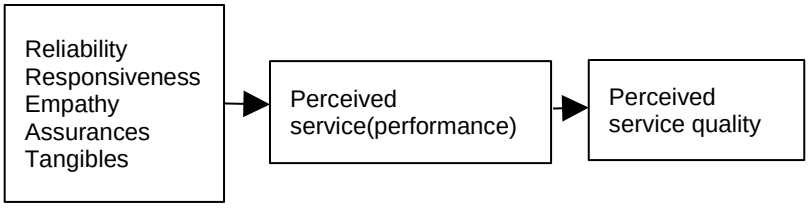


Figure 7: The SERVPERF model

Figure 7 shows that the perceived service quality of a firm is measured by its performance based on the five listed attributes.

SQM 4: Measuring the performance of management/professional consulting firms- Patterson et. al. (1997)

Patterson et. al. (1997) developed a model that can aid professional firms (such as environmental consulting firms and project management firms) and management consulting service firm (marketing research and HRM-Human Resource Management firms) assess the services they offer to their clients.

The scholars proposed six criteria for measuring the performance of consulting firms, however, in their final conclusion one dimension, the outcome dimension (measures the ability of the service firm to achieve its commitment. Also, it was said to be a technical dimension) was considered as a factor that aids in defining satisfaction whilst the remaining five dimensions were agreed to have a symbolical influence on satisfaction and value, therefore, the outcome dimension was not included in the dimensions that have a strong impact on satisfaction. (ibid).

The five dimensions recognized by Patterson et. al. (1997) to have a strong effect on satisfaction are:

1. The methodological dimension: This consist of the methodology used in producing services and the ‘’creativity’’ used.
2. Service dimension: Relates to the extent of services offered. It includes traits like ‘’reliability in meeting deadlines, responsiveness, and general professionalism displayed’’.
3. Relationship dimension: measures the relationship that is built between a company (service provider) and its clients.
4. Global network dimension: The ability of the service provider to seek assistance from international network to aid in solving client’s problem.
5. Problem identification dimension: The ability of the service provider to understand the needs and objectives of their clients.

Also, the researchers argued that in situations where there exist ‘’inexperienced clients’’, they may encounter struggles when assessing the value of the technical dimension therefore in such cases, the service dimension or relationship dimension can be adopted to assess after-sales events. (Patterson et. al.,1997). However, according to Richard et. al. (1993) and Weekes et. al. (1996), customers in making choices use several ‘’process and outcome quality attributes’’ thus service quality models that suggest process and outcome quality attributes are significant over models that propose only a process or outcome quality attribute.

SQM 5: A Multi-Stage Model of Service Quality and Value (Bolton et. al., 1991b)

The authors developed a three-stage model (namely assessments of performance, service quality and value) where customers can evaluate the services of a firm. Prior to this study, the service quality phase will be discussed. That is, how customers evaluate the overall service quality of a service firm.

According to the model, service quality is influenced by:

1. The performance level of the firm: This is based on how customers judge the performance level of a firm in relation to qualities such as reliability.
2. Expectations: evaluates the expectations of customers in relation to the performance of the various service elements
3. Disconfirmation experiences: disparities between customer's expectation and actual performance of a firm.

The model can be modified to suit the firm's setting. For example, a further study was conducted by the scholars to evaluate the services a telephone industry provides. The expectation function was excluded in the study because an ''exploratory research'' in the telephone service industry showed that their customer expectations are not effectively treated. (Bolton et. al., 1991b).

SQM 6: INDSERV model (Gounaris, 2005)

The model is developed purposely for B2B services since the researcher concluded that SERVQUAL has crucial 'methodological'' issues when implemented in B2B services. To verify the model's validity, it was implemented in the studies of four other industrial service sectors which also showed its significant.

Gounaris (2005) defined perceived service quality as a ''second-order construct'' which comprises of five dimensions namely the process quality (provider's ability to perform service before the process actually begins), hard quality (what service is produced), soft quality (how the service is processed), immediate output (whether the produced results have solved the customers' problems) and final output (the effect of results after its implementation). However, the model was revised to present only four dimensions where the immediate and final output was combined to form one single dimension known as the output quality.

The model aids professionals to examine service quality under two levels namely, the individual level where service firms assess customers based on each individual item; and the level based on ‘’latent endogenous variables’’, where strategical issues are exposed if this model is implemented (Gounaris, 2005). However, Lee (2011) stated that as a result of the single constructive nature of the model, it is not a suitable measure in a more developed process.

SQM 7: Hierarchical model (Brady et. al., 2001):

The researchers developed a three-dimensional model based on the combination of four service quality models namely, the SERVQUAL model by Parasuraman, et al., (1988), the service quality dimensions proposed by Grönroos (1984) and Rust et. al. (1994) and lastly, Dabholkar, et. al.’s (1996) Multilevel model. The model proposed three service quality dimensions namely the interaction, physical environment and outcome quality. Interaction quality is made up of attributes such as attitude, behaviour and expertise. The physical environment attributes include ambient condition, methodology and social factors whilst the outcome quality consist of the waiting time and tangible attributes.

According to the developers of the hierarchical model, the model will aid service firms to identify how customers evaluate their services and also address issues relating to what explains the service quality perception, how such perceptions are developed and how essential it is to consider where a service perception occurs. Additionally, Ghotbabadi et. al. (2012) concluded in his research that, this model is the most useful tool that will aid managers to gather accurate information and take appropriate actions. However, the authors had concerns of the model not being able to be categorized as a general model for service quality since its study was based on a small section of the service industry.

SQM 8: P-C-P attributes model (Philip, et. al., 1997)

This model is also a 3-hierarchical structural service quality-measuring tool consisting of pivotal attributes, which are located at the apex of the structure, the core attributes located at the centre of the pivotal attributes, and lastly, the peripheral attributes. The pivotal attributes are said to influence service quality the most. They consist of what a customer expects to receive after the service is created (that is, the ‘’end product’’ or ‘’output’’ from the service

process). The core attributes are related to the people, process and organizational framework of a service firm where the customer interacts and negotiate with the service provider to achieve its needs. The attributes belonging to peripherals are known to be "incidental extras" or ‘’frills’’ developed to include a "roundness" to the service encounter in order to provide a complete experience for customers. (Philip, et. al.,1997)

The model serves as a guideline that companies can develop upon, in relation to service firms deciding on which dimensions are appropriate to be employed in their respective evaluation measure. The model is accessible and it identifies the gaps in a service that needs improvement, however, it requires more ‘’empirical’’ verification (Seth et. al., 2005).

SQM 9: Attribute service quality model (Haywood-Farmer, 1988)

According to Haywood-Farmer (1988), a service firm is considered to produce high-quality service if its customer’s expectation and preferences are met constantly. The model is made up of three attributes namely, physical facilities and processes which consist of elements like location; behaviour traits which consist of qualities like attitude and how complaints are handled and lastly, professional judgement attribute which includes honesty and competence qualities. These dimensions are individually located at the high-points of a triangle (see Appendix 1). The scholar then ‘’map different type of service settings as per degree of contact and interaction, degree of labour intensity and degree of service customization into this model’’ with assigned numbers ranging from 1 to 5. Therefore, a service firm that has low contact with their customers, low customization and labour intensity as well (represented by 1), are said to be located nearer to the physical facilities and process attributes thus when evaluating their service quality, such companies should take into consideration that attribute. (Seth et. al., 2005: 919-920). The model is shown in Appendix 1.

The model has the ability to provide insight on the service quality concept and provide a framework that will assist researchers/managers identify the target audience. However, the framework does not provide guidelines on how to measure the service quality of a firm, how the researcher/firm can investigate issues relating to the services they provide and/or ways of enhancing its service quality. Additionally, the extensive focus on a peculiar dimension may create issues. (Seth et. al., 2005).

SQM 10: Evaluated performance and normed quality model (Teas, 1993)

This model was developed based on the revision of the SERVQUAL model. The scholar identified certain obstacles in relation to the use of the SERVQUAL model (P- E setting). Such complexities include the theoretical and explanatory issues relating to the definition of the expectation concept and the ‘’theoretical justification of the expectations component of the P-E framework’’. (Teas, 1993: 18).

As a result of this, Teas (1993) developed two structures for measuring service quality. They are the Evaluated Performance model(EP) and the Normed Quality model(NQ). The Evaluated Performance model(EP) is given by the equation:

$$Q_i = -1\left[\sum_{j=1}^{m} w_j \sum_{k=1}^{n_j} p_{ij_k}\left|A_{j_k} - I_j\right|^l\right] I \Big/ l. \qquad (1)$$

Where,

Q_i = customer’s perceived quality of object i.

w_j = Importance of attribute j that explains the perceived quality.

p_{ij_k} = the perceived probability that object i has amount k of attribute j.

A_{j_k} = amount k of attribute j.

I_j = the perfect number of attribute j that is theorized ‘’in classic ideal point attitudinal models’’.

m= ‘’number of attributes’’.

n_j = number of ‘’amount’’ categories of attribute j.

l = Minkowski space parameter. (ibid).

According to the model, the perceived quality of an object i can be increased by factors such as narrowing the difference ‘’between object i’s performance and the ideal object’s performance on one or more of the m attributes’’ and reducing the relative weights w_j for attributes characterised by large $\left|A_{j_k} - I_j\right|$gaps. (Teas, 1993: 22).

When the quality of different object i Q_i is comparative to the ‘’quality of the excellence norm’’, it can be theorized as the normed quality model(NQ) and it is formulation by the equation:

$NQ = [Q_i - Q_e]$. (2)

Where,

NQ = Normed Quality index for object i.

Q_i = customer's perceived quality of object i.

Q_e= customer's perceived quality of the excellence norm object.

In relation to the two models explained above, the Evaluated Performance model(EP) is proposed to be more accurate than the NQ. However, the model in general had some drawbacks, such as the validity of the model was evaluated on few ''sample size'' which focused on a limited service sphere. (Seth et. al., 2005; Teas, 1993).

SQM 11: Qualitometro I method (Franceschini et. al., 1998)

This method measures and observe service quality assessment ''on-line''. The model also adopts the ten determinants of service quality proposed by Parasuraman et al. (1985) in its concept (Pribadi et. al., 2007; Franceschini et. al., 1998). It was developed to perform a ''direct evaluation of expected (qe) and perceived service quality (qp)'' (Pribadi et. al., 2007). What distinguishes the model from the others is the fact that it assesses Qe as an ''ex-ante service use'' and the latter as an ''ex-post '' service use in the same survey (Franceschini et. al., 1998). This method also employs ''statistical data analysis'' based on ''the traditional approach (after data numerization), central tendency and dispersion estimation without any numerical coding of collected Information'' (Pribadi et. al., 2007: 38). Thus, it uses the Multiple-criteria decision analysis(MCDA) and 'p' control chart. It permits the control of quality online of the ''differential ∂Q between expected and perceived quality'' which is computed with a ''p control chart'' (Franceschini et. al., 1997).

3.2 Techniques in acquiring customer satisfaction information

Companies have over the years with/without the assistance from professionals organized surveys in relation to how customers feel about their offerings (Mumel et. al., 2011), however, the use of unsuitable method can affect the quality of the results.

Instead of adopting "off the peg" general methodologies to collect data on a specific problem, researchers and practitioners should consider a more suitable approach which will yield answers relating to the specific research objectives. Additionally, the initial stages of any

survey is to identify the specific information required to help solve the research problem and what methods can be adopted to generate such information. (Gilmore et. al., 2009).

According to Chan (2003), there exist three elements that should be included in a measuring structure. They are:

1. The ‘’overall satisfaction’’ which is mostly used as the main index.
2. The ‘’confirmation of expectations’’ which refers to the extent to which performance outweighs or fails to meet the expectation of customers.
3. Analysing performance in relation to the customer’s ‘’hypothetical ideal product’’.

The findings derived from customer surveys aid companies to identify their strengths and weaknesses (Devlin et.al., 1993) and also to provide value based on what customers actually want and not on only what they presume customers will want (Keuc, 2014). Therefore, it is importance for companies to conduct such surveys.

However, several scholars have identified the complexities involved in measuring techniques employed. According to Oskamp (1991), researchers find difficulties in ‘’wording’’ questions whereas according to Gilmore et. al. (2009), the most common issue is how the series of responses may violate the accuracy of the answers to the questionnaire. Reichheld (2003) criticises the use of lengthy set of questions in a survey because it is time and money consuming and researchers might result in measuring misguided indicators.

There exist various methods that can be used to collect data regarding the satisfaction of customers; the traditional methods and the newly developed ones that answer specific research questions (example is Granot et. al.’s (2012) study that revised the in-depth interview method to develop a new method for business and industrial marketing research). It can be observed that the newly developed methods originated from the traditional methods.

Based on this, the rest of this section discusses the most widely known and used (traditional methods) data collection methods.

Observation studies

This is a qualitative method of data collection which when applied produces a comprehensive knowledge of a service aspect and its interaction process. This method is for service companies such as hotels and restaurants in their quest to gather information relating to their customer's experience. A company or researcher that uses observation studies gains information and knowledge that cannot be acquired through questionnaires. The observer evaluates the elements of service, quality of service and service employees-client interaction. For instance, in the hospitality industry, customer experiences acquired during service employee-client interactions and the other elements of the services provided is sought. (Gilmore et. al., 2009).

Questionnaire

This method is said to be one of the most widely used (Jacoby, 1978), cheap to adopt, convenient and effective to administer as compared to other methods such as personal interviewing. Despite the advantages attached to this method, the validity of results generated can be affected if questions posed are ambiguous. The ''wording'' of questions is important because it affects the results of the survey, thus it is necessary to use simple and clear words in order to make it easy for ''lay-people'' to comprehend. (Mathers et. al., 2007).

Questionnaires can be emailed directly to clients for them to respond to independently (self-administered) (examples are Brady et. al.'s (2001) and Dabholkar et. al.'s (1996) study), presented personally (face-face) and conducted by an interviewer or done through the telephone. However, questionnaires (especially those without introductory letters attached) that are mailed are observed to receive a lower response rate. (Mathers et. al., 2007).

Hayes (1992) proposes four stages involved in designing a customer satisfaction questionnaire. They are identifying the questions/items to be included in the questionnaire, determining the response pattern, formulating an introduction for the questionnaire and identifying what will constitute the approved questionnaire.

In-depth interviews

In-depth interviewing assist researchers to acquire knowledge and understanding of each customer's judgement that is voiced out by the target group (Gilmore et al., 2009). The basic

objective of the interview is to capture how people feel about certain events/things, listen to their opinions and their stories in relation to experiences they have had (Patton, 1990).

Also, to identify their perceptions about an offering, ‘’memories and interpretations’’ that studies find complicated to examine in alternative methods. In-depth interviews can either be unstructured (aims at collecting individual and overall views) or structured (centres on specific ‘’questioning approach’’) (Gilmore et al., 2009). This method also gathers the judgement of service providers (such as managers) about their overall quality of service they provide. These interviews can centre on the sphere and structure of service delivery, how service provider-customer interactions are maintained and the accuracy of service quality measuring tools adopted in the service. (ibid).

However, Jacoby (1978) stated that in relation to how interviews are conducted, as a result of its verbal nature, there exist differences in what a respondent will say and what their actual actions are.

Focus group discussions

This method can identify the logic surrounding the judgements, ‘’attitudes, behaviour and perceptions’’ of workers and clients where it encourages respondents to communicate amongst each other (Gilmore et al., 2009). The main feature of this method is that information generated from respondents during the research exercise occur at the same time (Morgan, 1988). Additionally, since discussions are made in a group, ideas are formulated jointly however, misunderstanding might arise out of such discussions (Smithson, 2000).

According to Morgan (1988), focus groups either function as a ‘’self-contained method’’ (the main method adopted in a research), ‘’supplementary source’’ (a foundation to provide information for the development of the main research method) or ‘’multimedia studies’’ (part of a multiple use research data collection).

In the service industry, because of its dynamic character and versatility to certain research issues, the method can be adopted to obtain the ‘’opinions and attitudes’’ of customers of service firms such as restaurants in relation to their perceptions about the menu, price (‘’value for money’’), service offered, interaction between workers and customers and the appearance

of the food. Additionally, it aids to capture the factors that affect the judgement and views of customers since the method also considers ‘’environmental and competitive’’ problems. (Gilmore et al., 2009).

However, since it involves a group of people, certain issues might arise such as how the researcher/conductor will be able to control a participant or several participants who feel their ideas are the best hence should be heard and used and also how the attitude and cultural history of the conductor might influence the attitudes of the respondents (Smithson, 2000).

According to Locke (1989), choosing an appropriate method for data collection depends on the objectives and questions of the research. That is, to answer a research question like” how do managers behave in this company?", observation of the target audience is suitable. Therefore, deciding on a suitable research method in a research is not ‘’rigid’’ thus multiple methods can be used in a study. (Granot et. al., 2012).

3.3 Measuring-question scales and response items in customer satisfaction survey.

‘’A critical element in the evolution of a fundamental body of knowledge in marketing, as well as for improved marketing practice, is the development of better measures of the variables with which marketers work’’. Churchill (1979).

As a result of the current growth in the business world, in order to make effective decisions and take accurate actions, it is essential for practitioners/managers to acquire knowledge concerning the current market situation, competition and ‘’technologies’’. (Gilmore et al., 2009).

There is an ongoing debate as to which scale is suitable for a research, comparing conventional and current methods in formulating scales; and single and multiple items scale. The formulation and adoption of scales in measuring the services a firm offer is seen to lack foresight and has been observed to have a slow process in its formulation thus the need for more studies. (Gilmore et al., 2009). According to Churchill (1979), marketers are interested in measuring service quality however they lack the ‘’know-how’’.

Additionally, Jacoby (1978) pointed out that, the reasons for the lack of quality in most marketing research is because of the type of measures researchers used to measure the study's variables, that is, how valid such measures are. Little attempt has been made by researchers to find out how valid the measures they plan to adopt is. (Gilmore et al., 2009). Based on this, the rest of this section discusses the generally known types of item scale with examples of their respective questions posed, in addition, other scales that have been proposed by other scholars will also be discussed.

''In the quest to measure the quality of products and services from the customer's perspective, researchers should assess the quality of the measurement tool as well. One focus for such an assessment is the response scale that customers would use to communicate their views about the performance of the product or service. What is the best scale? Which categories are positive indicators of performance? Can responses be interpreted to drive quality improvement? '' Devlin et. al. (1993).

Mumel et.al. (2011) identified various set of response items that can be used in a questionnaire. They include:

1. Excellent, satisfactory and unsatisfactory.
2. Very good, good, satisfactory and needs improvement.
3. Excellent (5), very good (4), good (3), average (2) and bad (1).

There exist two types of item scales namely the single-item and the multiple-item scales. (Danaher et. al., 1996; Mumel et.al., 2011; Keuc, 2014). The single item scale consists of an item that evaluates a ''construct'' whilst multi-item scales consist of several items that measure a ''construct'' (Ali, 2012).

Single-items scale

The single-item scale is said to be less time consuming, not lengthy (Nagy, 2002; Loo, 2002) and simple to use. Basically, it has two to nine measuring point whereby customers select answers from a ''very satisfied'' to ''very dissatisfied'' response range (Mumel et.al., 2011; Danaher et. al., 1996). A five-point scale (response consisting of 1=dissatisfied, 2 =dissatisfied, 3 = neutral, 4 = satisfied and 5 = very satisfied) is the most widely used in customer satisfaction research (Keuc, 2014). This scale has been used by several

researchers such as Nagy (2002). Also, a seven-point scale which ranges from ‘’strongly agree’’ (7) to ‘’strongly disagree’’ (1) has been used by renowned scholars in their studies such as Parasuraman et. al. (1988) and Gounaris (2005); and a ten-point scale ranging from ‘’extremely good’’ (10) to ‘’extremely poor’’ (1) by Parasuraman et. al. (1991). Other authors that used a single-item scale in their study includes Bolton (1998) and Rust et. al. (1995). Questions are asked in relation to the attributes attached to the various service aspects and they are either in negative wording such the questions used in Parasuraman et. al.’s (1988) study or positive wordings like the ones used in Gounaris (2005).

An example of the single item scale with its question is shown in table 4 (Bergkvist et. al., 2007).

Table 4: Example of a single item scale (Bergkvist et. al., 2007: 180).

Construct	Question	Answer scale
Rating based on customer’s perception of the company’s advertisement (L_{AD})	‘’Thinking about the ad for /BRAND/, which of the following statements best describes your feelings about the ad?’’	1. I liked it very much 2. I liked it 3. I neither liked it nor disliked it. 4. I disliked it. 5. I disliked it very much

Even though this scale is said to be simple, according to Diamantopoulos et. al. (2012), the scale should be carefully used and applied mostly in exceptional cases. Yi (1989) also states that the scale is complicated in testing the reliability of the estimates and also it fails to provide information on its constituents and evaluate the dimensions separately, hence, using this scale has a possibility of not identifying all difficulties relating to customer satisfaction. However, Nagy (2002) stated that, despite the fact that a reliability indicator is essential to show the accuracy of a measure, a tool ‘’that is more inclusive of the construct’’ should be highly taken into consideration.

In the midst of the challenges and disadvantages surrounding the single-items scale, this item scale over the years has been approved by researchers because it reduces the stress

respondents go through in selecting an answer, increases the response rate and minimize the content of information gathered and the transformation of data. (Reichheld, 2003).

Multi-items scale

The use of multi-items scale in marketing research has grown over the years. This is because advocates of this method agree that a single-item scale can be deceitful and flawed hence the use of multi-items scale should be used rather than the single item scale. (Gilmore et al., 2009). Some examples of multi-item scales include ‘’verbal, graphic, semantic differential, Likert and inferential scales’’ where the semantic differential is tested to have a high reliability (Mumel et.al., 2011). Ranking, Graphic, semantic differential, Likert are some of the most widely used scales in customer research (Danaher et. al., 1996). Some of these question scales are explained with examples below:

- Likert scales

Likert scales give the opportunity for respondents to assign a score to each ‘’attitudinal’’ statement. With this method, the ‘’wording’’ of the statement should be taken into much consideration. (Mathers, et. al., 2007) An example of a question and its Likert scale which is seen in Appendix 2. An example of scholars that adopted the Likert scale in their studies is Patterson et. al. (1997) who used a seven-point Likert scale.

- Semantic differential

Semantic differential scales are based on a series of various dimensions where respondents provide information on a particular statement. (Mathers, et. al., 2007). This method is effective when the attributes at the ends of the scale are opposite in meanings. Therefore, in order to avoid complexities in answering these questions (such as respondents think the attributes at both edges of the scale should be chosen), an evaluation of the scale is important. An example of a question and its semantic differential scale response is seen in Appendix 2. An example of research that adopted the semantic differential is Dabholkar et. al. (1996) and Cronin et. al. (1992). They also used a seven-point semantic differential.

- Ranking

With this method, respondents are either presented with a set of elements ‘’on a show card’’ and are requested to rank them orally or they are presented with a set of ‘’cards’’ containing an element and are requested to arrange the ‘’cards’’ in terms of priority. Another alternative is for respondents to attach ‘’numbers 1-5’’ to every element. (Mathers, et. al., 2007). An example is also seen in Appendix 2.

Churchill (1979) recommends the multi-item scale. He argued that the single-item measure is considered to have a ‘’uniqueness’’. That is, every item is said to be less interrelated with the features being evaluated. Also, the single item scale has measurement errors thus it is unreliable.

Churchill (1979) further suggested that multi-items scale can help curtail the reliability issues of single item scale by joining the measuring items (its ‘’uniqueness’’ can be eliminated). This will result in less limitation since the people are categorised thus reliability increases and errors related to measurement reduces.

However, the scale is perceived to be expensive (mostly when used in service research) to use (Drolet et. al., 2001) and insignificant which can be interchanged for the use of the single-item scale in various settings (Drolet et. al., 2001; Bergkvist et. al., 2007). That is, although the multi- item scale produces reliable indicators, when a ‘’second or third item’’ is added to a scale, it contributes less to the information that a first item contains (Drolet et. al., 2001).

Additionally, the use of multiple-item scales can make respondents tired, uninterested and careless in selecting responses. Thus, can affect the ‘’quality’’ of information that will be obtained. (Drolet et. al., 2001). I can attest to this statement with my own experience. On multiple times when asked to fill a questionnaire that contains multi-item scale, i answer the first four questions with much zeal, however, i loss interest with the question settings and confused as to which to tick as I progress. I just end up ticking any response just to finish answering.

Appendix 3 shows a graphical example of three set of respondents answering two multi-item questions. In relation to the first respondent, it is observed that the answers to the first question show a steady trend (circled all 1’s), however, can it be concluded that it was just a coincidence that the respondent felt the same way about the items or not? The second respondent shows a confusing pattern (researcher’s view) as well (circled all 1’s in both questions). The researcher will be indifferent as to whether the answers really show the true experience of the respondent or it is also just a coincident. The third respondent did not finish answering the questions therefore, the researcher will intend on figuring out if that

questionnaire should be included when analysing and interpreting the collected information. All these might affect the quality of information that will be generated at the analysing and interpreting stage of the survey.

The decision as to which of the item scale to implement depends on the particular ‘’criterion’’ to be measured (Diamantopoulos et. al., 2012). A study by Kwon et. al. (2005) revealed that the multi-item scale is significant than the single item scale in some cases whilst in other cases the single-item scale is significant than the multi item scale or even, there exist no contrast between them.

The general aim of adopting a scale (multi-item or single-item) is to obtain information thus in selecting an item scale, the type of information that is required to be generated should also be taken into consideration (Drolet et. al., 2001).

In further literature, generally used scales such as Likert, Semantic differential and Graphical are categorized under three customer satisfaction measurement scales namely performance scales, disconfirmation scales and satisfaction scales. The performance scales consist of attributes like ‘’poor, fair, good and excellent’’ whilst the disconfirmation scales involve scales such as ‘’worse than expected to better than expected’’. The satisfaction scales also consist of scales like ‘’dissatisfied to very satisfied’’. (Danaher et. al., 1996; Devlin et al., 1993; Haddrell, 1994; Mumel et.al., 2011). The disconfirmation scale is preferred to the other two scale classifications because, the scale fuses the P-E approach by Parasuraman et al. (1988) into a single question. It also decreases the rate of irregularities relating to the experienced service that is measured. (Danaher et. al., 1996).

Mumel et.al. (2011) also discussed an additional scale; the ‘’recommend scale’’. It consists of responses ranging from ‘’very likely’’ to ‘’very unlikely’’ and is related to a ‘’how likely are you to recommend...to a friend’’ question.

Webster et. al. (1994) developed a -2 to +2 scale suitable for measuring the quality of service. They stated that the point -2 (represent ‘’much less than i expected’’ and/or ‘’very disappointed’’) to the point +2 (represent ‘’much more than i expected’’ and/or ‘’very

impressed'') provides results as to whether customers are satisfied with a service or not. The model was adopted by Philip, et. al. (1997) in the P-C-P attributes model.

Appendix 4 shows each point scale and its respective implication to the satisfaction level of customers. Points below 0 are considered as an unacceptable quality, 0 is considered as a satisfactory quality and points above 0 represent ideal quality. (ibid).

Reichheld (2003) encourages practitioners/managers to keep it simple. In his 2003 study to identify questions that have a high interrelationship with customer's continuous purchase or recommendation, he concluded that one simple question which is "How likely is it that you would recommend [company X] to a friend or colleague?" is meant to answer customer's continuous purchase intention or recommendation. It contains ten response items ranging from ''not at all likely'' (0) to ''extremely likely'' (10) whereas the 5th item response is ''neutral''. This question can be applied to a vast number of industries. (ibid).

However, the decision on which question or item scale should be used in a research depends on the objectives and questions of the research thus practitioners/marketers/managers should understand what they intend to identify in a research before adopting a particular method (Gilmore et al., 2009) and also have knowledge about the measurement process (Churchill, 1979).

3.4 Techniques in analysing and interpreting customer satisfaction data

After data is collected in a research, the next step is to analyse and interpret the obtained information in order to make the necessary decisions (Olsen et al., 2014).

The rest of this section discusses analytical tools that will provide more additional information to collected customer satisfaction information.

Thematic Analysis

In a qualitative research, the technique for data analysis is the thematic analysis (Attride-Stirling, 2001). The information gathered from a research survey is summarized and categorized into various topics with the use of a ''coding framework''. The topics are revisited again and narrowed to identify the essential topics. A ''network'' is then further developed

where related topics are put together. A ‘’thematic network’’ (which is deduced from the ‘’global themes’’) is formulated by first selecting and revising ‘’basic themes’’ (the restructured topics from the originally developed topics), to create ‘’global themes’’ (this is developed by compiling the essential ideas in the ‘’organized themes’’) and which out of the ‘’global themes’’ a ‘’thematic network’’ is created. The ‘’thematic network’’ is then summarized and interpreted. (ibid).

The quantitative research uses statistical techniques in its data analysis and they have the capacity to draw out significant meanings in a data (Babones, 2016). Statistical techniques such as the measurement of central tendency (mean, median and mode) and the measures of variation (like standard deviation and variance). The most widely statistical methods are discussed below:

Frequency table

This method can be used to analyse categorical variables. That is, to find out the number of respondents that ‘’ticked’’ a particular category (Save the children, 2014). This method counts the number of occurrence of a variable and can further be visually represented in graphs such as histogram. (Save the children, 2014; Hayes, 1992). However, it is important to categorize values that are alike into specific sections as a result of the presence of a vast number of values that might be in a data (Hayes, 1992).

Percentages

This technique is used to compute the ‘’proportion of scores of a particular value’’ (Hayes, 1992) and the answer is in percentage which is a proportion of 100%. It is calculated by dividing the number of occurrence of a variable(frequency) by the total number of respondents in the survey. The percentage is recommended in an analysis rather than the frequency because it includes the total number of data size in its computing (ibid) and it is simple to comprehend and explain (Save the children, 2014).

Central tendency:

Another method that can be adopted to analyse data is to identify the ‘’center or middle point of scores’’. This statistical technique consists of three measurement methods namely the mean, median and mode (Hayes, 1992) whereas the mean and median are the most widely

statistical method used (Save the children, 2014). These methods also fall under the category of descriptive statistics that assist in summarizing a data (Erjavec, 2015; Novikova, 2009).

The mean is the ‘’arithmetic average of all scores in the data set’’ (Hayes, 1992) and can be used to identify which element of a service, customers are satisfied with (Novikova, 2009). That is, a service element/attribute with the highest mean value implies that customers on an average are satisfied with that service element and vice versa.

The median is the value found at the midpoint of a data set and it is obtained after the data has been categorized under ‘’highest to lowest’’ or ‘’lowest to highest’’. This implies that a fraction of the data is greater than the median value and the other fraction has lesser values than the median value. (Hayes, 1992: Save the children, 2014).

In analysing a data, the mode is the value that is represented or recorded the most in the data. The mode can be one or more values. (Hayes, 1992).

Measures of variability:

These measures include the range, standard deviation and variance and it explains how values in a data are dispersed. The range in a customer satisfaction study computes how wide or narrow the highest and lowest customer satisfaction factor in a survey is apart from each other (Novikova, 2009) whilst the standard deviation shows how dispersed values are and in its interpretation. That is, a high standard deviation implies that the opinion of the respondents is more diverse and hence are not closer to the average response about the service element that satisfies the respondents (Surveystar, 2013; Novikova, 2009). The variance on the other hand shows how nearer the computed sample mean is, from the population mean (Surveystar, 2013).

The formulas for the above-discussed statistical methods (central tendency and measures of variability) are shown in Appendix 5.

Visual analysis

To present a visual description and summary of generated information, various charts/graphs can be used such as control charts, histogram, scatter plots, bar graph, pie graph and line

graph (Kessler. 1996). This method clearly shows the pattern of variables in a data thus makes it easy to understand the data.

Hypothesis testing

Hypothesis testing involves formulating hypothesis' by using a ''random sample'' to examine whether there is proof that holds a hypothesis significant or not (Paiva, 2010). The test is developed in two forms; the null(H_0) and alternative(H_1) hypothesis (Hayes, 1992). The null hypothesis is either accepted or rejected, however if in a test it is concluded not to reject the H_0, it does not imply that the null is absolutely validated but it implies that, there is not enough proof supporting the alternative hypothesis (Paiva, 2010).

Hypothesis testing aids managers/marketers/researchers identify whether the satisfactory level of two categories of customers are the same or not (Hayes, 1992). This will help managers when restructuring its strategies to suit the needs of each client category. Two hypothesis, in relation to the business context, can be tested where the null hypothesis to be tested can be stated as: ''there is no difference'' in the satisfaction levels of the two categories of customers of company A and the alternative hypothesis can be stated as: ''there is a difference'' in the satisfaction levels of the two categories of customers of company A. (Hayes, 1992).

Additionally, there exist various statistical tests that can be used in hypothesis testing such as the t-test, z-test, chi-squares and the ANOVA (Analysis of Variance) test. The type of test to adopt depends on various factors and/or assumptions. This can be seen in Appendix 9 which was obtained from Anawis (2012).

Regression Analysis:

A regression analysis shows the extent of the relationship between two variables- a dependent variable(Y) and independent variable(X). In a service quality assessment, the regression analysis can also be used to identify the relationship between two variables such as the customer's perception of service quality in relation to how available the service firm is to its customers and the customer's ''overall satisfaction'' of service provided by a firm. For example, assuming a marketer is to determine how customer's perception of service quality (in relation to how available the service provider is) affects the customer's overall satisfaction

of service provided by the firm and the intercept and slope is 0.782 and 0.76 respectively. This can be interpreted as: all things being equal, the customer's overall satisfaction increases by 0.76(76%) if customer's perception of service quality (in relation to how available the service provider is) increases by a unit thus shows how significant the independent variable is to the dependent variable. (Hayes, 1992).

Additionally, in terms of identifying the extent to which the regression line reflects the collected data, the Pearson r^2 is computed whereas the Pearson r can be computed to determine how strong the relationship between two variables possess. (Hayes, 1992).

The following presents additional formulas which should be used in specific assumptions:

1. When the independent variable is more than one, the multiple regression analysis is adopted.
2. When the independent variables are categorical such as gender (male or female) and geographical location (example cities in the north, east, south and west of a country), a dummy variable is assigned to each.
3. When the dependent variable(Y) is said to be ''dichotomous'' and it can take the form of two likely possibilities, the Linear Probability Model is used. (Grigoroudis et. al., 2009).

Even though the analytical methods used in qualitative research is thematic and that of quantitative research is statistical, each research method captures components from the other (Save the children, 2014). Also, there exist various software that can aid in calculating these statistical methods rather than computing them manually which is more time-consuming. Statistical software such as Microsoft Excel and SPSS (Statistical Package for the Social Sciences) can be used.

There also exist analytical tools that have been developed by various scholars. The rest of the section discusses some of the customer satisfaction data analysis techniques developed by scholars.

The P- E approach

The famous Perception – Expectation approach proposed by (Parasuraman et. al., 1985) has been used by majority of researchers/ marketers in gathering and analysing their customer satisfaction survey. The expectation for an offering is what a customer expects to receive from an offering whilst the perception of an offering is the actual experience the customer gained from consuming the offering. During a research, the researcher poses questions to its customers based on an overall satisfaction and on each named attribute/ criterion. In interpretation, when results generated shows that the expected service of customers (ES) exceeds their perceived service (actual experience) (PS), it implies that the ‘’perceived ‘’ quality of service provided by the firm is poor/’’unacceptable’’ thus the difference between ES and PS is wide. Additionally, when ES is equal to PS, the ‘’perceived ‘’ quality of service offered is satisfactory; also, when the ES is lesser than its respective PS, the ‘’perceived ‘’ quality of service offered is ideal. (Parasuraman et. al., 1985).

Multicriteria Satisfaction Analysis (MUSA) method-Grigoroudis et. al. (2002):

The method adopts the concept of ‘’ordinal regression analysis’’ to acquire the views of actors (such as customers and employees) on their overall satisfaction of an offering and their satisfaction level on a set of proposed dimensions. These collected judgements are then accumulated into ‘’unique satisfaction functions’’. In the business world, the method is adopted to assess the ‘’quantitative global and partial satisfaction levels’’ of customers that are collected during a customer satisfaction survey and also aids businesses to identify their strengths and weaknesses. In comparison of the MUSA model to other analytical tools, the model in its analysis includes qualitative data responses. (Grigoroudis et. al., 2002).

The ordinal regression analysis for the model is (it has double-error variables):

$$\tilde{y}^* = \sum_{i=1}^{n} b_i x_i^* - \sigma^+ + \sigma^- \quad . \qquad (3)$$

where:

Y^* = the value function of the customer’s global satisfaction function.

X_i^*= the value function of the customer’s satisfaction based on the ‘i’th criteria.

i represents individual criteria and n is the number of criteria.

The equation 3 underwent various transformation such as transforming the function to become linear, including double error terms and also considering certain issues such as the

‘’problem of multiple or near optimal solutions’’ (Grigoroudis et. al., 2002). The final function is seen in Appendix 6.

The computed value functions identify the ‘’ demanding’’ level of customers which is evaluated on three customer categories. They are the neutral customers (with these customers, their satisfaction level and met expectations are positively related), demanding customers (if these customers are not presented with quality offerings, they are not absolutely satisfied) and non-demanding customers (these customers are satisfied even if their expectations are not fully met). (Grigoroudis et. al., 2002).

In interpreting customer satisfaction data results, the following procedures and formulas are computed (Grigoroudis et. al., 2002):

1. Formulate the average satisfaction indices: That is the average score for the overall and fractional variables which ranges from 0% to 100%. Appendix 7a shows the formula.
2. Compute the average demanding indices: In customer research, these indices can be adopted to study the behaviour of customers and the extent of quality a service firm’s offering possess. Thus, the greater the demanding indices score, the more the need for the company to improve their offerings in order to increase the satisfaction level, service quality and/or realisation of customers’ expectation. The indices are standardized at a (-1, 1) range and the formula is shown in Appendix 7b.
3. Deduce the average improvement indices: The indices can expose the extent of improvement on specific criteria and they are standardized at a (0,1) range. The formula is seen in Appendix 7c.
4. Draw an action diagram: Action diagrams are formulated from the addition of the computed weights and average satisfaction indices. The concept of the diagram is alike the SWOT (Strengths–Weaknesses–Opportunities–Threats) analysis and it exposes the customer satisfaction areas that are effective and/or ineffective and additionally identify areas that need to be improved in terms of priority. The diagram has four parts which depict high and low importance and then high and low performance. The diagram can be formulated either by using the weights and the average satisfaction indices of the MUSA method (known as ‘’raw action diagrams’’)

or adopt the relative variables B_i^I and S_i^I (known as ‘’relative action diagrams’’). Appendix 8a presents the structure and components of the diagram.

5. Draw an improvement diagram: As compared to the action diagram, this diagram shows the output or the intensity for the need of improvement and its computed by either adding the average improvement and demanding indices (raw improvement charts) or computing the end level of the axes as the median of all the marks located on the diagram. Appendix 8b presents the structure and components of the diagram.

Fuzzy-rule Based Decision Support (Ammar et. al., 2008):

This method was proposed as a result of emerging issues from the use of other methods of data analytical tools. According to Ammar et. al. (2008), statistical methods like the weighted average scores does not take into consideration the relationship between the measured ‘’attributes’’ in a customer satisfaction survey. This is because the method measures each satisfaction attribute separately and estimates that there exists a linear relationship between the satisfaction level of an ‘’attribute’’ and the overall satisfaction. However, customers’ overall satisfaction does not imply it consist of the composition of the satisfaction level of the various attributes in a study.

The proposed Fuzzy-rule method is an analytical technique that has incorporated the fuzzy set theory and knowledge-based rule systems in its approach. The fuzzy set theory is proposed to deal with ‘’imprecision’’ and vagueness of data which is expressed in ‘’linguistic form’’. It also assists researchers/managers study the systematic movement from one classification set to the other where the classification is explained ‘’by a function in [0,1]’’ which represent the extent of ‘’membership of a given value in the specific category’’. (Ammar et. al., 2008). On the other hand, a knowledge-based system (KBS) is an IT application/program that uses knowledge to solve complicated issues.

Braendle et. al. (2014) defined the fuzzy set with the following assumption: ‘’Let X be a universe of discourse, Ã is a fuzzy subset of X such that for all x ϵ X. there is a number μ Ã (x) ϵ [0, 1] which is assigned to present the membership of x to Ã, and μ Ã (x) is called the membership function of Ã’’. Additionally, defined the membership function as:

$$\mu_{\alpha}(x) = \begin{cases} 0, & x \le a_1, \\ \dfrac{x-a_1}{a_2 - a_1}, & a_1 \le x \le a_2, \\ \dfrac{a_3 - x}{a_3 - a_2}, & a_2 \le x \le a_3, \\ 0, & x > a_3 \end{cases} \quad (4)$$

Where:

x= preference ratings of the attribute.

μ (x) = membership function.

a1, a2, a3 = real numbers which assumes that a1<a2<a3. Additionally, a1 and a3 are the lower and upper boundary of the fuzzy number respectively. (Ibid).

Returning to the Fuzzy- rule method, the model concludes that satisfaction is not the opposite of dissatisfaction and also there exist no linear relationship between the overall satisfaction and the individual satisfaction level of attributes. In addition, the method when implemented does not only assist in analysing results, it also boosts the know-how of the marketers/managers who have adopted it and evaluates the effects of single and ‘’group’’ attributes. This method has been successfully implemented in various organizations and for various purposes such as its implementation in the USA to assess the financial and capital operation of the cities and also in assessing the financial well-being in governmental schools. (Ammar et. al., 2008).

A 10-item scale was developed, however, most responses relating to importance ranged from 7 to 10 whilst that of satisfaction ranged from 5 to 10. Additionally, in identifying the difference between the two scores a -4 to +4 range was used. These were then modified to include fuzzy classifications. The classification for importance and satisfaction scales are ‘’low’’, ‘’medium’’ and ‘’high’’; ‘’negative’’, ‘’near zero’’ and ‘’positive’’ for the differences in importance and satisfaction. (ibid).

The model is explained using the Corporate Information Systems (CIS) Division of a US electric utility company’s evaluation of their Action Development function survey, as an illustrative example where customers were asked about their satisfaction level of attributes

and a 10 Likert response item was used. Additionally, the Fuzzy-rule system is explained under two sections; analysing individual attributes and the combination of attributes. (ibid).

Analysing individual attributes: Based on the case study, fuzzy sets were chosen to evaluate an individual attribute being measured in the survey and it is explained in relation to the ‘’low’’, ‘’medium’’ and ‘’high’’ categorical scales. This is seen in Figure 8 below:

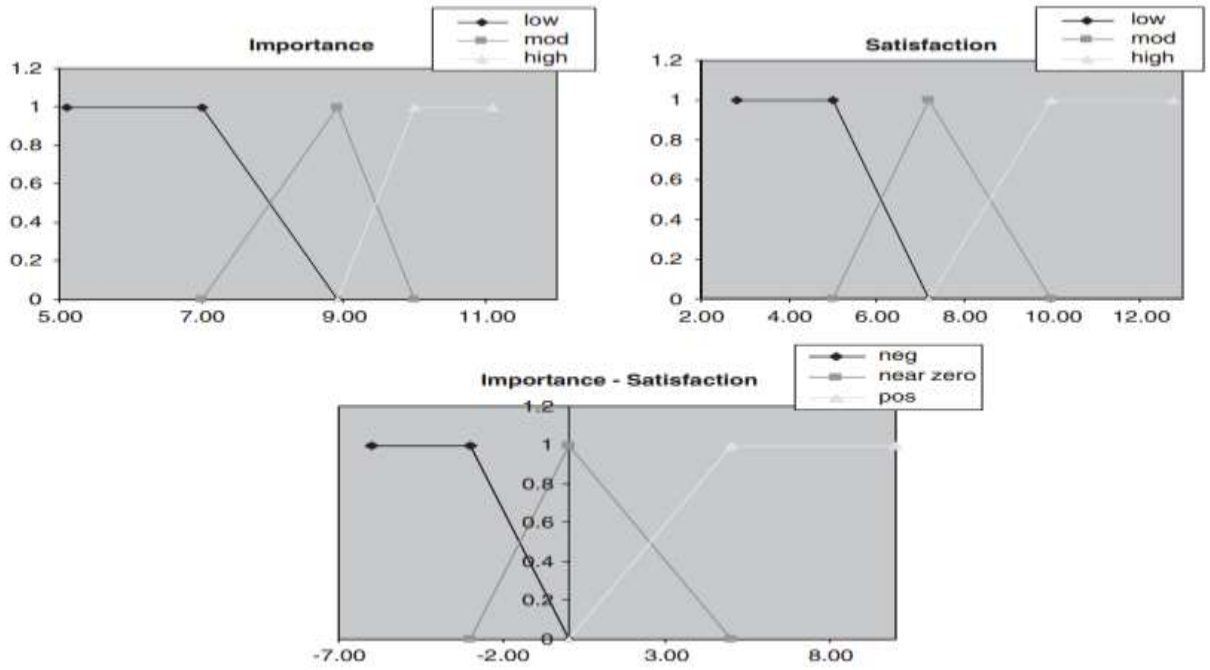


Figure 8: Representation of fuzzy sets for an individual customer satisfaction attribute. (Ammar et. al., 2008: 96).

Based on figure 8, if a customer scores an 8 for its importance level of an attribute, the fuzzy sets shows a ‘’low’’ importance representing a 0.47 membership and a ‘’moderate’’ importance representing a 0.53 membership. In relation to the level of satisfaction, a 9 satisfaction score implies a ‘’moderate’’ satisfaction representing about 0.36 membership and a ‘’high’’ satisfaction representing a 0.64 membership. In identifying the difference between importance and satisfaction level, the value is computed thus prior to the example above where importance is 8 and satisfaction is 9, the value of the difference is -1(8-9). When traced to its fuzzy sets diagram in figure 10, it shows that the difference between the levels is ‘’negative’’ at 0.33 membership and ‘’near zero’’ at a 0.67 membership. (ibid).

A rule-based system is further ‘’designed to evaluate the scores in a manner that is not sensitive to small changes in values, and where multiple assessments can be applicable to any given set of scores.’’ The rule-based system in relation to the case study is seen in figure 9:

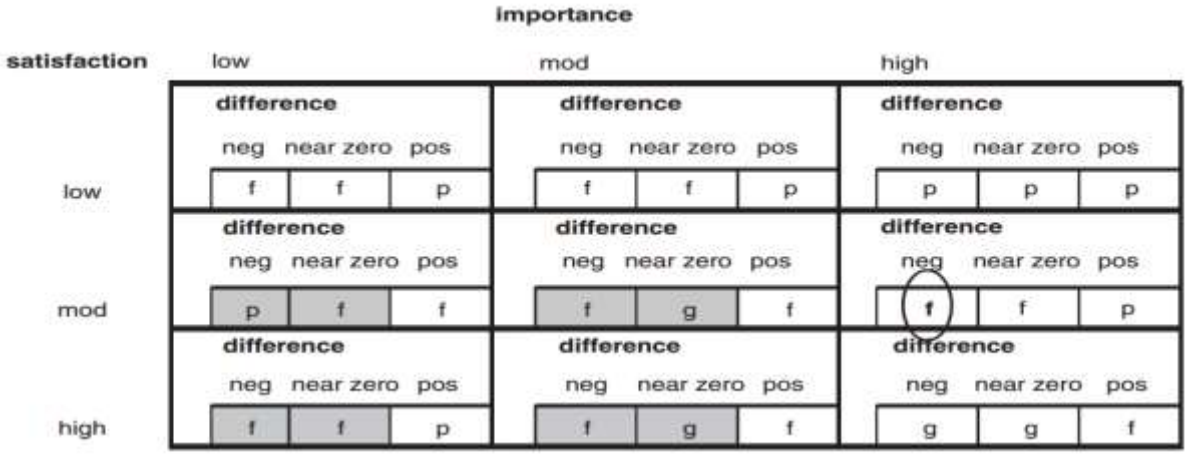


Figure 9: Rule base system for an individual customer satisfaction attribute. (Ammar et. al., 2008: 97).

The system presents a conclusion based on 3 categorical measures which are ‘’poor’’, ‘’fair’’ and ‘’good’’. The circled box is interpreted as ‘’ if importance is high, satisfaction is moderate and the difference is negative, then the rating is fair’’.

In relation to the results generated from the case study, it will be interpreted as, ‘’if importance is 0.47, satisfaction is moderate (0.36) and the difference is negative (0.33), then the rating is poor (0.33)’’. OR ‘’if importance is moderate (0.53), satisfaction is moderate (0.36) and the difference is near zero (0.67), then rating is good (0.67).

It is observed that the fuzzy rule presents a set of rules in its conclusion thus it is considered to enhance validity and also omit ‘’inconsistencies’’ in the conclusion. (ibid).

Analysing group attributes: This method deals with incorporating all attributes of a survey to develop a rule base system. However, attributes exceeding four is complicated to analyse when using this method. The evaluation and interpretation of a rule base system for group attributes follows the same analyses as stated for the individual attributes (discussed above).

However, in analysing group functions, the defuzzified scores is preferred instead of a fuzzy method. The defuzzified method enhances simplicity in ranking and evaluation of results. The Center of Area formula is used for defuzzification of fuzzy numbers and this is seen in Appendix 10. It was obtained from Braendle et. al. (2014).

In conclusion, the method seems to be more detailed and requires the use of computer programming and artificial languages thus technical and IT experts are needed to conduct this analyses in order to successfully utilize the method and produce accurate results and interpretation.

Dominance analysis(Budescu,1993):

According to Kumar et.al. (2009), this analysis is proposed by Budescu (1993) to determine the impact of attributes on the ‘’squared multiple correlation (R2)’’, curtail complexities involved in explaining the dependent variable, analyse attributes by identifying the importance of each attribute (‘’by itself’’), the effect of an attribute in conjunction with the other attributes and the effect of an attribute in conjunction with other explanatory variables (partial effect).

The analysis has been adopted and implemented in various studies to identify the effect, in terms of importance, of explanatory variables. One of such studies is Kumar et. al.’s (2009) study to analyse the service quality in the Malaysian banking industry. Based on this, the Dominance analysis is explained below using the results generated from Kumar et. al.’s (2009) study to explain the ‘’relative importance’’ of the attributes, tangibility, reliability, competence and convenience. Table 5 shows the effect of the four above-mentioned attributes on the dependent variable, SERVQUAL gap, whilst table 6 aids in explaining the ‘’relative importance’’ of each attribute.

Table 5: The effect of four attributes on the dependent variable, SERVQUAL gap. (Kumar et.al., 2009: 222).

Variable(s)	R^2	X_1	X_2	X_3	X_4
	-	0.13	0.23	0.52	0.37
X_1	0.13	-	0.11	0.39	0.25
X_2	0.23	0.01	-	0.30	0.23

X_3	0.52	0	0	-	0.06
X_4	0.37	0.01	0.1	0.21	-
X_1 X_2	0.24	-	-	0.28	0.22
X_1 X_3	0.52	-	0	-	0.06
X_1 X_4	0.38	-	0.1	0.20	-
X_2 X_3	0.52	0	-	-	0.06
X_2 X_4	0.50	0	-	0.12	-
X_3 X_4	0.60	0	0	-	-

Where:
R2 is the Marginal R2 contributions of the attributes, X1 refers to tangibility, X2 is reliability and X3 and X4 are competence and convenience respectively.

The first four variables in the first column of table 5 show the four variables that are analysed in the survey. The rest are the variables that are paired is to assess their relationship with the dependent variable. In interpreting the results from the table, it is observed that a simple linear regression consisting of X1 and the dependent variable produces a squared multiple correlation of 0.13. Also, when X1 is included in the model, Y = F (X2, X3), it has no rising effect on the marginal R2 (That is, at the intersection of X1 and X2X3 that yielded a 0.000 result) . However, the highest increasing marginal effect will occur if X3 is included in the model, Y = F(X1). At that point, the marginal R2 will increase by 0.39. (Kumar et.al., 2009).

Table 6: Dominance analysis relative importance metrics of the four attributes. (Kumar et.al., 2009: 223).

k	X_1	X_2	X_3	X_4
0	0.13	0.23	0.44	0.38
1	0.04	0.11	0.35	0.22
2	0	0.03	0.20	0.11
M(Cx)	0.06	0.12	0.33	0.24
Percent	8	16	44	32

The Dominance Analysis is further explained in Table 6. Table 6 aids the researcher identify which of the variables are more significant in helping to explain the dependent variable. The table shows the squared (multiple) correlation (M(Cx)) for the individual variables and also the relative marginal increase in R2 when the variables are individually included in a model consisting of one or two variables. Based on the results it can be concluded that the variable, competence(X3) has the highest effect on the SERVQUAL gap (a 44% influence) whilst tangibility has the least influence on the outcome variable. (8%). Therefore, by improving the qualities of competence(X3) and convenience (X3; second highest influencer; 32%) in the banking industry, ‘’the overall service quality gap’’ can be enhanced up to 76%(44+32%). (ibid)

Also, other statistical analytic methods include the Data Envelopment Analysis (DEA), Cluster analysis, and Kruskal’s relative importance approach. It is more effective to combine various analytical methods in order to generate more valid interpretations; however, researchers should take caution when selecting a tool. The research objective should be considered when selecting the right tool(s) for analysing and interpreting data in order to clearly identify what the researcher intends to assess from the data.

4. DESCRIPTION OF THE CASE COMPANY: LCA CONSULTING COMPANY

As already stated, the case company provides sustainable services as value to its clients. They provide professional services to both public and private organizations. They offer evaluation activities of the lifecycle process of its client's product, facilities involved in the production, waste management and energy systems and also carbon footprint.

In the life cycle evaluation of a client's product and its production process, the company investigates the influence the product and/or its production process has on the environment. Additionally, a software and other specific guidelines such as the ISO 14040 and ISO 14044 standard guidelines are used to produce accurate findings. (LCA Consulting, n. d.(a)). The ISO 14040 presents the ''principles and framework'' involved in lifecycle assessment whilst ISO 14044 are the ''requirements and guidelines'' that can be used in lifecycle assessment (Finkbeiner et. al., 2011). Findings obtained from the assessment will aid customers to identify areas for improvement which will also positively influence the brand of the customer through the use of ''environmental product declarations or ecolabels'' (LCA Consulting, n.d.(a)).

In assessing the waste management system of a client, LCA Consulting uses its expertise and assessment skills to identify a suitable management approach for every waste material. Their aim is to enhance the re-use of such waste materials and they do so by performing a cost analysis to identify which aspect of the waste management system of their client is costly and also which waste management system is more appropriate for the various element of the company's waste. (LCA Consulting, n.d.(a)).

LCA Consulting also offers carbon footprint computation. Carbon footprint, according to East (2008: 2) is defined as ''a direct measure of greenhouse gas emissions (expressed in tonnes of carbon dioxide [CO2] equivalents) caused by a defined activity''. The company in its computation uses a lifecycle assessment model in addition to other suitable standards and guidelines such as international standard ISO/TS 14067 and Greenhouse Gas Protocol standard to identify which of a client's product, service and/or system during its lifecycle process is prone to climate warming. The ISO/TS 14067 outlines the ''principles, requirements and guidelines'' needed for the ''quantification and communication of the carbon footprint of a product'' (ISO, 2013).

Also, the company provides services on how private and public organizations can sustainably utilize their resources. Industrial symbioses and material auditing services are offered to the private sector whilst ‘’regional and community climate and energy action plans, and environmental programme development services, resource wisdom programmes and greenhouse gas minimizing services’’ are offered to the public sector such as municipals. (LCA Consulting, n.d.(b)).

In terms of industrial symbioses, the company creates a partnership between its client and other entities where there exists the streaming of materials between the entities. This will prevent wastage of resources on the part of their client because rather than producing new materials and discarding them after use, they can transfer it to another organization and receive other useful resources as well. (LCA Consulting, n.d.(b)).

Material auditing services: The company assesses the production equipment of clients in order to propose much more efficient and cost effective ways of performing activities and operations such as efficient ways of consuming electricity and cost-effective ways of manufacturing. (LCA Consulting, n.d.(b)).

Renewable Energy Municipal Audit: This service presents a visual description of the trend in energy consumption of a municipality, its CO_2 emission analysis, yearly savings and payback periods in order to assist a municipal achieve cost efficient actions/activities, significantly influence the environment and also expose more areas for business ventures. (LCA Consulting, n.d.(c)).

Environmental programme development services: LCA Consulting offers a bundle of services to municipals such as presenting a pictorial description of an existing issue and providing a ‘’preliminary report’’ or redeveloping services in relation to a current environmental initiative which can involve preparing further methods, managing such methods and incorporating other plans into the current plan. Additionally, such environmental plan creation-services are also offered to regions. (LCA Consulting, n.d.(c)).

The services the company offers to the private and public organizations differs in terms of the extent of confidentiality on each sector’s individual information and project. That is, the project and information of companies/organizations in the private sector are highly confidential to the

respective companies whilst that of the public sector is ‘’open’’. The kind of project of private customers and their respective names are the only information that can be mentioned in LCA Consulting’s marketing strategies. However, in the public sector, projects can be acquired through a bidding process where information about the customer’s needs is publicly mentioned and the winning ‘team’ follows the set of principles stated in the ‘’quotation request’’. (Kumpulainen, 2016b).

In general, the company aims to propose to its clients, more effective and efficient ways in their business activities that will help grow the company financially, enhance the image of the company and positively influence the environment and climate. Additionally, for every project/service package (example in a renewable energy municipal audit), there exist specific guidelines the company must adhere to (Kumpulainen, 2016b).

Below is a table showing the category of customer groups and their respective services the company offers. It was derived from Kumpulainen (2016a) of LCA Consulting in an interview.

Table 7: LCA Consulting’s clients and respective services they offer to them. Kumpulainen, 2016a)

Customer group	Services offered
Private sector	● Industrial LCA modelling for products and production Carbon footprint Industrial symbiosis Material audits ● Waste management Modelling of waste management systems Landfill gas modelling
Municipal/Public sector	Renewable Energy Municipal Audit, environmental programme development services, climate programme development services, regional energy systems modelling and waste management.

5. DEVELOPING A SERVICE QUALITY MEASURING FRAMEWORK

As a result of the growing importance of service companies to provide high-quality services to its customers due to reasons such as the high competitive nature of the industry and its positive impact on the growth and profitability level of the company, seeking information about how customers feel about a service is essential.

The research adopts the qualitative research method because the aim of this method is to assist in identifying and acquiring new knowledge that can be further tested. In addition to the qualitative research adopted, literature analysis and empirical research is used. However, literature analysis is extensively used. Also, the constructive method is used as a research strategy in this thesis.

Literature analysis is conducted in relation to the topic area, its concept and the formulated research questions. Information is gathered mostly from books, journal articles, internet documents, theses, conference and working papers. With the empirical research, an interview was held with a representative from the company.

Based on this, both primary and secondary data methods are adopted. In terms of primary data collection, meetings with the supervisor from the case company, as stated earlier, was held regularly with the use of unstructured questions through mediums such as face-face and by mail to gain information concerning the company and its operations, specifically, the classes of client they have, the services they offer to clients and how they offer such services. On the other hand, secondary information from already existing literature is used extensively.

As stated earlier, the constructive method is implemented as a research strategy in this thesis. The constructive method is a ‘’managerial problem solving’’ approach that computes ‘’models, diagrams, plans, organizations etc.’’ (Kasanen et. al., 1993). It has been adopted in the research of various scholars such as Kasanen et. al.’s (1993) study in the management accounting research, Oyegoke’s (2011) study in project management study and Alsakini’s (2012) study in the Finnish construction market to develop a model of virtuality and a model of maximum virtual CM (Construction management) firm (max VCMF) with its management system.

A primary characteristic of this method is to target ‘’real world’’ issues thus findings can be applicable in real life situations. Therefore, an important stage in this approach is to link the stated problem and its results to the gathered ‘’theoretical knowledge’’ in order to produce accurate and original result. (Alsakini, 2012; Kasanen et. al., 1993).

For a constructive research to be conducted successful, the study should contain five important components namely the ‘’practical relevance of the problem, connection to the theory, constructions as solutions to problems, practical functioning of the solutions, and theoretical contribution of the solutions’’ (Perätalo, 2010). These components are seen in the figure below which is acquired from Kasanen et. al. (1993).

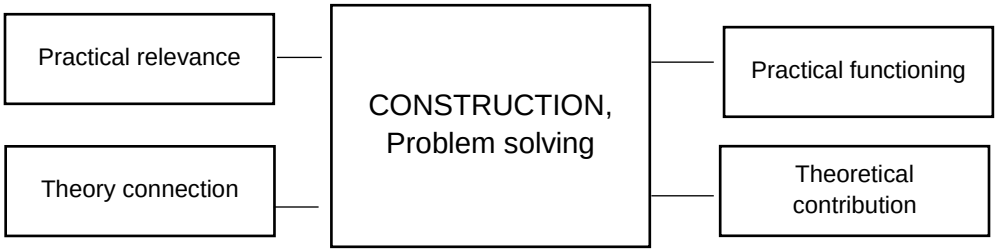


Figure 10: Components of constructive research (Kasanen et. al., 1993: 246).

Furthermore, there are six steps involved in a constructive research (Kasanen et. al.,1993: 246), they are:

1. Identify a real-life situation worth researching into.
2. Acquire detailed knowledge in relation to the topic.
3. Develop a ‘’construct’’/solution.
4. Show that the solution is functional.
5. Identify the construct’s theoretical conjunctions and its impact on literature.
6. Analyse the constructs ‘’scope of applicability’’.

However, these steps might differ in certain settings (ibid).

In relation to the above-stated steps, the first step in this thesis was to identify the research problem and formulate the research questions. This activity was primarily done by interviewing the representative from the case company personally to find out certain issues of interest they face in the company. After much deliberation on a couple of issues presented, this research problem was selected. This is because it is important for a firm to use an

appropriate measuring tool to evaluate its service quality due to the recognized benefit and influence, offering high service quality to clients has on the growth of a business.

In the second phase, literature analysis regarding information on the research area was collected, in addition to further interview with the company to enhance the understanding of the research topic. Theoretical background was done to identify what have been done up-to-date. Emphasis was on existing service quality models that are favourable for consulting firms. During the interview, some of the questions asked includes what are the activities/steps involved in creating and delivering services to clients? what type of customer groups do you provide services to? and what services do you offer to each group?

Oyegoke (2011) states that the knowledge derived from the literature analysis and that of the research problem should be a yardstick in developing a construct. Therefore, based on the findings and knowledge obtained from the literature analysis and the interview conducted with the case company, a solution in a form of a framework is constructed in order to guide the environmental consulting firm in measuring their service quality. The advantages regarding the adoption of the solution construct is also elaborated (Oyegoke, 2011)

The fourth phase, proving the solution works is conducted after the framework is designed (Lukka et. al., 1998). Kasanen et. al. (1993) developed ‘’a three-level market-based validation’’. They are the ‘’weak market test’’ which is analysed on the extent to which a manager is willing to adopt the construct, a ‘’semi-strong market test’’ which relates to the number of companies that will use the construct and lastly, the ‘’strong market test’’ which evaluates whether the organizations that implement the construct accurately have shown significant outcomes as against those organizations that do not.

According to Oyegoke (2011), validation can be tested either ‘’theoretically’’ or ‘’empirically’’. The idle method is a ‘’pilot case study’’ however, circumstances where this method cannot be used presents an alternative, ‘’triangulation’’ where various types of research methods can be used. There exist four general ‘’triangulation’’ methods namely: data source triangulation (the data should be the same in different settings), investigator triangulation (when different examiners assess the same ‘’phenomenon’’), theory triangulation (researchers with different perspective conclude on the same outcome) and methodological triangulation (involves the

use of different methods). Analogical validation can also be an ideal method where the researcher examines already-existing ‘’project case surveys’’. Theoretical validation can be used to proof the ‘’theoretical compatibility’’ of the constructed solution to other known ‘’lower or higher theories or both’’. (ibid).

The ‘’weak market test’’ is adopted because as stated by Lukka (2000), the main concern is whether the company will be willing to implement the designed solution. The ‘’semi-strong market test’’ and/or the ‘’strong market test’’ is not selected because it is complex to adopt in a ‘’constructive case study’’ (ibid). The test was performed by interviewing the company’s project manager. However, theoretical validation will also be applied where other service quality models will be compared with the constructed framework to identify their compatibility.

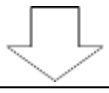
In the fifth phase (show the theoretical connections and the research contribution of the solution concept), the solution concept is mapped against an already existing service quality model which was discussed in the theoretical section of this thesis and also which its study primarily focuses on consulting firms. The aim of this exercise is to identify the gap between the new model and already existing model. In addition, the contribution the new concept is bringing into service quality literature is also be identified. (Oyegoke, 2011)

The sixth phase examines the scope of applicability of the solution. That is the extent to which other companies in the consulting industry can apply the construct (Labro et. al., 2003). Further studies relating to the research is also be discussed in this section (Oyegoke, 2011).

The table below shows a summary of the research design which is adopted. It consists of the thesis’ sub-questions and their respective research objective, research method, data collection technique and the method that was used to analyse collected information to generate the research result.

Table 8: Summary of research design used

Research sub-question	Objective	Method	Data collection method	Mode of analysis
1)a). What are the essential service quality determinants customers expect in a service delivery?	To identify the essential attributes customers, look out for in a service.	Literature analysis.	Secondary data collection. Mostly from journal articles.	Summarize gathered literature and identify the most mentioned service quality determinants across the various literature.
2 a) What service quality measurement framework is suitable for LCA Consulting?	To recommend an appropriate service quality framework for LCA Consulting	Literature analysis and Interview	Secondary and primary (interview from case company) data collection	Analyse the respective literature and the service creation process of the case company and propose a framework
2)b) What customer feedback collection method is suitable for LCA?	To recommend suitable customer feedback collection method(s) for the company.	Literature analysis.	Secondary data: mostly from journal articles and case company's website.	Summarize each method and identify which can be more easily adaptable by comparing each method's advantages and criticisms.
2)c) What type of questions should be asked in the customer satisfaction survey?	To identify suitable type(s) of question(s) that can be used in a customer satisfaction survey.	Literature analysis.	Secondary data: mostly from books and journal articles.	Based on each mentioned advantages and criticisms of the discussed type of questions, propose various (or a specific type) types of questions that can be used.
2)d) How should obtained customer data be analysed, evaluated and reported?	To investigate how gathered customer information can be analysed, evaluated and reported.	Literature analysis.	Secondary data: mostly from books and journal articles.	Analyse each analytical/evaluating/reporting method and identify which can be more suitable, understandable, less time consuming and cost-effective to adopt.



Research Strategy: CONSTRUCTIVE APPROACH

6. RESULTS

This section is divided into the following segments. The first segment discusses findings generated from the interviews conducted with the representative from the case company in relation to the activities involved their service creation and delivery process.

In the second segment, the various discussed service quality models and the service quality determinants are summarized to aid in answering their respective research questions. The summary identifies the determinants which were elaborated the most by the various scholars and also the service quality models that are widely recognized will also be identified.

Lastly, the third part discusses information gathered in connection with the various types of customer feedback collection methods, types of questions that can be asked in a survey and the content of such questions and lastly, various ways generated feedback information can be analysed and reported will be summarized to also aid in answering their respective research questions.

6.1 Interview: LCA Consulting Business Process

Figure 11 shows the diagrammatical presentation of the company's general business process. That is, the stages involved in developing a service value to its clients. The structure of questions asked during the interview was unstructured. This information is essential because, in order to identify a suitable service quality measuring framework for the company, detailed information as to the various structures, actors and processes involved in the value creation and delivery of services should be gathered and analysed.

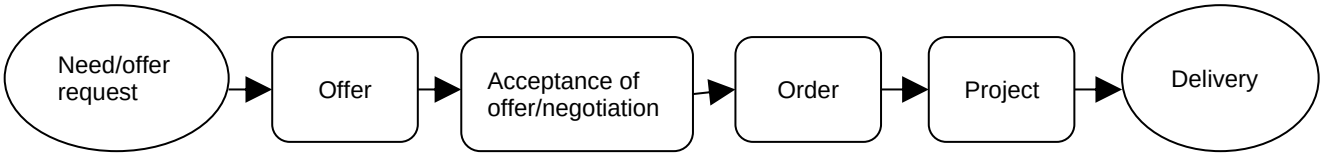


Figure 11: General service creation process of LCA Consulting Company (Kumpulainen, 2016a).

In the beginning of the process, a client presents its need or offer to LCA Consulting who then develop/create a package/offer and present to it the client for their approval (negotiation can be also made). After an agreement has been made, the company is given a go ahead to perform its function and the project which consist of activities such as auditing and

assessment of product(s) and its process (es) is conducted. In creating its services, the physical equipment mostly needed is a laptop whereas more concentration and usage of sustainable guidelines and/or instructions such as ISO 14040 and Greenhouse Gas Protocol standard are the main facilities/tools used in addition to any specific rules given to them by their client. Results are then delivered to clients personally; it is a main objective of the company. A written report is mostly included on demand or they are part of a service package (such as the renewable energy audit, a written report is included) (Kumpulainen, 2016(b)). It can also be realised that the service value creation is solely done by the company and the customers get involved only when they are presenting their needs (first stage), accepting an offer/negotiation, providing additional information to be used and when the services are being delivered to them.

It can also be observed that the activities in the service process of the company are similar to that of the one proposed by Ponsignon et. al. (2011) (see section 2.1.2).

6.2 Literature Analysis of Service Quality Models and its Determinants

Based on the literature analysis on service quality models, it can be observed that the most utilised service quality models are that of Grönroos' (1988) Nordic model (perceived service quality model) and Parasuraman et. al.'s (1985) American model (SERVQUAL model). They are considered as general models on which other researchers modify to suit specific case studies. Based on the obtained literature on measuring service quality, it is observed that scholars that specifically focused their research on professional service such as consulting firms and accounting firms (based on ISIC classification), B2B service firms (a typical characteristic of LCA Consulting/environmental consulting firms) or included professional firms in their case study used either the Nordic or American model as a basis for developing their service dimension concept. The dimensions proposed by Gounaris (2005), Sonne (1999), Szmigin (1993) and Patterson et. al. (1997) can be traced to the concept of the Nordic model whilst that of Saxby et. al. (2004), Yoon et. al. (2004), Tang et. al. (2003) and Day et. al.'s (1992) study can be traced to the American model.

Furthermore, upon discussing more than 10 service quality models and the determinants of service quality, additionally, carefully reviewing the developed models aimed at measuring the service quality of professional service firms/ consulting firms, it is observed that most of the scholars either directly mentioned at least one of Parasuraman et. al.'s (1988) proposed five service quality determinants (namely reliability, responsiveness, assurance, empathy and tangibles) or changed the wording of the attributes (or similar in meaning) to suit the industry. That is:

- Sonne (1999) who proposed the perceived hard and soft process and client factors stated that the perceived hard process includes factors like competence and tangibles; perceived soft process includes responsiveness and reliability; and client factors includes factors such as support from management and communication.
- Choudhury (2013), Arasli et. al. (2005), Yoon et. al. (2004) and Saxby et. al. (2004) aside proposing additionally dimensions included at least one of the five dimensions as a measuring variable.
- Harte et. al. (1995) suggested the use of the attribute, timeliness, in replace of the attribute responsiveness when measuring the level of quality services offered by accounting and/or management consulting firms.

Therefore, it can be concluded that Parasuraman et. al. (1988)'s five dimensions are the essential service quality determinants customers expect in a service delivery process.

However, it is observed that there exist overlapping issues relating to the five dimensions proposed, thus it is advised that they should be used with caution. The developers of the five dimensions agreed that as a result of these issues, slight adjustments to the ''wording'' of the dimensions is allowed in order to suit particular spheres.

Additionally, even though there seem to be relative similarities in meaning between some attributes proposed by other scholars and the attributes in the five dimensions, the determinants selected should show a true reflection in the industry it is meant to measure.

6.3 Literature Analysis of Gathering, Analysing and Reporting Customer Satisfaction Data

As stated earlier, in deciding on a suitable mode of data collection and analysis to implement, the researcher should clearly understand what he intends to collect and answer in the research. The main aim of a service quality data collection tool is to gather information as to how customers feel about the services they are being offered thus it is necessary to discuss the important aspects involved in collecting such information and the ways in which meanings can be generated out of the collected data.

Gathering Customer Satisfaction Data

Regarding the discussed ways of collecting data (that is, observation studies, questionnaire, in-depth interview and focus group discussions), the use of questionnaires is observed to be widely recognized because it is considered cheap, convenient and quick to administer. However, the ‘’wording’’ used should be clear and relatively easy to understand.

In-depth interviews are considered to be more detailed because the researcher listens to the opinions, memories and experiences of the target audience as well as that of the service provider. However, the true reflection of how customers feel and what they will actually say might not be met because of the verbal nature of the interview.

Observation studies are said to deduce information that methods like questionnaires cannot produce. This method analyses various aspects of the service process such as the elements of service, quality of service and the service employees-client interaction. However, observation studies are more suitable for service firms such as hotels and restaurants.

With the focus group discussions, information is gathered from customers at the same time. The research also aims at identifying the factors that affect the opinions and judgements of the customers. The reasons for customers’ judgement can also be determined with this method. However, conflicts between members in the group might arise.

In formulating questions, the type of question and its response items are essential in order to get accurate answers from customers. The single and multi-item scales were discussed. The single item scale is known to be widely implemented in research, simple, easy to administer

and answer. Even though critics argue that it has issues with the reliability of the indicators, the scale has been adopted in the studies of various well-known scholars such as Parasuraman et. al. (1988) and Gounaris (2005). On the other hand, the multi-item scale is perceived to produce accurate results. Nevertheless, it has been concluded to be insignificant and interchanged for the single-item scale in several settings. Also, the existence of multiple response items can breed bias results because respondents might feel bored whilst answering the questions or show ‘’unaccepted’’ behaviours such as abandoning answering the questions or just circle any response just to complete it fast.

Furthermore, the performance, disconfirmation and satisfaction scales were discussed. The highly recognized definition of measuring service quality, which is, how customers perceive the quality of a service compared to the actual experiences they receive can be clearly answered in the disconfirmation scale. This is because it provides options to respondents with the scope from ‘’worse than expected to better than expected’’. This scale is also concluded to produce more accurate findings as compared to the other scales suggested.

Webster et. al.’s (1994) -2 to +2 scale determines if customers’ experiences are what/what not they expected. Each point on the scale shows whether the quality provided by a service firm is unacceptable, satisfactory or ideal.

Reichheld’s (2003) one-question scale and Mumel et. al.’s (2011) ‘’recommend scale’’ can help investigate whether customers are satisfied with the services provided, the nature of their loyalty and purchase intention. Customers are asked if they are likely to recommend a company to a friend/colleague. An ‘extremely likely’ (Reichheld, 2003) or ‘very likely’ (Mumel et.al., 2011) response can mean the customer was satisfied with the service and is likely to come back for ‘more’ and is also willing to recommend to friends. However, it does not provide additional information that the service provider can use in enhancing its services, as compared to other scales that measure each service element. Therefore, this proposed question can be an additional question posed to customers.

Analysing and Reporting Customer Satisfaction Data

Analysing and interpreting results is also essential. If findings gathered are not analysed and interpreted accurately, the strategies/structures a firm decides to modify will not reflect the

voice of its customers. Analytical tools that can be used in quantitative and qualitative research were reviewed in the literature.

This research discussed several data analytical techniques, however, it was realized that majority of them (excluding thematic analysis for qualitative data) can be used interchangeably but the extent of detailed information that can be obtained serves as a difference between them. This is explained below:

- Using the Frequency, Percentages or Central tendencies (specifically the mean) aids in determining the service element/ attribute that generated the highest response/score.
- The visual analysis is seen as a supplementary tool. The MUSA model and Fuzzy rule method also provides visual description of results which are also easy to understand.
- The hypothesis testing method, the MUSA method, Regression analysis, Fuzzy rule method and Dominance analysis evaluates the relationship between variables

On the other hand, some of the tools are seen to complement each other. Example is the use of percentages and then constructing a visual analysis like scatter diagram to show the distributions and relationship pattern of the variables.

Additionally, the P-E approach determines the gap between customer's expectation about a service and their actual experience after adopting that service. The results this approach aims to derive shows a true reflection of the concept explained in most definitions of measuring service quality.

6.4 Framework for measuring service quality in LCA Consulting

This section presents the solution, a framework that will aid the company in measuring its service quality. The framework is made up of knowledge acquired through the interview with the case company alongside already-developed service quality measuring models that were discussed in this thesis. The service quality models and determinants discussed in the literature were examined to determine which of the concepts/ model have dimensions that can also be adopted in the service process of the case company. The advantages, structure, case study focus and the critiques of each discussed model were assessed. These analytical

steps were used to make sure the proposed framework reflect the business process of the company.

The developed framework was constructed based on knowledge deduced from service quality models and determinants such as the Hierarchical model (Brady et. al., 2001); the SERVQUAL model (Parasuraman et. al., 1988; 1991); and Patterson et. al.'s (1997), Rust, et. al.'s (1994), Gounaris' (2005) and Day et. al.'s (1992) service quality dimensions.

Also, it presents dimensions that reflect the essential elements of services the case company provides and also the famous five service dimensions proposed by Parasuraman et. al., (1988), however, some of the wording was changed to avoid further overlapping in its testing. Therefore, quality information can be obtained from this method.

Before presenting the framework, a summary of the primarily features of LCA Consulting based on the interview findings is listed below.

1. Services offered are in the form of projects thus has a beginning and an end.
2. Less customer participation in value creation process.
3. Involvement of clients is at the presenting of needs, acceptance of offer/negotiation and delivery stages of the company's service creation process.
4. Service/solution is delivered personally to clients.
5. Very few physical facilities are involved in creating service.
6. Solutions should follow standard principles and/or customer-specific guidelines.

The solution/framework is seen in figure 12.

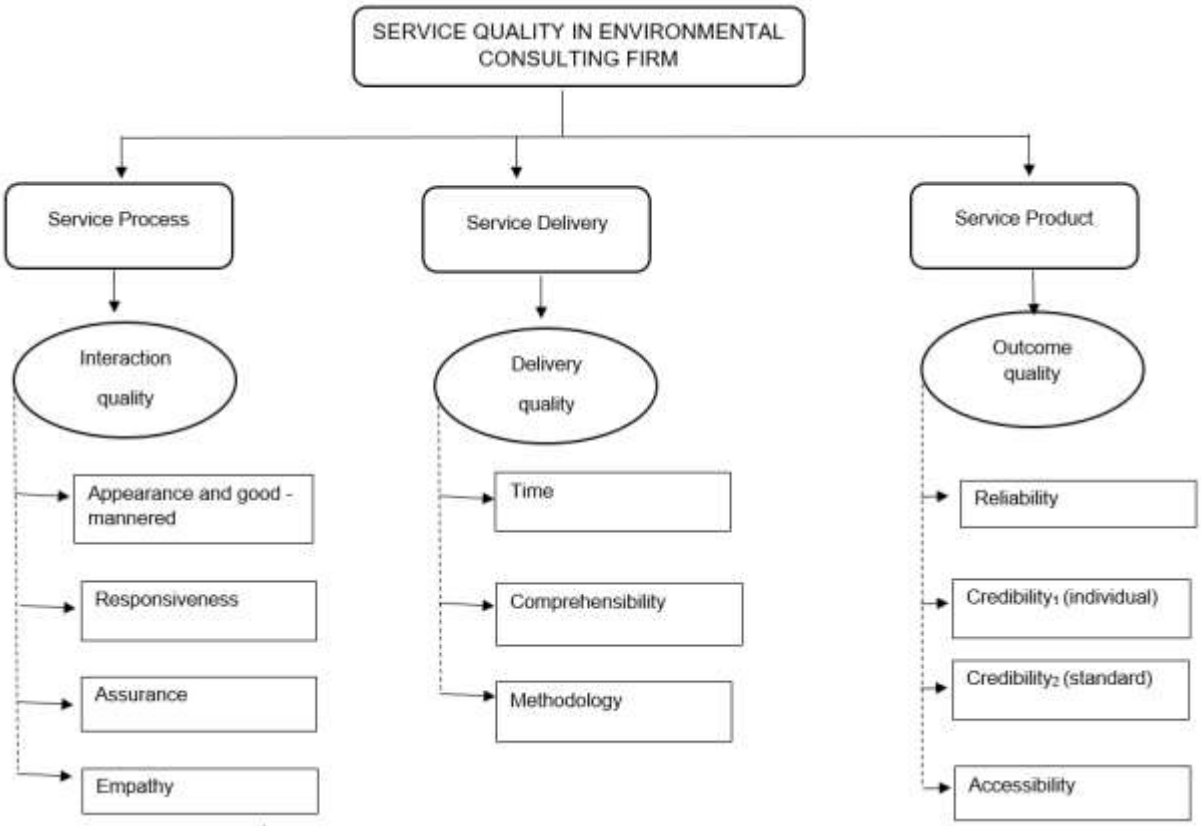


Figure 12: Constructed framework for measuring service quality in an environmental consulting firm.

The framework presents a three-dimensional structure and each structure is explained below.

1. Service Process: This measures the various stages in the service process where the clients are involved in thus the interaction quality is measured. The attributes in the interaction quality dimension is explained below:

A. Appearance and good mannered: How service provider/employees portray themselves and behave around clients.
B. Responsiveness: The willingness to assist customers and offer quick service.
C. Assurance: the knowledge a service provider has in relation to the field of their expertise and their ability to incite trust and confidence to clients.
D. Empathy: the level of attention given to customers and understanding in relation to the needs and business desires of its clients.

2. Service Delivery: This relates to how the service/solution is delivered to clients thus the delivery quality dimension. Its measuring attributes are:

A. Time: Relates to the ability of the firm to meet deadlines such as the delivery time.
B. Comprehensibility: Relates to how easy clients were able to understand the presented solution.
C. Methodology: measures the methodology the company used in delivering its services. Also, the extent of creative and innovative ideas that were used to solve the problem.

3. Service Product: This measures the outcome hence the outcome quality dimension is proposed. The outcome quality measures the service product itself and the effect the solution had on the company (client) after it was implemented.

A. Reliability: measures whether the service provided was as promised and showed accuracy. For instance, clients were able to use the solution to minimize their operational cost, as promised by the company.
B. Credibility_1 (individual): Measures whether the presented results conform to the instructions given by its client.
C. Credibility_2 (standard): Measures whether the presented results conform to the instructions given by standard guidelines/instructions such as the ISO 14040 and Greenhouse Gas Protocol standard.
D. Accessibility: Measures how easily a client was able to adopt and implement the service results.

The other objective of this thesis was to propose a suitable customer satisfaction data collection tool(s) for the company in addition to what type of questions can be asked and which analytical tool(s) will be suitable for the company. The use of questionnaire is a recommended technique in collecting the customer information whereas the single item response scale and the one question scale (this measures customer loyalty) can be used. This is because the questionnaire is easy to administer whilst the single item scale is also easy to administer and has a high response rate and generate quality information as compared to the multiple item scale.

Furthermore, based on the constituents of the constructed framework, in analysing obtained customer information, Parasuraman et. al.'s (1985:1988) P-E approach in addition with the

Dominance Analysis is proposed. These methods are said to complement each other. The P-E approach will measure the satisfaction level of the service dimensions under each of the proposed attributes to determine clients' expectation and experience of each thus the gap and also their overall satisfaction. The Dominance Analysis will then provide more detailed information. It will measure the importance of each attribute, the extent to which each attribute affects a customer's overall satisfaction and how each attribute affect each other thus will expose which of service elements/attribute needs much concentration/improvement.

6.5 Validity and Applicability of Solution

This section discusses the fourth (Show that the solution is functional.), fifth (Identify the construct's theoretical conjunctions and its impact on literature) and sixth (Analyse the constructs ''scope of applicability'') steps proposed by Kasanen et. al.'s (1993) in implementing the constructive method as a research strategy. Therefore, these remaining tasks/steps will be completed under the three segments in this section;

1. The functionality of the framework, which will demonstrate whether the solution is valid.
2. The theoretical-framework connection, which will discuss the relationship between theoretical findings generated and the solution framework. In addition, identify the gap between them and also the contribution the new concept is bringing into service quality literature.
3. The Applicability of the framework, which will discuss the extent to which other companies in the consulting industry can apply the construct. Also, further studies relating to the work on the developed framework.

6.5.1 The functionality of the Framework.

As stated earlier, the validity of the proposed framework is tested two ways. Firstly, an interview was conducted with the project manager of the case company to identify if the company will be willing to implement this solution and secondly, identify the theoretical compatibilities of the framework and other already-existing service quality models.

Interview

The solution/framework was first presented and then some questions were posed to the interviewee. Such questions included what do you like about the framework? its drawbacks? and will you be willing to implement this framework? If yes, how fast do you think it can be implemented? In general conclusion, the company is willing to implement this framework in their business model. The rest of the findings that was acquired from the interviewee is stated below.

1. The framework tackles the essential aspects of the services/project LCA Consulting offers therefore it is most likely to be implemented in the company. It does not require further test of validity before implementing the framework. Also, based on the interviewee's work schedule, the framework will be considered to implement in autumn, this year.

2. The time (relating to delivery time) attribute can be considered as an important factor in determining the satisfaction level of customers in goods firms but not consulting firms because in terms of delivery time since solutions are delivered personally to clients, the delivery time is based on an agreed appointment time (that is a meeting time) by both parties therefore its less considered in the service delivery of environmental consulting firms.

3. The methodology and comprehensibility attributes was liked the most because according to the project manager, they are important factors in a service delivery process. Additionally, the five-point scale which is an example of a single item scale (which ranges from dissatisfied to satisfied) and used in customer satisfaction survey will likely be used when measuring the company's level of quality service offered.

4. Both the credibility attribute for individual and standard requirements are considered to be more of quality measuring indicators for the company's internal management team rather than the clients' satisfaction, however, it will be an additional information for the company if customers evaluate their services based on credibility.

Since the main objective of the thesis in terms of developing a framework is for the framework to reflect the business process of the case company in order to obtain quality customer information thus prior to the weak market test conducted, the time attribute (relating to

delivery time) seems relatively less important in environmental consulting firm thus should be modified to fit the business setting. The time, as explained earlier is usually an agreed meeting time by both parties thus it will be more beneficial to measure time from the perspective of the availability of the service firm to the client. However, the availability of the service firm can be measured under the responsiveness attribute (that is, the willingness of firm to provide prompt service). On the other hand, there can exist situations where the customer (or service provider) is the one who has a busy schedule therefore deciding on a time seems complicated hence how the service firm tackled this situation can be a suitable measure. Based on this, the time attribute is modified to measure how the service provider tackled issues relating to agreeing on an appointment time therefore responses of this dimension will be limited to clients who experienced this situation.

Also, in terms of the credibility attributes, because specific projects such as the renewable energy municipal audit follows a set of instructions and delivery setting the service firm must follow, it is an important indicator. However, it is agreed that the principles/guidelines especially the standard ones are more of the service firm's internal quality measure thus the credibility(individual) and credibility(standard) is modified to become credibility and this new credibility attribute measures whether the service firm followed the instructions provided by the various specific projects.

The rest of the analysis made under this section is made on the modified framework.

Theoretical compatibility

This method was proposed by Oyegoke (2011) where the solution is compared to already existing literature to identify their similarities. Models that were used in this analysis have already been discussed in this study (see chapter 3) and their research either entirely or partly focused on consulting firms. They include Patterson et. al.'s (1997) study, Parasuraman et. al.'s (1988) SERVQUAL model and Grönroos' (1988) Perceived Service Quality Model and the proposed service quality determinants of Day et. al.'s (1992), Harte et. al. (1995), Tang et. al.'s (2003) and Yoon et. al. (2004). The analysis is shown below:

1. Constructed framework Vrs Patterson et. al.'s (1997) study: Majority of attributes and service elements proposed cut across. Example the methodology dimension is recognised by

both models. Essential information intended to be generated in Patterson et. al.'s study will still be derived if the constructed solution is used instead.

2. Constructed framework Vrs Parasuraman et. al.'s (1988) SERVQUAL model: The P-E approach is proposed by both models.

3. Constructed framework Vrs the Perceived Service Quality Model (Grönroos, 1988): The technical and functional qualities recognized by (Grönroos, 1988) can also be seen in the new framework. The technical attribute which measures what customers receive is similar to the service product dimension in the new model. Additionally, the functional attributes which relates to how offerings are delivered is similar to the service delivery dimension in the new model.

5. Constructed framework Vrs. Day et. al.'s (1992), Harte et. al. (1995), Tang et. al.'s (2003) and Yoon et. al. (2004) suggested service quality dimensions. The attributes suggested in the constructed framework in comparison with the above-mentioned scholars who also proposed dimensions for measuring service quality in professional firms is seen to be similar.

Based on this analysis, it can be concluded that the structure and proposed dimensions of the constructed framework has similar features with already-established literature.

6.5.2 The theoretical-framework connection

In finding the relationship between already existing literature and the proposed solution, the research narrows its scope to compare literature or works that concentrated on or included professional services/ environmental consulting firms in their research. Prior to this, the study compares the model proposed by Patterson et. al. (1997) with the developed solution because it focused on not only environmental consulting firms but considered the nature of projects in its model. Additionally, the gap the new model is filling in service quality literature will also be identified.

Based on the two models, it can be observed that both have similar dimensions and attributes, however the new model includes the outcome quality as a dimension. In Patterson et. al.'s (1997) work, they excluded the outcome quality from the dimensions because they

deemed it as technical for unskilled clients to give feedback on. However, some authors recognized the significance in including the dimension in a research. If clients are not given the platform to also analyse the end-results of a service after (and not before) its usage, information obtained might be biased. That is, if clients assess how implementable a solution is, without going through that process discrepancies between what their expectations for the use of the solution and what they actually experienced might be wide and thus can affect the quality of information generated.

6.5.3 The Applicability of the framework

This section discusses the extent to which other companies in the environmental consulting industry can apply the construct. Also, further studies on the developed framework are discussed.

It is observed that the general activities in a service process proposed by Ponsignon et. al. (2011) (see chapter 2) is similar to the one obtained from the company, therefore, it can be concluded that environmental consulting firms can generally adopt this model in their business model. Also, the model is flexible thus modifications can be made to include company specific additional information.

This study is considered as a first step. For further studies, detailed work on testing the validity of the model empirically can be done. The other validity market tests proposed by Kasanen et. al. (1993) can also be conducted to contribute to the framework's reliability. Additionally, testing the attributes for example for overlapping issues can be conducted. Analysing the business process of more than two environmental consulting companies to identify if the generated service process reflects that of the case company used in the study thus the extent of applicability of the proposed model is also an area for further studies.

7. SUMMARY

As a result of the widely recognized benefit companies can achieve by providing high service quality to customers, the main aim of this thesis was to propose a suitable framework an environmental consulting firm (LCA Consulting Company) can use to identify how customers feel about the quality of the services they offer and also identify service areas for improvement. In addition, what type of data collection method is suitable to adopt, what kind of questions should be formulated in their research and also various ways the obtained customer information can be analysed and reported. This is because currently, the company has no official measuring serving quality technique.

The thesis was primarily based on literature analysis. However, interviews were also used to gather information. Based on the literature analysis, the framework was developed on the basis of evaluating already-existing service quality models and determinants. Furthermore, literature relating to the various techniques of collecting data, types of questions (and response items) that can be used in the research and various ways of analysing and reporting data was also analysed. Also, series of interviews were conducted with the project manager from the case company to identify the types of services they provide, the activities involved in creating their services and also if they will be willing to implement the developed framework in their business model (weak market test). This is because the developed framework must reflect the business process of the company.

The questions and answers to the formulated research questions are stated below:
1. What are the most utilised service quality measurement models implemented in service companies? The American (Parasuraman et. al., 1985) and Nordic(Grönroos,1982) models are the most utilised measuring service quality models because most scholars used such models as a yardstick to propose theirs

a. What are the essential service quality determinants customers expect in a service delivery? The five service quality determinants proposed by Parasuraman et. al. (1988) are the essential values to be considered in producing and delivering high quality service

2. How can LCA Consulting firm measure their service quality offerings to customers? LCA Consulting can request feedback from clients based on the three proposed dimensions

whereby the questions posed can be in a single-item scale format and measured in relation to the respective attributes also proposed.

a. What service quality measurement framework is suitable for LCA Consulting?
The newly formulated framework is suitable for the company because it covers all the company's essential service creation process and service elements thus assessment made with this framework will reflect the company's business process.

b. What customer feedback collection method is suitable for LCA? Questionnaires are easy to administer and less time consuming therefore considered to be suitable for the company.

c. What type of questions should be asked in the customer satisfaction survey? Questions posed can contain single-item scale because this scale to known to have a high response rate and produce quality information. In addition to the type of question employed, a one-question scale (measures customer loyalty) can also be included.

d. How should obtained customer data be analysed, evaluated and reported? The P-E approach is recommended whereas the Dominance analysis is also suggested to be an addition. This is to gain more detailed information from collected data.

This framework is said to be general hence it can be implemented by any environmental consulting firm. Most of the literature retrieved had less focus on environmental consulting companies however it does not affect the accuracy of the findings because such firms have similar features with other consulting companies. Also, even though secondary data was used to determine the essential values customers look out for in a service thus might not reflect the true voices of the target customers, such data was retrieved from well-known scholars who are ‘’god fathers’’ in the service management sector thus are known for their good research. In further studies, more detailed empirical test of its validity should be considered such as the strong market test and also empirical test on customers should be conducted to gather primary information.

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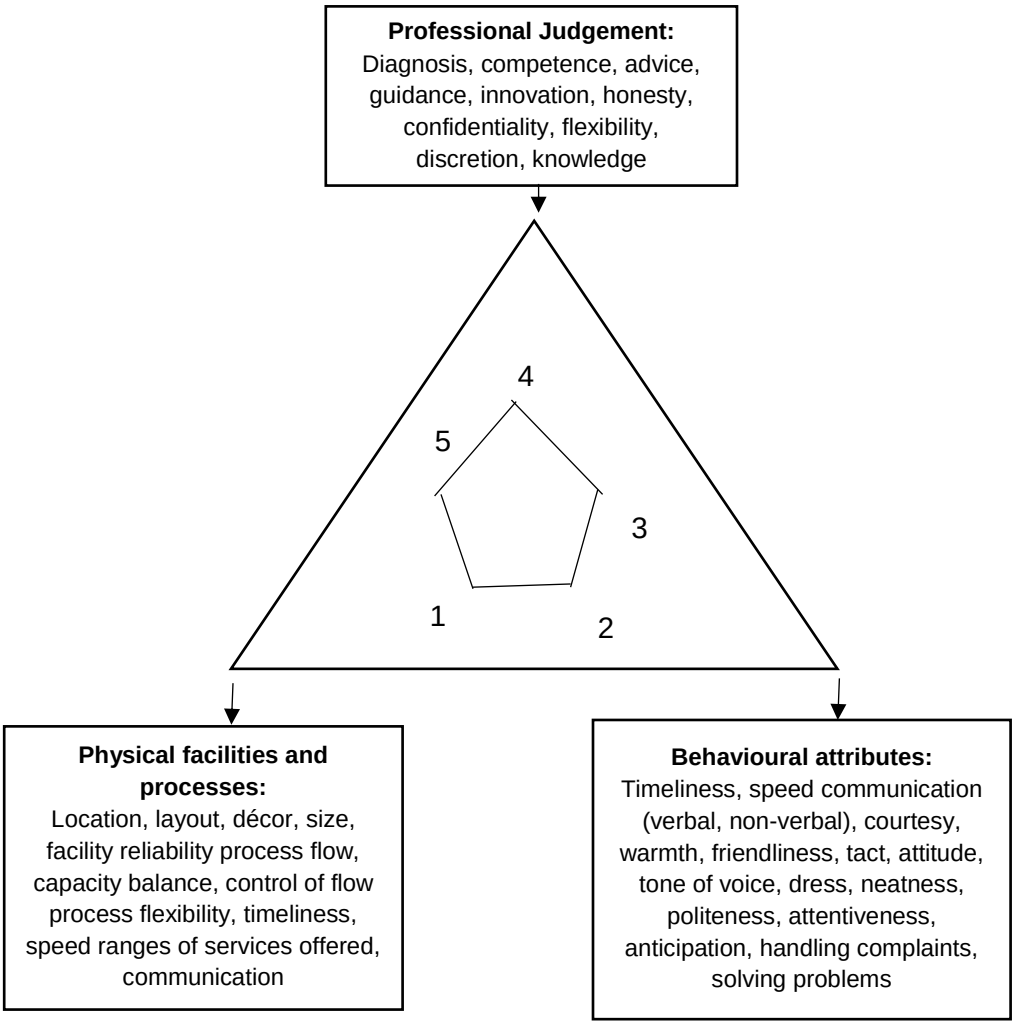
APPENDICES

APPENDIX 1: ATTRIBUTE SERVICE QUALITY MODEL (HAYWOOD-FARMER, 1988)



Where:

1= short contact low intensity and communication

2= medium contact low intensity and communication

3= high contact low intensity and communication

4= low contact high intensity and communication

5= high contact high intensity and communication

APPENDIX 2: EXAMPLES OF TYPES OF MULTI ITEM SCALE RESPONSE ITEMS AND THEIR RESPECTIVE QUESTIONS

Example of Likert, semantic differential and ranking scale response items with their respective question- (Mathers, et. al., 2007)

- Example of question with its Likert scale response items.

"To what extent do you agree with the following statement?"

Statements	Strongly agree	Agree	Neither agree or Disagree	Disagree	Strongly Disagree
	5	4	3	2	1
Traffic pollution is a major cause of asthma					
People with asthma who smoke a lot are more likely to have worse asthma					

- Example of a question with its semantic differential scale response item.

"Do you think that the medicine that the doctor has prescribed for your asthma:

	1	2	3	4	5	
Works well						Doesn't work
Is safe						Is dangerous

- Example of question with ranking response item.

“Which of these items do you think has the worst effect on your asthma?”
Exercise
Traffic pollution
Stress
Diet
Pollen
(Source: Mathers, et. al., 2007).

APPENDIX 3: EXAMPLES OF RESPONDENTS' ANSWERS TO A MULTI-ITEM QUESTION SCALE (DROLET ET. AL., 2001).

Respondent 1:

1. Please rate the *brand* in the advertisement on the following dimensions:

Bad	(1)	2	3	4	5	6	7	Good
Dislike	(1)	2	3	4	5	6	7	Like
Negative	(1)	2	3	4	5	6	7	Positive
Unfavorable	(1)	2	3	4	5	6	7	Favorable
Not useful	(1)	2	3	4	5	6	7	Useful

2. Please rate the *advertisement* on the following dimensions:

Bad	(1)	2	3	4	5	6	7	Good
Dislike	(1)	2	3	4	5	6	7	Like
Unpleasant	1	2	(3)	4	5	6	7	Pleasant
Awful	1	(2)	3	4	5	6	7	Nice
Irritating	(1)	2	3	4	5	6	7	Not irritating
Uninteresting	(1)	2	3	4	5	6	7	Interesting
Annoying	(1)	2	3	4	5	6	7	Not annoying
Unfamiliar	1	2	3	4	(5)	6	7	Familiar
Negative	(1)	2	3	4	5	6	7	Positive
Unfavorable	1	2	3	(4)	5	6	7	Favorable

Respondent 2:

1. Please rate the *brand* in the advertisement on the following dimensions:

Bad	(1)	2	3	4	5	6	7	Good
Dislike	(1)	2	3	4	5	6	7	Like
Negative	(1)	2	3	4	5	6	7	Positive
Unfavorable	(1)	2	3	4	5	6	7	Favorable
Not useful	(1)	2	3	4	5	6	7	Useful

2. Please rate the *advertisement* on the following dimensions:

Bad	(1)	2	3	4	5	6	7	Good
Dislike	(1)	2	3	4	5	6	7	Like
Unpleasant	(1)	2	3	4	5	6	7	Pleasant
Awful	(1)	2	3	4	5	6	7	Nice
Irritating	(1)	2	3	4	5	6	7	Not irritating
Uninteresting	(1)	2	3	4	5	6	7	Interesting
Annoying	(1)	2	3	4	5	6	7	Not annoying
Unfamiliar	(1)	2	3	4	5	6	7	Familiar
Negative	(1)	2	3	4	5	6	7	Positive
Unfavorable	(1)	2	3	4	5	6	7	Favorable

Respondent 3:

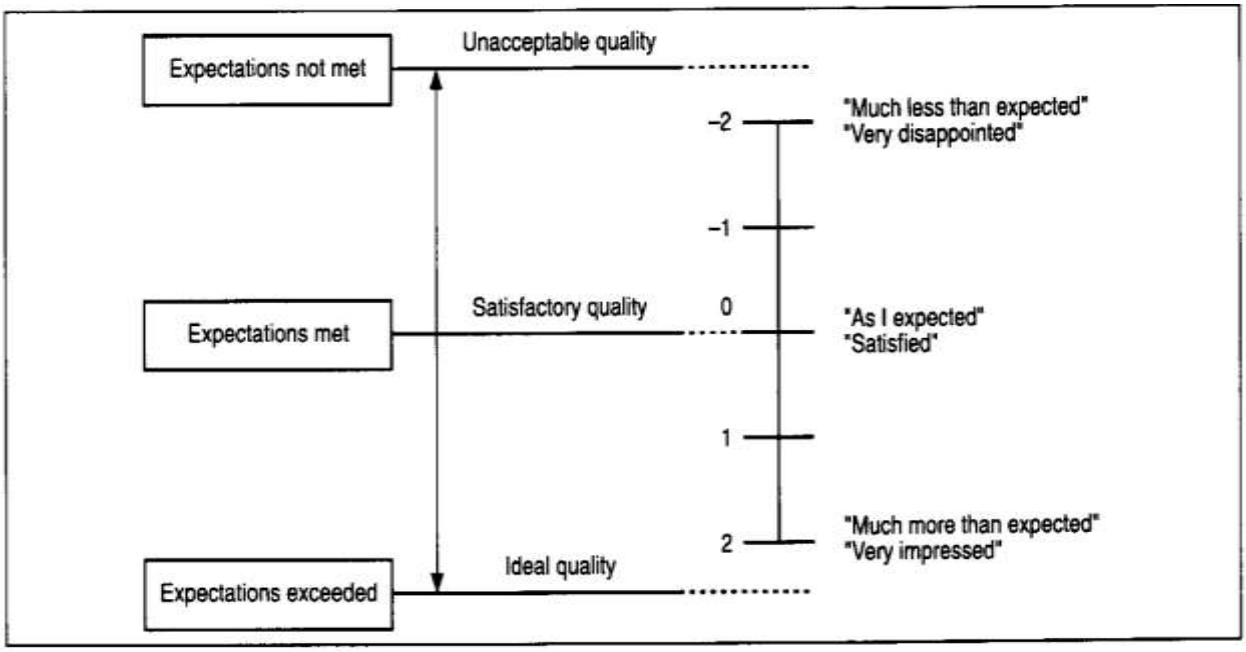
1. Please rate the *brand* in the advertisement on the following dimensions:

Bad	1	2	3	4	5	(6)	7	Good
Dislike	1	2	3	4	5	6	7	Like
Negative	1	2	3	4	5	6	7	Positive
Unfavorable	1	2	3	4	5	6	7	Favorable
Not useful	1	2	3	4	5	6	7	Useful

2. Please rate the *advertisement* on the following dimensions:

Bad	1	2	3	4	5	6	(7)	Good
Dislike	1	2	3	4	5	6	7	Like
Unpleasant	1	2	3	4	5	6	7	Pleasant
Awful	1	2	3	4	5	6	7	Nice
Irritating	1	2	3	4	5	6	7	Not irritating
Uninteresting	1	2	3	4	5	6	7	Interesting
Annoying	1	2	3	4	5	6	7	Not annoying
Unfamiliar	1	2	3	4	5	6	7	Familiar
Negative	1	2	3	4	5	6	7	Positive
Unfavorable	1	2	3	4	5	6	7	Favorable

APPENDIX 4: WEBSTER ET. AL.'S (1994) RESPONSE SCALE ITEM FOR MEASURING CUSTOMER SATISFACTION. (Anawis, 2012).



APPENDIX 5: FORMULA OF VARIOUS STATISTICAL METHODS

Formula's for central tendency and measure of variability's variables

Statistical method	Formula
Mean	$x = (\Sigma x_i) / n$ Where Σx_i = the sum of all scores and n is the number of scores.
Median	For an odd total score number =(n+½)th term and for an even total score number= **(**(n/2)th + (n/2+1)**)**/2.
Standard deviation	$s = \text{sqrt} [\Sigma (x_i - x)^2 / (n - 1)]$, x is the mean score.
Range	Highest value - Lowest value.
Variance	$s^2 = \Sigma (x_i - x)^2 / (n - 1)$.

APPENDIX 6: THE FINAL FUNCTION FOR THE MUSA MODEL. (GRIGOROUDIS ET. AL., 2002).

The final initial equation becomes:

$$[\max]F^1 = \sum_{k=1}^{a-1} w_{ik},$$

Where i = 1, 2, to the nth, with the constraint of $F \leq F^* + \varepsilon$

$$\sum_{i=1}^{n} \sum_{k=1}^{t_{ii}-1} w_{ik} - \sum_{m=1}^{t_j-1} Z_m - \sigma_j^+ + \sigma_j^- = 0,$$

For j = 1, 2, …m,

$$\sum_{m=1}^{a-1} z_m = 100\,,$$

$$\sum_{i=1}^{n} \sum_{k=1}^{a_i-1} w_{ik} = 100,$$

$$Z_m,\ w_{ik},\ \sigma_j^+\ \sigma_j^-\ \geq 0\ \ \forall m, i, j, k,$$

F^* is the highest value in the final function of the linear form:

$$(\min)\ F = \sum_{J=1}^{M} \sigma_j^+\ \sigma_j^-$$

Ɛ= small fraction of F^*

tj and tji = the perceptions of the jth customer in relation to their fractional and overall satisfaction levels with $y^{J_i} \epsilon\, y = (y_1, y^2, \ldots, y^{J_i}, \ldots, y^x)$ and $x^{tji} \epsilon\, X_i\ (X_i{}^1, X_i{}^2, \ldots, X^{tJ_i}, \ldots, X_i{}^{ix})$

I =1, 2, to the nth number

$z_m\ (y^{*m+1} - y^{*m}$ for m= 1, 2, …,α -1) and w_{ik} ($b_i x_i^{*k}$ for k = 1, 2, …, $\alpha_i - 1$ and I = 1, 2, …, n) are the transformation variables.

m =the number of customers.

σ^+ is the overestimation error and σ^- is the underestimation.

However, when there exists the issue of several or close ‘’optimal solutions’’ (which mostly occurs), the post-optimal function is used and it maximizes the weight of an attribute/element. This function is shown below:

$$[\max]\mathrm{F}' = \sum_{\mathrm{k=1}} \mathrm{w_{ik}}$$

Where i = 1, 2 to the nth number with the constraint $F \leq F^{*} + \mathcal{E}$

$$\sum_{\mathrm{i=1}}^{\mathrm{n}} \sum_{\mathrm{k=1}}^{\mathrm{t_{ii}-1}} w_{ik} - \sum_{\mathrm{m=1}}^{\mathrm{t_j-1}} \mathrm{Z_m} - \sigma_{\mathrm{j}}^{+} + \sigma_{\mathrm{j}}^{-} = 0,$$

For j = 1, 2, …M,

$$\sum_{\mathrm{m=1}}^{\mathrm{a-1}} \mathrm{z_m} = 100\,,$$

$$\sum\nolimits_{\mathrm{i=1}}^{\mathrm{n}} \sum\nolimits_{\mathrm{k=1}}^{\mathrm{a_i-1}} \mathrm{w_{ik}} = 100,$$

$$Z_{m\,,}\ w_{ik\,,}\ \sigma_{\mathrm{j}}^{+}\ \sigma_{\mathrm{j}}^{-}\ \geq 0\ \ \forall m, i, j, k,$$

To reduce the difficulty of acquiring an optimal solution, the dual linear programming function is computed and its stated as:

$$\mathrm{b_i} = \sum_{\mathrm{t=1}}^{\mathrm{\alpha_i-1}} w_{it} \,/\, 100$$

where i = 1, 2, to the nth number

$$y^{*m} = \sum_{\mathrm{t=1}}^{\mathrm{m_{-1}}} z_t$$

for m = 2, 3, …, α,

$$\mathrm{X_i^{*}} = 100 \sum_{\mathrm{t=1}}^{\mathrm{k-1}} \mathrm{w_{it}} \,/\, \sum_{\mathrm{t=1}}^{\mathrm{\alpha_i-1}} \mathrm{w_{it}}$$

where i = 1, 2 to the nth number and k represent values from 2, 3 to α_i .

APPENDIX 7: FORMULAS USED IN THE MUSA MODEL.

This section presents the average satisfaction indices, average demanding indices and the average improvement indices formulas respectively. (Grigoroudis et. al., 2002)

a)

$$S = \frac{1}{100}\sum_{m=1}^{a} P^m Y^{*m}$$

$$s_i = \frac{1}{100}\sum_{k=1}^{x_i} p_i^k \; x_i^{*k}$$

where I = 1, 2, to the nth number

Where:

P^m represent the satisfaction levels of customers belonging to Y_m

P_i^k represent the satisfaction levels of customers belonging to X_i^k

b)

The formula for both global(D) and partial(Di) demanding customers are seen below, respectively:

$$D = \frac{\sum_{m=1}^{\alpha-1}\left(\frac{100(m-1)}{\alpha-1} - y^{*m}\right)}{100\sum_{m=1}^{\alpha-1}\frac{m-1}{\alpha-1}} = \frac{1-\frac{\bar{y}^*}{50}}{1-\frac{2}{\alpha}} \quad \text{for } \alpha > 2,$$

$$D_i = \frac{\sum_{k=1}^{\alpha_i-1}\left(\frac{100(k-1)}{\alpha_i-1} - x_i^{*k}\right)}{100\sum_{k=1}^{\alpha_i-1}\frac{k-1}{\alpha_i-1}} = \frac{1-\frac{\bar{x}_i^*}{50}}{1-\frac{2}{\alpha_i}} \quad \text{for } \alpha_i > 2 \text{ and } i = 1, 2, \ldots, n,$$

Where

$\tilde{y}^*$=mean score of Y

$\tilde{x}^*$ = mean score of X_i

α is the number of overall satisfaction levels.

α_i is the overall satisfaction levels' variable for the ith attribute.

The followings assumptions can also be considered

If D is 1 or Di is 1, it implies that customers have higher level of demand.

If D is 0 or Di is 0, it implies customers have a neutral level of demand.

If D is 1 or Di is 1, it implies customers have a lower level of demand

c)

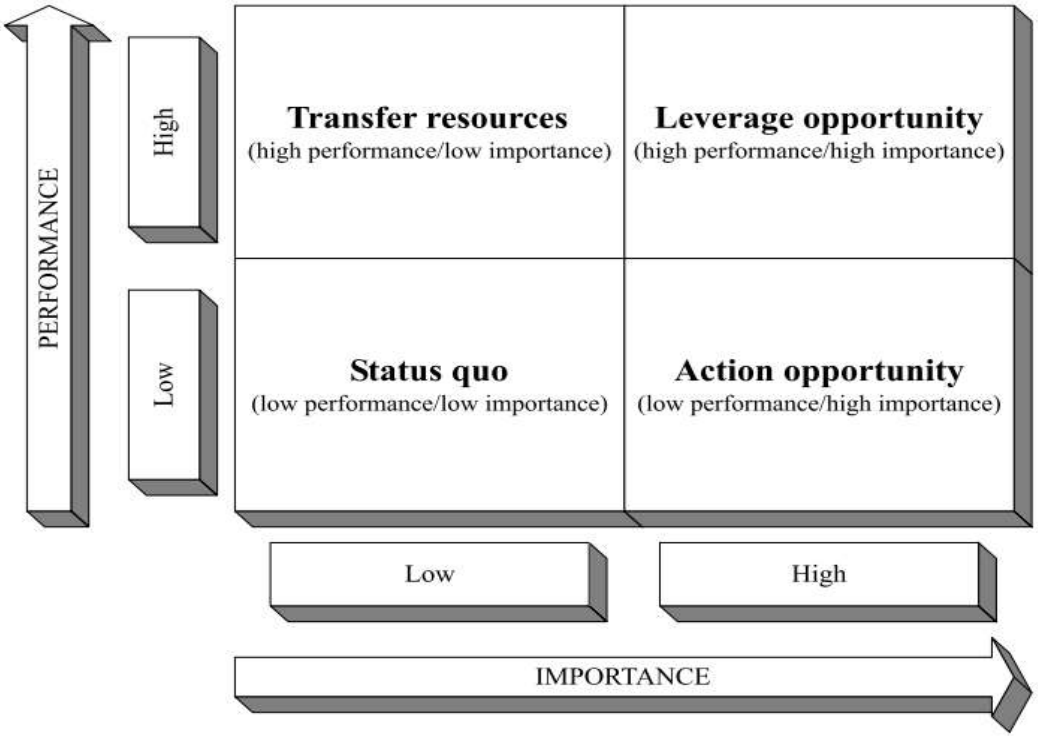
Average improvement indices

$I_i = b_i (I- S_i)$ for i = 1, 2, …, n.

APPENDIX 8: ANALYTICAL DIAGRAMS USED IN THE MUSA METHOD'S. (GRIGOROUDIS ET. AL., 2002)

This section displays the action diagram and the improvement diagram respectively.

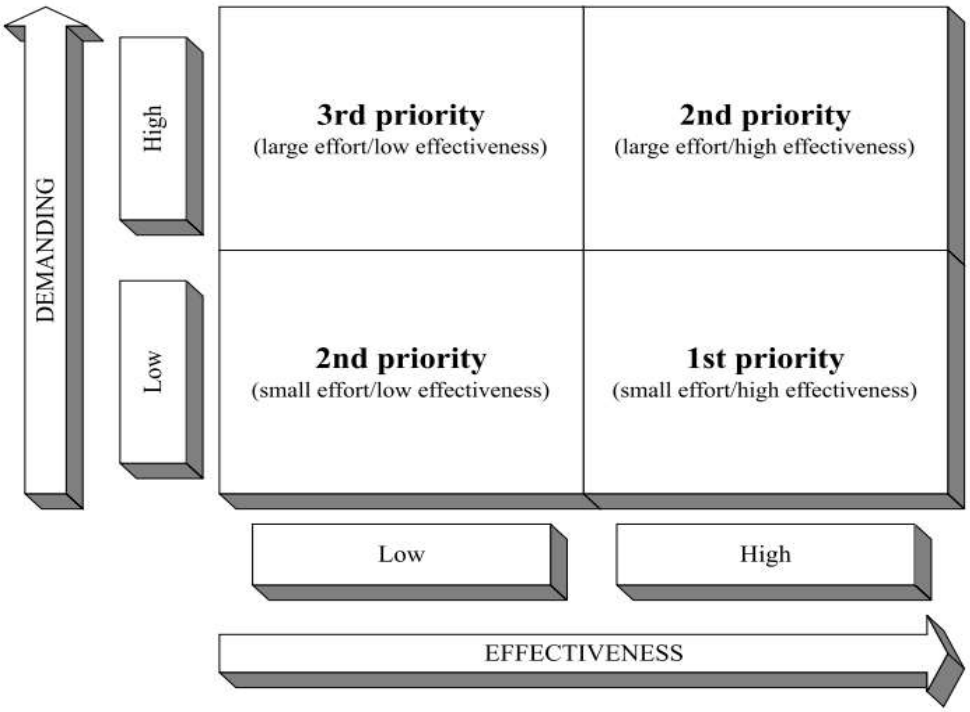
a)



Note:

1. Status quo section, no effort is needed to improve this area.
2. Leverage opportunity section: this area can be improved to gain a higher competitive advantage.
3. Transfer resources section: the firm is advised to divert its resources to other more important areas.
4. Action opportunity section: this section needs to be considered more.

b)



Note:

The first priority segment implies that there is the need for ‘’direct’’ activities to improve offerings of a company because as a result of its high effectiveness, its consumers are not demanding. With the small effort/low effectiveness second priority segment, the criteria for satisfaction is on a low demand and less effectiveness whilst the opposite in meaning is presented in the high effort and effectiveness section. Lastly, the third priority represents satisfaction levels that have a lesser need for enhancement but a considerable amount of effort is required.

APPENDIX 9: TEST STATISTICS USED IN HYPOTHESIS TEST

The test statistics, their respective assumptions and when to adopt each test. Source: Anawis (2012).

Test statistics	**Assumptions and Usage**
Z	In a normal distribution when the population standard deviation is stated. It is used to compare means ‘’to target or population’’
t	In a normal distribution when the sample standard deviation is known. Used to compare 2 sample means
Chi-Squared (variance)	In a normal distribution and used to compare variance and specified variance
Chi-Squared (independence)	In a normal distribution and used in a two ‘’variable test of association’’
Chi-Squared (goodness of fit)	‘’Test of adequacy of distribution type’’
F (variance)	In a normal distribution and used in a two ‘’sample variance test’’
F (ANOVA)	In a normal distribution and used to test the ‘’significance of model variables’’

APPENDIX 10: THE CENTRE OF AREA FORMULA USED FOR DEFUZZIFICATION (BRAENDLE ET. AL., 2014).

The Centre of Area formula used for defuzzification of fuzzy numbers.

$$CoA = \frac{(a_3 - a_1) + (a_2 - a_1)}{3} + a_1$$

where a_1, a_2 and a_3 are real numbers.