Service Quality of Water and Sewerage Companies

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Abstract. The purpose of this conceptual paper is to analyse, critically review and discuss on the perceived service quality of the water and sewerage services with the addition of sustainability factor with respect to economy, environment and social among the Malaysian water and sewerage companies. The review of various service quality model and sustainability model that lead to our findings on knowledge gap between sustainability and service quality especially in utility services sector (water and energy). The authors have developed a modified SERVQUAL model with six independent variables namely tangibles, reliability, responsiveness, assurance, empathy and with an additional dimension sustainability which modified the existing instrument of SERVQUAL to be called as sustainability service quality or SUSSERV. The paper involve discovering lack of research in sustainability service quality particularly in the context of Malaysian water services (including sewerage) industry. This review should be able to answer the question why SERVQUAL is not appropriate for measuring service quality of water services thus require some improvement or modification using SUSSERV. Previous efforts and focus have been made on water quality and water treatment or process quality based (that is technical issues), thus this paper is an attempt to fill the gap between service, product and process quality.

Keywords: Service quality, sustainability, water and sewerage industry, regulatory.

1. INTRODUCTION

The water services (water and sewerage) have been in our country for many years where the industry players have spent great amount of monies, effort and attention on infrastructure and water quality but not much on the quality of services itself. Service quality relates to how customers perceive the actual service performance against their expectation (Parasuraman, 1985). Suruhanjaya Perkhidmatan Air Negara is a technical and economic regulatory body for the water supply and sewerage services in Peninsular Malaysia and Federal Territories of Putrajaya and Labuan together with other imperative entity related to water should provide information to consumers about how it is meeting its responsibilities in relation to sustainable water usage, resources and how consumers may conserve water.

While sustainability is important goal for many companies, there is a question why and how the service quality instrument needs to be changed. Therefore, this review should be able to answer the question why the existing SERVQUAL is not appropriate for measuring service quality of water services thus require some improvement or modification. This research will explore and explain the impact of service quality of water and sewerage companies in Malaysia towards their sustainability and will allow for further improvements in the future because this kind of study is somewhat new in Malaysia. The main objectives of this research are to determine the perceived service quality of the water and sewerage companies and also to determine the relationship between sustainability factors and service quality factors by using an instrument for sustainability service quality or **SUSSERV** that has been developed to measure service quality in water and sewerage services. The findings can be used as a reference and guidance for SPAN and government agency to evaluate or analyse the performance of the water and sewerage companies or water industry, management of technology and to the body of knowledge. Furthermore, there is a lack of a research for service quality in water and sewerage services especially in Malaysia.

2. CONCEPTUAL DEFINITIONS

Gronroos (1984) developed Service Quality Model which has specifically mentioned the concept of perceived and

expected services. Subsequently, Parasuraman *et. al.* (1985, 1988), extended Service Quality Model and developed the SERVQUAL model for the same purposes as Gronroos (1984) to determine the perceived quality level. The important concept definitions use for the purpose of this research mainly involve the SERVQUAL or service quality model that was developed by Parasuraman *et. al.* (1985, 1988) with main components of high quality service or ten dimensions of service quality of which later were collapsed into five dimensions factors.

This model can be used to measure and manage service quality with a questionnaire that measures customer expectations of service quality in terms of these five dimensions, and their perceptions of the service they received. The concept of sustainability was briefly discussed through a review of supply chain management literature by Carter and Rogers (2008) of which have proposed a sustainable supply chain management with three important factors namely social, environmental, and economic goals with four supporting facets of sustainability reviewed above – risk management, transparency, strategy, and culture. The highest level of economic performance will occur at the intersection of environmental, social, and economic performance. Thus, firms which attempt to simultaneously maximize performance of all three dimensions of the triple bottom line will outperform organizations that attempt to only maximize economic performance, or companies that attempt to achieve high levels of social and environmental performance without explicit consideration of economic performance (Carter and Rogers, 2008).

The authors are of the opinion that, the Five Rules of Services elements by Gronroos (1988) are comparable with Sustainable Factors by Carter and Rogers (2008) as shown in **Figure 1**. Three sustainability factors are consistent with Enquist *et. al.* (2007) which investigated the relationship between service quality and sustainability using own developed model named *Values-Based Service Quality for Sustainable Service Business* comprised four dimensions in values-based service quality namely technical, functional, experiential and human resources/ corporate climate against five sustainability factors namely (1) an ethical dimension; (2) a social dimension; (3) a "nature-philosophic" dimension; (4) an economic dimension; and (5) a legal dimension.

Sustainability service quality or **SUSSERV** from this review consist six independent variables on service quality namely tangibles, reliability, responsiveness, assurance, empathy and sustainability will be used for the purpose of identifying service quality status of each companies. Five independent variables are based on Parasuraman (1988) while one sustainability variable comprises of economy, environment and social factors are based on Carter and Rogers (2008). Business growth is related to profitability of a company and important to this research as it is relatively giving impact to economy factor.

2.1 Services

Parasuraman Parasuraman *et.al.* (1985) have summarised the definition of services from previous authors as having three characteristics namely Intangibility (viewed as performances rather than objects), Heterogeneity (services performance often varies from different producer and customer) and Inseparability. Inseparable consistent with the definition of services that involves the interaction between the producer and the consumer. The consumers or purchasers themselves can assess the quality of service provided (Naik *et. al.*, 2010). Furthermore, Parasuraman (1998) defined "service" and "services" are not entirely synonymous although both share common traits such as intangibility and perishability. Services are "intangible products" that a supplier markets to its consumers.

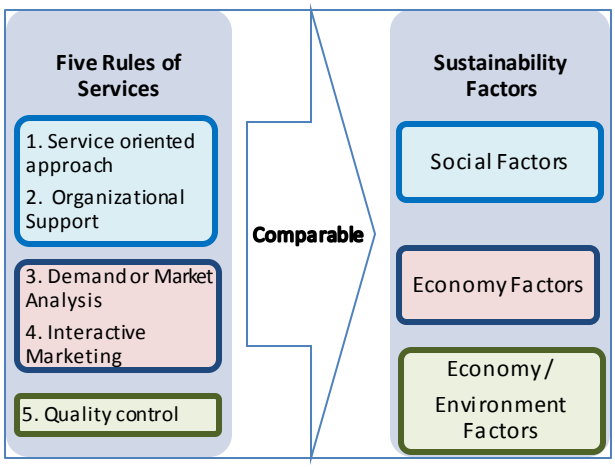

Figure 1 : Five Rules of Service Comparable with Sustainable Factors

Source: Adaptation from Gronroos (1988); Carter and Rogers (2008)

2.2 Quality

It is difficult to determine customers' expectation and whether they are satisfied with the company, its products, and its service. Numerous definitions of quality have been given by researchers, practitioners and gurus from many perspectives. According to Garvin (1984), the definition of quality can be identified using five major approaches are (1) *Transcendent* – Quality is synonymous with "innate excellence"; (3) *Product based* - Quality is viewed as a precise and measurable variable; (3) *User based* – Quality "lies in eyes of the beholder"; (4)

Manufacturing based – Quality is identified as "conformance to requirements"; and (5) *Value based* – Quality defined in terms of costs and prices. Product based and user based were normally viewed by marketing people whereby most engineers viewed quality as manufacturing-based. With a multiple perspectives in viewing quality, companies can takes advantage by shifting perspectives on quality as product move from design to market.

2.3 Type of Quality - Product, Process and Services

Basically there are three types of quality that are often discussed by many scholars namely *Products quality* (Yusof and Aspinwall, 2001), *Processes quality* (Agus and Hajinoor, 2012) and *Services quality* (Parasuraman *et. al.*, 1985, 1988; Parasuraman, 1998, 2004, 2010; Gronroos, 1984, 2001). The element of quality was discussed by Gronroos (1984) from the Service Quality model on three types of qualities comprised of perceived service quality, technical quality (what?) and functional quality (how?). Kang and James (2004) further explained that the "perceived service quality model" replaces the product features of a physical product in the consumption of services. The customers perceived what they received as the outcome of the process in which the resources are used, i.e. the technical or outcome quality of the process. Functional quality is also a part of the process quality dimension. The differentiation between technical quality and functional quality can be seen in the hospital and healthcare services (Abuosi and Atinga, 2013) and also in higher learning institution (Kong and Muthusamy, 2011). This is because their services involve high technology tools, equipment and peripherals which are related to functional quality. For manufacturing with total quality management (TQM) practices, other than service quality, process and product quality are being considered as well as technical quality because there is a positive relationship between TQM practices and market orientation (Lam *et. al.,* 2012).

Gronroos (1984, 2001) has discussed and emphasized the importance of *corporate image* in the experience of service quality or dimension of quality, the authors are of the opinion that corporate image is not applicable holistically to any company, business entity and individual based on the following arguments; (1) Something that one have to build over time but definitely not overnight or long-term process (Fatt *et. al.*, 2000) ; (2) Only big corporation have corporate image due to the high cost to build and maintain good image and involves the effort of the entire company (Fatt *et. al.*, 2000); (3) Not exclusively and ultimately owned because the real owner is the general public. Although corporate image is an intangible item it must be generally accepted by surrounding community because and it is the external publics' perceptions that result from their interactions with the organization (Abratt and Mofokeng, 2001).

Product quality is a very important aspect in Malaysian manufacturing (Yusof and Aspinwall, 2001). The industry is heterogeneous in terms of sub-sectors and product/ process complexity. Process and product quality are interrelated in manufacturing whereby process quality such as reduced setup time, pull production system, and shorter lead time have high positive relationship toward product quality performance and business performance (Agus and Hajinoor, 2012).

2.4 REVIEW OF SERVICE QUALITY (SERVQUAL) MODEL

The most important concept is managing the perceived service quality by managing the gap between perceived services and expected services. It has been thus concluded that technical quality is more important than the functional quality. A such, treated water produced by the water companies is a good example of technical quality or a technical outcome of the process. However, the customers are also interested to know water treatment process itself; curious about technology, tools or equipment used and how technical quality is obtained. It is important to them and to their view of the service they have received and this is called functional quality. Functional quality cannot be evaluated as objectively as the technical dimension because functional dimension is being perceived in a subjective manner. However, service quality was discussed and further refined by Parasuraman *et. al.* (1985, 1988), thus the SERVQUAL model has been developed. Parasuraman *et. al.* (1985) revealed that ten dimensions (namely tangibles, reliability, responsiveness, communication, credibility, security, competence, courtesy, understanding, access) that consumers use in forming expectations about and perceptions of services, are dimensions that transcend different types of services. They developed 97 items representing ten dimensions of service quality identified using seven points Likert scale ranging from 7 (strongly agree) to 1 (strongly disagree). The research also mentioned four key discrepancies or gap 1 to 4 on the service provider's side that are likely to affect service quality as perceived by consumers (gap 5). Subsequently, Parasuraman *et. al.* (1988), further refined and condensed the instrument from 97 items to 22 item to assess customers' perceptions of service quality in service and retailing industry. They have maintained five most important dimensions in Service Quality model namely Tangibles, Reliability, Responsiveness, Assurance and Empathy.

2.5 MODIFIED SERVICE QUALITY (SERVQUAL) MODEL

Although SERVQUAL model is proven to be reliable and a valid tool to measure service quality, has not stopped the researchers from enhancing or extending its capability through some modifications to suit their objectives and the areas of

research or industry. Some modified SERVQUAL models that has been developed include SERVPERF, PAKSERV, FM-SERVQUAL, BSQ Index and SSQ. The analysis on the modified SERVQUAL models used by scholars in previous research have been summarised as shown in **Table 1** and brief explanations on the models are; (1) **SERVPERF** model measuring service quality and performance or comparison of performance perceptions with expectation. Both service quality and satisfaction effected purchase intentions but satisfaction has a stronger and more consistent effect or SERVQUAL model has some limitation (Taylor *et. al.,* 1993). Despite critic on SERVQUAL model, Cronin (2003) still cannot totally confirm that there is a direct correlation or linear relationship between service quality and customer satisfaction, but at the same time would be misleading to suggest that they are totally unrelated; (2) Pakistan Service Quality or **PAKSERV** model scale to measure the service quality in the country context of Pakistan for the purpose of different cultural with regard to service quality perceptions between people from Asian and western societies.; (3) Facility management service quality or **FM-SERVQUAL** model has proven to be reliable instrument that contributes to improve the quality of delivery system in Local Authorities in Malaysia; (4) Bank Service Quality (BSQ) Index or **BSQ Index** model revealed that reliable communication and responsiveness have a direct bearing on perceptions of quality; (5) Sports service quality or **SSQ** model is used to investigate the relationship between emotional experience (EE) and user satisfaction (US) for sports competitions or training venues. Other researchers used the existing SERVQUAL model by Parasuraman *et. al* (1985 and 1988) and modified the instrument to suit their research in the areas of study such as hospital and healthcare (Kilbourne *et. al.,* 2004; Abuosi and Atinga, 2013); banking (Amin and Isa, 2008; Kumar *et. al.*, 2009; Amat Taap *et. al.*, 2011; Abdullah *et. al.*, 2011); manufacturing with TQM practices (Lam *et.al.*, 2012).

3. SUSTAINABILITY

To date, more research in area of sustainability conducted by many scholars and researchers across the field of knowledge such as social sciences (Enquist et. al., 2007; Carter and Roger, 2008; Amran *et. al.* 2010), and engineering (Hosseinpour *et. al.*, 2015; Ali *et. al.* 2013). Sustainable development is a major challenge and proves to be a daunting task to understand the inter-related complex issues. To date, sustainable development is an important concern, probably the most important, for business and society, and even for those who for years argued in favour of the importance of change towards sustainable development, this issue is now perceived as being more apparent and urgent. Therefore, sustainability is a key issue for the business community in the twenty-first century. The current crisis resulting from rapid industrialisation has caused significant social and environmental side effects (Amran *et. al.* 2010). The policy maker especially in water and sewerage industry will always want its industry to be sustainable and relevant to the consumers' needs. Change will definitely involve many parties and strong political will and support should be present to achieve its objectives.

Table 1 : Summary of Modified SERVQUAL Models

	Authors developed Modified SERVQUAL Model	Service Quality Dimensions (Ds)				
		Tangibles	Reliability	Responsive	Assurance	Empathy
1.	Cronin and Taylor, 1992 **[SERVPERF]**	√	√	√	√	√
	Others Ds	None				
2.	Raajpoot, 2004 **[PAKSERV]**	√	√	-	√	-
	Others Ds	sincerity, personalisation and formality				
3.	Wan Yusoff *et. al.*, 2008 **[FM-SERVQUAL]**	√	√	√	√	√
	Others Ds	Professionalism				
4.	Abdullah *et. al.*,2011 **[BSQ Index]**	-	√	√	-	-
	Others Ds	Systemization of service and Reliable Communication				
5.	Voon *et. al.*, 2014 **[SSQ]**	-	√	√	-	-
	Others Ds	Peripheral, core and value				

3.1 Type of Sustainability - Product, Process and Services

For the purposes of this research, other than product and process, sustainability of services will be discussed in detail by the authors based on past research, empirical findings and scientific references. Companies wishing to achieve business excellence are intense has resulted in shorter life cycles of new products. Business excellence will be achieved by companies which can react quickly to new market conditions and customer needs and constantly looking for creative solutions and continuous improvements or sustainability in products and processes is important and difficult practice of all in the organization (Ali *et. al.,* 2013). Therefore, meeting functional requirements and sustainability is critical for product success in the current market. Products compete on the basis of not only price, functions and diversity, but also sustainability. Sustainability can be defined as the ability of a product or system to work continuously during its life cycle with the lowest level of impact to the environment

(Hosseinpour *et. al.,* 2015). The element of sustainability does have an impact to the implementation of services and indirectly an attributes to the quality of services. The social and economy factors that can be in many forms are among the attributes that correlated with service quality.

3.2 Sustainability Components – Environment, Society and Economy

The Triple Bottom Line is a sustainability model developed by Elkington (1997, 1998) comprised of three important elements, environment (natural capital), social and economic (profit). The model has been referred by scholars (Enquist et. al., 2007; Carter and Rogers, 2008). The sustainability from the aspect of social science and discussed by scholars basically consists of three components namely (a) Economy; (b) Environment; and (c) Society (Carter and Rogers, 2008; Kheong, 2008; Tajbakhsh and Hassini, 2015; Gimenez and Tachizawa, 2012; Fernando, 2012; Afful-Dadzie *et. al.* 2016). However, Lehtinen (2012) briefly reviewed and suggested four (4) criteria need to be considered to evaluate the sustainability are; (1) Environmental factors; (2) Social factors; (3) Economic factors; and (4) The relationship factors. A non-denial fact that the *environment factor* has a major impact towards sustainability. Sustainability in manufacturing may differs from service industry especially with the existence of social factor, thus can be further researched to service industries. There is an element of cost and benefit or profit and loss for the purpose of measuring sustainability such as cost-efficient model (Benedetti *et. al.,* 2012). It can be concluded that sustainability has a positive relationship towards profitability, cost reducing, economic performance (growth) and competitive advantage (Amran et. al., 2010 and Carter and Rogers, 2008).

4. CONCEPTUAL MODEL

This review reveals that a few researchers in previous studies (Cronin and Taylor, 1992; Kilbourne et. al., 2004; Agus et. al., 2007; Wan Yusof et. al., 2008; Abuosi and Atinga, 2013; and Voon *et. al*., 2014) have modified the original SERVQUAL model in order to accommodate their areas of research. During the early years, the modified SERVQUAL model was developed and being used in research on service industry as discussed and shown in **Table 1**. The authors are of the opinion that based on the literature reviews, another area that have a major impact on service quality are sustainability factors or based on sustainable supply change management model with three important factors namely social, environmental, and economic goals as proposed by Carter and Rogers (2008). Therefore, using the original SERVQUAL model developed by Parasuraman *et. al.* (1988), a modified SERVQUAL model will be used in this research with additional dimension of sustainability. The summary of scholars/ authors and service quality dimensions together with additional dimensions in previous research used in proposed SUSSERV models are shown in **Table 2** below**.**

SUSSERV is a model with thirty one items comprises twenty two items from the original SERVQUAL model. In addition, three items each (totaling nine) from the sustainability dimension namely economy, environment and society. The SUSSERV model has been developed based on literature reviews and prior studies related to the subject of this research as shown in **Figure 2.** SUSSERV is able to empirically measure consumers' perception toward the service quality provided by water and sewerage service companies.

5. SUMMARY AND CONCLUSION

Based on the literature review, the authors' proposed SUSSERV model has achieved the research objective where it can be used to measure service quality and sustainability among the Malaysian Water Service companies. SUSSERV takes six components into consideration namely Tangible, Reliability, Responsiveness, Assurance, Empathy and Sustainability. The overall goal of this research, therefore, will be to implement the SUSSERV model to existing Malaysian water services industry. There is lack of research in service quality particularly in the context of Malaysian water services industry. Previous efforts and focus made on water quality and water treatment or process quality based were more technical in nature, thus this paper is an attempt to fill the gap between services, product and process quality by including sustainability.

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Table 2 : Summary of Authors and Sustainability Service Quality (SUSSERV) Dimensions

Dimensions	Authors
Tangibles	Parasuraman *et.al.* (1985, 1988); Cronin and Taylor (1992); Kilbourne *et. al.* (2004); Agus *et. al.* (2007); Amin and Isa (2008); Wan Yusof *et. al.* (2008); Kumar *et. al.* (2009); Abuosi and Atinga (2013); Raajpoot (2004)
Reliability	Parasuraman *et.al.* (1985, 1988); Cronin and Taylor (1992); Kilbourne *et. al.* (2004); Agus *et. al.* (2007); Amin and Isa (2008); Wan Yusof *et. al.* (2008); Kumar *et. al.* (2009); Abdullah *et. al.* (2011); Abuosi and Atinga (2013); Voon *et. al.* (2014); Raajpoot (2004)
Responsiveness	Parasuraman *et.al.* (1985, 1988); Cronin and Taylor (1992); Kilbourne *et. al.* (2004); Agus *et. al.* (2007); Amin and Isa (2008); Wan Yusof *et. al.* (2008); Kumar *et. al.* (2009); Abdullah *et. al.* (2011); Voon *et. al.* (2014)
Assurance	Parasuraman *et.al.* (1985, 1988); Cronin and Taylor (1992); Agus *et. al.* (2007); Amin and Isa (2008); Wan Yusof *et. al.* (2008, 2010); Kumar *et. al.* (2009); Raajpoot (2004)
Empathy	Parasuraman *et.al.* (1985, 1988); Cronin and Taylor (1992); Kilbourne *et. al.* (2004); Agus *et. al.* (2007); Amin and Isa (2008); Wan Yusof *et. al.* (2008); Kumar *et. al.* (2009)
Sustainability	Elkington (1997, 1998); Enquist et. al., 2007; Carter & Rogers (2008); Lehtinen (2012); Gimenez and Tachizawa (2012); Fernando, R. (2012); Lepage, 2009; Tajbakhsh and Hassini (2015); Afful-Dadzie *et. al.* (2016)

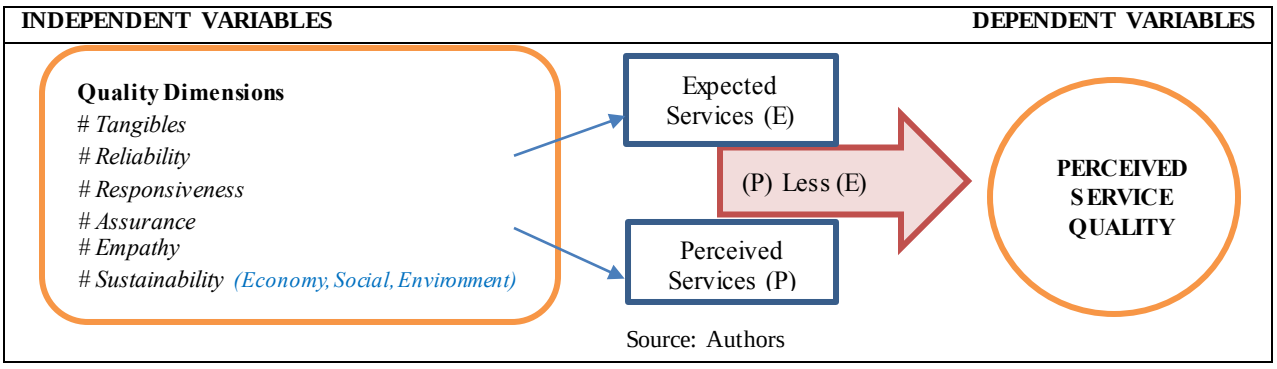

Figure 2: Conceptual Model – Sustainability Service Quality (SUSSERV)

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