Implications of e-Service Quality Dimensions for the Information Systems Function

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Abstract

The measurement of Information Systems (IS) effectiveness has been prominent on the research agenda since the 1980s. Consequently various approaches for measuring IS effectiveness have been produced including that of service quality. This approach has its roots in the marketing discipline where service quality is primarily used to measure business success via a customer satisfaction set of dimensions. With the advent of e-commerce, many studies have focused on online service quality measurement from the marketing perspective. There has been scant attention however, to the role of the IS function in achieving acceptable levels of online service quality. In acknowledging the elevated role of the IS function in the e-commerce environment, the primary objective of this paper, is to highlight the issues around service quality, and in doing so shift this research agenda into the domain of IS management. In light of this a review of both traditional and electronic service quality research is provided. A comprehensive set of e-Service Quality dimensions are consequently synthesized and discussed. Finally, the authors explore the implications of these dimensions for the IS function. The paper concludes by suggesting that an important contributor to IS success in the e-Commerce environment relates to the degree in which IS functionaries embrace Service Quality attributes in the planning, design, implementation and management of IS.

1. Introduction

Business-To-Consumer (B2C) e-commerce is still a relatively new phenomenon if one considers that the Internet has only been seriously harnessed for commercial purposes since the latter 1990s. Thus e-commerce businesses are still grappling to gain the confidence of many consumers, especially in countries where uptake of online shopping is relatively slow compared to the rest of the world. This is compounded by the fact that cyberconsumers are better informed, have more choices, control the sales process, and are more experienced, which contributes to their demanding high levels of service [2]. As a result may authors [e.g. 28] that companies need to develop and hone their e-commerce strategies with a customer focus so as to increase and retain market share [28].

As an increasing number of businesses of all sizes turn to adopt some form of web strategy it is clear that information technology will have an increased impact on business operations. Consequently, authors such as Delone and McLean [10], argue that even though companies are making large investments in e-commerce applications, they are very hard pressed to evaluate the success of their e-commerce systems. This has therefore caused many failures and disappointment [1] rather than success. This has motivated IS researchers such as Liu and Amett [17], Molla and Licker [20], and Teo and Choo [32] to turn their attention to developing, testing managing and applying e-commerce success measures. There have been various approaches to IS success measurement. IS researchers in the past decade have turned their focus away from traditional success constructs such as system quality, information quality to other means of measuring success. An important contribution in this regard has been made by Delone and Mclean [10], in a ten year update of the IS success model which was originally published in 1992 [9]. In the updated Delone & McLean IS Success model, a strong case is made for the inclusion of service quality constructs as an important dimension in IS success measurement.

Service quality research which is widely accepted in the literature on traditional service [2] has its roots in the marketing discipline. Parasuraman et al., [22] conducted an empirical study into customer's evaluations of business and developed the SERVQUAL instrument. Thus, service quality measures have traditionally not been in the domain of IS research. However in the mid 1990s IS researchers began to focus on service quality, but from the perspective of the service rendered by the IS function in traditional brick and mortar businesses. In the current internet age and in light of recent research it has become equally important to examine service

IEEE computer society

978-0-7695-3869-3/10 $26.00

quality dimensions from an IS context within *online* businesses as well.

Given this brief background, this paper provides an overview of service quality literature. This includes: an overview of the dimensions of service quality in both the traditional and online environment as well as the relative importance of service quality in an e-commerce environment. A comprehensive set of e-Service Quality dimensions are consequently synthesized and discussed. Following on this implications of these dimensions for the IS function in e-commerce businesses are then explored. The key research questions that are addressed are: (1) What are the most common service quality dimensions in an e-commerce environment? and (2) What are the implications of these for the IS function?

2. Information Systems Effectiveness

Measuring Information System effectiveness is critical to our understanding and effectiveness is a complex concept that offers both conceptual challenges as well as implementation difficulties [21]. As a result of these difficulties research into information system success has sought to borrow from the service management field thus underscoring the similarity between information system departments as a provider of services with that of other internal services [36]. Notwithstanding the difficulty involved in developing measures of effectiveness, businesses still need to have suitable indicators of the success of their IS investment [21]. Users don't have clear means whereby they can judge the success of a system [36] and consequently, IS managers and IS project leaders need to understand their user's view of success and the factors that affect its achievement. Hence, some of the benefits of developing scales for measuring IS effectiveness within e-commerce businesses are : To provide the IS department and e-commerce developers with a measure of the success of the e-commerce applications; provide e-business managers a better understanding of the value of high expenditure by the IS function; and improve the strategic planning process of e-businesses by providing relevant data on IS performance.

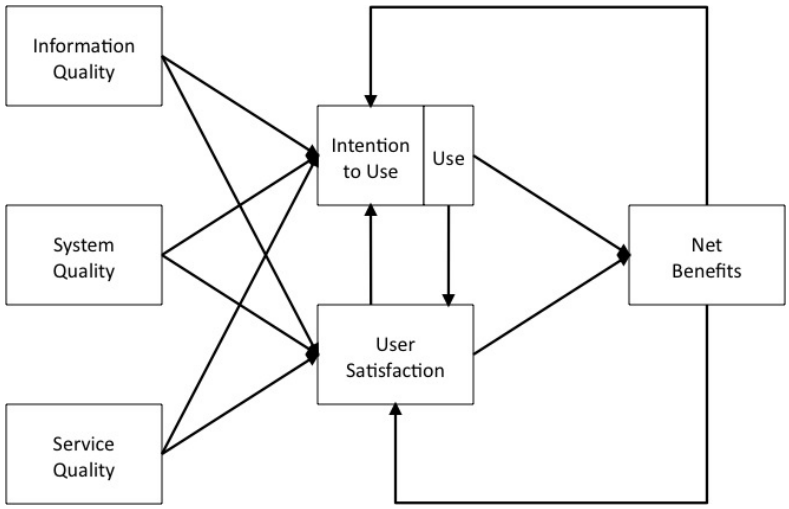

FIGURE 1: Updated D&M IS Success Model [Source: Delone and McLean, 2003]

The IS Success model [9] has been widely cited as it was the first attempt to provide a taxonomy of IS effectiveness measures. In updating the 1992 model [Figure 1], Delone and McLean [10] identified three dimensions of quality namely: Information Quality, System Quality and Service Quality. This model demonstrates the association among these dimensions. However, Galletta and Lederer [11] posit that there is a need for identifying and measuring a dependent variable because more direct ways of assessing IS effectiveness are difficult. Some well-researched approaches of measuring IS effectiveness are user satisfaction e.g. [33] and Service Quality [7]. However, Pather et al.. [21] have argued that User Satisfaction and Service Quality ought not to be treated separately and that existing theories should be merged to formulate new mechanisms of evaluating e-commerce effectiveness.

In addition, some researchers have argued that service quality in an online environment is not well understood and there is therefore a need to identify suitable determinants of e-service quality [7]. The problem that IS practitioners are faced with is that a large component of research being conducted to measure e-Service Quality are relevant mainly to Business and Marketing managers. A question worth asking therefore is, "How does the IS/IT manager ensure that e-commerce systems meet these service quality requirements?" As a step towards addressing this queston this paper considers, within the context of electronic business, the dimensions and determinants of service quality and how an online Information System in an e-commerce context can support them.

3. Service Quality

Ziethaml et al. [41], have defined service quality as the difference between the customer's expectations for service performance prior to the service encounter and their perceptions of the service received. Other researchers have described it as the subjective comparison that the customers make between the quality of the service that they want to receive and what they actually get [7, 18].

Parasuraman et al. [24] describe the concept as the ability to meet or exceed customer expectations i.e. meet or exceed the customer's expectation of service rather than the service provider's sense of what should be offered. Thus expectations can be known before the service is designed and serve to orient marketing strategies, and may be measured when the service is functioning and compared with the organisation's actions [2]. This approach is described by Long and McMellon [18] as "a comparison of customers' expectations of the service before it occurs, with their perceptions of the service after the encounter. It focuses on meeting customer's needs and requirements and how well the service delivered matches the customer's expectations of it".

Studies have shown that firms that show high customer satisfaction also enjoy high profitability [18]. Therefore, if service quality is measured accurately, it will provide a reasonable indicator of problems, strength and weaknesses. As a result businesses will be able to attend to specific issues that should result in customer satisfaction, which in turn will create customer loyalty, maximize business profits and thus ensure business success.

3.1 Service Quality in brick and mortar business

Traditional service quality is service that is offered in person-to-person interaction where the customers can observe factors such as friendliness, cleanliness, and physical appearance first hand. There have been several studies that have examined the application of service quality in various industry sectors [3, 12, 22, 23 24].

Various researchers have attempted to identify attributes that customers use to assess the quality of service they receive. Parasuraman et al. [23] identified five Service Quality dimensions: tangibles, reliability, responsiveness, assurance and empathy. Based on these dimensions they then developed the SERVQUAL measurement instrument. On the one hand, this scale has been used in a variety of proprietary and published studies to assess customer perceptions of service quality [19, 24]. On the other hand, several researchers challenged the usefulness of the SERVQUAL scale as a measure of service quality. [e.g. 3, 5, 8]. Carmen [5] found that SERVQUAL needs to be customized in some situations, by adding items or changing the wording of items, even though it was originally designed to be a generic instrument for measuring service quality at any sector. Additionally, he argued that SERVQUAL has five dimensions only, which are not sufficient to meet service quality measurement needs, and that the measurement of expectation in SERVQUAL is problematic.

Various researchers have nevertheless confirmed the dimensions that Parasurama et al. [23] identified. For example, Sureshchandar et al. [30] identified service quality factors that are very much similar to that of Parasuraman et al. [23]. The dimensions of which are proffered in that study are: the core service, human element of service delivery aspects such as reliability, responsiveness, assurance, empathy and service recovery, systematization of service delivery [30].

Siu and Cheung [29] also identified six dimensions of service quality, viz. personal interaction, policy, physical appearance, promise, problem solving and convenience. Although, service quality originated as a key concept in traditional businesses it has become an important aspect in online environments as well [10, 38, 39, 40].

Alzola and Robaina [2] suggest that the presence of different positions has led to three alternatives in the practical application of the SERVQUAL instrument: 1) The application of SERVQUAL; 2) the application of an adapted, enlarged, or simplified SERVQUAL; and 3) the creation of scale for the particular setting of the study.

IS researchers have also attempted to adapt SERVQUAL for IS effectiveness evaluation e.g. [13, 14, 25, 35]. However there is an emerging argument

that SERVQUAL is not appropriate for measuring service quality in computer-mediated self-service provision and does not provide a sound foundation for research into online service quality [31]. Thus the application of SERVQUAL in online environments needs to be approached with some caution.

The following section examines in more detail the relevance of service quality within e-commerce business.

3.2 e-Service Quality (e-SQ)

In distinguishing between electronic transacting and that of physical encounters between customers and business, Alzola and Robaina [2] argue that the structure of traditional service encounters is significantly altered in the e-commerce environment. The acquisition and retention of online customers is therefore not as straightforward and simple as was suggested in the early days of internet commerce. Today it requires well honed marketing strategies due mainly to the fact that the power is fast shifting to consumers who increasingly have the ability to compare prices with the click of a button [18, 28]. The level of online service quality is thus a differentiating factor which has become critically important for online business survival [7, 39].

e-Service Quality is therefore a key determinant of success in the e-commerce environment [26]. It is defined as the consumer's evaluation and judgment of the quality the service during online business transactions. This is a fact that was also recognized by Long and McMellon, [18] who argued that: "Service Quality is increasingly recognized as an important aspect of e-commerce. Because the online comparison of the technical features of products is essentially costless, feasible, and easier than comparison of products through traditional channels, service quality is the key determinant for a successful e-business".

Despite its importance however, concerns have been expressed in respect of the robustness of scales for measuring e-service quality [26] because research of consumer evaluations of online service is regarded to be still in its early stages [7, 18, 26, 39]. Thus many researchers continue to give this attention as the lack of measurement scales will result in dissatisfaction among online customers because their expectations and perceptions are unknown and therefore not being met.

Sureshchandar et al. [30] also believe that service quality and customer satisfaction go hand in hand and that increase in one can most likely cause increase in the other and because of this link the importance of service quality on the Internet cannot be understated.

In the absence of tangible evidence with which to evaluate quality, consumers must depend on other cues [22]. It is for this reason the advent of e-commerce has especially challenged researchers to identify dimensions of e-Service Quality. If online retailers can discover what attributes are assessed by consumers in their evaluation of service quality and overall satisfaction, then managers will be in a position to monitor and improve company performance [39]. Consequently various researchers have endeavoured to establish what these service quality dimensions or elements are.

The Service-Quality scale that was developed by Long and McMellon [18] was based on five dimensions: tangibility, assurance, responsiveness, reliability and the purchasing process. However, some researchers believe that e-service quality dimensions are more than these. For example, Ziethaml et al. [41], uncovered 11 dimension of e-Service Quality: reliability, responsiveness, access, assurance/trust, security/privacy, customization, navigation, flexibility, efficiency, site aesthetics and price knowledge.

According to Zhilin et al., [39] dimensions of e-Service Quality are: Responsiveness, credibility, ease of use, Reliability, convenience, communication, access, competence, courtesy, personalization, continuous improvement, collaboration, security/privacy and aesthetics.

Yang and Jun [37] found six service quality dimensions that were perceived by internet purchasers. These were: reliability, access, ease of use, personalization, security, and credibility. Using a sample of students, Yoo and Donthu [38] developed a scale called SITE-QUAL to measure the perceived quality of an Internet shopping site which resulted in a nine-item scale with the following four dimensions: Ease of use, Aesthetic design, Processing speed, Security.

In the study conducted by Santos [26], the following determinants in ascending order of importance were defined: reliability, efficiency, support, communication, security and incentive. Santos then developed an e-service quality model to support e-commerce businesses [see Figure 2].

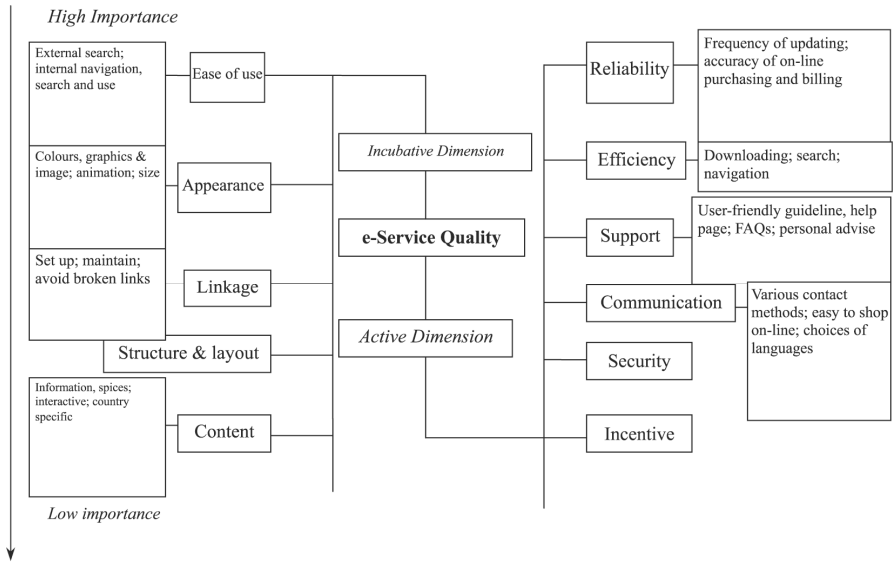

FIGURE 2: A model of e-service quality *[Source:Santos, 2003]*

4. A Synthesized set of e-service quality dimensions

In analyzing the literature, it is apparent that similar dimensions of e-service quality have been identified by the various studies. As an initial step towards synthesizing these, Table 1 provides a list of service quality dimensions [listed as column headings] indicating the source [rows]. Given the similarities of descriptions, some of the service quality dimensions are merged viz. appearance/aesthetics and availability/access.

TABLE 1: Studies that have identified common e-SQ Dimensions

	Appearance / Aesthetics	Availability / Access	Communication	Ease of Use	Reliability	Responsiveness	Security
Santos [2003]			X		X		X
Long and McMellon [2004]					X	X	
Yang and Jun [2002]		X		X	X		X
Yoo and Donthu [2001]	X			X			X
Ziethaml et al. [2001]	X	X			X	X	X
Zhilin et al. [2003]	X	X	X	X	X	X	X

Based on the literature review it is clear that reliability and security are the most the most commonly referred to dimension. These are followed by appearance/ aesthetics, availability/access, easy of use and responsiveness, followed by communication.

A more detailed explanation of how each of these dimensions impact the e-commerce environments follows:

Appearance/Aesthetics - Zhilin et al. [39], defines this dimension as the attractiveness of the web site.

This requires that the page layout is suitably user-friendly or "approachable" to encourage customers continue to purchase [7]. Its application in an online environment can be examined through graphics and images, pictures, animation, moving objects and zooming effects all interest customers and makes the web site not seem boring [26].

Availability/ Access - According to Cox and Dale [7], the availability dimension concerns the ability of the web site to inform customers of product availability in real time. It is also the ability to ensure that an e-commerce site continues to function as intended [27].

Communication - This means receiving "up-to-date information on orders and clear answers/instructions" from the business [39]. Keeping customers informed is something that can be achieved by communicating with them in a language they understand. This implies that there should be various language choices available on a web site. Furthermore, the availability of emails, telephone, fax and postal mail should also be available to customers when needed. Having clear instructions, sending a follow-up confirming order, sending a welcoming letter to new customers and having customer chat rooms are also important aspects that online customers look for [18]. Communication is provided through text, colour, graphics and animation and it is also used to describe service, feedback and customer confidence because of the link with informing and listening to the customer [67

Ease of use/Helpfulness - This is related to an easy-to-remember URL address, well-organized, well structured, easy-to-follow catalogues, site navigability, concise and understandable contents, terms and conditions available to help customers on a web site [39]. Customers expect help to be available when needed. For example, finding the right links for the products needed, help with filling in the ordering form, guidelines, clearly defined help pages, FAQs etc.

Reliability - Reliability is determined as consistency of performance and dependability, which is relevant to the web site design [7]. Reliability consists of two aspects, viz: the degree to which a customer is able to use the order process on the site easily and effectively as well as the degree to which the company is able to fulfil its promise and obligations to customers every time a purchase is made [34]. Reliability implies that if an online business promises to do something at a certain time they should do it at that promised time and it was also identified the most important dimension of all [18, 26]. In an online environment, there are many kinds of reliability such as search reliability, the reliability of payment gateway, reliable customer services, reliable delivery and reliable promises.

Responsiveness - Responsiveness is described as offering prompt delivery and overall service, a timely response from the company representative and quick solutions to problems [39]. Online customers expect the response to be quick and efficient when a problem occurs while they are online or even after receiving the ordered product(s). A business should be able to provide appropriate and accurate information to the customer when needed. It should also be able to provide mechanisms for handling returns and have guarantees by delivering their products in the agreed period.

Security - This dimension can be defined as "Freedom from Danger, Risk or doubt during the service process" [26]. Security is one of the main barriers to customer making purchases and a web site should indicate the extent to which it is secure e.g. handling of credit card details [7]. This will in turn give customers peace of mind knowing that all transactions will be dealt with in a safe and secure manner [39].

5. Implication of the e-service quality dimensions on the information systems function

In order to achieve satisfactory e-SQ levels, the Information Systems in an e-commerce environment must be designed and implemented in a manner that will achieve these levels. This is because the service delivery process in an e-commerce environment largely depends on how well the system has been designed to support these dimensions or elements. In the following section each of the seven e-SQ dimensions are discussed, within an IS context i.e. the implications of each of these dimensions on both IS design as well as management.

Appearance/Aesthetics - When a customer visits the web site for the first time, the interface is very important for first impression. Therefore Web site designers should use user-friendly background colours, avoid background that distort text or make it illegible, as well as distracting, obnoxious graphics and sounds that the user cannot control [16, 34]. Designers should furthermore, make sure that the use of frames is avoided at all costs. This is because good interface design will allow the user to accomplish a lot of tasks and to operate intuitively with ease of navigation [16]. In addition, the use of multimedia presentations can help improve the aesthetic features of the website and draw attention to potential customers [4]. The latter

should however take into account bandwidth limitations which customers may have.

Availability - It is the IS manager's responsibility to make sure that a quality hardware platform that will meet peak demand is chosen and implemented. Together with systems engineers, he should also create a cluster of computers to work in parallel and balance loads to avoid traffic. The use of mirrored hardware to operate as backups should be implemented as well as ensuring availability of unlimited power supply and stable reliable application software. He or she should make sure that the systems are supported by quality Internet Service Providers (ISPs) either by outsourcing or in-house, depending on the range of services and reasonable prices of the ISP and customer services that they offer. The system should have back up software and media with fully redundant hot standby and /or cold standby facilities. Antivirus software, firewalls, regular security audits and disaster recovery are further important factors that will ensure constant availability.

Communication - The IS manager will have to ensure that proper and efficient communication software are installed as well as databases to keep track of customer queries. Having accurate and reliable data integrity, will require personnel with database administration skills to be involved in the business on a day-to-day basis. Here again IS management will have to ensure that these responsibilities are assigned to the right people.

The website is also required to implement software language translators of various languages to ensure that customers will be able to view the web site in the language they prefer and are comfortable with. In South Africa, for example, sites already offer both English and Afrikaans pages.

Communication in an e-commerce environment can be enhanced through the use of chat rooms, email and automated response as well as help desks and call centres. According to Singh [28] online text chatting, provides real time communication between customers and suppliers, attracts new customers, increases customer loyalty and enhance relationships. He also suggests that the use of automated e-mail reply responses to customer inquiries are very efficient because they are developed using intelligent agents that recognizes keywords and quickly responds to common queries [28]. Other software that will also be of assistance is e-FrontOffice, for example, because it extends the functionality of call centres to email and web interaction into one product [28].

Ease of use/Helpfulness - To properly support this dimension, the web site could have frequently asked questions [FAQs] function to help them with common questions such as security risks, on-time delivery and return policies, pop help functionality, live text chat, co-browsing and page pushing implemented to provide customers with as much immediate help as possible [4]. According to Singh [28], self-service FAQ software and Web software is the simplest and least expensive tool to deal with repetitive customer questions. Software that supports the search process with key words, searches products or quickly locates a certain brand such as intelligent agents can also be implemented on the web site for the ease self help.

Reliability – The IS Manager must make a decision with regards to outsourcing the hosting of the site. Uptime of the web-site in an outsourced environment is generally not within the control of an IS manager. However not all businesses are in a position to host their own web-servers. Cai and Jun [4] recommended that to ensure timely and accurate service delivery, the online system should be able to integrate all the business' online and offline transactions which would help them deliver their service according to the promises made. Reliability could also mean that the web site is well designed, secure and provides online visitors with concise, clear and updated information about their products or services.

Responsiveness - The IS needs to be designed with processes which recognise and categorize orders and queries. Customers expect the same immediacy of service in an online environment, and therefore efficient processes must be supported which allow the relevant business functionaries to receive them quickly and to respond timeously to customers.

Orders also need to be processed as quickly as possible, and thus it is imperative that the system is able to respond to confirm orders and provide a clear indication of the total cost of purchase as well as other conditions of the sale. To support this dimension, data warehousing and data mining should be implemented because of their ability to handle complex queries and identify customer-shopping behaviours. This would allow the business to send customers information about products that they are interested in and therefore maintain their customer base. Again, it is recommended that the site implement frequently asked questions (FAQ) function, pop help functionality, live text chat, co-browsing and page pushing for immediate response [4].

Security - To ensure maximum security in an online environment, the system should install antivirus software, ICSA Certified firewall and regular security audits should be done and ensure that disaster recovery is put in place. Also the use of e-payment systems, digital cash, information security as well as ensuring secure transactions with data encryption and digital signatures will convince the customers of the online transaction safety.

6. Examining e-Service Quality implications in a generic e-commerce system configuration

Figure 3 is a representation of a generic IS configuration which comprises a typical e-Commerce business. The symbols 1 through to 6 in the diagram are used to highlight six critical areas of e-Commerce Information systems which impact on service quality. The web-interface is the customer's first point of contact with the business and as such it will have the most impact on service quality. This is well recognized in the current literature, with substantive research having been conducted into website design, usability of websites, and electronic service quality. However Figure 3 also highlights what is a common oversight in the e-service quality literature i.e. that e-service quality extends beyond the web interface.

Thus those aspects of the e-commerce IS identified in points 2 to 5 are equally important in ensuring e-service quality. This implies that all components of the e-commerce Information System should be service quality oriented in the way in which they are designed, deployed and managed. *Customer-centric e-commerce IS* are therefore of critical importance to the success of the e-Commerce business. The importance of an e-service quality oriented systems environment needs to be qualified. E-service quality in general, is a key issue especially for businesses that are located in a market in which there is a high degree of competition. Those businesses that have clearly formulated strategies in place to ensure that they meet or exceed their customers' expectations are those who would usually capture sufficient market share to remain profitable.

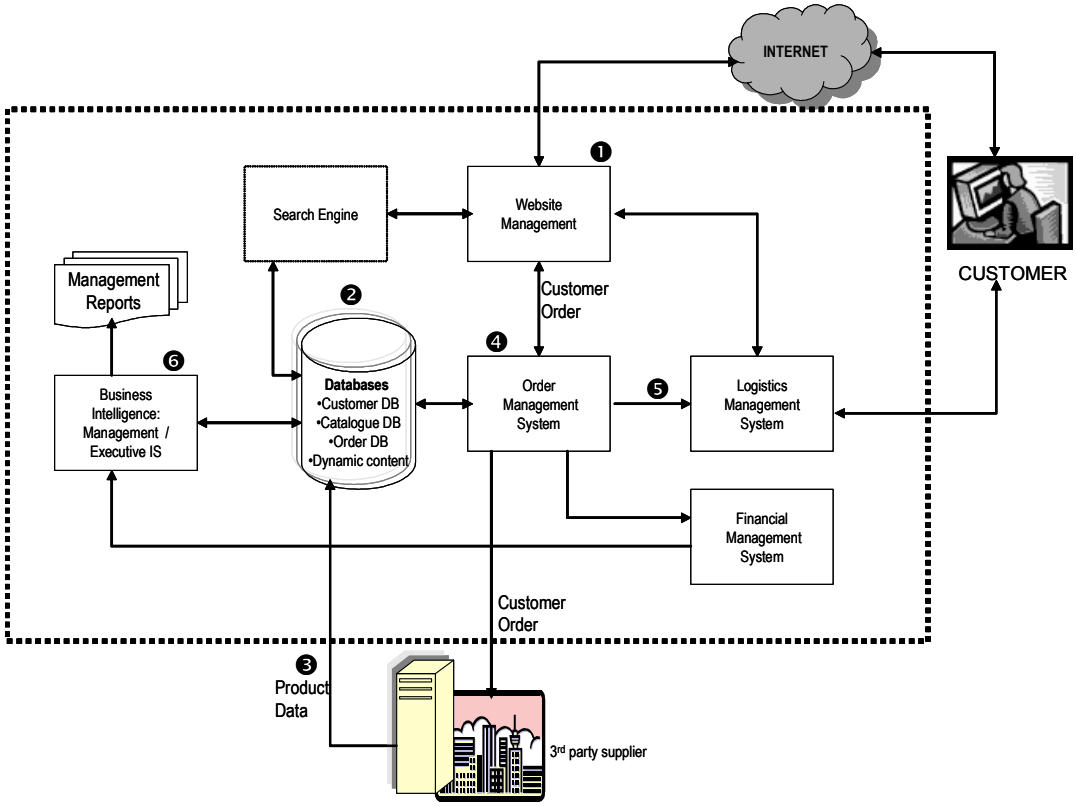

FIGURE 3 : Critical components of e-Commerce IS (numbered 1 to 6) which impact on e-service quality

7. Conclusion

In the e-Commerce domain, due to the pervasive nature of the web, e-service quality has become even more important since customers who are dissatisfied are able switch to another online company more easily if they are dissatisfied. Colby and Parasuraman, for example, argue strongly that those businesses "*who truly understand the desires and concerns of the growing base of e-customers will be the winners in this new era*" [6]. Thus the role of e-commerce systems in

facilitating the retention of customers is considerably more important than in brick and mortar businesses.

There are however exceptions to this as it may be possible in certain instances for an e-Commerce business to have low levels of service quality and yet still be profitable. For example if a business does not have any competitors, its customers' options are confined. In South Africa, the online wine retailer *Cybercellar* is one such example. Thus even the most uncaring companies could succeed if there is a sufficient demand for their product or service. In such cases, customers who have a need for a certain product will transact online with the company regardless of their perceptions of how well ECIS are used to meet their expectations of quality service.

In conclusion, this article has provided an extensive review on the extant literature around measuring Information Systems success and especially focused on service quality as a vehicle for measuring IS effectiveness. Various dimensions of service quality both in traditional and online environments and e-commerce in particular have been explored.

A prioritized list of service quality determinants was established. It was clear from the literature review, that reliability and security are the top priority dimensions of online service quality. These were followed by appearance/ aesthetics, availability/access, easy of use and responsiveness, and lastly communication.

Thereafter, these determinants were explored in terms of IS functions. Although this exploration entailed standard system development and management practice, the importance of the discussion is that an important inter-disciplinary link has been established between the marketing related service quality literature and that of the practice of IS design and management.

The issues explored in this paper highlight the need for IS functionaries to be mindful of the impact of the systems development practice on service quality. Without designing and managing e-commerce IS platforms with these issues in mind, will possibly result in e-commerce systems being ill-suited to achieving high service quality levels. The negative impact on customer satisfaction and ultimately profits, are obvious. By bringing these issues to the fore, an important starting point has been created in forging a closer alignment of the IS function and business within the e-Commerce environment.

8. Limitations

The objective of this paper is to stimulate debate on how IS and business could be more closely aligned within e-Commerce environments through fostering a service quality mindset. To this extent the objective has been achieved. However the review of the literature is not exhaustive and the synthesised set of service quality constructs presented may not be representative of all findings in this arena.

8. Implications for further research

Empirical data needs to be collected from amongst Information systems practitioners to verify how e-service quality dimensions impact on their functions. For this purpose a particular industry sector using e-Commerce in the Western Cape, South Africa will be targeted, in the next phase of this study.

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