

Evaluating Service Quality Dimensions within e-Commerce SMEs

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Abstract: With the continued growing investment in WWW technologies by e-Commerce businesses the measurement of Information Systems (IS) effectiveness in this business sector has become increasingly important over the last decade. As business users, especially in the SME sector, have become reliant on outsourced IS service providers for a wide range of services, the quality of service rendered by the latter is an important issue which impacts on IS effectiveness. Researchers have since the 1990s recognised the importance of service quality as a measure of IS performance. The literature suggests that IS service delivery to e-Commerce businesses needs to be evaluated differently to that of traditional brick-and-mortar businesses. There is however a paucity of research regarding IS evaluation in e-Commerce environments, including that of the application of service quality principles. It is thus difficult for managers of IS service providers in this context to develop a complete picture of the effectiveness of the IS they deliver.

This paper reports on a study which investigated whether IS service quality criteria and dimensions applied in large brick-and-mortar organisations, are also applicable to SME e-Commerce businesses in the tourism sector in South Africa. In pursuit of this objective an IS-adapted SERVQUAL instrument was tested in an e-Commerce SME environment. The research results indicate that, although SERVQUAL principles are applicable to the e-Commerce SME context, the service quality dimensionality is different. The research derived four new dimensions for service quality expectations of e-Commerce SMEs viz., Credibility, Expertise, Availability and Supportiveness. A fifth dimension is the Tangibles dimension, which is retained from SERVQUAL. Furthermore the results indicate that the Credibility dimension was the most important dimension in this research context, while the Tangibles dimension was the least important.

Keywords: information systems, evaluation, e-commerce, WWW, service-quality, SME, SERVQUAL, IS outsourcing

1. Introduction

Over the past 25 to 30 years researchers have developed several approaches to evaluating Information Systems (IS) effectiveness, e.g. IS usage, user information satisfaction (UIS), quality of decision-making, productivity from cost/benefit analysis, and system quality (Pather *et al.* 2004). Since the 1990s IS researchers introduced a new perspective to IS effectiveness measurement, namely *Service Quality*. The latter has subsequently been recognised as an important performance metric in the delivery of IS (Pitt *et al.*, 1995; DeLone & McLean, 2003; Kettinger & Lee, 2005).

However, IS research in the area of service quality, has focused mainly on traditional brick-and-mortar organisations in which there is usually an in-house IS department or function. Many authors have empirically researched IS service quality as a measure of the performance of this function (e.g. Pitt *et al.*, 1995; Van Dyke *et al.*, 1997; Pitt *et al.*, 1997; Kettinger & Lee, 1997; Watson *et al.*, 1998; Kang & Bradley, 2002; Jiang *et al.*, 2002; Bharati & Berg, 2003). However, an IS literature search revealed no such studies in an e-Commerce context¹. That is, no empirical research could be found which investigates the performance of IS service providers when servicing e-Commerce businesses. This concern has been substantiated

Studies in the e-Commerce environment have focused mainly on the service link between the e-Commerce business and its end-customers, i.e. website users. Furthermore, Small and Medium Enterprises (SMEs) generally outsource their IS functions in order to access the necessary IS expertise (Al-Qirim & Bathula, 2002) which are generally not available within the business. Thus external IS service providers are usually employed by these SMEs. The high reliance of these SMEs on outsourced IS service providers for the support of business critical systems implies that their service expectations could be different from those in a large brick-and-mortar organisation. Furthermore, IS service quality expectations of business units within a large organisation are influenced by issues such as corporate culture and standardised service levels agreements. However there are no such influences when an IS provider has a diverse number of SME clients, each with individualised expectations of service quality. Consequently, IS providers should be enabled with a firm understanding of service expectations of their clients in the SME e-Commerce businesses environment.

¹ This concern is also substantiated by DeLone & McLean (2004), Pather *et al.* (2004) and Hong & Zhu (2006).

In light of the foregoing, the research reported on in this paper examines the IS service quality expectations of SME e-Commerce businesses i.e. the clients of IS service providers. The main research objective was to investigate and determine service quality dimensions for this business environment. The principle research question of the study was: *What are the Service Quality dimensions for the evaluation of service expectations of e-Commerce SMEs?*

2. Literature review

2.1 The e-Commerce SME research context

The case for the research question has been made by a combination of issues raised in different studies. Firstly, Molla and Licker (2001) argue that further research is required to investigate whether IS effectiveness measurement in the e-Commerce context, should be approached differently to that of traditional IS. Secondly, the literature also suggests that the application of e-Commerce in small businesses is different from that of large businesses (Lui & Arnett, 2000; Stansfield & Grant, 2003). Although the principles of e-Commerce trading are the same regardless of the size of the business, differences arise especially with regards to how IS are managed. In-house IT units in large businesses are generally able to support and manage IS, but this is not the case for many medium, and almost all small and micro enterprises. According to Rohde (2004), SMEs also generally outsource their IS functions to external IS service providers. Consequently, the level of service quality delivered by these service providers is considered a critical success factor for SMEs (Kim *et al.*, 2003). Together, all these factors suggest that empirical research of IS service quality in the context of e-Commerce SMEs, would be a useful contribution to the IS effectiveness research field.

2.2 IS effectiveness research

The measurement of IS effectiveness has been widely discussed in the IS literature, and has been a long-standing concern for both academics and IS practitioners (Grover *et al.*, 1996). IS effectiveness can be defined as the extent to which a system achieves the goals for which it was designed (Lui & Arnett, 2000). However, in today's competitive world, IS are also expected to contribute to achieving the organisation's mission, improve productivity and facilitate service delivery (Elpez & Fink, 2006).

Researchers have had difficulty finding appropriate metrics to measure IS effectiveness (Pather *et al.*, 2004), and many researchers have resorted to surrogate measures (Elpez & Fink, 2006). From the multitude of IS effectiveness measures, Grover *et al.* (1996) identified some of the more prominent measures used in the literature, viz., IS usage, user information satisfaction, quality of decision making, productivity from cost-benefit analysis, and system quality.

DeLone and McLean (1992) developed a framework for classifying the multitude of effectiveness measures into six categories. They called this framework the DeLone and McLean (D&M) IS success model (Figure 1). DeLone and McLean's research brought about some structure to IS effectiveness research (Seddon & Kiew, 1996).

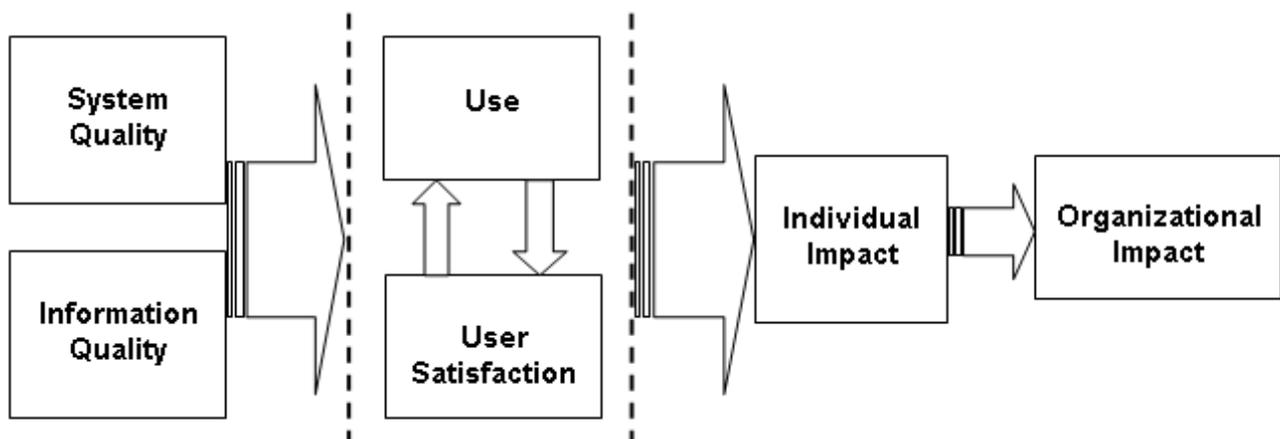


Figure 1: D&M IS Success Model (Source: DeLone & McLean, 1992)

Ten years after the publication of their original IS Success Model, DeLone and McLean (2003) reviewed more than 100 journal articles dealing with IS success measurement. They subsequently revised their model, producing the “Updated DeLone and McLean IS Success Model” (Figure 2). Some of the revisions to the original model were based on suggestions and re-specifications from other researchers in the field.

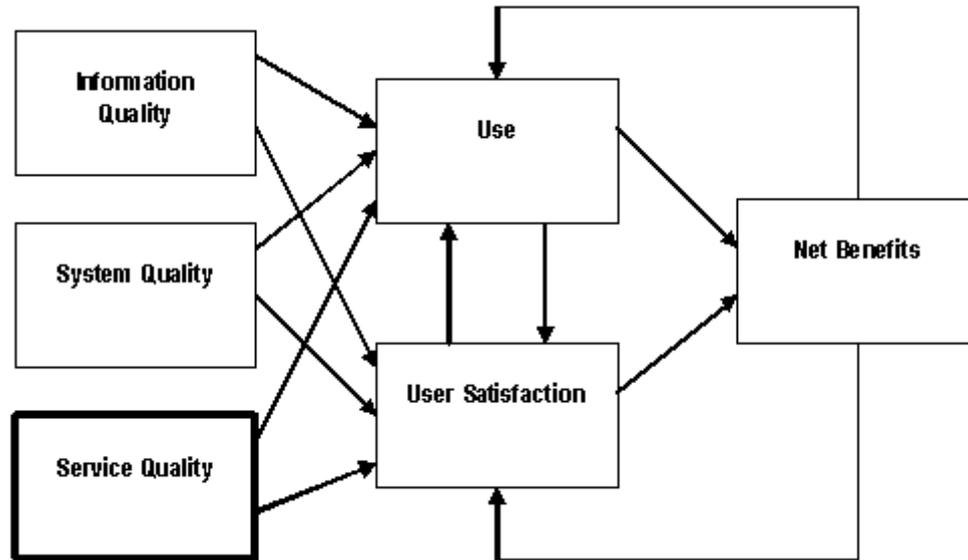


Figure 2: Updated D&M IS success model (Source: DeLone & McLean, 2003)

Importantly, amongst various amendments to the IS success model in 2003, was the introduction of a service perspective. IS effectiveness researchers up to the mid 1990s have shown bias towards a product perspective of evaluating effectiveness, while ignoring the service-based perspective (Whyte & Bytheway, 1996; Lomerson & Tuten, 2005). One exception was the study conducted by Pitt *et al.* (1995), whose research was the basis for DeLone and McLean (2003) adding the *Service Quality* measure to their updated model (Figure 2). Pitt *et al.* (1995) believed that the prominence of the service-based dimension had increased since the advent of the personal computer (PC). They assert that the PC had resulted in more IS users interacting with the IS department more often. Wilkin *et al.* (2001) offered two ways of interpreting how service applies to the IS function. Firstly, an IS can be seen to be more than just a technical product, it can also generate value from its “capacity to serve the needs of its end-users/stakeholders” (Wilkin *et al.*, 2001:113). Thus the whole system provides service to the stakeholders by serving their needs and providing pertinent information.

The second view of service deals with the service or support delivered by the IS department or external service providers. Examples of support tasks that IS users expect the IS department to assist them with included hardware and software selection, installations, problem resolution, connection to LANs, systems development and software education (Pitt *et al.*, 1995).

2.3 Service quality as an IS performance measure

The foundation of Service quality research in the IS literature is rooted in the work conducted by researchers in the marketing field. In the marketing literature the authors Parasuraman, Zeithaml and Berry (1985, 1988, 1991, 1993, 1994a, 1994b) have been particularly influential. These authors developed a measuring instrument called SERVQUAL, to measure service quality from the customers’ perspective. The SERVQUAL scale comprises of five service quality dimensions (Table 1) and 22 items.

Table 1: SERVQUAL dimensions (Adapted from Parasuraman *et al.*, 1988)

Dimension	Dimension Meaning and Attributes
Reliability	Ability to perform the promised service dependably and accurately
Responsiveness	Willingness to help customers and provide prompt service.
Assurance	Knowledge and courtesy of employees and their ability to inspire trust and confidence.
Empathy	Caring, individualised attention the firm provides its customers.
Tangibles	Physical facilities, equipment, and appearance of personnel.

Although SERVQUAL had its detractors (e.g. Cronin & Taylor, 1994)², Parasuraman *et al.* (1988:31) believed that the SERVQUAL instrument could be “*adapted or supplemented to fit the characteristics or specific research needs of a particular organisation*”.

Pather *et al.* (2004), having conducted an extensive literature review in this area, found that Kim (1990) was one of the first IS researchers to introduce the service quality perspective to IS user satisfaction research. The appropriateness of the SERVQUAL instrument for the IS domain was subsequently researched by authors interested in measuring user satisfaction of the IS department. Watson *et al.* (1993) proposed that the SERVQUAL scale be adapted to measure IS service quality as a surrogate measure for user satisfaction. Pitt *et al.* (1995) subsequently tested the use of the SERVQUAL scale empirically across three IS organisational types. They concluded that the “*study provides evidence that practitioners can, with considerable confidence, use SERVQUAL as a measure of IS success*” (Pitt *et al.*, 1995:182).

However, Van Dyke *et al.* (1997) challenged the assessment of Pitt *et al.* (1995), and questioned the validity and usefulness of SERVQUAL in the IS domain. In response to this critique, Pitt *et al.* (1997) criticised Van Dyke *et al.* (1997) for using arguments without empirical backing and for not offering viable alternatives. They re-iterated that the developers of SERVQUAL used rigorous empirical research in their development of the model

Kettinger and Lee (1997) in extending the debate agreed with the counter-arguments of Pitt *et al.* (1997). Kettinger and Lee (1997) adapted the 22-item SERVQUAL instrument for the IS environment, to reflect IS specific issues such as software, hardware and computer technology. After empirically testing the adapted scale in the IS domain, the authors used factor analysis techniques which resulted in a condensed 13-item scale called IS-SERVQUAL which omitted 9 of the original SERVQUAL items and had only four dimensions (the original *Tangibles* dimension was omitted). This derived scale was subsequently used in other IS service quality studies such as Kang and Bradley (2002) and Park and Kim (2005).

The concept of the “zone of tolerance” (ZOT) (Parasuraman *et al.*, 1994b), was another service-quality concept that captured the attention of IS researchers. The ZOT is a concept which allows for the multi-level nature of the user expectation measure. It provides for the measurement of the difference in user expectation between what the user considers an adequate level and that of a desired level of service. In a recent paper Kettinger and Lee (2005) again used the IS-adapted 22-item SERVQUAL scale to empirically test the ZOT concept in the IS domain. This time they derived an 18 Item scale across four dimensions. Unlike their previous findings (Kettinger and Lee, 1997) the *Tangibles* dimension was retained, and the *Assurance* and *Empathy* dimensions merged to form a new dimension which the authors labelled “*Rapport*”. Thus the dimensions for the derived 18-item scale, which the authors called IS-ZOT-SERVQUAL, are Reliability, Responsiveness, Rapport and Tangibles. However, both the Kettinger and Lee (1997, 2005) studies were conducted in the context of large brick-and-mortar organisations.

The foregoing review supports the assertions in the introduction of this paper regarding the dominance of IS service quality studies within large organisations only. In the next section, the research design and methods are discussed. In particular, we describe the use of a survey design, the delineation of the research population, and the statistical procedures that were applied to analyse the data.

3. Research design and methodology

Following on studies such as Kang and Bradley (2002), Kettinger and Lee (1997, 2005), Pitt *et al.* (1995) and Watson *et al.* (1998), the empirical work for this study was conducted using survey design principles.

The main section of the survey questionnaire consisted of the IS-adapted SERVQUAL questions that Kettinger and Lee used in their study (Kettinger & Lee, 2005). Kettinger and Lee’s adaptation entailed rewording of the 22 items³ to reflect the IS environment. These scale items were then reformatted for the current research, to focus only on the expectations of the clients of IS service providers i.e. e-Commerce

² Cronin and Taylor (1994) critiqued the use of the SERVQUAL “*perception-minus-expectations*” (P-E) measure in favour of a “*perception-only*” measure. They called their perception-only measuring instrument SERVPERF. Parasuraman *et al.* (1994a) refuted many of these concerns, and defended the managerial diagnostic capability of SERVQUAL over SERVPERF.

³ In their 2005 study, Kettinger and Lee tested the 22-item SERVQUAL scale by adapting the wording for the IS environment. We have used this IS-adapted 22-item scale in this study.

SME managers. Additionally an open-ended question was included in the survey instrument to draw possible inferences about any additional service quality expectations in the research context.

3.1 Research population

The first consideration in choosing the research population was that homogeneous data from the same sector was needed, so that data from different respondents would be comparable. It would thus also be unproblematic to aggregate the data for statistical analysis.

The tourism sector was selected because of the vast number of SMEs in this sector in South Africa (Warden & Williams, 2003). The tourism sector was also well suited to the application of e-Commerce and was an early adopter of e-Commerce in this country (Wynne & Berthon, 2001).

As this research focused on the service requirements of e-Commerce enabled businesses, the research population chosen for this study, from within the tourism sector, was e-Commerce enabled bed-and-breakfast and self-catering accommodation businesses in the Western Cape⁴. An *e-Commerce enabled business*, for the purposes of this study, was defined as a business that was on an adoption level of 2 or higher on the Subba Rao and Metts (2003) e-Commerce adoption stage model (refer to Table 2).

Table 2: Subba Rao and Metts (2003) e-Commerce adoption stage model levels

Adoption Stage Level	Stage Characteristics
1. Presence	Web Content; Window to the Web; No Integration; E-mail
2. Portals	Profiles; two-way Communication; E-mail; Order Placing; Cookies; No payment Transactions
3. Transactions Integration	B2B/B2C; Communities; E-Marketplaces; Auctions; 3rd Party E-Marketplaces; Low level Collaboration; Payment Transactions
4. Enterprises Integration	E2E; Full Integration; E-Business; E-commerce + CRM + SCM; Value Chain Integration; High level Collaboration

In summary, the criteria for eligibility to participate in the survey were that the business had to be:

- A bed-and-breakfast or self-catering accommodation business;
- Based in the Western Cape, South Africa;
- An SME; and
- At a minimum level 2 on the adoption model of Subba Rao and Metts (2003).

3.2 The survey

The *Capestay* website (<http://www.capestay.co.za>) which is a comprehensive directory for all types of accommodation in the Western Cape was used as a basis for random sampling. This website featured category listings which allowed for the separate listings of the bed-and-breakfast and self-catering businesses. The website hosts a dedicated homepage for each listing, which provides detailed information about the establishment, as well as an online booking facility. This implied that the businesses listed would be on a minimum of Level 2 (Portals Stage) on the Subba Rao and Metts (2003) e-Commerce adoption stage model. The listings on this directory website thus provided a representative list from which to select a sample for the research.

The www.capestay.co.za directory website had 1177 unique contact email addresses for bed-and-breakfast and self-catering accommodation establishments based in a wide geographic spectrum of the Western Cape region. The survey questionnaire accompanied by a cover letter was emailed to the listed 1177 email addresses. Only 48 responses were received. This is a response rate of only 4%, which although was lower than expected⁵, is a trend corroborated by Sheehan (2001) for email surveys.

3.3 Methodology

The survey instrument, based on the IS-adapted SERVQUAL instrument, used the same dimensions and items which had been applied in the context of large brick-and-mortar businesses in other studies. The validity of these dimensions and respective items for the research context (e-Commerce SMEs) was statistically tested using Exploratory Factor Analysis and re-affirmed using Confirmatory Factor Analysis.

⁴ The Western Cape is one of nine provinces in the Republic of South Africa.

⁵ Previous experience with the micro business sector in this region indicated that owners and managers were generally not very responsive to surveys.

The survey respondents were asked to rate the importance of individual service quality items taking into account their relationship with IS service providers. The objective was to assess the respondents' service quality expectations. The mean values of all the item responses per dimension were then used to rank the service quality dimensions. Thereafter EFA was used to statistically conclude if any service quality items should be eliminated and/or if the service dimensionality needed to be adapted for the research context.

4. Data analysis

The statistical data analysis for this research followed an approach similar to the approach used by Kettinger and Lee (2005). The analysis was undertaken as follows:

1. Perform an Exploratory Factor Analysis (EFA), using Principal Component Analysis, to ascertain if there are new or different service quality dimensions in this research context. This essentially entails eliminating low-scoring instrument items and regrouping others.
2. Perform a Confirmatory Factor Analysis (CFA) on the adapted survey instrument to re-affirm the results of the EFA.
3. Assess the validity and reliability of the adapted instrument, using Cronbach alpha and the results of the CFA.

The results of the foregoing are reported on in the following sections.

4.1 Exploratory factor analysis

EFA using a Principal Component Analysis (PCA) extraction method, is used "*to derive the minimum number of factors that account for the maximum portion of the total variance in an exploratory manner*" (Kettinger & Lee, 2005:612). An exploratory approach, similar to the approach used by Kettinger and Lee (2005), was also used in the current research. The following factor selection criteria was used in the EFA:

1. The use of Oblique rotation i.e. using Oblimin Rotation Method;
2. Factor loading should be greater than or equal to 0.5;
3. No multiple loadings are allowed i.e. no items (rows) with multiple factor loadings greater or equal to 0.5;
4. No single loadings i.e. no factors (columns) having only one high loading item.

Items not fulfilling the selection criteria were eliminated, as indicated by a strikethrough line in Table 3. A bold font with shading indicates the highest factor loading for each of the remaining items in Table 3.

Table 3: Exploratory factor analysis

	Component				
	1	2	3	4	5
Relia1 provides you with services as promised?	.426	.743	-.055	.156	-.453
Relia2 is dependable in handling your service problems?	.028	.639	.141	.175	-.116
Relia3 performs services right the first time?	.223	.500	.194	.304	-.732
Relia4 provides you with services at the promised time?	.280	.582	-.028	-.656	-.616
Relia5 provides you with reliable technology and systems?	.276	.161	.229	.647	-.134
Resp1 keeps you informed about when service will be made?	.377	.136	.224	.182	-.719
Resp2 delivers prompt service to you?	.312	.037	.290	.123	-.838
Resp3 has the willingness to help you?	.429	.661	.137	.397	-.595
Resp4 has the readiness to respond to your requests?	.796	.134	.273	.290	-.342
A1 has staff that instills confidence in you?	.870	.112	.319	.650	-.222
A2 makes you feel safer in computer transactions?	.673	-.032	.301	.728	-.479
A3 has staff that is consistently courteous?	.842	.148	.452	.440	-.366
A4 has staff that has the knowledge to answer your questions?	.549	.674	.155	.349	-.164
E1 gives you individual attention?	.882	.179	.191	.235	-.200
E2 has staff that deal with you in a caring fashion?	.873	.043	.406	.458	-.421
E3 has your best interest at heart?	.719	-.278	.288	.640	-.264
E4 has staff that understands your service needs?	.286	.115	.154	.912	-.220
E5 has convenient business hours?	.039	.053	.216	.253	-.650
T1 has up to date technology?	.426	-.336	.248	.312	-.327
T2 has visually appealing premises and facilities?	.220	.022	.894	.116	-.237
T3 has staff who appear professional?	.426	-.036	.832	.192	-.150
T4 has useful support materials (such as documentation, training, videos, etc.)?	.140	.151	.794	.415	-.471

Extraction Method: Principal Component Analysis.
 Rotation Method: Oblimin with Kaiser Normalization.

4.2 Regrouping of instrument items

As indicated in Table 3, eight items were eliminated, with all five dimensions being affected. After regrouping the remaining 14 items according to the highest factor loading, only one of the original SERVQUAL dimensions emerged from the Principal Component Analysis i.e. Tangibles as Component 3 in Table 3. Components 1, 4 and 5 had a mixture of items while Component 2 had only two of the original Reliability items. Table 4 summarises these item groupings

Table 4: Item regrouping

COMPONENT 1 = Supportiveness
Resp4 has the readiness to respond to your requests? A3 has staff that is consistently courteous? E1 gives you individual attention? E2 has staff that deal with you in a caring fashion?
COMPONENT 2 = Credibility
Relia1 provides you with services as promised? Relia2 is dependable in handling your service problems?
COMPONENT 3 = Tangibles
T2 has visually appealing premises and facilities? T3 has staff who appear professional? T4 has useful support materials (such as documentation, training, videos, etc.)?
COMPONENT 4 = Expertise
Relia5 provides you with reliable technology and systems? E4 has staff that understands your service needs?
COMPONENT 5 = Availability
Resp1 keeps you informed about when service will be made? Resp2 delivers prompt service to you? E5 has convenient business hours?

The derived dimensions shown in Table 4 contained a mixture of items from the original set of five dimensions in the IS-adapted SERVQUAL scale. These derived dimensions were then relabelled. The labels were intuitively chosen based on the criteria that the grouped items represented, i.e. each group of data was labelled based on the imagery of meaning they evoked when examined comparatively and in context (See Strauss & Corbin, 1998:105 for a more detailed explanation of labelling or coding textual data).⁶ The research by Wilkin and Castleman (2003) also helped guide the formulation of appropriate labels for the derived dimensions, viz., Expertise, Credibility, Availability, and Supportiveness. The rationale for these labels are as follows:

Component 1 had a mixture of Responsiveness, Assurance and Empathy items. These items related to the supportive interaction and communication between the service provider and its customer. An appropriate dimension label was **Supportiveness** to frame the supportive service quality aspects of the service provider towards its customers.

Component 2 contained only items from the original Reliability dimension. However, one other Reliability item had moved to Component 4. The remaining two items dealt with issues of service provider credibility regarding keeping service promises and handling service problems. An appropriate dimension label to frame these items was **Credibility**.

Component 3 contained only items from the original Tangibles dimension. Although one of the original Tangibles items was omitted, the remaining items were still best framed by the **Tangibles** dimension label, which focused on appearances and support materials. Thus this dimension label was retained.

Component 4 had a mixture of Reliability and Empathy items. These items related to the capability of the service provider to deliver reliable technology and systems that fulfil the customer needs. An appropriate dimension label for these items was **Expertise**, framing the ability of the service provider to provide the required systems.

Component 5 had a mixture of Responsiveness and Empathy items. These items related to the timely delivery of service. An appropriate dimension label was **Availability** to frame issues dealing with duration and promptness of service.

⁶ A similar approach was followed by Kettinger and Lee (2005). One of the derived dimensions in their research had a mixture of Empathy and Assurance items. This derived dimension was then relabelled "Rapport" by the authors because "the construct items focus on an IS service provider's ability to convey a rapport of knowledgeable, caring, and courteous support" (Kettinger & Lee, 2005:612).

4.3 Confirmatory factor analysis (CFA)

The next step in the data analysis was to perform a CFA on the data. A CFA using a Principal Axis Factoring extraction method was performed on the newly derived 14-item instrument. This was performed to confirm the dimensionality of this instrument (refer to Table 4). However, unlike Kettinger and Lee (2005), who used a second set of sample data (holdout sample) to confirm the dimensionality, this research used the same set of collected research data since the total number of usable responses were relatively small. The process followed in this research was therefore not as refined as the approach used by Kettinger and Lee (2005) and is noted as a limitation. The results of the CFA are presented in Table 5.

Table 5: Confirmatory factor analysis

		Factor				
		1	2	3	4	5
SUPPORTIVENESS	Resp4 has the readiness to respond to your requests?	.797	.291	.138	-.272	.300
	A3 has staff that is consistently courteous?	.871	.456	.095	-.413	.486
	E1 gives you individual attention?	.826	.176	.150	-.303	.248
	E2 has staff that deal with you in a caring fashion?	.839	.405	.063	-.512	.491
TANGIBLE	T2 has visually appealing premises and facilities?	.240	.808	.038	-.328	.197
	T3 has staff who appear professional?	.400	.779	-.037	-.176	.237
	T4 has useful support materials (such as documentation, training, videos, etc.)?	.161	.746	.282	-.513	.448
CREDIBILITY	Relia1 provides you with services as promised?	.445	-.032	.469	-.419	.134
	Relia2 is dependable in handling your service problems?	.091	.056	.875	-.122	.094
AVAILABILITY	Resp1 keeps you informed about when service will be made?	.344	.204	.159	-.835	.203
	Resp2 delivers prompt service to you?	.331	.314	.102	-.645	.156
	E5 has convenient business hours?	.122	.195	.138	-.499	.273
EXPERTISE	Relia5 provides you with reliable technology and systems?	.263	.201	.010	-.192	.485
	E4 has staff that understands your service needs?	.247	.159	.144	-.205	.826

Extraction Method: Principal Axis Factoring.

Rotation Method: Oblimin with Kaiser Normalization.

Garson (2007) defines a rule-of-thumb for factor loadings values to be *weak* if the value is less than 0.4, *strong* if it is more than 0.6, otherwise it is *moderate*. Applying this rule-of-thumb to Table 5, three of the factor loadings are considered *moderate* and 11 are considered *strong*. The results of the Confirmatory Factor Analysis thus appear to confirm the derived dimensions of the EFA in Table 3.

4.4 Validity and reliability of the derived instrument

Instrument validity entails verifying that the constructs measured by the instrument are real and reliable, and that the instrument is measuring the right content (Straub *et al.*, 2004). *Content validity* is defined by Straub *et al.* (2004) as the indication of whether the instrument is a true representation of all the ways that could be used to measure the content of the given construct. These authors assert that content validity is established

through literature reviews and expert judges or panels. The items used in this survey instrument were based on SERVQUAL items originally tested for applicability in the IS domain by Pitt *et al.* (1995). Therefore the rationalization used in Pitt *et al.* (1995) to argue the Content Validity of the measuring instrument also applies to this research.

Straub *et al.* (2004) posit that the two main components of *Construct Validity*, viz., *convergent Validity* and *discriminant validity*, can be deduced from the CFA results. The “strong” factor loadings indicate good convergent validity, because the items converge strongly to the derived dimensions. Also discriminant validity can be deduced because the factor loadings indicate that the items do not overlap across different dimensions.

Reliability is an evaluation of the measurement of accuracy of the instrument and can be viewed as the extent to which the respondent can answer the same questions or close approximations the same way each time (Straub, 1989).

A Cronbach alpha measurement can be used to determine reliability of a measurement instrument (Straub, 1989). A Cronbach alpha measurement of 0.7 and greater is considered reliable (Straub *et al.* 2004). The Cronbach alpha measurement for the derived instrument was calculated at **0.837** thus indicating good reliability.

4.5 Relative importance of the derived dimensions

The mean of the survey responses (rated 1 to 5, with 5 being most important) for each survey item, was used to deduce the importance ranking of the specific item i.e. the item with the highest mean value was regarded as the most important. The average score for each item of the derived factors (see Table 4) are tabulated in Table 6. The mean of all items that comprised each of the factors was then calculated. These mean values are indicated by a bold shaded font in Table 6.

Table 6: Mean values for regrouped items

FACTOR	Mean per item	Mean for Factor
FACTOR 1 = Supportiveness		
Resp4 has the readiness to respond to your requests?	4.69	4.25
A3 has staff that is consistently courteous?	4.00	
E1 gives you individual attention?	4.35	
E2 has staff that deal with you in a caring fashion?	3.96	
FACTOR 2 = Credibility		
Relia1 provides you with services as promised?	4.92	4.86
Relia2 is dependable in handling your service problems?	4.79	
FACTOR 3 = Tangibles		
T2 has visually appealing premises and facilities?	2.15	2.83
T3 has staff who appear professional?	3.29	
T4 has useful support materials (such as documentation, training, videos, etc.)?	3.04	
FACTOR 4 = Expertise		
Relia5 provides you with reliable technology and systems?	4.81	4.74
E4 has staff that understands your service needs?	4.67	
FACTOR 5 = Availability		
Resp1 keeps you informed about when service will be made?	4.56	4.58
Resp2 delivers prompt service to you?	4.75	
E5 has convenient business hours?	4.42	

The results in Table 6 were used to deduce the relative importance of the derived dimensions in the research context. The ranking of the service quality dimensions in the research context was as follows:

1st – Credibility

- 2nd – Expertise
 3rd – Availability
 4th – Supportiveness
 5th – Tangibles

5. Analysis of responses to the open-ended question

In this the last part of the data analysis section, the responses to the open-end question in the survey instrument are analysed i.e.

How can your e-Commerce service providers better assist or support your business to benefit from e-Commerce?

The verbatim responses are included in the Appendix.

In taking an interpretive approach (Klein & Myers, 1999) the text was analysed for both literal and underlying meaning. However, no conclusions from the responses could be made on whether additional service quality dimensions are applicable to the research context. However, the responses seem to support the derived dimensions of service quality in the e-Commerce SME context. The impacted dimensions for each of the verbatim responses are also included in the Appendix. A summary of the results of the number of responses impacting on these dimensions are displayed in Table 7.

Table 7: Service Quality (SQ) dimension impacts of the responses to open-ended question

SQ Dimension	No. of responses impacting on the SQ dimensions
Credibility	11
Expertise	11
Availability	5
Supportiveness	4
Tangibles	2

The results in Table 7 thus appear to confirm the results of the importance ranking of the derived dimensions in the previous section.

6. Data interpretation

The EFA results indicate that all the SERVQUAL items are not needed in the research context i.e. bed-and-breakfast and self-catering accommodation eCommerce SME's in the tourism sector. Eight items were consequently omitted. These items are not necessarily unimportant, but the results suggest that these are not required in the measurement of service quality expectations in the business environment studied. The remaining items are sufficient for gathering data about the relative importance of the derived service quality dimensions. The derived dimensions, viz., Credibility, Expertise, Availability, Supportiveness and Tangibles, indicate the expected service quality focus in the research context.

An explanation of the meaning and attributes of these dimensions are tabulated in Table 8.

Table 8: Meaning and Attributes of the Derived Service Quality Dimensions

Derived Dimension	Meaning and Attributes of the Derived Dimension
Credibility	The service provider should be credible in maintaining its service promises and delivering the exact system requirements as agreed with the client. The service provider should also be dependable when handling service problems after system installation.
Expertise	The service provider should have the expertise to deliver reliable systems and know-how to its clients. The service provider should also have the ability to understand the service needs of the client, and how to fulfil those needs.
Availability	The service provider should be available when service is required, and should respond promptly to service requests. The service provider should also be able to inform the client about time, duration and status of service requests.
Supportiveness	The service provider should have the readiness to help clients in a caring and supportive manner.
Tangibles	The service provider should have visually appealing premises, staff that appear professional, and supply useful support materials.

Figure 3 illustrates the change of service quality dimensionality for the specific business environment studied. The Tangibles dimension label was retained from SERVQUAL, although one of its original items was omitted. The remaining items were still best framed by this label. The other SERVQUAL dimension labels, viz., Reliability, Responsiveness, Assurance and Empathy, were replaced by Credibility, Availability, Expertise and Supportiveness.

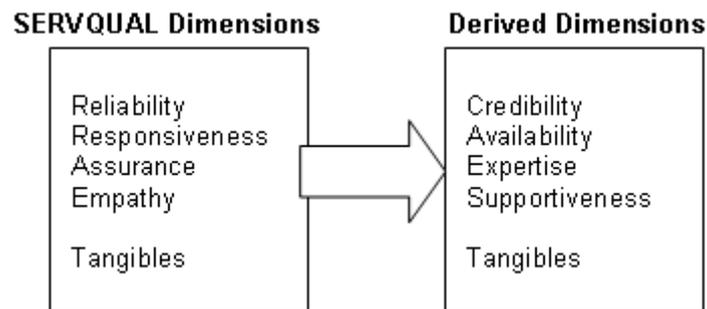


Figure 3: Change of service quality dimensions for research context

7. Conclusion

The objective of this study was to investigate the application of an IS-adapted SERVQUAL instrument in the SME e-Commerce sector. Evidence has been provided that in the SME sector chosen for this study, service quality expectations differ from that of larger corporate organisational settings. The results of the study have yielded a validated instrument with a new set of service-quality dimensions. The dimension differences between the e-Commerce and brick-and-mortar contexts could be due to issues of trust and uncertainty in an environment that relies on outsourced IS service providers. Additionally issues related to the separation of human contact and required technology expertise could also have an influence. These issues are expanded on in the framing of each of the new service quality dimensions that follows.

Credibility was identified as being the most important service quality dimension. The criteria for this dimension entail that the IS service provider be credible in maintaining its service promises and delivering the exact system requirements as agreed with the client. The service provider should also be dependable when handling service problems after system installation. This could be as a result of the technical dependence that the SMEs have on their IS service providers. The high ranking of this dimension could also be related to uncertainty of the security and reliability of the online environment, especially after the “dot-com” crash (Razi *et al.*, 2004). Thus IS service providers need to instil confidence in their e-Commerce SME clients. One of the implications of this is that they should refrain from making service promises that they know will be difficult to honour. This also has a bearing on the extent to which SMEs successfully adopt e-Commerce, since they can only be expected to embrace the technology if service providers are perceived to be credible.

Expertise was identified as the second most important service quality dimension. The criteria for this dimension suggest that the IS service provider is expected to have the expertise to deliver reliable systems and technical know-how to its clients. This dimension also incorporates the service provider’s ability to understand the service needs of the client, and how to go about fulfilling those needs, and is possibly related to the SMEs technical dependence on IS service providers. Barnes *et al.* (2004) report that outsourcing IS expertise was one of the problems during the “dot-com” crash. They assert that this was a weakness in e-Commerce businesses with respect to initial technology choices and on-going management and development. The lack of technical expertise by the SMEs could place additional requirements on the service provider in solving service problems. The service provider would need to have the expertise to also get to the root cause of service problems without technical advice from the client. It is very important that the IS service providers consistently provide a high level of expertise, and in so doing allow the e-Commerce SMEs to concentrate on their core business activities.

The third ranked service quality dimension is *Availability*. The criteria for this dimension suggest that the IS service provider be available when service is required, and respond promptly to service requests. The service provider should also be able to inform the client about time, duration and status of service requests. The online environment places large importance on availability of Internet technologies. System downtime could mean revenue loss for the e-Commerce SME. These businesses firstly require reliable systems that seldom fail. But if the systems do fail, they expect prompt service and reparations. The businesses expect

the service providers to be available when there are system failures, and to have the processes and infrastructure in place to keep them updated on reparation progress.

The fourth ranked service quality dimension is *Supportiveness*. The criteria for this dimension underscore the willingness of the IS service provider to assist clients with a caring and supportive disposition. This dimension underscores the need for service providers to be able to empathise with the IS related problems that underlie business problems confronting managers. IS service providers are evaluated by clients based on mutual interests, shared approaches to problem solving, and a compatible management culture and style (Dibbern *et al.*, 2004). This is the foundation on which the service relationship is structured. It is thus important for IS service providers to provide such supportiveness in order to foster goodwill and trust in their clients.

The last dimension, and lowest in terms of importance is *Tangibles*. The criteria for this dimension suggest that the IS service provider have visually appealing premises, staff that appear professional, and supply useful support materials. The finding that Tangibles is the least important dimension in the research context is not surprising considering the nature of an outsourcing relationship. SME businesses in the e-Commerce environment are less dependant on visual contact with the service provider. IS service providers in this environment are able to manage technical and other problems remotely. Consequently less physical interaction required. Thus IS service providers should focus on the delivery of reliable systems rather than on attractive and professional visual appearances of staff and premises.

Lastly an understanding of these service quality dimensions is not only useful to the IS service providers, but to the e-Commerce SME business managers themselves. Business managers with a higher level of prior experience, and greater familiarity with the subject of evaluation may be more confident about the realisation of their expectations (Khalifa & Liu, 2003). These dimensions and their criteria serve to highlight to the business managers what reasonable service quality expectations are in this business environment.

The study provides the foundation for much needed research in the SME sector to enhance the ability of businesses to conduct e-Commerce business on a satisfactory platform of IS. The study highlights those areas in which SMEs require support from their IS service providers. Future work will entail further testing of the derived instrument in other SME sectors, as well as application of the instrument amongst client's of specific IS service providers.

Acknowledgements

The authors gratefully acknowledge:

- Financial support from the National Research Foundation (NRF) of South Africa, and of the Cape Peninsula University of Technology (CPUT) for the financial contribution to this study.

N.B. Any opinion, findings and conclusions or recommendations expressed in this paper, are those of the authors and do not necessarily reflect the views of the NRF.

- Corrie Uys, e-Innovation Academy (CPUT) for statistical support.

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Appendix

Verbatim responses to Open-ended Survey Questions

How can your e-Commerce service providers better assist or support your business to benefit from e-Commerce?

The verbatim responses to this question are listed below together with the service quality dimensions which are impacted by the responses:

- "Don't let the server go down – loss of business... SP should do what they say they can and will do."

IMPACTED DIMENSIONS: Credibility, Expertise
- "SP should care about me – I should be important enough to them – they should know who I am. Had a bad experience with "Webmail" – did not deliver on promise – wasted R6000."

IMPACTED DIMENSIONS: Credibility, Supportiveness
- "SP should deliver on promises of increased customer awareness and bookings. Have listings on 23 website – get booking from only 3. Have invested R30 000 in listings."

IMPACTED DIMENSIONS: Credibility
- "User-friendly 'templates'."

IMPACTED DIMENSIONS: Tangibles
- "Keeping us informed of technological advances that may be of benefit."

IMPACTED DIMENSIONS: Expertise, Availability
- "They could give themselves a face! We have never met most of them - purely email or phone conversations."

IMPACTED DIMENSIONS: Supportiveness, Tangibles
- "By constantly reviewing my website and ensuring that the website appears at the top of search engine listings."

IMPACTED DIMENSIONS: Availability, Expertise
- "Our e-Commerce service provider does keep as well abreast of new technologies, systems and developments. We feel secure in their hands, and rely heavily on their expertise going forward. They have a good understanding of our business model. This we feel is the most important part of an e-Commerce provider, that they take the time to understand and develop with you (not for you) an e-Commerce solution to suit your business."

IMPACTED DIMENSIONS: Credibility, Expertise
- "I rely on good websites with loads of hits leading to loads of enquiries. All my business comes from websites. Most I try are a waste of money but a couple of South African ones always come up trumps. I now don't subscribe to any new offers unless they give a free trial and can put their money where their mouth is."

IMPACTED DIMENSIONS: Credibility, Expertise
- "Note: I am with MWEB who have consistently provided the best service around at almost the best rates."

IMPACTED DIMENSIONS: Credibility
- "Probably more than 90% of our business is sourced from our secondary website listings. I think the small B&B market is well catered for in SA. I'm generally very satisfied with the services provided."

IMPACTED DIMENSIONS: Credibility

- “More information for latest developments and current improvements. I am happy with my service provider right now but need to sort out Telkom and the skyrocketing costs of dial-up. Honestly, these are necessary evils.”

IMPACTED DIMENSIONS: Credibility, Expertise

- “Make sure that the business advertised reach more possible clients. Help me in my marketing endeavour and win customers for my tourist business.”

IMPACTED DIMENSIONS: Expertise

- “I find my dealings with the e-Commerce service providers outstanding and personal attention exceptional!”

IMPACTED DIMENSIONS: Availability, Supportiveness

- “Don’t interrupt service delivery.”

IMPACTED DIMENSIONS: Availability

- “They close over December – January, but I suppose they need to take a break.”

IMPACTED DIMENSIONS: Availability

- “Up to date with technology and developments in that area.”

IMPACTED DIMENSIONS: Expertise

- “Update and Upgrade website. Confidentiality. Improve search engine ratings.”

IMPACTED DIMENSIONS: Credibility, Expertise

- “SP should inform me of webpages that are not working for me – are they viable.”

IMPACTED DIMENSIONS: Credibility, Expertise

- “None, very happy with the service that I receive, good feedback & reasonable special offer advertising – capestay.co.za”

IMPACTED DIMENSIONS: Credibility, Supportiveness

- “By taking a pro-active approach. “

IMPACTED DIMENSIONS: Credibility, Expertise

- “Ensure that search engines find our website.”

IMPACTED DIMENSIONS: Expertise