

Measuring service quality in b2b services: an evaluation of the SERVQUAL scale *vis-à-vis* the INDSERV scale

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Abstract

Purpose – The purpose of this paper is to validate an empirically derived measure for assessing perceived service quality in the business-to-business (b2b) context. In doing so, the SERVQUAL scale is evaluated against the alternative measure.

Design/methodology/approach – A questionnaire was mailed to 1,285 companies from different industries. Respondents were identified by approaching companies from four service industries, namely consultants offering middle and senior management training and recruitment services, banks offering corporate banking, software development and maintenance houses and freight shipping providers in Athens, Greece.

Findings – SERVQUAL appears to suffer from significant methodological problems when applied to b2b services. This comes hardly as a surprise since the instrument has been developed using consumer markets as a frame of reference.

Practical implications – For practitioners, the major implication is that the developed instrument allows them to make the most out of their efforts to monitor the perceived quality of their services since it is more relevant to the b2b context and it has greater predictive power than SERVQUAL.

Originality/value – The findings of this study may stimulate future research towards various directions. For instance, INDSERV must be examined in other national contexts before being widely adopted, can be used for assessing the impact of increased levels of perceived service quality on various performance indicators or it can be directed towards tackling some of the limitations of this study such as testing the instrument in different types of services, along the lines that various classification schemes have identified.

Keywords SERVQUAL, Customer services quality, Service industries

Paper type Research paper

An executive summary for managers and executive readers can be found at the end of this article.

Introduction

Developing profitable and long-term relationships with customers is a major objective in the business-to-business (b2b) sector (Webster, 1992; Achrol, 1997). As a result, researchers focused on understanding the pre-requisites for establishing and maintaining long-term and profitable relationships with customers. The emerging area of “relationship marketing” underpins this focus. Within this area, the level of quality in the way a firm delivers its service to industrial customers has also become a central issue.

In recent years, substantial research has examined the level of quality (and its dimensions) in the performance of a service. Research has found empirical support for the relationship between perceived service quality and business performance (Athanasopoulos *et al.*, 2001; Caruana *et al.*, 1995), probably reflecting the difficulty to imitate (e.g. Hise and Gabel, 1995). Consequently, a validated instrument to

measure the customer’s perceptions about the service being delivered is crucial, especially since there is evidence which show that the customer’s evaluation of service quality and the resulting satisfaction/dissatisfaction is connected to repurchase, loyalty, and willingness to maintain a long-term relationship with the provider (Iacobucci *et al.*, 1994; Athanassopoulos *et al.*, 2001).

Responding to this need, researchers have devised and examined various instruments to measure perceived service quality. Nonetheless, in the service realm, most of the research has focused on measuring service quality in the consumer sector and particularly using the SERVQUAL scale as developed and subsequently modified by Parasuraman *et al.* (1991) or some variation.

The application of this scale to the consumer sector contrasts sharply with the relative absence of studies employing it in the b2b context (e.g. Durvasula *et al.*, 1999). Moreover, whenever SERVQUAL was applied results were mixed: While Pitt *et al.* (1996) report that the instrument’s reliability and validity scored well in the mainframe software sector, Durvasula *et al.* (1999) found the opposite. In fact, this led the authors to make a call for devising an instrument that will be designed to measure perceived service quality in the b2b context.

Responding to the need for developing and validating an instrument for measuring perceived service quality in the b2b context, this study attempts to do so by examining the psychometric properties of SERVQUAL *vis-à-vis* an alternative measure, INDSERV. The rest of the paper is organized as follows. First, the differences between consumer and b2b services is discussed and the need for tailoring a b2b

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Journal of Services Marketing
19/6 (2005) 421–435
© Emerald Group Publishing Limited [ISSN 0887-6045]
[DOI 10.1108/08876040510620193]

specific measure of perceived service quality is established. Then, a brief discussion of the problems associated with the use of SERVQUAL are detailed. Following this, alternative approaches that have been considered in measuring perceived b2b services and an integration of these approaches into the suggested measure is offered. Next, the methodology and the analysis of the data are presented. The paper concludes with the discussion of the findings and the limitations and suggestions for future research sections.

Applications of SERVQUAL and concerns

Service quality is a critical concern in b2b marketing of services because of its impact on the organizational customers' own service to their customers. For instance, poor shipping services can have drastic consequences on the exports business of the organizations who may face loss of orders, increased claims, lower prices, delayed payments and generally lower supplier ratings (Mehta and Durvasula, 1998). Yet, as pointed by Asubonteng *et al.* (1996), little empirical work has focused on deriving or even empirically testing and validating an integrated instrument for assessing perceived quality in b2b service. On the contrary, the majority of the studies conducted in the b2b context employ the SERVQUAL (Parasuraman *et al.*, 1985) instrument which, originally, was developed using a sample of various consumer services. More importantly, although widely applied, this instrument has received heavy criticism on various issues, the most important of which are summarized in the following paragraphs.

Three major issues concerning the SERVQUAL measure have been raised since it was originally introduced: The psychometric properties of the measurement, the linkage between satisfaction and quality and the use of gaps (difference scores) to assess perceived quality. A brief summary of this criticism is provided in the following paragraphs.

With regard to the psychometric properties of SERVQUAL, several studies report similar Cronbach's alpha reliability coefficients for the five SERVQUAL dimensions (e.g. Babakus and Boller, 1992; Babakus and Mangold, 1992; Carman, 1990; Cronin and Taylor, 1994) and at least equally high as the Parasuraman *et al.* (1988) reported. These findings validate the internal reliability or cohesiveness of the scale items forming each dimension. However, the validity of the instrument has raised major concerns. Most studies imply greater overlap among the SERVQUAL dimensions – especially among responsiveness, assurance, and empathy (Peter *et al.*, 1993) – than implied by Parasuraman *et al.* (1985), which puts the instrument's discriminant validity under questioning. A detailed discussion on the issue is provided by Asubonteng *et al.* (1996). Convergent validity has also been questioned since the factor loading patterns in none of the studies are similar to those obtained by Parasuraman *et al.* (1988).

In addition, concurrent validity has also been questioned (e.g. Babakus and Boller, 1992; Brensing and Lambert, 1990) and some interesting findings have been documented: For instance, Babakus and Boller (1992) found that perception scores have stronger correlations with other dependent measures (e.g. overall quality) than do the actual SERVQUAL scores (i.e. perception-minus-expectation scores).

When it comes to the instrument's link with satisfaction, a study in the health care context (O'Connor *et al.*, 1994) reported that certain dimensions of the original SERVQUAL measure were not identified as significant predictors of customer satisfaction.

With regard to the use of gaps (difference scores) to assess quality, Teas (1993, 1994) pinpoints two potential problems regarding discriminant validity that are associated with the use of difference scores. Since difference score measures are usually less reliable than non-difference score measures, they appear to possess discriminant validity simply because such measures are unreliable (Peter *et al.*, 1993). Empirical findings have demonstrated that expectations about the performance of a service may change after it is used once (Halstead and Page 1992), which in turn reduces the reliability of a difference score based on those measures.

Additionally, when using difference scores to predict some outcome (e.g. satisfaction), it is assumed that the components of the difference score have equal but opposite effects on the criterion variable (Edwards, 1994). A detailed discussion on the issue is provided by Page and Spreng (2002). Finally, many practical concerns have also been voiced (e.g. Cronin and Taylor, 1992, 1994) regarding the operationalization, since performance-only models have been found superior than difference scores (e.g. Babakus and Boller, 1992; Brown *et al.*, 1993; Cronin and Taylor, 1992, 1994; Durvasula *et al.*, 1999).

In summary, the findings from studies provide some support for reliability and face validity for the SERVQUAL scores on the five dimensions. However, serious concerns have been raised regarding the validity of the instrument as well as the use of difference scores to assess service quality.

Contemporary developments in conceptualizing and measuring perceived service quality

Service quality as an independent construct

A recent stream of research that has developed over the last few years treats perceived customer service as an individual construct. Spreng and Mackoy (1996) as well as Dabholkar *et al.* (2000) are among those researchers who have pursued this approach. More specifically, Spreng and Mackoy (1996) studied an integrated model of perceived service quality and satisfaction among students regarding their assessment of undergraduate advising. In that study, overall perceived quality was treated as an individual construct which was assessed by asking the respondents to evaluate the quality of the service they received with three seven-point scales anchored by "Extremely poor/extremely good", "Awful/excellent" and "Very low/very high".

Dabholkar *et al.* (2000) used a similar approach when assessing the quality as perceived by institutional customers of the pictorial directory division of a national photographic company. In their study, overall perceived quality was also treated as an individual construct measured through four items, namely, "excellent overall service", "service of a very high quality", "a high standard of service" and "superior service in every way", while factors such as service reliability, personnel attention are treated as antecedents to perceived service quality.

This approach in conceptualizing service quality has the merit that, in comparison to the more "traditional" approach, i.e. that service quality represents the congeries of different

sub-dimensions that aggregate in order to derive an estimation of service quality, the assessment of perceived service quality is more simplified, particularly for practitioners. The latter, following this approach, have not to measure all the sub-components of perceived service quality. Instead, they can derive a more holistic appraisal of the quality of their offering and, given the limited length of the measure, do so more regularly (Dabholkar *et al.* 2000).

On the other hand though, one has to notice that, in both studies that have treated perceived service quality as an individual construct, the measure of overall perceived service quality appears to be a tautology of the items that were employed in each case. For instance, one would have difficulty to tell how “excellent overall service quality”, when compared to “service of a very high quality” or to “a high standard of service”, delineates a different facet of the same phenomenon that the latter items capture. This view is in line with various efforts to obtain a direct measure of overall service (e.g. Babakus and Boller, 1992; Cronin and Taylor, 1992) using a single item measure while it is also echoed by Dabholkar *et al.* (2000, p. 166) who concede that even for practitioners it is required to evaluate the antecedents/sub-dimensions of perceived service quality in order to diagnose quality drawbacks in the service they deliver.

Service quality as a multi-level construct

An alternative approach in conceptualizing service quality has been proposed by Shemwell and Yavas (1999). In their view, perceived service quality is better conceptualized as a multilevel-hierarchical notion that is comprised of search, credence and experience attributes. Their conceptualization was validated in the consumer services context (health care services) and their study provided strong empirical evidence of face validity.

A similar view is also proposed by Brady and Cronin (2001). Using the retail services as the frame of analysis, they investigated the possibility of conceptualizing perceived service quality as a three-levels construct. In their view, service quality is comprised of three primary dimensions, each consisting of three sub-dimensions. Customers aggregate their evaluations of the sub-dimensions to form their perception of the firm’s performance on each of the three primary dimensions they propose. Then, these perceptions lead to an overall service quality perception (Brady and Cronin, 2001). In an attempt to bridge the different perspectives adopted by the so called “American” perception (based on the disconfirmation paradigm on which SERVQUAL was originally developed) with the “Nordic” one (which focuses on the technical and functional sub-dimensions of quality), the primary dimensions suggested by the authors are interaction quality, physical environment quality and outcome quality.

The rationale behind this multilevel/multi-dimensional conception of service quality, is rooted on the work of Carman (1990) who noted that customers tend to perceive service quality as the aggregation of different quality sub-dimensions. Subsequent researchers (e.g. McDougall and Levesque, 1994; Mohr and Bitner, 1995; Carman, 2000) provided support to this approach, despite the divergence of their findings regarding the sub-dimensions that each study identified. It also must be noted that, in all previous studies

that pursued this approach, the frame of analysis remained the context of retail services.

The main disadvantage of this approach is that it makes it quite cumbersome for practitioners to measure perceived customer service since, before an overall evaluation can be derived, it is required to administer a lengthy instrument. On the other hand though, the conception and measurement of perceived service quality becomes robust since verbosity is avoided. Also, this approach is in-line with marketing theory regarding the multifaceted nature of many constructs, such as satisfaction, market orientation (e.g. Flynn *et al.*, 1993; Kohli and Jaworski, 1990) and so on. Such constructs (global constructs), are comprised by distinct subcomponents (sub-constructs) which, however, contain a significant amount of shared variance attributed to their common relation with the higher order global construct (Bagozzi and Heatherton, 1994).

For instance, perceived quality is important because it is related with satisfaction which is known to influence positively the firm’s performance. Various studies have investigated the link between perceived service quality and buyer’s satisfaction (e.g. Yi, 1990; Kane *et al.*, 1997; Carman, 1990, 2000) and have demonstrated that satisfaction is related with the ability of the firm’s outcome to meet an optimum level on certain – specific characteristics that are of importance for the buyer (Oliver, 1997). In turn, these characteristics are frequently referred to as “satisfaction drivers” and are at the core of the notion of perceived service quality, as opposed to laboratory quality (i.e. the level of quality depicted on the service blueprint) and delivered quality (i.e. the extend to which the firm’s ability to actually match the standards described in its blueprints). Given that overall satisfaction with the provision of a service is a function of the buyer’s degree of satisfaction with various aspects of the service offered, perceived service quality has been suggested to follow the same rationale. Hence, the superiority of the hierarchical/multilevel approach in conceptualizing perceived service quality.

Conceptualizing and measuring perceived service quality in the b2b context

The differences between consumer and industrial goods are well documented in the literature and an extensive review would be unessential. Very briefly, the differences in the buying behavior, the evaluation criteria for appraising alternative suppliers, the existence of buying centers are, among others, the most eminent distinctions of industrial buyers. As a result, the marketing effort and priorities of the producers vary accordingly. When it comes to b2b services, the context is even more dissimilar because of the fundamental characteristics of services: Their intangible nature and the inseparability between production and consumption.

For instance, services purchased from organizations (b2b) are provided by qualified professionals whose expertise and skills are key elements of the quality of the service provided (Yorke, 1990). They interact closely with managers from the buying organization and on a very frequent basis (Hausman, 2003). In addition, b2b services, are far more complex and require the management of a larger number of parameters to ensure their flawless provision and outcome (Lovelock, 1996). Jackson and Cooper (1988), also stress this increased demand for specialization, which in a way is a consequence of the

increased customization that is required when serving organizational buyers. As a result, selecting, evaluating and deciding on the continuation of the relationship with a b2b service provider is not a routine task (Jackson *et al.*, 1995), even for established providers. What organizations actually purchase is frequently a customer-specific and quite unique solution to a specific problem (Patterson, 1995).

Given both the distinct differences between consumer and b2b services as well as the serious concerns regarding the suitability of the SERVQUAL instrument, it is no surprise that various alternative measures for assessing the quality of b2b services have been suggested. One of the pioneers in this area is Gronrøos (1984) who suggested that two types of perceived service quality is of concern for industrial customers: Technical quality and Functional quality. The former was conceived as encompassing the core operation-related aspects of the service while the latter as comprising the interaction between individuals from the two organizations.

Following Gronrøos (1984) original conceptualization, Morgan (1991) proposed two different but quite similar dimensions: Process elements, i.e. how the service is delivered with regard to the interaction between the staff from the two companies (customer and provider) and Outcome elements, i.e. what the customer actually received from the provider. Another dimension, that of integrative quality, is proposed by Edwardson *et al.* (1990) referring to the provider's ability to ensure that all the sub-systems that are required to deliver the service are actually coordinated well enough to do so.

Later work by Szmigin (1993) furthered the dimension of output quality which relates with eventually delivering the service outcome that the customer expects. This dimension is different from hard quality because a service company may well manage to put all the required sub-systems to work in a coordinated fashion and still the end result of the serving endeavor will be less than what the customer expected.

Given this difficulty to relate outcome quality to the efforts and success of the provider, Halinen (1994) suggests that output quality ought to be broken down in two distinct dimensions: "Immediate outcome" and "Final outcome quality". With regard to the former, it relates to the success of the provider to provide the customer with a solution to its problem while, the latter describes the effects that the service offered created for the customer, after it has been implemented.

To summarize, since 1984 when Gronrøos pioneered a conceptualization of perceived b2b service quality, several authors have been addressing the issue, each suggesting different elements of the notion. However, until today an integrated instrument that can capture all aspects of the service provision process has still not been validated (Mehta and Durvasula, 1998).

In an attempt to close this gap, the present study attempts to investigate the possibility to develop and validate an instrument for measuring perceived service quality in the b2b context. Based on the preceded discussion concerning the contemporary developments in measuring perceived service quality the multi-dimensional/multilevel approach that Brady and Cronin (2001) as well as Shemwell and Yavas (1999) is adopted. Figure 1 presents the proposed model.

In Part (a), a model is depicted where all measures have been totally aggregated across dimensions. This indicator is assumed to measure the construct exactly and the main advantage of total aggregation is its simplicity and ability to

capture the underlying meaning of service quality. Assuming that the observable indicators share common variance, summing or averaging across multiple indicators tends to smooth out random error and, thus, reliability increases. In Part (b), a second model is depicted which is partially aggregated. This approach provides more meaningful information for practitioners as it signals where potential problems in quality may lay (Shemwell and Yavas, 1999). Interestingly enough, this approach appears to fit the conceptualization proposed by Dabholkar *et al.* (2000) although its major benefit is missed because of the indiscrimination between the different facets that comprise the notion of perceived service quality as proposed by the authors.

In Part (c) a third alternative is presented. It is a totally disaggregated first-order model in which each individual item has potential meaning but the items are still hypothesized to measure single sub-constructs of service quality which are allowed to correlate among them. In comparison to the two previous approaches it has two advantages: First, it allows practitioners to analyze the customers' perception of quality at two levels of abstraction, individual items and latent variables, that is the sub-constructs of service quality. Second, it matches with the standard first-order confirmatory factor analysis model which allows for rigorous assessment of construct validity.

Finally, in Part (d) the proposed model is presented. It is a totally disaggregated second-order model in which the sub-dimensions are specifically viewed as sub-designations for the overall perceived service quality construct and are related to each other only through their shared variance in measuring the second order construct. This latter conception also echoes the opinion of Bagozzi and Heatherton (1994) who argue that second order models are especially useful when the sub-dimensions are distinct but contain a significant amount of shared variance.

Thus, according to the proposed model, perceived service quality is conceived as a second order construct that is comprised of five dimensions which have been identified in the literature:

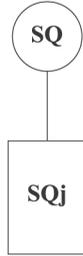
- 1 potential;
- 2 hard;
- 3 soft;
- 4 immediate output; and
- 5 final output quality.

More specifically, Bochove (1994) suggested that a critical dimension of perceived service quality is that of potential quality which relates to the search attributes that customers use in order to evaluate the provider's ability to perform the service before the relation has actually begun. This is in line with the findings of Patterson (1995), who reports that industrial customers have significant difficulty to assess the provider's ability to perform the requested service. Gounaris and Venetis (2002) provide empirical evidence of how this specific dimension influences the overall evaluation of the service offered by the provider.

Hard and soft quality are based on the work of Szmigin (1993). Thus, hard quality pertains to what is being performed during the service process, while soft quality pertains to how the service is performed during the service process. Both dimensions describe the service process itself with the former referring to the service blueprint the provider

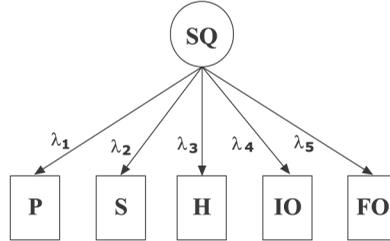
Figure 1

(a) TOTAL AGGREGATION



SQ: Service Quality as a unidimensional construct represented as the aggregate of 23 items

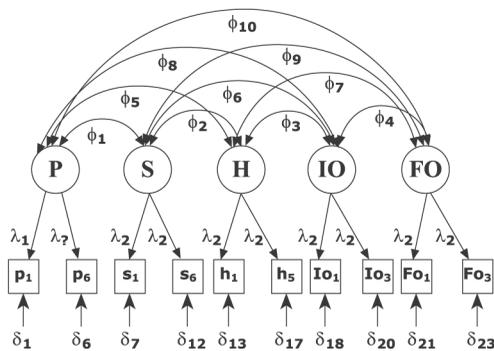
(b) PARTIAL AGGREGATION



SQ: Service Quality as a latent variable represented by five indicators.

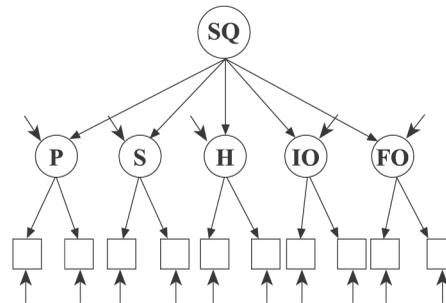
- P:** Observable indicator that is the aggregation of 6 questionnaire items about Potential Quality
- S:** Observable indicator that is the aggregation of 6 questionnaire items about Soft Quality
- H:** Observable indicator that is the aggregation of 5 questionnaire items about Hard Quality
- IO:** Observable indicator that is the aggregation of 3 questionnaire items about Immediate Outcome Quality
- FO:** Observable indicator that is the aggregation of 3 questionnaire items about Final Outcome Quality

(c) TOTAL DESEGRATION
First Order Model



- P:** Latent variable for Potential Quality
- S:** Latent variable for Soft Quality
- H:** Latent variable for Hard Quality
- IO:** Latent variable for Immediate Outcome Quality
- FO:** Latent variable for Final Outcome Quality
- p₁ ... p₆:** Questionnaire items for potential quality
- s₁ ... s₆:** Questionnaire items for soft quality
- h₁ ... h₅:** Questionnaire items for hard quality
- io₁ ... io₃:** Questionnaire items for immediate outcome quality
- fo₁ ... fo₃:** Questionnaire items for final outcome quality

(d) TOTAL DESEGRATION
Second Order Model



- SQ:** Overall endogenous latent construct of "Service Quality"
- P:** Exogenous latent variable for Potential Quality
- S:** Exogenous latent variable for Soft Quality
- H:** Exogenous latent variable for Hard Quality
- IO:** Exogenous latent variable for Immediate Outcome Quality
- FO:** Exogenous latent variable for Final Outcome Quality
- p₁ ... p₆:** Questionnaire items for potential quality
- s₁ ... s₆:** Questionnaire items for soft quality
- h₁ ... h₅:** Questionnaire items for hard quality
- io₁ ... io₃:** Questionnaire items for immediate outcome quality
- fo₁ ... fo₃:** Questionnaire items for final outcome quality

uses, the accuracy with which the service is delivered and so on. A notion similar to Gronrøos' (1984) "technical quality". The latter, i.e. soft quality, on the other hand pertains to the front-line personnel and the interaction they develop with the client's employees. It goes beyond courtesy (Parasuraman *et al.*, 1988) capturing communal elements of the interaction between the managers from the two companies, such as understanding customer's needs and personality match (Morgan, 1991), self-disclosure (Hausman, 2003) and so on. In b2b services extended and intimate exchanges are required to produce successful outcomes (Price *et al.*, 1995), hence the importance of the soft quality dimension.

Szmigin (1993) has also proposed the dimension of output quality, referring to the client's evaluation of the end-results of the hard and soft parameters. However, Halinen (1994) suggested the distinction between immediate outcome quality and final outcome quality. With regard to the former, immediate outcome quality relates to the success of the provider to provide the client with a solution to its problem. Final outcome quality describes the effects that the solution offered created for the client, after it has been implemented.

Having developed the theoretical framework for developing and testing an alternative model for assessing the level of perceived service quality in the b2b context, the major hypothesis of the paper is that INDSERV will outperform SERVQUAL as a means for conceiving and assessing the quality that b2b customers perceive they receive from their providers. To test this hypothesis, a series of research propositions are examined:

- RP1. INDSERV is expected to exhibit a better structure regarding its sub-dimensions than SERVQUAL.
- RP2. INDSERV is expected to outperform SERVQUAL in terms of internal consistency.
- RP3. INDSERV is expected to outperform SERVQUAL in terms of convergent validity.
- RP4. INDSERV is expected to outperform SERVQUAL in terms of discriminant validity.
- RP5. INDSERV is expected to outperform SERVQUAL in terms of predicting customer satisfaction and commitment to the provider of the service.

Methodology

Data collection and sample

To collect the data a questionnaire was mailed to 1,285 companies from different industries. Respondents were identified by approaching companies from four service industries, namely consultants offering middle and senior management training and recruitment services, banks offering corporate banking, software development and maintenance houses and freight shipping providers in Athens, Greece. We then asked them to name their five most important customers in terms of the annual income they generate for the firm. We also asked for the details of the line manager of their client with whom they usually liaise more closely. In total, 257 service providers responded positively and collaborated. This process produced a list of 1,285 companies from various industries and from various regions of Greece. Although the sample is clearly a cross-section one, such samples are frequently used in research efforts in order to increase the researchers' ability to generalize. In fact two recent meta-analysis studies (Geyskens *et al.*, 1998; VanderWerf and

Mahon, 1997), report that that heterogeneity and the resulting increased variation that is present in cross-section data does not impede the researcher from drawing reliable conclusions because they transcend industry-specific methodologies (Makhija, 2003) as well as attitudes and values (Lowe *et al.*, 2002) and, thus, allow the researcher to draw conclusions that can be generalized (Greene, 1997).

With regard to the respondents, the line management positions more frequently were from senior management position (e.g. marketing and/or financial director). Two mailing waves produced 515 useable questionnaires (response rate about 40 percent). Non-response bias was investigated through a *t*-test between early and late (follow-up mailing) respondents (Churchill, 1991). The analysis indicated absence of non-response bias.

Variables measurement

With regard to the SERVQUAL instrument, the items were derived from the refined version published by Parasuraman *et al.* (1991). In this version five major dimensions are employed to capture the elements of perceived quality namely tangible elements, elements pertaining to the provider's reliability, responsiveness, assurance and empathy. All items were measured using a seven-point scale of agreement anchored 1 = "I strongly disagree" to 7 = "I strongly agree". Yet, given the concerns and the criticism regarding the computation of difference scores that was presented in previous paragraphs, we assessed directly the service performance of the service providers as perceived by the respondents.

The development of the INDSERV instrument was also based on known scales which were combined to form an alternative integrated approach to measure perceived service quality for b2b services. Thus, to measure soft and hard process quality the scales suggested by Kaynak *et al.* (1994) were employed. Potential quality was measured using the scale suggested by Bochove (1994) while the scales suggested by Halinen (1994) were employed to capture immediate and final outcome quality (a more detailed presentation of the items and descriptive statistics are offered in Table I).

For validation purposes, other measures were also employed. Respondents were asked to use seven-point scales to indicate their overall satisfaction with their provider, their conception of the overall quality of the service they receive and their intention to develop a long-term commitment with the specific provider.

Results

Scales structure and dimensionality

To answer RP1, the dimensionality of the two scales was assessed by comparing their fit against competitive models. With regard to the SERVQUAL scale, Parasuraman *et al.* (1991) suggest a five-dimensions model and consequently this was the initially hypothesized model. However, Babakus and Boller (1992) identified only two dimensions in SERVQUAL while Durvasula *et al.* (1999) when applied SERVQUAL in b2b services found that a single factor model can hold and in fact provide a more parsimonious representation of the data. Thus, in our analysis the two and the single factor models were also considered.

With regard to the INDSERV, the originally hypothesized model is a second-order model comprised of five dimensions

Table I

The INDSERV items		Mean value
Potential quality	Offers full service	4.73
	Has required personnel	5.21
	Has required facilities	5.14
	Has required management philosophy	4.89
	Has a low personnel turn-over	5.22
	Uses network of partners/associates	4.14
Hard process quality	Keeps time schedules	5.21
	Honors financial agreements/stays in budgets	5.71
	Meets deadlines	5.66
	Looks at details	5.37
	Understands our needs	5.16
	Soft process quality	Accepted enthusiastically
Listen to our problems		5.27
Open to suggestions/ideas		5.19
Pleasant personality		5.31
Argue if necessary		4.80
Look after our interests		4.79
Output quality	Reaches objectives	5.07
	Has a notable effect	4.82
	Contributes to our sales/image	4.90
	Is creative in terms of its offering	5.23
	Is consistent with our strategy	5.17

namely: potential quality, soft process quality, hard process quality, immediate output quality and final output quality, as explained in the previous paragraphs. However, because the distinction between immediate and final output quality is only suggested by Halinen (1994), a four model was also investigated. Finally a totally aggregated, single dimension model was also considered. Table II summarizes the results of this phase of the analysis.

As can be seen from Table II, from the three competing models that were examined for SERVQUAL, the fit indices of the model composed of two factors are closer to those values that are considered acceptable. In this model, empathy, assurance, reliability and responsiveness are collapsed in a single dimension, probably best described as one that captures behavioral elements of the service delivery process

and thus of perceived service quality, while tangible elements formed a different dimension. The same analysis was repeated separately in each of the four sub-sample of respondents (i.e. responses concerning perceived service quality in the corporate banking industry, the consulting, the software and the freight shipping industry respectively) and the overall picture remained the same.

As far as the assessment of the INDSERV's dimensionality is concerned, from the three competing models that were examined, the four factors model is clearly superior than the other two examined. In this model, immediate and final output quality are collapsed in a single factor, while the rest of the factors (potential quality, hard process quality and soft process quality) remained intact. Again, the same analysis was also repeated for each sub-sample and the overall picture remained.

To summarize, *RP1* stated that INDSERV would exhibit a better structure of its dimensions than SERVQUAL would. The results of the analysis presented in Table II support the research proposition although the analysis indicated the need to collapse immediate and final outcome quality dimensions in a single one. This is an interesting finding because it provides evidence that organizational customers do not make the distinction between the outcome of the service effort from the effects that the service generated for their line of business. This point is discussed in more detail in the discussion section of the paper.

Internal consistency

In order to examine *RP2*, internal consistency (reliability) for each factor in each model was assessed. This was done by calculating the Cronbach's Alpha coefficient (Cronbach, 1951). Although several measures of reliability can be ascertained in order to establish the internal consistency of an instrument, this method is considered to be the most general form of reliability estimation (Nunnally, 1988). In this method reliability is operationalised as internal consistency, which is the degree of inter-correlations among the items that constitute a scale (Nunnally, 1988). An alpha value of 0.60 and 0.70 or above is considered to be the criteria for demonstrating internal consistency of new scales and established scales respectively (Nunnally, 1988). Table III summarizes the results of the pertinent analysis.

From Table III it is clear that the factors of both scales are internally consistent and this general picture remains as new

Table II Tests for dimensionality: confirmatory factor analysis results for SERVQUAL and INDSERV

	Five factors (original)	Two factors	Single factor
<i>Alternative structuring of SERVQUAL</i>			
GFI	0.80	0.91	0.86
AGFI	0.73	0.88	0.83
CFI	0.82	0.90	0.87
RMSEA	0.14	0.08	0.10
	Five factors (proposed)	Four factors	Single factor
<i>Alternative structuring of INDSERV</i>			
GFI	0.82	0.93	0.75
AGFI	0.70	0.91	0.66
CFI	0.83	0.90	0.68
RMSEA	0.09	0.03	0.17

Table III Tests for internal consistency: Cronbach Alpha coefficients

	Reliability indices (Cronbach alpha)
SERVQUAL	
Tangibles	0.82
Reliability	0.86
Responsiveness	0.77
Assurance	0.80
Empathy	0.78
Reliability, responsiveness, assurance, empathy	0.80
INDSERV	
Potential quality	0.81
Hard process quality	0.79
Soft process quality	0.83
Immediate output quality	0.88
Final output quality	0.73
Output quality (immediate and final)	0.84

factors are developed by collapsing the original ones according to the results of the previous face of the analysis. Also, it must be noted that for both scales, the analysis pertaining to assessing the internal consistency was repeated in all four sub-samples and no significant deviation from the total picture was observed.

RP2 claimed that INDSERV will outperform SERVQUAL in terms of internal consistency. However, as the results in Table III would seem to suggest, this does not appear to be the case, so the research proposition must be rejected.

Convergent and discriminant validity

RP3 and RP4 investigated the superiority of INDSERV over SERVQUAL in terms of convergent and discriminant validity respectively. With regard to the SERVQUAL model, following Fornell and Larcker (1981) convergent validity was examined by calculating the average variance extracted by each factor of the original (five factors) model suggested by Parasuraman *et al.* (1991). Table IV summarized the results of this analysis.

In Table IV the analysis concerning the discriminant validity was again assessed following Fornell and Larcker’s (1981) suggestion which is to compare the average variance extracted for each factor with the variance shared between the remaining factors. If the factor is distinct from the rest then the average variance extracted will be greater than the shared variance. From Table IV it is clear that although the factors of the SERVQUAL scale, as described by Parasuraman *et al.* (1991), have convergent validity, are indistinct from each other with the exception of the tangible elements, which exhibits marginal discriminant validity.

The tests of convergent and discriminant validity for the INDSERV model are also summarized in Table IV. With regard to convergent validity, because INDSERV is a second-order model, an additional requirement must be met. That is, the relationship between the endogenous latent factors (potential quality, soft and hard process quality and output quality) and the exogenous overall factor (i.e. perceived service quality) captured by the gamma coefficients must be significant.

From Table IV it is evident that all the dimensions of the INDSERV model meet the criteria for both convergent and discriminant validity while the gamma coefficients are also statistically significant at 0.05 or better adding thus to the convergent validity of the model.

Once again, for both scales, the analysis pertaining to assessing convergent and discriminant validity was repeated in all four sub-samples but no significant deviation from the total picture was observed.

Thus, from the analysis presented in Table IV, RP3 is rejected because both measures perform satisfactory when examined for convergent validity. However, given the marginal performance of SERVQUAL in terms of discriminant validity, RP4 is accepted since INDSERV exhibits strong evidence of this type of validity.

Predictive validity

Finally, RP5 investigated the superiority of INDSERV over SERVQUAL in terms of predictive validity. To investigate RP5, the ability of each scale to explain overall perceived quality, customer satisfaction and intention to stay committed

Table IV Tests for convergent and discriminant validity for the SERVQUAL scale

Tangible		SERVQUAL dimensions								Conv.	Disc.
AVE	(Corr) ²	Reliability		Responsiveness		Assurance		Empathy			
		AVE	(Corr) ²	AVE	(Corr) ²	AVE	(Corr) ²	AVE	(Corr) ²		
0.52	0.53	0.52	0.74	0.60	0.81	0.65	0.86	0.55	0.90	Yes	No
		INDSERV dimensions									
Potential quality		Hard process quality		Soft process quality		Output quality		Conv.	Disc.		
AVE	(Corr) ²	AVE	(Corr) ²	AVE	(Corr) ²	AVE	(Corr) ²				
0.66	0.40	0.54	0.45	0.75	0.50	0.62	0.50	Yes	Yes		
Service quality → Potential quality				0.78 ^{a,b}							
Service quality → Hard process quality				0.85 ^a							
Service quality → Soft process quality				0.90 ^a							
Service quality → Output quality				0.68 ^a							

Notes: ^a Figures indicate standardized regression coefficients as produced from the AMOS program capturing the gamma coefficients of the second-order model
^b All estimates have a critical ratio > 1.96 suggesting that they all are significantly different from zero at the 0.05 level or better
 AVE = Average variance extracted = $\sum (\text{standard loadings})^2 / \sum (\text{standard loadings})^2 + \sum \epsilon_{ij}$; Conv = Convergent validity (AVE > 0.50); Disc = Discriminant validity = $\text{AVE}/(\text{Corr}^2) > 1$; (Corr)² = highest (Corr)² between factor of interest and remaining factors

to the provider in the long run was assessed using multiple step-wise regressions. The results are presented in Table V.

As can be seen from Table V, with regard to overall quality, the SERVQUAL model explains 33 percent of the total variance and only two factors enter the regression, namely, tangibles and reliability with the latter having a much stronger impact on overall quality assessment. On the other hand, the INDSERV model explains 57 percent of the total variance in the dependent variable while all four factors have significant betas.

When it comes to customer satisfaction, the SERVQUAL achieves an adjusted $r^2 = 0.32$ while again only two factors enter the regression, namely, reliability and empathy, with the former again having the stronger impact on the dependent variable. INDSERV on the other hand achieves an adjusted $r^2 = 0.55$ and again all four factors entered the regression analysis with significant betas.

Finally, when it comes to intention to remain with the same provider in the long-run, SERVQUAL fails to explain any significant proportion of the dependent variable. On the other hand, although its ability to explain the intention to remain with the same provider in the long-run is somewhat lower when compared to INDSERV explanatory power with the other two variables (adjusted $r^2 = 0.14$), it explains a noteworthy amount of the variance in the dependent variable while, as it was the case with overall quality and customer satisfaction, all four factors have significant beta coefficients.

This general picture remained when the analyses were repeated within the four sub-samples with some minor deviations. For instance, in the case of corporate banking services, potential quality did not load in the regression equation. Similarly, in the case of freight shipping providers, output quality also did not have a significant beta.

RP5 claimed that INDSERV would outperform SERVQUAL in predicting constructs known to be related with perceived quality. On the basis of the overall picture presented in Table V, it is accepted.

Discussion

The purpose of this study was two-fold. One major objective was to investigate the suitability of the SERVQUAL instrument in assessing the quality perceived by corporate customers. The second was to validate an alternative measure and compare it *vis-à-vis* the scale developed by Parasuraman *et al.* (1985). By doing so, this study responds to earlier calls (Durvasula *et al.*, 1999) regarding the need for tailoring a scale to measure perceived service quality in a b2b setting.

The results of the analysis point to the following conclusions. To start with, SERVQUAL appears to suffer from significant methodological problems when applied to b2b services. This comes hardly as a surprise since the instrument has been developed using consumer markets as a frame of reference. In other words, the methodological problems identified in this study are not necessarily attributed to inherent deficiencies of the SERVQUAL instrument since it was not tested in the consumer context, for which the scale was originally developed. Rather, because industrial markets are quite different from consumer ones, mainly because of differences in the culture and mindset of industrial buyers as compared to individual consumer buyers (Webster, 1978), priorities and perceptions are also bounded to be different.

Table V Assessment of concurrent validity

Standardized regression coefficients	
Method: Stepwise; dependent: overall quality assessment	
<i>Quality measurement: SERVQUAL</i>	
Constant	2.74
Tangible	0.12**
Responsiveness	–
Reliability	0.48*
Assurance	–
Empathy	–
Adjusted R^2	0.33
<i>Quality measurement: INDSERV</i>	
Constant	1.12
Potential quality	0.25*
Soft process quality	0.62*
Hard process quality	0.34*
Output quality	0.55*
Adjusted R^2	0.57
Method: stepwise; dependent: customer satisfaction	
<i>Quality measurement: SERVQUAL</i>	
Constant	2.45
Tangible	–
Responsiveness	–
Reliability	0.48*
Assurance	–
Empathy	0.12**
Adjusted R^2	0.32
<i>Quality measurement: INDSERV</i>	
Constant	0.95
Potential quality	0.39*
Soft process quality	0.48*
Hard process quality	–
Output quality	0.26*
Adjusted R^2	0.55
Method: stepwise; dependent: long-term commitment	
<i>Quality measurement: SERVQUAL</i>	
Constant	4.27
Tangible	–
Responsiveness	–
Reliability	0.29*
Assurance	–
Empathy	–
Adjusted R^2	–
<i>Quality measurement: INDSERV</i>	
Constant	1.23
Potential quality	0.21*
Soft process quality	0.33*
Hard process quality	0.39*
Output quality	0.49*
Adjusted R^2	0.14

Notes: * $p < 0,001$; ** $p < 0.050$; Dash indicates coefficient not loaded or not significant at 0.100 level

Consequently, the marketing of industrial services is also different. Industrial services are more complex mainly because, when compared to consumer services, are more specialized and more technology driven (Jackson and Cooper, 1988). Hence, the elements of perceived service quality that may be relevant in consumer services are not necessarily equally applicable by analogy in b2b services.

This is particularly reflected on the lack of predictive validity that the analysis revealed for SERVQUAL or, in other words, its inability to explain certain phenomena such as satisfaction and long-term commitment. Moreover, it is also worth mentioning, when applied in the b2b context, the dimensionality of SERVQUAL, as revised by Parasuraman *et al.* (1994), is not proven. In fact, with the exemption of tangibles, all other factors collapsed in a single factor which, as pointed earlier, could be conceived as reflecting behavioral elements of overall perceived service quality that are related with the interaction between the service provider's and the customer's employees. This new, merged, dimension is very close to the soft process quality of the INDSERV scale.

On the contrary, when the two dimensions of immediate and final output quality were collapsed into a single one, the proposed alternative model became methodologically sound. INDSERV exhibits not only predictive validity but, equally importantly, convergent and discriminant validity as well as internal consistency. Again this does not come as a surprise since the quality elements that comprise it have all originally being conceived in reference with the unique aspects of the marketing tasks of b2b service providers. Nonetheless, this is the first attempt to integrate these elements in a single instrument and empirically examine its psychometric properties. Equally importantly, the instrument was examined in four different b2b service industries and its methodological robustness remained.

To this end, our empirical tests show that industrial customers base their evaluation of the perceived service quality on their assessment of four corresponding sub-dimensions:

- 1 potential quality;
- 2 hard quality;
- 3 soft quality; and
- 4 output quality.

The combination of all these four dimensions constitutes a customer's overall perception of the quality of service. On the basis of these findings, it appears that a hierarchical conceptualization of service quality is appropriate. As a result, our study is in-line with recent developments in conceptualizing and measuring perceived service quality (Brady and Cronin, 2001), consolidates multiple service quality conceptualizations within a single, comprehensive, multilevel/multi-dimensional framework, with a strong theoretical base suitable for capturing the actual components that comprise service quality in the b2b context.

Moreover, this hierarchical four level conception of quality is in line with contemporary advancements in the study of service quality which calls for a new direction in service quality research. These advances are particularly significant because a high level of service quality is associated with several key organizational outcomes, including high market share (Buzzell and Gale, 1987), improved profitability relative to competitors (Kearns and Nadler, 1992), enhanced

customer loyalty (Zeithaml *et al.*, 1996), and trust (Gounaris and Venetis, 2002).

Thus, potential quality represents an important element of perceived quality because it corresponds to search attributes that organizational customers need to evaluate and consider in advance of the provision of the service. This is particularly important for b2b services due to the increased complexity and degree of customization that characterizes them, which results in a greater degree of uncertainty regarding the performance of the service, even if the provider is selected from a list of existing providers. Hard quality explains the customer's concern regarding the processes through which the service is actually delivered and the evaluation of the suitability of these processes to produce a solution timely and according to the customer's needs.

Soft quality interprets the customer's evaluation regarding the interaction with the first line personnel from the provider with whom an interaction is developed as a result of the serving effort. It explains the customer's concern regarding the empathetic conduct of the provider's contact employee, their openness to ideas and suggestions, their benevolence and communicated willingness to watch the customer's best interest. Apparently, such qualities are important dimensions of quality because:

- they serve to develop a positive climate during the encounter; and
- facilitate the process of aligning the provider's service with the customer's specific requirements.

Finally, output quality explains the customer's concern regarding the actual offering delivered. This is also a very important dimension that captures not only the results of the technical efforts to deliver the service, but also the impact that the service delivered eventually produces for the buying organization. At this point it is worth mentioning that in the literature it has been argued that organizational buyers consider these two aspects separately (Halinen, 1994). However, our empirical findings do not support this position, probably because demand for b2b services is derived from the customers' need to compete in their markets. Consequently, the output quality of b2b services efforts is measured against this latter aspect too.

With regard to the usefulness of the INDSERV for the practicing marketers, the instrument offers two advantages. First, it is a relevant, valid and reliable way to measure service quality because the elements on which it has been developed are designed to depict unique aspects of marketing services to corporate customers.

Second, the instrument provides practitioners with the opportunity to look at service quality issues at two additional levels of abstraction. At the individual level, service providers might look at their customers' ratings for each individual question and identify areas that might require correction. For instance, if a company falls short on the "pleasant personality" (soft process quality) or the "meets deadlines" (Hard process quality), this would signal a need for intervention. Contact personnel would have to be better trained in adjusting with customers in order to achieve better personality match and blueprints would also probably require revision so that blueprint deficiencies in delivering the service punctually are eliminated. Moreover, a second level of analysis, that represented in the model by latent endogenous variables, can also be employed.

This, in turn, may have two major benefits for practitioners (Shemwell and Yavas, 1999): first, by performing the analysis at this higher level, patterns of strategic concern are revealed. To give an example, suppose that a consultant firm finds that, in comparison to its major competitor, falls short in customers' perception regarding its ability to offer a full service, possession of the required facilities, overall management philosophy, high personnel turnover (all being elements of Potential quality) and the openness of first-line employees to suggestions and ideas offered by the customers (soft process quality). Clearly, the main problem pertains to potential quality and the consultant's management ought to focus their effort towards this direction.

A second advantage is that the theory underlying the endogenous latent variables of the INDSERV model can be meaningfully extended for practical purposes regarding the choice context and/or customer retention (Lynch and Schuler, 1990; Athanassopoulos *et al.*, 2001). This was particularly clear when the instrument's predictive validity was assessed. By employing the proposed model, she/he can more reliably make assumptions and draw conclusions regarding his/her company ability to convert increased quality into customer satisfaction and customer retention.

The only possible drawback in employing the proposed model is probably its length. Because of the latter, it may be cumbersome to administer frequently. To this end, practitioners may consider its use in relation with decisions taken at a strategic level, i.e. when quality priorities need to be set and/or corrective courses have to be drawn. For a more regular/tactical-basis evaluation of their services perceived quality, practitioners could also consider using a concise measure of overall quality (Dabholkar *et al.*, 2000) which however ought to be specifically tailored to the unique aspects of serving organizational customers.

Limitations and future research

Alas, our study is not free of limitations, which however, future research may easily resolve. One such limitation is the national context of the study. There are several studies which have shown that perceived service quality is culture-specific (e.g. Cronin and Taylor, 1992). To this end, before the scale is adopted, it will be required to test its psychometric properties in other, non-south-European regions.

Another limitation of the present study relates to the service industries from which the data were collected. Again, as it has already pointed, many authors have pointed that perception of quality are industry-specific. Although in this study service providers from different industries were investigated, if ones follows Lovelock's (1983) classification than, for instance, all four types of services investigated are quite intangible and there is a lack of any formal relationship between the provider and the client. Thus, again, future research is required in other types of services so that a more detailed investigation of the psychometric properties can become possible.

Apart from future research that will seek to tackle the limitations of the present study, other directions are certainly open to future researchers. To start with, a recent study by Brady and Cronin (2001) showed that the sub-dimensions of perceived service quality are modified depending on the possession or not of certain characteristics, e.g. responsiveness and empathy of the service providers. Although this study has been conducted in the consumer

services context, its findings are intriguing. Thus, future researchers may consider:

- identifying relevant modifiers for the b2b context (e.g. customization, reliability); and
- examining the extent to which such modifiers influence the organizational customers' perception of service quality.

Another interesting direction would be the identification of quality indicators. As pointed in the discussion section, the length of the proposed instrument is a possible demerit. Dabholkar *et al.* (2000) have been working on identifying a concise overall measure of perceived service quality which can help practitioners particularly with the task of monitoring service quality level at tactical/regular level. Thus, future research may be directed towards this direction too and use the instrument proposed here in order to develop such a concise instrument for assessing overall perceived level of quality.

Finally, another interesting direction for future research would be to investigate the impact of increasing market share on the various dimensions of perceived service quality as identified in this study. In the tangible goods industries there are strong evidence (Fornell, 1992; Gounaris *et al.*, 2002) that under conditions of heterogeneous market demand, perception of quality vary considerably and this has a direct, negative impact, on customers' level of satisfaction. Given the increased customization that is usually the case with b2b services, one could argue that this situation resembles conditions of increased heterogeneity. If so, then future researchers may wish to examine which, if any, of the four dimensions are susceptible to this phenomenon. Answering this question would help practitioners to make better strategic decisions regarding the augmentation of their clientele and their ability to compete on quality and customer satisfaction.

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Executive summary and implications for managers and executives

This summary has been provided to allow managers and executives a rapid appreciation of the content of this article. Those with a particular interest in the topic covered may then read the article in toto to take advantage of the more comprehensive description of the research undertaken and its results to get the full benefits of the material present.

The weaknesses of SERVQUAL in a business-to-business setting

The SERVQUAL instrument captures the perceived quality of a service by measuring the tangible elements of the service, plus elements that relate to the provider's reliability, responsiveness, assurance and empathy. SERVQUAL has been criticised for failing to explain phenomena such as customers' satisfaction and their long-term commitment to a provider. Moreover, the instrument was developed using consumer markets as a frame of reference. Consumer markets differ from business-to-business markets, mainly because of differences in the mindset and culture of industrial buyers as compared to individual consumers. Priorities and perceptions in the business-to-business market are different and so, therefore, is the marketing of industrial services. Business-to-business services tend to be more specialized and more technology driven than those in consumer markets. As a result, the elements of perceived service quality that may be relevant in consumer services are not necessarily equally applicable in business-to-business services.

A new model for measuring quality in a business-to-business setting

Gounaris proposes a new model, INDSERV, which is based on the idea that four dimensions combine to make up the industrial customer's perception of service quality:

- 1 *Potential quality.* This relates to the search attributes that customers use in order to evaluate the provider's ability to perform the service before the relationship has actually begun. Potential quality is particularly important for business-to-business services because of the increased complexity and degree of customization that characterizes them, which results in a greater degree of uncertainty regarding the performance of the service, even if the provider is selected from a list of existing providers.
- 2 *Hard quality.* This pertains to what is being performed in the service process. It refers to the service blueprint the provider uses, the accuracy with which the service is delivered and so on.
- 3 *Soft quality.* This is concerned with how the service is performed during the service process. It relates to the front-line personnel and the interaction they develop with the client's employees. It captures how open the service provider is to ideas and suggestions from the client, the service provider's benevolence and communicated willingness to watch the customer's best interest. These qualities help to develop a positive climate during the service encounter and facilitate the process of aligning the provider's service with the customer's specific requirements.

- 4 *Output quality.* This explains the customer's concern regarding the actual offering delivered. It captures not only the results of the technical efforts to deliver the service, but also the impact that the service delivered eventually produces for the buying organization.

The usefulness of INDSERV for practising managers

At an individual level, INDSERV gives service providers the chance to look at their customers' ratings for each question and identify areas – such as not having the right facilities (an aspect of “potential” quality) or not meeting deadlines (an aspect of “hard” process quality) – that might need attention. Moreover, analysis at a higher level can reveal patterns of strategic concern. A consultant firm may find, for example, that it falls short, when compared to its competitors, in customers' perception of its ability to offer a full service, in its

overall management philosophy and in its high staff turnover. The consultant firm would then know that it has a problem with “potential” quality and its management ought to focus attention on improving performance in this area.

A further advantage of INDSERV over SERVQUAL is that the former provides a better instrument for forecasting customers' satisfaction and long-term commitment to the service provider. A manager is, therefore, better placed to make assumptions and draw conclusions about his or her company's ability to convert increased quality into customer satisfaction and customer retention.

(A précis of the article “Measuring service quality in b2b services: an evaluation of the SERVQUAL scale vis-à-vis the INDSERV scale”. Supplied by Marketing Consultants for Emerald.)