Research Note: Validating INDSERV (Industrial Service Quality) Scale in Business to Business Context: A Study Based on the Sri Lankan Hotel Sector

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Abstract

Service quality is generally measured on the SERVQUAL scale, developed by Parasuraman, Berry & Zeithaml (1985). However, the appropriateness of SERVQUAL is disputed as it is specifically designed for the B2C (business-to-customer) context (Gounaris 2005a, 2005b, Lee 2011). Thus, Gounaris (2005a, 2005b) developed an instrument called INDSERV that specifically measures business-to-business (B2B) service quality performance. The purpose of this study is to validate the INDSERV scale in Sri Lanka as well. Cross-sectional data of service quality in the outsourcing context was collected through a survey of managers in the hotel sector in Sri Lanka using self-administered structured questionnaires. A total of 183 usable responses were collected. Unidimensionality, reliability and validity of the scale were assessed accordingly. Among the four dimensions of the scale, Hard Process Quality shows the highest contribution on the vendors' service quality performance (β= 0.98) followed by Output Quality (β= 0.86). Statistical tests were proposed to exclude the 'potential service quality' dimension from the scale as it reported weak reliability (α = 0.25, all item total correlations were below 0.1). There were 22 items in the INDSERV scale and the refined model contains only 12 items. In conclusion, this study identified the need for a field survey to uncover unique factors that measure industrial service quality in Sri Lanka as it may be a reason for the contextual mismatch of a borrowed scale.

Keywords: business-to-business, INDSERV, outsourcing, service quality.

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Introduction

Collaboration among firms enhances their respective competitiveness and develops their resource bases (Al-Natour & Cavusoglu 2009), which can be in the form of strategic alliances, mergers, partnerships or outsourcing. It is imperative that any form of collaboration relies on the strength of the members' relationship beyond traditional purchasing. With regard to the upstream supply chain of service firms, vendors play a major role in satisfying customers.

The vendor's performance basically includes quality and other performance specifications. They are generally evaluated through SERVQUAL scale (Parasuraman, Berry & Zeithaml, 1985, 1988). But, it appears to perform weaker in business to business (B2B) contexts (Gounaris 2005a, 2005b, Lee 2011). Alternatively, Gounaris (2005a, 2005b) developed a measurement scale to evaluate vendor's service performance known as INDSERV. This is widely accepted for the evaluation of service performance in the B2B context. The scale comprises four service quality dimensions that a firm expects from its B2B business partners: potential quality, hard process quality, soft process quality and output quality. Together, these dimensions explain 22 aspects (items) of service quality and other performance expectations. This study investigates the outsourcing practices of the service sector in Sri Lanka in order to validate the INDSERV scale. The service sector has more than a 57 percent share of gross domestic production (during 2009-2014). Telecommunication, trading, ports, hospitality and financial services are the main contributors to the growth (Source: Central Bank of Sri Lanka, website: http://www.cbsl.gov.lk/htm/english/08_stat/stat.html). According to the pre-field study conducted, only the hotel industry has been formulating strategic partnerships with outsourcing vendors at multiple level activities as their main competitive strategy. Thus, the authors assumed that the hotel industry covers a wide range of service quality aspects in business-to-business relationships. Having identified the importance of the INDSERV scale as a measurement of B2B service quality, this study attempts to validate the scale in the Sri Lankan context.

This paper is structured in the following way. First, the literature is briefly reviewed for business-to-business service quality. Second, the research setting and chosen research methodology are discussed. Third, the analyses of the empirical research findings are presented. Fourth, managerial and theoretical implications and suggestions for future research are presented.

Literature Review

Whipple and Frankel (2000) pointed out that the vendors' ability to meet performance expectations is a key success factor in a B2B business context. The best vendors are those that can meet the needs of the buying organization in terms of capacity, quality, technology, price, and service (Ogden 2006). Petersen, Ragatz & Monczka (2005) attempted to measure the vendor's performance by improvements in on-time delivery, quality and responsiveness. Nevertheless, prompt delivery has been highly recognized as an important aspect of outsourcing (Chan & Chin 2007, Rajabzadeh, Rostamy, & Hosseini 2008, Byramjee, Bhagat, & Klein 2010). Furthermore, many authors see pricing as an important aspect of economic transactions and relationships, but different studies use different terms to measure pricing performances such as accuracy in budgeting (Rajabzadeh et al. 2008) and competitive cost of goods from the suppliers (Chan & Chin 2007).

In addition, service quality improvements (Bettis, Bradley & Hamel 1992, Allen & Chandrasekhar 2000) and knowledge contributions (Cusmano, Mancusi & Morrison 2000, Banerjee & Williams 2009) are also used to measure a vendor's performance. Service quality is generally measured using the SERVQUAL scale, developed by Parasuraman et al. (1985, 1988). However, the appropriateness of the SERVQUAL scale is in doubt, as it is specifically designed for the B2C (business to customer) context (Gounaris 2005a, 2005b, Lee 2011). Gounaris (2005 b) developed a measurement instrument called INDSERV that specifically deals with business-to-business (B2B) service quality.

Gronrøos, (1984) is the pioneer in conceptualizing B2Bbusiness- to-business service quality. He claimed that service quality in a B2B context could be measured in terms of 'technical quality' and 'functional quality', which was the foundation for the development of the INDSERV scale. Referring to Gounaris (2005a, 2005b), the development of a proper scale for B2B services has evolved in the past two decades. Table 1 gives a summary of different quality aspects, identified in previous studies.

Table 1: Service Quality in B2B Context

Measure	Source Citations from:
Technical quality /hard quality: core operation-related elements	Gronrøos, 1984
Functional quality/ soft quality: interaction between individuals	
Process quality: quality of service delivery	Morgan 1991
Outcome quality: quality of service received	
Potential quality: search attributes of provider's ability to perform the service (i.e. vendors' ability) before the relation has actually begun	Bochove 1994

Source: Gounaris (2005a) Measuring service quality in B2B services: an evaluation of the SERVQUAL scale visa versa the INDSERV scale.

The technical/hard quality and functional/soft quality represent the different quality aspects of the service delivery process. Gounaris (2005a), however, combined Gronrøos (1984), Szmigin (1993) and Morgan's (2001) ideas for the classification of process quality and established 1) hard process quality and 2) soft process quality. Combining it all, he formulated four dimensions as the INDSERV scale to measure service quality in a B2B service context. Table 2 depicts the items of the INDSERV scale.

There are 22 items, which cover potential quality, hard process quality, soft process quality and output quality that measure the vendor's performance. Moreover, with respect to the items in the INDSERV scale, they cover not only quality aspects, but also a range of other performance indicators of the vendors' service performance, compared to the scales/measures applied previously (Whipple & Frankel 2000, Ogden 2006, Petersen et al. 2005, Chan & Chin 2007, Selviaridis et al. 2008, Rajabzadeh et al. 2008).

Table 2: INDSERV Scale

Dimension	Code	Item
Potential quality (PTQ)	PTQ 1	1. Offers full service
	PTQ 2	2. Has required personnel
	PTQ 3	3. Has required facilities
	PTQ 4	4. Has required management philosophy
	PTQ 5	5. Has a low personnel turn-over
	PTQ 6	6. Uses network of partners/ associates
Hard Process quality (HQ)	HQ1	7. Keeps time schedules
	HQ2	8. Honours financial agreements / stays in budget
	HQ3	9. Meets deadlines
	HQ4	10. Looks at details
	HQ5	11. Understands our needs
Soft process quality (SQ)	SQ1	12. Accepts agreement enthusiastically
	SQ2	13. Listens to our problems
	SQ3	14. Opens to suggestions/ideas
	SQ4	15. Has pleasant personality
	SQ5	16. Argues if necessary
	SQ6	17. Looks at our interests
Output quality (OQ)	OQ1	18. Reaches objectives
	OQ2	19. Has a notable effect
	OQ3	20. Contributes to our sales/image
	OQ4	21. Is creative in terms of its offering
	OQ4	22. Is consistent with our strategy

Source: Gounaris (2005a) Measuring service quality in B2B services: an evaluation of the SERVQUAL scale visa versa the INDSERV scale, Journal of Services Marketing, 19/6, (2005, p. 427).

The items measured using a 7-point Likert scale, ranging from 1 = 'strongly disagree' to 7 = 'strongly agree' in the original study.

Methodology

This study is purely quantitative and data was collected from the hotel industry in Sri Lanka. A self-administered questionnaire was developed including a demographic profile and the INDSERV scale. Firstly, the content validity of the questionnaire was assessed. The content validity is a subjective but systematic evaluation of how well the content of the scale represents the measurement task at hand. A pilot study served as a supplementary method to assure content validity. Content validity can be determined by having a panel of experts examining whether the items sufficiently describe the constructs being measured in the context of the study. Bryman and Bell (2007, p. 165) viewed it as an 'intuitive' process. The content validity of the questionnaire was tested in two rounds. Firstly, it was forwarded to peers. The group comprised twelve senior PhD students from the University of Malaya, Malaysia; University of Nagoya, Japan and the University of Otago, New Zealand. They were asked to check the appropriateness of wordings, flow of questions, or make any other suggestions, which in their opinion require improvement. Minor changes were proposed, and corrections were carried out. Secondly, the altered questionnaire was forwarded to five individuals. Three of them are academics from Malaysia and Sri Lanka, who are familiar with services management and quality management. Two professionals were selected from the hotel industry in Sri Lanka for their comments as well. The preparation of the final questionnaire considered the relevant comments of all experts.

According to the 2011 Directory (Rainbow Pages), there are 384 registered hotels in Sri Lanka. However, 81 'one star' and 24 'unclassified' hotels were omitted from the population, as the pre-field study found that these hotels are less likely to outsource due to their small size. Thus, the questionnaire was forwarded only to 279 hotels but responses were received from only 189. Six questionnaires were excluded from the analysis due to incompleteness and missing values. Thus, hundred and eighty three (183) usable completed questionnaires were subjected to the analysis. The hotel organizations were considered as the unit of analysis of the study. The respondents were middle level managers who handle the procurement system of the corresponding firm. The data analysis started with descriptive statistics. Then the INDSERV scale was subjected to an exploratory factor analysis, reliability tests and confirmatory factor analysis.

Data Analysis

Quantitative data was analyzed using Principle Component Analysis and Structural Equation Modeling (SEM) as it allows validating, refining and estimating complex relationships (Hair et al. 2006;). A total of 183 hotels were investigated. Most of the hotels studied are rated as two star (39%), followed by three (35%), four (24%), and five star (2%). The majority of respondents were middle level managers (43%), followed by executives (25%), and individuals who specified their designation as 'managers' (17%). A total of 31 respondents declined to state their designation details.

The Kaiser-Mayer-Olkin measure of sampling adequacy was acceptable (0.81) and Bartlette's test of sphericity was significant, indicating that the items were correlated and suitable for factor analysis (Hair et al. 1998). With regard to the internal consistency of the scale, Cronbach's alpha was used (Table 3).

Table 3: Cronbach's Alpha Reliability

Dimension/Item	Item-Total Correlation	Cronbach's α if Deleted	Cronbach's Alpha
Vendors' potential quality			**0.250**
PTQ1	*.080*	*-.079[a]*	
PTQ2	*-.033*	*.086*	
PTQ3	*0.02*	*0.34*	
PTQ4	*0.03*	*0.45*	
PTQ5	*.010*	*.022*	
PTQ6	*-.003*	*.044*	
Vendors' hard process quality			0.797
HQ1	.118	.647	
HQ2	.417	.506	
HQ3	.331	.554	
HQ4	.378	.527	
HQ5	.529	.437	
Vendors' soft process quality			0.725
SQ1	.188	.763	
SQ2	.535	.663	
SQ3	.517	.669	
SQ4	.498	.676	
SQ5	.519	.669	
SQ6	.522	.669	
Vendors' output quality			0.795
OQ1	.593	.750	
OQ2	.420	.803	
OQ3	.598	.748	
OQ4	.660	.728	
OQ5	.610	.744	

None of the instrument subscales except PTQ (Potential Quality) indicated any value below the threshold level of Cronbach's alpha (α=0.70). An item with a value that is less than 0.25 was considered as very weak, and played a very small role in conceptualizing the given factor (Nunnally 1978). Accordingly, the PTQ dimension was discarded due to a very low alpha value (0.25), and item-correlations were below the cut-off point (0.25). This reflects that the context of the study (i.e., the hotel sector in Sri Lanka) does not show sufficient concern for future occurrences, and thereby demonstrates the characteristics of the 'short-term orientation' nature in developing countries (Hofstede 1984). The reason may be high economic uncertainty in developing countries. Next, all other variables were subjected to a factor analysis. An exploratory factor analysis was performed to check the unidimensionality of the INDSERV scale. The results with cross loadings are reported in Table 4.

Table 4: Exploratory Factor Analysis for INDSERV

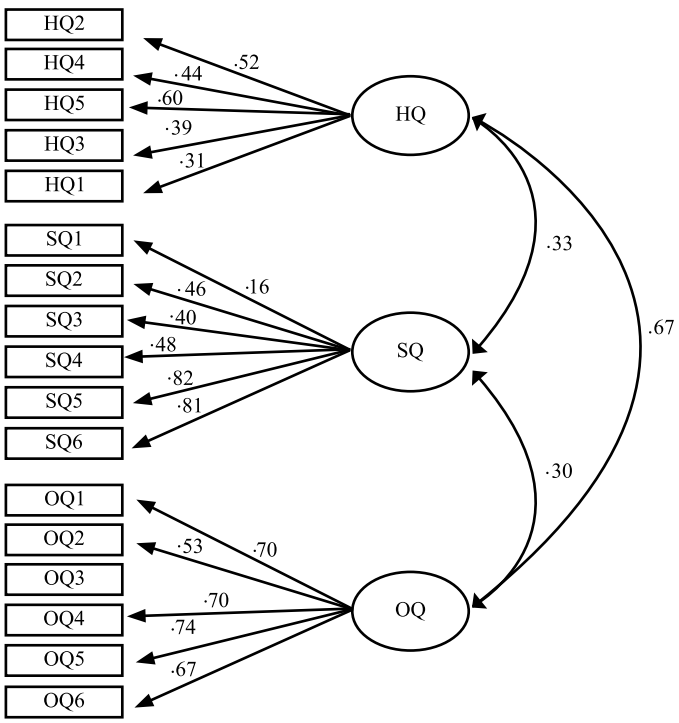
Items/dimensions (INDSERV)	Component			
	1	2	3	4
Potential Quality				
PTQ1	-.159	.104	**.655**	.110
PTQ2	.089	-.038	.243	**-.556**
PTQ5	.170	-0.47	.063	**.620**
PTQ6	**.403**	-.131	-.051	.196
Soft Process Quality				
SQ1	.064	.205	.166	**.566**
SQ2	.081	**.742**	.029	.013
SQ3	-.096	**.715**	.228	.178
SQ4	.130	**.684**	.173	-.003
SQ5	.221	**.677**	-.271	.029
SQ6	.182	**.677**	-.248	.023
Hard Process Quality				
HQ1	-.142	-.131	.315	**.507**
HQ2	-.135	.184	**.618**	-.135
HQ3	-.334	.145	**.549**	.046
HQ4	.132	.144	**.517**	.198
HQ5	.725	.003	-.055	.159
Output Quality				
OQ1	**.693**	.105	.181	-.034
OQ2	**.642**	.101	-.088	.107
OQ3	**.660**	.138	.319	-.178
OQ4	**.682**	.242	.264	-.128

1. Total variance extracted by 4 factors = 48.141%
2. Extraction Method: Principal Component Analysis.
3. Rotation Method: Varimax with Kaiser Normalization

Even though unidimensionality is not well demonstrated in the scale (except soft process quality and output quality dimensions), EFA created four factors. The number of factors generated is well aligned to the original scale developed by Gounaris (2005a). These four factors explain only 48.141 per cent of total variance, which is considerably low. The PTQ (i.e. potential quality) items are scattered among three factors and this results in poor discriminant validity. Furthermore, SQ1, HQ1 and HQ5 deviated from the theoretically defined location. With respect to the factor loadings, PTQ6 is determined to be below 0.5.

The deletion of items due to statistical issues is not advisable in the beginning (Hair et al. 2006), as this may affect construct validity. Then, the scale was subjected to a confirmatory factor analysis to assess convergent validity, composite reliability and discriminant validity. The first order measurement model for INDSERV is shown in Figure 1.

Figure 1: 1st order Measurement Model for INDSERV

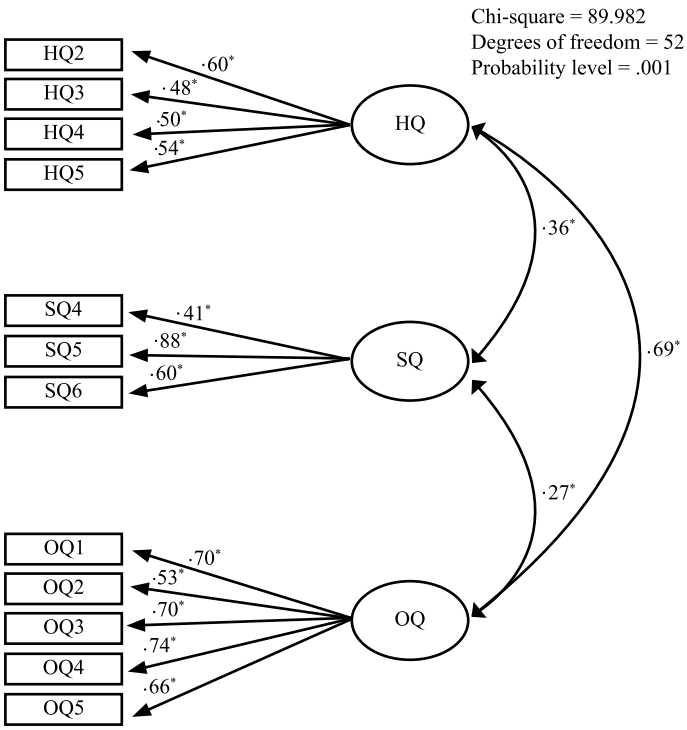


HQ1, 3, 4; SQ1, 2, 3, 4 report standardized regression weights below 0.5, and subsequently, a step-wise deletion of items starting from the lowest standardized regression weight was conducted.

For instance, SQ1 reports the lowest value (0.16) and hence was discarded first, followed by HQ1, HQ2 and HQ3 in successive stages. Ultimately, the INDSERV model was refined, as depicted in Figure 2. The refined model represents 'Hoelter's critical N' for 0.5 as 160, and 0.1 as 180, which confirms the adequacy of the sample for the model (Hair et al. 2006). However, the refined model (in Figure 2) contains items with low (i.e., HQ3 and SQ4) and marginal convergence validity (i.e., HQ4, HQ5 and OQ2).

Indeed, these items will affect Average Variance Extracted (AVE) and discriminant validity of the latent variables/construct. But the study still wishes to maintain them, as the deletion of further items could seriously affect the content validity of the INDSERV scale. The above results indicate a mismatch of the scale in the South Asian context.

Figure 2: Purified 1st Order Measurement Model for INDSERV



*Factor loadings are significant at 0.05 level

Table 5: Goodness of fit indices of INDSERV

Absolutes				Incremental		
CIMIN/DF	**GFI**	**AGFI**	**RMSEA**	**IFI**	**TLI**	**CFI**
1.730	.940	.910	.060	.947	.931	.946

According to Table 5, the absolute fit indices confirm the fit between the observed data and the model. The RMSEA is within the range of 0.05- 0.08, indicating that badness of fit of the model is negligible (Hair et al. 1998). Then, incremental indices are above 0.9, confirming that the construct fits the baseline model, assuming that all observed variables are uncorrelated (Hair et al. 2006, p.749). Based on the factor loadings reported in the refined model, the convergent and discriminant validity was assessed with the Average Variance Extracted (AVE) and Composite Reliability (CR) accordingly. Table 6 reports CR values with SMC and AVE matrix for Discriminant Validity.

Table 6: Validity and Reliability Summary

Variable	Mean	CR	AVE	SQ	HQ	OQ
SQ	4.56	0.75	0.53	**0.53**		
HQ	5.31	0.83	0.32	.113	**0.32**	
OQ	5.56	0.87	0.45	0.78	**.476**	**0.45**

The AVE of less than 0.5 shows that, on average, more errors remain in the item than variance explained by the latent factor structure imposed on the measure (Hair et al. 2006). Table 06 shows two variables (HQ=.32, OQ=.45) having lower convergence validity (AVE). In relation to HQ and OQ, they are considered acceptable, as not only the direct paths between these items and their respective latent variables indicate significant p-values, but they could also maintain a satisfactory level of composite reliability (CR). The results in Table 06 indicate good CR values for all dimensions of INDSERV.

With regard to discriminant validity, Hard process Quality (HQ) is weak in discriminating its own items from other constructs. This outcome was expected, as some items of HQ variable do not sufficiently maintain their convergence validity. As noted above, those items are kept in the scale, as it otherwise severely affects content validity.

The SMC value between HQ and SQ (0.476) is higher than the AVE of Hard process Quality (0.32). This implies that the discriminant validity of Hard process Quality (HQ) is unsatisfactory. With reference to Table 04, there are two items (i.e. HQ 1 and HQ 5) of the dimension loaded into two different factors disturbing the unidimensionality of the HQ. Thus, from the beginning of scale refinement, the scale demonstrated issues of reliability and validity.

Discussion

However, the INDSERV scale was developed in the Western context. In the original study, INDSERV showed satisfactory reliability and validity (Gounaris 2005a). It also reported superior psychometric properties in SERVQUAL (Lee 2011, p. 3180). However, in the present study the scale reported many reliability and validity issues. As a result one dimension as a whole and some items were excluded. This study provides evidence of a contextual mismatch of borrowed scales from a different cultural context. All deleted items are listed in Table 7.

Table 7: Deleted Items in INDSERV Scale

Dimension	Items	Description
Potential Quality	PTQ 1	Offers full service
	PTQ 2	Has required personnel
	PTQ 3	Has required facilities
	PTQ 4	Has required management philosophy
	PTQ 5	Has a low personnel turn-over
	PTQ 6	Uses network of partners/ associates
Hard process Quality	HQ 1	Keeps time schedules
Soft process Quality	SQ 1	Accept agreement enthusiastically
	SQ 2	Listen to our problems
	SQ 3	Opened to suggestions/ideas

According to Table 7, it is clear that the context of the study does not oversee a value of 'potential quality' of the vendor in assessing their performance. This might reflect that the context of the study (i.e., Sri Lanka) does not show sufficient concern for future occurrences, and thereby demonstrates the characteristics of the 'short-term orientation' nature of developing countries (Hofstade 1984). The reason may be high economic uncertainty in developing countries. Therefore, 22-item INDSERV scale shows a contextual mismatch. Despite these facts, Lee (2011) stated that the dimensions of INDSERV are interconnected.

He empirically justified that soft process quality (SQ) and hard process quality (HQ) are the mediators between potential quality and output quality rather than their independent roles. Among the dimensions remaining in the scale, hard process quality (HQ) shows the highest contribution on the INDSERV (β= 0.98, R2= 96.5%) followed by output quality (β= 0.86, R2= 74%). With reference to the factor loadings in Figure 02, the prominent service quality characteristics of a vendor are: argues when necessary (SQ5, λ =.88), looks at the focal firm's interests (SQ 6, λ =.81), have creative offerings (OQ4, λ =.74), reaches objectives (OQ1, λ =.70), and contributes to the focal firm image (OQ3, λ =.70).

Conclusion

The vendors' market is also competitive; hence they have to strive for survival. The INDSERV scale provides general guidelines for vendors about the expectations of the focal firm in the business-to-business context (Gounaris 2005a). But as far as the study context is concerned, not all elements are equally important and valid. Accordingly, vendors in the study context can focus more on the refined elements of the INDSERV scale (in Figure 2). Further, the focal firms (i.e., hotels in this study) are more likely to assess output and soft process quality aspects rather than hard process quality and potential quality in measuring their vendor's service quality performance. The vendors' potential quality however becomes invalid in the hotel sector in Sri Lanka possibly for many reasons such as economic uncertainty, short-term orientation, etc. Anyhow, these factors need to be empirically tested.

Having identified that the findings of this study are limited to the hotel sector in Sri Lanka, future research could validate the INDSERV scale in different contexts with data from different service industries. The present study further recommends performing exploratory studies to discover unique service quality dimensions in the business-to-business context in Sri Lanka. More specifically in-depth interviews and focus group discussions with focal firms and vendors will help find new quality dimensions/aspects. This study highlights the recommendation of the use of localized scales when the research context is considerably different from the context where the scale originated.

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