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Validation of supplier performance evaluation questionnaire in a sample of service companies

Validación de cuestionario sobre evaluación del desempeño de proveedores en una muestra de empresas de servicio

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Abstract

In Mexico, 98% of the companies are micro or small sized and 36% of private and public enterprises are engaged in the services sector. The supplier customer relationship, in the supply chain, we have studied various aspects such as customer and supplier satisfaction, the determination of the attractiveness degree of customers, and vendor's selection. Although it is true, the quality management systems suggest that evaluating the performance of the suppliers for both its selection as for their stay, the shopping areas are mainly considering aspects of delivery, quality and price. The aim of this study was to identify the relevant factors for assessing the performance of suppliers of services to small businesses in order to have a reliable tool to facilitate decisions about staying with or changing a supplier. The validity of the questionnaire was determined by the method of principal components and varimax rotation, and reliability where the Cronbach reached was 0.953 and the total variance explained was 68.23%. The identification of five factors called was achieved: Traditional Performance, Communication and Flexibility, Competitiveness, Innovation and Technology as well as confidence.

Evaluation, Factor analysis, Performance suppliers

Resumen

En México, el 98% de las empresas son de tamaño micro o pequeñas y el 36% de las empresas privadas y no paraestatales se dedican al sector servicios. La relación cliente proveedor, en las cadenas de suministro, se ha estudiado diversos aspectos, tales como la satisfacción del cliente y la del proveedor, la determinación del grado de atractividad de los clientes, y la selección de proveedores. Si bien es cierto, los sistemas de gestión de calidad sugieren evaluar el desempeño de los proveedores tanto para su selección como para su permanencia, las áreas de compra han considerando principalmente aspectos de entrega, calidad y precio. El objetivo de este estudio consistió en identificar los factores relevantes para la evaluación del desempeño de proveedores en pequeñas empresas del sector servicios a fin de disponer de un instrumento confiable que facilite las decisiones sobre la permanencia o cambio de proveedores. Se determinó la validez del cuestionario con el método de componentes principales y rotación varimax, y la confiabilidad donde el valor Alfa de Cronbach alcanzado fue de 0,953 y la varianza total explicada fue de 68.23%. Se logró la identificación de cinco factores denominados: Desempeño Tradicional, Comunicación y Flexibilidad, Competitividad, Innovación y Tecnología así como, Confianza.

Evaluación, Análisis factorial, Desempeño, Proveedores

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Introduction

Megatrends indicate that among the major changes observed in the world in the 21st century is the growth of the service sector. Small enterprises (SEs) in the service sector have increased their participation in the economy of any country and have diversified in terms of their level of specialisation in order to meet the new emerging demands of an increasingly dynamic and complex society, and therefore the challenges they face to remain relevant to consumers' tastes are becoming greater and greater (Arellano-González, Lizardi-Duarte and Carballo-Mendívil, 2008).

In Mexico, there are around 590,000 registered microenterprises, while 34,000 are in the small category (almost 98% of the total); only 9,500 are medium-sized and 5,000 are considered large enterprises (Sistema de Información Empresarial Mexicano - SIEM, 2006). De la Rosa-Alburquerque (2000) also states that the problems of MSMEs are complex, as they comprise knowledge that is made up of several facets. He also reports that so far an external view of small enterprises has been presented, i.e. a way of knowing what is being done for them, the way in which it is intended to promote their development and what is expected of them.

According to Carrión (2007), who states that the value chain developed by Michael Porter makes it possible to disaggregate the activities carried out by a company to sell a product or service, classifying them. Those activities related to the physical creation of the product, marketing, distribution and after-sales are referred to as primary.

Those that provide factors of production and the infrastructure necessary to enable the above-mentioned activities to function are called support activities.

However, Porter's proposed value chain is considered to refer to industrial companies, so it may not be meaningful for other types of organisations. The adaptation of Porter's value chain by Alonso (2008) includes attributes of services (see figure 1).

Figure 1 Reinterpretation of the Value Chain for Service Enterprises

In the reinterpretation of the value chain it can be seen, that the changes basically lie in the organisation of the primary links consisting of: Marketing and Sales (driving tasks, such as advertising, sales force, promotion, etc.); Contact personnel (personnel who intervene directly in the service, interacting with the client); Physical support and skills (the former are all those elements that to a greater or lesser extent take part in the service, be they tools or materials with which it is possible to carry out the service); Service (the very concept of the service itself).); Provision (the concept of the service itself, the experience provided to the client, the precise moment in which the client is attended to from the moment he/she arrives, the agreed service is carried out and he/she leaves); Clients (as well as the contact personnel.

Customers are the other human variable that intervenes and conditions the quality of the service provided. They are the personnel who come to the company in search of a good quality service at a fair price and in an adequate time) and Other clients (people outside the company, also clients who can affect or benefit a client's stay when the service is provided).

Regarding the support links, these consist of: General Management and Human Resources, Internal Organisation and Technology, Infrastructure and Environment, and last but not least, Procurement, whose function is the process of acquiring materials, inputs, and services. Based on the set of primary and support links mentioned in the previous value chain, a service margin is established; in which all the activities mentioned contribute to improving the service, the more structured and better functioning each link is, the greater and better the service margin that the company can provide.

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As mentioned by Rivera, Siller and García (2011), the success of companies depends on certain factors such as the quality of the products they manufacture or the service they provide, delivery times to customers and the constant search to exceed their expectations, as well as the selection and maintenance of suppliers, which allow them to have reliable and secure sources of raw materials that meet specifications. By addressing the above, it is possible to establish globalised companies capable of maintaining competitive levels that allow them to remain in the market.

According to Porter (1980), the bargaining power of suppliers and the bargaining power of buyers are two of the forces that influence the selection of competitive strategies.

Reinforcing this, Miglierini and Treviño (2012) indicate that the resources and capabilities approach argues that integrated companies accumulate and combine resources that generate advantages that are difficult for competitors to overcome, and in the face of current competitive demands, business organisations have been forced to adopt collaborative strategies throughout their supply chain in order to improve their performance in price, quality, time and service (Sarache, Hoyos-Montoya and Burbano J., 2004). In this sense, the selection of a competitive supplier base is of high importance in the search for better results.

According to Arroyo-López and Sánchez-Maldonado (2009), a company's suppliers are a critical resource because the products and services supplied influence the quality, cost and delivery times of the products manufactured by the purchasing company, so to ensure a competent supplier base, companies have the option of implementing supplier development programmes whose performance objectives range from cost reduction to advancing co-design and continuous improvement. However, supplier performance is not only determined by their participation in development programmes but also by their absorptive capacity profile, partnership and level of commitment to the customer.

Based on the above and in accordance with the strategic importance of decision-making in the purchasing management of companies, it is necessary to have increasingly effective and efficient support tools for the supplier performance evaluation process in order to facilitate decision-making regarding the selection of suppliers. In the light of the above, what are the most relevant aspects that small service companies should consider when evaluating the performance of their suppliers?

Objective

To identify the relevant factors for the evaluation of supplier performance in small service sector companies in order to have a reliable instrument to facilitate decisions on the permanence or change of suppliers.

The article is divided into four important parts. The first part is an introduction to the service sector, generic information on the SMEs that participate in this sector and the characteristics of their supply chain, identifying the importance of suppliers in this chain. In the second part, the theoretical basis of the study is reported, in the third section, the methodology to approach the study is reported, ending with the results on the validation of the proposed instrument for the evaluation of suppliers and its respective conclusion.

Theoretical foundation

The following theoretical background aims to describe a frame of reference consisting of concepts, definitions and theories used in this study.

Supply chain

The supply chain, according to Young and Esqueda (2005), is defined as a series of entities connected by a customer-supplier link. It starts with the production or extraction of products from primary activities up to the delivery of products or services into the hands of the final consumer. The external integration of the supply chain has been considered as a factor that promotes the competitiveness of firms depending on the degree to which the logistics activities of suppliers, customers and other members of the chain are interrelated (Vallet-Bellmunt, 2010).

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According to Bermeo-Muñoz and Bermeo-Muñoz (2005) backward integration is one of the ways in which the firm can integrate externally and implies that by making agreements with key supply providers, it can consider investing resources in supplier development.

Supplier selection and evaluation

Evaluation is the systematic assessment of the worthiness or merit of an object, the most common type of evaluation is that with an objective-based viewpoint. Once the results achieved have been determined, the evaluator has sufficient material to also identify the causal factors that contributed to the achievement of those results. These data provide a greater focus on identifying the drivers and barriers to programme success, and thus provide the basis for recommendations for performance improvement (Stufflebeam & Webster, 1980).

From a quality management systems point of view, organisations are required to establish effective and efficient processes for selecting and evaluating supplier performance from a variety of perspectives.

Thus, organisations need to have information regarding the ability of suppliers to: provide products that meet the requirements of quality, price, delivery time; maintain a financial situation that ensures the viability of the relationship during the supply period; comply with legal and regulatory requirements; maintain the best performance compared to their competition among other aspects (Moreno, Peris & Gonzalez, 2001).

Procurement is an integrated function that, in the global context, is part of a broader concept called Procurament, which according to Sarache-Castro, Castrillón Gómez, & Ortiz Franco (2009) includes "supplier selection, negotiation, expediting, monitoring supplier development, material handling, transportation, storage and receipt of materials". Quality management systems emphasise that supplier evaluation must exist both to select suppliers and to determine whether they remain as suppliers, so in the elements of "procurament", the activity of evaluating to remain would be included in the monitoring of supplier development.

Sarache-Castro et al. (2009) report that Dickson (1966) pioneered research on relevant criteria in supplier selection, concluding that out of 23 criteria investigated, quality was the highest priority criterion, followed by on-time delivery and good historical performance of the organisation. In addition to these criteria, the Sarache-Castro et al. (2009) study identifies in their literature review as criteria to be considered: cost, availability, service, flexibility, management practices, quality management, financial strengths, and in the late nineties, service and innovation, technology levels, ability to work in collaborative schemes, problem solving, trained personnel, technology levels and the ability to work in collaborative schemes were also included in the study.

Problem solving, trained staff, good communication skills, adequate documentation and at the beginning of this century: social and environmental responsibility.

Not only have studies been conducted to identify criteria to evaluate, such as Paiva, Phonlor, & D'Avila (2008), who analysed the influence of buyer-supplier relationships on service performance, the study considered a sample of 53 companies that are international users of machinery and food transport by sea. The results indicated that traditional performance measured in delivery time and costs are clearly influenced by aspects related to relationship management including information exchange, trust and interaction between the parties. Supplier selection uses various methods to comparatively evaluate different suppliers including: Pre-qualification or approximation methods, categorical methods, fuzzy techniques, data envelopment analysis, case-based reasoning, analytical hierarchy process method or final decision methods based on linear programming (Sarache-Castro et al., 2009).

One of the most widely used methods is the Analytical Hierarchy Process (AHP) method, identifying Bogdanoff (2009) as someone who has studied with it, from the customer's perspective, the selection of suppliers and the criteria of cost (product price, transport cost); quality (product rejection ratio, average delivery time, solutions for quality problems); service performance (deliveries, technical services, support in changes, ease of communication) and supplier profile (financial status, historical performance, production capacity).

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In the customer-supplier relationship Hüttinger, Schiele, and Veldman (2012) argue that the degree of attractiveness of a customer is the potential force that makes a supplier initiate and intensify the exchange of business relationships, after which, if the relationship meets the expectations of the supplier, the customer satisfaction assessment is activated with the aim of identifying those factors that need to be improved; finally, among the customer portfolio of a supplier there will always be preferred customers, those who otherwise give back to the supplier benefits of different indoles. Corsten, Gruen and Peyinhaus (2007), propose to evaluate the perception of suppliers with respect to their customers with the variables: degree of customer-supplier identification; specific investments in the relationship with the supplier; trust; information exchange; innovation; cost performance; operational volatility; operational failures; by integrating a measurement questionnaire on the customer-supplier relationship in order to identify those that impact the operational performance of supplier companies.

According to Van der Valk, Van Weele & Kibbeling (2008), there is a difference between quality measured in terms of cost and quality with respect to collaboration as a bargaining power strategy of suppliers. In their case study on the development of a model to assess the post-selection performance of suppliers of service companies, they classify the behaviour of suppliers into transactional suppliers (if their relationship is based on cost and quality characteristics of the final product); whereas if the customer-supplier relationship is based more on aspects of collaboration, communication as well as resource sharing, they call them relational suppliers.

Finally, he found in the cases addressed that customers appreciate both types of suppliers equally and that the existence of one or the other depends on the needs of the customer organisation.

Methodology

The units of analysis were suppliers of small companies in the service sector, specifically car repair and maintenance companies, beauty salons, and restaurants located in Ciudad Obregón, Sonora as well as in Ciudad Juarez, Chihuahua (both in Mexico).

Therefore, the study is non-probabilistic with convenience sampling. A questionnaire was designed to evaluate the performance of suppliers based on criteria reported in the literature on the subject, aligned with the objective of the study, face validity was considered, so that the content reflects what is measured, taking care of a good presentation format, clear instructions, questions written in an understandable way and presented in an appropriate sequence and coherent response options as recommended by Fanning (2005).

Based on the literature review, 33 questions (items) were proposed to address the criteria quality, delivery, price, flexibility, competitiveness, training, innovation, technology, and trust (Miglierini & Treviño, 2012; Hüttinger, H., & Veldam, 2012; Corsten, Gruen, & Peyinghaus, 2007; Porter, 1980; Rodríguez-Escobar, 2008).

The response options were presented in open-ended, choice-choice modalities for the socio-demographic data and closed-ended for the questions related to the selected criteria questions, as the latter was considered to favour the statistical analysis of the data.

A four-point Likert scale was chosen to force the respondent to clearly state his or her perception.

The analysis was carried out using the statistical software for social sciences, SPSS (version 19.0). Reliability and validity analyses of the instrument were conducted. The internal consistency of the test was sought from Cronbach's Alpha coefficient. To determine whether the data fit the factor analysis (FA), the Kaiser-Meyer-Olkin index (KMO) was calculated; it was decided that if the index was greater than 0.7 it was justified according to Chávez-Ramírez and López-Ribeiro (2005). Exploratory PA was performed using the principal components method with varimax rotation. The following criteria were considered for the choice of factors and items: The factors had to have an eigenvalue greater than 1; the items had to have a saturation (factor loading) equal to or greater than 0.50; The question had to be included in only one factor; the one in which it presented a higher level of saturation, or where it is better supported by theory*; It had to possess conceptual congruence between all the questions included in a factor.

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A factor had to be made up of three or more questions, except for those factors in which two questions were clearly supported by the theory or by the internal consistency coefficient; A factor had to have a reliability higher than 0.5 according to Oviedo & Campos-Arias (2005).

Results

Sample characteristics

The sample consisted of 509 suppliers evaluated by their customers, the descriptive statistics of the evaluators are 213 (41.8%) women and 296 (58.2%) men, their age ranged from 19 years to over 55 years. Most of them were in the 30-55 age range (71.9%).

Age	Frecuency	Percentage
19 years or less	30	5.9
20-20 years	136	26.7
30-55 years	308	60.5
More 55 years	35	6.9
Sex		
Man	296	58.2
Woman	213	41.8
Level of studies		
Primary	13	2.6
High school	50	
Preparatory	143	28.1
Technical	63	12.4
College	228	44.8
No studies	12	2.4
Hometown		
Ciudad Oregón	365	71.7
Ciudad Juarez	144	28.3

Table 1 Descriptive statistics of the demographic variables in 509 adults participating as evaluators.

In relation to the level of education they have, it is distributed as follows: 2.4%, no studies, 2.6% primary school, 9.8% secondary school, 28.1% have completed high school, 12.4% technical level and 44.8% university.

Exploratory factor analysis (FA)

The KMO measure of adequacy of the Supplier Performance Evaluation questionnaire reached a score above 0.7 and Bartlett's test of sphericity was below 0.05 validating the factor analysis procedure (KMO = 0.994; Bartlett p = 0.000). Cronbach's alpha for the 33 items was 0.893, with 68.23% of total variance explained for five factors.

Of the 33 initial items contained in the questionnaire, the following items were excluded because they did not meet the criteria considered for selection: 5, 16 and 30. The questionnaire consisted of 30 items and five factors. The Cronbach's alpha value achieved was 0.953 and the total variance explained was 68.23%.

The findings of the present study indicate that the supplier evaluation questionnaire was consistently adapted. Five factors were obtained, consisting of conceptually and statistically consistent items. The factors represent information on how service sector customers in Ciudad Obregón Sonora and Ciudad Juarez, Chihuahua perceive the performance of their main suppliers. The percentage of the total accumulated variance of 68.3% suggests that what is assessed through this test is represented by a single construct (supplier performance). The factors identified through factor analysis are described below.

Factor 1, Traditional Performance: this can be described as the traditional criteria that suppliers are normally evaluated by grouping items related to:

	1	2	3	4	5
Valor propio	13.955	2.569	1.551	1.440	1.073
Total varianza total explicada %	46.515	55.078	60.248	65.047	68.625

Matriz de componentes rotadosa

	Componente				
	1	2	3	4	5
P23	.780				
P9	.778				
P13	.765				
P18	.718				
P11	.682				
P12	.679				
P22	.663				
P24	.653				
P25	.647				
P8	.641				
P10	.631				
P31	.619				
P26	.614				
P21	.608		.506		
P19	.587				
P28	.510				
P7		.785			
P3		.757			
P2		.742			
P15		.727			
P14		.679			
P4		.587			
P6		.579	.504		
P1			.667		
P17			.547		
P27				.762	
P29				.624	
P33					.770
P32					.767

Table 2 Factor structure with varimax rotation of questionnaire to assess supplier performance

Quality: understood in terms of compliance with specifications, tangible and technical aspects in the context of the service, delivery of defective products, handling of complaints, and commitment to the environment.

Delivery: considering the speed of delivery of purchased products or requests for quotations.

Price: Considered financial aspects of the supplier, offer of different payment methods, discounts offered and cost of the product or service.

Factor 1 represents 46.1 of the total variance explained and is congruent with that reported by Sarache-Castro et al. (2009), that these aspects are preferred by organisations when considering supplier evaluation criteria.

Factor 2, Communication and Flexibility: this strategy refers to two fundamental criteria in the field of the relational customer-supplier relationship.

Communication, understood in terms ranging from providing information on new trends of interest to customers, the ease and formality of communication by any means, and finally the enthusiasm of suppliers for the products they offer.

Supplier flexibility in relation to meeting customer needs under various conditions and responsiveness to requests for changes or adjustments to orders.

Factor 3, Competitiveness: this factor considered post-sales follow-up, mutually beneficial relationships, the continuous offer of training to customers as well as the suppliers' interest in the growth of their customers.

Factor 4 Innovation and Technology. This co-respondent considered customers' perception of their suppliers' innovation processes and use of technology in a broad sense.

Factor 5, Trust. This factor addressed the supplier's ability to respond to customer requests in times of shortages and the extent to which the supplier honours the guarantees to which it has committed itself.

Conclusions

From the theoretical review it can be concluded that research on the customer-supplier relationship is important, as studies by Miglierini et al., (2012); Hüttinger et al., (2012); Corsten et al., (2007); Porter, (1980); Rodriguez-Escobar, (2008) and Bogdanoff (2009), and Van der Valk, et al., (2008) present diverse views on this relationship. The references and studies found in relation to the evaluation of supplier selection and performance deal mainly with the handling of essentially quantitative aspects, such as price and delivery time aspects. But there is also a point of view on factors that have to do with the quality of relationships during the purchasing process.

Five factors were identified that jointly measure both transationally and relationally the performance of suppliers of small service companies. The results of the study are reliable and valid. It is considered that the objective of the study has been achieved by developing an instrument to determine the performance of suppliers from the customers' perspective. It is suggested that the information generated be analysed both descriptively and inferentially to determine possible relationships between the socio-demographic variables and the factors obtained, as well as comparative studies between the performance of the various participating organisations to identify their strengths and weaknesses.

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