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Article

Evaluation of Service Quality in Harbor Bonded Warehouses

Evaluación de la calidad del servicio de recintos fiscalizados portuarios

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ABSTRACT

Aim: To evaluate the quality of the service rendered by bonded warehouses at Manzanillo Harbor, Colima Mexico, using the Servqual method, and to suggest improvement actions.

Methods and techniques: The study type used was descriptive-correlational. A 22-item questionnaire based on a five-point Likert scale was applied to 100 customs agencies in Manzanillo Harbor, with 95 % confidence level, and 5 % permissible error. The Goodman and Kruskal gamma statistics were used to know the association level of factors in relation to the quality of service.

Main results: The factors with the highest level of association were safety (0.783), visible tangible elements (0.639), reliability with certain positive relationship level (0.589), and empathy (0.559). Factors safety and visible tangible elements were high in the determination of service quality.

Conclusions: The bonded warehouses should direct their strategies to the solution of problems that might block service quality, which may be related to sensitivity, empathy, and reliability as a result of their moderate level in the determination of quality, depending on the perception of customs agencies through their representatives. Continuous improvement strategies should be implemented in relation to the least

satisfied items, such as time and speed of service offered, and in aspects like confidence conveyed by employees, the promptness of their service, and personal care, which can be corroborated in factors safety and visible tangible elements.
Keywords: customs agencies, service quality, bonded warehouses.

RESUMEN

Objetivo: Evaluar la calidad del servicio que prestan los recintos fiscalizados en el puerto Manzanillo, Colima, México mediante el método Servqual y proponer las acciones de mejora.

Métodos y técnicas: El tipo de estudio fue descriptivo-correlacional. Se aplicó un cuestionario de 22 ítems con una escala tipo Likert de cinco puntos a 100 agencias aduanales ubicadas en el puerto de Manzanillo, con un nivel de confianza del 95 % y un error permisible del 5 %. Se utilizó el estadístico de gamma de Goodman y Kruskal para conocer el grado de asociación de los factores respecto a la calidad del servicio.

Principales resultados: Los factores con mayor grado de asociación fueron: seguridad (0,783), elementos visibles tangibles (0,639) y con cierto grado de relación positiva los de fiabilidad (0,589) y empatía (0,559). Los factores seguridad y elementos visibles tangibles tuvieron un alto nivel en la determinación de la calidad del servicio.

Conclusiones: Los recintos fiscalizados deben concentrar sus estrategias en solucionar los problemas que pueden estar obstaculizando la calidad del servicio, relacionados con los factores sensibilidad, empatía y fiabilidad por tener un moderado nivel en la determinación de la calidad, según la percepción de las agencias aduanales a través de sus representantes. Deben plantearse estrategias para la mejora continua en los ítems de mayor insatisfacción como el tiempo y rapidez en la prestación del servicio, y en aspectos como la confianza que infunden los empleados, la prontitud de su servicio y el aspecto personal, lo que se corrobora en los factores de seguridad y elementos visibles tangibles.

Palabras clave: agencias aduanales, calidad del servicio, recintos fiscalizados.

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INTRODUCTION

In recent years, quality is an issue every industry should handle optimally, since it contributes to the continuous improvement of company processes, thus ensuring their success and cost-effectiveness.

According to Martínez and Kadi (2019), who referred to Deming, quality does not mean luxury. Quality is a degree of predictable, low cost, uniformity and reliability that adapts to the market. In other words, quality is everything consumers need and long for.

Because the needs and wishes of consumers are always changing, according to the above authors, the definition of quality associated with consumers consists in redefining the requirements constantly. Likewise, they note that 94% of quality issues are related to management, so they insist that one of the first measures of managements is to remove the barriers that keep workers from developing an efficient task.

Although the theoretical, practical, and methodological conceptions of quality were marked by its origin and later evolution in the field of industry, its introduction in the field of services has necessarily had to adapt to the particularities of the industrial sector, such as, the intangibility of processes; the product cannot be stored or recycled; the suppliers and customers must coincide in time and space; the relative values of personal communication are decisive (Kotler, 2006; Ladhari, 2008; Parasuraman, Zeithaml, and Berry 1985).

The previous helped infer that service quality is harder to evaluate than goods quality; however, the criteria for evaluation not only show the final result of the service, but they also include the process of reception and the customer-supplier relationship throughout this process in a significant manner.

Consequently, the evaluation of service quality by consumers is a key competitive tool; it significantly affects cost-effectiveness and the competitive position in the long-run, and it derives from a process where consumers compare their expectations to perceptions.

That is, quality is measured by establishing the difference between the service expected by customers, and the one received by the organization, so the greater customer formation and information has evolved in relation to suppliers, so they are increasingly more demanding, and value quality more as an indispensable element (Matsumoto, 2014).

In Mexico, this culture associated with services is still incipient, and the literature that refers to quality studies in business organizations is poor (Palacios and Vargas, 2012). Recent data reveal that only 1.83% of the whole universe of Mexican companies has ISO 9001 certification, accounting for 12 417 entities (Álvarez, 2019).

This problem also involves bonded warehouses, as a commercial choice that facilitate, speed up, and simplify customs and foreign trade activities whose end is to promote the competitiveness of national companies, and encourage national and international investments.

Mexico needs effective programs that foster productive investment: from the creation of facilities to ensuring safety during the activities and projections. Considering the importance of logistic in Mexican trade, the attention must focus on the area of bonded warehouses, in order to create better conditions for the production sectors.

Consequently, a key element of this research was to identify the factors that determine service quality in bonded warehouses through the perception of customers, in order to find areas of improvements, start actions, and adopt decisions that benefit and improve performance, and to enhance the trading position of customs.

Accordingly, this research evaluated the bonded warehouses at the port of Manzanillo, Colima, Mexico, a national referent that ranks third among the ports of Latin America and the Caribbean in terms of container movement, according to the Economic Commission for Latin America and the Caribbean (CEPAL, 2019).

This paper was part of a research project related to the quality of service at bonded warehouses in that harbor, and it is based on a study of tendencies of modernization at Manzanillo Customs, and its effects on supervision, collection, and facilitation of foreign trade (Reyes, 2018). This study entails a direct relation between commercial facilitation and service quality through national indicators (Tax Service Administration, 2015) in sight of no analyses of this type in Mexican Customs.

Accordingly, the aim of this research was to evaluate the quality of services offered by bonded warehouses at the harbor, using the Servqual method, and to recommend improvement measures.

DEVELOPMENT

Theoretical rationale for service quality

In the early 1900s, Frederick W. Taylor, founder of the School of Scientific Administration, developed a new philosophy of production. It consisted in the separation of planning from implementation. This method worked well at the beginning of the century, when the employees lacked proper education to conduct planning. Dividing a job into specific tasks and focusing on increasing efficiency left the job in the hands of supervisors. Later, Henry Ford incorporated Taylor's philosophy to massive industrial production, which gave rise to the first models and quality tools to correct mistakes and flaws in the products (Granados, 2011).

After the Second World War, production became the main priority, whereas the management of organizations showed little interest to improve quality or prevent flaws and errors.

Then, Joseph Juran and Edwards Deming introduced the techniques for statistical control of total quality. Basically, the Japanese were benefited with this proposal whose tools helped rebuild the country. Shortly after, they spread out internationally, paving the way for the creation of the quality system for production, which soon was transmitted to other areas of the planet. It took the Europeans longer to adopt the system, though they developed definitively during the 1980s (Cubillos and Rozo, 2009).

As soon as businesses and the industry began to focus on quality, governments recognized its importance for the economic health of countries; by 1984, the US government named October as the national month of quality. In 1985, the National Aeronautics and Space Administration (NASA), announced the Quality and Productivity Award. In 1987, the National Malcom Balridge Quality Award –a statement showing the intention to provide quality leadership– was established through a Law of Congress (Evans and Lindsay, 2008).

In the 1990s, the concept of total quality management (TQM) was used for the first time, as a global management strategy for the organization. The implementation of TQM was a long and complicated process that entailed a change of philosophy of the organization, as well as the management procedures of the responsible parties. This evolution in the concept of quality has taken place alongside the evolution of production systems in recent years, from massive production to lean production.

The managing strategy of TQM comprises a compilation of the best management practices that can and should be developed by organizations to adapt increasingly faster to the current reality of change. Likewise, so that it becomes effective, a fundamental condition must be met: all the leaders of the organization should be convinced of the need of change and the role they must play to conduct those changes (Torres, Ruíz, Solís, and Martínez, 2012).

That way, total quality is a systematic condition through which the organization meets the needs and expectations of their customers, shareholders, and the general society, using the resources available, such as people, materials, technology, production systems (Carro and González, 2012).

The introduction of the concept of quality permitted the modification of rooted conception that considered quality as an exclusive responsibility of people directly linked to production, an issue that could only be addressed in the technical areas. In addition to the previous, there was a remarkable emphasis on quality assessment in detriment of conscientious action; that is, improvements and innovation.

In that sense, Ishikawa (1986) stated that the implementation of quality control as part of this management means developing, designing, manufacturing, and maintaining a quality product within the highest cost-effectiveness, usefulness, and customer satisfaction.

In terms of quality as satisfaction, Crosby (1987) developed the idea by affirming that it does not cost, but it is not a gift, though it is free of charge. What costs money is the things that have no quality, all the actions that result from not doing things right the first time.

Under this conception, quality was more associated with consumer demands in relation to the satisfaction of their needs understood as the set of all the characteristics of a

product or service that becomes important to customers. Some of them can be implicit, as the customer does not require them explicitly, but anyway vital. If organizations focus on guaranteeing quality, they could increase sales profits between 5 and 10% (Crosby, 1987).

It is worth noting that the concept of continuous improvement of quality is inseparable from total quality; in fact, many authors and specialists use them as a single unit. This approach was adopted in the ISO 9001:2000 Standard, Systems of quality Management that emphasized on the importance of customers, greater knowledge of their needs and expectations, and the process approach, as part of the continuous improvement of the quality management system (International Standardization Organization [ISO], 2020).

These contributions have consolidated a body of duly structured theories, methods, and instruments that constitute the base of quality assessment of service under the present conditions, though several authors had referred to its particularities much earlier.

Because services are not objects, but results, consumers cannot assess quality before purchasing. Neither can they refer to particular uniform specifications of goods; hence, due to the intangible character of organizations (Grönross, 1982) of this type, they often face difficulties in understanding how their customers perceive the quality of the service they offer (Duque, 2005).

Generally, every organization demands management oriented to customer satisfaction. The improvement of this service should be done through quality measurements before making changes, so the concept of service quality measurement must be clearly specified (Senlle, 2001).

According to Parasuraman *et al.*, (1985), service quality is harder to assess; by purchasing goods, customers use quite a few tangible signs to judge it: style, hardness, color, label, feeling, packing, adjustment. In comparing services, fewer tangible signs can be observed. In most cases, the tangible evidence is reduced to the physical facilities of the service supplier, equipment, and staff.

In sight of this situation, it is necessary that service suppliers know how it will be assessed by customers, possibly suggesting how this assessment influences on a desired direction (Grönross, 1982). If the organization knows what customers want,

about the service offered, then it is much easier to meet those expectations and maintain these consumers longer by their side (Chase and Tansik, 1983).

The end of assessment is that the organization where it applies, the conceptions and basic values that govern it can be kept, including the creation of conditions for continuous improvement and development.

Organizations seek competitiveness in a highly competitive market, where service quality is an attribute demanded by consumers, so measuring it has become a useful tool, since it allows the organization to diagnose areas of deficiency, and identify the main breaches of perceived quality customer dissatisfaction (Sánchez and Sánchez, 2016).

According to Porter (2002), the competitive advantage permits organizations to differ from competition, having a unique value offer preferred by customers. Likewise, so that organizations develop such advantage, they must conduct strategic actions to be more efficient than their competitors (cost leadership), or create goods or services different from the rest (differentiation).

The closest strategy to the approach of this research is service differentiation, since it consists in offering customers something that makes the difference in the competition, making them more attractive in the market.

Undoubtedly, as a result of globalization, the sector of foreign trade requires innovation and technology that allows them to be among the first to have the purpose of delivering products satisfactorily in terms of quality and time, with the correct quality and price, which leads to full customer satisfaction (Guzvha, Nebotov, and Ivanov, 2019).

Likewise, product differentiation (which is never identical in all the markets), and service customization (derived from the interactive nature of services) gain momentum. Both aspects entail that service, in general, and the one offered by the bonded warehouse must have quality that meets the demands of the foreign market (Maroto, Gago, and Rubalcaba, 2005).

Factors that determine quality of the service offered by bonded warehouses in the harbor of Manzanillo, Colima, Mexico.

In reference to a bonded warehouse, it is a place administered by private entities to which the Service of Tax Administration (SAT) leases for management, storage, and

protection of merchandise in facilities located within fiscal facilities, called leased bonded warehouses. Leasing is done through bidding, according to the Rules, and includes the utilization, possession, or use of the facility where the service will be provided (Congress of the Union, 2018).

The legal base of bonded warehouses is established in Articles 14 and 14-A of the Customs Law (Congress of the Union, 2018):

> Handling, storage, and custody of foreign trade merchandise is the responsibility of customs services and the legal entities that use or possess a facility adjacent to a bonded warehouse or harbor facility, even though it is a constrained route or facility located inside or adjacent to a harbor, including the area of development. In the case of maritime, border, railroad or air traffic customs, they may request authorization from SAT to offer services of handling, storage, and custody of merchandise, in which case it will be known as authorized bonded warehouse. (p. 8)

According to the Chamber of Deputies (2018), the Customs Law, Article 14-A rules that:

> Authorizations could be granted for up to twenty years, which may be extended at the request of the interested party for a similar period, provided that the request is submitted within the last three years of the authorization, and the foreseen requisites for the lease are still being fulfilled, along with the liabilities derived from the system. In no case, the original term of existence of extension of authorization will be greater than the one authorized for legal use or possession of the facility in which the service will be provided. (p. 9)

In this paper, the assessment of service quality in bonded warehouses is important for customs due to the following reasons: a) the effect produced on providing trade; b) the place used for special logistics for merchandise imports, and consequently, their contribution to the optimization of resources and cost reduction; and c) faster customs operations.

In Manzanillo harbor, the Integral Harbor Administration of Manzanillo (APIMAN, 2019) is the organization in charge of controlling bonded warehouses. It conceives a

comprehensive system of harbor quality that ensures importers, exporters, and shipping companies access to quality service, by complying with commitment voluntarily acquired by the harbor authorities and the service providers.

The harbor of Manzanillo, according to CEPAL annual report of 2018, is the most important container cargo transportation in the country, ranking 64th in the world, and 3rd in Latin America (CEPAL, 2019). Today, it has 14 bonded warehouses that provide services.

Research method

A transversal quantitative descriptive-correlational study was designed. It was descriptive because the factors that determine service quality were identified and described; and correlational because it established the relation and association of the factors that characterize it. The factors included were the dimensions recognized in the Servqual survey designed by Parasuraman *et al.,* (1985): reliability, sensitivity, safety, empathy, and visible tangible elements. It is considered the most widely accepted and used multidimensional tool to measure quality in companies that provide services, due to its validity and reliability.

This research relied on the analysis made by Zeithaml, Bitner, and Gremler (2010): 1) reliability (FIA): understood as the ability to run the service agreed reliably and carefully; that is, the organization meets its agreements about deliveries, service provision, problem solution, and price settling; 2) sensitivity (SENS): the willingness to help users and offer fast and proper service. It refers to the attention and promptness when dealing with the requests, answering questions and complaints from customers, and addressing issues; 3) safety (SEGU): it represents the knowledge and attention of the staff, and their ability to inspire credibility and reliability; 4) empathy (EMPA): in reference to the level of customized attention offered to customers by companies. It must be diffused through personalized or adapted means to meet the customer's taste; and 5) tangible visible element (ETVI): it includes the physical appearance, facilities, infrastructure, equipment, materials, staff.

The space-time boundary corresponded to the harbor city of Manzanillo, Colima, Mexico. A questionnaire was designed in relation to quality factors comprising 22 items, which are statements to collect and measure the responses about the perception of

service quality. The indicators of service qualification in Mexican customs offices during 2007-2019 (Service of Tax Administration, 2019), the theoretical rationale for the functions of modern customs, and the results of the flexible customs modernization model using the variable observed, according to the method of *Path Analysis* (Hair, Anderson, Tatham, and Black, 1999), were considered to adjust the statements to the context of bonded warehouses. It demonstrated the contribution of technology, particularly the one related to safety and infrastructure of effective administration of customs in Manzanillo (Reyes, 2018).

The population in the study was the customs agencies located in the harbor of Manzanillo, which belong to the Association of Customs Agents in the Harbor of Manzanillo A.C. (AAAPUMAC). In 2018, it was made of 134 members (AAAPUMAC, 2018). Using the formula of finite populations, according to Fischer and Espejo (2014), a sample of 100 customs agencies was defined (95% confidence, 5% error)

Analysis of results

Fig.1 shows the result of the Spearman correlation coefficient (ρ), and the Goodman and Kruskal gamma (γ) association statistic.

The Spearman rho (ρ) coefficient was calculated as follows:

$$\rho = 1 - \frac{6T}{n(n^2 - 1)} \quad (1)$$

$$T = \sum_{i=1}^{n} \left[R(x_i) - R(y_i) \right]^2 \quad (2)$$

The application of this test required data in a bivariate random sample with an *n* size (x_1, y_1), (x_2, y_2),…, (x_n, y_n), and the application of position change. That is: defining $R(x_i)$ as the position *of* x_i when compared with other values of *X*, for *i* = 1, 2,…, *n*, $R(x_i)$ = 1, if x_i is the lowest, $R(x_i)$ = 2, if it is the second lowest, and successively, and the *n* position is given to the greatest x_i value. Similarly, $R(y_i)$ will be equal to 1, 2,…, or *n*, depending on the relative magnitude of y_i when it is compared with all the *Y* values (Zimmermann, 2004).

Then:

$R(x_i)$ = is the position of x_i when compared with other values of X, for i = 1, 2,…, n,

$R(x_i)$ = is the position of x_i when compared with other values of Y, for i = 1, 2,…, n,

T = is the sum of the difference to the square root between positions $R(x_i)$ *and* $R(y_i)$.

n = number of sample observations.

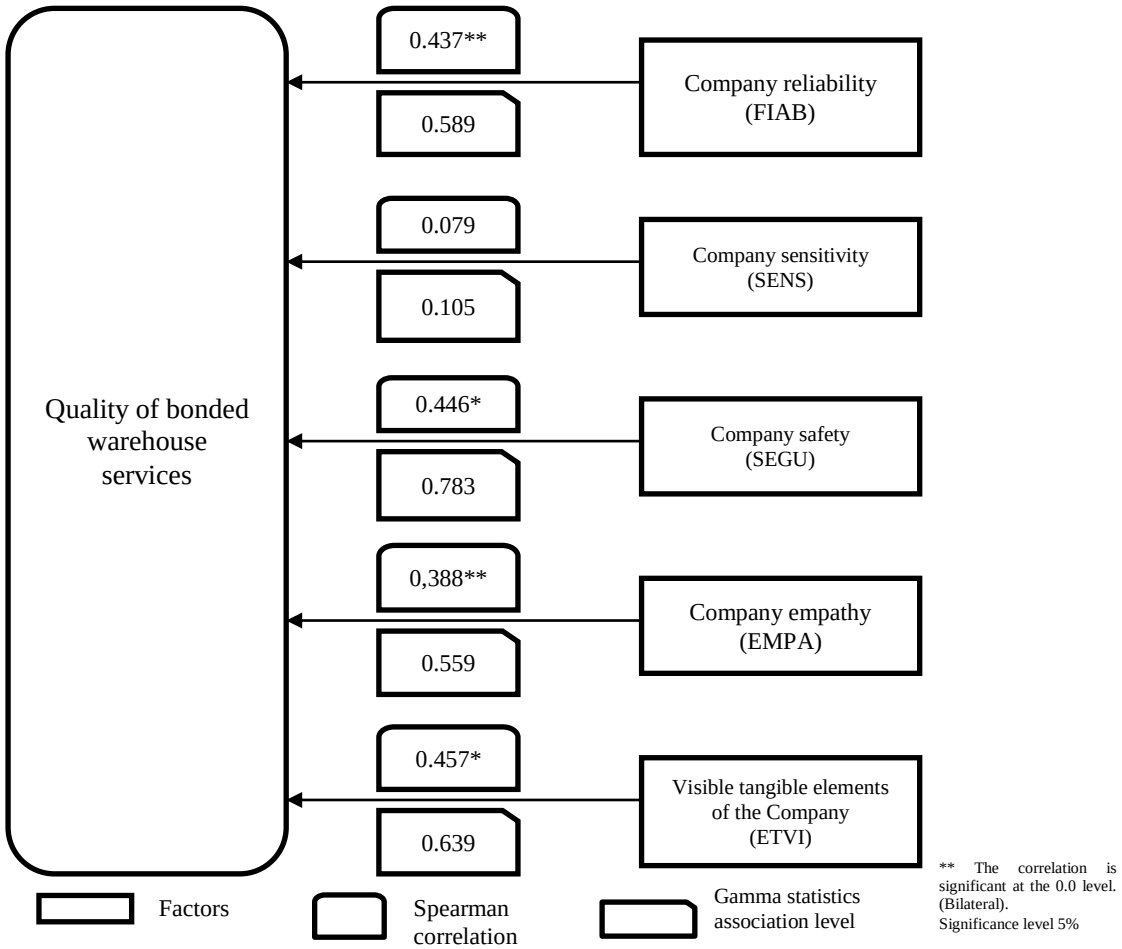

Fig. 1. Results of the correlation and association degree of factors used to evaluate the quality of bonded warehouse services

Source: Self-made, data collected from field research using the Statistical Package for the Social Sciences (SPSS v. 21).

The correlation coefficient varies between -1 and +1; 0 indicates no linear correlation of the factors for the analysis (Zimmermann, 2004). Table 1 shows in detail the variation and relation (Martínez, Tuya, Martínez, Pérez, and Cánovas, 2009). The utilization of the correlation matrix is appropriate when the aim of researchers is to determine the relations among the variable analyzed, in this case, factors (Hair *et al.*, 1999).

Table 1 Interpretation scales for the correlation degree of Spearman rho (ρ)

Range	Relation
-0.76 to -1.00	Negative strong-perfect correlation
-0.51 to -0.75	Negative moderate-strong correlation
-0.26 to -0.50	Negative weak correlation
-0.01 to -0.25	Little negative correlation
0.00	No correlation
0.01 to 0.25	Little positive correlation
0.26 to 0.50	Positive weak correlation
0.51 to 0.75	Positive moderate-strong correlation
0.76 to 1.00	Positive strong-perfect correlation

Source: Martínez *et al*. (2009).

Likewise, Goodman and Kruskal gamma statistics was calculated to indicate the type of existing association, which is a nonparametric measure of strength and direction of the association between two variables measured in an ordinal scale (Laerd Statistics, 2017). The gamma (γ) statistics summarizes the association between two variables (a predictor, namely the factors and responses); it is in the interval [-1, 1], so a positive number or data indicates that the high values of a variable are associated with the high values of the other, while the low values associate with low values; a negative data or number indicates that the high values of a variable associate with the low values of the other, while the low values associate with the high values (García, 2004).

The formula to calculate this statistic was

$$Gamma\ \ (\gamma) = \frac{P - Q}{P + Q} \qquad (3)$$

Where:

γ = Goodman and Kruskal gamma statistics

P = product of the concordant pairs

Q = product of discordant pairs

The calculation of the internal consistency of a scale was done through Cronbach Alpha, which produced a value of 0.7, considered as acceptable by Hernández, Fernández, and Bapstista (2014).

The factors that showed the highest correlation were visible tangible elements (0.457),

then safety (0.446), reliability (0.437), empathy (0.388). In general, the results show a weak positive correlation. However, the association of items, except for the sensitivity (0.105), showed a positive and favorable behavior. The factors with the highest degree

Likert scale range	Interval	Category
5	4. 20<$\bar{x}$ ≤5.00	Very high level

of association were safety (0.783), visible tangible elements (0.639), reliability (0.589), empathy (0.559).

The importance given to items in bonded warehouses in the harbor of Manzanillo was analyzed, depending on the perception of customs representatives. Accordingly, a survey questionnaire was applied and evaluated using a five-point Likert scale, in which 5 indicates the most positive perception, and 1 indicates the most negative perception of service quality factors (Kerlinger, 1997).

The analysis of the indicators of the Likert scale and semantic differential relied on the parameters established in descriptive statistics, which used the mean as the central tendency measure. The proposal of Gómez, Santos, and Castrillón (2016) was implemented to interpret the descriptive statistics and the design of result tables, and for the analysis of the perception mean in the interpretation of the Likert scale (Table 2). In this study, the categories correspond to the level in which the factors determine the quality of service rendered by bonded warehouses, and permitted the interpretation of the perceived mean.

Table 2. Analysis of the interpretation mean thorough the Likert scale

Source: (Gómez *et al*., 2016)

Likert scale range	Interval	Category
5	4. 20<$\bar{x}$ ≤5.00	Very high level
4	3.4<$\bar{x}$ ≤ 4.20	High level
3	2.60<$\bar{x}$ ≤3.40	Moderate level
2	1.80<$\bar{x}$ ≤2.60	Low level
1	1.00<$\bar{x}$ ≤1.80	Very low level

The assessment of factors was conducted as shown in Table 3, considering the responses in the Likert scale, using the perception means and the measurement scale.

Table 3. Factor statistics

Factors	Mean	Category
Reliability	3.13	
Sensitivity	3.11	Moderate level
Empathy	3.25	
Safety	3.5	High level
Visible tangible elements	3.52	

Source: made by the authors, based on the analysis of the questionnaire

The interpretation of results of perception means indicated that the factors sensitivity, reliability, and empathy corresponded to the moderate category, according to the measurement scale set previously. In turn, the tangible elements and safety showed a high level in the determination of service quality in the bonded warehouses.

One plausible explanation of this finding is that safety is growingly gaining more importance in Mexican customs, since important resources are being earmarked for infrastructure as a practice that comprises building refurbishing for commercial operations, along with improvements to the road system and infrastructure. The purpose was to facilitate trade as one of the key functions of modern customs, because its direct effect can be completed through the growing manipulation of loads from cross border trade (Reyes, 2018).

The plan to modernize customs in Manzanillo, particularly (Service of Tax Administration, 2006) was designed to contribute efficiently and productively to the national and international logistics chain, which resulted in the duplication of the capacity of the entity in terms of expanding the physical infrastructure consisting in transportation means, technology, and safety.

Another element to be considered, which would explain the significance of safety is article 15 of the Customs Law, rules that the legal entities participating in bonded warehouses must comply with the guidelines set by the customs authorities to control, monitor, and protect the warehouse (Congress of the Union, 2018). However, there are no specific guidelines associated with reliability, empathy, and sensitivity.

An analysis of item frequency of every factor evidenced the factors of service quality that cause dissatisfaction, and helped lay out improvement actions. Accordingly, the responses with values 1 and 2 (completely in agreement or disagreement) were assumed. Tables 4, 5, 6, 7, and 8 show the results achieved. Note that the responses are homogeneous, since the typical deviations are relatively low, compared with the means, so the ideas expressed in the responses are widely extended in the subjects of the sample.

Table 4. Reliability statistics (%)

Items	Likert scale					Mean	Typ.
	1	2	3	4	5		Dev.
1.-When the company promises to do something at a given time, it honors its word.	14	34	24	21	7	2.73	1.15
2.-When the customer has a problem, the company shows true interest in addressing it.	11	12	30	38	9	3.22	1.12
3.- The company renders the service well for the first time.	6	22	18	39	15	3.35	1.15
4.- The company provides services at the time it commits to do so.	8	26	20	34	12	3.16	1.17
5.- The company insists on error-free records.	8	22	27	28	15	3.20	1.18

Source: Source: made by the authors, based on the analysis of the questionnaire

Table 5. Sensitivity statistics (%)

Items	**Likert scale**					**Mean**	**Typ.**
	1	2	3	4	5		**Dev.**
6.- The company maintains customers informed about when the services will be rendered.	9	13	17	40	21	3.51	1.21
7.- The company's employees provide fast service.	15	19	27	32	7	2.97	1.18
8.-The employees are willing to help.	10	15	19	46	10	3.31	1.15
9 The company's employees are not too busy to help.	25	21	23	25	6	2.66	1.26

Source: Source: made by the authors based on the analysis of the questionnaire

Table 6. Safety statistics (%)

Items	Likert scale					Mean	Typ. Dev.
	1	2	3	4	5		
10.-The behavior of employees transmit confidence to customers.	8	14	27	45	6	3.27	1.03
11.-The customer feels safe during the transactions with the company.	8	8	23	42	19	3.56	1.13
12 The employees are kind to the customers at all times.	6	13	15	47	19	3.60	1.11
13.- The company's employees are capable of responding to the concerns of customers.	8	11	21	37	23	3.56	1.19

Source: Source: made by the authors, based on the analysis of the questionnaire

Table 7. Empathy statistics (%)

Items	Likert scale					Mean	Typ. Dev.
	1	2	3	4	5		
14.-The company provides customized attention to customers.	6	17	29	31	17	3.36	1.13
15.-The company has employees who offer personalized attention to customers.	12	17	33	23	15	3.12	1.21
16.-The company is aware of its interests.	6	17	41	25	11	3.18	1.04
17.- The employees meet the particular needs of customers.	8	25	19	35	13	3.20	1.18
18.- The company has convenient customer support hours.	8	19	13	43	17	3.42	1.20

Source: made by the authors, based on the analysis of the questionnaire

Table 8. Visible tangible elements statistics (%)

Items	Likert scale					Mean	Typ. Dev.
	1	2	3	4	5		
19.-The company has modern equipment.	6	9	19	47	19	3.64	1.03
20.- The facilities of the company are attractive.	8	11	17	37	27	3.64	1.21
21.- The company's employees are neat.	10	13	25	33	19	3.38	1.22
22.-The materials related to service are visually attractive for customers of the company.	9	8	31	35	17	3.43	1.13

Source: Source: made by the authors, based on the analysis of the questionnaire

The results show that the main items with confirmed dissatisfaction in terms of reliable service performance were associated with the deadline set to render the service (48%), provision of the service in time (34%), and error-free records (30%).

Sensitivity was the least explicative factor of service quality in bonded warehouses. In turn, the main items associated to dissatisfaction, as to the willingness to help and render a fast and appropriate service to questions, complaints, and the solution of problems, were linked to the promptness of service, due to busy employees (46%), service speed (34%), and the willingness to help (25%).

This dimension had a highly explicative level of service quality in bonded warehouses, in aspects like knowledge and attention of employees and their ability to inspire credibility and reliability, with the main dissatisfactions, though in low percent, in terms of reliability inspired by the employees (22%), and courtesy to customers (19%).

This dimension refers to the customized attention offered by companies to customers. The main dissatisfactions observed in the items associated with the specific needs of customers (33%), the company should have employees that provide customized attention to customers (29%), and convenient hours for attention (27%).

Finally, the factor visible tangible elements, with a high level of determination of service quality in bonded warehouses, showed dissatisfaction, with relatively low percent in items like physical appearance (23%), and the attractiveness of the facilities (19%).

CONCLUSIONS

One way of evaluating service quality in bonded warehouses is to identify, ultimately, the factors that help measure it, based on the assumption of the importance of the relation established between the customer and the provider throughout the process; secondly, the recognition that evaluation by consumers is a key competitive tool that affects cost-effectiveness and the competitive position of customs in the long run.

This research contributed to the identification of the factors that determine service quality in bonded warehouses, according to the perception of costumes representatives. It considered prior results of research on the modernization of customs in Manzanillo.

It was corroborated that the factors with the highest degree of association were safety (0.783), visible tangible elements (0.639), reliability (0.589), and empathy (0.559). According to the perception study, the factors safety and tangible elements showed the highest values in the determination of service quality in bonded warehouses,

corresponding to the priorities established in the plans to modernize customs, based on the legal guidelines of bonded warehouses.

The results indicated that the bonded warehouses should focus their strategies on addressing problems that may be hindering service quality linked to sensitivity, empathy, and reliability, because they have a moderate level of determination, according to the perception of representatives from customs agencies. New strategies should be established for continuous improvement in relation to the issues with the highest customer dissatisfaction, in terms of time and speed when rendering services, some aspects associated with confidence transmitted by the employees, fast service, and personal appearance, which corroborates the analysis of safety factors and visible tangible elements.

REFERENCES

The population in the studywas the customs agencies located in the harbor of Manzanillo, which belong to the Association of Customs Agents in the Harbor of Manzanillo A.C. (2018). *Directorio de asociados*. Retrieved from http://170.80.31.82:82/Bases/AAAPUMAC/DirectorioAA.nsf/Directorio%20Web?OpenForm&Start=1&Seq=1

Álvarez, O. (2019). Estado de la certificación ISO 9001 y sus predicciones en México para el 2019. *Revista Consultoría*, (mayo), 2-6. Retrieved from https://revistaconsultoria.com.mx/estado-la-certificacion-iso-9001-predicciones-mexico-2019/

APIMAN. (2019). *Terminales e instalaciones*. Retrieved from http://www.puertomanzanillo.com.mx/esps/0020303/terminales-e-instalaciones

Cámara de Diputados (2018). *Ley Aduanera, artículo 14-A*. Retrieved from http://www.diputados.gob.mx/LeyesBiblio/pdf/12_241218.pdf

Carro, R. y González, D. (2012). *Administración de la calidad total*. Mar del Plata, Argentina: Editorial Universidad Nacional de Mar del Plata.

Comisión Económica para América Latina y el Caribe (2019). *Informe de la actividad portuaria de América Latina y el Caribe 2018*. Retrieved from

https://www.cepal.org/es/notas/informe-la-actividad-portuaria-america-latina-caribe-2018

Congreso de la Unión. (2018). *Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la Ley Aduanera*. Retrieved from http://www.diputados.gob.mx/sedia/biblio/prog_leg/Prog_leg_LXIII/278_DOF_25jun18.pdf

Chase, R. B. & Tansik, D. A. (1983). The Customer Contact Model for Organization Design. *Management Science*, *29*(9), 987-1012. doi: 10.1287/mnsc.29.9.1037

Crosby, P. B. (1987). *La calidad no cuesta*. *El arte de cerciorarse de la calidad*. México D.F., México: McGraw Hill.

Cubillos, M. C. y Rozo, D. (2009). El concepto de calidad: Historia, evolución e importancia para la competitividad. *Revista de la Universidad de La Salle, 9*(48), 79-99. Retrieved from https://ciencia.lasalle.edu.co/ruls/vol2009/iss48/4/

Duque, E. J. (2005). Revisión del concepto de calidad del servicio y sus modelos de medición. INNOVAR *Revista de Ciencias Administrativas y Sociales*, *15*(25), 64-80. Retrieved from redalyc.org/pdf/818/81802505.pdf

Duque, E. J. & Parra, M. C. (2015). Análisis de los modelos de medición de calidad percibida del servicio aplicados en la industria de hospitalidad. *Revista Perspectiva Empresarial*, *2*(2), 35-54.

Evans, J. R. y Lindsay, W. M. (2008). *Administración y control de calidad*. México D.F., México: Cengage Learning Editores.

Fischer, L y Espejo, J (2014). *Investigación de mercados: un enfoque práctico*. México D.F, México: OPCOM.

García, M. (2004). *Socio estadística: introducción a la estadística en sociología*. Madrid, España: Alianza Editorial.

Gómez, L. E., Santos, E. R. y Castrillón, M. J. (2016). Estrategias de innovación desarrolladas por los centros de investigación de las universidades públicas del Departamento de la Guajira, Colombia. *INGE CUC, 12*(1), 32-41. doi: 10.17981/ingecuc.12.1.2016.03

Granados, I. (2011*).* Calidad de vida laboral: historia, dimensiones y beneficios*. Revista IIPSI, 14(*2), 271-276. Retrieved from

http://pepsic.bvsalud.org/pdf/ripsi/v14n2/a14.pdf

Grönross, C. (1982). *Strategic management and marketing in the service sector*. Stockholm, Sweden: Krieger Publishing Company.

Guzvha, I., Nebotov, P. & Ivannov, Y. (2019). Foreign trade policy for integration into global value chains. *Baltic Journal of Economic Studies, 5*(2), 24-29. doi: 10.30525/2256-0742/2019-5-2-24-29

Hernández, R., Fernández, C. y Baptista, P. (2014). *Metodología de la investigación*. Ciudad de México, México: Mc Graw Hill.

Hair, J., Anderson, R., Tatham, R. y Black, W. C. (1999). *Análisis multivariante* (5ta ed.). Madrid, España: Prentice Hall Iberia.

Ishikawa, K. (1986). *¿Qué es el control total de la calidad? La modalidad japonesa*. Bogotá, Colombia: Norma.

Organización Internacional de Estandarización. ISO (2020). *Sistemas de gestión de calidad ISO 9000*. Retrieved from https://iso9001calidad.com/iso-9001-2000-sistemas-gestion-calidad-requisitos-21.html

Kerlinger, F. (1997). *Investigación del comportamiento*. Ciudad de México, México: McGraw-Hill.

Kotler, P. (2006). *Dirección de marketing*. Retrieved from https://books.google.com.cu/books/about/Direcci%C3%B3n_de_marketing.html?id=cON_PAAACAAJ&redir_esc=y

Ladhari, R. (2008). Alternative measures of service quality: A review*. Journal of Service Theory and Practice, 18*, 65–86. doi:10.1108 / 09604520810842849

Laerd Statistics. (2017). *Goodman and Kruskal's gamma using SPSS Statistics*. Retrieved from https://statistics.laerd.com/spss-tutorials/goodman-and-kruskals-gamma-using-spss-statistics.php

Maroto, A., Gago, D. y Rubalcaba, L. (2005). Relaciones entre globalización y servicios: ventajas competitivas de los servicios europeos y españoles en el comercio internacional. *Revista de Economía ICE,* (824), 93-115. Retrieved from https://dialnet.unirioja.es/servlet/articulo?codigo=1289975

Martínez, L. & Kadi, O. E. (2019). Logística integral y calidad total, filosofía de gestión organizacional orientadas al cliente. *Revista KOINONIA, 4*(7), 202-234.

Retrieved from https://dialnet.unirioja.es/servlet/articulo?codigo=7062704

Martínez, R. M., Tuya, L. C., Martínez, M., Pérez, A., & Cánovas, A. M. (2009). El coeficiente de correlación de los rangos de Spearman, caracterización. *Revista Habanera de Ciencias Médicas*, *8*(2), 1-19.

Matsumoto, R. (2014). Desarrollo del modelo SERVQUAL para la medición de la calidad del servicio en la empresa de publicidad ayuda experto. *Perspectivas, 14*(34), 181-209. Retrieved from https://www.redalyc.org/pdf/4259/425941264005.pdf

Palacios, J. L. y Vargas, D. (2012). *Medición efectiva de la calidad, innovaciones en México*. Ciudad de México, México: Trillas.

Parasuraman, A., Zeithaml, V. & Berry, L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing, 49*(4), 41-50. doi: 10.2307/1251430

Porter, M. E. (2002). *Ventaja competitiva: creación y sostenimiento de un desempeño superior*. Ciudad de México, México: Grupo Patria.

Reyes, O. (2018). *La fiscalización, recaudación y facilitación del comercio exterior de la aduana a partir de su modernización: El caso de la Aduana de Manzanillo, Colima, México.* (Tesis doctoral). Universidad de Guadalajara, Jalisco, México.

Sánchez, M. y Sánchez, M. C. (2016). Medición de la calidad en el servicio, como estrategia para la competitividad en las organizaciones. *Revista Ciencia Administrativa, 16*(2), 110-117.

Servicio de Administración Tributaria. (2006). *Libro blanco 01. Aduana Modelo*. México: Autor.

Servicio de Administración Tributaria. 2015. *Proyecto de Integración Tecnológica Aduanera (PITA). Anexo Técnico*. México: Autor.

Servicio de Administración Tributaria. (2019). Matriz de Indicadores. México: Autor. Retrieved from http://omawww.sat.gob.mx/adminsat/Paginas/documentos/E025_COA_2019.pdf

Senlle, A. (2001). *ISO 9000-2000 CALIDAD en los Servicios.* Retrieved from https://www.casadellibro.com/libro-iso-9000-2000-calidad-en-los-servicios/9788480886260/787900

Torres, K. M., Ruíz, T. S., Solís, L. y Martínez, F. (2012). *Calidad y su evolución: una revisión*. *Revista Dimensión Empresarial, 10*(2), 100-107.

Zeithaml, V. A., Bitner, M. J. & Gremler, D. D. (2010). *Services marketing strategy.* doi:10.1002/9781444316568.wiem01055

Zimmermann, F. J. (2004). *Estadística para investigadores*. Bogotá, Colombia: Editorial Escuela Colombiana de Ingeniería.

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