

Grado de satisfacción de calidad de las actividades del mantenimiento industrial, según la percepción del área de producción

Degree of satisfaction of quality activities of industrial maintenance, according to the perception of the production area

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Resumen

La misión fundamental del departamento de mantenimiento en las organizaciones es mantener la disponibilidad de los equipos y que estas condiciones logren a su vez mantener la calidad de los productos o servicios ofrecidos al mínimo costo (Gento y Redondo, 2005). A pesar de que el área de mantenimiento industrial trabaja con elementos tangibles, equipos y herramientas, el resultado del proceso de sus actividades suele ser un servicio en el cual el cliente interno inmediato es el área de producción. Este trabajo tiene como finalidad determinar el grado de satisfacción de la calidad de los servicios ofrecidos por el área de mantenimiento al área de producción mediante una adaptación de la herramienta SERVQUAL.

Para realizar este estudio se utilizó un cuestionario de 17 preguntas, de las cuales 5 fueron cerradas y estuvieron encaminadas a conocer el perfil de la muestra, la información general del área en función a normatividades y las certificaciones de calidad; las otras 12 preguntas se

formularon con la intención de adaptar la herramienta propuesta por Parasuraman, Zeithaml, y Berry (1988), denominada SERVQUAL, en este caso para la evaluar el servicio interno —según la percepción del área de producción—, con respecto a los trabajos del área de mantenimiento industrial. El cuestionario fue dirigido a los responsables del área de producción de 20 plantas industriales ubicadas en el puerto industrial de Altamira, Tamaulipas.

Con el estudio empírico realizado se analizó la información a través del SPSS, obteniendo los valores de cada una de las dimensiones ponderadas de la herramienta SERVQUAL, mostrando que el índice promedio de calidad en el servicio de las actividades el área de mantenimiento es de 69.81 %. Con ello se interpreta que la percepción de calidad del servicio por parte de los responsables del área de producción es de nivel satisfactorio.

Sin embargo, surgen algunas interrogantes como las siguientes: ¿a pesar de analizar el servicio de mantenimiento se adaptan estas ponderaciones a cualquier giro de la empresa?, ¿varían las ponderaciones de cada dimensión si el servicio de mantenimiento es externo o interno?

Palabras clave: satisfacción, calidad, SERVQUAL, mantenimiento.

Abstract

The fundamental mission of the Department of maintenance organizations is to maintain the availability of the equipment and that these conditions will in turn maintain the quality of the products or services offered at the minimal cost (Gento and Redondo, 2005). While the area of industrial maintenance works with tangible elements, equipment and tools, the result of the process of their activities tends to be a service in which the immediate internal customer is the production area. This work aims to determine the degree of satisfaction of the quality of the services offered by the holding area to the area of production using an adaptation of the tool called SERVQUAL.

A questionnaire of 17 questions, of which 5 were closed and were aimed to know the profile of the sample was used to conduct this study, the general information of the area according to regulations and certifications of quality; the other 12 questions were formulated with the intention of adapting the tool proposed by Parasuraman, Zeithaml and Berry (1988), so called SERVQUAL, in this case to evaluate the internal service —according to the perception of the production area—, with respect to the area of industrial maintenance works. The questionnaire was directed to those responsible for production of 20 industrial plants located in the industrial port of Altamira, Tamaulipas.

With the empirical study data were analyzed through SPSS, obtaining the values of each of the weighted dimensions of the tool SERVQUAL, showing that the average rate of quality in the service of the activities the holding area is 69.81%. It is interpreted that the perception of service quality by the makers of the production area is satisfactory level.

However, some questions like these arise: Despite analyzing servicing these weightings are adapted to any rotation of the company?, They vary the weightings of each dimension if the maintenance service is external or internal?

Key words: satisfaction, quality, SERVQUAL, maintenance.

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Introduction

The fundamental mission of the Department of maintenance organizations is to maintain the availability of the equipment and that these conditions will in turn maintain the quality of the products or services offered at the minimal cost (Gento and Redondo, 2005). While the area of industrial maintenance works with tangible elements, equipment and tools, the result of the process of these activities is a service that translates into an intangible question, where the instant client is the production area and the holding area offers a service internal to the area of production.

Quality is not only attributed to the manufacture of products (objective quality), but also focuses on the perspective of the consumer (subjective quality) (Duque, 2005). In this sense, Grönroos (1988) proposes that the quality of the service depends on the comparison that is made between the expected and the received service. In the case of the maintenance service, not only it is expected that measurement of the service provided is subject to the subjective judgment of the Department that receives such services, but also through the goals set by the parameters set—for example, the availability of equipment, in other words, the expected service—to obtain a more reliable measurement of the tasks carried out by this Department. Moreover, Lovelock (1983) defines that the service to the client involves a task-oriented activities and that these include interactions with customers, stressing that this function should be designed, play and communicate with two objectives in mind: customer satisfaction and

operational efficiency. In such intangible matter, the customer satisfaction contrasts with a tangible fact that is the result of the actions of the maintenance area, translated into operational efficiency in the production area.

Parasuraman, Zeithaml and Berry (1988) conducted an exploratory, qualitative and quantitative investigation whose outcome is an instrument called a SERVQUAL, which measures the quality of a service through the evaluation of the expectations and perceptions of customers. This tool consists of a series of questions divided into two sections: in the first the expectations of customers for a generic category of services is collected, and in the second measured perceptions of the client in a private company (Montes,1995). The tool is subdivided into five dimensions, which allow assessing the quality of the services and are the following:

- Tangible items: appearance of physical facilities, equipment and so on.
- Reliability: Ability to perform the promised reliably and care-sa service.
- Responsiveness: readiness and willingness to help users and provide them with fast service.
- Security: knowledge and care shown by employees, and abili-level ties to inspire trust and confidence.
- Empathy: contemplating accessibility, communication and understanding user.

That investigation found that, regardless of the type of service analyzed, the reliability, which is defined as the "ability to perform the promised service dependably and accurately," is the most important criterion. Please note that for purposes of this study the reliability or reliability, according to the argot of industrial maintenance, it is understood as the probability of an equipment or system to perform its function during a preset period of time and under conditions of use defined (Mora, 2009). In both definitions the fact fulfill the prescribed function of the equipment (the tangible part), and the self-vice provided by the area (the intangible part) is assumed, considering that the service provided by the maintenance area is the result of a process management-industrial area in maintenance. It should be remembered that the measuring results in processes allows us to control these processes.

This paper aims to determine the degree of satisfaction of the quality of the services offered by the maintenance area to the production area by adapting the SERVQUAL tool.

Method

For this study a questionnaire of 17 questions, 5 of which were closed and were aimed at knowing the profile of the sample, the overview of the area according to normativities and quality certifications used; the other 12 questions were formulated with the intention of adapting the SERVQUAL tool by Parasura-man et al. In this case it was done to evaluate internal service as the production area, with respect to the work area of industrial maintenance.

In this study we used the 5 dimensions of the SERVQUAL tool have an importance relative or weight, according to the empirical study of Montes (2005), which varies depend-on the type of service. For this work the following weights were established:

○	Elementos tangibles	20 %	(0.20)
○	Confiabilidad	30 %	(0.30)
○	Capacidad de respuesta	20 %	(0.20)
○	Seguridad	20 %	(0.20)
○	Empatía	10 %	(0.10)
○	Total	100 %	

These weights were performed raised agreement, which according to Palacios (2002) is to assign weights to the dimensions of the various aspects taken into account for the assessment of the service. This assessment is based on a function of the principal industrial maintenance mission, excelling reliability over empathy.

The questionnaire was answered by those responsible for the production of industrial 20 plants located in the industrial port of Altamira, Tamaulipas.

Results

In this section the results obtained are set, the profile of the sample and-intervention assessments of service satisfaction index as production managers,

Sample profile

The following describes the general characteristics of the sample, such as the percentage of corrective maintenance, the percentage of outsourced maintenance, the percentage of companies with ISO certification maintenance standards, and organizational structure.

As shown in Figure 1, 40% of those responsible for the area of production-sideran that corrective maintenance activities performed between 21 or 40% of total maintenance work area. However, more than a quarter of the companies surveyed believe that such activities exceed 40%.

	Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válido 0 a 20 %	5	25.0	25.0	25.0
21 a 40 %	8	40.0	40.0	65.0
41 a 60 %	5	25.0	25.0	90.0
61 a 80 %	1	5.0	5.0	95.0
81 a 100 %	1	5.0	5.0	100.0
Total	20	100.0	100.0	

De los mantenimientos que realiza, ¿en qué porcentaje realiza sus actividades de mantenimiento correctivo?

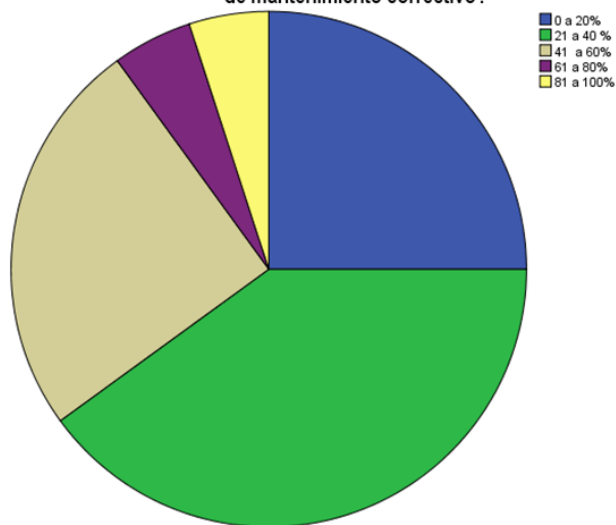


Gráfico 1. Actividdaes de mantenimiento correctivo

With respect to the proportion of outsourced maintenance in the company, 70% of the companies surveyed indicated that there is very little maintenance subcontract to not exceed 20% (see Chart 2).

¿Cuál es el porcentaje de mantenimiento que su empresa subcontrata?

	Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válido 0 a 20 %	14	70.0	70.0	70.0
21 a 40 %	5	25.0	25.0	95.0
41 a 60 %	1	5.0	5.0	100.0
Total	20	100.0	100.0	

¿Cuál es la proporción del mantenimiento es subcontratado en su empresa?

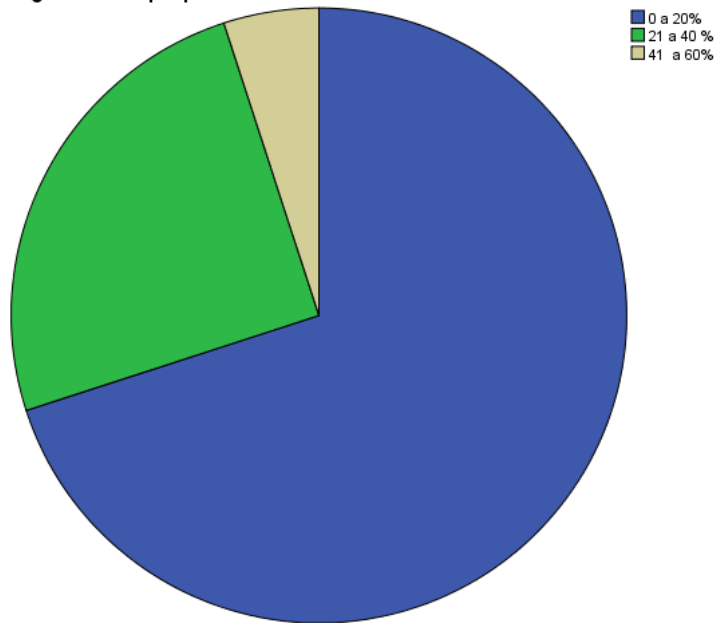


Gráfico 2. Proporción de mantenimiento subcontratado

With regard to certification in maintenance processes, 80% of the companies surveyed said they had ISO 9000 certification processes maintenance (see Chart 3).

¿Cuenta con certificación ISO 9000 en sus procesos de mantenimiento industrial?

	Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válido No	4	20.0	20.0	20.0
Sí	16	80.0	80.0	100.0
Total	20	100.0	100.0	

¿Cuenta con certificación ISO 9000 en sus procesos de Mantenimiento industrial?

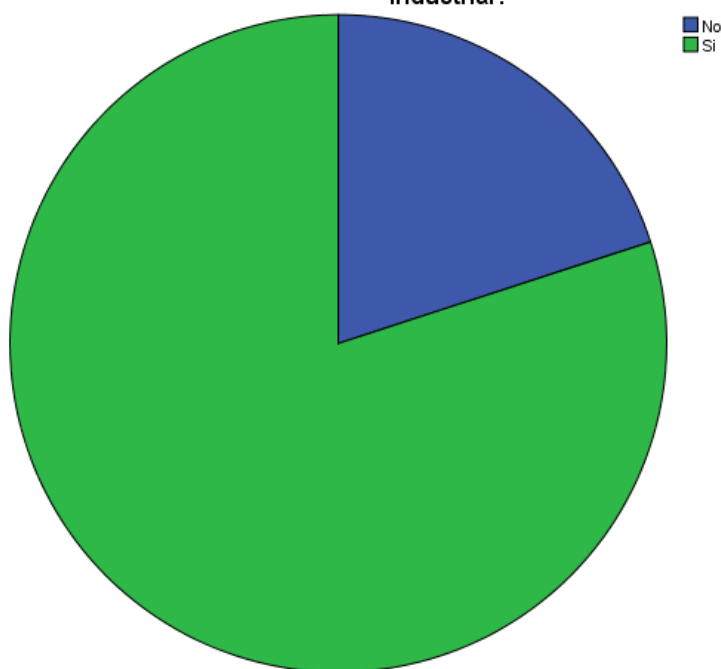


Gráfico 3. Proporción de Certificación ISO 9000

With regard to the question of the rules governing the maintenance, 70% said yes there are rules governing maintenance processes (see Figure 4).

¿Existe alguna norma específica que regule los procesos del mantenimiento industrial?

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válido	No	6	30.0	30.0	30.0
	Sí	14	70.0	70.0	100.0
Total		20	100.0	100.0	

¿Existe alguna norma específicas de Mantenimiento industrial que regule sus procesos?

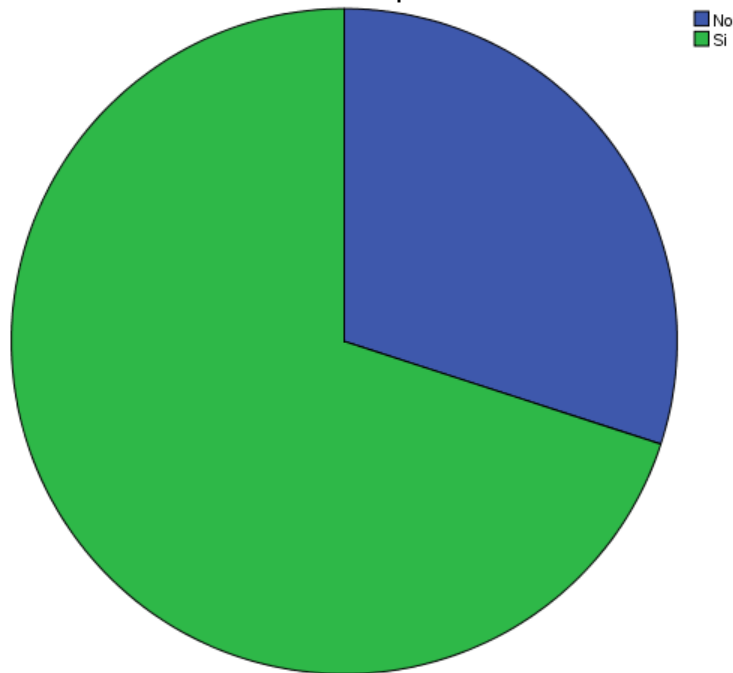


Gráfico 4. Normas que regulan las actividades de mantenimiento

With regard to the question of the organizational structure, it is surprising to note that of the industries surveyed, 60% said that the maintenance department depends on the production area (see Chart 5).

¿El departamento de mantenimiento depende de la producción en su estructura organizacional?

		Frecuencia	Porcentaje	Porcentaje válido	Porcentaje acumulado
Válido	No	8	40.0	40.0	40.0
	Sí	12	60.0	60.0	100.0
	Total	20	100.0	100.0	

En su estructura organizacional, ¿el departamento de mantenimiento depende de Producción?

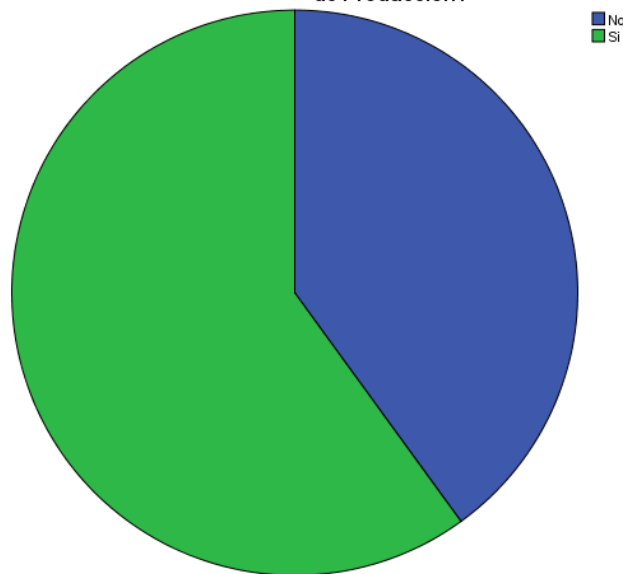


Gráfico 5. Proporción de dependencia del área de producción

After conducting a crusade in question 5 tab between the organi-zational structure, Question 1 and the percentage of maintenance activities, in Table 1 it can be seen that most companies that rely area production spend between 20 and 80% of its maintenance activities to corrective action.

Tabla.1. Tabulación cruzada

¿El departamento de mantenimiento depende de la producción en su estructura organizacional?* **¿Qué porcentaje de los mantenimientos que realiza lo dedica a actividades correctivas?**

Tabulación cruzada

Recuento

		¿Qué porcentaje de los mantenimientos que realiza lo dedica a actividades correctivas?					Total
		0 a 20 %	21 a 40 %	41 a 60 %	61 a 80 %	81 a 100 %	
¿El departamento de mantenimiento depende de la producción en su estructura organizacional?	No	3	2	2	0	1	8
	Si	2	6	3	1	0	12
Total		5	8	5	1	1	20

Satisfaction rate quality maintenance activities

The next stage of the questionnaire shows the level of satisfaction reached by the service offered by the industrial maintenance area to the production area, applying and adapting the SERVQUAL tool. Because this questionnaire is aimed at managers or supervisors of the production area chose to use the Likert scale of 7 levels (Osinski and Sanchez). The meaning of the scale shown in Table 2.

Tabla 2. Escalas y rangos de Likert

Nivel de Likert	Significado	Rango de porcentaje de satisfacción del cliente	
		Rango menor	Rango mayor
1	Totalmente satisfecho	86	100
2	Muy satisfecho	71	86
3	Satisfecho	57	71
4	Ni satisfecho ni insatisfecho	43	57
5	Insatisfecho	29	43
6	Muy insatisfecho	14	29
7	Totalmente insatisfecho	0	14

Through SPSS information is organized, obtaining the values of each of the dimensions of the tool (see Table 3). There the average results of each dimension evaluated observed: in the weighting row weights or weights assigned to each dimension are established, noting that the dimension highest weighting is reliability with 30% and the lowest weighting Empathy with 10%. Other dimensions: Tangible, Responsiveness and Security, dropped 20%. averages are established in line weighted average by weight in each dimension, calculated as follows (Palacios, 2002).

$$ICS = \mu_A * 0.20 + \mu_B * 0.30 + \mu_C * 0.20 + \mu_D * 0.20 + \mu_E * 0.20$$

Where:

ICS: Índice de Calidad en el Servicio

μ_A : Valor promedio de dimensión tangible

μ_B : Valor promedio de dimensión Confiabilidad

μ_C : Valor promedio de dimensión Capacidad de Respuesta

μ_D : Valor promedio de dimensión Seguridad

μ_E : Valor promedio de dimensión Empatía

Tabla 3 Resultados del Índice de calidad en el servicio ICS

	Tangi- ble	Confiabili- dad	Capacidad de res- puesta	Seguridad	Empatía	Índice de Calidad en el Ser- vicio (ICS)	Porcenta- je
Pondera- ción	0.20	0.30	0.20	0.20	0.10	1	100 %
Promedio ponderado	1.25	1.59	1.1867	0.27	0.59	4.8867	69.81 %

With this information shows that the rate of average quality service provided by the maintenance area in the analyzed companies is 69.81%. This indicates that companies surveyed average perception index reaches the degree of service Satisfied (see Table 2).

Conclusions

The average rate of service quality of maintenance activities through adaptation and weighting of the five dimensions of SERVQUAL tool of industrial companies surveyed through a Likert scale with 7 levels was 69.81. This is a satisfactory level; however, some questions still arise: these weights to suit any business of the company despite analyzing the maintenance service ?, weights vary each dimension if servicing is external or internal?

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