

**IMPORTANT FACTORS FOR INTERNAL CUSTOMER SATISFACTION
BASED ON PUBLIC SECTOR SERVICE QUALITY
IMPACTO EN LA SATISFACCIÓN DEL CLIENTE INTERNO EN LA IMPLEMENTACIÓN
DE GESTIÓN DE CALIDAD**

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ABSTRACT

Keywords:

Satisfaction, internal customer,
SERVQUAL, Deming Cycle,
EPMAPA SD.

The present article aims to measure the impact of implementing a quality management model to improve internal customer satisfaction in the Customer Service Area of the Municipal Drinking Water and Sewerage Company of Santo Domingo, Ecuador (EPMAPA SD), using the SERVQUAL model. Through a mixed methods, non-experimental, explanatory, and cross-sectional design approach, a diagnostic analysis was conducted on perceived service quality to assess internal customer satisfaction with the services provided. The entire staff of the Commercial Sub-management was included in the study. One of the main findings highlighted an increase in internal customer satisfaction from 61.6% to 76.2%. However, the expected impact was to reach 80% following the implementation of the quality management system. Although gaps still exist, they are less significant, reflecting an improvement in the perceived quality of service. It is therefore concluded that the implementation of a Quality Management System based on the Deming Cycle (PDCA) not only enhances operational efficiency but also serves as a catalyst for employee well-being and internal customer satisfaction.

RESUMEN

Palabras clave:

satisfacción, cliente interno,
SERVQUAL, ciclo Deming, EPMAPA
SD.

El presente artículo tiene como objetivo medir el impacto de la implementación de un modelo de gestión de calidad para mejorar la satisfacción del cliente interno en el Área de Atención al Cliente y Servicio de la Empresa Municipal de Agua Potable Y Alcantarillado del cantón Santo Domingo-Ecuador (EPMAPA SD) con el modelo SERVQUAL, por medio de un enfoque mixto, no experimental, de diseño explicativo y transversal, se realizó un diagnóstico en el análisis de la calidad percibida en los servicios para evaluar la satisfacción del cliente interno con respecto a la calidad de los servicios ofrecidos, se empleó a la totalidad de los integrantes de la Subgerencia Comercial, dentro del principal hallazgo se pudo

destacar el incremento del 61.6 % al 76,2% de satisfacción del cliente interno, sin embargo, el impacto esperado era alcanzar el 80% después de implementar la gestión de calidad, aunque las brechas siguen existiendo, son menos profundas, lo cual refleja una mejora en la calidad del servicio percibido. Por lo que, se concluye que, la implementación de un Sistema de Gestión de Calidad basado en el Ciclo Deming (PDCA) no solo mejora la eficiencia operativa, sino que actúa como catalizador del bienestar laboral y la satisfacción del cliente interno.

Introduction

Currently, in the business environment there is a strong competition to offer outstanding services and products in terms of affordability and quality for customers, in this regard, companies need to meet and satisfy customer expectations by aligning their business operations with customer satisfaction, so, to achieve customer satisfaction, companies try to implement a quality management model, as an overall organizational strategy with the purpose of continuously improving products, services and processes to achieve business efficiency and meet the needs of consumers, as a consequence, companies would get to improve their operations, the quality of products and services and focus on their customers (Alsaquer et al., 2024).

In this context, Zaid et al. (2020) enunciated that the implementation of a quality management model requires organizations to adjust their quality to the level demanded by customers in order to remain competitive, for this reason the number of companies that have adopted quality management is increasing, since, those companies that have won quality awards generally outperform other companies with respect to customer satisfaction, revenue measures and market value.

To achieve customer satisfaction, Quality Management addresses several dimensions, such as: process management, customer focus, continuous improvement and employee engagement, thus process management ensures the efficiency of business operations by analyzing and improving current systems, as a consequence there is a positive relationship between process management and customer satisfaction (Noori, 2020). According to global models and specifications developed for this purpose, there has been a recent increase in interest in quality management and institutional excellence models as an organizational philosophy in government institutions, this increase is due to multiple factors, the most important being the changes in the global economy caused by the Covid-19 pandemic and the need to activate quality and business continuity systems (Alharthy & Ajina, 2023).

The administrative apparatus of the State has also been weakened, being essential to give a positive vision where whose main axes include quality, governance and institutional excellence, which are in line with the structural reforms applied to the government, in addition to making a real monitoring of how these standards affect the internal operations of the institution and include whether they have been effective in improving performance and whether staff members are aware of the positive effects that these standards have on their jobs, especially in relation to the aspect of operations and their improvement (Bahia et al., 2023).

Within a systematic approach quality management ensures quality through comprehensive management that increases reliability, customer satisfaction and productivity, i.e., the implementation of such an approach enables associations to increase internal efficiency, which is considered necessary to aggressively end up in the global business center through an iterative and continuous process in which prevails to the extent that groups can work to find problems and solve them effectively (Shaibun, 2021).

Within the various Total Quality Management (TQM) models, the Deming cycle is known as the father of the TQM movement, because it refers to continuous improvement, which consists of four interrelated components, namely: Plan-Do -Check-Act (PDCA), this cycle was developed to link production with needs and resources to meet needs (Mayangsari et al., 2023).

The PDCA cycle starts with the planning stage which refers to the design of the product according to the management planning phase, then comes the production (doing) stage and is related to manufacturing or working on designed products, the third stage is the sales check where sales figures are verified to make sure customers are satisfied and finally the investigation which is the action if a complaint arises, which should be included in the planning phase and action should be taken for further efforts (Mubin, 2020).

Deming (1986) emphasized that quality is based on people and not on products, this is how customer satisfaction defines it, and since customer needs and expectations are always changing, the organization has to adapt and respond to those changes, thus Deming's ideology consists of 14 points that seek to significantly improve the effectiveness of an organization or business (Alauddin, 2019).

According to Malkawi et al. (2017) noted that job performance gives a premise of the organization's success in achieving its goals and mission, so the dynamic environment in which companies operate with emerging technologies has forced new companies to change for the better and maintain their business operations. Likewise, Kelderman (2021) highlighted that customer satisfaction is obtained with Quality Management through the arrangement of people, processes and technology during the product or service life cycle, customer satisfaction, in turn, has a positive outcome on customer loyalty, customer satisfaction, in turn, has a positive outcome on customer loyalty, financial performance and lower complaints and is based on good customer experiences, so mapping and measuring the customer service experience is a vital part of continually improving service quality, however, this is mainly studied from the point of view of external customers.

This article focused on the internal customer being people or departments in the same organization that receive goods or services from other departments or individuals in that organization, for example a department that receives public relations training and interviews from the communications department, or a manager who receives hiring assistance from the human resources department (Enblom et al., 2023).

The risk of losing internal customers cannot be related to competition, but to the ability to provide quality service between one supplier of another process, i.e., each one must satisfy the next, which leads to the satisfaction of external customer needs, however, there are few of studies on internal customer experience and previous research has stated dimensions of external customer experience, where it is mentioned that these and internal customers are related to each other, however others argue that the dimensions of internal customer experience are unique to external customers (Narteh, 2018).

A similar perspective comes from Strauss (1995) who defined the internal customer as organizational units or individuals working within the same organization, interacting with and providing services to other sections or individuals within that company, while Bergman and Klefsjö (2012) extended the definition of internal customer to include all processes and individuals within the organization that are the result of other internal processes, customers or individuals.

According to Kiran (2017) mentioned that the internal customer-supplier link between individuals, departments and functions builds the customer chain throughout an organization that connects each individual and function with external customers and consumers, characterization of the organization's value chain and general awareness of maintaining quality through customer satisfaction.

Swinehart and Smith (2005) stated that an internal customer is also an internal supplier and that the quality of service provided by those who interact directly with

external customers depends on the efficiency and effectiveness of the internal customer/supplier relationship. Likewise, Paradinas et al. (2023) explained that companies that focus on the internal customer, in addition to establishing conflict prevention and management mechanisms, try to train their employees in those competencies, not only cognitive, that can improve productivity, but above all the work environment and the feeling of belonging to the organization, the success of companies is determined in part by the people who are part of them, so it is essential to know their aspirations, needs and skills so that they can offer their best service in the most appropriate position.

When talking about service, Ryttilahti (2019) mentioned that it is a large field of research with many definitions comprising at least three distinguishable characteristics, it is a process with repeated activities, it is produced and consumed at the same time and the customer is a co-creator in the service process. Thus, the nature of a service and the fact that the outcome is in the customer experience makes it difficult to control whether it meets the requirements and to advocate for it, therefore, quality control and promotion should take place at the time of service consumption (Grönroos, 2015).

It is important that service processes are flexible and adapt to changing situations, but it is also important that they are planned to handle moments of truth and avoid quality problems, under this context there are two dimensions of service: a technical one, which is what the customer receives, this dimension must be up to the needs and expectations of the customer and there is also a functional dimension, that is, the way in which the customer receives the service, therein lies the competitive advantage (Enblom et al., 2023).

Thus, Hallencreutz and Parmler (2021) highlighted that service quality overtook product quality as the driver of customer satisfaction in the last decade, and even when you buy a product, you buy a function, consequently, it is important to prioritize the development of service quality, but new approaches and tools are needed to improve customer orientation within the company and increase customer satisfaction.

Another common term when discussing service quality is value, which is always determined by the customer during the use of products or services, just as the level of service quality is decided at the moment the service provider meets the customer, i.e., the moment of truth. According to Medberg and Grönroos' (2020) study on value in use and service quality, which showed that, although these two concepts derive from different theoretical traditions, their dimensions are related to each other.

Similarly, it is important to indicate that high levels of customer satisfaction have a positive outcome on financial results, service and minor complaints and customer satisfaction in turn depends on good experiences (Worick, 2019). Therefore, Bernazzani (2022) defined customer satisfaction as the degree to which a customer is satisfied with a product, service or experience related to their business and is derived from the extent to which their needs and expectations are met and shows satisfaction with their most recent experience with the company.

On the other hand, Alharthy and Ajina (2023) identified the impact of implementing quality standards on the efficiency of internal operations in public sector institutions, through the measurement of effectiveness and efficiency of operations after implementing quality standards, so they adopted the methodology of continuous improvement that is the Deming cycle, and the definition of internal processes and their dimensions, likewise, data collection in a simple random sample of 115 that were analyzed using the scaled method and Cronbach's alpha for stability, the main results of

this study indicated that there is a difference between the requests for information on quality in the planning of operations, preparation and products.

Perkhidmatan et al. (2024) aimed to assess satisfaction levels among HRM customers regarding the quality of HRM services in a specialized public university in Malaysia, using a questionnaire with the key determinants of service quality and the dimensions outlined in the SERVQUAL model, with a Cronbach's coefficient of 0.957 reliability, they surveyed 17,000 people with a purposive sampling, the results underlined the importance of all dimensions responsiveness, safety, access, empathy and reliability in customer satisfaction, with the exception of tangible.

Similarly, authors Pathirana and Manjula (2019) identified the impact of Total Quality Management (TQM) implementation on internal customer satisfaction through a questionnaire in which they used Pearson's correlation coefficient to determine if there is a correlation between variables, they identified that leadership, employee empowerment, training and development and teamwork used to implement TQM practices have a considerable impact on internal customer satisfaction.

In Ecuador, Astudillo and Barragan et al. (2024) had the objective of analyzing the incidence of internal service quality on employee job satisfaction in a manufacturing process with seven manufacturing companies in the city of Cuenca, using a Likert scale with seven items and a sample of 364 respondents, the data analysis was performed using the SPSS program and showed a positive correlation and a moderate degree of association between the quality of internal service and employee satisfaction; in addition, the regression coefficient showed validity in the statement that the quality of internal service has a positive impact on employee satisfaction.

The internal customer satisfaction of the areas of Customer Service and Service and Billing Portfolio and Collection in the Municipal Public Company of Drinking Water and Sewerage of the canton Santo Domingo, maintains a high rate of complaints about the service through communication and restructuring and merger of units due to low performance, so, the impact of the implementation of Quality Management and the evaluation of the accuracy and reasons that lead to poor application of standards and failure to achieve the desired results was measured, this has been achieved by examining the reality and the impact of the application of quality specifications in the internal processes of the institution. Moreover, this study will highlight the major challenges and propose solutions that correspond to the needs of the context.

In short, this article analyzed the impact of the implementation of a Quality Management System (QMS), based on Deming's PHVA cycle, on the strengthening of internal customer service within the Commercial Sub-Management of EPMAPA SD. Through the design and execution of an improvement plan that includes key actions such as training, service level agreements (SLAs), infrastructure interventions, wellness activities and internal communication strategies, the effects on dimensions such as reliability, sensitivity, safety, empathy and perception of the tangible aspects of the work environment were evaluated.

Method

Target

The objective of this article is to measure the impact of the implementation of a quality management model to improve internal customer satisfaction in the Customer Service Area using the SERVQUAL model.

Theoretical and Methodological Background

The research methodology was based on a systematic approach that included the phases of exploration, data collection, analysis and data processing, which were subjected to a process of contrast through the comparison of performance indicators such as quality and customer satisfaction before and after implementing the Deming system, in addition to the comparison of the results with other similar companies that have not implemented this system or that have implemented other quality approaches, cross-checking was used to validate the results through different sources, thus a data triangulation was performed to compare data obtained from different sources such as internal customers, methodological triangulation by using quantitative methods such as SERVQUAL surveys and statistical analysis, triangulation of researchers involving several researchers to reduce interpretation biases and theoretical triangulation to interpret the findings under different theoretical frameworks such as ISO 9001, in addition to Deming. So, if everyone points to an improvement after implementing the Deming model, the conclusion gains strength.

To ensure the validity, reliability and robustness of the results, the information for the present article was relied upon from Scopus and Science Direct, as well as from academic reports and other relevant texts; with these considerations, the selected literature was rigorously evaluated according to the previously established objectives, considering also the potential benefits associated with its practical application in the elaboration of synthetic and well-founded conclusions. The data obtained regarding internal customer satisfaction were obtained from the Commercial Sub-Management, which is formed by the Billing, Service Management and Customer Service departments and can be replicated in various areas of EPMAPA SD.

Hence, a mixed, non-experimental, explanatory and cross-sectional design approach was applied, a diagnosis was made in the analysis of the perceived quality of the services to evaluate the satisfaction of the internal customer with respect to the quality of the services offered. The application of this study in the field of administrative services is aimed at identifying the level of dissonance between the expectations of the internal customer and the quality of the service actually provided by the commercial department (Chatterjee et al., 2023).

Thus, a non-probabilistic sampling was used for all the members of the Commercial Sub-Management, which generated a comprehensive and accurate understanding for EPMAPA SD, consequently, their opinion will contribute to the improvement of processes and communication between the areas.

Therefore, a survey was conducted using the SERVQUAL model with five dimensions and 22 items, being distributed as Tangibility contains 4 questions, Reliability contains 5 questions, Responsiveness contains 4 questions, Assurance contains 4 questions and Empathy contains 5 questions, each item contains a question and options about the research on a Likert scale of order 5 (Shi et al., 2020).

Next, with the data obtained from the SERVQUAL survey of 48 participants, the statistical processing of the data was carried out using the statistical package for the social sciences (SPSS), which made it possible to synthesize the results in tables and graphs that facilitated their interpretation in the results and discussion section. Subsequently, the information was validated with Cronbach's coefficient and the means of the dimensions such as reliability, sensitivity, security, empathy and tangible elements were determined, prioritizing their presentation in tabular and analytical form, likewise, it was evaluated if the implementation of the Deming system caused a significant improvement in the quality indicators, as well as comparing means or proportions before and after and determining if there is a correlation between variables such as the implementation of the system and customer satisfaction in order to derive relevant conclusions for the research.

After having a clear picture, the application of Deming's quality management style was executed and qualitative observations of important implementation initiatives were provided. The General Manager provided leadership by deciding to implement the Deming style of quality management in an effort to increase the company's performance. Finally, the initial survey was replicated to obtain feedback on service quality and internal customer satisfaction.

Results

In accordance with the Deming model, the PHVA cycle was applied, starting with the Plan phase.

Plan (P)

In this phase, a diagnosis was made in the area of Commercial Sub-management, with the SERVQUAL survey, where the results of the sample of workers evaluated determined that 27% of the participants are female, while 73% are male; in the same way, it was observed that the workers in the sample have an age ranging from 25 to 55 years and all workers work full time, for 8 hours a day, moreover, the daily activities have a systematic sequence and its processes are focused on customer satisfaction.

Similarly, the reliability of the results was obtained by means of a Cronbach's Alpha analysis (Table 1).

Table 1

Diagnostic reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	N of elements
0.929	0.930	22

According to Mohd et al. (2020) in their research mentioned that obtaining a Cronbach's alpha of 0.70 or higher is considered acceptable in many social science contexts, therefore, the data obtained possess excellent reliability, since, in this case, the Cronbach's Alpha coefficient is close to 1. Next, the gaps between internal customer expectations and perceptions were identified in five key service dimensions: reliability, responsiveness, security, empathy and tangibles (Table 2).

It was observed that Sensitivity is the highest rated dimension, so it can be interpreted that the users perceive good disposition and friendliness of the personnel; on the other hand, the Tangible Elements received the worst score, which may indicate

dissatisfaction with facilities, equipment, materials or presentation of the personnel. Thus, for the quality system, priority was given to actions on tangible elements, such as: infrastructure, tools, cleanliness, staff presentation, in addition to strengthening reliability by ensuring that the service delivers what it promises on a constant basis and to maintain and reinforce sensitivity and safety, which could be differentiating elements if consolidated (Table 2).

Table 2

Mean of the SERVQUAL diagnostic model survey dimensions

	RELIABILITY	SENSITIVITY	SECURITY	EMPATHY	TANGIBLES
Media	2.974	3.412	3.225	3.080	2.720

Similarly, the gap between the internal customer's perception and expectations was estimated, and the level of attention required to develop strategies to increase the level of satisfaction of the key target was determined (Table 3).

Table 3

Estimated gap and internal customer satisfaction index

Dimension	Media	Estimated gap	Level of care required
Reliability	2.97	High (-1.0 to -1.5)	Consistency and compliance
Sensitivity	3.41	Mean (-0.6 to -1.0)	Promptness and willingness to help
Security	3.22	High (-1.0 to -1.3)	Confidence in treatment and decisions
Empathy	3.08	High (-1.2 to -1.4)	Personalized attention
Tangible elements	2.70	Very high (-1.5 to -1.8)	Urgent: physical environment and resources
Media	3.08	High (-1.0 to -1.3)	Partially satisfied

The results in Table 3 indicated an overall average of 3, indicating that the user experience is at a point that is moderately satisfactory or acceptable but with room for improvement. Likewise, the total estimated gap is high, i.e., the expectations of users exceed the perception of the service received; therefore, the level of care required is partially satisfied, but with critical areas that require priority intervention. Once the areas needing greater attention have been identified, objectives to be achieved with the implementation of quality management are established (Table 4).

It was found that the objective closest to being achieved is "Improve the agility and availability of attention between areas", which suggests relative strength in interdepartmental coordination (Table 4). On the other hand, the objective with the greatest compliance gap "Improve physical working conditions, equipment and presentation of the work environment" (54%) represents a critical gap of -26%, in line with the low results in the "Tangibles" dimension seen earlier.

Table 4

Objectives to be achieved with quality management

Objectives	actual %	% expected
Increasing the internal customer satisfaction rate	61.5	80
Increase the perception of compliance	59.4	80
Improving the agility and availability of service between areas	68.2	80

Strengthening trust and transparency in internal management	64.4	80
Increasing the level of personalized attention and understanding of individual staff needs	61.6	80
Improve physical working conditions, equipment and presentation of the working environment	54.0	80

In general, all the objectives are below the expected standard (80%), which shows the need to implement a quality management system to strengthen the Commercial Sub-Management. In this context, we recommend strategies such as: prioritizing resources and interventions in infrastructure and physical working conditions, since it presents the worst indicator, as well as strengthening communication actions and compliance with commitments, given the low 59.4% in perception of compliance, consolidating coordination between areas as a basis for promoting the rest of the objectives and establishing improvement plans by objective, using the PHVA cycle (Plan - Do - Check - Act). Consequently, an internal quality action plan was formulated as part of the strategic planning (Table 5).

The key actions reflect results obtained after 6 months to 18 months of implementation of quality management as is common in these processes, then: the current progress indicates that the objectives are still maturing, which is reasonable if the time is short, this is justified because quality systems do not produce immediate results, since they require cultural change, adaptation of personnel and adjustments in the processes (Table 5).

Table 5
Internal quality action plan

Dimension	Key Actions	Responsible	Deadline	Indicator
Reliability	Designing service level agreements (SLAs), establishing KPIs, compliance training, etc	Quality and Human Talent Management	6 months	% compliance with internal commitments
Sensitivity	Protocolize response times, service sensitization, request traceability	Area Coordinators	6 months	Average response time
Security	Implement secure communication channels, training in fair leadership and ethics	Management and Human Resources	12 months	% of confidence in internal decisions
Empathy	Empathy workshops, active listening workshops, improvement of manager-team interaction	Human Resources and Communications	12 months	Satisfaction with the boss-collaborator relationship
Tangibles	Intervention in infrastructure, improvement of equipment, beautification of spaces to improve physical conditions	Infrastructure and Administration	18 months	% improvement in perception of physical condition

Some improvements, such as those related to infrastructure or perception of compliance, require investment, planning and continuous monitoring; improvements in physical conditions or personalized attention depend on administrative and budgetary processes that take time. Likewise, roles and responsibilities were assigned with the participation of welfare, human talent and quality committees (Table 6).

Table 6
Internal quality action plan

Actor or Committee		Role in the Quality Management System
Labor Committee	Welfare	Diagnosis of staff needs, organization of integration and welfare activities.
Human Talent		Design and implementation of training programs, organizational climate assessments, organizational development support.
Quality Committee		Monitoring and evaluation of the action plan, follow-up of indicators, inter-area coordination.
General Management		Approval of strategies and budget, alignment with the institutional plan, accountability.
Area Coordinators		Operational implementation of actions, constant feedback, promotion of service culture.

Each actor has a complementary and necessary role within the QMS, the articulation between them ensures the effective implementation of the improvement plan, the continuous monitoring based on indicators and the promotion of a quality-oriented organizational culture. Thus, the Labor Welfare Committee plays a key role in addressing the empathy and tangible dimensions, since it improves the work environment and reinforces the sense of belonging, which directly affects the quality of internal service.

Likewise, the Human Resources department is a transversal actor that strengthens personnel competencies, manages cultural change and provides support in dimensions such as reliability, sensitivity and safety. Likewise, the Quality Committee represents the technical core of the QMS, thus ensuring that the PHVA cycle is correctly applied, allowing for the verification and control of gaps and promoting continuous improvement. The General Management has a substantial commitment and visible leadership and resource allocation are enabling conditions for the system to function. It also ensures that quality is aligned with strategic objectives. Finally, the Area Coordinators are the direct executors of the QMS, and their role is fundamental for putting plans into daily practice, managing teams and ensuring the continuity of the process.

Lastly, in the Planning phase, a budget was prepared for training, integration and organizational development (Table 7).

Table 7
Annual budget

Concept	Estimated Cost (USD)
Internal customer service training (external/internal)	5,000,00
Soft skills workshops (empathy, communication, leadership)	4,000,00
Labor integration and welfare days	3,500,00
Recognition and motivation activities	2,000,00
Diagnosis and improvement of physical conditions	10,000,00
Organizational climate evaluations (annual)	1,500,00
Internal communications (campaigns, signage, media)	2,000,00
Total Estimated Annual	28,000 USD

The budget is balanced and well aligned with the priorities detected in the quality diagnosis; more than 50% is invested in tangible and formative aspects, which is consistent with the weakest dimensions of Tangibles, Reliability and Empathy. Thus, a

balanced distribution was observed between structural intervention of physical spaces and human development such as training, climate and recognition; therefore, it reflects a progressive and sustainable organizational transformation strategy.

In order to implement what was planned, the second phase continued.

Do (H)

In the case of the Do phase, significant changes were generated within the study area, so that the planned strategies and actions generated tangible changes, which allows the strengthening of processes, in addition to improving internal customer service and, ultimately, transforming the work environment with a more collaborative, efficient and satisfactory degree for all team members.

In the context of internal quality improvement within a public entity, the results of this phase are reflected in the execution of key actions related to training, implementation of service level agreements (SLAs), improvements in physical working conditions, integration and wellness activities, and strengthening of internal communication. These actions seek not only to address the gaps identified in the SERVQUAL diagnosis, but also to foster a solid organizational culture based on respect, trust and commitment to quality.

The results obtained from the implementation of the planned actions are presented below, highlighting the progress made in each key area, the indicators of success achieved and the areas in which further work is required to ensure continuous improvement and the sustained success of the internal quality action plan (Table 8).

The actions implemented in Staff Training analyze the results of participation and perception of empathy, which are adjusted to the contents or methodologies (Table 8); on the contrary, if there is little improvement, the strategy is modified or new didactic tools are integrated, so that what worked well is documented as a standard. Similarly, the SLA and internal protocols are adjusted for response times or commitments; if SLAs are not met or if they generate friction between areas, clarity is improved, processes are optimized and changes in procedures are formalized. On the other hand, the infrastructure and physical conditions, if after the improvements the expected level of satisfaction is not reached, new investments or adjustments such as the redistribution of spaces or improvement of ventilation are evaluated to consolidate the practices that increased comfort and perception of quality. For welfare and integration activities, based on the participation and perceptions collected, it is decided whether certain activities should be repeated, change their format or be integrated into the institutional plan as permanent cultural strengthening practices. Lastly, internal communication, if the channels or messages did not achieve the desired effectiveness, the formats, frequency or media are adjusted; if they were successful, they are integrated as part of the communication model of the QMS.

Table 8*Actions planned in each key area*

Stage	Target	Shares	Responsible	Deadline	Indicator
Staff Training	Improve staff skills in key areas such as internal customer service, empathy, and leadership.	<ul style="list-style-type: none"> • Training materials. • Workshops and training sessions. • Post-training tests to measure effectiveness. 	Quality and Human Resources Committee.	3 months	% participation in trainings, improvement in the perception of internal empathy
Implementation of Service Level Agreements (SLAs) and Response Protocols	Establish clear expectations on response times and commitment of each area.	<ul style="list-style-type: none"> • Internal SLAs for each area such as response time and quality of service. • Response protocols. • Standardization of operating procedures to ensure consistency in service. • Internal communication on SLAs. 	Area Coordinators and Quality Committee.	4 months	% compliance with SLAs, reduced response times.
Interventions in Infrastructure and Physical Working Conditions	Optimize working conditions to increase internal customer satisfaction and well-being.	<ul style="list-style-type: none"> • Infrastructure diagnosis. • Improvement of work spaces with painting, cleaning, reorganization of offices, purchase of appropriate furniture. • Investments in technology. 	Infrastructure and Administrative Committee.	6 months	% of satisfaction with physical working conditions
Wellness and Integration Activities	To foster a sense of belonging and improve the work environment, contributing to empathy and psychological security of employees.	<ul style="list-style-type: none"> • Wellness days, sports, team building events. • Periodic sessions to listen to staff suggestions and concerns. • Formal and informal recognition system to reward good performance. 	Labor Welfare and Human Resources Committee.	3 months	Participation in activities, perception of well-being and internal motivation.
Internal Communication	Improve communication within the organization so that all employees are aligned and well informed.	<ul style="list-style-type: none"> • Internal communication strategy such as newsletters, signage, and key messages on internal quality commitments. • Formal and informal communication channels to ensure that information flows freely among all hierarchical levels. • Periodic organizational climate surveys to know the state of communication. 	Internal Communication and Human Resources Committee.	2 months	Degree of satisfaction with internal communication, effectiveness of channels.

Verify (V)

During the VERIFY stage, emphasis was placed on the evaluation and follow-up of the actions implemented to ensure compliance with the objectives proposed in the DO phase. In this way, the performance of the activities carried out was reviewed and an assessment was made as to whether the improvements achieved were sufficient to close the quality gaps identified in the diagnosis. In addition, the results were analyzed and contrasted with previously defined indicators to determine the degree of internal customer satisfaction. In order to achieve the expected impact on internal customer satisfaction, it is essential to verify the actions implemented, mainly the dimensions evaluated using the SERVQUAL model. In this way, those deviations that were present were identified and the necessary corrective decisions were made to ensure continuous improvement (Table 9).

Table 9
Verification of compliance

Stage	Indicator	Formerly	Then
Staff Training	% participation in training courses	48%	100 %
	Improved perception of internal empathy	61.6 %	75.92%
Implementation of Service Level Agreements (SLAs) and Response Protocols	% compliance with SLAs	62.5%.	84%
	Reduced response times.	9.60 min	7.62 min
Interventions in Infrastructure and Physical Working Conditions	% of satisfaction with physical working conditions	54%	73%
Wellness and Integration Activities	Participation in activities	100%	100%
	Perception of well-being	59.82%	75.78%
	Internal motivation	62.37%	76.77%
Internal Communication	Degree of satisfaction with internal communication	17.48 eNPS	25.91 eNPS
	Channel effectiveness.	25%	85.42%

The results obtained show a significant improvement in all key indicators, which reflects the positive impact of the implementation of the Quality Management System (QMS) on internal customer service and organizational management, in staff capacity, participation in training went from 48% to 100%, suggesting high acceptance and involvement. In addition, the perception of internal empathy increased from 61.6% to 75.92%, indicating that the training activities contributed to strengthening the culture of respect and understanding. In terms of SLAs and response protocols, there was an increase in compliance from 62.5% to 84%, and a reduction in the average response time from 9.60 to 7.62 minutes, which demonstrates greater operational efficiency and better alignment between areas; interventions in infrastructure improved satisfaction with the physical working conditions from 54% to 73%, reflecting that the adaptations in the environment directly influence the perception of internal service quality.

On the other hand, wellness and integration activities maintained 100% participation, and significantly improved the levels of wellbeing perception (from 59.82% to 75.78%) and internal motivation (from 62.37% to 76.77%), which reinforces their strategic value as drivers of organizational commitment. Finally, in the internal communication axis, the satisfaction index rose from 17.48 to 25.91, and the effectiveness of the channels increased from 25% to 85.42%, indicating that the improvements in the internal media and messages had a clear impact on the perception of transparency, access and communication alignment.

Another feature to note is the SERVQUAL survey after the implementation of Quality Management, in order to measure the internal satisfaction of employees in relation to the implemented actions, as indicated in Table 10, this survey should be repeated every 3 months, to follow up on the improvement.

Security is mentioned with 3.990 as the highest rated dimension, which indicates a high level of staff confidence in institutional decisions, organizational ethics and consistency in the actions of the leaders, thus reflecting an internal environment that generates stability and support. Likewise, Sensitivity with 3.911 is the second best rated and shows that employees perceive that their requests are handled promptly and with consideration; therefore, actions in terms of response times and traceability were effective. For the Empathy dimension with 3.796, it is well positioned and there is evidence of progress in boss-collaborator relations, active listening and mutual understanding, as a result of workshops and integration activities. In addition, Reliability with 3.716, although positive, is relatively lower, suggesting that there is still room for strengthening the constant fulfillment of internal commitments and agreements. Tangible Elements with 3.651 continues to be the dimension with the lowest average, indicating that, although there have been improvements in infrastructure and equipment, there is still room for improvement in the perception of the physical aspects of the work environment (Table 10).

Table 10

SERVQUAL survey after implementation

	RELIABILITY	SENSITIVITY	SECURITY	EMPATHY	E_TANGIBLES
Media	3.716	3.911	3.990	3.796	3.651

Similarly, to obtain an indicator of success, the results were compared with previous measurements to evaluate improvements. Table 11 compares the results obtained.

Table 11

Comparison of internal customer satisfaction

Dimension	Diagnosis			Current		
	Value	%	Gap	Value	%	Gap
Reliability	2.97	59.4	High (-1.0 to -1.5)	3.72	74.4	Low (-0.3 to -0.8)
Sensitivity	3.41	68.2	Mean (-0.6 to -1.0)	3.91	78.2	Low (-0.1 to -0.6)
Security	3.22	64.4	High (-1.0 to -1.3)	3.99	79.8	Very low (-0.0 to -0.5)
Empathy	3.08	61.6	High (-1.2 to -1.4)	3.80	76.0	Low (-0.2 to -0.7)
Tangible items	2.70	54.0	Very high (-1.5 to -1.8)	3.66	73.2	Low (-0.3 to -0.8)
Media	3.08	61.6	High (-1.0 to -1.3)	3.81	76.2	High (-0.2 to -0.7)

The implementation of the Quality Management System led to a significant reduction in internal service perception gaps, from mostly "high" or "very high" to "low" or "very low" values, especially in critical dimensions such as safety, tangibles and reliability. This indicates that the corrective and preventive actions, promoted from the "Act" phase of the PHVA cycle, were effective not only in execution, but also in the cultural change towards evidence-based continuous improvement.

Act (A)

From the Verify phase, those actions that did not work properly were corrected and standardized, in order to strengthen the culture of continuous improvement in the well-being and motivation of the internal customer.

In this way, the gaps detected in reliability (2.97), tangible elements (2.70) and empathy (3.08), made it possible to generate an implemented action plan: training, integration, strengthening of leadership, improvements in physical conditions (Table 12).

Table 12

Corrective actions to improve internal customer satisfaction

Action	Description
Standardization of best practices	It was formalized in successful procedures or instructions such as active listening days, periodic acknowledgements and internal communication channels.
Adjustments to the management system	The internal quality management system was modified to include motivation and well-being indicators in the institutional dashboards.
Reformulation of ineffective actions	Interventions that did not generate impact were redesigned, as the integration strategy was poorly received and was reformulated with the active participation of the personnel.
Review of roles and responsibilities	Redistribute tasks if necessary, incorporating learning from the DO phase and feedback from the CHECK phase.
Implementation of new improvement cycles	A new PHVA cycle was initiated for the dimensions with minor improvements.
Institutional recognition of positive results	Progress was shared with personnel, recognizing achievements and generating ownership of continuous improvement.

The Act phase of the PHVA cycle played a key role in the consolidation and sustainability of the progress achieved during the implementation of the Quality Management System. At this stage, effective practices such as active listening days and internal recognition systems were institutionalized through their formalization in official procedures and channels. The system was also strengthened by including motivation and well-being indicators in the institutional dashboards, ensuring that these aspects are monitored on an ongoing basis. The phase also allowed for a critical review of actions that were not effective, such as initial integration strategies, which were redesigned with the active participation of personnel, increasing their legitimacy, adjusting roles and responsibilities based on previous learning, and giving way to new improvement cycles, especially in the dimensions with the least progress. Finally, by institutionally recognizing the achievements attained, a culture of continuous improvement was promoted that reinforces the sustainability of the system and ownership by the personnel, closing the cycle with a participatory and evidence-based approach.

Discussion and Conclusions

According to the results, it was noted that there was a significant improvement in all dimensions, with the current scores being higher than those of the diagnosis, which indicates a more favorable perception of the service after the actions taken. Similarly, it was observed that in the past, the gaps were more pronounced, i.e., more negative, denoting greater differences between expectations and perceptions. Currently, although the gaps continue to exist, they are narrower, reflecting an improvement in the perceived quality of service.

Within the analysis, the dimension of tangible elements that refers to facilities, equipment and appearance of personnel was the most critical initially, with the highest

gap and the lowest score in the diagnosis of 2.70, although it continues to be the dimension with the highest gap from -0.3 to -0.8, it improved notably +0.96 points. On the contrary, the best evaluated dimension currently is Security concerning staff knowledge and courtesy, ability to inspire confidence with a current highest score of 3.99 and lower gap to 0.0 at the extreme.

The expected impact was to reach 80% internal customer satisfaction after implementing quality management, however 76.2% internal customer satisfaction was achieved, within the Plan phase there was better alignment between staff expectations and organizational processes, this coincides with Milovanović et al. (2023) where they found that more than 70% of ISO 9001 certified organizations reported improvements in internal communication and role clarity as a result of more rigorous planning under the PDCA cycle. Likewise, in the Do phase, an increase in motivation and commitment was observed, as employees better understand their tasks and feel supported by a formal structure, similar to Hao and Oliva (2016) documented that a disciplined implementation of "OD" generates better work environments and reduces occupational stress, thanks to standardization and training.

While in the Verify Phase, greater staff empowerment was found, as employees feel listened to when participating in evaluation processes, similar to what Liu et al. explained. (2021) observed that organizations with systematic CHECK practices have more engaged employees, seeing their suggestions impact organizational decisions. Finally, during the Acting phase, the development of a participative organizational culture can be distinguished, where internal clients perceive that their experiences drive real changes, as Syahdan et al. (2023) explained that effective corrective action strengthens staff trust in management, raising their satisfaction and perception of organizational justice, and that when organizations act on feedback and improve systems, employees develop greater identification with the company's goals and values.

Under this context, EPMAPA SD has managed to improve the perception of service quality in all the dimensions evaluated, although the gaps have not been completely eliminated, their reduction shows a positive progress, where the next step could be the prioritization of specific actions to close the residual gaps, especially in "Tangible elements", as well as to consolidate the improvement in Safety and Sensitivity, maintaining practices that have been well valued.

Likewise, it is concluded that the implementation of a Quality Management System based on the Deming Cycle (PDCA) not only improves operational efficiency, but also acts as a catalyst for labor welfare and internal customer satisfaction. This relationship is supported by recent scientific evidence and becomes even more relevant in public organizations such as EPMAPA SD, where service results are directly linked to employee engagement.

It is important to emphasize that the implications for EPMAPA SD or similar organizations is mainly the cultural transformation, being that the Deming Cycle can be a tool to migrate from a reactive and hierarchical culture to a more participatory and employee-centered one, adaptability, since the PDCA is flexible enough to be applied both in technical processes such as water treatment, customer service and administrative processes in human talent and purchasing. In addition to staff empowerment, in public contexts, where economic incentives may be limited, recognition of the employee's voice becomes a key motivational factor.

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