

Development of a Quality Management System in the Cheyla CYC Microenterprise In Accordance With Standard 9001

MBA. Ing. Ever Ángel Fuentes Rojas ¹, Juan Esteban González Pérez ²,
Miguel Stiven Suarez Garzon ³

¹ (Industrial Engineering, Bogotá DC/ Universidad Libre, Colombia)

² (Industrial Engineering, Bogotá DC/ Free University, Colombia)

³ (Industrial Engineering, Bogotá DC/ Free University, Colombia)

ABSTRACT: *Quality standards have become a factor of competitiveness that, although they are voluntary, have spread over time. CHEYLA CYC, being aware of this factor, begins the development of a Quality Management System in accordance with ISO 9001:2015. The focus was on improving positioning and ensuring long-term success by standardizing processes and ensuring standardization. The absence of documented procedures generated inefficiencies and variability in products, negatively impacting consumer satisfaction and business performance. To address these challenges, a structured methodology was adopted that included detailed diagnoses, application of standards, study of statistical techniques, staff training, and feasibility evaluation. The QMS allows a reduction in variability, improves operational control and increases customer satisfaction, thus correcting the conformity of standards and the efficiency of the organization. This study highlights the effectiveness of carrying out these mechanisms, which helps strengthen commercial management and prepare microenterprises for sustainable growth and greater profit in the industry.*

KEYWORDS – *Quality, ISO 9001:2015, competitiveness, standardization, process*

Date of Submission: 01-07-2024

Date of Acceptance: 12-07-2024

I. INTRODUCTION

The present study addresses the development of a quality management system (QMS) in the CHEYLA CYC microenterprise, aligned with the standards of the ISO 9001:2015 standard [1]. The company faces significant challenges in process standardization and quality assurance, which motivates this research [2]. The problem centers on the lack of well-defined processes and the absence of a comprehensive system that guarantees quality at each stage of production, negatively impacting operational efficiency and customer satisfaction [3].

Previous studies have shown that the adoption of quality standards increases operational efficiency and customer satisfaction. However, specific literature on the implementation of ISO 9001 in textile microenterprises, such as CHEYLA CYC, is limited. Previous research has focused mainly on larger companies or other industrial sectors, leaving a gap in the understanding of how these standards can be effectively applied in textile microenterprises. [4].

The main objective of this study is to optimize internal processes and ensure excellence in CHEYLA CYC products and services. An exhaustive diagnosis of the company's current situation is carried out, identifying critical areas for improvement and designing an action plan in accordance with the requirements of ISO 9001:2015. The approach includes the implementation of statistical control techniques, internal audits and training of personnel in essential aspects of quality [5].

The article is organized as follows: the initial section describes the problem and the context of the company; The relevant background and previous work is presented below. Then, the methodology used for the diagnosis and implementation of the QMS is detailed, followed by the results obtained and their analysis. Finally, the conclusions are discussed and recommendations are proposed for future research and continuous improvements in the company [6].

This research contributes significantly to knowledge about the application of standards in microenterprises, offering a practical and theoretical framework to improve the competitiveness and sustainability of CHEYLA CYC. Furthermore, it is expected that the conclusions found will serve as a reference for other microenterprises in the textile sector that seek to implement similar quality management systems, thus contributing to the strengthening of the industry at the local and regional level.

In summary, this research not only aims to improve CHEYLA CYC's internal processes, but also provide a replicable example for other microenterprises facing similar challenges. Through a systematic and detailed approach, this study seeks to demonstrate the tangible benefits of adopting the ISO 9001:2015 standard,

underlining the importance of quality and continuous improvement in the current business context. The introduction lays the foundation for an in-depth and structured analysis of the implementation of a QMS in a textile organization, highlighting its relevance and potential positive impact. [7].

II. METHODOLOGY

The methodology used to develop a QMS in the CHEYLA CYC microenterprise in accordance with the ISO 9001:2015 standard follows a series of well-structured and systematic steps that allow an exhaustive analysis of the current situation of the company, the identification of areas for improvement and the implementation of practices that ensure the quality and efficiency of internal processes. This study was carried out in two stages, which are:

Diagnosis: First, a comprehensive diagnosis is performed by scheduling visits, surveys, interviews and questionnaires to observe and collect data on current operations and processes. To do this, tools such as inspection sheets, self-diagnosis matrices and SWOT analysis are used, thus obtaining a clear view of the current state of the company [8].

Elaboration: Subsequently, a documentary structure was generated to standardize and optimize the processes. Documentation needs were analyzed and specific standards and procedures were developed. Characterization and review matrices helped ensure consistency and efficiency of documentation. [8]

Next, statistical control techniques were applied to evaluate the results obtained, identify problems and analyze the internal and external factors that affect the processes. X-bar graphs, results analysis and structured surveys are used to control and improve quality.

ISO 9001:2015 is then implemented in a critical process. To do this, specific quality plans and strategies are developed, a management system is implemented and compliance with the standard is evaluated. During this process, direct observations are made, technical sheets are prepared and the results obtained are compared.

To ensure the effectiveness of the QMS, audit guidelines were established. This included defining criteria and procedures, training internal auditors, and conducting regular inspections. The checklists and reports made documented the findings and corrective actions.

Finally, a feasibility analysis is prepared in which the economic, technical and operational viability of the QMS is evaluated, different approaches are compared and recommendations based on financial analysis, market studies and surveys are documented.

III. DEVELOPMENT AND RESULTS

Next, the development and the corresponding results will be explained by objective.

Comprehensive diagnosis: Faced with this situation, a diagnosis will begin to evaluate the extent to which the organization is prepared for the implementation of the ISO 9001:2015 standard. Based on the results, it will be decided to start the construction of the Quality Management System (QMS). If this challenge is accepted and a satisfactory result is achieved, CHEYLA will benefit from recognition in its environment, including suppliers, customers, the community and the economic sector.

Self-diagnosis matrix: The matrix includes several key aspects of the standard, such as the organization's context, leadership, QMS planning, support, operation, performance evaluation and continuous improvement. Each of these is evaluated in terms of percentage of compliance, providing a clear view of areas of strength and those requiring attention, as shown in Figure 1.

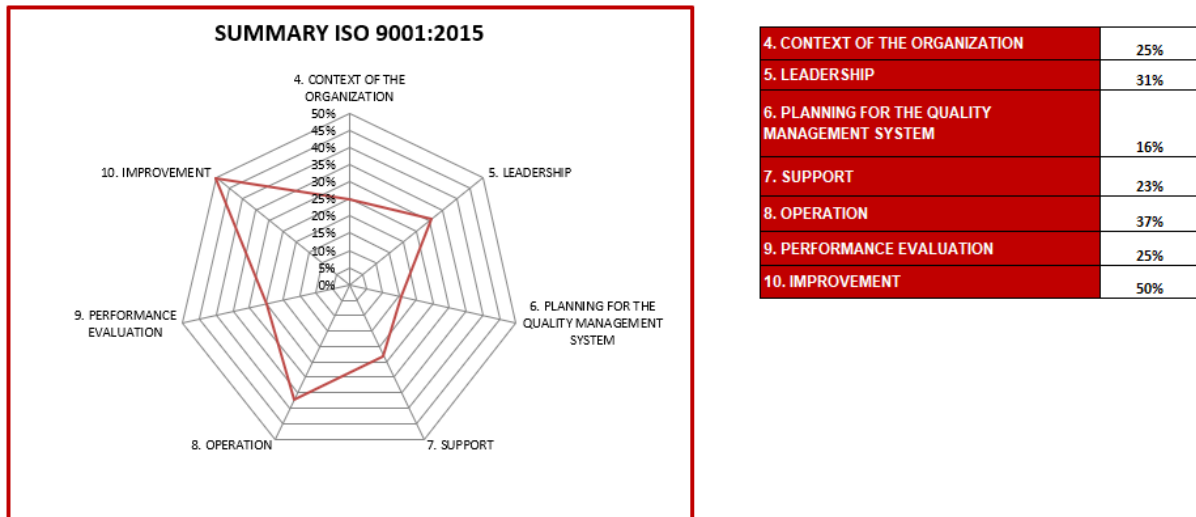


Fig. 1 Summary self-diagnosis matrix

Figure 1 shows graphically the level of compliance of the microenterprise in each of these aspects. The results indicate good performance in areas such as operation (37%) and continuous improvement (50%), but planning for the quality management system (16%) and support (23%) needs to be reinforced.

These results are crucial to identify priority areas for improvement and develop an effective action plan that fully aligns the company's processes with the requirements of ISO 9001:2015.

SWOT Matrix: This analysis focuses on both internal and external aspects of the company, providing a comprehensive view of its current position and the factors that could influence its future development. To achieve a comprehensive understanding of the CHEYLA situation, a SWOT analysis was carried out, as shown in Figure 2 [9].

	POSITIVES	NEGATIVES
INTERNAL FACTOR	<p>STRENGTHS</p> <p>F1: Have employees trained in each of their different tasks, recognized for their excellence and commitment</p> <p>F2: Adaptation of the workforce to adapt to various changing scenarios</p> <p>F3: Have the ability to compete with our customers and their different tastes, to innovate products every day</p> <p>F4: Knowledge to acquire appropriate equipment and machinery which helps with continuous improvement</p> <p>F5: Competitive prices in the national market</p> <p>F6: Surveys are carried out to measure the level of customer satisfaction</p>	<p>WEAKNESSES</p> <p>D1: Intensive manual production processes</p> <p>D2: Low level of investment in new export development strategies</p> <p>D3: Present a constant rotation of personnel that makes it impossible to maintain specific knowledge in the areas of work</p> <p>D4: Inconsistency in product labeling</p> <p>D5: Reduced space, which limits mobility in the warehouse</p> <p>D6: Limited production capacity</p>
EXTERNAL FACTOR	<p>OPPORTUNITIES</p> <p>O1: Generation of new products in the textile sector, according to consumer preferences</p> <p>O2: Growing demand for textile products in the national and international market</p> <p>O3: Strategic alliances which allow expanding the market nationally and internationally</p> <p>O4: Access to new markets with quality requirements</p>	<p>THREATS</p> <p>A1: Variation in raw material prices</p> <p>A2: Loss of customers due to better offers from the competition</p> <p>A3: Rapid changes in the market</p> <p>A4: Increased global competition</p>

Fig. 2 SWOT Matrix

In addition, the EFE – EFI matrix is implemented to have an assessment of CHEYLA CYC factors, where values close to 2 are obtained, which indicates that work must be done to strengthen the company since the threats and weaknesses place it in a risk situation to the organization.

Complementing these evaluations, the crossed SWOT has made it possible to visualize the strategic intersections between internal and external factors. When examined, strengths can be used to capitalize on opportunities and weaknesses could be exacerbated by external threats.

Document structure: The characterization matrix is carried out with the objective of analyzing the different variables that affect the efficiency of the production system at CHEYLA CYC.

This analysis is part of the continuous improvement project that is implemented to optimize processes.

The creation of the characterization matrix allows you to identify critical areas of improvement that were not evident before. This process shows the importance of having accurate data and involving the entire team in identifying problems and solutions [11] [12].

On the other hand, 12 instructions were generated for the correct implementation of the processes in the production plant, responding to the need to standardize and optimize operations. These steps were designed with the objective of providing clear and detailed guides that allow operators and technicians to carry out their tasks efficiently and safely [13] [14].

Finally, three key processes were taken in the operation, which were detailed in the best way to ensure that the operations were carried out with greater efficiency, these were:

- Production procedure
- Purchase procedure
- Commercial management procedure

Finally, 3 company formats were modified, as well as 5 were created, this in order to keep the processes in order, which helps to achieve better quality for CHEYLA CYC.

Statistical control techniques: The study will specifically address the nonconformities reported by customers; a representative sample of the affected products was taken. This data was analyzed using an X-bar graph, which is an effective tool for monitoring the average of a process over time and detecting any significant variation [15]

By implementing the X-bar graph, deviations and patterns in the data could be clearly visualized, providing a solid basis for taking corrective actions.

In summary, the application of statistical control techniques in a textile company allows for more effective and efficient management of critical production processes. This not only helps in the improvement of product quality and customer satisfaction, but also improves profit and reduces expenses associated with the production of defective items [16].

The study was carried out for the 3 disagreements with the most repetitions, which were:

Size different from the one referenced:

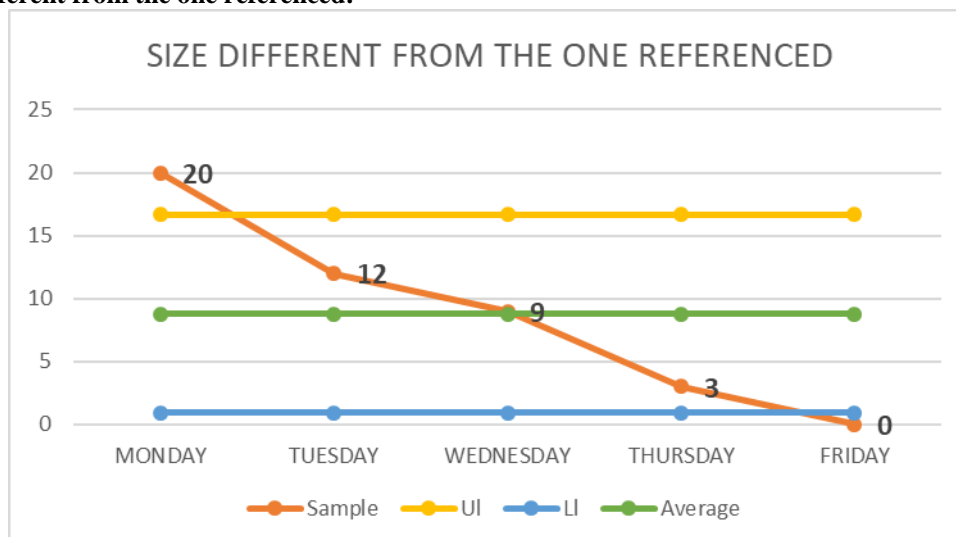


Fig. 3 Size different from the referenced one

As seen in Figure 3, the size different from the reference was the most frequent problem or failure in CHEYLA CYC, which led to taking corrective measures to mitigate this inconsistency.

• **Exchange:**

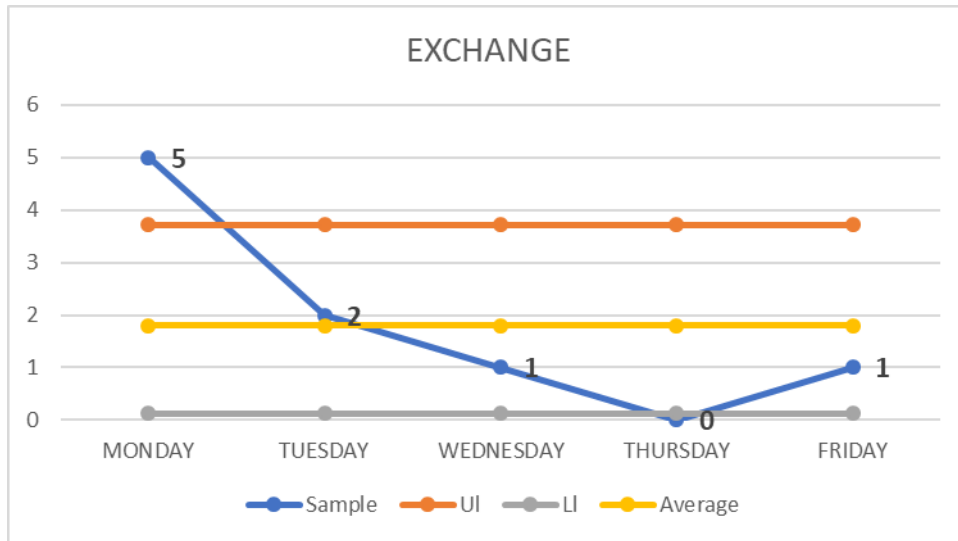


Fig. 4 Exchange

As seen in Figure 4, a significant figure was presented for this nonconformity, which warrants taking corrective measures to mitigate this inconsistency.

• **Dirt on Product:**

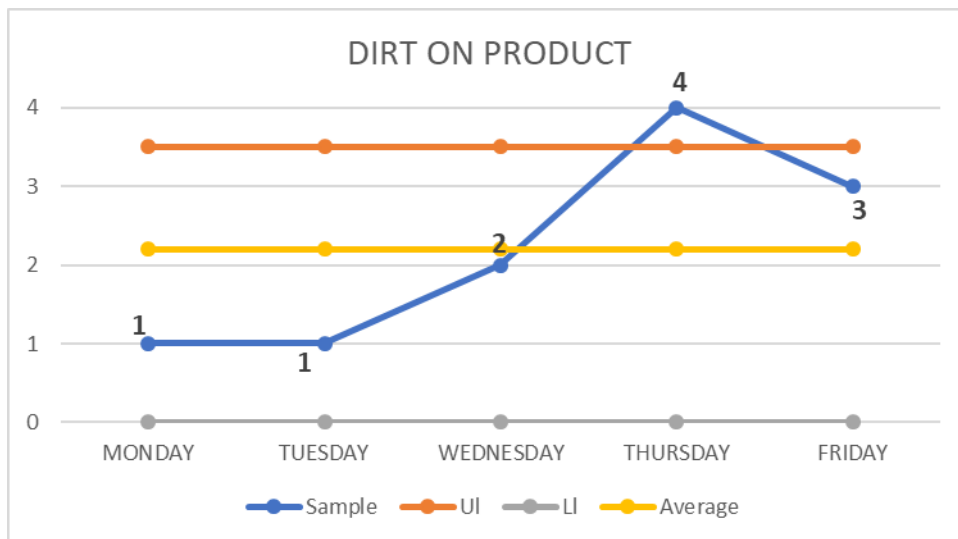


Fig. 5 Dirt on product

As seen in Figure 5, a significant figure was presented for this nonconformity, which led to taking corrective measures to mitigate this inconsistency.

To mitigate the three nonconformities, a series of metrics were carried out to improve the quality process:

- People were designated to oversee these processes; these people were responsible for monitoring and ensuring that the correct procedures were followed.
- Regular training sessions were held for workers, focusing on the importance of keeping processes in order, to achieve greater efficiency in the final product.
- Talks were implemented, which included detailed explanations about correct procedures, recommended practices, and the importance of quality in the final product.

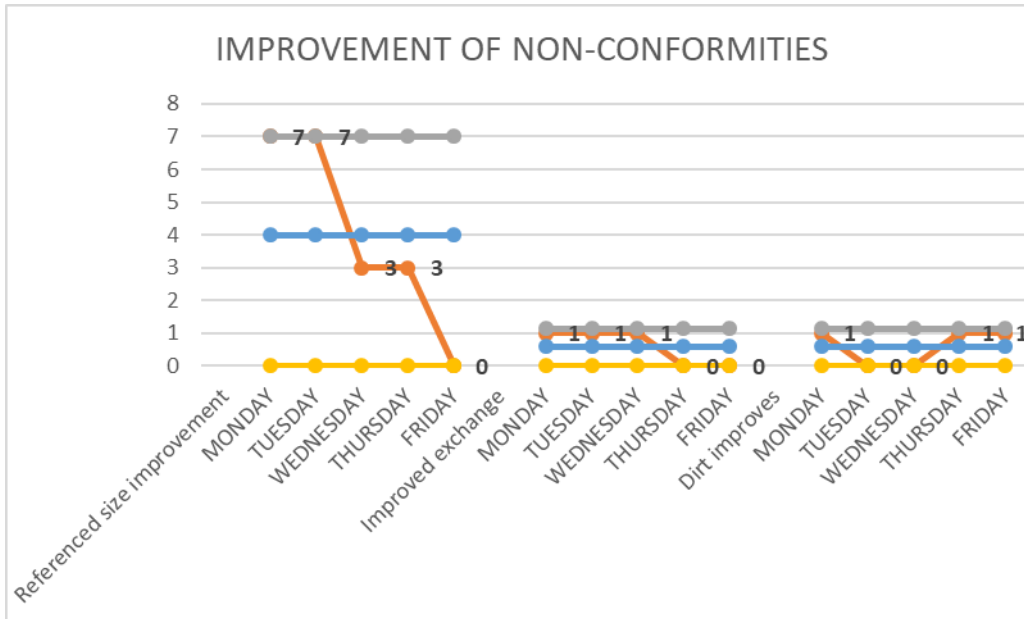


Fig.6 Improvement of non-conformities

As shown in Figure 6, the execution of the improvement plan, with the assignment of personnel for supervision and holding training talks for workers, has shown a positive impact on the reduction of disagreements. Chart 6 suggests that these efforts have led to greater consistency and alignment with expected standards, reducing the number of irregularities.

It is important to continue with supervisions and training to maintain and improve these results in the future [17].

Apply the ISO 9001:2015 standard in a critical process: To fulfill this objective, a sample of the company's historical data was taken.

The implementation of quality indicators at CHEYLA CYC follows a structured and systematic process that includes the following stages: identification of needs and objectives, selection of indicators, data collection and analysis, communication and reporting, and finally, corrective action and continuous improvement.

5 indicators were considered, which were the following:

- Indicator 1: Cutting waste
- Indicator 2: Overtime
- Indicator 3: Daily capacity
- Indicator 4: Inputs
- Indicator 5: Compliance

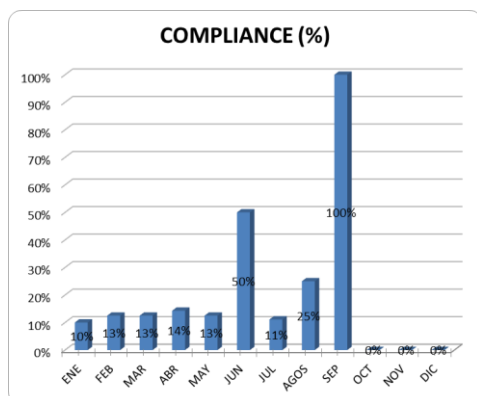


Fig. 7 Indicator 1 compliance graph

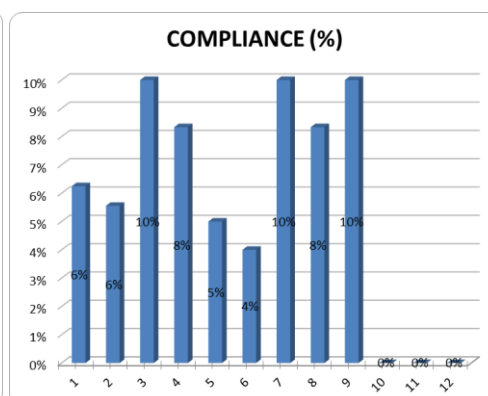


Fig. 8 Indicator 2 compliance graph

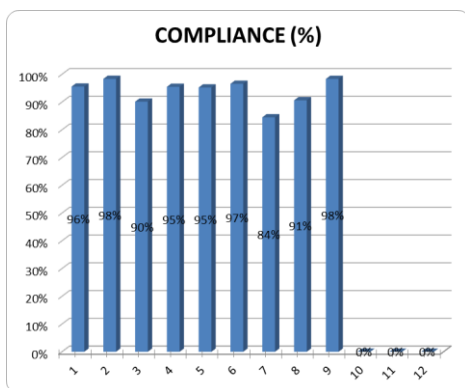


Fig. 9 Compliance graph of indicator 3

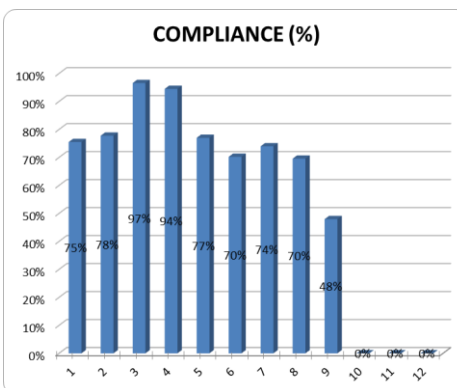


Fig. 10 Compliance graph of indicator 5

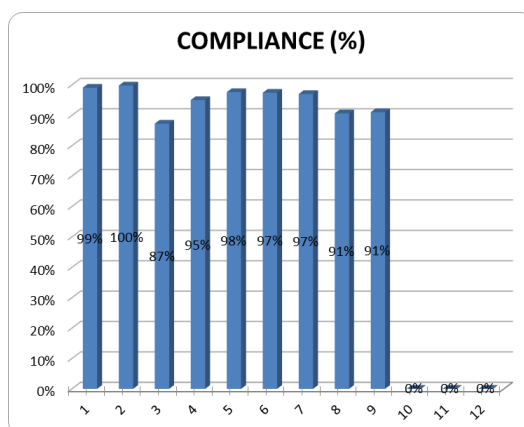


Fig. 11 Indicator 5 compliance graph

The analysis of performance indicators in the cutting and input management process shows significant variability in compliance with established objectives.

For Indicator 1, the main idea is to reduce the storage of scraps and imperfections of fabrics, but low compliance was observed in most months, with the exception of June and September, where peaks of 50% and 25% were reached. as seen in Figure 7.

It is recommended to analyze and replicate successful strategies, adjust methodologies in periods of low performance and establish an action plan to improve overall performance.

Regarding Indicator 2, whose idea of improvement is to avoid overtime by meeting the cutting objectives at the scheduled time, the results were consistently low, between 4% and 10%, as seen in Figure 8, it is recommended investigate the reasons for compliance, improve outage planning, replicate successful practices from the months with the best performance, and establish realistic goals with continuous improvement plans.

Indicator 3, which seeks to unify cutting and sewing capacity, showed high compliance in general, between 83% and 98%, as seen in Figure 9, although February and July recorded the lowest levels at 83%. and 84% respectively. It is essential to investigate the causes of these low achievements, maintain and improve strategies that ensure high performance, and continue to monitor and adjust daily capabilities.

For Indicator 4, which aims to ship products without packaging shortages, compliance varied between 48% and 97%, as seen in Figure 10, March and April had the best results, while September presented the worst. It is recommended to analyze the causes of poor performance in this last month, maintain and replicate the successful strategies of the months with the best performance and ensure a continuous supply of inputs.

Finally, Indicator 5, with the objective of delivering products without shortages, showed high and consistent compliance as seen in Figure 11, between 87% and 100%. March, August and September were the months with the lowest performance, although they still represented a good level of performance.

The causes of the low levels in March must be analyzed, the successful strategies of the high-performance months must be maintained and replicated, and adequate registration and continuous supply of inputs must be ensured.

Establish audit guidelines: Initially, CHEYLA CYC faced problems of inconsistencies in production and lacked adequate controls. To mitigate these risks, it was decided to implement audit guidelines based on ISO standards [18]. Requirements were identified through an internal assessment and consultation of relevant regulations. The guidelines were designed following best practice models and documented in manuals accessible

to all staff [19]. Training was carried out through workshops and information sessions. Pilot audits were applied to adjust procedures. Monitoring was carried out quarterly, using quality and compliance indicators [20]. Implementation of these measures resulted in a 20% decrease in production errors and an increase in operational efficiency. In the long term, the company experienced improved customer satisfaction and reduced operating costs.

Prepare feasibility analysis: An essential tool in companies to improve operations and competitiveness in the market is quality cost analysis. These are classified into four main categories: prevention, evaluation, internal failures and external failures. Each of these categories reflects different aspects of the business effort to improve the quality of the final product.

Prevention costs are associated with activities designed to prevent the occurrence of defects, such as personnel training and preventive maintenance of machinery. Evaluation costs relate to the evaluation and testing of products to ensure that they meet quality standards.

Internal failure costs refer to defects detected before the product reaches the customer.

Finally, external failure costs are associated with defects identified after delivery to the consumer.

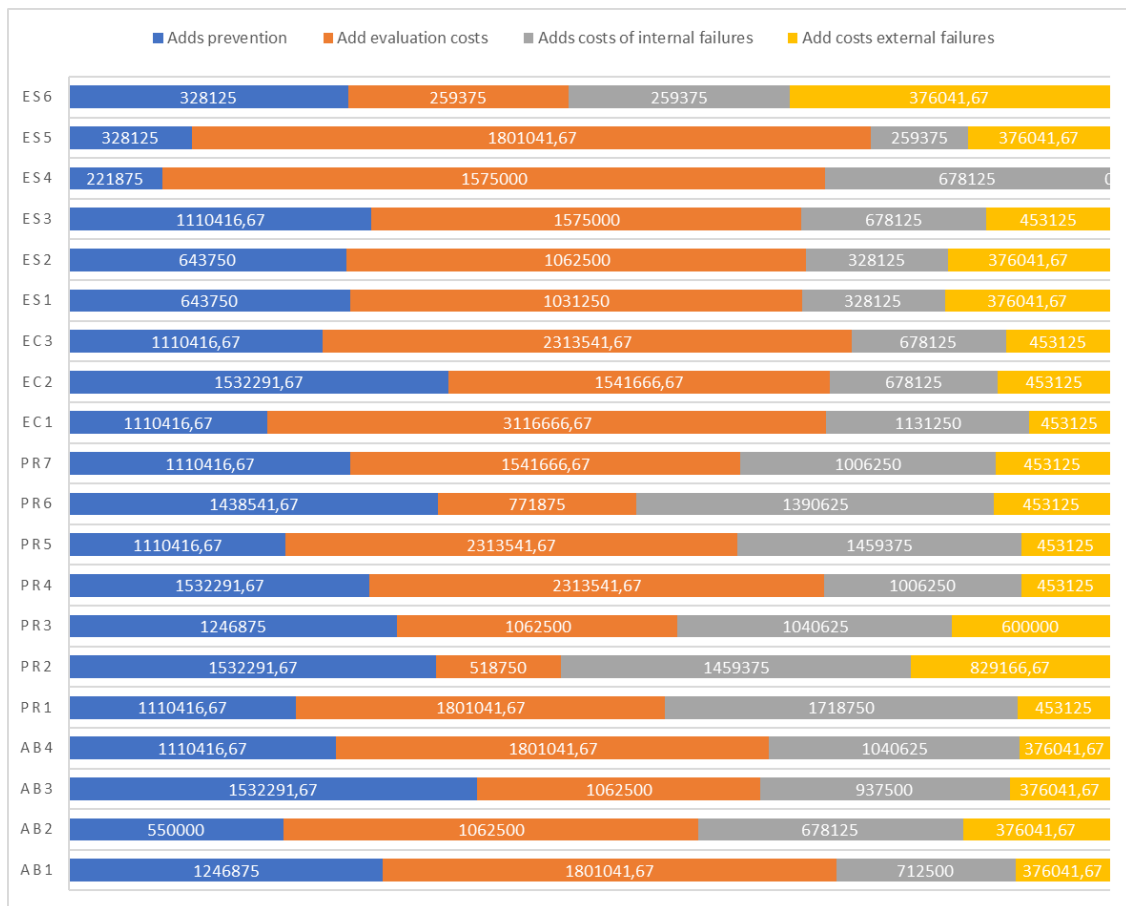


Fig. 12 Cost graph

Figure 12 shows a quality cost analysis divided into four categories: prevention (blue), evaluation (orange), internal failures (gray), and external failures (yellow) for various entities of the CHEYLA CYC company. Some key takeaways based on the analysis are as follows:

Entities EC1, PR5, EC3 and PR4 have the highest costs in general, with predominance in evaluation and internal failures.

The entities with the lowest total costs are ES6, ES5 and ES4, which may indicate a lower volume of operations or greater efficiency in quality management. In terms of prevention, EC2, PR2 and AB3 stand out for their high values, which may reflect a proactive approach to avoiding defects.

On the other hand, entities such as ES4 and AB2 show significantly lower costs in this category, which could result in higher expenses in other areas due to lower investment in prevention.

Regarding evaluation, EC1 and EC3 have extremely high costs, suggesting a rigorous quality control process. Entities such as PR6 and AB2, in contrast, present relatively low values, which could imply a less

exhaustive approach to quality assessment. PR6, PR3 and PR1 show high internal failure rates, indicating a considerable amount of errors detected before the product reaches the customer.

Entities ES1, ES2, and AB2, on the other hand, have lower costs in this area, which may be indicative of better production efficiency.

External failure costs are relatively uniform across many entities, with EC1, EC3, and PR5 having the highest expenses. PR3 stands out for a noticeably higher value in this category, which could indicate significant problems in the quality of the product reaching customers.

In several entities such as EC1, EC3 and PR5, high evaluation costs do not necessarily translate into low internal and external failure expenses, suggesting that, although a lot is invested in evaluation, many errors are still detected both internally and externally.

Entities with greater investments in prevention, such as EC2 and PR2, also have high evaluation expenses and relatively low costs of internal and external failures, suggesting a more balanced and effective strategy in quality management.

The CHEYLA company appears to have a variety of quality strategies across its entities. Those with greater investment in prevention and evaluation tend to have lower costs of internal and external failures, indicating better quality management in general.

However, there are entities with high costs in internal and external failures, which suggests areas for improvement in their prevention and evaluation processes.

IV. DISCUSSION

The implementation of a QMS at CHEYLA CYC according to ISO 9001:2015 has made it possible to effectively address the main challenges in terms of operational efficiency and customer satisfaction. The lack of documented procedures and a structured quality management system negatively affected product consistency and the company's competitiveness. Through a comprehensive diagnosis, critical areas that required intervention were identified, and a documentary structure was generated that allowed existing processes to be standardized and optimized.

The SWOT analysis and the EFE-EFI matrix provided a comprehensive view of internal and external factors, which facilitated the development of an effective strategy.

In summary, the implementation of the QMS improved the internal processes, product quality, competitiveness and sustainability of the company.

In the article "Implementation of ISO 9001:2015 in Small and Medium Enterprises (SMEs)" addresses how SMEs face similar challenges during implementation of the standard. The study highlights the importance of staff training and internal audit as critical components for success. An initial diagnosis also identified areas of weakness, with a focus on improving QMS planning and support [21].

Adequate document creation and the use of statistical control techniques were essential for process standardization and continuous improvement. The SMEs studied managed to reduce nonconformities and improve operational efficiency by assigning supervisors and conducting regular training. The analysis of internal and external factors allowed the development of effective strategies for the future [21].

In general, the implementation of the QMS in these SMEs resulted in an improvement in quality, competitiveness and business sustainability.

Both studies show that the implementation of a QMS based on ISO 9001:2015 can generate significant benefits in terms of quality, operational efficiency and competitiveness. For CHEYLA CYC, the SMEs in the article faced similar challenges, the need to improve planning and support of the Quality Management System. In these cases, staff training, internal audits and statistical control played crucial roles in the implementation process [21].

The results at CHEYLA CYC highlight an improvement in customer satisfaction and a reduction in operating costs, while the SMEs in the study also reported increases in quality and competitiveness. The use of tools such as SWOT analysis and the EFE-EFI matrix was common in both contexts, providing a comprehensive vision for strategic decision making.

V. CONCLUSION

The comprehensive evaluation carried out by CHEYLA Senior Management revealed a detailed overview of its readiness for the implementation of the ISO 9001:2015 standard. The results highlighted strengths in operations and continuous improvement, along with areas of opportunity in planning and support. Additionally, the SWOT analysis identified potentials to expand and diversify the market, although it also pointed out threats such as regulatory changes and increasing competition.

Among the strengths identified are the team's technical experience and process innovation, while weaknesses were highlighted in document management and staff training. By creating a characterization matrix, critical processes were prioritized for significant improvements in production. In addition, standardization with

detailed instructions and the use of statistical control techniques made it possible to manage nonconformities and improve the consistency and quality of the product.

Implementing internal audits to assess compliance with established standards resulted in palpable improvements in operational efficiency and customer satisfaction. A quality cost analysis identified high cost areas in evaluation and internal failures, directing efforts toward cost reduction and continuous improvement.

In summary, this comprehensive evaluation allowed CHEYLA to identify critical areas for improvement, develop effective strategies, and establish solid criteria for the successful implementation of the ISO 9001:2015 standard. The primary focus was on continuous improvement and customer satisfaction, critical to the company's long-term growth and sustainability.

REFERENCES

- [1] International Organization for Standardization. (2015). ISO 9001:2015 Quality management systems — Requirements. ISO. Fecha de consulta: junio de 2024. Extraído de: <https://www.iso.org/standard/62085.html>
- [2] Jaca, C., Viles, E., Mateo, R., Santos, J. (2012). Components of sustainable improvement systems: Theory and practice. *The TQM Journal*, 24(2), 142-154. Fecha de consulta: junio de 2024. Extraído de: <https://doi.org/10.1108/17542731211215080>
- [3] García, M. L., & García, J. (2012). *Gestión de la calidad: Conceptos y herramientas*. Editorial Paraninfo. Fecha de consulta: junio de 2024. Extraído de: <https://clea.edu.mx/biblioteca/files/original/64db843c11c52aaf913a5322feafd3d8.pdf>
- [4] Sierra, L., & Gutiérrez, P. (2014). ISO 9001 para PYMES. Editorial Díaz de Santos. Fecha de consulta: junio de 2024. Extraído de: <https://redgesiso.es/wp-content/uploads/2014/09/GUIA-ISO-9001-para-PYME-CAPITULO-1.pdf>
- [5] Domínguez Machuca, J. A. (2011). *Dirección de la Producción y Operaciones: Fundamentos de Ingeniería de Organización Industrial*. McGraw-Hill. Fecha de consulta: junio de 2024. Extraído de: [file:///D:/HP/Downloads/Dialnet-DireccionDeOperaciones-6439108%20\(1\).pdf](file:///D:/HP/Downloads/Dialnet-DireccionDeOperaciones-6439108%20(1).pdf)
- [6] Hoyle, D. (2017). *ISO 9001:2015: Understand, implement, succeed!*. Routledge. Fecha de consulta: junio de 2024. Extraído de: <https://www.routledge.com/ISO-9000-Quality-Systems-Handbook-updated-for-the-ISO-9001-2015-standard-Increasing-the-Quality-of-an-Organizations-Outputs/Hoyle/p/book/9781138188648>
- [7] Goetsch, D. L., & Davis, S. B. (2014). *Quality Management for Organizational Excellence: Introduction to Total Quality* (7th ed.). Pearson. Fecha de consulta: junio de 2024. Extraído de: https://nibmehub.com/opac-service/pdf/read/Quality%20Management%20for%20Organizational%20Excellence%20_%20introduction%20to%20total%20quality.pdf
- [8] Wheelen, T. L., & Hunger, J. D. (2012). *Strategic Management and Business Policy: Toward Global Sustainability* (13th ed.). Pearson. Fecha de consulta: junio de 2024. Extraído de: <https://www.scirp.org/reference/referencespapers?referenceid=2836558>
- [9] Kotler, P., & Keller, K. L. (2016). *Marketing Management* (15th ed.). Pearson. Fecha de consulta: junio de 2024. Extraído de: <https://www.edugonist.com/wp-content/uploads/2021/09/Marketing-Management-by-Philip-Kotler-15th-Edition.pdf>
- [10] Slack, N., & Brandon-Jones, A. (2018). *Operations Management* (9th ed.). Pearson. Fecha de consulta: junio de 2024. Extraído de: https://api.pageplace.de/preview/DT0400.9781292253992_A37370732/preview-9781292253992_A37370732.pdf
- [11] Heizer, J., Render, B., & Munson, C. (2017). *Operations Management: Sustainability and Supply Chain Management* (12th ed.). Pearson. Fecha de consulta: junio de 2024. Extraído de: https://books.google.com.co/books/about/Operations_Management.html?hl=id&id=APLpCwAAQBAJ&redir_esc=y
- [12] Crosby, P. B. (1979). *Quality is Free: The Art of Making Quality Certain*. McGraw-Hill. Fecha de consulta: junio de 2024. Extraído de: <https://www.scirp.org/reference/referencespapers?referenceid=1808367>
- [13] Imai, M. (1986). *Kaizen: The Key to Japan's Competitive Success*. McGraw-Hill. Fecha de consulta: junio de 2024. Extraído de: https://books.google.com.co/books/about/Kaizen_The_Key_To_Japan_s_Competitive_Su.html?id=gqg9ngEACAAJ&redir_esc=y
- [14] Juran, J. M., & Godfrey, A. B. (1999). *Juran's Quality Handbook* (5th ed.). McGraw-Hill. Fecha de consulta: junio de 2024. Extraído de: <https://gmpua.com/QM/Book/quality%20handbook.pdf>
- [15] Montgomery, D. C. (2019). *Introduction to Statistical Quality Control* (8th ed.). Wiley. Fecha de consulta: junio de 2024. Extraído de: https://media.wiley.com/product_data/excerpt/94/11197230/1119723094-8.pdf
- [16] Evans, J. R., & Lindsay, W. M. (2019). *Managing for Quality and Performance Excellence* (11th ed.). Cengage Learning. Fecha de consulta: junio de 2024. Extraído de: https://books.google.com.co/books/about/Managing_for_Quality_and_Performance_Exc.html?id=uMUaCgAAQBAJ&redir_esc=y
- [17] Domínguez Machuca, J. A. (2008). *Control Estadístico de Calidad*. McGraw-Hill. Fecha de consulta: junio de 2024. Extraído de: <https://www.uv.mx/personal/ermeneses/files/2018/05/6-control-estadistico-de-la-calidad-y-seis-sigma-gutierrez-2da.pdf>
- [18] P. (2013). *The Internal Auditing Pocket Guide: Preparing, Performing, Reporting and Follow-up* (3rd ed.). ASQ Quality Press. Fecha de consulta: junio de 2024. Extraído de: <https://www.perlego.com/book/3805187/the-internal-auditing-pocket-guide-preparing-performing-reporting-and-followup-pdf>

- [19] Cannon, T., & Leeke, P. (2018). *Auditing Social Media: A Governance and Risk Guide*. John Wiley & Sons. Fecha de consulta: junio de 2024. Extraído de: https://books.google.com.co/books/about/Auditing_Social_Media.html?id=6ymUej505x0C&redir_esc=y
- [20] López Martín, M. J. (2011). *Auditoría de la calidad*. Editorial Paraninfo. Fecha de consulta: junio de 2024. Extraído de: <https://revistas.unilibre.edu.co/index.php/criteriolibre/article/view/2130>
- [21] Oakland, J. S. (2014). *Total, Quality Management and Operational Excellence: Text with Cases (4th ed.)*. Routledge. Fecha de consulta: junio de 2024. Extraído de: <https://www.taylorfrancis.com/books/mono/10.4324/9781315561974/total-quality-management-operational-excellence-john-oakland-michael-turner-robert-oakland>