



Design of an improvement plan applying the 5's methodology in the chicken roastery "El Pechugón".

Diseño de un plan de mejora aplicando la metodología 5's en el asadero de pollo "El Pechugón".

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Abstract.

The objective of this research work is to design an improvement plan based on the 5'S methodology in the chicken roaster "El pechugón" with the purpose of increasing efficiency in business performance. To know the current situation of the business, a check list was used based on each of the phases of the 5'S methodology, in which deficits were determined such as: non-standard processes, lack of discipline, lack of cleaning protocol, poorly committed collaborators, producing low-quality products and harming customer satisfaction. Faced with these deficits, action plans and a process manual were developed in order to provide the business with effective work spaces, reduce unproductive time, increase commitment and discipline in collaborators in order to improve the work environment together with the quality of the product and increase customer satisfaction.

Keywords

improvement plan, standardization, 5'S methodology, efficiency, productivity

Resumen.

El presente trabajo de investigación tiene como objetivo el diseño de un plan de mejora basado en la metodología 5'S en el asadero de pollo "El pechugón" con el propósito de aumentar la eficiencia en el desempeño del negocio. Para conocer la situación actual del negocio se hizo uso de check list basado en cada una de las fases de la metodología 5'S, en la cual se determinaron déficits como: procesos no estandarizados, carencia de disciplina, inexistencia de protocolo de limpieza, colaboradores escasamente comprometidos, produciendo productos de baja calidad y perjudicando la satisfacción del cliente. Ante estos déficits, se desarrollaron planes de acción y un manual de procesos con la finalidad de proporcionar al negocio espacios de trabajo eficaces, disminuir los tiempos improductivos, aumentar el compromiso y disciplina en los colaboradores para así mejorar el ambiente laboral junto a la calidad del producto e incrementar la satisfacción del cliente.

Palabras clave.

plan de mejora, estandarización, metodología 5'S, eficiencia, productividad

1. Introduction

The business "El Pechugón" began operations in 2019 and is dedicated to the preparation and sale of roasted chickens, along with soft drinks, located in the Jesús María parish, Cantón Naranjal, Guayas Province, under the management of Gerardo Alfredo Albán Alcívar. Although it has experienced steady growth, operations lack efficient management due to the absence of quality tools [1]. The lack of standardization, planning and clear protocols translates into problems such as lack of discipline, uncommitted collaborators and inadequate classification of resources and tools. These internal deficiencies directly impact product quality and, consequently, customer satisfaction [2].

The lack of a structured approach and clear protocols negatively influences the internal environment of the business and, therefore, its performance. To address these deficiencies, it is crucial to design a plan that solves the identified problems and contributes to business development and improvement [3].

The analysis of the current state of the business was based on direct observations, revealing critical deficiencies, which are detailed below:

- Lack of discipline: Employees do not maintain their responsibilities in the absence of the boss or supervisor, impacting the operation.
- Non-standardized processes: The lack of uniformity in production activities generates problems in the preparation of dishes.
- Disorganization in the classification of material resources: Tools and resources are not properly located.
- Insufficient commitment of employees: insufficient dedication to their responsibilities.
- Lack of cleaning protocol, which affects the hygiene and cleanliness of the environment [4].

Based on the above, the objective of this research is to propose an improvement plan for the "El Pechugón" chicken rotisserie in order to increase the efficiency of the business performance.

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In order to meet the proposed objective, the following is proposed: First, they seek to identify and understand the current situation of the chicken rotisserie "El Pechugón", with the purpose of detecting the present deficiencies. Subsequently, they are oriented towards the establishment of improvement actions that contribute to the increase of the general performance of the business. Finally, they are aimed at preparing a process manual to ensure standardization in production activities, which in turn will guarantee the quality of the products offered by the business [5].

Total Quality.

Total quality is defined as a commitment to constant improvement, seeking to achieve excellence in all aspects of an organization. This strategy drives the evolution and continuous improvement in both production and administrative processes, in order to enhance productivity. Its objective is to achieve an optimal balance in the satisfaction of the needs and expectations of those involved in the organization, i.e. its stakeholders [6].

Continuous Improvement Cycle.

The Continuous Improvement Cycle, also called the PHVA Cycle (Plan, Do, Check, Act), represents a fundamental cyclical method that fosters a culture of continuous improvement within organizations. Its effective application makes it adaptable to any type of company. It is structured in four stages:

1. Plan: In this initial phase, the problem is identified, its origin is determined and the improvement objectives are defined together with the necessary resources [7].
2. Do: Here the plan established in the previous stage is implemented. The employees execute the plan under defined conditions, requiring supervision to ensure its organization and compliance within the established deadlines.
3. Check: This phase is crucial, as it evaluates and verifies whether the results meet the initial objectives. If they are not achieved, it returns to the planning stage to correct the defects that prevented the achievement of the objectives.
4. Act: Once the verification stage has met the objectives, the changes made are standardized and their execution is documented in detail. The continuous application of this method guarantees sustained improvement [8].

This method ensures the continuous improvement of the organization by identifying problems and seeking opportunities for constant improvement, enhancing strategies and competitive advantages [9].

5'S Methodology.

The 5'S methodology emerged in Japanese industry after World War II, in the 1950s, as a quality tool focused on continuous improvement. Its main objective is to optimize

work environments, increase productivity and improve working conditions. It is composed of five key terms:

1. Seiri (classification): Consists of distinguishing the useful from the useless and getting rid of the unnecessary.
2. Seiton (order): Defines the correct location and arrangement of objects.
3. Seiso (cleanliness): Establishes cleanliness as a regular practice.
4. Seiketsu (standardization): Seeks to maintain consistency and compliance with the previous stages.
5. Shitsuke (discipline): Seeks to ensure that these stages form an inherent part of the organizational culture.

The 5'S methodology is designed to guarantee total quality in organizations, based on continuous improvement. Its application reduces unproductive time, optimizes production costs, and improves the work environment. Its purpose is to offer an efficient and satisfactory work environment, allowing collaborators to develop their daily activities effectively and produce high quality goods or services to satisfy their target market [10].

How does the 5'S Methodology work?

The 5'S methodology, consisting of five stages, aims to improve work organization and the quality of the work environment. Each phase focuses on specific aspects:

1. Seiri - Selection: Refers to identifying and discarding the non-essential, allowing the classification and elimination of elements that do not add value to the workspace. The reduction of unnecessary tools and materials allows greater efficiency in the processes.
2. Seiton - Order: This stage involves arranging the essential elements in visible and easily accessible areas. The correct arrangement avoids misplacement, streamlining processes and generating a clearer and more organized work image.
3. Seiso - Cleaning: Focused on the cleaning of work elements to maintain a safe and healthy environment, improving the productivity of employees and extending the useful life of tools and machines.
4. Seiketsu - Standardization: This phase establishes acquired habits as an integral part of the organizational culture, reinforcing standards and consolidating new habits on an ongoing basis.
5. Shitsuke - Self-discipline: Requires that employees maintain the established standards and that top management supervises this compliance. Self-discipline and the incorporation of the 5'S as a daily responsibility strengthen the organizational culture, improve efficiency and guarantee customer satisfaction.

The implementation of the 5'S contributes to operational efficiency and product quality, which satisfies customer expectations and establishes a robust and productive organizational culture [11].



Advantages of the 5S Methodology.

The 5S Methodology has several advantages that have a positive influence on the organization:

1. **Increased productivity:** The implementation of the methodology has a direct impact on the increase of productivity and, consequently, on the profitability of the organization.
2. **Improved appearance and comfort in workspaces:** Workspaces become more pleasant and comfortable, making it easier for employees to fulfill their responsibilities more effectively.
3. **Reduction of work time:** The correct execution of the selection, order and cleaning phases speeds up operations, making work in an organized and clean space faster and more efficient.
4. **Reduction of accidents at work:** The 5S methodology contributes to create a safer environment and reduces the possibility of accidents in the workspace.
5. **Sustainable results:** The benefits obtained with the application of the methodology are sustainable over time, which ensures continuous and constant improvement in the organization [12].

2. Materials and methods

This research work is based on different typologies, chosen according to the needs of the topic to be developed. Descriptive research was used to know, understand and analyze the current situation of the "El Pechugón" steakhouse by collecting information through direct observation, interviews and surveys. Documentary research was also carried out based on sources such as articles, books and web pages, which provided relevant data and served as support for the development of the topic. Since the information was obtained in the field, at the business facilities, field research was also applied. Finally, by means of exploratory research, an initial approach was made to the steakhouse, determining the inexistence of previous studies on it through a conversation with the owner. The complementarity of these research approaches guarantees the validity of the study.[13].

Population and sample

The population identified for this research is made up of the total number of employees and customers of the "El Pechugón" chicken roastery, i.e. 4 employees and 200 customers, which adds up to a finite population of 204 people to whom we have access to collect the necessary information.

As for the sample, being a small number of collaborators, all of them will be taken for the study. With respect to customers, given their number and the difficulty of accessing them, a sample will be obtained by means of the non-probabilistic casual method, which consists of selecting them by chance on a working day during the busiest hours,

in order to obtain their opinion about the product and service offered in the business. This sample will allow us to have an idea of the customers' perspective without the need to survey all of them [14].

To ensure the veracity of the data, various data collection techniques were used. First, direct observation made it possible to examine in situ the work environment, order and cleanliness activities, and the work environment of the employees. Second, an interview was conducted with the owner of the business, who has a deep knowledge of general management. Finally, surveys were administered to workers and customers to determine the current situation of the production processes in relation to the five phases of the 5S methodology. The complementation of these techniques, especially the observation, interview and survey, facilitates obtaining reliable and relevant information for the research[15].

3. Results

Table 1. Evaluation methodology.

Rating Scale	Description
1 = Does not comply	Nothing was done in this phase.
2 = Inefficient	Poor compliance with the phase.
3 = Regular	An intermediate phase condition is perceived.
4 = Good	There are minimal situations to be corrected.
5 = Efficient	It effectively complies with the phase.
Total	The evaluation of each of the evaluated items is added up.
Average	The total is divided by the number of items evaluated.

Table 1 shows the methodology to be used to evaluate the degree of compliance with each of the 5S at the "El Pechugón" chicken roastery.

A rating scale of 1 to 5 is established, where:

1 = Does not comply: Means that absolutely nothing has been done with respect to the evaluated phase.

2 = Inefficient: Indicates a very poor compliance with the requirements of the phase.

3 = Regular: Indicates that there is an intermediate level of compliance with the phase, with significant opportunities for improvement.

4 = Good: Implies that there are minimal specific situations to be corrected in the evaluated phase.

5 = Efficient: Means that the requirements of the phase in question are effectively and fully met.

Subsequently, the evaluation of each of the evaluated items is added up, and an overall average of the evaluation of that phase is calculated, dividing this total by the number of evaluated items [16].



This mechanism will allow for a comprehensive and objective assessment of the level of implementation of each of the 5S at the chicken roastery.

Table 2. Check list based on the Selection phase - Seiri.

Selection - Seiri						
1= Not compliant; 2= Inefficient; 3=Regular; 4=Good; 5= Efficient						
Items to evaluate	1	2	3	4	5	Observation
Is there a separation of necessary tools and/or materials from unnecessary ones?	X					There is no separation of necessary utensils from unnecessary ones, so everything is in disarray.
Are only the specific tools and materials for the activity to be performed present in the workspaces?		X				Workspaces are cluttered with unnecessary utensils so there are delays in deliveries.
All machines and/or equipment, workspaces in good condition?			X			The floors are not in good condition.
When there is an obsolete tool and/or utensil, is there a solution guide either to be repaired or discarded?	X					There is no solution guide for obsolete objects.
Total=	7	Average= 1.7 - Does not comply.				

The average obtained was 1.7, which according to the rating scale means that nothing has been done in this phase of the methodology.

Table 3. Check list based on the Order phase - Seiton.

Order - Seiton						
1= Not compliant; 2= Inefficient; 3=Regular; 4=Good; 5= Efficient						
Items to evaluate	1	2	3	4	5	Observation
Are shelves and/or workspaces properly marked for proper placement of utensils?	X					There is no signage to locate the utensils.

Is the order of the utensils according to the frequency of use? (Higher frequency of use=closer proximity for use)			X			The utensils are in order, but not according to frequency of use.
Are workspaces properly identified and signposted?		X				There is no signage to delimit work spaces.
Do you have the right quantities for the activity to be carried out (utensils, raw materials, cleaning supplies)?	X					The amounts to be used are taken empirically.
Total=	7	Average= 1.7 - Does not comply.				

The average obtained was 1.7 and, according to the rating scale, this means that nothing is being done with respect to this phase of the methodology.

Table 4. Check list based on the Cleaning phase - Seiso.

Cleaning - Seiso						
1= Not compliant; 2= Inefficient; 3=Regular; 4=Good; 5= Efficient						
Items to evaluate	1	2	3	4	5	Observation
Are the workspaces completely clean (free of food residues, dust and/or dirt stains)?		X				Workspaces are dirty and cluttered.
Are the utensils completely clean (free of food residues, dust and/or dirty spots)?		X				Not all utensils are clean.
Is there evidence of the existence of a cleaning protocol?	X					There is no cleaning protocol.
Are the organic and inorganic waste bins properly marked and located to avoid contamination of the product?		X				There is only one waste deposit, but it is not properly marked.
Total=	7	Average= 1.7 - Does not comply.				

The average obtained was 1.7, which according to the rating scale means that nothing is done in this phase of the methodology.

Table 5. Check list based on the Standardization phase - Seiketsu.

Standardization - Seiketsu						
1= Not compliant; 2= Inefficient; 3=Regular; 4=Good; 5= Efficient						
Items to evaluate	1	2	3	4	5	Observation
Is visual inspection management done to maintain selection, order and cleanliness?			X			



Are the processes specific, documented and actively used?	X					
Do employees have a detailed knowledge about the how and when of their responsibilities?		X				
Does senior management conduct periodic checklist inspections to review the status of the first three phases?	X					
Total=	7	Average= 1.7 - Does not comply.				

The average obtained was 1.7, which according to the rating scale means that nothing is being done in this phase of the methodology.

Table 6. Check list based on the Discipline phase – Shitsuke

Cleaning - Seiso						
1= Not compliant; 2= Inefficient; 3=Regular; 4=Good; 5= Efficient						
Items to evaluate	1	2	3	4	5	Observation
Is there a sense of teamwork, respect and cordiality among all the individuals who are part of the business?					X	During direct observation and employee surveys, it is evident that there is a cordial and respectful treatment among all employees.
Are processes modernized and inspected regularly?	X					There is no process inspection or updating.
Is there a work environment with a culture of selection, order, cleanliness and compliance with standards?		X				There is an inefficient culture in the business to preserve selection, order and cleanliness.
Total=	8	Average= 2 – Inefficient				

The average obtained was 2, which according to the evaluation scale means that there is little compliance with this phase.

Table 7. Overall average of the 5S Methodology

Phases of the 5'S	Score
Selection - Seiri	1.7
Order - Seiton	1.7
Cleaning - Seiso	1.7
Standardization -Seiketsu	1.7
Discipline - Shitsuke	2
Total	8.8
Overall average	1.7

The business has been evaluated with an average score of 1.7 for compliance with the 5S methodology, indicating noncompliance with the key phases of the methodology. This assessment highlights critical areas that require immediate improvement. The detailed results of the specific checklists for each phase of the 5'S indicate:

- In Selection (Seiri): The inadequate accumulation of utensils has generated disorder, causing obstructions in the processes. Infrastructure in poor condition increases the risk of occupational accidents.
- In Order (Seiton): The lack of signage and organization of tools causes delays when looking for tools. The lack of delimitation in work spaces causes unavailability of tools, generating inefficient displacements. Lack of control over the amount of resources causes unnecessary financial overruns.
- In Cleaning (Seiso): The absence of a cleaning protocol has created dirty environments, leading to contamination and proliferation of microorganisms, insects and rodents, negatively impacting product quality and customer perception.
- In Standardization (Seiketsu): Lack of uniformity in processes leads to low quality products, resulting in a possible loss of customers and affecting the sustainability of the business.
- In Discipline (Shitsuke): Lack of commitment and knowledge among collaborators prevents standards and methodology phases from being an integral part of the business, affecting productivity and overall performance.

Table 8. Selection Action Plan -Seiri

Selection - Seiri		
Actions for improvement	Responsible	Resource
-Item identification diagram. -Use of identification labels.	The owner.	-Item registration list. -Red tags. -Registration of red tags.

Table 8 shows the action plan proposed for the Selection or Seiri phase, within the implementation of the 5S methodology in the "El Pechugón" chicken roastery.

Three key improvement actions are identified:

1. Item identification diagram: This involves drawing up a diagram with the exact location of the different materials, tools, products and inputs within the facilities.
2. Use of identification labels: Placement of labels for each item, allowing quick recognition of what it is and where it should be located.
3. Registration of red tags: Red tags indicate unnecessary or useless items. Control of what has been labeled will be carried out to later decide its destination.



The business owner is responsible for implementing these actions. Resources such as log lists and red tags for marking are required.

The purpose of these measures is to eliminate from the area everything that is useless or unnecessary.

Table 9. Order Action Plan -Seiton

Order -Seiton		
Improvement actions	Responsible	Resource
-Location according to frequency of use. -Identification and marking.	The owner.	-Table of frequency of use. -Graphical division of business areas. -Table of color indicators. -Labels of areas.

Table 9 presents the suggested action plan for the Order or Seiton phase, as part of the 5S methodology implemented in the "El Pechugón" chicken roastery.

It involves three main actions:

1. Location according to frequency of use: organize items depending on how much they are used, the most frequently used items closer to the work area.
2. Identify and mark: Visibly demarcate the location of everything by signage.
3. Graphic division of areas: Distribution of spaces within the premises using intuitive diagrams.

The owner is responsible. Required resources include: frequency of use chart to classify elements, color chart to standardize visual indicators and labels to identify each zone.

Seiton seeks to optimize searches and process flow by keeping the workstation organized.

Table 10. Cleaning Action Plan -Seiso.

Cleaning -Seiso.		
Improvement actions	Responsible	Resource
Perform a cleaning protocol	The owner.	-List of cleaning materials. -Cleaning procedure. -Cleaning planning. -Cleaning verification.

Table 10 presents the improvement actions proposed for the Cleaning or Seiso phase, within the implementation of 5S in the chicken roastery.

The primary action is the completion of a cleaning protocol that involves:

- List of necessary cleaning materials.
- Cleaning procedure, detailing tasks, frequencies, people in charge.

- Cleaning planning with a schedule of activities.
- Verification of cleaning effectiveness through checklists or inspections.

The business owner is responsible for the implementation. Having this protocol in place will allow standardizing and maintaining the required levels of cleanliness throughout the work area as part of the 5S methodology.

The aim is to create awareness among workers about the importance of cleanliness and to perform this activity in a disciplined manner as part of their habits. A clean work environment has a positive impact on productivity.

Table 11. Standardization Action Plan -Seiketsu.

Standardization -Seiketsu		
Improvement actions	Responsible	Resource
-Periodic inspections. -Process documentation sheet. -Establish and report assigned responsibilities.	The owner.	-Inspection schedule. -Process documentation form. -Responsibility information sheet.

Table 11 details the recommended plan of action for the Standardization or Seiketsu stage, within the 5S methodology applied to the barbecue plant.

It comprises three major initiatives:

1. Periodic inspections: conduct routine audits or monitoring to verify that procedures and conditions are being met.
2. Documentation sheet: Develop standardized formats to record and document executed processes.
3. Inform responsibilities: Define those in charge of each task and make this information known by means of visible sheets or notices.

The business owner is responsible, relying on resources such as inspection schedules, standardized formats and information sheets on the responsibilities of each role.

Seiketsu seeks to prevent the occurrence of errors and non-compliance with procedures through standardization and effective communication.

Table 12. Discipline Action Plan - Shitsuke.

Disciplina - Shitsuke		
Improvement actions	Responsible	Resource
-Short meetings. -Training of collaborators.	The owner.	-Meeting registration. -Training planning.

Table 12 presents the approach for the Discipline or Shitsuke stage within the 5S program in the chicken roastery.



This phase focuses on two central actions:

1. Short meetings: conduct short coordination meetings on a systematic basis with the chicken roastery workers for feedback and engagement.
2. Train personnel: Establish training schedules to train the team in the 5S concepts and tools.

The owner is responsible for leading these tasks. Resources such as meeting records and planning of staff training sessions are required.

The Shitsuke aims to achieve the habit and culture of compliance with the established in terms of order, cleanliness and standardization, through information, commitment and training of employees.

Cleaning protocol.

It consists of the description of a series of cleaning and disinfection procedures, as well as the control of the correct cleaning of the work spaces.

List of cleaning instruments.

- Cleaning materials
- Broom
- Detergent
- Garbage bags
- Bleach
- Disinfectant
- Mop
- Dustpan
- Protective gloves
- Heavy-duty plastic apron
- Toilet brush
- Strong absorbent cloth rags
- Bucket
- Brush type broom

Cleaning procedure.

The cleaning procedure consists of several stages: it begins with personal hygiene and preparation with the appropriate equipment. Then, garbage is collected and sorted. As for cleaning, it is indicated how to clean the floors and surfaces. After cleaning, disinfection is done with chlorine bleach and left to act for the necessary time. For the bathrooms, the cleaning and disinfection procedure is repeated, and the missing elements are supplied. Finally, it describes how to clean and disinfect the waste tanks and specifies how to allow them to dry before returning them to their place.

Table 13. Responsibility assignment sheet.

Assignment of responsibilities sheet	
Occupation	Responsibilities
Owner	Supply and organize resources.
	Ensures compliance with activities.

	Makes decisions.
	Positively influences collaborators.
	Examines legal and financial issues.
Head Cook	Checks the existence of suitable quantities of the material.
	Monitors the preparation of the dishes.
	Inspects the cleanliness and order of the kitchen.
Kitchen assistant	Assists in the preparation of dishes.
	Cleans and tidies the kitchen.
	Chop, cut and peel food.
	Reports any anomalies to the head cook.
Customer service	Order taking and collection.
	Cash register.
	Clarifies doubts and attends to customers.
	Receives feedback from customers.
	Collaborates in the different activities.
	Runs errands on behalf of the owner.
	Inform the owner of any anomaly.

Table 13 presents a chart to visualize the assignment of responsibilities among the different work roles at the "El Pechugón" chicken roastery.

The main functions and duties of the following are detailed:

- Owner: General leadership, direction of resources and compliance with plans.
- Head Cook: Supervision of raw materials and supplies, preparation of dishes, management of cleanliness and order in the kitchen.
- Kitchen Assistant: Support to the Cook in food preparation, kitchen cleaning, incident reporting.
- Customer Service: Management of orders and payments, customer service, recording feedback and communication with the owner.
- All roles: Collaboration between areas, incident reporting, 5S compliance.

This information sheet will allow a clear distribution of functions under the concepts of responsibility and commitment.

4. Conclusions

We were able to understand the current situation of the business by identifying and pointing out its deficits through the evaluation of the checklists of each phase of the 5'S methodology. Non-standardized processes, low employee involvement, absence of a cleaning protocol, lack of discipline, and inadequate classification of resources and tools were identified. These deficits become an explicit focus for necessary improvement actions.

Specific action plans were developed to improve each phase of the 5'S methodology. These plans aim to enable the business to correctly classify its elements, have safe and pleasant workspaces, and ensure the proper location of resources and tools to carry out activities.



A process manual was prepared, which plays a significant role in defining production procedures in an efficient manner, avoiding variations that could hinder the fluidity of the processes.

This research work successfully concluded in the design of an improvement plan based on the 5'S methodology, identifying situations that required improvement and establishing specific actions for each one of them. The ultimate goal is to increase the efficiency of the business as a whole.

It is strongly recommended that the business owner consider and implement the improvement plan designed based on the 5'S methodology in order to increase the efficiency of the company.

To ensure success in the execution of the improvement plan based on the 5'S methodology, it is essential to respect and rigorously comply with the actions established in the plan.

It is essential to motivate and involve the collaborators in the fulfillment of the improvement actions presented in each phase of the 5'S methodology.

It is recommended to periodically update the process manual and formats, adjusting them according to the improvements implemented in the business.

It is suggested that employees be trained regularly to ensure that they are competent in carrying out their activities, which will help to increase productivity.

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