

Standardization of Cleaning Processes for the Tourist Accommodation Service at Dentcol S.A.S

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ABSTRACT: In the tourism industry, various processes play crucial roles in ensuring excellent service, with particular emphasis on the response time between reservations for maintenance tasks. Currently, Dentcol S.A.S. allocates a 4-hour period for cleaning, but in practice, this extends to 8 hours, resulting in operational inefficiency and resource loss for the company. The main objective of this project is to improve these processes through standardization, using engineering tools such as diagnostics, documentation, execution analysis, indicator establishment, and impact evaluation. These strategies enable the development of effective plans aimed at reducing execution time to a maximum of 240 minutes. The research findings revealed the feasibility of implementing this procedure more efficiently, optimizing both available resources and the time spent. Implementing standardized practices aims not only to improve execution periods but also to ensure superior consistency in the quality of service offered. This not only meets customer expectations but also strengthens the company's competitive position in the market. Additionally, the improvements implemented not only reduce operational costs but also stimulate additional revenue through more efficient management of time and available resources.

KEYWORDS: Tourism, process, tools, strategies, costs

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I. INTRODUCTION

The standardization of cleaning procedures in accommodations is crucial for operational management and customer experience. In a competitive market, where service quality makes a difference, maintaining consistent hygiene standards is essential not only for efficient operation but also for ensuring guest satisfaction and loyalty. Cleanliness goes beyond aesthetics; it directly affects how visitors perceive the safety and quality of the service offered [1-2]. Additionally, process documentation allows for better control and monitoring, facilitating the identification of areas for improvement [3].

Recognizing the importance of process documentation and control, in his 2022 study, Marcillo [4] began his work by diagnosing the operational procedures of the Hotel Higuerón, using surveys and a SWOT matrix to identify and measure indicators related to existing activities and problems. Through the creation of departmental maps and the application of process matrices, he was able to develop a Procedures Manual that detailed the activities, purposes, scopes, and responsibilities of the hotel's operations.

The implementation of standardized processes, like those developed by Marcillo, ensures that cleaning is performed uniformly and effectively. This is achieved through detailed procedures that specify disinfection techniques, appropriate products, and tools. This uniformity improves efficiency by reducing the time spent on planning and executing tasks, minimizes errors, and maximizes service quality. Additionally, it fosters transparency and accountability within the organization [5-6].

Following this approach, Mariño and Medina [7] in 2020 developed a procedures manual for Hostal Dulce Amanecer del Cantón, with the aim of optimizing its management. Their work included surveys and interviews that allowed for a detailed analysis of the organizational structure, identifying and describing different positions, as well as detailing the profiles and years of experience of the employees. They also emphasized the need for staff training and periodic evaluations to ensure the effectiveness of the implementation.

Staff training and periodic evaluations are essential to maintaining high standards. By establishing clear and measurable standards, it becomes easier to assess the performance of the cleaning staff and identify areas for continuous improvement. This not only benefits the quality of service but also strengthens organizational culture by aligning individual goals with the company's strategic objectives [8].

In the current context, where online reputation and customer reviews are crucial, maintaining high hygiene standards becomes a significant competitive differentiator. Guests expect immaculate rooms, common

areas, and sanitary facilities that reflect high levels of disinfection and care. Consistency in applying cleaning standards directly contributes to improving the customer experience, increasing satisfaction, and strengthening loyalty to the establishment's brand [9].

To ensure this consistency and quality, Camacho Guevara [10] in 2017 developed a functions and procedures manual for the reception and accommodation area in a vacation colony. By using checklists and defining job profiles, he standardized methods in the facilities, ensuring a clear assignment of tasks and responsibilities.

II. METHODOLOGY

For this study, a diagnosis of the current situation of the cleaning processes at Dentcol S.A.S. was initiated. Then, detailed documentation of the processes was carried out to identify the operations that comprise them. Subsequently, a time study was conducted with the aim of improving customer service delivery. Using this information, indicators were established to measure the results obtained. Finally, an impact analysis was performed to evaluate the success of the project and formulate recommendations for continuing to improve service quality.

2.1 Diagnosis

To develop the diagnosis of the cleaning processes, four research tools were employed. Initially, a SWOT analysis [11-12] was implemented to identify the company's weaknesses, opportunities, strengths, and threats. Following this, a Vester matrix [13] was used to determine the weaknesses that most affect the processes. Simultaneously, a survey was conducted with five workers from the cleaning department and 25 users to gather their opinions on the service quality. It's important to note that although the project includes a total of 25 services, the hiring of five individuals (one internal and four external) is required to fully execute them. Finally, an Ishikawa diagram [14] was used to understand the causes and sub-causes behind the cleaning issues.

In the case of the survey, to determine the required sample size, the following formula was used:

$$n = \frac{z^2 P Q N}{E^2 (N-1) + z^2 P Q}$$

Formula 1: Sample needed

n: It's the sample size, it is determined by the result of the formula

Z: Normal deviation, this is determined by the level of confidence, in this case it's 90%. With this information, the value of the deviation is 1.28

P: The success portion, taking into account the level of trust, a value of 0.5 will be used

Q: It is the portion of failure, taking into account the level of confidence, a value of 0.5 will be used

E: It is the error shown, for this case, a maximum error of 5% is being used

$$n = \frac{1.28^2 * 0.5 * 0.5 * 30}{0.05^2 (30-1) + 1.28^2 * 0.5 * 0.5} = 25.4 = 25$$

2.2 Documentation

To document the operations performed, a fieldwork was conducted to meticulously identify the sequence of the cleaning procedure. In this initial phase, direct observation and recording of each stage were included in a process diagram [15], from initial preparation to completion of cleaning tasks across various accommodations.

Subsequently, the cleaning procedure was mapped according to the organizational structure of the company. Interviews and consultations were conducted with administrative and operational staff to ensure a comprehensive and accurate understanding of the roles and responsibilities in each phase of the cleaning procedure.

2.3 Time study

With the information obtained from the documentation, a time study [16] was conducted to improve customer service delivery. For this purpose, an operations diagram [17] was developed to reflect the proposed changes in the methods to be followed during the cleaning process in accommodations. This diagram not only documents each step of the process but also incorporates necessary modifications to increase the efficiency and effectiveness of cleaning tasks.

Once the necessary procedure adjustments were defined and implemented, twenty time measurements were conducted for cleaning services in different accommodations. These measurements were carried out from February 5 to February 23, 2024, on randomly selected days.

2.4 Establishing indicators

To establish performance indicators [16], it was necessary to identify key areas that directly impact the quality of the service offered. This process included reviewing and analyzing the company's accounting records, which provided information on the costs associated with cleaning operations. Additionally, internal records of the accommodation were examined along with customer feedback and ratings to gain direct insight into their experience and satisfaction with the cleaning service. Finally, internal checklists that employees must follow during the cleaning process were utilized.

2.5 Impact analysis

With the results obtained from the time study and the establishment of indicators, the effects on cleaning procedures were analyzed. To achieve this, risks were identified and prioritized [18] with the aim of effectively managing existing issues. Subsequently, a FMEA (Failure Mode and Effects Analysis) [19] was developed to identify and categorize all activities related to these processes.

III. RESULTS

After completing all phases of the methodology, these are the results obtained:

3.1 SWOT

To conduct the analysis of Dentcol S.A.S., a CAME analysis was carried out using the information gathered from the survey respondents, as seen in Figure 1. This analysis provided a comprehensive view of the internal and external factors affecting the efficiency and effectiveness of cleaning processes in accommodations. Based on the identification of Strengths, Opportunities, Weaknesses, and Threats, strategies were designed to optimize available resources and mitigate potential risks, aiming to improve service quality and customer satisfaction.



Figure 1. CAME Analysis

3.2 Vester Matrix

Subsequently, a Vester diagram was developed, providing a graphical representation of the issues associated with cleaning processes in accommodations. By categorizing problems into passive, critical, indifferent, and active, attention and resource allocation were prioritized efficiently to address areas requiring greater attention and immediate action. Figure 2 details the identified problems and their relationships with other issues, classified by their degree of impact. Critical issues identified include "limited internal cleaning staff" and "lack of training for cleaning personnel".

Problems		1	2	3	4	5	6	7	8	9	10	Total Assets	
P1	Lack of direct supervision	1	0	2	0	3	0	1	1	3	1	0	11
P2	Time constraints for cleaning tasks	2	0	0	3	0	0	1	1	2	1	0	10
P3	Changes in cleaning and safety regulations	3	1	0	0	0	1	1	0	0	1	1	5
P4	Limitation of internal cleaning staff	4	3	3	0	0	1	3	3	2	3	1	19
P5	Increase in tourist demand in accommodations	5	3	3	1	3	0	3	2	3	2	0	20
P6	Inconsistency in service quality	6	1	2	0	3	1	0	2	1	3	0	13
P7	Resistance to change from external staff	7	3	2	0	3	1	1	0	2	2	0	14
P8	Lack of training for cleaning staff	8	3	3	0	3	1	3	3	0	3	1	20
P9	Excessive dependence on internal staff to cover all tasks	9	1	1	1	1	0	2	2	3	0	1	12
P10	Increase in labor costs for hiring external staff	10	2	1	0	2	0	1	2	2	1	0	11
Total Liabilities		19	17	2	21	5	16	16	18	17	4		

Figure 2. SWOT Analysis

3.3 Ishikawa Diagram

Next, the Ishikawa Diagram was developed, providing a visual structure to identify and analyze potential causes and sub-causes contributing to cleaning-related issues. The analysis using this tool revealed six main causes categorized as: human resources, policies and regulations, equipment, materials, processes, and organizational climate. These causes, in turn, create difficulties in meeting the required hygiene standards within the established timeframe. Staff shortages, inefficient planning, and inadequate supervision negatively impact customer experience and the reputation of accommodations. One central issue highlighted was "difficulties in meeting the required hygiene standards within the established timeframe".

3.4 Cleaning Process Distribution

After conducting the diagnosis, the documentation of procedures proceeds, identifying the operations that constitute the cleaning process. The tasks commence at 9:30 a.m. with the preparation of cleaning equipment, carried out by the service supervisor who understands the specific requirements of the procedure. A detailed inventory of beds and bathrooms in the establishment is conducted, crucial for determining the exact quantity of linens and supplies needed. In larger establishments, the required personnel for efficient cleaning is evaluated. Additionally, the company utilizes a specially designed application to facilitate team organization, providing clear and efficient guidance before moving to the location.

Upon entering the establishment, an initial inspection is conducted to identify any shortages or damages. If any issues are detected, the supervisor proceeds to resolve them immediately by purchasing necessary items or retrieving them from the warehouse to bring to the location. It's important to consider additional costs in cases where parking is not available. Simultaneously, necessary cleaning tasks are carried out, and any other issues that arise are reported to the supervisor to manage the required replacements. Once incidents are resolved, necessary repairs are made, followed by a final inspection to ensure no traces of dirt or forgotten items remain.

The procedure concludes with final cleaning and organization, ensuring everything is in perfect order and conditions for the arrival of new guests. Subsequently, the cleaning staff and equipment return to the warehouse where linens are laundered. They are air-dried to prevent wrinkles, meticulously folded, and stored on the appropriate shelf. On average, this process finishes around 5:30 p.m., ensuring the establishment is ready and in optimal condition to welcome the next guests.

3.5 Distribution of the Cleaning Process by Roles

Once the distribution of the cleaning process has been identified, the next step is to map this process according to the organizational structure of the company. This step is crucial for understanding how responsibilities are allocated among the staff. Consequently, responsibilities are divided into three parts: administrative staff, cleaning staff, and drivers.

3.6 Operations Diagram

After identifying and documenting each of the steps, it is necessary to break down the cleaning process into more practical elements. To achieve this, an operations diagram was developed that decomposes the task into its individual components, showing each step sequentially to facilitate understanding of the interactions between different activities. This diagram details each stage of the accommodation cleaning service, with necessary adjustments to improve service quality, dividing the cleaning activity into 21 elements. It covers from the arrival of cleaning staff to the completion of the work, including the execution of specific tasks and final checks.

3.7 Time Measurement

To carry out the time measurement for each task in the cleaning process, a stopwatch is used. Measurements for each operation are conducted over twenty-two sessions. These data are meticulously recorded in an Excel spreadsheet, which facilitates the organization and analysis of information. Each task has its own column in the spreadsheet, and multiple measurements are collected for each task, enabling the calculation of averages and identification of potential variations.

Once the data is collected, a detailed analysis is conducted. Each operation in the cleaning process is examined, with times expressed in seconds to facilitate comparison and understanding. To ensure the reliability of the results, the optimal number of observations is determined, considering a 95% confidence level for an acceptable margin of error. To establish the standard time for the cleaning process in accommodations, calculations are performed using the data obtained during the study. Initially, the average of all tasks is obtained, considering variations and the desired confidence level. Adjustments are then applied to account for factors such as work pace and necessary breaks, which could affect the total duration of the process. Figure 3 provides an example of this analysis for the first 4 elements of the cleaning process.

	Element 1	Element 2	Element 3	Element 4
	Open all the windows	Check the condition of the accommodation and look for any forgotten items left by guests	Removal of bed linens and towels	Sweeping rooms
Categories →	Manual	Manual - Tools	Manual	Manual
NT \bar{X} Seconds	304,23	676,59	185,32	322,36
Variance S^2	199,99	284,73	101,18	252,81
Standard deviation S	14,14	16,87	10,06	15,90
Standard deviation / Mean X	3,02	3,60	2,14	3,39
Confidence level	95%	95%	95%	95%
Error in seconds	0,5	0,5	0,5	0,5
Calculation of V	21	21	21	21
$\infty/2$	0,025	0,025	0,025	0,025
$T \infty/2$	2,08	2,080	2,080	2,080
Calculation of Ideal n	3462	4928	1751	4376
Time Interval A	297,96	669,11	180,86	315,31
Time Interval B	310,50	684,07	189,78	329,41
Error in seconds \pm	6,27	7,48	4,46	7,05

Figure 3. Time Analysis

After this analysis, as shown in Figure 4, the standard time for the cleaning process in accommodations is established to be 240 minutes. This result represents an achievable and realistic goal, as it reflects not only the average duration of individual tasks but also the adjustments needed to ensure efficient workflow and service quality.

NT \bar{X} Minutes	222,76	NT
Variable Supplements		
Fixed Supplements		
Contingency Supplements		
Standard Time	240,58	ST
Frequency		
Total Standard Time	240,58	TST

Figure 4. Standard Cleaning Process Times

Additionally, as shown in Figure 5, worker efficiency is established in terms of time spent compared to the established standard.

2	WORKER EFFICIENCY	
Actual production		1
Target theoretical production		1,00
Efficiency %		100%
Efficiency in minutes		1,00

Figure 5. Worker Efficiency

3.8 Establishing Indicators

Regarding indicators, four key areas were identified that have a direct impact on the quality of service offered:

The Incident Rate in Preparation provides information on the frequency and severity of issues related to rooms, helping to detect potential deficiencies in accommodation cleaning procedures. Secondly, Guest Evaluation, which offers direct feedback crucial for assessing satisfaction with cleanliness and facility maintenance; this indicator helps measure customer perception and identify areas for improvement.

Thirdly, Cleaning Cost per Accommodation helps analyze expenses associated with the cleaning process, efficiently managing resources and optimizing economic performance. Lastly, Accommodation Cleaning Quality allows for procedure evaluation, ensuring compliance with established standards and providing a satisfactory guest experience. To obtain accurate and relevant information on these important aspects, methods ranging from customer satisfaction surveys to cost analyses, quality inspections, and incident tracking were utilized.

3.9 Impact on cleaning processes

As for the impact, an analysis of the data collected before and after the standardization of processes was conducted. This includes the evaluation of key performance indicators such as the incidence rate in the cleaning kit setup, guest evaluation, cleaning cost per accommodation, and cleaning quality. Based on this information, potential risks associated with each procedure are identified, allowing the company to anticipate and mitigate negative effects before they occur. For a more practical visualization, each risk is assigned a code as shown in the following list:

- AM1=Omission of essential items
- AM2=Damage to products during transportation
- AM3=Cross-contamination in the cleaning kit
- LH1=Improperly disinfected surfaces
- LH2=Damage to furniture or facilities
- LH3=Inconsistencies in cleaning quality
- LC1=Premature deterioration of bedding and towels
- LC2=Inadequate laundering of bedding and towels
- LC3=Cross-contamination of bedding and towels
- EC1=Inconsistent evaluations
- EC2=Failures in communicating findings
- EC3=Omission of areas during inspection

Now, as shown in Figure 6, the prioritization of risks is detailed considering the evaluation of the likelihood of occurrence and severity of each risk associated with the mentioned procedures.

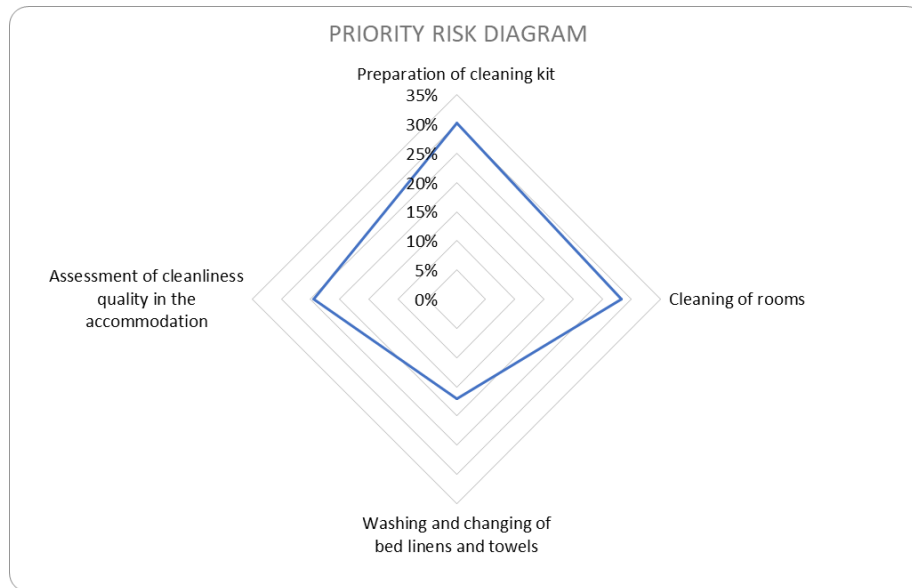


Figure 6. Risk prioritization diagram

Subsequently, a PFEP (Prevention, Evaluation, Internal and External Failures) is developed, identifying and categorizing all tasks related to cleaning procedures. Figure 7 represents actions associated with risk prevention and service quality evaluation. These actions identify and mitigate threats before they become problems, examining both current and potential process situations to detect areas for improvement and potential failures.

Element	Prevention	Element	Evaluation
P1	Purchasing committee	E1	Regular Inspections
P2	Control and Management	E2	Performance monitoring
P3	Induction and training	E3	Guest evaluation
P4	Standardization of documents	E4	Non-conformities and improvement commitments

Figure 7. Prevention and evaluation

On the other hand, Figure 8 details the tasks related to the identification and management of failures both within the organization and those originating from the external environment.

Element	Internal failures	Element	External failures
FI1	Inadequate cleaning	FE1	Supplier follow-up
FI2	Idle time	FE2	Guest expectations and complaints
FI3	Adverse Events		
FI4	Damage to facilities		

Figure 8. Internal and external failures

Next, responsibilities are assigned and costs associated with each activity are determined, including the monetary value per hour of professionals or services involved. At this point, the company's cost-expenses are identified. Prevention costs are calculated by identifying all tasks and resources needed to prevent risks in cleaning processes. This includes staff training, acquisition of suitable equipment and materials, implementation of standard procedures, and continuous supervision of operations. On the other hand, evaluation costs are determined by identifying all activities necessary to assess the quality of cleaning service. This involves conducting regular inspections, customer satisfaction surveys, and reviewing cleaning procedures.

The costs of internal failures are calculated by identifying issues occurring within the cleaning process before affecting the customer, replacing defective materials, and correcting errors in cleaning kit setup. Lastly, external failure costs are determined by identifying issues directly affecting the customer after cleaning service completion, including discounts, compensations, and reputation loss due to customer complaints. Figure 9 shows the total of each value related to each existing risk.

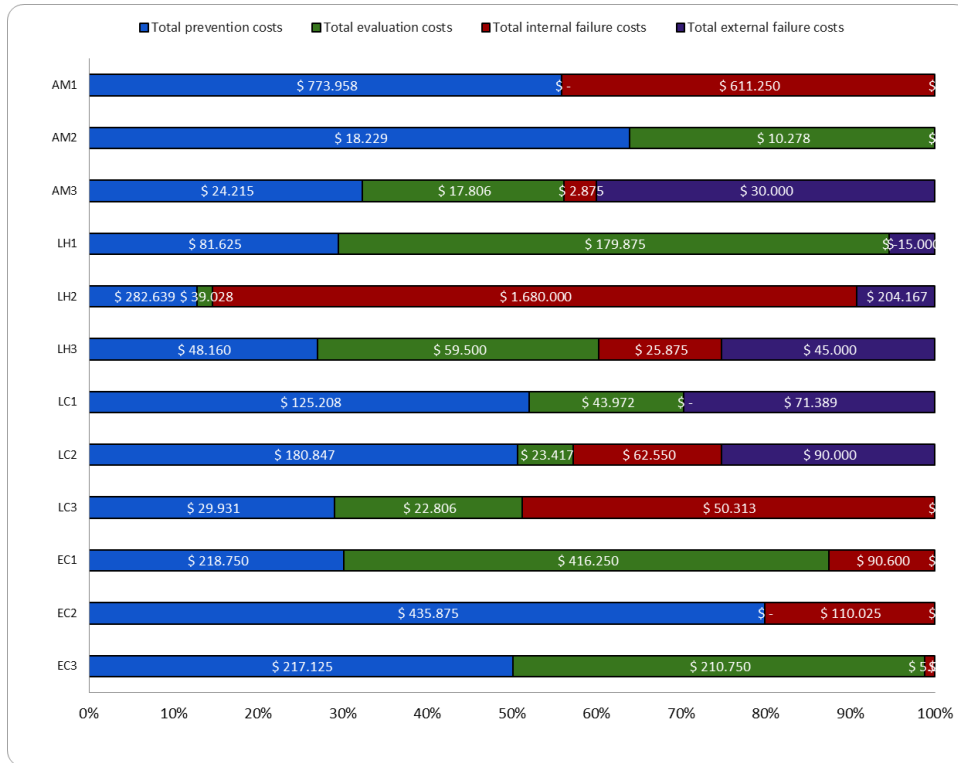


Figure 9. Costs and purchases diagram

Figure 10 provides the total costs-purchases of the different tasks in the PFEP and their respective percentages, indicating which tasks have a higher value, particularly those related to internal failures and prevention.

Purchasing costs		Costs outside the purchasing area	
Prevention	Evaluation	Internal failures	External failures
\$ 2.436.562,50	\$ 1.023.680,56	\$ 2.638.581,25	\$ 455.555,56
37%	16%	40%	7%

Figure 10. Total costs-purchases

Upon completing this process, costs were reduced by addressing problems proactively, creating a calendar showing all available days to synchronize existing tasks. This allows staff to better organize days for purchases or work, reducing stress and frustration caused by improvisation.

The calendar is complemented by the task list, which includes the following data:

- Task ID
- Lodging
- Responsible Area
- Reported Issue
- Possible Solution
- Priority
- Date of Occurrence

Additionally, a specific day is designated for shopping, focusing solely on this and avoiding additional time in transportation and improvisation. The cleaning staff makes necessary changes and standardizes various appliances and lights, allowing specialization in certain brands, suppliers, and external maintenance personnel. All situations that arise are documented, and easy-to-understand manuals and videos are created, avoiding the need to hire additional personnel to solve problems. With these tools, savings are achieved in training, instruction, and transportation costs for both the manager and the administrator, which are the highest costs.

An inventory of stock is maintained in the warehouse to prevent unforeseen events; if they occur, the original process is followed. A list of suppliers is created, classified by quality and value, with the option to increase the number and obtain quotes from different places for products or services.

Regarding the additional available bookings, as the proposed modifications are implemented, this improvement increases revenue and reduces costs. However, it is crucial for logistics to be prepared to handle such a quantity of simultaneous daily cleanings. Thanks to time optimization, at least 5 additional nights can be offered per month, with the expectation of booking at least 2 of these opportunities.

The nightly rate varies according to the accommodation category and promotional offers:

- Low Category (1 lodging): \$100,000 per night
- Medium Category (3 lodgings): \$160,000 per night
- High Category (2 lodgings): \$300,000 per night

Calculation of additional monthly income:

- Low Category: 2 nights * \$100,000 = \$200,000
- Medium Category: 2 nights * 3 lodgings * \$160,000 = \$960,000
- High Category: 2 nights * 2 lodgings * \$300,000 = \$1,200,000
- Total additional income per month: \$2,360,000

Additionally, logistics have been adjusted to ensure everything is prepared in advance. To achieve this, a standardized daily start protocol has been implemented, including preparing bedding, luggage, and other necessary items for the following days and scheduled cleanings. Although this process starts at 11 a.m., management is planned in advance to ensure efficiency and quality, improving availability and allowing access to a market that previously couldn't book on specific days. Finally, ratings are maintained similarly by hiring additional staff to handle more demanding tasks. The cost of an additional cleaner is \$70,000. It is more profitable to receive a reservation of \$300,000 for that night and pay for the additional cleaner, ensuring the facilities are impeccable and profits are maintained.

IV. DISCUSSION

In their 2022 study, Ortiz Urbina [20] focused on conducting a comprehensive analysis and control of room cleaning times. Through an initial diagnosis, the workload of the room attendants was meticulously evaluated, identifying downtime and critical areas within the process. This thorough analysis not only allowed for the identification of issues such as unnecessary movements and challenges in linen management, but also provided insight into how these directly impacted the efficiency and quality of service provided to guests. Additionally, a detailed and specific procedures manual was developed for the cleaning staff, aiming to standardize operations and enhance overall performance. However, despite efforts to diagnose and propose immediate solutions, the project could have further benefited from a more strategic and sustainable implementation of these solutions, ensuring continuous and consistent improvement in service standards and customer satisfaction over time.

On the other hand, at Dentcol S.A.S., there was a strong focus on rigorous standardization of cleaning processes in short-term tourist accommodations. Through a comprehensive diagnosis of the current situation, existing processes were documented, and a detailed time study was conducted to identify areas for improvement in customer service delivery. The strategic implementation of performance indicators played a crucial role in this process, enabling effective monitoring of outcomes and facilitating immediate adjustments when necessary. This approach not only led to a notable reduction in response times for cleaning services but also significantly increased customer satisfaction by establishing clear and measurable service quality standards. Additionally, the economic improvements achieved, evidenced by reduced operating costs and more efficient management of available resources, underscored the project's success in terms of efficiency and profitability.

When comparing these two projects, it is evident that while Urbina's approach focused on the thorough diagnosis of specific issues within the cleaning process, Dentcol S.A.S. distinguished itself through effective standardization of procedures and strategic implementation of performance indicators.

V. CONCLUSION

With the study, it can be demonstrated that standardization of processes has been crucial in reducing response times and increasing customer satisfaction through the implementation of uniform and clear procedures, achieving significant reduction in execution times to a standard of 240 minutes. Additionally, the definition of performance indicators has facilitated effective supervision, allowing for adjustments. This not only optimizes human and material resources but also ensures consistency in the quality of service offered. Economically, the implemented improvements have proven profitable by reducing operating costs and encouraging additional revenue through more efficient time and resource management. This efficiency not only enhances short-term profitability but also lays the foundation for market growth and expansion.

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