

# **Service Model Augmentations for Improving Company Management Systems of Corregidor Inn™**

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## **Abstract**

Corregidor Inn is a hotel and accommodations company that handles trips, ferries, food, and lodging to Corregidor Island, a historical tourist destination in the Philippines. The company has observed a steady decline of annual visitors to the island and consequently experienced a hefty opportunity loss. To stay competitive in today's service industry business, a strategy for this annual opportunity loss is analyzed to recuperate the expected profit of the company. Various analyses were used to diagnose the problem observed, including a stream diagnostics chart, regression analysis, a Pareto chart, and causal analysis. It has been found that poor room management and food and beverages services were the main cause of the loss of customer loyalty. The researchers conducted a series of analyses on the proposed alternatives that are further tested using cost-benefit analysis and integrated by risk analysis. An SOP procedure for the company service model is also proposed for augmenting the current management. With the solutions that are analyzed, rectified with cost-benefit analyses and risks assessed for its implementations, a viable approach for overcoming the steady opportunity loss is considered a prime course of action as its solution.

## **Keywords**

Corregidor Inn, Regression Analysis, Stream Diagnostics Chart, Standard Operating Procedures, Cost-benefit analysis

## **1. Introduction**

Service Industry is a business or commerce that is part of the economy that creates services rather than tangible products. The Service Industry has been one of the strongest and fast-growing sectors of the Philippine economy that grows by an average of 6.3% on its gross value-added contribution from 2000 to 2014 (Noland, 2013). Service Industry has a lot of branches that contribute to its sector as it continues to grow and develop. Some of the examples that branch out of Service Industries are Information Technology, Hospitality, Travel, Transportation, Media, Entertainment, Sports, Healthcare, Wellness, etc. Revealed Comparative Advantage (RCA) data shows that Information Technology, as well as Travel & Hospitality, are the highest growing competitiveness between the other branches in the Service Industry. This gives an indication that both Information Technology and Travel & Hospitality in the Service Industry may have a comparative advantage in other countries (Tsai, 2008).

The Philippines is gaining traction in terms of providing outsourcing services not only for customer support but also for outsourcing tech services to different foreign businesses (Alejandria-Gonzalez, 2016), Business Process Outsourcing (BPO) has become one of the country's leading generators of income. The boom in the Information Technology Industry is because of the innumerable employment opportunities it provides for the Filipino people including tech jobs. The demand for IT support (calls, internet usage, maintenance) is significantly increasing each year and is currently becoming more popular. Also, in the Philippines, the booming tourism industry is prompting more investments in the hospitality sector since foreign tourists' arrivals grew by 7.6 percent in the first quarter of 2019 (Alejandria-Gonzalez, 2016). Filipinos are also valued as a strong market for the industry with 60 million domestic trips made by locals every year.

Hospitality Industry, that is generally recognized as a section of the wider service industry, focuses on leisure rather than the basic needs of its customers. This industry focuses on the satisfaction of the customers and focuses on the ideas of pleasure, luxury, enjoyment, and experiences as opposed to catering for the customer's necessities and essentials. The rise in the Travel & Hospitality Industry is because of the increase in tourism campaigns and improvements on accessibility and lodging on different tourism sights in the Philippines. The hotel industry is a prime example of this type of businesses, wherein there is a focus on accommodating the needs of the customers including lodging, recreation, comfort, food and beverages (Ali & Omar, 2013).

This type of industry is competitive in its core, precisely because it offers a diverse amount of services that can virtually be varied with each establishment (Tsai, 2008). To maintain each fundamental part of the business, the industry requires that many divisions handle each need of the guests separately and coordination between these is tight. Innovations for better serving the convenience of guests have been made throughout years of research, such as transaction models and technological integrations. The holistic approach of the hospitality industry to provide a sense of security, comfort, and well-being to its customers is a direct measure of how well the business satisfies its customers. In turn, customers that have experienced great service and satisfaction will develop loyalty that will maintain the demand for on-going and future revenues (Holjevac et al., n.d.).

The company involved with the study, Corregidor Inn, began as a ferry service to the historic island of Corregidor back in 1988 has now turned into something more significant for Sun Cruises, Inc. (SCI). The expansion of Sun Cruises shows just how committed they are to be the leading provider of quality travel experiences that are anchored on being fun, educational and cultural. As they now offer guided tours, all being a wide variety of adventure and fun activities on the island to choose from. All their tours on Corregidor are meticulously planned to include visits to places of interest and scenic drives through areas of natural beauty with historical value. Every detail is planned down to the last point to assure the right amount of balance between scheduled activities and free time. Hence, the birth of Corregidor Inn comes next. The figures below show the summary of the total number of visitors checking in Corregidor Inn for the night. It can be observed that there is a huge decline in visitors and demand for accommodations each year.

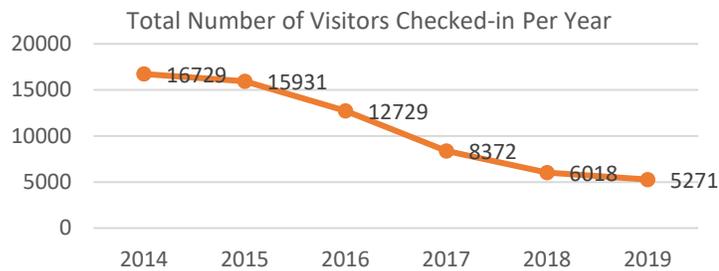


Figure 1.1. Graph of the total number of visitors checked in Corregidor Inn per year

From the year 2014 to 2019, the graph indicates a downward trend which shows a rapid decline of customers in a span of 5 yrs. In figure 1.1, It is notable that having fewer visitors on the island will have a major impact on the customers of the Inn. From the year 2014 to 2019, a massive decline of customers is shown in the line graph. For the first 10 months of 2019, Corregidor Inn only had 5271 total checked-in customers compared to the 16279 check-in customers in 2014. This rapid decline of customers can be ascribed to weather, lack of marketing or even loss of interest from customers. A table below shows the tabulated difference between actual and expected customers per month of 2019.

Table 1.1. Comparison of the actual and expected number of customers per month of 2019

Customers in Corregidor Inn	Month				
	January	February	March	April	May
Actual Number of Customers	674	684	1019	1137	1322
Expected Number of Customers	1922	1736	1922	1860	1922
Difference between Actual and Expected Number of Customers	(1248)	(1052)	(903)	(723)	(600)

The comparison of the actual and expected number of visitors in Corregidor Inn is shown in Table 1.1. This comparison consists of those customers that both visited the island and acquired the accommodation. The difference between the actual and expected values was then computed.

Table 1.2. Computation of Total Opportunity Loss for Corregidor Inn in the Peak Months of the year 2019

Opportunity Loss for the year 2019	Month				
	January	February	March	April	May
Number of Customers in Corregidor Inn	₱4,680,000	₱3,945,000	₱3,618,750	₱2,711,250	₱2,250,000
Total Opportunity Loss for the Peak Months of 2019				₱17,205,000	

The opportunity loss is computed since customers who purchase accommodation are also entitled to a day tour around the island. The researchers would also want to know the factors as to why the number of customers who check-in the hotel decline, and if it affects the number of visitors who visit the island as well. The total number of opportunity loss gradually decreases each month from January to May. The total number of the lowest opportunity loss is in the month of May. The total opportunity loss for the month of January – May is ₱17,205,000.

The study aims to evaluate the current operations in Corregidor Inn & Tours and identify the complaints of each customer and analyze its root causes. Consequently, it prioritizes to reduce the number of opportunity loss of Corregidor Inn & Tours by at least 20%. This study is only limited to the current operations of the company. The aspect taken into account is the number of visitors who check-in Corregidor Inn. The basis of this study is from the data that is provided by the company to the researchers. All the data provided are from January – October of the year 2019, while the total number of visitors is tallied from the year 2014 to October of 2019. All documents are solely and confidentially given to the researchers with the permission of the General Operations Manager of Corregidor Inn. Due to the nature of the problem, a more extensive focus is given to factors that can be managed such as the poor management system instead of external factors such as the effect of seasonal weather.

## 2. Literature Review

Service Industry is a business or commerce that is part of the economy that creates services rather than tangible products. Among the countries in Asia, the service industry has been finding growth throughout the years. There is a recently seen rise in terms of service output and employment across Asia and this trend has been steadily increasing (Minh et al., 2015). It has been proven that the exploration of this growth in service industries suggests a decrease in poverty, and consequently offers a positive effect on the economy. Thus, to improve and quantify how the service industry works and the model it follows is essential to improve and augment its system and further the growth in a countries economy and quality of services (Noland, 2013). Productivity and profitability are also a major factor for these businesses, for it has a larger emphasis on the use of labor as cost and transactions that are non-refundable in nature (Schoffstall, 2013). The implications of this uphold the notion of further maintaining a plan or solution to the constantly-changing market and finding sustainable methods to improve quality and demands for services (Grubel & Walker, 1989).

The service industry consists of many sectors, each having its own uniqueness and specialties on the services offered. A more relevant example now for the Philippines is the tourism sector, characterized by a recently seen increase on its development and infrastructure (Alejandria-Gonzalez, 2016). Hotels and tourist destinations have seen a greater focus now than the past few decades. The influx of tourists in the Philippines is a large boost to the economy, and so it is vital that a strategy for maintaining the upkeep and quality of these services is required to ensure economic stability (Ali et al., 2017).

A recurring pattern for the success of renowned hotels and services is the emphasis on customer satisfaction, loyalty, and feedbacks (Subramony & Douglas Pugh, 2015). A conceptual framework developed by a group of researchers has found that the satisfaction of guests in hotels, specifically the food and beverage departments, has observed a higher chance for customer loyalty and revenue (Abukhalifeh & Mat Som, 2012). The application of the so-called dimensional models can ensure that the company has a steady demand for their offered services, using a polished and reviewed system for offering great services and satisfying customer demands. A study from Ghana and its hotel

management has rectified this pattern of customer loyalty being effective feedback for satisfying customer needs (Poku et al., 2013). Furthermore, a study has used a unique methodology for finding how to reliably satisfy customer expectations. The methods state that the competitive nature of these services should always be upheld since customer expectations are dependent on the services offered by the whole industry (Jasinskas et al., 2016).

The rise in tourism and service industry growth has influenced many countries in Asia as well. A study in Vietnam investigated the most critical factors for achieving customer loyalty and satisfaction, these being assurance, reliability, responsiveness and customer empathy. These factors can be used to diagnose how to further improve hotel services to accustom customer loyalty (Minh et al., 2015)

### **3. Methodology**

#### **3.1 Construction of Problem Statement**

To diagnose the problem of why there is a steady decline of visitors to Corregidor, various diagnostic and analytical methods were used. The first method used was the why-why diagram that is known as a method that is designed to consider and ruling out all possible causes of a problem. In this study, the researchers used the aforementioned tool to identify the root cause of the problem that the Inn is currently facing. The causal analysis was also used for finding which steps in the transaction and business models are critical to improving. The flowcharts formed from this analysis were used to strategize around the already existent model and augment it by using alternatives or adding more efficient methods.

#### **3.2 Procurement and Treatment of Data**

Data were gathered directly from the company database. The number of visits and trips recorded was procured from the company management. Tables 1.1, and 1.2. were gathered at specific time periods by the company, all of which were logged and bookkept. The complaints were recorded from customer feedback from the year 2019.

For the analysis of the model improvements, various methods are used. One of these is the Pareto Analysis which is used to help identify the 20% of the services offered that should be enough to solve 80% of the customer complaints. Stemming from the causal analysis, the Stream Diagnostic Diagram is another organizational tool to help aid causal analysis for the company. The table shows the stream diagnostic chart prepared by the researchers for the problems and complaints identified by Corregidor Inn. This chart is divided into four categories: Organizational Arrangement, Social Factors, Technology, and Physical Setting.

The decision analysis is calculated using cost-benefit analysis, wherein the alternatives listed to address the issue are then weighed versus the benefit and its projected cost. This benefit-cost ratio was calculated using equation 1, considering the accommodation of extra visitors as the benefit. The value of this ratio is expected to be more than 1.0 in order to be deemed feasible and a higher ratio signifies a significant difference in the benefit versus the cost.

$$BCR = \frac{B}{C} = \frac{n * \frac{\text{₱ } 4,508}{\text{accomodation}}}{C} \quad (1)$$

where B is the projected benefit from the increase in visitors in ₱, C is the cost of improvements in ₱, and n is the number of projected increased trips and avoided cancellations due to better service for visitors. As an outlying value for n, it is assumed to be 674 visitors as this is the minimum number of visitors the Inn received in the year 2019.

The study involves the feedbacks from the Corregidor Inn's guest from the months of January to May of the year 2019, to see if their feedbacks can be linked to why the number of customers who check-in the hotel decline. The sample size of the feedbacks of the months of January to May 2019 was computed using the Slovin's formula, the mathematical model also utilized in other researches (German & Catabay, 2018).

$$n = \frac{N}{1 + Ne^2} \quad (2)$$

Using a 5% margin of error, a total of 1,089 from the feedbacks of the months of January to May 2019 was analyzed.

## 4. Results and Discussion

### 4.1 Current Company Accommodation Model

To analyze solutions and what improvements can be made to the system, a visualization of the current model and system used by the company is featured below, including accommodation flowchart, sales and marketing, ferry, tour, and hotel operations.

Table 1.3. Sales and Marketing, Ferry and Tour, and Hotel Operations IPO

TEAM	INPUT	PROCESS	OUTPUT	FEEDBACK
Sales and Marketing	Booking Details Customer Information Mode of Payment	Schedule Counterchecking Payment Confirmation	Confirmed Booking Payment Method	Booking Receipt
Ferry and Tour	Booking Receipt	Booking Validation	Ferry Ride Island Tour	Ferry Ticket, Tour Kit
Hotel Operations	Booking Receipt	Booking and Accommodation Validation	Hotel Accommodation	Hotel Keycard

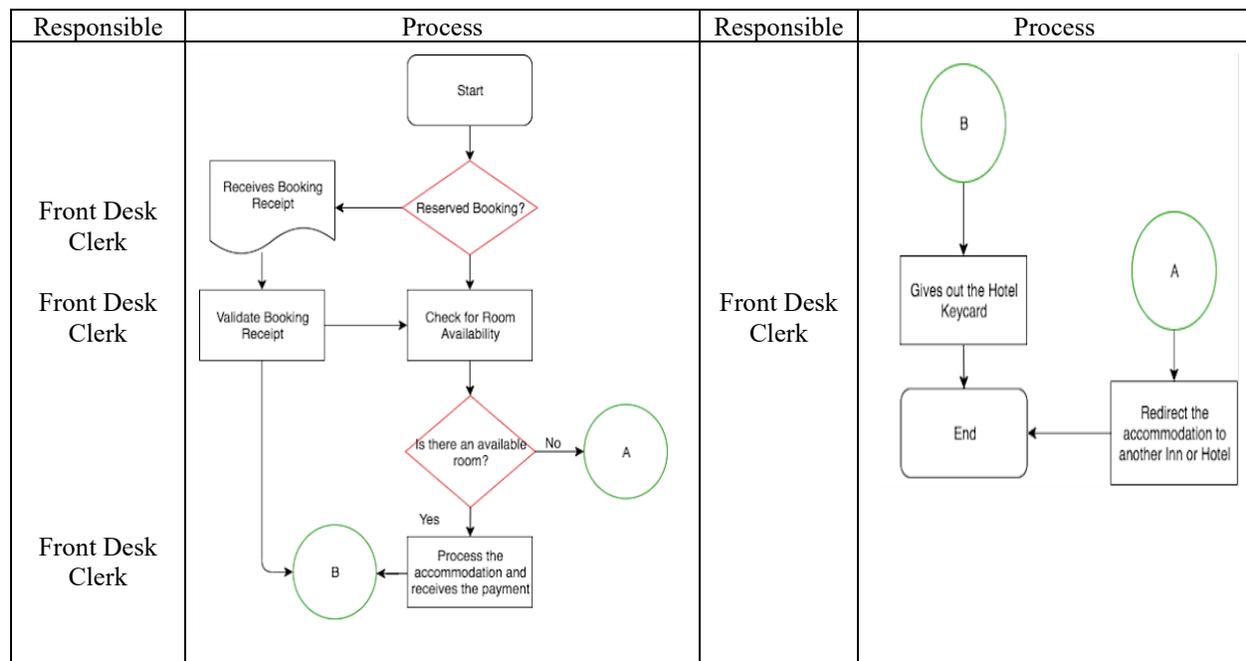


Figure 1.2. Hotel Accommodations Process Map and Booking Flowchart

### 4.2 Problem Diagnosis

To appropriately propose solutions to the company problem statement, a diagnosis for discussing the main focuses has been conducted. The analysis consists of a Pareto chart, a regression analysis, and a stream diagnostic chart. A summary of the regression analysis graphs is shown below to identify which categories are the cause for the dissatisfaction of customers.

From the regression analysis for each of the categories, it can be observed that the majority of the respondents have answered Dissatisfied (1) and Somewhat Satisfied (2) from the survey questions for the months January – May of 2019. Furthermore, the different categories of the survey questions were classified namely: Staff, Room Maintenance, Service, Food and Beverages, Amenities and Recurring Visitors. These factors are then put into an account for the furtherance of the study. A table below is shown below to summarize these findings.

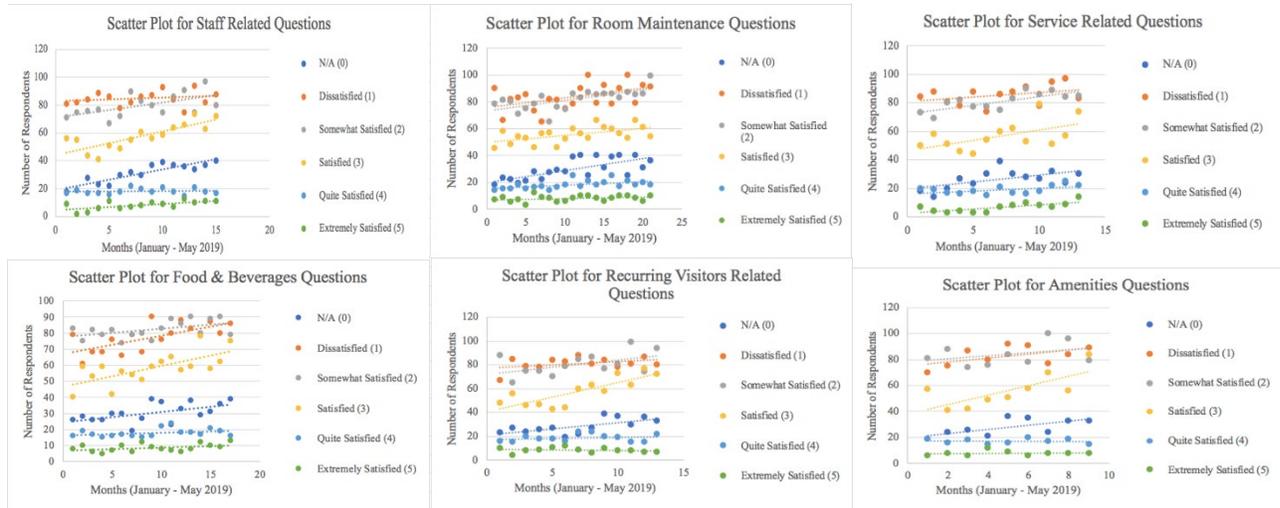


Figure 1.3. Scatter Plots for Regression Analysis of Customer Feedback Forms

Table 1.4. Summary of Customers who answered Dissatisfied (1) with their stay for the Peak Months of 2019

Category	January	February	March	April	May
Staff	247	253	255	252	264
Room Maintenance	406	376	429	439	447
Service	253	240	265	270	261
Food & Beverages	276	289	334	330	355
Amenities	145	167	183	161	175
Recurring Visitors	231	245	253	246	258

It can be observed from the data that the majority of the customers have answered dissatisfied with their stay in Corregidor Inn. Table 1.4. shows the survey form and the questions distributed to the customers after their stay. In the data given above, a lot of customers are dissatisfied with the room maintenance of the hotel as well as the food and beverages that were served to them. To further analyze the study, written complaints were gathered and were also summarized. From the data, a total of 63 written complaints were given to the researchers, having Room Maintenance as the highest complaint with 21 for the year 2019. Food & Beverages category complaints got 20 while amenities got 11 complaints.

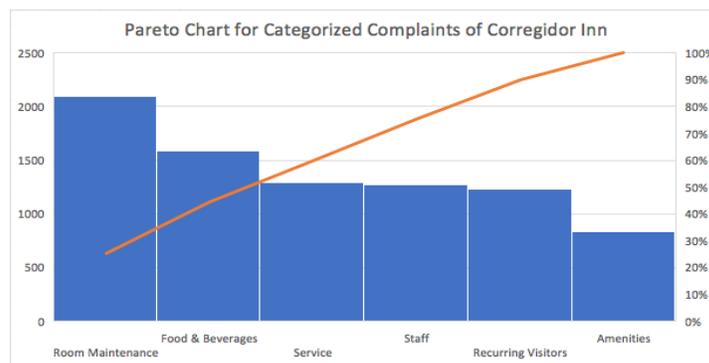


Figure 1.4. Pareto Chart of the Categorized Complaints of Corregidor Inn

A Pareto Chart is accomplished to visualize the areas that should be focused to achieve great improvement. Room Maintenance and Food & Beverages had a total of 65% of the total number of complaints. It can be established that the two major categories of complaints should be addressed for the company to further develop.

### 4.3 Causal Analysis

The Stream Diagnostic Diagram is an organizational tool to help aid causal analysis for the company. The table above shows the stream diagnostic chart prepared by the researchers for the problems and complaints identified by Corregidor Inn. This chart is divided into four categories: Organizational Arrangement, Social Factors, Technology, and Physical Setting. Boxes refer to the problem statements and arrow lines refer to the cause and effect relationships of these problem statements.

Problems regarding policies and procedures, methods and administrative works are found under the organizational arrangement. The researchers have identified 4 major problems of Corregidor Inn from the complaints collected. Under the organizational arrangement, the problems correlated to this are pricey food & beverages, limited food & beverages, misleading marketing, and poor management system.

The Stream Diagnostic Diagram is another organizational tool to help aid causal analysis for the company. Figure 1.5 shows the stream diagnostic chart prepared by the researchers for the problems and complaints identified by Corregidor Inn. Problems regarding policies and procedures, methods and administrative works are found under the organizational arrangement. The researchers have identified 4 major problems of Corregidor Inn from the complaints collected. Under the organizational arrangement, the problems correlated to this are pricey food & beverages, limited food & beverages, misleading marketing, and poor management system. The core problem that has the most outgoing arrows is the problem pertaining to the poor management system of Corregidor Inn.

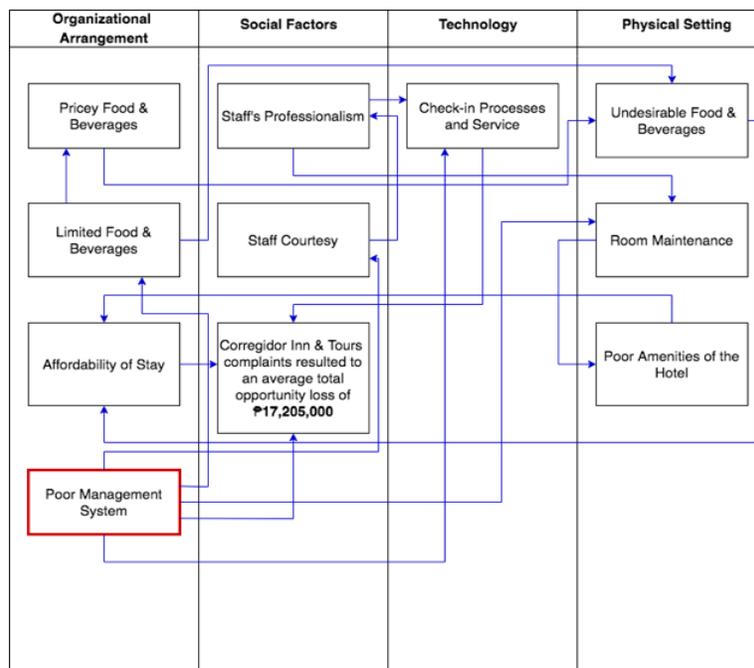


Figure 1.5. Stream Diagnostic Chart

From this diagnostic chart, it can be observed that the poor management system leads to many problems branching out too many categories. Poor management affects the implementation of staff courtesy as with a lack of training and discipline. More so, online booking problems are also prevalent with poor management of room service and availability. There is a need to uphold the regular checking of room cleanliness and availability to ensure all guests are provided with the proper accommodations and reservations. Consequently, other areas of the services offered such as food and beverages are also affected if there is poor handling of the system that caters to these needs, such as the transport of food, quality of consumables, etc.

#### 4.4 Decisions Analysis

As found from the problem diagnosis, the root cause for the decline of annual visitors is the poor management system. The inn is said to be lacking in its management system in various means as per the customers' complaints. Specifically, there are lacking in their room maintenance followed by the Food and Beverages complaints. Moreover, having the case of isolation from the mainland, the Inn is currently getting its resources from the mainland thus making a large impact on their resources. Therefore, the main decision focus is to improve the management system of Corregidor Inn & Tours.

The first alternative is to improve the Inn's Accommodation, make training everyday priority and not just a one-time event. Whenever there is an issue with the room during the stay, the guests can simply make a request for the solution. The hotel can shift guests into other rooms or fix an amenity such as a defective air conditioner when required. This is not the case, however, in the vacation rentals as they don't have the ability to relocate guests to other rooms. A benefit-cost analysis is used to test this alternative, calculated and shown below at table 1.5.

The first alternative is to give out more training to the staff of Corregidor Inn. From the Philippine Statistics Authority's annual data, the cost to train 40 employees is ₱ 509,400. Training the staff includes food & beverage services including its functions, operations, and organization of their food & beverage department. Training also includes room maintenance including preventive maintenance of each room and its up-keep. The total benefit of the first alternative is ₱ 3,038,392. This includes an additional 674 visitors multiplied by the cost of accommodation which is ₱4,508. Its cost-benefit ratio is 5.965.

Table 1.5. Cost-benefit analysis for the 1<sup>st</sup> Alternative

1 <sup>st</sup> Alternative: Improve Inn Accommodation			
Cost	Amount (Php)	Benefit	Amount (Php)
Training Cost for 40 workers	₱ 509,400	Fewer complaints from visitors. More visitors are given great service	674 visitors * ₱4,508/accommodation = ₱ 3,038,392
Total Cost	₱ 509,400	Total Benefit	₱ 3,038,392
Benefit-Cost Ratio		5.965	

The second alternative involves offering exciting packages and retreats. Customers love to explore a destination during off-season months as it is less crowded and cheaper compared to the peak season. Having 2-3 days packages depending upon your location like safari, sight-seeing, dance parties, extended happy hours, indoor pools, etc. could attract the guests. Since private events can be made in Corregidor Inn & Tours, public events are another alternative that is proposed to the company. Vulca Fire dancers, which can have a show on the island every week, and can entertain the guests during night time costs ₱ 520,000. Also, private DJ's that can be paid for public parties amount to ₱ 260,000. Different indie bands, who can give good music to the guests every week amount to ₱ 416,000. More events in Corregidor Inn produce more visitors since guests are attracted to different fun events. This will also attract a different generation of visitors and would also have recurring guests. This alternative has a total benefit of ₱ 5,125,596 and a total cost-benefit ratio of 4.286.

Table 1.6. Cost-benefit analysis for the 2<sup>nd</sup> Alternative

2 <sup>nd</sup> Alternative: Offer Exciting Packages / Retreats			
Cost	Amount (Php)	Benefit	Amount (Php)
Vulca Fire dancers	₱ 520,000	More events in the Inn produce more visitors	1137 visitors * ₱4,508/accommodation = ₱ 5,125,596
DJ	₱ 260,000		
Indie Bands	₱ 416,000		
Total Cost	₱1,196,000	Total Benefit	₱ 5,125,596
Benefit-Cost Ratio		4.286	

The last option is to update the technology toolbox by adopting hotel management systems. Hospitality may be one of the oldest businesses in the world, but in this day and age, it should come as no surprise that hotel efforts can only reach their fullest potential by adding modern technology. Hotel Management Systems (HMS) helps the management

to streamline the check-in and check-out process, generate financial reports, manage staff and automate daily tasks – saving time, relieving the hotel staff of the more tedious responsibilities and improving the guest experience. These alternatives are weighted using cost-benefit analysis.

Table 1.7. Cost-benefit analysis for the 3<sup>rd</sup> Alternative

3 <sup>rd</sup> Alternative: Update technology toolbox by adopting Hotel Management Systems			
Cost	Amount (Php)	Benefit	Amount (Php)
Acquisition and implementation of the Hotel Management Systems inclusive of workshop	₱ 108,000.00	The number of tourists acquiring the Inn accommodation increased	1248 accommodation * Php 4,508 / accommodation = ₱ 4,080,641.60
Maintenance Cost	₱ 30,000		
Total Cost	₱ 138,000	Total Benefit	₱ 4,080,641.60
Benefit-Cost Ratio		29.570	

The third alternative is the acquisition and implementation of HMS software for the Inn's management. This would cost them ₱ 108,000 to purchase the license annually and this includes the workshop for the employee who will be assigned in the inventory. However, the use of the said software also entails maintenance costs amounting to ₱ 30,000 annually. The total cost for this alternative would sum up to ₱ 138,000.00. Using the HMS will help the Inn in monitoring and managing the whole Inn for them to accommodate all the customers and tourists on the tour. For the year, the average number of the not accommodated customers will be accommodated hence the average benefit is ₱ 4,080,641.60. With the data presented, the resulting cost-benefit ratio is 29.570.

With the result of the cost-benefit ratio analysis, Alternative 3 has the greatest cost-benefit ratio. This decision acquires and implement an HMS software for the Inn's management to improve the accommodation and monitoring of the Inn and would eventually improve the management system of Corregidor Inn & Tours.

#### 4.5 Solutions Design

The Standard Operating Procedure (SOP) is a set of steps compiled by the company that complies with the standards set for a certain work assignment. SOP's plan is to attain effectiveness, quality output, and consistency of execution while reducing miscommunication and the inability to comply in industry controls. The following SOP addresses the issue which regards the poor management system. These can improve the current system of the company by improving the company's room maintenance and food/beverages.

Table 1.8. SOP Room Maintenance and Food and Beverages Policy Procedure

Title: Policy Statements for Food and Beverages	
I. Food Hygiene Standards	8. Clean as you go. 9. Follow food safety instructions.
1. Keep one's self-clean and wear clean clothing. 2. Always wash hands before handling food or utensils. 3. Inform supervisor of any ailments that may affect your performance and cleanliness before working. 4. Avoid unnecessary handling of food. 5. Do not smoke, eat, drink and never cough or sneeze in the food room. 6. Inform supervisor of any concerning issues. 7. Do not prepare food too far in advance in order to maintain freshness.	II. Taking Orders 1. Approach table with a smile and great customers. 2. Inquire if guests are ready to order and if not do give them some time. 3. Write down table number and other necessary information. 4. Before the guests places an order inform them of and food that may not be readily available. 5. Once order is placed, repeat the order to the guests. Make suggestions to compliment the guest's meal.



the hotel decline, and if it affects the number of visitors who visit the island as well. Peak months of Corregidor Inn are from January – May of each year and the total number of opportunity loss gradually decreases each month from January to May. After analyzing the data, the researchers identified a poor management system as the root cause of a reduction of accommodation by 14.11% that resulted in an average total opportunity loss of ₱17,205,000.

Three alternatives were considered for the determined root cause. All three alternatives were evaluated through a cost-benefit analysis. To help determine the factors that affect the number of visitors declining, the researchers used a Pareto analysis and identified the major complaints of customers. The chosen plan of action, to acquire and implement a hotel management system, improve employee skills through proper training and the introduction of standard operating procedures, and acquire better and less outdated room amenities, were analyzed.

Furthermore, the alternative selected is feasible and involves a major risk. The problem encountered by Corregidor Inn was addressed by solving the root cause. Also, the researchers conclude that the number of customers affects the number of visitors on the island and vice versa. In line with this, the number of customers is expected to increase by at least 969 transactions and generating an additional profit of PHP 3,580,500.

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## **Biography / Biographies**

**John Brixter J. Aliado** is a 4th year undergraduate of Mapúa University taking up Bachelor of Science in Industrial Engineering. He is a member of the Philippine Institute of Industrial Engineers (PIIE) and Operations Research Society of the Philippines (ORSP). He is a remarkable student as he exemplifies in the fields of Operations Research and Production Planning. Having a lively and perky personality, he works harmoniously and cooperatively with his team.

**Maria Rebeka Isabel M. Carcellar** is a 4th year undergraduate of Mapúa University taking up Bachelor of Science in Industrial Engineering. She is a member of the Philippine Institute of Industrial Engineers (PIIE) and Operations Research Society of the Philippines (ORSP). She always has a spirit of enthusiasm and is always dedicated to improving her skills in problem analysis and research work. Her love and passion for her work and studies have exemplified throughout her years in college. Her skills and knowledge are in the area of systems engineering and statistical analysis.

**Marjorie Joyce D. Ochoa** is a 5th year undergraduate of Mapúa University taking up Bachelor of Science in Industrial Engineering. She is a member of the Philippine Institute of Industrial Engineers (PIIE) and Operations Research Society of the Philippines (ORSP). A dedicated student, driven by her passion and integrity to learn and develop skills in simplifying complex problems and resulting in a seamless solution. She gives interest in researches that divulge on facility planning, cognitive and simulation studies.

**Marquin Jose R. Pacana** is a 4th year undergraduate of Mapúa University taking up Bachelor of Science in Industrial Engineering. He is a member of the Philippine Institute of Industrial Engineers (PIIE) and Operations Research Society of the Philippines (ORSP). He is a remarkable student, driven by his passion for his work. His pique of interests are researches that discuss on facility planning and ergonomics, with these interests of him, he applies these values in the work and tasks assigned to him.

**Jenalyn Shigella G. Yandug** is an Assistant Professor of the School of Industrial Engineering and Engineering Management at Mapua University in Intramuros, Manila, Philippines. She has done research projects in Systems Simulation and Systems Engineering.