IMPROVING THE QUALITY OF HOUSEKEEPING MANAGEMENT PROCESS FOR STAY BRIDGE SUITES HOTEL

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Abstract - This research paper studies the housekeeping services in Stay bridge Suites Hotel, which deals with challenges in managing the Quality of Service (QoS). Since there is no standard procedure for serving customers and the staff is required to perform manual tasks, miscommunications between staff present lead to long waiting times. This problem results in frequent complaints regarding the services, which leads to a bad reputation, low customer retention, and improper utilization of resources. The project aims to identify the root causes affecting the QoS and standardize the housekeeping management process. To achieve these objectives, DMAIC (Define, Measure, Analyze, Improve, and Control) methodology was accomplished. As a result, some of the significant factors that affect the waiting time are manual task allocation, seasonal workload, and lack of supervision. Therefore, a preventive automated solution was proposed regarding the scheduling procedure to decrease the service waiting time.

Keywords - Housekeeping (HK), Stay bridge Suites Hotel, Waiting time, Manual task allocation, Quality of Service (QoS), Automation,

I. INTRODUCTION

According to the most recent statistics, the hotel service industry represents 38% of the total value in the World Economic Community. Hundreds of millions of dollars are spent yearly to improve service quality. Furthermore, poor performance of services is responsible for 30% to 40% of operational costs in the service sector [1]. Therefore, one of the features of a successful hotel business is the continuous improvement of high-quality services that exceed guests' expectations in every manner, from pre-booking until post-stay. Since customers are much more demanding than ever when it comes to Quality of Service (QoS), understanding their expectations and needs is becoming more critical. This allows the hotel to know how the QoS is defined from a customer point of view, helps to formulate customer satisfaction surveys, and influences visit repetition and word-of-mouth suggestions. To sustain the hotel's current position and thrive in the future, it is vital to offer high quality services to retain old customers and attract new customers. Some of the main concerns for hotel industries are to be aware of guest expectations, have a standard working procedure, and have skilled staff that delivers high quality services to guests.

II. PROBLEM STATEMENT

The Housekeeping Department of the Stay bridge Suites Hotel is dealing with a variety of challenges regarding providing high QoS. As the staff does not have a standard procedure for serving the customer and due to the manual tasks, that leads to miscommunication between the staff and increases the waiting time. Therefore, this project will focus on automating the housekeeping process by developing a software-based system to enhance the QoS and reduce the hotel's services' waiting time.

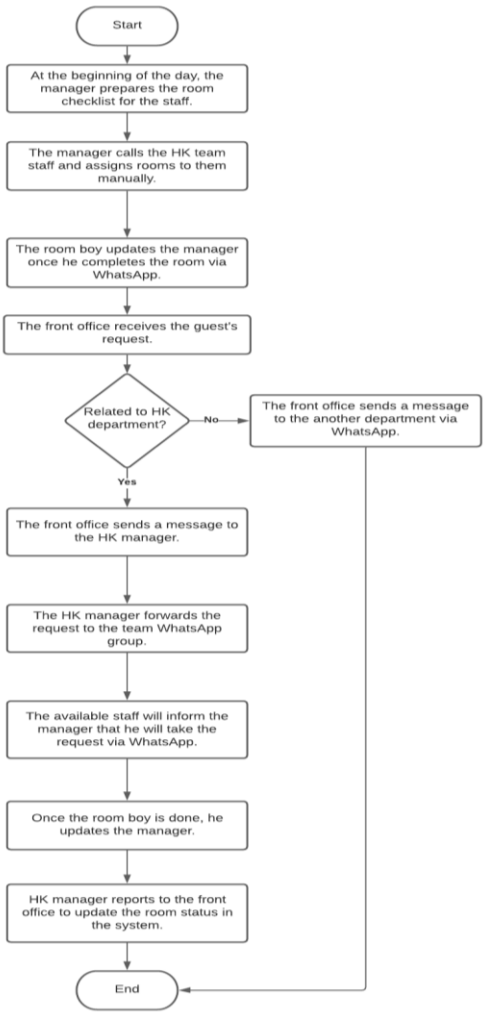


Figure 1:The current HK process flowchart.

Afterward, the project will highlight the potential engineering techniques and then select the best technique, which is the DMAIC methodology. The variables impacting the QoS for the hotel's housekeeping department will then be identified and prioritized. Finally, an alternative solution will be suggested and implemented to increase the hotel's QoS and productivity. Figure 1 below illustrates the detailed as-is HK management process flow chart.

III. VARIABLES/ FACTORS ANALYSIS

An interrelationship diagram for the long service waiting time factors was drawn to understand the cause-and-effect relationships among the factors to identify the key driver and the outcome. The potential factors were collected by conducting a meeting with the HK team and front office team members. As shown in Figure 2 below, first each factor was placed in a box, then each factor was compared to the other factors to identify cause-effect relationship. The factor with a high number of outgoing arrows is a key cause of the issue, and the factor with many ingoing arrows is the main outcome. For example, manual task allocation affects the guest waiting time, information flow through the department, and QoS. The factor manual task allocation is the key driver since it has the most outgoing arrows and no ingoing arrows. Therefore, manual allocation tasks are the major issue to be focused on for causing a long service waiting time. On the other hand, the two factors: high guest waiting time and low QoS had the highest number of ingoing arrows, consequently they are the main outcomes. Thus, manual allocation task needs to be eliminated to reduce the service waiting time and increase the QoS.



Figure 2:Interrelationship Diagram.

- **Eliminating Non-Value Adding Activities**

the 5-Whys analysis method was used in this phase to find the root cause of the non-value adding activity, which is the manual task allocation as illustrated in the above interrelationship diagram. The 5-Whys technique is an iterative, team-driven procedure that interrogates a problem by repeatedly asking "Whys" to find the root cause of a specific issue. The number five refers to that five iterations of asking why are usually sufficient to identify the root cause [2]. However, in some cases, it may take more or fewer whys, depending on the depth of the root cause [2]. This method was used to obtain preventive actions for the non-value-adding activities.

Non-value-adding activity: The HK manager manually allocates the human resources (staff) to services in papers every morning.

To find the root cause:

1. Why? The system does not have the feature of assigning resources.
2. Why? There is no visibility on staff availability status.
3. Why? The system has limited access to the managers and the front office only.

Root cause: The HK staff do not have access to the hotel's system to update their status.

Corrective action: The HK manager and the front office department should all be integrated with the

staff inputs in the system to develop an auto-scheduling process that eliminates the manager's manual allocation, resulting in a reduction in the HK services waiting time.

- **Room cleaning services VS. Other HK services**

Providing services to customers represents a deep concern in the housekeeping department, especially room cleaning services, as they consume more effort from HK staff and long-time duration than other services. To illustrate the fact that room cleaning services have the longest waiting time, the average waiting for the time duration of the room cleaning services compared with other services in HK that are sensitive to customer needs or demand such as ordering inventory items (e.g., bed sheets, towel, shampoo) and additional guest requests (customized services). Figure 3 below illustrates the average waiting time durations for HK services requested during June, July, August, September, and October. According to the bar chart, room cleaning services represent the longest average waiting time among the HK services, 35 minutes on average compared to inventory items order of 17 minutes and additional guest requests of 24 minutes.

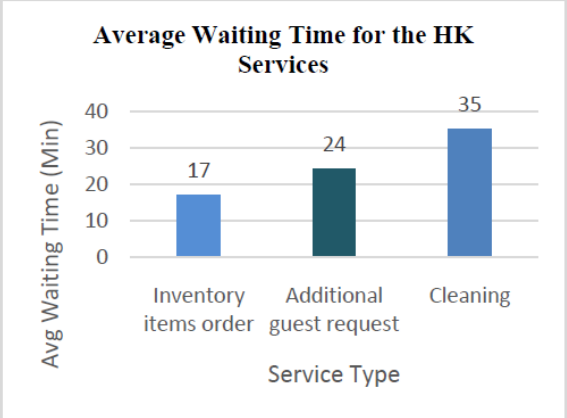


Figure 3:Average Waiting Time for the HK Services.

Since there are different standard durations for the room cleaning services in Stay bridge Suites Hotel, as illustrated in Table 1below, the team should select one room and cleaning type to calculate and compare with other HK services. Thus, the lowest standard duration was determined for comparison, the "Daily Cleaning for 1B" equal to 20 minutes. Compared to the standard time, the graph shows that additional 15 minutes on average were spent in the room cleaning service, which is considered additional waiting time. As the standard duration for the other two services is 15 minutes, approximately two to nine minutes on average are considered as waiting time. Consequently, the graph highlights that room cleaning services have the highest variation compared to the standard time. Hence, the room cleaning service's waiting time should be considered to enhance the QoS of the housekeeping.

Room Type	Cleaning Type	Cleaning Duration (Minutes)
One Bedroom (1B)	Daily	20
One Bedroom (1B)	Checkout	35
Two Bedrooms (2B)	Daily	30
Two Bedrooms (2B)	Checkout	45
Studio	Daily	45
Studio	Checkout	55

Table 1: The standard time for cleaning service.

- **Service types VS. Customer waiting time**

To investigate more about the relation between the service type and the waiting time, the following hypothesis was tested:

H0: Service type does not affect the customer waiting time.
H1: Service type affects the customer waiting time.

A random sample of 12 consecutive days that were exceeding their standard duration was taken to analyze their service waiting duration (day 1 = Monday)

a)Room cleaning service

A regression line has been plotted to study the relationship between the type of service (room cleaning service) and the waiting time, as shown in Figure 4.
The regression equation of the plot is:
Y= 41.60 – 1.666 x (1)

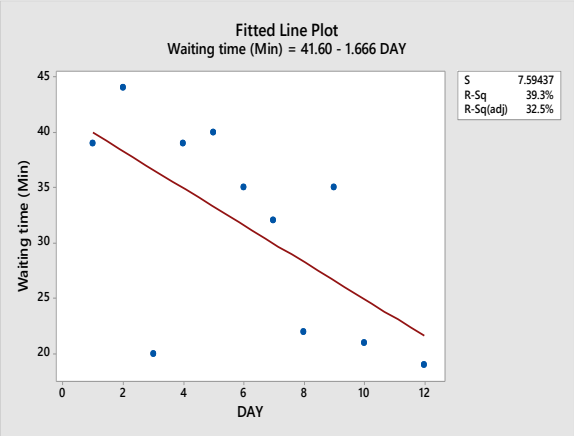


Figure 4:Regression Line.

From Figure 4, the waiting time of cleaning services on days 4,5, and 6 increased since these were the weekend days and the demand on the hotel and the cleaning services are much higher on the weekends.
The correlation is equal to -0.627, which indicates a strong negative relationship. Additionally, as shown in Figure 5, the P-value equals 0.039, which is less than 0.05.

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	335.657	335.657	5.82	0.039
Error	9	519.071	57.675		
Total	10	854.727			

Figure 5: Analysis of Variance (ANOVA).

Hence the H0 will be rejected. Therefore, the room cleaning services affect the customer waiting time.

b) Additional guest requests

The second type is additional guest services, which means more customized services in responding to the guest requests. This type represents the main concern since staff should be highly responsive to the guest's demands. A regression test was accomplished to study the relationship between the additional guest requests service and the waiting time.

The regression equation of the plot is: Y= 24.67 – 0.5385x (2)

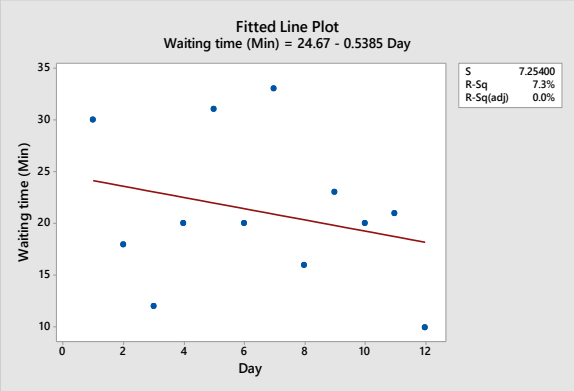


Figure 6:Regression Line.

As displayed in Figure 6 above, there are different durations plotted for the selected sample since the customized services vary depending on the guest's request. However, the standard time for the additional services should not exceed 15 minutes, and it appears that six points (services) exceed the standard time.

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	41.462	41.4615	0.79	0.396
Error	10	526.205	52.6205		
Total	11	567.667			

Figure 7: Analysis of Variance (ANOVA).

Furthermore, there is a negative trend between this type and the waiting time, and the correlation is equal to -0.27, which indicates a weak negative relationship. Also, as indicated from Figure 7, the P-value equals 0.396, which is more than 0.05; hence the decision is failing to reject H0. Therefore, there is no relationship between the additional guest requests and the waiting time.

c) Inventory items order

A regression line has been plotted to study the relationship between the type of the service (Inventory items order) and the waiting time, as shown in Figure 8.

The regression equation of the plot is: Y=24.48–0.2028x (3)

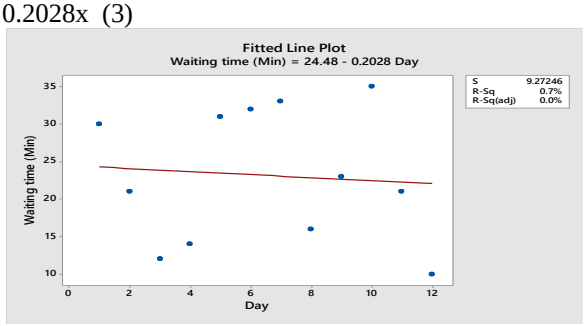


Figure 8:Regression Line.

Figure 8 above illustrates that the waiting time is unstable, and it is due to the different inventory locations (nearest to the rooms) and the availability of the ordered items. Furthermore, the correlation equals -0.082, which indicates that the relationship is a weak negative relationship. Also, as shown in Figure 9 below, the P-value is greater than 0.05. Therefore, the decision fails to reject H0. Hence, there is no relationship between the inventory items order and the waiting time.

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	5.881	5.8811	0.07	0.799
Error	10	859.786	85.9786		
Total	11	865.667			

Figure 9: Analysis of Variance (ANOVA).

The relationship between service types and waiting time is illustrated in Table 2 below.

Service type	Impact on waiting time
Room cleaning type	Strong negative relationship – High effect
Additional guest requests	Weak negative relationship – No effect
Inventory items order	Weak negative relationship – No effect

Table 2: The standard time for cleaning service.

To sum up, managing the different services is crucial, especially room cleaning services since it has the highest impact on the waiting time. Consequently, Stay bridge Suites hotel should prioritize the consequences of each service type and investigate the reasons behind the long waiting time consumed per staff in the suggested solution.

- **Room Cleaning Standard Duration Vs. Actual Duration**

The previous analysis identified the room cleaning service as the highest contributing service type to the waiting time. Therefore, a random sample of 75 room

cleaning services was collected from the data to plot a graph of the actual waiting durations versus the standard waiting durations. Since Stay bridge Suites hotel has three types of rooms, the service duration depends on each type.

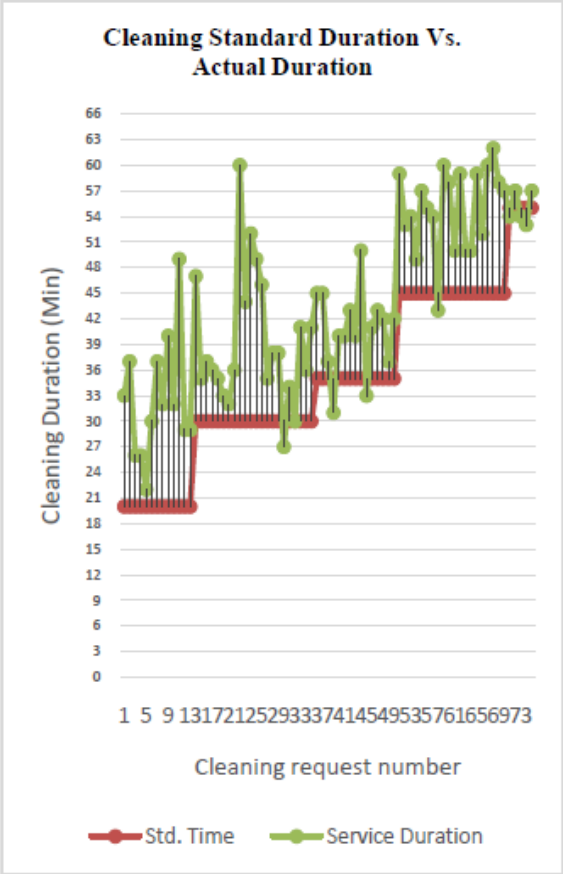


Figure 10:Cleaning Standard Duration Vs. Actual Duration.

In Figure 10 above, MS Excel was used to plot the actual duration versus standard durations to observe the deviation of the cleaning waiting time of this sample. For instance, the standard time of the two-bedroom in a daily cleaning type would take 30 minutes to complete the service, while with the improper scheduling, the range deviates between 30 to 55 minutes; therefore, the average for the range is 42 minutes of the service duration, and the increase will be 12 minutes increase.

- **Seasonal periods VS. Customer waiting time**

The Interrelationship diagram in Figure 14 shows that the hotel's seasonal workload is a cause of high guest waiting time. As many hotels become super busy and hectic during seasonal periods such as Ramadan, Eid, National Holiday, etc. Furthermore, as the demand increase for the reservations, the guests will occupy most of the rooms. A poor QoS, high workload, and complicated scheduling process will be resulted since the same number of staff is used during the seasonal periods. In order to verify this, the regression relationship between seasonal periods and guest waiting time was investigated.

The alternative hypothesis to be tested for the regression model is as follows:
H0: There is no relationship between seasonality and the guest's waiting time.

H1: There is a relationship between seasonality and the guest's waiting time.

Figure 11 below shows a regression line of 2-weeks average waiting time durations (in minutes) for room cleaning services to spot the seasonality and find the relationship between the seasonal periods and the guest waiting time for the room cleaning services.

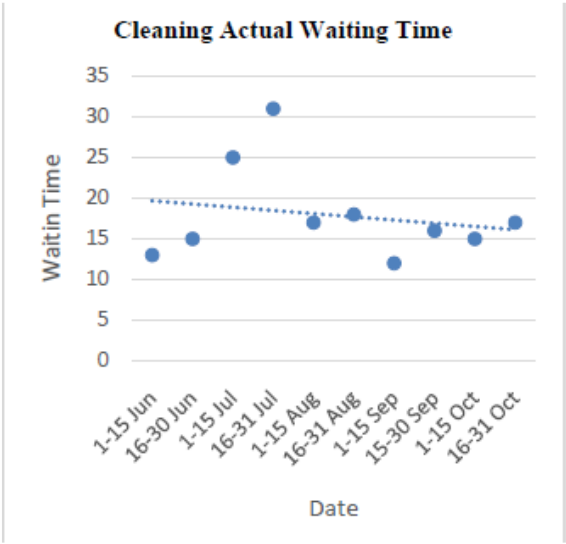


Figure 11:Regression Line.

The regression equation of the line is as follows:
$Y = - 0.394x + 20.067$ (4)

The scatter plot in Figure 11 represents the average cleaning durations pattern in the original data period, which is five months. The fitted line in Figure 11 indicates that the pattern is somehow constant (has a slight negative slope), except for July month, since there was Eid Al-Adha holiday (14/7/2021 – 24/7/2021), demonstrating that the waiting time rate was significantly higher than usual.

As shown in Figure 12, the Analysis of Variance (ANOVA) indicates that the H0 should be rejected since the P-value is less than the significance level of 0.05. It can be concluded that are seasonal periods affect the guest's waiting time for services.

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	908.7	9	100.967	100.967	0.0000	2.3928
Within Groups	20	20	1			
Total	928.7	29				

Figure 12:Analysis of Variance (ANOVA).

IV. DEVELOPING AUTOMATED SCHEDULING SYSTEM

Murakami, Tasan, Gen, and Oyabu (2011) stated that managers require automated assistance in order to make successful human resource allocations [3]. By investigating the situation and based on the analysis above, the manual resource allocation is a factor of the increased guest's waiting time, thus affected the quality of housekeeping performance. At Stay bridge Suites hotel, the HK manager allocates the human resources manually per each service using checklists and Whats App messages between the front office and HK department to circulate the guests' request. Accordingly, to reduce the manual allocation without immediate effect on the HK QoS, an automated web-based system will be developed.

To construct the system, there are certain steps that should be follow as the following:

Step 1: Understanding the current situation and identifying the need.

As mentioned in section II the problem statement.

Step 2: Determine an appropriate system

Since the current situation at the Staybridge hotel necessitates adopting a proper web-based management system between the HK manager, employees, and front office to reduce waiting time, the Application Express system (APEX) will be utilized. The APEX system is a multi-model relational database management system primarily intended for enterprise grid computing and data warehousing. It offers a software solution for managing database operations, ranging from personal to enterprise-level applications [4]. Moreover, APEX mainly consists of two major programming languages, Structured Query Language SQL, and JavaScript, familiar with the team members.

Why is APEX used?

a. Because the circumstance necessitates three main stakeholders, the system's access will be restricted for more privacy.

b. The APEX system supports uploading/downloading Excel sheets that is extracted from the hotel's system, which will facilitate the process of scheduling services.

c. It is a world-class technology service that provides the required features to support the current situation (e.g., Database, User interface, algorithms (several programming languages)) all in one more efficient system.

d. Easy to use and adapt to future changes and improvements.

Step 3: Designing the new process

In designing the model, the APEX system features will be utilized extensively to enhance the current process and eliminate non-added value activities. The website consists of three main stakeholders: the HK manager, staff, and the front office. The HK manager can view the requests, needed services, and available staff in each shift. The ability to make auto scheduling. Also, check the schedule of the staff who is available and who is busy, and the details of each staff work. The second stakeholder is the front office, who can check the services' reports and assign the guest's request in the system with more details (e.g., room type, date, time, room number). Another feature is the ability to view the database and the accomplished reports done by staff.The third one is the staff; the staff can access the system to view the assigned tasks ordered by the HK manager set the start time and end time of the service. This will eventually increase the staff's commitment to accomplishing the task in minimum time. Additionally, if a delay occurs, the staff should mention the reason behind this delay so that the HK manager can check and take corrective action later. Figure 13 illustrates the flow chart of the system.

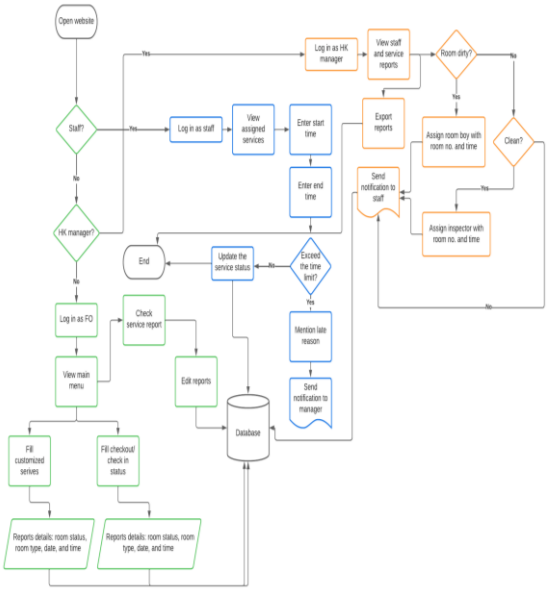


Figure 13:The Flow Chart of The System.

Step 4: Building Database tables

SQL will be the programming language used in the APEX system database because it was the most resilient and not limited the number of entries accepted among the other options. The system mainly needs five connected tables using different relations and dependencies. Figure 14 shows the initially designed tables.

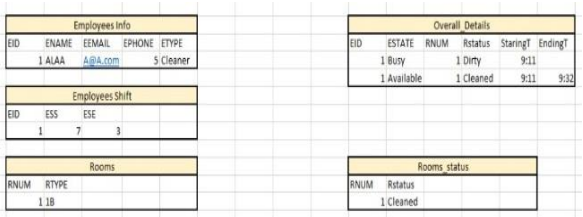


Figure 14:TheInitial Tables.

Before the pilot test, the data of the services and guest requests collected from the hotel system, Opera, should be in an Excel sheet in a format that the APEX

system can read. So that the system can enter accurate data, avoid misunderstandings of assigned tasks, and have a substantial positive impact on the HK process. Comparing this plan according to the specifications, it noticed that good coordination between stakeholders, delivering services in less time, and providing more efficient services are met by this plan. Also, the resource to accomplish the alternative is available. The solution is applicable, feasible, and user-friendly regarding the constraints. It does not violate the hotel's regulation and can be completed within seven months.

V. CONCLUSION

The hotel will improve itself in several ways by implementing the recommended solutions. The team has successfully identified the root causes of the waiting time, developed criteria to detect staff performance, developed plans to oust the current process and set strategic actions to bypass long waiting times in the future. Furthermore, the solution will assist in be preparing for unexpected reservations while effectively maintaining the hotel's reputation and the level of services provided to customers. Moreover, the Stay Bridge hotel will be impacted by these actions and their competitor, the industry, and local businesses. As a result, high-quality performance value will have a favorable impact in various sectors.

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