ANALYSIS OF CHECK-IN COUNTER SERVICE PERFORMANCE USING THE QUEUE METHOD AT HUSEIN SASTRANEGARA AIRPORT

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ABSTRACT

The airport is a very vital facility that exists in every country that functions as a gateway to be able to connect between islands and countries. With this very vital function, it is necessary to have several checks to be able to enter the airport. One of the services at the airport is the Check-in Counter, which is a place where passengers get their boarding passes and weigh their baggage to be labeled and put on the plane. At check-in, the passenger must submit his ticket and identity to the check-in counter for inspection. After checking in and obtaining a boarding pass, the passenger is allowed to enter the waiting room (boarding gate). Optimizing check-in counter services is a very important part of the airport service stage. To find out this can use analysis using the queuing method to be able to optimize the service process at the Check-in Counter. The initial data used in processing is the average number of consumer arrivals and service time at the check-in counter. The results of this study indicate that the service conditions are still good because the level of utilization is still <1. The average consumer who queues is 3 people per hour and the time needed to queue is 27.86 minutes. Meanwhile, the time needed to complete the Check-in Counter facility service is 42.86 minutes

Key Words: Check-In Counter, Queue Method, Service Performance, Customer Arrival, Service Time

PRELIMINARY

The presence of consumers is a very important factor in supporting the running of a business. However, there are still many consumer services that are considered not to meet the convenience for customers. In fact, customer satisfaction is a very decisive factor that the business will last a long time. One of the things that interfere with the comfort in customer service is the length of waiting for consumers to be served. One of the service parameters that can be felt by consumers is the length of waiting to get the service. To measure the time required by consumers from starting to wait until they finish getting the service, the queuing theory method can be used.

Good customer service will prioritize service quality and service time that is tailored to consumer needs. As much as possible making consumers not waiting to receive service will make the business can compete with its competitors. Using the queuing theory method will be very helpful in determining and optimizing queue management in a service [1-4].

The object of research in this study is the service at the Check-in Counter of Husen Sastranegara Airport. Husen Sastranegara Airport is an international airport located at Jalan Pajajaran Number. 156, Husen Sastranegara sub-district, Cicendo sub-district, Bandung city (capital of West Java province). Check-in counter service is a service available at the airport at the forefront of the airport which is also called frontliners. As the foremost frontliners service at the airport, it is very consumer related so that the performance of the check-in counter must be in excellent condition for service to consumers. The queuing theory method will be used to perform an analysis for optimizing queue management so that services at the airport check-in counter are always optimal in customer service[5].

LITERATURE REVIEW

Excellent service

Excellent service or called Excellent service is to provide optimal service to customers to be able to realize customer satisfaction. The purpose of excellent service is how to provide satisfaction to consumers so that it will have an impact on consumer confidence in the company and will generate maximum profit for the company. There are 3 concepts of excellent service:

- Attitude
- Attention
- Action

According to [6]and [7]that all significant characteristics of service quality affect customer satisfaction. [8, 9] states that the methods that any company can use to monitor and measure customer satisfaction are as follows: (1) complaint and suggestion system, (2) customer surveys, (3) ghost shopping, and lost customer analysis.

Queue Theory

According to [10] queuing theory is a theory that uses a mathematical model of the queuing model problem. According to [11]said that the queuing system is an event when customers will get service, then wait to be served by the server while the system is still busy, then get service and finally leave the system after getting service.

According to [12, 13] queuing systems can be classified as follows:

1. Single Chanel Single Phase

Single Channel means that there is only one path that enters the service system or there is a service facility. Single Phase means that there is only one service facility.

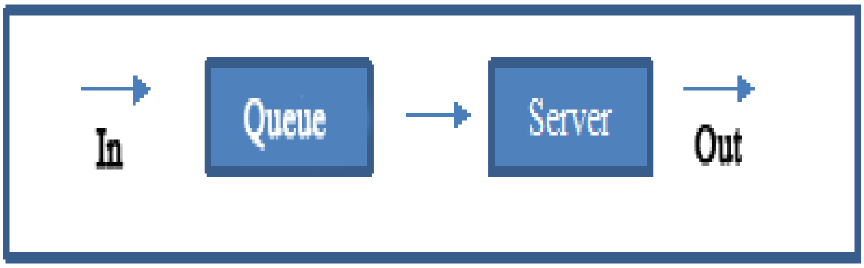

Figure 1 Single Channel Queue System - Single Phase

2. Single Channel Multi Phase.

This single line queuing system with multiple stages or shows that there are two or more services that are carried out in sequential service facilities.

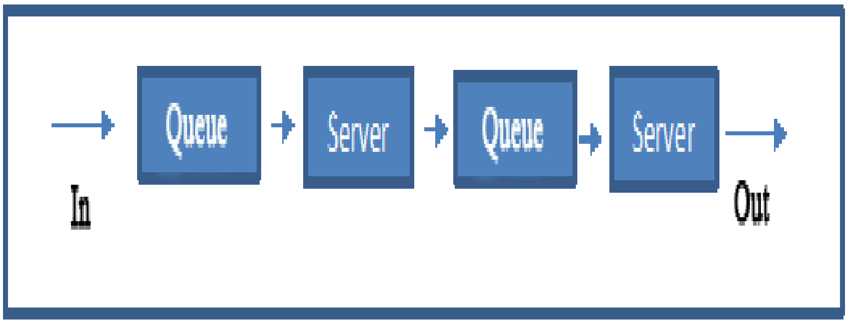

Figure 2 Single Channel Queue System - Multi Phase

3. Multi Channel Single Phase Homogeneous rate

Multi Channel System – Single Phase occurs where there are two or more service facilities fed by a single queue.

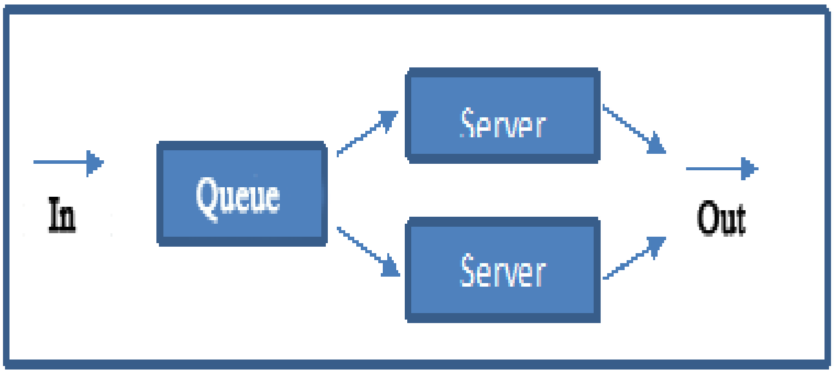

Figure 3 Multi Channel Queue System - Single Phase

4. Multi Channel Single Phase with Heterogeneous rate

Multi Channel Single Phase system with heterogeneous rate occurs where there are two or more service facilities fed by a single queue, but have free conditions to enter the system.

5. Multi-Channel Multi-Phase

This Multi Channel – Multi Phase system shows that each system has several service facilities on each hold so that there are more than one customer that can be served at the same time.

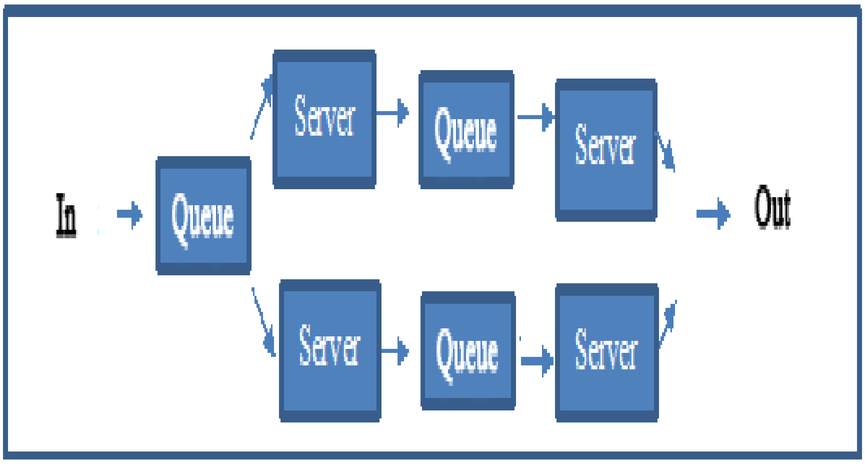

Figure 4 Multi Channel Queue System - Multi Phase

Some of the notations and symbols used in the queuing model are: *Table 1*

Symbols and Notations in the queuing model

Symbols	
λ	Average arrival rate
μ	Average departure rate
n	Number of individuals in the system
L_s	Expected average number of units in queue/number of customers in queue (Units)
L_q	Expected average number of units in queue/number of customers in queue
W_s	Length of time the customer spends in the system
Wq	Length of time customers spend in queue
P_0	Probability of no customer in the system
P_w	Probability of waiting in queue
ρ	Departure intensity level
S	Number of service facilities (servers)

METHODOLOGY

The method used in this study uses quantitative methods with the application of mathematical models in queuing problems at the Check-in counter at Husein Sastranegara Airport. The systematics in this research is initiated by observing customer arrival data and the average service time at the Check-in Counter service, then the data is used as initial data in calculating the service level at the check-in counter.

Observational data will be calculated to get the following values:

- Average number of customer arrivals per hour (λ)
- Average number of customers served per hour (μ)
- Probability of no customer in service (P_0)
- Service utilization rate (P)
- Average number of consumers in the system (L_S)
- Average number of customers in the queue (L_q)

- Average customer time in queue (W_q)
- Average time of the consumer in the system (W_s)

The queuing method that will be used in this research is Multi Channel Single Phase, where there are more than 1 service units installed in parallel.

Outcome

The initial data used in this study is data on consumer arrivals to the Check-in Counter service. The data is obtained from direct observation conducted for one month by counting the number of consumer arrivals every day for 30 days. *Table 2*

Initial data on the number of consumer arrivals

No	Number of costumer	No	Number of costumer	No	Number of costumer
1	60	11	72	21	72
2	44	12	40	22	52
3	64	13	60	232	40
4	56	14	44	42	56
5	40	15	52	5	48
6	44	16	36	26	36
7	35	17	40	27	64
8	56	18	64	28	52
9	56	19	56	29	44
10	64	20	40	30	60

Beside the arrival data, there is additional data to calculate queuing problems, including:

Standard service time per customer : 15 minutes/costumer
Current Chanel Number (s) : 2 Chanel
Working hours per shift : 8 Hours

The next step is to perform data processing to determine the optimization of the current service system. So some indicators to assess the condition of the mini site are as follows:

1. Determine the average number of customer arrivals per hour.

$$\lambda = \frac{Costumer\ numbers\ per\ hours}{Number\ of\ Hours\ per\ month}$$

$$\lambda = \frac{1548}{30 \times 8} = 6{,}45\ costumer/hour$$

From the calculation results obtained the number of consumers who come every hour is 6,45 ≈7 costumers per hours.

2. Determines the average number of customers served per hour.

$$\mu = \frac{hour}{service\ time}$$

$$\mu = \frac{60\ minutes}{15\ minutes/costumer} = 4 = costumer$$

The number of customers served by the system per hour is 4 people..

3. Service utilization rate.

$$P = \frac{\lambda}{s.\mu}$$

$$P = \frac{6{,}45}{2 \times 4} = 0{,}806$$

The service channel has a utilization rate or a busyness level of 0.806 or 80.6% for every hour.

4. The probability that there are no customers in the service system.

$$P_o = \frac{1}{\sum_{n=0}^{s-1} \frac{\left(\frac{\lambda}{\mu}\right)^n}{n!} + \frac{\left(\frac{\lambda}{\mu}\right)^s}{s!\left(1 - \frac{\lambda}{s.\mu}\right)}}$$

$$P_o = \frac{1}{\frac{\left(\frac{6,45}{4}\right)^0}{0!} + \frac{\left(\frac{6,45}{4}\right)^1}{1!} + \frac{\left(\frac{6,45}{4}\right)^2}{2!\left(1 - \frac{6,45}{2 \times 4}\right)}} = 0,107$$

The probability that there are no consumers in the service system is 0.107 or 10.7% per hour.

5. Average number of customers in the queue.

$$L_q = \frac{P_0 \left(\frac{\lambda}{\mu}\right)^s \left(\frac{\lambda}{s.\mu}\right)}{s!\left(1 - \frac{\lambda}{s.\mu}\right)^2}$$

$$L_q = \frac{0,107 \left(\frac{6,45}{4}\right)^2 \left(\frac{6,45}{2 \times 4}\right)}{2!\left(1 - \frac{6,45}{2 \times 4}\right)^2} = 2,995 \approx 3\ costumers$$

The number of possible customers in the queue is 3 customers per hour.

6. The average number of consumers in the system.

$$L_s = L_q + \frac{\lambda}{\mu}$$

$$L_s = 2,995 + \frac{6,45}{4} = 4,607 \approx 5\ costumers$$

The number of possible consumers in the system is 5 consumers per hour.

7. Average customer time in queue.

$$W_q = \frac{L_q}{\lambda}$$

$$W_q = \frac{2,995}{6,45} = 0,464\ hour$$

The length of time consumers wait in the queue is 0.464 hours or 27.86 minutes.

8. Average consumer time in the system.

$$W_s = W_q + \frac{1}{\mu}$$

$$W_s = 0,464 + \frac{1}{4} = 0,714\ hour$$

The length of time for consumers in the service system is 0.714 hours or 42.86 minutes.

CONCLUSION

The results of this study can be concluded that:

The queuing method used to analyze the Check-in Counter service at Husein Sastranegara Airport is Multi Channel Single Phase, because this study only discusses the service process in the Check-in Counter service section. The number of facilities installed is 2 service facilities. The queuing system used is First Come First Serve (FCFS). The arrival rate of consumers to service facilities is about 7 people per hour with the service time of each customer is 15 minutes per person. After calculating the service, it turns out that the service is still categorized as good with a utilization value of < 1. The average number of consumers queuing for service is 3 consumers per hour and the total number of consumers in the system is about 7 people per hour. The time needed to queue up to get the service is 27.86 minutes and the time it takes from starting to wait in the queue to finish the service is 42.86 minutes. It can be seen that this result shows the performance of the service from the Check-in Counter facility. Future research needs to be done to see in more detail the utilization of service facilities by comparing the busy and non-busy times.

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