**PERFORMANCE ANALYSIS OF VEHICLE TAX PAYMENT SYSTEM QUEUE**

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**ABSTRACT:** The research aims to identify the queuing model, describe the results of the analysis and assess the queuing system of vehicle tax payments at the SAMSAT Bandar Lampung Office. The study is descriptive research type. The population is all motor vehicle taxpayers who will pay at SAMSAT Bandar Lampung, and the sample is taxpayers who are paying annual taxes. Data collection techniques are interviews, observation. The data analysis method uses a queuing model formula *multi-channel multi-phase* to analyze the number of average customers in the system, the average amount of time spent in the system, the average number of consumers waiting in a queue, the average time spent waiting in the queue until it is serviced, the probability of the service unit is empty, the probability of a number of customers being in the system. The results showed that SAMSAT Bandar Lampung implemented a *multi channel - multi phase* queuing system with a queuing system *M / M / S* and queuing discipline *FCFS*. At the registration counter there is an average queue density at 8 00 and 13 00. At the checkout, there is an average queue density at 9 00 to 11 00.

**Keywords: Queue, SAMSAT Bandar Lampung.**

**INTRODUCTION**

The development of increasingly advanced science and technology requires humans to be able to work effectively and efficiently. Even for the public service sector itself, it often happens that queues become common in implementing services. Queues are people or goods in line that are waiting to be served (Heizer and Render, 2011: 772). This event is caused by fulfilling the needs and becoming a problem that needs to be dealt with by looking at the behavior of modern humans that are demanded to be fast paced. One government agency that serves the public, SAMSAT (*Satuan Manunggal Satu Atap*), is tasked with serving the motor vehicle tax. The service system at the SAMSAT Bandar Lampung office still looks busy waiting in line. This is caused by an increase in the number of motorized vehicles in Bandar Lampung, which affects the increasing number of taxpayers. This queuing theory is very necessary to create the atmosphere expected by the taxpayers.

The impact of the busy queue is a loss for the company due to loss of customers. The company must devise a strategy so as not to lose customers, the company must provide servers sufficient, but on the other hand, the company must incur greater costs (Sinalungga, 2008: 238). Therefore, in order to avoid greater losses, an analysis of the queuing system of the government agency is needed.

**METHODOLOGY**

This research is a descriptive study that is research conducted to provide a more detailed picture of a symptom or phenomenon. Descriptive studies are conducted to find out and be able to explain the characteristics of the variables studied in a situation (Sekaran, 2014: 158). This research was conducted at SAMSAT Bandar Lampung on Jl. Scout No.1, Rajabasa, Bandar Lampung from 08.00-15.00 with a period of up to 14 days. The queuing model used is multi-channel multi-phase or double lane queue with multiple stages.

**Table 1. Formula Model for Queue B (M / M / S)**

|  |  |  |
| --- | --- | --- |
| **No.** | **Model B (M / M / S)** | **Formula** |
| 1 | Average arrival rate  |  |
| 2 | Average service level  |  |
| 3 | Probability of having 0 people in the system (Po) | =  |
| 4 | Cashier utility level (*ρ)* | *=*  |
| 5 | The average number of consumers in the system  |  |
| 6 | Average time average spent by a consumer in the system ( |  |
| 7 | Number of people or average units waiting in a queue ( |  |
| 8 | Average time spent by a consumer in a queue ( |  |

 *Source: Heyzer and Render (2011: 778)*

**DISCUSSION**

**Queue System Analysis with M / M / S Model**

At SAMSAT Bandar Lampung, three service lines are provided to serve taxpayers who will make payments. At counter 1A the endorsement is then continued by paying tax obligations at cashier 1 and cashier 2 and get a new STNK at the STNK counter. Analysis of the queuing system with the M / M / S model is as follows:

**TABLE 4.6 PERFORMANCE RESULTS OF THE QUEUE SYSTEM**

|  |  |
| --- | --- |
| **Time Period** | **Queue System Performance** |
| **M** | **Λ** | **µ** | **Po** | **Ρ** | **Lq** | **Ls** | **Wq** | **Ws** |
| 08.00-08.59 | 2 | 22 | 17 | 21% | 65% | 1 | 2 | 2m 54s | 6m 7s |
| 09.00-09.59 | 2 | 20 | 17 | 26% | 59% | 1 | 2 | 2m 27s | 5m 4s |
| 10.00-10.59 | 2 | 18 | 17 | 31% | 53% | 0 | 2 | 1m 37s | 4m 9s |
| 11.00-11.59 | 2 | 10 | 17 | 55% | 29% | 0 | 1 | 33s | 4m 26s |
| 13.00-13.59 | 2 | 25 | 17 | 15% | 74% | 2 | 3 | 4m 15s | 8m 8s |
| 14.00-14.59 | 2 | 9 | 17 | 58% | 26% | 0 | 1 | 27s | 3m 8s |

 *Source: Primary data processed with QM-POM Software for Windows V5, 2018*

Calculations aim to optimize the queuing system by overall so that the average time a taxpayer spends in the system (Ws) ≤ 4 minutes. Based on table 4.6 the results of the performance of the queuing system shows that:

1. **Probability of 0 People in the System (Po)**

The probability of 0 people in the largest system occurring at 14.00-14.59 at 55%. At 14.00-14.59 and the probability that there are 0 people in the system (Po) the smallest occurred at 13.00-13.59 which is 15%. During this period, the queuing system was filled with taxpayers waiting to receive services.

1. **Service Line Utility Level or Service Line Busy Level (p)**

At 14.00-14.59 service line conditions are very free with service line utilization level ***(ρ)*** amounted to 26% and the highest utilization rate occurred at 13:00 to 13:59 and 08:00 to 08:59 that is equal to 74% and 65%, the condition of the queuing system is very crowded because of the accumulation of taxpayers to obtain services

1. **Average Number of Taxpayers in Queue (Lq)**

Average the shortest average number of taxpayers in the queue (Lq) occurred at 10:00 to 10:59 pm, 11:00; 11.59, and 14.00-14.59 that is as many as 0 people and the average number of taxpayers in the queue (Lq) the longest occurred at 13.00-13.59 namely as many as 2 people. This condition is caused by the large number of taxpayers waiting to obtain services on the service path

1. **Average Number of Taxpayers in the System (Ls)**

The shortest number of taxpayers in the system (Ls) occurs at 11.00; 11.59 and 14.00-14.59, namely as many 1 person and the longest average number of taxpayers in the system (Ls) occurs at 13.00-13.59 which is as many as 3 people. In this condition taxpayers are required to queue to obtain services from the service channel.

1. **The Average Time Spent by Taxpayers in the Queue (Wq)**

The shortest time spent by taxpayers in the queue (Wq) occurs at 14.00; 14.59 ie for 27 seconds and the average time spent by the longest taxpayer in the queue (Wq) occurs at 13.00-13.59 i.e. for 4m 15s on the service lane.

1. **The average time spent by a taxpayer in the system (Ws)**

The average time spent by a taxpayer in the queue (Ws) occurs at 2:00 PM, 14.59 ie for 3m 18s and the average time spent by a taxpayer in the longest queue (Ws) occurs at 13.00-13.59 i.e. for 8m 8s on the service lane.

**CONCLUSION**

SAMSAT Bandar Lampung implements a multi-channel multi-phase queuing system with queuing system *M / M / S* and queue discipline FCFS. The queue discipline applied at SAMSAT Bandar Lampung is first come first served (FCFS), which is the service provided in the order of arrival.

The results of the analysis of the queuing system performance at SAMSAT Bandar Lampung showed an average at 08.00-08.59 and 13.00-13.59 there was a very tight queue because many taxpayers took care of their vehicle tax at the beginning of SAMSAT working hours or after recess. At 09.00-09.59 and 10.00-10.59, the queue began to decrease. 11:00 to 11:59 and 14:00 to 14:59 at the average queue is very quiet because at that hour was nearing completion time hours SAMSAT working and the average taxpayer is busy with their own activities.

**References**

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