ANALYSIS OF QUEUE SYSTEM AND OPTIMIZATION OF TELLER SERVICE AT PT. BANK DKI TANJUNG PRIOK BRANCH USING MULTI CHANNEL-SINGLE PHASE QUEUE MODEL

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***Abstract* – *Abstract* -** *This study aims to analyze the performance of the queue system and how to optimize customers by using the queue theory in the teller section of PT. Bank DKI Tanjung Priok Branch. Sampling techniques used in this study used purposive sampling. The sample was obtained by 1361 customers during a 15-day working study at the teller. This research uses descriptive research with quantitative approach. The population in this study is all customers who transact on tellers. The statistical method used is the analysis of multiple line queue system (M/M/S) with POM-QM for Windows version 3.0 application with Waiting Lines module. Queue system performance at PT. Bank DKI Tanjung Priok Branch is seen that using 4 tellers customer opportunities in the system 77.71%, customers in the system is 0 people. Time spent by a customer in a system of 1.00002 minutes, customers waiting in a queue of 0 people. After the evaluation using 3 teller customer opportunities in the system 77.72%. The average number of customers in the system is 0.2522468, the customer in the system is 0 people. Time spent by a customer in the system 0.012576 minutes, customers waiting in a queue of 0 people. Optimization of PT customers. Bank DKI Tanjung Priok Branch using 4 tellers has not been optimal, because judging from the calculation of the average usefulness of teller services have more idle time. At the time evaluated to 3 people teller is optimal, because judging from the calculation of the average usefulness of the service teller has a lower idle time.*

***Keywords*:** *Service Optimization, Teller, Queue Theory, Multiple Lines (M/M/S)*

I. BACKGROUND

In today's modern era technology is growing, considering the growing population, companies in the field of services must move to provide the best service quickly according to the wishes of the recipients. One of the companies engaged in services is banking and is one of the important sectors in a country's economy. Because many customers who make transactions can certainly cause problems in the queue system at PT. Bank DKI Tanjung Priok Branch especially in the teller section, queue problems can cause an uncomfortable impression for customers and customers will give an un good impression on the banking service system. As a result, the public will be reluctant to make transactions with the bank in question because customers basically want fast and practical service (Robiati, 2015: 22).

There is a long queue in a transaction at the bank, so it is expected that the bank pays attention to the optimization of better services in its operating activities. Optimization is an effort to improve performance in a work unit or a person related to the public interest, in order to achieve satisfaction and success from the organizers of such activities (Nurrohman, 2017: 99-100).

The author chooses PT. Bank DKI Tanjung Priok Branch because seen from the results of direct observations there is a buildup of queues, but during the pandemic queues are limited every day. With this service can not be said to be effective, then the author took the queue method to improve the service that was previously less effective to be effective so that no more queue buildup occurred. The speed of service and the determination of the right teller formation will make the waiting time not too long is one of the main attractions for customers, and PT. Bank DKI Tanjung Priok Branch desperately needs this to be able to maintain the integrity and loyalty of its customers. Therefore, it is necessary to optimize the number of tellers by using the Multi Channel – Single Phase queue system model.

Based on the background above, the author is interested in doing research on "Queue System Analysis And Optimization Of Teller Services At PT. Bank DKI Tanjung Priok Branch Using Multi Channel-Single Phase Queue Model".

II. LITERATURE REVIEW

2.1. Research Review

Research conducted by Prayogo, et al., (2017: 928-934) with the title "Queue System Analysis and Optimization of Teller Services at PT. Bank SulutGo" and published in EMBA Journal: Journal of Economic Research, Management, Business and Accounting, Vol. 5, No.2. The purpose of this research is to analyze the application of M/M/S model in Bank SulutGo queue system. Research methodology in the form of data collection obtained from direct observations such as observation and recording to find out the average number of customers in the system, the average time a customer spends in a queue or being served (in the system), the number of people or units waiting in the average queue, and the average time spent by a customer or unit to wait in a queue. The research used a sample of the population of all customers who came to Bank Sulutgo, using the method of analysis of the performance of the queue system. The structure of the queue model that occurs at Bank SulutGo is a Multi channel-Single phase that is the pattern of arrival rate is random (random) expressed in some customers in a certain period. The queue discipline applied is First come first serve (FCFS), poisson distributed customer arrival pattern and exponential distribution service pattern. The results concluded that the calculation of the average number of customers waiting in the longest system in the period of time 12.00 -13.00 is as many as 5.1353 people or = 5 people, while the average number of customers waiting in the shortest system occurs in the period of time 08.00 - 09.00 is as many as 0.8338 people or = 1 person. The average number of customers in the queue occurred in the period of 12.00 - 13.00 which is as many as 1,385 people or = 1 person can be concluded the performance of the bank's queue system SulutGo main branch optimal.

Research conducted by Botutihe, et al., (2018: 1388-1397) with the title "Analysis of Teller Queue System for Optimization of Services at PT. Bank Negara Indonesia (BNI) 46 Manado Campus

Unit Branch" and published in EMBA Journal: Journal of Economic Research, Business Management and Accounting, Vol. 6, No. 3.The purpose of this research is to know the queue system and to know the optimal teller service at PT. Bank Negara Indonesia (BNI) 46 Manado Campus Unit Branch. The research methodology uses a sample of the population of all customers and students who conduct transactions every day in the teller, using the method of analyzing the performance of the queue system. The analysis process uses "POM-QM for Windows" software with waiting lines module, primary data collected through interviews with bank leaders or employees. The structure of the queue model that occurs at Bank Negara Indonesia (BNI) 46 Manado Campus Unit Branch is a Multi channel-Single Phase that is the pattern of random arrival rate is stated in some customers in a certain period, the discipline of queues or rules used by Bank Negara Indonesia (BNI) 46 Manado Campus Unit Branches implements the First Come First Serve (FCFS) system where customers who come first will be served first. From the calculation of the average number of customers waiting in the longest system in the period of 10.00-15.00, which is 27 people. While the average number of customers waiting in the shortest system occurs in the time period of 08.00-10.00 which is 3 people. The average number of customers in the queue occurs in the period of 10.00-15.00 which is as many as 24 people. The results concluded that the performance of pt queue system. Bank Negara Indonesia (BNI) 46 Manado Campus Unit Branch has not been optimal, and to improve the performance of the queue system the Bank can consider the level of customer arrival and the level of queue that occurs every day so that the operational performance of PT. Bank Negara Indonesia (BNI) 46 Manado Campus Unit Branches can run optimally so as not to make customers queue too long.

The research conducted by Sihombing and Marpaung (2018: 38-43) with the title "Optimization of Teller Service Queue System at BRI Unit Sumbul Dairi Regency" and published in Jurnal Sains Indonesia, Vol. 42, No. 2. The purpose of this research is to optimize the teller service system in the BRI unit of Sumbul Unit of Dairi Regency. The research methodology uses customer samples located in 18 villages in Sumbul sub-district because the Bank Rakyat Indonesia unit is the only one located in the village of Sumbul Subdistrict. Data collection is done without taking into account the number of transactions made by the customer while in the teller. The queue discipline is First come first serve (FCFS), as well as the maximum number of queues in the unlimited system. The queue model is (P/En/2) : (FCFS/∞/∞), with the same characteristics but with the addition of 1 teller the queue model becomes (P/ En/3) : (FCFS/∞/∞). The results concluded that with the addition of such tellers there were significant changes related to the characteristics indicated by the probability of idle tellers from 0.079351 to 0.1644, the probability of a busy teller from 0.785281 to 0.3155, the average number of customers in the system from 6.26143 to 2.1218, the average number of customers in the queue from 4.55 to 0.4159 the average time spent by customers in the system from 15.21 minutes to 5.141 minutes and also the average time spent by customers to queue from 11.03 minutes to 1.007 minutes, in addition the calculation results show that the optimum service rate in the queue is 31.73 customers per hour. Thus, it is necessary to add teller facilities to get optimal service at Bank Rakyat Indonesia axis unit of Dairi district.

The research conducted by Sari, et al., (2016: 81-90) with the title "Application of Queue Theory on Bank X Teller Service of Puri Sentra Niaga Branch Office" and published in Gaussian Journal 2016, Vol. 6, No. 1. The purpose of this study was to determine a suitable queue model on the teller service. Research methodology in the form of data collection used in the research is the number of customer arrivals per hour and customer service time in queue 1, as well as the number of arrivals and customer service per hour in queue 2. The study used a sample of the number of customers who made transactions on the teller section with primary data that was the result of observation and recording directly from the observed object. The suitable queue model for queue 1 is (M/G/1):(GD//), meaning that this model has poisson arrival distribution and general service distribution, number of service counters provided 1. The suitable model for Queue 2 is (M/M/2):(GD//), meaning that this model has the arrival distribution and distribution of poisson services, the number of service counters provided is 2. Discipline of service model queues 1 and 2

FIFO, as well as unlimited capacity and source of summons. The results concluded that the simulation of Queue 1 model was done with a different number of counters namely c = 1 and c = 2, exponential arrival time distribution and lognormal service distribution, both simulated models went well. Models with c = 1 have a fairly long waiting time, increasing the number of counters to 2 causes the customer's waiting time to be shorter with a significant difference. Queue 2 model simulation is done with a different number of counters namely c = 2 and c = 3, both simulated models run well. Models with c = 2 have a wait time that is not too long, so increasing the number of counters is not very necessary.

The research was conducted by Reski, et al., (2019: 91-98) with the title "Queue Model Analysis on General Teller Service of Bank Nagari Andalas University Branch" and published in Unand Mathematics Journal 2019, Vol. 8, No. 1. The purpose of this research is to analyze the queue process that occurred at Bank Nagari Andalas University Branch. The research methodology uses a sample of the population of all customers who come. The queue model used is the model (G/G/1) : (GD/∞/∞), this model is a model with the distribution of un distributed customer arrival poisson (general) and the distribution of customer service time is not distributed exponentially (general). The number of counters operating is one, the discipline of service is FCFS (First come first served), and the maximum number of services and sources of arrival is infinite (∞). The results of the study concluded that from the analysis of the queue model at the general teller service of Bank Nagari Andalas University branch obtained measures of the performance of the queue system that is for the opportunity of the number of 0 customers in the system (P0) is 0.5788, the average number of customers estimated in the queue (Lq) is 5.3703 customers/minute, the average number of estimated customers in the system (Ls) is 5.7915 customers/minute and the estimated wait time in the queue (Wq) is 29.2979 minutes and the estimated average wait time in the system (Ws) is 31.5957 minutes.

Research conducted by Sunarya, et al., (2015: 111-118) with the title "Analysis of Application of M/M/S Model Queue System in PT. Bank Negara Indonesia (Persero) Tbk. Pontianak Branch Office (Case Study on BNI Sultan Abdurrahman)" and published in the Journal of Scientific Bulletin Mat. Stat. and Its Applied (Bimaster) 2015, Vol. 4, No. 2. The purpose of this research is to analyze the application of M/M/S model in BNI KCP Sultan Abdurrahman queue system. Research methodology in the form of data collection obtained from taking data on the arrival of customer queues and using the standard of average service level, the research uses a sample of the population of all customers who make transactions every day in the teller. The queue system applied at BNI KCP Sultan Abdurrahman uses the M/M/S queue system model and uses electronic facilities that number the order of customers who come and occupy the available places, then the empty teller can call the order number corresponding to the order number electronically which the customer will be served immediately by the teller. Disipilin queue applied is First Come First Served (FCFS). The results of the study concluded that from the calculation of the performance of the queue system at BNI KCP Sultan Abdurrahman, the average number of customers waiting in the system is longest in the period of 11.00-12.00 where the number of customers waiting in the system is 4.4442 people or 4 people. While the average number of customers waiting in the system is shortest or slightest occurred in the time period of 15.00-16.00 which is as many as 1.2824 people or 1 person, and the average number of customers in the queue occurred in the time period of 11.00-12.00 where the average customer who queued in that time period was 2.8442 people or 3 people. However, in the performance results table in the discussion of the average number of customers in the queue no one waited directly served teller because because one teller rest and the average standard level of service is 4 minutes, then for 60 minutes is 15 customers served. While the optimal number of tellers on BNI KCP Sultan Abdurrahman is three tellers and the performance of the queue system at the Bank is optimal.

Research conducted by Nuryadin and Pebriani (2020: 37-45) with the title "Analysis of Utility Level of M/M/S Model Queue System in Transaction Process at PT. Bank Rakyat Indonesia (Persero) Tbk Branch Office Sidrap Pangkajene Unit" and published in the Journal of Economics

and Business 2020, Vol. 3, No. 1.The purpose of this research is to analyze and know the Utility Level of Model M/M/S in the Transaction Process at PT Bank Rakyat Indonesia (Persero) Tbk, Pangkajene Unit of Sidrap Branch Office. Research methodology in the form of data collection techniques in this research using observation, interview and documentation. In this research, data analysis techniques used are Model M / M / S that has two or more lines / service systems available to serve customers who come. The results concluded that the model of pt service queue type. Bank Rakyat Indonesia Persero Tbk Branch Office Sidrap Pangkajene Unit is a type of Multi Channel - Single Phase model by applying the discipline of queues, namely FIFO. The customer arrival pattern follows poisson distribution with the arrival rate of 25 customers per hour. Therefore, it can be concluded that the highest customer arrival rate is at 13.00 – 15.00 WITA. From the calculation of teller utility level in PT. Bank Rakyat Indonesia Persero Tbk Branch Office Sidrap Pangkajene unit by 62.5% while empty service by 37.5% and losses to be paid by PT. Bank Rakyat Indonesia Persero Tbk Sidrap Branch Office Pangkajene unit with 2 Tellers of Rp 108,000/day (assuming only from basic salary).

Research conducted by Nugraha, et al., (2019: 902-907) with the title "Analysis of Teller Service Queue System with Multi Channel-Single Phase method in optimizing services (Case Study at Bank BJB Tamansari Branch Office Bandung City)" and published in Journal of Management Proceedings 2019, Vol. 5, No.2.The purpose of this research is to find out the performance of the queue system at bank BJB Taman Sari Branch in Bandung at this time and to find out the performance of the queue system by using the multi channel single phase method at bank BJB Branch Taman Sari Kota Bandung. This research methodology uses descriptive research techniques using quantitative approaches. The case study in this study is Bank BJB Taman Sari Branch in Bandung. The Multi Channel Single Phase method is used to measure the performance of the queue system. The results of the study concluded that the performance of the current queue system used by Bank BJB Taman Sari Branch in Bandung with a single phase multi channel method with a number of tellers as many as 4 people is not optimal because there are still many customers who queue long and there are long queues. After the increase in the number of tellers to 5 people, there was a decrease in customer waiting time in the queue system which was originally 32.28 minutes to 7.11 minutes and the number of customers who queued dropped to 5 people who were originally 25 people. In terms of cost efficiency, the increase of teller will be issued by Bank BJB Taman Sari Branch by 9.09%.

2.2. Theoretical Foundation

2.2.1. Understanding Operational Management

Heizer and Render (2011: 4) state that operations management is a series of activities that generate value in the form of goods and services by converting inputs into outputs. Meanwhile, according to Handoko (2015: 3) states that production and operation management are efforts to optimally manage the use of resources (or often called production factors) - labor, machinery, equipment, raw materials and so on - in the process of transforming raw materials and labor into various products or services.

2.2.2. Optimization

The definition of optimization is derived from the optimal base word which means best, highest, most profitable", (Dictionary of Indonesian Language, 2011: 345). Making the best, making the highest, optimization of processes, ways, actions optimize (make the best, the highest, and so on), so that optimization is an action, process, or methodology to make something (as a design, system, or decision) become more / completely perfect, functional, or more effective, optimization is an effort to maximize activities so as to realize the desired profit or desired.

2.2.3. Service

2.2.3.1. Definition of Service

Service is an activity that a person does with others in terms of meeting the interests or needs of others to create customer satisfaction, where the customer satisfaction is in accordance with their expectations and desires that must be met immediately. Each service business is seen as a system consisting of two main components, namely service operations and service delivery.

According to Moenir (2010: 26) service is an activity carried out by a person or group of people with the basis of material factors through certain systems, procedures and methods in order to fulfill the interests of others in accordance with their rights.

2.2.3.2. Service Systems

Service system is the basis of consideration in designing processes or systems that will be achieved for companies such as human resource management systems and choosing the technology used for service processes. The four main characteristics of services that distinguish it from goods are intangibility, inseparability, variability, perishability.

Good service makes customers happy and provides a sense of satisfaction. Services are generated by people, not by machines. It is not out of the production process, but experienced when there is a transaction between the waiter and the one served. Services are increasingly important for business progress.

2.2.4. Queue Theory

2.2.4.1. Understanding Queue Theory

According to Heizer and Render (2011: 5) queue theory is a science that studies a queue where queues are common occurrences in everyday life and are useful for either manufacturing companies or services.

Queue theory is the mathematical study of the waiting line. Waiting line is a natural event caused by the demand by the public for a service system service at certain times where the demand exceeds the capacity of the service system services available. Generally, busy time can be shown through the process of the existence of the queue system begins when the consumer arrives, then waits for the turn, and will end when the customer leaves the service system. (Ferreira, 2011: 190).

2.2.4.2. Purpose of Queue Theory

According to Render, et al., (2015: 454), most of the waiting lines are centered on questions to find the ideal level of service that the company should provide. The purpose of queue theory is to design service facilities, to overcome the demand for services that fluctuate randomly and maintain a balance between the cost of service and the costs required during queuing.

2.2.4.3. Queuing Systems and Characteristics

According to Gross and Haris (2008: 12), the queuing system is the arrival of customers to get service, waiting to be served if the service facilities (servers) are still busy, getting service and then leaving different systems where queue theory and simulation are often widely applied.

According to Kakiay (2009: 36) the factors that influence the analysis of queues are arrival patterns, consumer behavior, queue rules, service systems, orderly. The source of characteristics that bring customer arrival to a service system has three characteristic components in the queue system, namely arrival characteristics, discipline, service facilities.

2.2.4.3.1. Arrival

Arrival is described by statistical distribution, it can be determined in two ways i.e. the union arrival time or the distribution of time between arrivals, the distribution of arrivals is

characterized in the first way the number of arrivals that can occur within a certain period of time should be explained.

According to Heizer and Render (2014: 773) explains that there are three components in a queuing system namely the size of the arrival population (source), arrival behavior, arrival pattern in the system.

2.2.4.3.2. Queue

Queue lines are the second component of a queue system, the length of a queue line can be limited and unlimited. A queue line is called limited if the queue can not be increased again indefinitely, the queue line is called unlimited when the queue size is not restricted and can continue to be increased.

The characteristics of the next queue are related to the rules of the queue (queue discipline), the rules of the queue refer to the order rules of the customer in the row who will receive the service. Most systems use a queue rule called the First-In First-Out (FIFO) rule where customers who come first are the first to be served.

2.2.4.3.3. Service

There are 2 (two) important things in the characteristics of service, namely the design of the queue system and the distribution of service time. The distribution of service time illustrates the time it takes to serve the customer, if the service time is constant then the time it takes to serve each person is the same. The distribution of service time also discusses the pattern of arrival in which this pattern is constant as well as random, it can be assumed that the random service time is explained by the negative exponential probability distribution.

2.2.5. Measuring Queue Performance

The queue model helps managers make the decision to balance service costs by using queue fees. By analyzing the queue will be obtained many measures of the performance of a queue system. Measures of queue system performance by Heizer and Render (2014: 776) i.e. the average time customers spent in the queue, the average queue length, the average time customers spent in the system, the average number of customers in the system, the probability of 0 units in the system, system utilization factors, the probability of a number of customers being in the system.

2.2.6. Queue Discipline

Queue discipline is a queue rule that refers to the regulation of customers who are in line to receive service. According to Heizer and Render (2014: 773) there are several forms of service discipline used, namely first come first served (FCFS) or first in first out (FIFO), last come first served (LCFS) or last in first out (LIFO), service in random order (SIRO), sort operation times (SOT).

2.2.7. Definition of Poisson Distribution

Poisson's distribution was discovered by Simeon Denis Poisson, who was a French mathematician. The Poisson distribution includes theoretical distributions that use discrete random variables (x). As for the characteristics of the poisson distribution is that the average arrival rate can be predicted based on the past, the average arrival rate of unity time is constant, the number of arrivals in units of time is not affected by what happens in the previous interval, the probability of an arrival in a very short interval is very small so the probability of > of an arrival in a short interval will be close to 0 (zero).

2.2.8. Exponential Distribution

Exponential distribution in accordance with the probability distribution of time between arrival and service time distribution. The average service is given the symbol μ which is the number

of customers who can be served in units (units) of time, while the average service time is the average time used to serve per customer which is given the symbol 1/μ unit (unit).

III. RESEARCH METHODS

3.1. Research Strategies

This research uses descriptive research method with quantitative approach. The definition of descriptive research method according to Sujarweni (2014: 74) is a study that aims to know the value of each variable, whether one variable or more independent without making a relationship or comparison with other variables.

Quantitative research is the reduction of data into figures (Hamdi and Bahruddin, 2014: 5). Meanwhile, according to Sugiyono (2013: 13) quantitative research can be interpreted as a research method based on the philosophy of positivism, used to examine certain populations or samples, sampling techniques are generally done randomly, data collection using research instruments, data analysis is quantitative / statistical with the aim to test the hypothesis that has been determined.

It can be interpreted that descriptive research method with quantitative approach is to describe existing or ongoing phenomena, and the results presented in the form of numbers will make conclusions to explain the general picture of the object that has been studied.

3.2. Population and Sample

3.2.1. Research Population

According to Sugiyono (2013:115) the population is a generalization area consisting of objects/subjects that have the quality of certain characteristics set by researchers to be studied and then drawn conclusions. Population is as a collection of subjects, variables, concepts, or phenomena. We can examine each member of the population to find out the nature of the population in question (Morissan, 2012:19).

In this study, the population is all customers who come to make transactions on PT tellers. Bank DKI Tanjung Priok Branch during the implementation of research, and research using samples for 15 days every working day with a total number of customers 1361..

3.2.2. Research Samples

According to Sugiyono (2013: 63), in quantitative research the sample is part of the number and characteristics possessed by the population. What is learned from the sample then the conclusion will be applied to the population. For that the sample taken from the population must be really representative (representative). In determining the sample technique used is purposive sampling technique. Purposive sampling is the selection of a group of subjects based on certain characteristics that are considered to have close ties to previously known populations or sample units contacted are adjusted to certain criteria applied based on research objectives.

Sampling in this study based on the criteria of arrival of customers per day who make transactions in the teller section using the queue number, the arrival of customers per hour who make transactions in the teller section using the queue number.

3.3. Research Data and Methods

The method of data collection carried out by the authors in his research is to collect primary data and secondary data. According to Purhantara (2010: 79) Secondary data is data or information obtained indirectly from research objects of a public nature, consisting of the organizational structure of archives data, documents, reports and books and so on related to this research.

According to Purhantara (2010: 79) Primary Data is data obtained directly from the study subjects, in this case researchers obtained data or information directly using established instruments. The primary data in this study is raw data obtained from direct observations about the variables of the queue system at PT. Bank DKI Tanjung Priok Branch.

Data collection techniques obtained from observation and direct recording carried out on the performance of the queue system at PT. Bank DKI Tanjung Priok Branch is to know the average number of customers in the system, the average time spent by a customer in a queue or being served (in the system), the number of people or units waiting in the average queue, the average time spent by a customer or unit to wait in the queue.

3.4. Data Processing Methods

POM-QM (also known as POM and QM). POM and QM were originally created separately for each particular type only, but are currently combined into one program called POM-QM. POM/QM software for Windows is a software designed to perform the calculations required by management in making decisions.

3.5. Data Presentation Method

After the data is processed then obtained results. Then the results of data processing will be presented in the form of table and Graphic Probability, so that it can be read easily and can be quickly understood.

IV. RESULTS OF RESEARCH AND DISCUSSION

4.1. Data Description

Number of tellers in PT. Bank DKI Tanjung Priok Branch is 4 tellers, which shows the channel used is double (Multi Channel), while the process of customers who will make transactions on the teller shows there is only one stage (Single Phase). So the structure of the queue model that occurs in PT. Bank DKI Tanjung Priok Branch is Multi Channel-Single Phase. The length of service time depends on the type of transaction, but in an effort to serve customers as best as possible PT. Bank DKI Tanjung Priok Branch determines the standard service time is for 1 minute.

4.2. Description of Observation Data

The following is the result of observation or observation of customer arrival data every day, for 15 working days (3 weeks) at PT. Bank DKI Tanjung Priok Branch :

Table 4.1 Customer Arrival Data Per Day

No	Tanggal	Hari Kerja	Jumlah Kedatangan Nasabah	Jam Kerja
1	08-06-2020	Senin	82	6 jam
2	09-06-2020	Selasa	100	6 jam
3	10-06-2020	Rabu	85	6 jam
4	11-06-2020	Kamis	83	6 jam
5	12-06-2020	Jum'at	82	6 jam
6	15-06-2020	Senin	89	6 jam
7	16-06-2020	Selasa	101	6 jam
8	17-06-2020	Rabu	105	6 jam
9	18-06-2020	Kamis	90	6 jam
10	19-06-2020	Jum'at	96	6 jam
11	22-06-2020	Senin	87	6 jam
12	23-06-2020	Selasa	79	6 jam
13	24-06-2020	Rabu	93	6 jam
14	25-06-2020	Kamis	86	6 jam
15	26-06-2020	Jum'at	103	6 jam
Total			1361	6 jam

Source : Observation Results, 2020

Pt. Bank DKI Tanjung Priok Branch currently serves customers for 5 working days a week. In 1 day provide 7 hours service starts at 08.00-15.00, but during the pandemic the service operating hours are advanced to 6 hours of service starting at 08.00-14.00, because every day the queue number is limited to 150 customers.

Data collection is done by observation or observation, namely recording directly the queue in PT. Bank DKI Tanjung Priok Branch for 15 working days every consecutive day. Which the author can see the level of customer arrival, the level of customer service, how many servers are opened by PT. Bank DKI Tanjung Priok Branch, and also conduct interviews with bank employees who know about the queues that occur at the bank.

4.3. Findings of Research Results

1. Performance of existing queue system in the transaction process at PT. Bank DKI Tanjung Priok Branch

Queue system performance at PT. Bank DKI Tanjung Priok Branch is seen that during the pandemic the number of queue numbers is limited to 150 customers every day, the standard service time is 1 minute and 10 minutes for the length of customer waiting time. The study used samples for 15 days each working day with a total number of 1361 customers, data obtained directly from interviews, observations.

Queue discipline using First Come First Serve (FCFS) or First in First Out (FIFO), which comes first will be served until the customer finishes making a transaction. Because judging from the results of direct observations there is a buildup of queues, with this service can not be said to be effective then the author took the method of queues to improve services that were previously less effective to be effective so that no more queue buildup occurred. The average arrival of the most customers in 5 working days is on Wednesdays 15.72222222 and the arrival of customers is slightly on Monday 14.333333333. The standard service time is 1 minute and the average level of service per hour is 60 people. The average usability rate uses 0.0630556 or 63.05% to 0.0840124 or 84.01% of its working time, that value is close to 1 or 100%. The average probability of no customers in the system is 0.7771138 to 0.777217, indicating that the odds in the system are 77.71% to 77.72%. The average number of customers in the system is 0.2522316 to 0.2522468, indicating that the number of customers in the system is 0 people. The average time a customer spends in the system is 0.016667 hours or 1.00002 minutes to 0.0467028 hours or 0.012576 minutes, indicating that a customer is spending time in the system. The results concluded that the average calculation of the number of customers waiting in the queue is 0.000094 to 0.0002096 or 0 people. The average time spent by a customer waiting in a queue of 0.000001 hours or 0.00006 minutes to 0.0000132 hours or 0.000792 minutes, it indicates a low arrival rate.

This is not supported by previous research conducted by Sihombing and Marpaung (2018: 38-43) which concluded that the probability of tellers being unemployed from 0.079351 to 0.1644, probability of a busy teller from 0.785281 to 0.3155, the average number of customers in the system from 6.26143 to 2.1218, the average number of customers in the queue from 4.55 to 0.4159 average time spent by customers in the system from 15.21 minutes to 5.141 minutes and also the average time spent by customers to queue from 11.03 minutes to 1,007 minutes. Because in the study the average calculation value that was high to low, it is necessary to add tellers to be optimal, while the average calculation value in PT. Bank DKI Tanjung Priok Branch from low to high, it is necessary to reduce teller to be optimal.

2. Optimization of customer service by using queue theory at PT. Bank DKI Tanjung Priok Branch

Teller service at PT. Bank DKI Tanjung Priok Branch opened 4 counters starting at 08.00-12.00. While at 12.00-13.00 teller only opened 2 counters because some tellers took turns to rest, and at 13.00-14.00 teller re-opened 4 counters. For the speed of service and determination of teller formation, it is necessary to optimize the number of tellers by using the multi channel - single phase queue system model, namely there are two or more service facilities flowed by a single queue so that customers have to queue and take the queue number first and wait until the queue number is called by the teller.

Judging from the calculation that using 4 tellers is not optimal, because judging from the calculation of the average usefulness of teller services have more idle time. At the time of evaluation to 3 people teller is optimal, because judging from the calculation of the average usefulness of service teller has a lower idle time.

This is not supported by previous research conducted by Nugraha, et al., (2019: 902-907) which concluded that using 4 tellers is not optimal because there are still many customers who queue long and long queues. Then the PT. Bank BJB Taman Sari Bandung Branch added the number of tellers to 5 people, so that the waiting time of customers in the queue system is 32.28 minutes to 7.11 minutes. And the number of customers queuing 25 people dropped to 5 people. In terms of efficiency of the cost of adding tellers to be issued PT. Bank BJB Taman Sari Bandung Branch by 9.09%, while the difference in pt. Bank DKI Tanjung Priok Branch is not discussing the calculation of the efficiency of teller fees and does not increase the number of tellers.

V. CONCLUSIONS AND SUGGESTIONS

5.1. Conclusion

Based on the research that has been done, it can be concluded as follows:

1. In the performance of pt queue system. Bank DKI Tanjung Priok Branch is seen that within 5 working days the average arrival of the most customers on Wednesday is 15.722222222 (15.72 people). The average service usability rate using 4 tellers is 0.0630556 or 63.05% and using 3 tellers the average service usability rate is 0.0840124 or 84.01%, that value is still far from the number 1 or 100%. So it shows that the queue is not too long. Using 4 tellers the average time spent by a customer to wait in a queue is 0.000001 hours or 0.00006 minutes, and using 3 tellers the average time spent by a customer to wait in a queue is 0.0000132 hours or 0.000792 minutes. This indicates that the arrival rate is low because it has 0 people on average waiting in line.
2. The average number of arrival rates of customers with a standard service time of 1 minute and having 4 tellers is not optimal, because it has a lower level of usefulness of facilities of 63.05%. That suggests that idle teller time is more. And after the evaluation it was seen that with 3 people teller PT. Bank DKI Tanjung Priok Branch serves its customers optimally because it has a higher level of facility usability of 84.01% compared to using 4 tellers, it shows that the idle time of the teller is lower.

5.2. Advice

1. PT. Bank DKI Tanjung Priok Branch can make improvements to the network system to prioritize the right service for customers. And make educational efforts to customers so that it makes it easier to conduct transactions anywhere and anytime.
2. PT. Bank DKI Tanjung Priok Branch has a break time at 12.00-13.00, but at that time the customer's arrival rate is the most from other hours. In order to keep the service optimal, all tellers should remain on duty at their place until 13.00-14.00, because at that time the customer's arrival rate is not too much then the teller can take turns to rest and take turns to serve.
3. PT. Bank DKI Tanjung Priok Branch can implement a system of chasing sesame teller targets for efforts to improve service to customers. Surely every teller must have the principle to achieve the target determined in different ways each teller, with which the teller can compete healthily to achieve the target.

5.3. Limitations of Research

1. Researchers expect further researchers and pay attention to research objects that have a very high customer arrival rate and have an unbalanced number of tellers the arrival rate of their customers so that it really needs improvement.

2. It is necessary to consider the customer arrival rate and the level of queues that occur every day, in order to maintain the operational performance of PT. Bank DKI Tanjung Priok Branch as a whole is not disturbed and the process can run optimally so as not to make customers queue too long.
3. Further research needs to be done by involving the calculation of costs from several other factors, such as the operational cost of the tool and the cost of employee salaries that must be incurred by the company.

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