INCREASING SERVICE EFFICIENCY THROUGH A QUUE SYSTEM AT MSMES IN DAONG-BOGOR COFFEE SHOP

Siti Musyiroh Madania [a*)], Jaenudin [b)], Doni Wihartika [c)], Yohanes Indrayono[d)]

[a)]Universitas Pakuan, Bogor, Indonesia

[*)]Corresponding Author: musyirohm@gmail.com

Abstract

In the last two years, coffee shops no longer only offer their specialty coffee blends and offerings. However, things about the coffe shop concept become reinforcement for coffee shop owners to optimize service quality and efficiency. The purpose of this research to find out the analysis of queing system at the MSME coffee shop Daong-Bogor in an effort to increase the efficiency service. The kind of research used is descriptive (explorative) quantitative. Quantitative data was used in study of secondary data and primary data based on tim of cross section data. The method of analysis that used the descriptive analysis, quantitative analysis (queuing system) by using multhi channel - multhi phase method, trade off, and service efficiency level. The result show that comparative analysis of three real conditions, the addition of one unit, and the addition of two units. On weekdays (Tuesday and Thursday), the queuing system with the addition of one unit to three cashiers and three baristas has the best performance with an optimal level of service as seen from the minimum total cost of IDR178.752 and high efficiency rate of 160%. Meanwhile, on weekends (Saturday and Sunday), the queuing system with the addition of two units to four cashiers and four baristas has the best performance with an optimal level of service as seen from the minimum total cost of IDR201.009 and high efficiency rate of 160%.

Keywords: Queuing System; Trade Off; High Efficiency.

I. INTRODUCTION

Business coffee shop in Indonesia lately this develop so fast . Change style life push business this Keep going grow . TOFIN's research results year 2020 , company provider solution business in the form of goods and services in the HOREKA industry (Hotels, restaurants , and cafes), in Indonesia, together MIX Macomm Magazine SWA Media Group shows amount coffee shops in Indonesia in August 2019 reached more from 2,950 outlets, increased almost triple compared 2016 which only about 1,000 outlets .

Indonesia is one of the countries with level largest coffee consumption in the world. According to data from International Coffee Organization (ICO) in page databoks.katadata.co.id (2018), level Indonesian people 's coffee consumption reaches 4.6 million lb or of 2 million kg along year 2016/2017. Based on number , the State of Indonesia occupies order to six after the State of Russia in the list of 10 Countries with largest coffee consumption in the world in 2016/2017.

Based on Coffee Day data in 2018 , coffee shops in Bogor reached 150 shops , in total prospect coffee shop in Bogor the growth is very extraordinary normal parallel with development Consumption of coffee in

Indonesia continues increase . From these data , it indicates that many occurrences new coffee shop in Bogor. Two year lately this coffee shop no again just offer specialty coffee concoctions and servings course . Draft unique , themed coffee shop natural open with atmosphere relaxation is also power lure separately . things _ about draft coffee shop is strengthening for owner inner coffee shop skeleton optimization quality and efficient service . _

According to Rusdiana (2014) efficiency is something size rated success _ from aspect big source or cost for reach results from activities carried out . Ideally , service will efficient if second factor the walk by sustainable . That thing could in the form of addition nor subtraction facility service.

According to Fitzssiomn, and Fitzssiomn, (2011) queue is queue waiting customers in need service from one or more servers. Queue this could occur if amount arrival customer exceed capacity service that doesn't adequate.

Interview results writer with 12 (two twelve) Daong Coffee customers at the time they in queue service say that service coffee order yet in accordance to be expected , because long time in queue about 15 minutes every day , duration time service coffee order by cashier

about 8 minutes and long time wait get coffee from barista about 6 minutes . That thing make customer waiting in line in long queue because limitations good service servers (cashiers) and baristas (serving coffee) are quite long. So that customer becomes bored and sometimes leave queue booking before get service.

As for the results observation direct there is customers who leave queue at the moment day senggangg (Tuesday and Thursday) as much as 30% counting 534 customers leave queue , while moment day the busiest (Saturday and Sunday) as much as 20% counted 871 customers who left queue

Problem survey i the introduction above , can overcome with method to be used for analyze problem system queue to run with good , that is with method multiple channel multiple phase (M/M/S) . So that later level optimal service will seen from results minimum total cost analysis.

Destination conducted study this is as following:

1.   For describe system queue made by Kopi Daong.
2.   For produce system optimal queue in improvement efforts   efficiency service at Daong Coffee.

II.   LITERATURE REVIEW

Management operational is series activity by sustainable and effective through the input to output process or provide service with management source available power _ by efficient in reach goal. Destination management operational could describe what to do done by manager in Thing produce goods and services in accordance a production process plan that has influence enough big on quality , cost and speed .

System Queue

According to Heizer and Render (2015) theory queue (queuing theory) declared that the collection of knowledge about line wait (waiting-line/queue) goods or insider line wait services, are often a part important operations and also very valuable tools for manager operation."

"According to Fitzssiomns and Fitzssiomns (2011) stated that: A queue is a line of waiting customers who require service from one or more servers."

"According to Gross and Haris (2008) the system queue declared that " Arrival " customer for get service, waiting for served if facility service (server) still busy , get service and then leave system after served ."

Based on definition above expert so could concluded that queue is gathering knowledge about line wait (waiting-line/queue) goods or people (customers) or waiting client in system for get service so that system queue part important operations and also very valuable tools for manager operation.

Destination System Queue

Destination from system queue is reach balance fare service caused by time wait that. (Jacobs and Chase, 2015)

"According to Murdifin and Mahmud (2014) theory queue declared that useful for measure effectiveness system by quickly and in general with see a number of indicator essential service."

"According to Siswanto (2007) theory queue declared that aim for minimize at a time two type cost that is cost direct for provide service and cost waiting individual for get service."

Based on expert description related destination system queue, then could concluded that destination theory queue is for measure effectiveness system by fast in balance fare service caused by time wait from a number of indicator service as well as there is two type cost direct and cost individual .

### Characteristics System Queue

According to Stevenson (2014) characteristics main on the system queue consist from four kinds , namely :

1.   Source arrival patient (population source)
2.   Number of service units (number of servers/channels)
3.   Arrival and service patterns
4.   Discipline service queue (queue discipline/order of service)

System overview Queue

Multiple server queueig system

System queue with one line wait, but with a number of servers. For example counter ticket airline flight, McDonald's drive through and others.
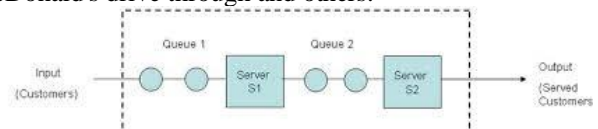
Cost System Queue

"According to According to Heizer and Render (2015) states that managers operational must recognize the exchange that takes place between two cost that is cost provide good service with cost time wait consumer or machine."

Total cost wait is whole cost the loss suffered customer consequence bad service or long queue.

Total cost wait $= (\lambda . W_q) C_w$

Total cost service is whole costs incurred by the company in give service to customer .

Total cost service $= m . C_s$

According to Subagyo (2011) stated there is two cost queue, namely :

Cost service, can covers cost permanent investation beginning in care or facilities, fees installation and training employees and costs variable other as well as expenditure addition for maintenance .

Cost waiting, covers cost unemployment of employees, loss of sales, customers , contracts & trust in something management, level inventory, and congestion system.

Based on description cost system queue of experts above, that total cost of something system queue is cost waiting and cost service with see evaluation facility service so that seen in graph of the total expected cost .

System Model Variations Queue

According to Heizer and Render (2015) stated that the highly variable queuing model could applied in management operational . Queue model used _ use assumptions :

1. Arrival distribution poisson
2. FIFO Discipline
3. Phase service single

There are four the most variety of queuing models used, that is in general terms.

	Name	Example	Number of Servers (Line)	Amount Phase	Arrival Rate Pattern	Pattern Service Time	Size Population	Discipline Queue
A	System *server* single	Counter Information on supermarkets	Single	Single	*Poisson*	Exponential	Infinite	FIFO
B	System *server* single	Counter ticket airplane	Multiple servers	Single	*Poisson*	Exponential	Infinite	FIFO
C	System *server* single	Wash car automatic	Single	Single	*Poisson*	Constant	Infinite	FIFO
D	Population limited (population infinity)	Shop with a dozen possible machine _ damaged	Single	Single	Poisson	Exponential	Limited	FIFO

Service

"According to Hardiyansyah (2011) service declared that could interpreted as given activity for help , prepare , and take care of good that in the form of goods or service from one party to party else ."

"According to Moenir (2015) service the truth declared that series activity, because that is a process. As a process, service in progress by routine and continuous , including whole organization in society."

According to Kotler and Keller (2016) services (services) are stated that any act or that one party can offer another that is essentially intangible and does not

result in the ownership of anything. It's production may or not to be tied to a physical product."

Based on definition the above expert, can concluded that service the truth is series activities (helping, preparing, and managing) in the form of goods or service from one party to the other party routine and continuous.

Quality Service

" According to Tjiptono and Gregorious (2016) quality good service , there is criteria service declared that , between other :

1. Accuracy time services , including inside it time for wait During transaction as well as payment processing.
2. Accuracy service , namely minimize error in service nor transaction.
3. Polite and friendly in give service.
4. Convenience for get service , namely like availability source power man for help serve consumer as well as facility supporter like a computer.
5. Convenience consumers, namely location, place parking, space comfortable waiting, aspect cleanliness, availability information and so on.

"According to Geotsh and David in Hardiansyah (2011) quality service declared that something related with fulfillment expectations / needs customer , where service said quality if could provide appropriate products and services (services) with needs and expectations customer. "

Based on description expert above , can concluded that quality service is fulfillment expectations / needs customer, where service linked quality if could provide products and services (service) appropriate with needs and expectations customer .

Efficiency

"According to Heizer and Render (2015) efficiency declared that percentage from truly effective capacity achieved. Depends on how pat facility used and managed, maybe will Becomes difficult or no possible for achieve 100% efficiency."

"According to Sedarmayanti (2014) efficiency declared that size level source power in a process. more economical or a little use source power , then the process said the more efficient . Efficient process be marked with process improvement so that Becomes more cheap and more fast."

"According to Rusdiana (2014) efficiency declared that something size rated success from aspect big source or cost for reach results from activities carried out. "

Based on description expert above, that could concluded efficiency is something size success rated from source power in progress and magnitude source or cost for reach results activities that are carried out and actually achieved.

Factor determinant Efficiency

"According to Kosasih (2009) stated that influencing factors efficiency or productivity are :

1. Labor
2. Company Capital
3. Management
4. Entrepreneurship

Measuring Efficiency Level

"According to Kosasih (2009) the key to improvement efficiency often there is in repair problem quality and deep effective scheduling, training, and maintenance."

Efficiency Service

Efficiency service declared that ability in determine amount source service power (facilities) used with appropriate without reduce quality from service that alone. (Aminudin, 2005)

"According to Dwiyanto et al. (2008) efficiency service declared that: Comparison best Among input and output service. Ideally, service will efficient if bureaucracy service could provide service inputs , such as cost and time service that improves use service."

Based on Description expert related efficiency service could concluded that so importance professionalization this related with effectiveness and efficiency service public in determine amount source service power (facilities) used with appropriate without reduce quality from service that alone with comparison best Among service input and output like cost and time service that improves use service.

III. METHODOLOGY

Type Study

Study descriptive (explorative) quantitative with statistical observation research techniques .

Object, Research Unit of Analysis and Research Location

Object research on research this is system queuing and efficiency service.

Unit of Analysis used in study this is the server (cashier) and the barista (serves coffee).

Research location this carried out at the Daong Coffee Shop – Bogor which is located at Pancawati , Kec . Caringin , Bogor, West Java 18730

Types and Sources of Research Data

Types of data studied is quantitative data which is secondary data and primary data based on time of data cross section .

Source of data collected in the form of :
1. Secondary Data , namely supporting data facility service cashiers and baristas like machine, salary employees, and company capital for maintenance service.
2. Primary Data, namely data on average arrivals and average services in the cashier and barista.

Method Data Collection

Method data collection is done with a number of way, namely :
1. Observation Directly, with To do observation directly at Daong Coffee Shop - Bogor with destination for knowing by

direct problem queue customers who happen.
2. Interview, with authorities and interests that is Management Marketing and Management Operational as well as current customer waiting in line for get service.
3. Literature Studies, using various literature like books, journals, e-books, research past and source other for obtain relevant data with researched problem.

Method Data Processing / Analysis

1. Analysis Descriptive

Analysis descriptive conducted with destination for get description by deep and objective about system queue applied at Daong Coffee Shop - Bogor.

2. Analysis Quantitative

System queue could analyzed using formula model Multiple Channel - Multiple Phase, as following:

M = number of servers opened

λ = average rate arrival

μ = average rate service on each server (channel)

The probability that there are 0 people or units in system are :

$$P_0 = \frac{1}{\left[\sum_{n=0}^{M-1} \frac{1}{n!} \left(\frac{\lambda}{\mu} \right)^n \right] + \frac{1}{M!} \left(\frac{\lambda}{\mu} \right)^M \left(\frac{M\mu}{M.\mu - \lambda} \right)} \quad untuk, M\mu > \lambda$$

Average number of people or units in system are :

$$Ls = \frac{\lambda\mu \left(\lambda/\mu \right)^M}{(M-1)!(M\mu - \lambda)^2} P_0 + \frac{\lambda}{\mu}$$

Average unit time spent in line single and medium fixed (in system) are :

$$Ws = \frac{\lambda\mu \left(\lambda/\mu \right)^M}{(M-1)!(M\mu - \lambda)^2} P_0 + \frac{1}{\mu} = \frac{Ls}{\lambda}$$

Average number of people or units in line wait for repair are:

$$Lq = Ls - \frac{\lambda}{\mu}$$

Average time spent by a person inside _ queue wait for repair are:

$$Wq = Ws - \frac{1}{\mu} = \frac{Lq}{\lambda}$$

1. Method Analysis Service with Trade Off

For count level optimal service with analyze the trade off of a minimal total cost using formula cost service and cost waiting.

a. Cost Wait

$E (Cw) = (\lambda. Wq) Cw$

b.   Cost Service

E (Cs) = mx Cs

From both formula above, then the total cost is:

$E(C_t) = E(C_w) + E(C_s)$

2.   Method Efficiency Level Analysis Service
Formula efficiency service include:

$$\text{labor efficiency} = \frac{M.\mu \times \text{total labor}}{\lambda \times \text{total labor}} \times 100\%$$

$$\text{capital efficiency} = \frac{M.\mu \times \text{total capital}}{\lambda \times \text{total capital}} \times 100\%$$

IV. CONCLUSIONS

Results and Discussion

        System Queue at Daong Coffee Shop – Bogor Daong Coffee Shop -Bogor is starting operate starting at 09:00-21:00 WIB every day . Daong Coffee Shop - Bogor yet apply time standard service customer good cashier and baristas because still existence obstacle small from support facility service good cashier as well as baristas. The flow of the service process to customers , namely: he paper will not be reformatted, so please strictly keep the instructions given above, otherwise it will be returned for improvement. Please upload your paper in DOC file through the Conference website under Paper Submission menu.

Analysis System Optimal Queue In Effort Enhancement Efficiency Services at Daong Coffee Shop – Bogor

        Queue model system performance real nor scenario addition of unit of analysis has calculated , can conducted comparison Among third results calculation that . This thing done to know how much big change performance system queue , fee lowest , and level the resulting efficiency of the system queue if conducted addition one unit to two units of analysis .

Table 4.4 Comparison of Trade off and Efficiency Levels in the System Free Day Queue

Sub Variable	Real	Add One	Addition Two
Amount track open (M)	2	3	4
Average Arrival (λ)	111	111	111
Service Average (μ)	89	89	89
Probability (P$_0$)	30%	32%	28%

Average amount customer wait in system (Ls)	2.27	1.37	1.28
Average time spent in queue (Ws)	1.26	0.72	0.72
Average amount customer in queue for served (Lq)	1.023	0.123	0.033
Average time spent for served (Wq)	0.66	0.067	0.02
Cost Service	Rp 129.178	Rp 133.304	IDR 177,738
Cost Wait	IDR 447,692	IDR 45,448	IDR 13,566
Total Cost	Rp 576,870	IDR 178,752	Rp 191.304
Labor Efficiency	160%	241%	321%
Capital Efficiency	160%	241%	321%

Source : primary research data processing

        Table 4.4 shows that improved service _ have dramatic influence on almost whole characteristics . Recorded moment real condition time spent _ for wait in line queue down from 0.66 minutes Becomes only 0.067 minutes with add one unit and becomes 0.02 minutes with add two units. in terms of cost results total cost analysis in real conditions down from IDR 576,870 to IDR 178,752 with add one unit and go back up to IDR 191,304 with add two units. Whereas level efficiency moment real condition experience enhancement from 160% to 240% with add one unit and becomes 320% with add two units.

Table 4.5 Comparison of Trade off and Efficiency Levels in the System Busiest Day Queue

Sub Variable	Real	Add One	Addition Two
Amount track open (M)	2	3	4
Average Arrival (λ)	272	272	272
Service Average (μ)	187	187	187
Probability (P$_0$)	17%	22%	19%
Average amount	3,213	1,663	1.52

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customer wait in system (Ls)			
Average time spent _ in queue (Ws)	0.72	0.367	0.336
Average amount customer in queue for served (Lq)	1.76	0.21	0.0654
Average time spent _ for served (Wq)	0.39	0.05	0.014
Cost Service	Rp 129.178	Rp 133.304	IDR 177,738
Cost Wait	IDR 648,377	Rp 83.110	Rp 23,271
Total Cost	Rp 777.555	Rp 216,414	Rp 201.009
Labor Efficiency _	138%	260.3%	275%
Capital Efficiency	138%	260.3%	275%

Source : primary research data processing

Table 4.5 shows that improved service _ have dramatic influence on almost whole characteristics . Recorded moment real condition time spent for wait in line queue down from 0.39 minutes Becomes only 0.05 minutes with add one unit and becomes 0.014 minutes with add two units. in terms of cost results total cost analysis in real conditions down from IDR 777,555 to IDR 216,414 with add one unit and becomes IDR 201.009 with add two units. Whereas level efficiency moment real condition experience enhancement from 138% to 260.3% with add one units and becomes 275% with add two units.

Closing

Based on results research and discussion that has been described in chapter previously regarding " Analysis " System Queue at Daong Coffee Shop SMEs - Bogor Dalam Effort Enhancement Efficiency Service ". The conclusions drawn by the researchers that is as following :

1. System queue Daong Coffee Shop apply system queue a n with *Multichannel* model - *Multiphase* who has discipline queue *first in fist out* . Arrival pattern that is not predictable occurs the average rate service not enough of the average arrival make time wait quite a long time customer .

2. Analysis result comparison , at the moment day Free (Tuesday and Thursday), level optimal service will seen from results analysis of the

minimum total cost of Rp. 178,752 accompanied by level efficiency by 160% with add one unit. While at the time day busiest (Saturday and Sunday), level optimal service will seen from results analysis of the minimum total cost of Rp. 201,009 accompanied by level efficient by 275% with add two units.

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