



TIME WASTE REDUCTION BY SIMULATION IN SERVICE INDUSTRY

This report is submitted in accordance with requirement of the University Teknikal
Malaysia Melaka (UTeM) for Bachelor Degree of Manufacturing Engineering
(Engineering Management) (Hons.)

by

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APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of Universiti Teknikal Malaysia Melaka as a partial fulfilment of the requirement for Degree of Manufacturing Engineering (Engineering Management) (Hons). The member of the supervisory committee are as follow:

.....
(DR.EFFENDI BIN MOHAMAD)

ABSTRAK

Industri servis merupakan sektor awam yang sering dikaitkan dengan masalah masa menunggu yang lama di kaunter servis. Isu ini menyebabkan ramai pengguna mempunyai persepsi yang buruk terhadap sektor awam. Kajian ini dijalankan di Jabatan Pengangkutan Jalanraya (JPJ) Bukit Katil, Melaka. Objektif kajian ini adalah untuk mengurangkan masa menunggu yang lama di kaunter servis JPJ Bukit Katil, Melaka. Thesis ini bertujuan untuk mencadangkan penambahbaikan terhadap sistem JPJ. Kajian ini dijalankan menggunakan kaedah kualitatif dan kuantitatif di mana data diambil dari sumber pertama. Sebagai permulaan, pemerhatian, temuramah dan analisis masa dilakukan di kaunter servis. Kemudian, proses di kaunter servis dianalisis. Fokus kajian ini adalah di transaksi perlesenan kenderaan. Hasil kajian mendapati hari Isnin dan Jumaat merupakan hari yang sesak dengan jumlah pelanggan yang tinggi bermula pada pukul 9 pagi dan 2 petang. Kesesakan ini juga kerana proses ejen yang mengambil masa lebih dari satu jam untuk menyelesaikan semua transaksi. JPJ juga telah menyeragamkan sistem mySIKAP dan servis e-government melalui portal utama untuk mengurangkan masa menunggu pelanggan. Tetapi, masih ramai pelanggan yang belum menyedari kebaikan sistem ini. Kaedah yang dicadangkan adalah dengan mengadakan kempen di cawangan JPJ supaya sistem mySIKAP boleh diperkenalkan dan membolehkan pelanggan untuk berurusan di atas talian. Alternatif lain adalah dengan mencipta RTD Queue System yang membolehkan pelanggan mendapat nombor melalui sistem atas talian sahaja. Sistem ini membolehkan pelanggan mengambil nombor dari rumah dan mereka boleh mengetahui tempoh menunggu sebelum giliran mereka tiba. Kaunter khas untuk ejen perlu dibuka untuk mengasingkan proses mereka dengan pelanggan biasa. Kaedah simulasi dilakukan dan sebanyak 74.5% masa dapat dikurangkan di kaunter 2 dan 80.4% di kaunter 4. Kaedah simulasi membuktikan dengan menambahkan kaunter untuk ejen dapat mengurangkan masa menunggu di kaunter JPJ.

ABSTRACT

Service industry is the public sector that always related to the main issues of long waiting time at the service counter. This issues may bring the citizen to have bad perception towards service in public sector. This study was conducted at Road Transport Department Malaysia (RTD) located in Bukit Katil, Melaka. The objective of this study is to reduce long waiting time at RTD service counter. Then, improvement is proposed for RTD system and layout. This study was done by using a quantitative and qualitative method and the data information was collected from primary sources. Firstly, observation, interview and time study were done at the service counter. Then, the current process at RTD counter is analysed. This study focuses on counter that deals with transaction of driving license. Based on finding, the peak day with the highest number of customers were Monday and Friday while the peak times start at 9 a.m. and 2 p.m. The crowded also contributed from the agent that take more than one hour to settle down all transaction. The RTD has implemented mySIKAP system and the e-government service through RTD portal to reduce long waiting time problem at RTD. However, most people are not aware of these systems. Thus, the best action to introduce this system to people is by doing the campaign to selected RTD branch in Malaysia. This campaign aim to acknowledge the customer about the existence of the mySIKAP system that can help the customer to access their transaction through the online tool. The others method that proposed was doing RTD Queue Online System that will manage the queue number booking system. This system enable the customer to book their queue number from their home and they are notified their duration of waiting time before get the service. The customer can be present at the counter just in time before their number get called. The counter for agent has been provided and the agent process will be differentiate with the other customers. The simulation method has been done and the result shows the improvement of 74.5% at counter 2 and 80.4% at counter 4. Simulation method proved that add a counter for agent will reduce the long waiting time at RTD.

DEDICATION

Only

My beloved father, Hamdan Bin Ahmad

My appreciated mother, Resmah Binti Ishak

My supportive siblings, Suzana, Athirah, Shakilah, Najib, Rozaini and Zulhelmi

My lovely supervisor, Dr Effendi Bin Mohamad

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LIST OF ABBREVIATIONS

RTD -	Road Transport Department
ID -	Identification
IOS -	Iphone Operating System
No. -	Number
JPJ -	Jabatan Pengangkutan Jalanraya

CHAPTER 1

INTRODUCTION

1.0 Background of Study

In Malaysia, the Road & Transport Department (RTD) has been established under the Traffic Enactment in 1937. The Traffic Enactment 1937 has then changed to Road Traffic Ordinance 1953 followed by the Enforcement Division being set to enforce the law (retrieved from www.jpj.gov.my, 2016).

In 1st April 1946, RTD targeted to handle all transportation aspects in the country with different acts such as Road Transport Ordinance 1958 and Road Transport Act 1987. RTD provide service for licensing of vehicles and follow the Road Transport Act 1987 to make sure the safety of drivers and the transport (retrieved from www.jpj.gov.my, 2016).

In service industry such as hospital, bank, restaurant and others, there is an interaction between the customer and people that serve the customers. The efficiency of the service provided was measured from the customer's satisfactions. As the standard of living in developed countries increases, the value of customer's time also increases, and consequently they seek out those goods and services which will minimize the expenditure of their time (Heineke and Davis 1993). Customers usually will not consider any other offers rather than the low waiting time except for the goods. Customer's satisfaction can be assessed by measuring the waiting time during the service.

1.1 Problem Statement

RTD is one of the many service industries in Malaysia. There are five type of transaction that provided at RTD and their role is giving the service to people. There were more than 14 million registered drivers in 2015 (Ministry of Transport Malaysia, 2016). From the statistic shown in Figure 1.1, the numbers of registered drivers increase gradually from year 2010 with 12,236,524 drivers to 14,764,527 drivers in 2015. This high number of registered drivers is one of the factors that contribute to the high number of customers that get the service from the RTD. It is a challenge for the workers to serve the customer in minimum time with maximum satisfaction.

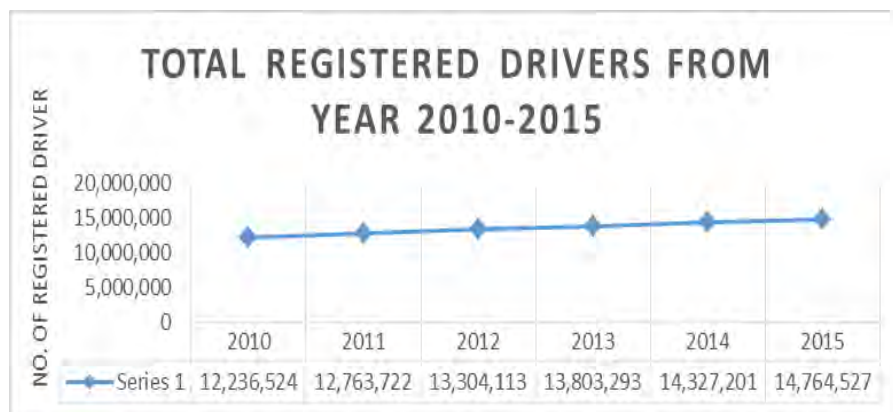


Figure 1.1: Total registered drivers from year 2010-2015
(Retrieved from <http://www.jpj.gov.my/web/guest/statistik-pemandu>)

The objective of this study are to identify the service provided by RTD Bukit Katil Melaka and solve the problem related to long waiting time especially at the counter by propose new system and prove its efficiency by using simulation.

Taylor (1994) said that “to understand the waiting experience, one must understand what is meant by wait for service. Here, it refers to the time from which a customer is ready to receive the service until the time the service commences”.

In RTD Bukit Katil Melaka, most of the customer experienced long waiting time due to long queue (refer to Figure 1.2). Time study has been done to get customers arrival time, inter-arrival time and waiting time. After collect and analyse the data, some research about the method in improving the queuing problem was conducted. Finally, the simulation

method was provided to improve customer arrival time and process flow. The numbers of counter provided also affect the waiting time but this variable acts as a constraint.



Figure 1.2: Customer waiting for service in RTD Bukit Katil, Melaka

1.2 Objective

There are three objectives which are:

1. To study the current service provided and the long waiting time problem at RTD.
2. To analyse the customer waiting time at RTD.
3. To improve the current system at RTD using simulation method.

1.3 Scope of project

This study focus on the service system in Road Transport Department, Bukit Katil, Melaka. The new method will be propose to reduce the customer waiting time and do the simulation to prove the efficiency of the method proposed. There are five types of service provided by Road Transport Department as listed below:

- i. Transaction for Driver License
- ii. Transaction for Commercial Vehicle Registration and License

- iii. Enforcement Transaction
- iv. Transaction for Automotive Engineering
- v. Transaction for Private Vehicle Registration

Based on these five services, this study only covered one service only which is transaction for driver license. The reason of choosing the transaction for driver licence is because based on the data recorded and interview session, the transaction of driver licence has the most average activities conducted every day as 400 numbers of activity and could reach until 600 activities during the peak day claimed as Monday and Friday.

CHAPTER 2

LITERATURE REVIEW

Using attitudinal research, based on the previous research there are many technique used to solve the queuing problem in service industry especially in road transport department. This chapter 2 will explain several projects that have been done and can be used as a references to the simulation study towards time waste reduction in service industry. These information obtained from different type of material included journal, books, newspaper and online resources.

2.1 The Definition of Services

Takagi (2014) defined the service is the action that bring worth and satisfaction, not only to the client or customers but also the workers or personnel by top managing of a set of existing resources. While (Silvestro and Johnston, 1990) indicate that industrial sector of services “does things for you. They don’t make things”. Nick Johns (1999) defined that it has clearly developed from economists need, to categorize it into economic activities. For example the UK Office for National Statistics categorises service industries into financial, transport, retail and personal services (Office for National Statistics, 1992). More than that, Gummesson (1994) stated that customers do not buy things or services in the traditional sense. They buy things that offered and high value of many components, it can be either service or things. Gummesson (1994) makes a similar comment about the way different industrial sectors are organised. There are three organisational examples:

- i. Manufacturing

- ii. Administrative
- iii. Legal and service

Gummesson (1994) notes a common movement towards the service example within both manufacturing and “public service” sectors. Edvardsson et al. (2000) has another definition of the service concept as a detailed picture of the “customer needs to be satisfied, how they are to be satisfied, what is to be done for the customer, and how this is to be achieved”.

For the service concept, Grönroos (2001) claimed that the service concept “as an activity or series of activities of a more or less intangible nature that normally, but not necessarily, take place in the interaction between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems”.

For the service characteristics, Zeithaml et al. (1985) found that most frequently mentioned characteristics were intangibility, inseparability of production and consumption, heterogeneity or non-standardization, and perishability or rejection from the inventory. Bateson (1979) claims that intangibility is the worst characteristic of services from all other differences occur. The term “double intangible” used and difference between “physical intangibility” was made that’s mean it cannot be touched and “mental intangibility” that means it cannot be mentally grasped. This statement supported by the results from an empirical study conducted by Bielen and Sempels (2003).

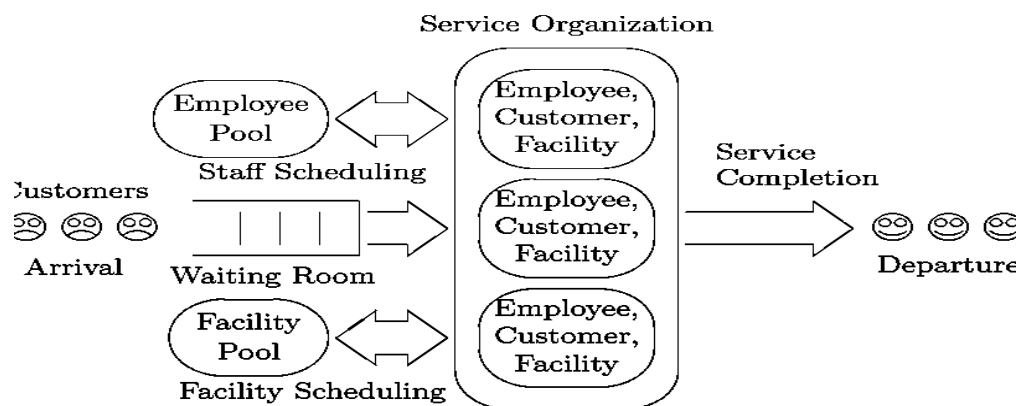


Figure 2.1: Generic Service System Involving Human Servers and Facilities (Takagi, 2014)

2.2 Queuing Theory

In years 1909, the book of “The Theory of Probabilities and telephone Conversations” has published by A.K. Erlang that contained formula waiting probabilities and for loss. “Queuing models provide the analyst with a powerful tool for designing and evaluating the performance of queuing systems.” (Bank, Carson, Nelson & Nicol, 2001). Adan (2000), claimed that queuing at server based on the different appliance by the customer for example the customer tend to prefer queue in shortest queue or less workload. Jackson (1957) started the queuing systems with exogenous Poisson process and Exponential servers. In 1963, queuing network started with arrival process that depend to the system and closed queuing with exponential server. While, F. Haight (1958) came with parallel queue ideas.

2.3 Behaviour during Queue

(George, 1991; George & Bettenhausen, 1990; George & Brief, 1992) discussed that employees behaviour affected from these factors:

- i. Number of individual
- ii. Number of group
- iii. Contextual or background
- iv. Motivational factor

Keaveney (1995) found that customers tend to move from one firm to another firm causes by previous service failure. This statement proved by a recent demonstrated by Ok and his associates (2005) at restaurant. From this demonstrated, behaviour of customer for example repetitive visit affect by the failure of service. Customers normally think for explanation on certain bad condition. (Mc Coll Kennedy & Sparks, 2003). Customers also wanted to know the reasons, the countermeasure, demonstrate the perceived need for, and possible value of providing an explanation. Karatepe (2006) claimed that many of customers did not acknowledged any complaint responses.

The detail explanation of failure service must be done to the customer. It takes many forms such as reasons, justifications, apologies and so on (Folger & Cropanzano, 1998). There are two type of explanation. Shown as below:

- i. Justifications
- ii. Referential explanations

Justification consider an excuses for an actions that contribute for the service failure (Folger & Cropanzano, 1998) while the referential explanations improve the situation by lowering the expectation of angry clients (Bies, 1987). For Bies (1987), justification is giving a reason for a bad output that need for persistence.

Different with Sabir (2012) that claimed usually customer satisfaction of service provided will bring to the 'trustworthiness'. (Towo NN, Mbuya L, 2015) The factor that may affect the service quality of customer included:

- i. Skill of employee
- ii. Look and feel of the environment and employee
- iii. Well-timed service skill

2.4 Perception of Waiting Times

The wait is major principal in receiving the service. In order, the wait is the first interaction that customer will experienced with the firm (Chase and Dasu, 2011; Dixon and Verma, 2009). These first of experienced can affect overall service satisfaction whether in good or bad perception of customers towards the service (Chase and Dasu, 2001; Dixon and Verma, 2009).

While wait to be served, the customer attend to leave the queue (Bitner, 1990). They are willing to leave and start again the servicing if the queue are too long. The satisfaction of waiting conditions proved that it affect the customer satisfaction level. When the people has a low level of satisfaction with the long wait in getting the service, the customers must