

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**COMPARISON BETWEEN QUEUEING THEORY AND SIMULATION
METHOD AT A RESTAURANT**

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ABSTRACT

Queueing theory is a mathematical study of waiting lines or queues. Queuing or waiting in line is a common experience for customers. However, if the waiting time is too long, the restaurant might lose customers. Time spent in line has an opportunity cost for people because it takes up time that could be spent doing something else. Systems that are too complex to be studied using analytical models like queueing theory can be studied using simulation models. In order to determine which is best for the restaurant to use, this study compared single server and multi-servers. This study is conducted to compare customer waiting times in single-server and multi-server restaurants using the queueing theory formula and simulation method in order to minimize the customers' waiting time in restaurants and avoid customer loss. The observation was conducted in the restaurant to obtain data about the arrival time of customers and the service time during peak hours. The queueing theory formula was used to analyze the productivity of work or busyness of the restaurant when it employs a single server, a single-phase system, and Arena Simulation Software when it employs multi-servers. Hence, using Arena Simulation Software will help to find out the changes that would happen if the restaurant used a multi-server system. The results of analyzing those servers were compared to determine the best one that the restaurant needed to employ. By that, multi-servers are the best ones for the restaurant to employ since they succeed in minimizing the customers' waiting time in restaurants, which can avoid customer loss and increase the efficiency of the restaurant's services. Furthermore, the results show that having three cashiers and three chefs has the lowest waiting time and utilization of the workers. However, in the future, it will be better for the restaurant to use a multi-server system with two cashiers and two chefs since it is less costly than three cashiers and three chefs. Therefore, the restaurant should employ multi-server, which are two cashiers and two chefs as the total cost of its employee salaries is comparable to the improvements in service performance at the restaurant.