SELF-ORDERING SYSTEM

Research Methodology in Computing and Technology (RMCT)

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Abstract - *Technology currently dominates a wide range of industries around the world. This includes the food and business sector. Advancement in applications and IoT allows users to do a lot of things through it. Technology has been integrated into the restaurant business to provide more services to customers. One exciting example is the self-ordering system. The number of restaurants providing self-ordering services are not many, as they may seem to have an unnecessary need. The following research proposal will discuss the opportunities that can be derived from the use of this system and how it can affect the people who use it. Quantitative methodology is used for the acquisition and analysis of numerical data. Restaurant data is obtained through online survey. This is important as it may help to improve the restaurant business and may change the way people order food.*

1.0 Introduction

Nowadays, the age of the restaurant self-service has dawned, and they are replacing the workers. Selfordering system tends to benefit for restaurant management in order to serve the customer effectively and promote inventory control. Some of the fast-food, beverage and restaurant industry are investing in this technology (Abel, E, E. & Obeten, E, 2015). It is because this kind of technology is one of the latest trends and new technology gives the organization an advantage in the market. The manual restaurant ordering system is depend on a lot of manpower to handle all the process such as the workers may be taking order from customers, placing the orders and clean up the table and dishes. If the restaurant is busy and there are not enough workers to help serve the customers or clean the place, it will decrease the customer's satisfaction.

The staffs also may be taking the order and processing the payment. Also, it is difficult to find staffs because the labor rates are increasing all the time (Poonam, K, Priya, K, Snehal, K & Ingale, P, B, 2016). Some restaurants do not have enough workers because they need to use a lot of resources looking for potential employees. Besides that, customers are also quick to become impatient during the waiting time of the ordering process or waiting the food arrive. Hence, the "self-ordering system" is ready to solve this problem. Many fast food restaurants have started to use selfordering system in their food industry. It can help to reducing the customer's waiting time and accurate to get the customer's order details. The kitchen does not waste time in preparing an unordered item. In this research, self-ordering system is upgraded. It combines some of the existing functions.

First, the customer can place order using the application. The customer can view the e-menu and the price to choose what kind of food they want. Then they need to choose a selection such as to eat in the restaurant, take away or have it delivered to them. If they choose to eat in the restaurant then they need to specify the time that they will reach the restaurant, this will give the kitchen adequate time to start preparing for the food. This can reduce the amount of time customers need to wait, as the customers can walk in and start eating their food. If the take away option is selected, the customer may choose a time to collect their food. If customers select the delivery option, the restaurant will arrange a rider to deliver the food to them. The system also accepts mobile payment, as it is more convenient to the customer. Because customers these days do not like to bring much cash when they go out, they prefer using mobile payments as it is a faster and safer way to pay the bill. A self-ordering system can help the industry restaurant to decrease waiting time, enhance order accuracy and save money on labor.

2.0 Research Background / Literature Review

A self-ordering system is defined by its ability to service a customer without the need of a staff in the entire process of ordering items to the payment of it. There are also hybrids of ordering systems that requires a staff to assist the customers in some areas of the ordering process. Some systems require a payment counter and a staff in order to operate. This is because the system uses cash and requires staffs to collect the payment after ordering. Some requires the staffs to manually send in the order to the kitchen. All these systems are not fully self-ordering as they require the staffs to be part of the ordering process. In this age and time, self-ordering is widely used. Large food and beverage organizations such as McDonald's and Sushi King uses self-ordering system. Both of these restaurants provide selfordering in different ways. Based on diagram 3.0.1, the ordering process for Mac Donald's requires the customers to order at a touch screen kiosk. They would then pay at the kiosk by card or queue at the counter and pay by cash. After payment, the order would be sent to the kitchen. The food can be collected at the collection area or delivered to the table by the staffs (Rastegar, N, 2017). Mac Donald's also provide delivery service for customers. It is on another system as this system is an application that can be downloaded. Customers are able to order through it and pay through it or by cash on delivery. For Sushi King, their self-ordering system is only for dine in customers. A tablet is assigned for each table. Based on diagram 3.0.2, when the customers want to order something, they have to do it through the tablet. The tablet will then submit the customer's order to the kitchen and the staffs will serve the prepared food. The customers pay when they are done eating. The payment is done at the physical payment counter. Another example that can be looked at is Domino's. It allows the customers to order food online and collect it at the store. Since Domino's have multiple physical stores, customers are able to select which store they would like to collect it from. This gives customers the convenience to get their food. This service is usually more used in fast food as the food can be prepared within a short amount of time and can be easily be taken away. Currently there are various research about selfordering systems. Non which includes a system that allows the customers to order food and at the same time gives them the option to select if they are going to collect it, have it there or have it delivered to their address. It can be said that these functions are not new as there are already been implementation of some of these functions such as the delivery of food, online ordering and self-collecting. But many of these systems lack the ability to do all of them. The closest system is Domino's. They are able to allow the customers to order food online, it also allows them to select if they want to deliver the food or it collect it by themselves. The only feature it lacks is that it does not allow the users to collect it and have it there. Although it is possible for customers to collect it and have it there, it does not reserve a space in advance. So, if customers are to have it there, it would depend on the amount of people in the restraint. Another type of ordering system requires the customers to write their orders on a paper and submit it to the staffs. Then the staffs will send the order to the kitchen. This system is not fully a self-ordering system as it requires the staffs to send the order to the kitchen. The customer is only required to write their orders on a piece of paper, then the staffs would have to do the rest. Such as entering the order into the system for billing and sending the order to the kitchen. Also, some restaurants that are using physical menus may be of some issue. The issue is It is not economical to print all menu cards over and over. When the menu card is printed, it cannot be any changed. When the menu card is lost or damaged or when it needs to be changed due to price updates or items updates, the restaurant has to print a new set of menus. (Umap, S, Surode, S, Kshirsagar, P, Binekar, M & Prof. Nagpal, N, 2018). This uses resources that can be allocated in other areas such as improving the restaurant. Hence, some restaurants use tables that have applications that show the menu to replace the traditional printed menus. The issue with this is that the handwriting of the customers may be ineligible (Poonam, K, Priya, K, Snehal, K & Ingale, P, B, 2016). This may cause confusion within the staffs. If the staffs are not able to read the written paper, they would have to take it to the customers and ask for clarification. This is a repeating issue in this system. The weaknesses in the other existing systems that is some restaurant are using a counter that requires a worker to function. The worker may take customer's food orders or any requests. It provides assistance quickly so an to keep queues at minimum. Counter people need to answer questions about the menu or product. It may be taking a long time, because some workers are on training, so they will practice serving or taking

order to customer. Some customer waits until they are impatient, causing them not to come next time.

3.0 Problem Statement

The food ordering process is one of the most crucial aspect in determining the quality of a restaurant as this area focuses on customer services. Allowing the customers to determine if good customer service is being provided. Hence many restaurants are constantly looking for ways to improve the way they do things. Improving the ordering process of a restaurant is one of the most researched areas to improve customer satisfaction. The issue these days is that customers do not like to wait for a long time for food. This issue is so common that many restaurants have to state in their menu if an item takes more than 20 minutes to deliver. From this, it is safe to say that most customers are impatient when ordering and waiting for their food to arrive. Without a proper ordering system, the restaurant will not be able to fulfil the requirements of the customers in time. Many ordering systems are not efficient as the queue becomes longer. If a restaurant has limited seats, customers have to wait for space. There are no other options for them to have their meals. If there are not enough staffs to take orders from the customers at the restaurant, the ordering process slows down. All these can irritate the customers and leave a bad impression on the restaurant.

4.0 Aims and Objectives of the Research

The aim of this research is to prove that using a selfordering system is more efficient and effective than the standard staff-oriented ordering system. The objectives of this research include: OBJ1: To collect information about the current ordering systems that are used in various restaurants. OBJ2: To find out the efficiency of a self-ordering system in restaurants. OBJ3: To collect and analyse information about what will affect the customer's satisfaction during the ordering process. 5.0 Research Questions Below are research questions that can help investigate and find out if using a self-ordering system is more efficient and effective: Q1: What type of restaurants are suitable to implement self-ordering system? Q2: What impact does the self-ordering system have if customers are not familiar with the technology? Q3: What is the average time that customers are willing to spend on ordering food?

5.0 Significance of Research

The findings of this research will mostly benefit the restaurants. If the restaurant owners know which type of ordering system is more efficient, they would consider changing and implementing it. This is beneficial for them as the main objectives of most restaurants is to increase the amount of items that they sell in order to make more profit. This means that they rely on the amount of space that they can use to service customers and also the customers turnover rate. Which is the number of customers serviced within a period. This is not only affected by the ordering speed but also other factors that will not be discussed such as the amount of time it takes to prepare the food, the environment and atmosphere that the customers are in. If either one of them is increased, the restaurant's profit will be increased. All of the variables above relies on the constant that the number of customers that are coming in is unlimited or more than what the restaurant can accommodate. This usually happens during peak hours and peak seasons. Due to the fact that this system is used to improve the ordering speed of customers. As stated before, this system allows the customers to select where they would like their meal and how they would get it. Although only restaurants that have issues with queueing will be able to fully utilize this system, it can also be used for restaurants that wish to expand their business. This can be done using this system to create a delivery service. Hence, improving their business.

6.0 Methodology

There are 2 main types of methodology that are used to conduct a research. These are quantitative and qualitative research. Quantitative research is also known as exploratory research. It is mainly used to gather information about problems, opinions, concepts and meanings which helps the researcher gain insight about the issue that is being researched. In other words, it is data that is cannot be calculated with statistics. It does not usually produce statistics or require numerical data for analysis as it cannot be expressed using numbers (Susan E. DeFranzo, 2011). It uses other types of identifiers to classify the findings. It is usually made up by the researchers and is based on what they are researching on. Methods for doing qualitative research include one-to-one interviews, observations, archives, case studies and ethnographic (Pickell, D, 2019). Questions asked in the interviews are usually open ended and the interviewee can give their own opinions. Due to the amount of work needed to research each object, the sample size of quantitative is small (Susan E. DeFranzo, 2011). This research methodology is

suitable for researches that deals with human behaviors as they could not be explained using numbers.

Quantitative research on the other hand, is to use various ways to acquire numerical data and analyze it. The conclusion of the analysis can be a statistic. It is used to group opinions, understanding or behaviors of the subject together. Researchers analyze the data that they have gathered to find patterns. The most common way to collect data for quantitative research is surveys. Online surveys are now widely used as they can reach a higher amount of people. Other than that, short interviews and systematic observations are also used in this research method. Statements and questions asked are usually close ended. It also has a larger sample size as the larger the sample size, the more accurate the analysis will be. For this research, quantitative research method will be used. This is because this research is focused on the finding out if the self-ordering system is more efficient than the typical ordering system. This comparison requires numbers as efficiency is referring to the speed of the ordering process. Both subjects have to be tested with the same data gathering method and the results have to be compared. Hence, quantitative research is used. The data that have to be collected for this research includes:

• The amount of time it takes for the ordering process to take for each system.

• How long do customers usually wait for food and how long before they start being impatient?

• Which system do customers prefer?

• The demographics of the people that provides the information.

The research methods that will be used includes testing of the systems in a controlled environment with controlled variables. This means that 1 restaurant will be conducting the test and all of the systems will be tested in the same restaurant. For collecting data on customers, surveys are used. A 5-point Likert scale is used in the surveys. 1 being “Not at all" and 5 being “All the time”. The person that is being surveyed will be given a close ended questionnaire to fill out.

7.0 Overview of the Proposed System

However, this system is developed to reduce the customer waiting time to ultimately increase customer satisfaction. It also can get accurate data about customer’s needs. For example, customer can take order by their own and inform the restaurant about what they need. It provides better communication between the customers and the restaurant. This can be a benefit for both parties. So, most of the development of food ordering systems focus on customer and cashier side. Self-ordering system can provide a great value to the restaurant. Customer can make their order through the system. The system will be developed as mobile application to allow customer to take a self-order online. The application allows customers to enter an order into the mobile on their own no matter where they are, and it allows the customers to provide the time of their arrival, increasing the efficiency by reducing the time which the customers have to wait. The customer can also have an option of eating in, taking away or having the food deliver to them. This will directly impact the sales of the restaurant as the orders are taken much faster and more orders can be completed when compared to the previous system. This gives customer a platform for self-ordering as they no longer need to wait for an available waiter to order food. It can also make suggestions for customers to order more and provide a personalized menu to customers. The system is also directly affected by the rise of mobile payment like Apple Pay, Google Wallet, QR Pay and Samsung Pay. Mobile payments are being trusted and used more frequently as online payment services are being more secure and more convenient for the customer. This is highly beneficial for a system that runs on the internet. Making it more usable and more attractive for the customers of the restaurant. This is a benefit for the restaurant as people are more likely to purchase a good or service if the payment method is convenient for them. This system also allows the restaurant to minimize human errors and reduce food wastage. How this can be done is because the whole ordering processes is done through the system. This means that the customer of the restaurant must confirm the food that they are ordering every time they make an order. This prevents the customers from accidently adding a wrong item into their cart. The system requires the customers to review the food that they have added into their cart before proceeding to the checkout. This can minimize the effect of human error in ordering systems. This will indirectly reduce food wastage. Without an electronic ordering system that records what the customers are ordering, the orders might have errors as the restaurant staffs might send the ordering list with wrong items into the kitchen. This will cause the wrong food to be prepared for the customers. Thus, on a neutral

perspective, it is the restaurant's fault for sending the wrong order. Hence, the restaurant would have to compensate for the wrong order. most restaurants also have a policy that does not allow wrong orders to be consumed by the staffs. This is to prevent staffs from purposely making a "wrong order" and taking it for themselves. Hence, many restaurants would discard wrong orders. This leads to food wastage. With the self-ordering system, these issues can be avoided as the customer of the restaurant orders the food by themselves. And the customers are less likely to make an ordering mistake as the system requires them to confirm their order. So, unless the customer makes the wrong order, the customers will get the food that they want. Hence, there would be lesser food wastage. Besides of increasing the efficiency of the ordering process, this system keeps a record of all the orders of the customers, this allows the restaurant to collect data about their customers. Data is one of the most valuable assets any organization can have. Knowing what to do with it is equally valuable. With an electronic ordering system, the restaurant is able to collect data from the customers. They are able to collect data as the customers are required to sign in before ordering anything. When the customers create an account to order food, they would have to enter personal details such as name, date of birth, address, gender and so on, This means that the restaurant now knows who is using the system, how many users are using it and where are they from. This can allow the restaurant to know how successful their system is and if it has to be upgraded or downgraded. Because customers order using the same system, it is also capable of providing an analysis tool for the restaurant. It can show which product is the most liked among the customers and which product brings in the most profit. All this information can be taken from the system and it can be used to improve the restaurant. This system also allows the customer to view and track the order status. The customer can view the tracking status by entering the order ID into the system, then it will display all the items that the customers have ordered. This allows the customers to track the progress of the order and the location of the driver that deliver the order. The customer can also view the preparation status, then the customer to be at the restaurant to get ready to collect the order or eat there or wait at the delivery address for the food to come. In this application, it is not limited to a single restaurant. Any restaurant can register on this application to provide food ordering and delivery services.

8.0 Conclusion

In conclusion, this research can help further the understanding of self-ordering systems in restaurants. Not every restaurant can implement this kind of system because it may not be suitable for all. But for the majority, it can help in reduce the customer's waiting time and provide other services that also increase the customer's satisfaction. The proposed system can also be upgraded in the future. A points system can be considered when upgrading the system. When customers complete a payment, the system can give cash back, points or discounts to the customers. This allows the customers to use the system again in the future.