Factor Affecting Customers' Acceptance of Self-service Restaurant Ordering System (SROS) in Johor Restaurant

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Abstract

The advancement of technology has led the restaurant sector towards a sustainable future where a self-service restaurant ordering system (SROS) can be utilized at every level of the service process. However, customers who had used the SROS at McDonald's and Haidilao Hot Pot found that the older generation didn't want to learn or relearn due to age because they think this technology is complicated and too much hassle, and the young generation also has internet problems. Moreover, customers of McDonald's and Haidilao Hot Pot found that the inevitability of any technology is that at some point, it will need downtime for maintenance. Hence, this research aimed to measure the level of SROS received expected by customers and identify the determinants influencing customers' intention to use SROS in Johor restaurants. 384 customers who had used the SROS at McDonald's and Haidilao Hot Pot were involved in this study. A survey questionnaire was distributed online to the respondents to collect the data. The data collected were analyzed quantitatively using SPSS. The results showed that customers had a high level of SROS, as well as performance expectancy, effort expectancy, social influence, and facilitating conditions, are significantly correlated with intention to use. This study will provide deeper insights that will increase customers' intention to use SROS. Besides, this study can help restaurant practitioners to analyze the factors considered by customers regarding these technologies.

1. Introduction

According to Alfaren & Arijanto (2021), although many restaurants still rely on manual meal ordering methods, such as waiters approaching customers and taking their orders or handing out paper menus, implementing ordering systems that the customers themselves carry out can help restaurants improve. While it still takes time for the waiter to serve the customer when the order is placed through a paper menu, allowing customers to place their orders directly can help streamline the process and save time for both parties. When customers use the manual ordering procedure, it consumes more energy as employees need to listen carefully and note down each customer's order. This process can become challenging when there is a large crowd, and some customers

may need help to place their orders at once. Therefore, it becomes necessary to have an alternative system for restaurants' manual order systems, which are still considered less effective and efficient during peak hours. Self-ordering technology provides a plethora of advantages for restaurants, especially when it comes to customer service. By implementing this system, eateries no longer need to be concerned about the number of customers they will have, as every customer can conveniently order their food or drinks from their table. Additionally, servers are no longer required to wait for and manually record customer orders, freeing them up to focus on other tasks that enhance the restaurant's overall efficiency and effectiveness.

In today's fast-paced world, technology-enabled transactions are becoming increasingly prevalent. Instead of interacting with a service representative, a growing number of customers prefer to use technology to accomplish their service needs. Self-service technologies (SSTs) refer to technology interfaces that enable customers to access services without having to rely on direct service personnel (Meuter *et al.*, 2000). Moreover, when a restaurant adopts self-service or self-ordering technology, it implies that it allows customers to place their orders online or via kiosks, tablets, and QR codes. Self-service is a preferred option for customers as it enables quick and easy transactions while minimizing the likelihood of communication errors (Umap *et al.*, 2018). The utilization of cashless touchscreen kiosks and self-order and pay tablets in restaurants highlights the SST trend. This type of self-service has gained popularity, mainly after Chili's and Applebee's, the top two casual dining chains, introduced tablet-based touchscreen devices for ordering and payment in 2014. Many other restaurant chains also followed this trend (Ahn, 2018), and touchscreen tablets have become a common sight on restaurant tables, placed alongside ketchup bottles and saltshakers (Filloon, 2017). The adoption of SST in the restaurant industry has resulted in higher profits, as customers tend to buy more food items, and there is a reduced need for human servers (Hanks *et al.*, 2016). SST also offers a valuable means of collecting consumer consumption information and enhancing customer service by increasing service flexibility and minimizing service wait times (Okumus *et al.*, 2018).

Self-ordering is an idea. A technology-based solution called the meal ordering system is used in restaurants to speed up the ordering process and improve the customer's experience (Alfaren & Arijanto, 2021). Customers may place orders using the system's self-ordering kiosk without a server's assistance. Customers may easily explore menus, choose goods, and personalize their orders using the self-ordering kiosk's simple interface. The system can also provide recommendations based on the customer's prior orders or well-liked menu items. Instead of requiring a server to input the order once the consumer places it manually, the technology transmits it straight to the kitchen. This can increase order accuracy and decrease mistakes. Customers may pay for their purchases and follow their progress in real-time using capabilities like payment processing and order tracking included in the system. The technology may also offer insightful data and analytics on consumer intention and preferences, enabling restaurants to make data-driven decisions to grow their business. Essentially, the self-ordering concept food ordering system uses technology to speed up the ordering process, improve the customer experience, decrease mistakes, and boost efficiency in restaurant operations.

Besides that, As the pace of people's lives accelerates, more and more restaurants are pursuing high efficiency by using self-service restaurant ordering systems (SROS), allowing consumers to complete their orders without going through a waiter/waitress (Ting, 2022). Research has studied the restaurants that use SROS, such as McDonald's and Haidilao hotpot. In keeping with Vignali (2001), in 1937, McDonald's was established by two siblings, Richard and Maurice McDonald, whose small drive-in restaurant east of Pasadena, California, became known for its innovative food processing and assembly line methods. Ray Kroc, a milkshake mixer salesman, recognized the potential of the McDonald's business model and negotiated a franchise agreement in 1954, granting him exclusive rights to franchise McDonald's throughout the United States. At a time when other franchising companies sold restaurant and ice cream franchises for as much as $50,000, Wor Kroc offered a McDonald's franchise for $950. In addition, Wor Kroc received a royalty of 0.5% of sales from the McDonald brothers and took a service fee of 1.9% of sales for himself. In 1961, the McDonald brothers sold their business for $2.7 million. In 1967, McDonald's opened its first international location in Canada. George Cohon bought the license for McDonald's in eastern Canada shortly after, and he opened his first restaurant in 1968. After that, Cohon established a network of 640 restaurants, which made McDonald's in Canada more profitable than any other McDonald's outside of the United States. The use of franchising has been the key to McDonald's international success. By franchising to locals, the locals automatically translate the product and service delivery and interpretation of what might be perceived as US brand culture. Over 20,000 McDonald's restaurants are currently in operation across more than 100 nations, of which approximately 80% are franchises.

According to Wang & Ching (2020), Haidilao, the name means "fishing treasures from the bottom of the ocean," which resembles treasure hunting in a hot pot. Additionally, it is referred to as Sichuan Mahjong, a popular Chinese tile-based gambling game. In Mahjong, the last person of "Haidilao" alludes to dominating the match and, in this manner, addresses the extraordinary fortune. Haidilao was first established in Sichuan Province in 1994 by Yong Zhang as an unremarkable restaurant serving hot soup in the Sichuan manner. It has grown into a well-known chain restaurant brand in China over 20 years. The founder's experience inspired the company's fundamental principle, "changing your own life using your hand." As a result, the staff is deeply

committed to their organization and driven to grow it by improving customer happiness and offering safe and wholesome food. The success of Haidilao, which has more than 1300 restaurants in China and more than 100 restaurants worldwide, is attributed to its distinctive culinary offerings, clever marketing initiatives, and incredibly considerate customer care. The Haidilao chain café was first established as a hot pot chain on the planet, with 593 eateries in 118 urban communities around 10 nations (Cheng *et al.*, 2013).

In this research, the researcher conducted a preliminary study to identify and observe the actual problems faced by customers when using the SROS at McDonald's and Haidilao Hot Pot. According to Lee (2022), a preliminary study is a preliminary investigation into potential problems with quality review or evaluation. The purpose of conducting a preliminary study is to provide an overview and ensure that the review will include relevant fields of study (Lee, 2022). The reason for choosing the restaurants McDonald's and Haidilao Hot Pot is because McDonald's has prepared kiosks and QR codes for their customers. Meanwhile, Haidilao Hot Pot has used table ordering through tablets for its customers. Therefore, the researcher performed a preliminary study by interviewing the customers who had used the SROS at McDonald's and Haidilao Hot Pot to identify the real problems faced by customers when they utilize the SROS in restaurants.

After the researcher conducted a preliminary study with the customers of McDonald's and Haidilao Hot Pot, the customers explained the actual problems they faced while using the SROS in restaurants. First, customers who had used the SROS at McDonald's and Haidilao Hot Pot discovered that the older generation has this assumption that technology is complicated and too much hassle. They end up not wanting to learn or relearn due to age. Meanwhile, the young generation also has internet problems. For Example, when scanning a QR code needs the internet to connect. Therefore, the level of customers' intention to use SROS was studied in this research.

Other than that, customers of McDonald's and Haidilao Hot Pot found that the certainty of any technology is that, at some point, it will need downtime for maintenance. This will be the case for using SROS. If the kiosk and table are placed in a high-traffic area, they will see much use. If maintenance is needed, it will lead to a loss of sales if the kiosks and tablets shut down during peak hours. Some customers will need more patience to wait in line, and the long waiting time can cause customer unhappiness. There is also the risk of potentially losing return customers (Kumar *et al.*, 1997). Therefore, the researcher intends to study the determinants influencing customers' intention to use self-service restaurant ordering systems (SROS) in Johor restaurants.

2. Literature Review

2.1 Self-Service Restaurant Ordering System

Self-service ordering systems revolutionize the restaurant industry, offering patrons various technologies like kiosks, tablets, and QR codes to place orders swiftly. Notably, they enhance efficiency and customer satisfaction, as evidenced by studies by Chik (2011) and Odesser (2018). Self-service options not only expedite orders but also enhance customer experience, potentially boosting loyalty and reputation (Odesser, 2018). Bhatnagar (2006) underscores the transformative impact of electronic ordering screens and stands in cafes, streamlining processes and reducing errors while enabling easy payment methods. Innovative establishments like the Nuremberg restaurant featured by Spiegel International in 2007 utilize cutting-edge technology, employing touch screens and automated systems for order placement and inventory management. Bytes restaurant in Canterbury also stands out with its touchscreen ordering system, offering online ordering, interactive games, and internet access (Brickers, 2006). Oliveira (2014) emphasizes the simplicity of self-service ordering, where customers customize their orders and receive real-time updates through digital signage and SMS notifications. In conclusion, self-service ordering systems redefine traditional dining experiences, emphasizing speed, customization, and convenience for both customers and restaurant owners alike.

2.2 Self-Service Kiosk (SSK)

A self-contained, autonomous structure known as an interactive kiosk (or a self-service kiosk, or SSK) is used to speed up processes or display information (Eleni, 2019). Customers may order food, customise their meals, and pay their bills using the SSK, which is accessible at McDonald's, without having to interact with personnel. Even though technology has altered the way food is provided in Malaysia, there were few digital ordering choices in the sector because of the high setup costs. (Muhammad Izzat, 2017). This technology can relieve the financial burden of a restaurant over time, according to Park & Shin (2017). Abdul Hamid *et al.* (2021) stated that the SSK has developed into a more effective instrument for addressing the difficulties of delivering service in the present environment and meeting client expectations. Fast food restaurants, especially McDonald's, have been using it.

2.3 Self-Service Menu Tablet Order

In Malaysia's food service industry, self-service menu tablet ordering using devices like iPads or Samsung Galaxy Tabs remains uncommon (Stamam *et al.*, 2016). However, its adoption could alleviate financial strains for restaurants (Park & Shin, 2017) and enhance customer satisfaction (Issa *et al.*, 2018). Despite its potential benefits, high implementation costs hinder widespread adoption. Success hinges on factors like information quality and user interface (Tian, 2015; Wang *et al.*, 2013). The industry is shifting towards digital menu presentation, leaving traditional menus behind (Kimes, 2008). A user-friendly self-service tablet ordering system can replace manual processes prone to human error (Yieh *et al.*, 2012). Thus, as technology integrates further into daily life, automated procedures naturally replace outdated methods in restaurant operations.

2.4 QR Code Order

Ravipati (2022) advised to use QR codes on each table as part of a suggested technique for intelligent restaurants. Customers may quickly scan these QR codes using a reader or cell phone. Customers may find out more about the restaurant by visiting its website after scanning the QR code that directs them there. Customers may peruse the menu selections online and place their orders straight from their mobile devices, disregarding the requirement for a server or actual menu cards. Orders will be taken by the kitchen staff, who will then make the food and serve it to the appropriate table. Customers will get a bill and may pay it physically or online. Additionally, a feedback system is also in place to collect client feedback and use it to enhance service quality, eventually increasing customer happiness (Habib *et al.*, 2017).

2.5 Unified Theory of Acceptance and Use of Technology (UTAUT)

The initial exploration into technology acceptance led to the development of a technology acceptance model (TAM), pioneered by David in 1989. This model focused on Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) as fundamental perspectives for comprehending user behavioral intentions. Building on this foundation, Venkatesh (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT), a synthesis of eight theoretical models. These models were designed to clarify the intricate connection between user behavior and intentions. The UTAUT incorporates essential elements such as performance expectations, effort expectations, social impact, and enabling situations to better understand and predict an individual's adoption of technology. Additionally, UTAUT takes into account four moderating variables, specifically demographic factors, prior experience, age, and the voluntary nature of technology use, influencing individuals' perceptions and utilization of technology. In summary, UTAUT provides a comprehensive methodology for exploring the acceptance and utilization of technology within the domain of consumer behavior (Dwivedi, 2019). However, it's important to note that UTAUT was initially employed to elucidate the reasons behind technology adoption in organizational settings (Singh & Matsui, 2017).

2.5.1 Intention to Use Self-Service Restaurant Ordering System (SROS)

Maiyaki (2013) emphasised the importance of keeping an eye on behavioural intention since it implies actual purchasing. He also says that behavioural intention is regarded as one of the most crucial ideas in marketing literature because of its close connection to consumer purchasing behaviour. A study by Parasuraman & Zeithaml (1996) implied that service providers are likelier to have good behavioural intentions when they obtain favourable client feedback, referrals, devoted consumers, and increasing expenditure. This study aimed to ascertain the relationship between perceived waiting time, behavioural intention, and customer happiness.

2.5.2 Performance Expectancy

As per Venkatesh (2003), performance expectation, also known as "perceived usefulness" in other and TAM-related models, is a component of all eight models. This means people embrace a specific method because they think it will improve their performance in certain circumstances. The measuring scales are identical and consider the following elements, even if the term is defined differently in different models: the new technology makes jobs simpler to accomplish, saves time, enhances output quantity and quality, and boosts efficiency. Besides that, as noted by Odelia & Ruslim (2023), it has repeatedly been demonstrated in several research and situations that performance expectations are the most significant predictor of expectation. The hypothesis put out by this study is the following, based on prior findings. In addition, performance expectancy was an essential predicting factor for consumer behaviour toward new technologies (Chaouali *et al.*, 2016). Customers are more likely to have favourable intentions to utilise a system when they believe it to be more successful. It is also expected in the food service sector that as consumers learn more about the benefits of self-service technology, their intentions to utilise kiosks will steadily rise (Baba *et al.*, 2019). Therefore, the SROS can be a crucial driving force for the acceptance of technology by providing practical advantages through a convenient use and transaction method.

H1: Customers' performance expectancy on using SROS has a positive correlation with their intention to use

2.5.3 Effort Expectancy

Another crucial indicator of intention is effort expectation, commonly referred to as "perceived ease of use," "ease of use," or "complexity," which describes the efforts necessary to operate the system (Venkatesh, 2003). In general, effort expectancy is defined as how easy an individual feels when he/she uses the technology and how easy it is to use that technology (Sair & Danish, 2018). People wish the system were too easy to use so they could allocate relatively less effort to use it (Davis, 1989). Furthermore, the scales to measure it are flexible, understandable, and easy to learn (Dillon, 2006). When consumers believe that the system is more flexible and easier to learn, they will have more intention to use it (Ting, 2022). Additionally, effort expectancy measures how certain we are that the system will not be easy to use. (Lee *et al.*, 2019). Service convenience is created with a customer's inherent need to save time and effort. (Kim *et al.*, 2008). Studies support the idea that technology is more likely to prompt system-use intention if it is seen as being more straightforward to use (Baba Aslinda Mohd Shahril & Hafiz Hanafiah, 2019; Okumus *et al.*, 2018; Bouwman *et al.*, 2014), so this study developed the following hypothesis:

H2: Customers' effort expectancy on using SROS has a positive correlation with their intention to use

2.5.4 Social Influence

Social influence is critical in UTAUT deciding a person's inclination to utilise technology. The model also uses the term "subjective norm" to describe this (Venkatesh, 2003). Both theories contend that people's desire to use technology is impacted by the thoughts and deeds of others who matter to them, such as their parents, friends, and coworkers. People are more likely to use technology if they believe others anticipate them doing so or if it enhances their social standing or image (Baba Aslinda Mohd Shahril & Hafiz Hanafiah, 2019). When people learn about the benefits of how their coworkers and those around them utilise technology, their perspective begins with the conviction that they can achieve the same benefits and values by doing the same (Baabdullah, 2018). Social influence has been shown to have a favourable impact on technology adoption for mobile food ordering applications like QR codes (Lee *et al.*, 2019) and the usage behaviour of smartphone diet apps (Okumus *et al.*, 2018). Consumers who are not experienced with a specific product or service generally rely on WoM (Word of Mouth) for information acquisition (Baba Aslinda Mohd Shahril & Hafiz Hanafiah, 2019). Therefore, it is assumed that acquiring information about the SROS through social influence will have a close relationship with the behaviour intention. However, Venkatesh (2003) discovered that social impact is only relevant in required situations rather than choices. In other words, social variables will only have a minor impact when people have the freedom to decide.

H3: Customers' social influence on using SROS has a positive correlation with their intention to use

2.5.5 Facilitating Conditions

The term "facilitating conditions" refers to situations in which individuals believe the basic organizational and technical infrastructure exists to enable them to use new technology without encountering obstacles. Examples of facilitating conditions include organizing training sessions to impart the necessary knowledge and providing resources, guidance, or instructions (Venkatesh, 2003). Conceptually, when consumers believe they can receive help and assistance more efficiently, they are more likely to have the intention to use the system. However, Venkatesh (2003) shows that working with conditions is more closely connected with use rather than expectation, and its consequences for the goal are short-term.

In addition, food restaurants that use SROS can contribute to the greater use of kiosks, tablets, or QR codes through various promotions (Baba *et al.*, 2019). Indeed, different promotion methods and support from organizations in the banking sector can remove barriers to the use of technology and impact technology adoption (Oliveira *et al.*, 2014). In the context of SROS, facilitating conditions must include the function to access the screen easily, such as the system's composition, touch speed, and screen movement. Therefore, SROS's kiosks, tablets, and QR codes are assumed to be more accessible than traditional systems, making it easier to facilitate technology adoption. The following hypothesis was nonetheless developed to determine whether facilitating conditions affect intention.

H4: Customers' consideration of facilitating conditions on using SROS has a positive correlation with their intention to use

2.6 Conceptual Framework

Based on Fig. 1, the relationship between each variable is the independent variable and the dependent variable. The independent variable is the level of SROS received expected by customers which consists of performance expectancy, effort expectancy, social influence, facilitating conditions, gender, and experience. The dependent variable only consists of one variable which is the intention to use SROS in Johor restaurant.
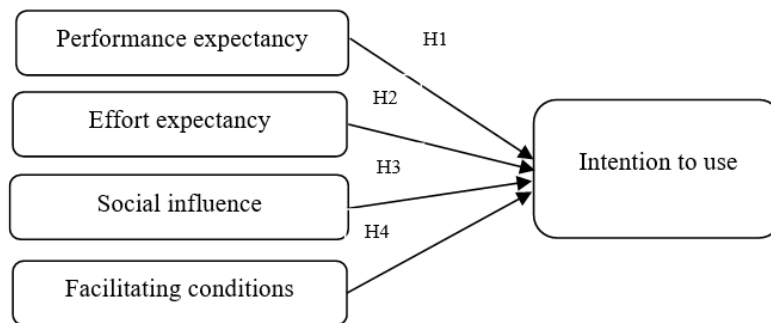

Fig. 1 *The relationship between the determinants influencing customers' intention to use SROS in restaurants*

3. Methodology

3.1 Research Design

Based on Wisler (2009), plans for conducting research will include a variety of options, from general suspicions to precise methods for gathering and analysing material. This plan gives you a few options, but they don't all have to be chosen based on how nice they sound to you and how much you want them to perform here. The ultimate choice is which research strategy should be employed to explore a subject. Finding out how likely clients are to utilise SROS is the primary goal of this study. The study's second goal is to discover the factors that influence patrons' decisions to utilise SROS in Johor Bahru eateries. The quantitative approach was employed by the researcher to carry out this investigation. The quantitative technique often entails a methodical and empirical investigation of phenomena utilising mathematics, statistics, and numerical data processing. Additionally, descriptive analysis was used to compute the mean and standard deviation in this study. The researcher conducted a correlation analysis to look at the correlation between the independent factors and the dependent variable after collecting the data.

3.2 Research Process

For the research process, the researcher first and foremost determined the issue statement and the study's goals. Following that, the researcher identified the research questions and the study's scope. The next stage is to study the literature of prior research, utilizing secondary sources such as articles, books, journals, and newspapers. By distributing a survey questionnaire to patrons who have utilized the SROS services at McDonald's and Haidilao Hotpot in Johor Bahru, the researcher gathered study data. The gathered data were analyzed using the IBM Statistical Package for the Social Sciences (SPSS) Statistics version 27. Finally, the researcher discussed the research outcomes, and concluded with recommendations in the last step.

3.3 Sampling Size

According to Kaur (2021), sample size can be determined as the number of samples involved in research. The target respondents of this research are customers who had used the SROS at McDonald's and Haidilao Hot Pot, Batu Pahat. The unit of analysis is the individual who consumes food at the two restaurants which are McDonald's and Haidilao Hot Pot. According to Krejcie & Morgan (1970), a sample size of 384 should be sufficient for this research because the population of this research was unknown. There is a formula to calculate the reliable sample size for an unknown population by using a z-score. The formula is:

$$n = Z^2(P)(1-P)/C^2 \tag{1}$$

Where, n = required sample size, Z= standard normal deviation set at 95% confidence level (1.96), P = percentage picking a choice or response (50% = 0.5), and C = confidence interval (0.05 = ± 5). The calculation indicates that the sample size in this research was 384.16 which was a round figure would be 384. Thus, the actual sample size was 384 customers who had used the SROS at McDonald's and Haidilao Hot Pot.

3.4 Questionnaire Design

A questionnaire is frequently employed as a data collection method in normative studies. It entails respondents answering a series of questions about a particular study topic. Both closed-ended and open-ended surveys are used. Closed-ended questions, like multiple-choice or Likert scale questions, provide respondents with a list of possibilities to select from. Respondents are able to express their ideas through open-ended questions. Because closed-ended questions only allow respondents to choose from the pre-selected options, they make it simpler to get greater response rates in this particular study.

Table 1 *Questionnaire design*

Section	Description
A	Demographic respondent (this section was identified by using multiple choice options)
B	Level self-service restaurant ordering system (SROS) received is expected by customers (this section was identified by using a 5-point Likert scale)
C	Determinants influencing customers' intention to use self-service restaurant ordering systems (SROS) in Johor restaurant (this section was identified by using a 5-point Likert scale)

3.5 Pilot Test

A pilot study is the first phase in the research process, and it entails carrying out a smaller-scale investigation to help in designing and modifying the investigation. A pilot study's primary goals are to assess the acceptability of interventions, find participants, get permission, and decide whether the research is feasible Donald (2018). Pilot studies are frequently used by researchers to determine whether their suggested methodologies and processes are appropriate. A well-designed and executed pilot research can help determine the required sample size by uncovering previously undiscovered factors and evaluating the strength of correlations between each variable (Polit & Beck, 2017). In this investigation, a pilot study was carried out by giving survey questionnaires to 30 participants. Johanson & Brooks (2010) recommend that 30 representative individuals from the population of interest are an acceptable minimal requirement for pilot research to develop a scale or conduct a preliminary survey. After that, Cronbach's alpha was computed to obtain the internal consistency reliability.

The reliability of a measuring instrument depends on how consistently it measures the concept it is intended to measure. Cronbach's alpha was used to measure the internal consistency reliability (Taber, 2018). When measuring the reliability of a research instrument, a Cronbach's alpha of 0.7 or higher indicates that the instrument has a high internal consistency (George & Mallery, 2003). Table 2 indicates the Cronbach's alpha for each variable. First, Cronbach's alpha for performance expectancy with 4 items is 0.849 and the result is considered good. The Cronbach's alpha for effort expectancy with 4 items and 4 items is 0.902 and the result is considered excellently consistent and reliable. Regarding the variable of facilitating conditions, there are 4 items with Cronbach's alpha value of 0.863. The reported result indicates that all items are good. Next, 4 items of social influence show a Cronbach's alpha value of 0.719 which indicates acceptable. Besides that, the intention to use have 4 items with Cronbach's alpha value of 0.923. The result for intention to use is considered excellent. The overall reliability of this study is 0.967 with a total item of 20 and it is considered excellent. Thus, the survey questionnaire of this study is suitable for the respondents, and it reached reliability and validity.

Table 2 *Pilot test result*

Variable	No. of items	Cronbach's alpha	Interpretation
Performance expectancy	4	0.849	Good
Effort expectancy	4	0.902	Excellent
Facilitating Conditions	4	0.863	Good
Social Influence	4	0.719	Acceptable
Intention to use	4	0.923	Excellent
Overall reliability	**20**	**0.967**	**Excellent**

3.6 Data Analysis

Data analysis is the process of examining data to provide valuable insights. It entails analysing, extracting, and processing raw data to provide useful information. It takes a variety of approaches and processes to put data into a format that makes it possible to spot patterns, trends, linkages, and conclusions using this methodical and organised approach. Both quantitative approaches, such as statistical analysis, regression analysis, and data mining, as well as qualitative ones, such as theme analysis, content analysis, and grounded theory, are used in data analysis. The analytical procedure is depicted in Table 3, which contains the data analysis table for this study. The researcher used IBM Statistical Package for the Social Sciences (SPSS) Statistics version 27 to analyze the data that was collected.

Table 3 *Data analysis method*

Research question	Data collection tools	Data analysis method
What level of self-service restaurant ordering system (SROS) received is expected by customers?	A survey questionnaire was disseminated to customers via an online platform.	Descriptive analysis • Mean • Standard deviation
What are the determinants influencing customers' intention to use self-service restaurant ordering systems (SROS) in Johor restaurant?	A survey questionnaire was disseminated to customers via an online platform.	Statistical Packages for Social Sciences (SPSS) • Exploratory Factor Analysis (EFA) • Correlation analysis

4. Results and Discussion

4.1 Response Rate

In most situations, a 50% survey response rate or higher is considered excellent (Thabit, 2021). According to Krejcie & Morgan (1970), a sample size of 384 should be sufficient for this research because the population of this research was unknown. According to the information in Table 4, 384 survey questionnaires were sent out to the intended participants using online platforms like Facebook, WhatsApp, and Xiaohongshu. Of those, 384 respondents willingly took part in the study, resulting in a survey return rate of 91.2%. Consequently, the researcher effectively gathered data on the specified sample size.

Table 4 *Survey return rate*

Population	Sample size	Questionnaire distributed	Questionnaire returned	Percentage (%)
Unknown	384	421	384	91.2

4.2 Demographic Analysis

Demographic analysis was utilized to evaluate the frequency and percentage of each response based on the data presented. In this investigation, 384 questionnaires were distributed to McDonald's and Haidilao Hot Pot patrons in Johor Bahru. Upon collecting the questionnaires, the analysis yielded the following outcomes in Table 5. Concerning gender, the study encompassed 114 males and 270 females, constituting 29.7% and 70.3% of respondents, respectively. This indicates a higher proportion of female customers engaging in the SROS experience at McDonald's and Haidilao Hot Pot Restaurants.

The breakdown of respondents by race revealed that the majority, accounting for 78.9%, identified as Chinese, totalling 303 individuals. Malay respondents constituted the second-highest percentage at 13.8% (53 people), followed by Indian respondents at 6.7% (26 people). Bumiputera Sarawak and Punjabi respondents represented 0.3%, with one respondent each, emphasizing a predominantly Chinese customer base. In analysing respondent demographics by age, the largest group comprised individuals aged 20-29, making up 82.8% of the total with 318 participants. The highest percentage was in the 30-39 age range, constituting 6.3% with 24 respondents. The 40-49 age range represented 3.4% with 13 respondents, and the 50-59 age range had a percentage of 1.5% with six respondents. Additionally, 5.2% of respondents were 19 years old and below, while 0.8% were 60 years old and above, highlighting the majority falling within the 20-29 age range.

Moreover, regarding the respondents' experience with the SROS system in the restaurant, the study's results revealed that all 384 respondents (100%) had experience using SROS in a restaurant. In addition, the frequency of restaurants visited by respondents indicated that out of 384 respondents, 51.6% visited only McDonald's, 5.7% visited only Haidilao Hot Pot, and 42.7% visited both McDonald's and Haidilao Hot Pot. This suggests that

the majority of customers visited McDonald's compared to Haidilao Hot Pot. Moreover, regarding the respondents' experience with the SROS system in the restaurant, the study's results revealed that all 384 respondents (100%) had experience using SROS in a restaurant. In addition, the frequency of restaurants visited by respondents indicated that out of 384 respondents, 51.6% visited only McDonald's, 5.7% visited only Haidilao Hot Pot, and 42.7% visited both McDonald's and Haidilao Hot Pot. This suggests that most customers visited McDonald's rather than Haidilao Hot Pot.

Table 5 *Demographic analysis*

Question	Frequency	Percentage (%)
Gender		
Male	114	29.7
Female	270	70.3
Total	**384**	**100.0**
Race		
Chinese	303	78.9
Malay	53	13.8
Indian	26	6.7
Bumiputera Sarawak	1	0.3
Punjabi	1	0.3
Total	**384**	**100**
Age		
19 years and below	20	5.2
20-29 years	318	82.8
30-39 years	24	6.3
40-49 years	13	3.4
50-59 years	6	1.5
60 years and above	3	0.8
Total	**384**	**100**
Education level		
SPM qualification and below	31	8.1
Diploma	40	10.4
STPM	2	0.5
Degree	295	76.8
Master	13	3.4
PhD	2	0.5
UEC	1	0.3
Total	**384**	**100**
Do you have the experience to SROS system		
Yes	384	100.0
No	0	0.0
Total	**384**	**100**
Which restaurant did you visit		
McDonald's	198	51.6
Haidilao Hot Pot	22	5.7
Both	164	42.7
Total	**384**	**100**

4.3 Exploratory Factor Analysis (EFA) of SPSS

Initially, the factors constructed in this study were represented by 16 items which are performance expectancy (4 items), effort expectancy (4 items), facilitating conditions (4 items), and social influence (4 items). A principal component analysis in the extraction method with a varimax rotation was utilized in order to reduce a large number of variables to a smaller number of factors.

Table 6 shows the results of factor analysis on factors. The final run of factor analysis produced four components of factors with eigenvalues more than one, which explained 53.193 percent of the total variance. The factor loadings for the remaining 13 factor variables were in the range of .555 to .806, which indicates the recommended cut-off point value of 0.45 for practical and statistical significance. The Kaiser-Meyer-Oklin value was 0.969 and the Bartlett test of sphericity was significant at 0.000. Anti-image correlation of the remaining 13 items of factors exceeded 0.50. The commonalities of the 13 items ranged from 0.614 to 0.798.

Table 6 *Factor analysis of factors*

	Component			
	1	2	3	4
I believe that my interaction with SROS is clear and understandable. (EE2)	.806			
I find SROS easy to use. (EE3)	.642			
I believe that learning how to use SROS is easy for me. (EE1)	.626			
My friends recommend me to use the system. (SI2)	.601			
SROS will make me order faster. (PE2)	.572			
When the system fails, it can be supported. (FC4)		.754		
Not using the system seems to be outdated. (SI4)		.730		
Many people around me have positive comments on the system. (SI3)		.691		
SROS can let me not make a few ordering errors. (PE3)			.737	
There are staff in restaurants to assist in use. (FC3)			.619	
I feel comfortable using SROS. (FC2)			.578	
SROS can make me flexible and adjustable in my ordering. (PE4)				.796
I believe it is easy for me to become skillful at using SROS. (EE4)				.662

Firstly, factor one "performance expectancy" consists of five items which were "I believe that my interaction with SROS is clear and understandable", "I find SROS easy to use", "I believe that learning how to use SROS is easy for me", "My friends recommend me to use the system" and SROS will make me order faster. It has an eigenvalue of 8.511 which accounted of 24.990 per cent of the total variance. Next, Factor 2 was labelled "Effort expectancy". There were three items which were "When the system fails, it can be supported", "Not using the system seems to be outdated" and, "Many people around me have positive comments on the system". It has an eigenvalue of 1.090 which accounted of 15.675 per cent of the total variance. After that, Factor 3 was labeled "Facilitating conditions" and included item were "SROS can let me not make a few ordering errors", "There are staff in restaurants to assist in use", and "I feel comfortable using SROS". It has an eigenvalue of .640 which accounted of 15.541 percent of the total variance. Lastly, Factor 4 was labeled "Social Influence". The only two items were "SROS can make me flexible and adjustable in my ordering" and "I believe it is easy for me to become skillful at using SROS". It has an eigenvalue of .624 which accounted for 11.701 percent of the total variance.

4.4 Descriptive Analysis

According to Kaliyadan et al, (2019), descriptive analysis is a type of data analysis that helps to explain, illustrate and summarize the data effectively. The data of this research is computed into mean and standard deviation. According to Krejcie & Morgan (1970), the mean value is calculated to evaluate the average responses received for each item, while the dispersion of the data about the average value is measured by the standard deviation. The lower the standard deviation value, the closer the data is to the average value. The level of agreement with the mean measurement which is graded by the central tendency level is revealed in Table 7 (Jamil, 2002). According to Perez *et al.* (2019), the scale for the interpretation of the standard deviation suggested by Ruiz (2015) is shown in Table 8.

Table 7 *Level of agreement with the mean measurement. (Jamil,2002)*

Mean score	Mean score interpretation
1.00-2.33	Low
2.34-3.66	Average/Moderate
3.67-5.00	High

Table 8 *Scale for the interpretation of the standard deviation*

Standard deviation scale	Dispersion level
1.34- 1.67	Very high
1.01-1.33	High
0.68-1.00	Average/Moderate
0.34-0.67	Low
0.00-0.33	Absent

The mean and standard deviation for performance expectancy items is summarized in Table 9. Based on the results, all five things have a high mean score between 3.96 and 4.11. This shows that most respondents agreed with all the statements about perceived ease of use. Moreover, the standard deviation values range from 0.871 to 1.071. Thus, the data was not clustered closely around the mean since the data has a moderate and high dispersion. The mean and standard deviation for effort expectancy items is summarized in Table 9. Based on the results, all three things have a high mean score between 3.88 and 4.08. This shows that most respondents agreed with all the statements of effort expectancy. Moreover, the standard deviation values range from 1.036 to 1.132. Thus, the data was not clustered closely around the mean since the data has a high dispersion level. The mean and standard deviation for social influence items is summarized in Table 5. Based on the results, all three things have a high mean score between 3.88 and 4.08. This shows that most respondents agreed with all the statements of effort expectancy. Moreover, the standard deviation values range from 0.981 to 1.048. Thus, the data was not clustered closely around the mean since the data has moderate and high dispersion levels. The mean and standard deviation for facilitating conditions items is summarized in Table 9. Based on the results, all three things have a high mean score between 4.07 and 4.08. This shows that most respondents agreed with all the statements of effort expectancy. Moreover, the standard deviation values range from 0.961 to 0.970. Thus, the data was not clustered closely around the mean since the data has a moderate dispersion level.

Table 9 *Mean and standard deviation for variables*

Performance expectancy	Mean	Std. Deviation	Interpretation
PE1	4.11	0.981	High
PE2	4.10	1.068	High
PE3	3.96	0.871	High
PE4	4.09	1.052	High
PE5	4.04	1.071	High
Average mean PE	4.06		High
EE1	3.91	1.132	High
EE2	3.88	1.075	High
EE3	4.08	1.036	High
Average mean EE	3.96		High
SI1	4.03	0.981	High
SI2	4.04	1.015	High
SI3	3.98	1.048	High
Average mean SI	4.02		High
FC1	4.07	0.961	High
FC2	4.08	0.970	High
Average mean FC	4.08		High

IT2	4.08	0.886	High
IT3	4.20	0.980	High
IT4	4.15	1.036	High
Average mean IT	**4.14**		**High**

4.5 Correlation Analysis

Pearson correlation coefficients were used in this study to examine the strength and the direction of the relationship between factors (performance expectancy, effort expectancy, facilitating conditions, and social influence), toward intention to use (Pallant, 2005). The Pearson correlation coefficient values are as follows (Pallant, 2005: 126):

a. $r = .10$ to $.29$ or $r = -.10$ to $-.29$ are considered small.
b. $r = .30$ to $.49$ or $r = -.30$ to $-.49$ are considered medium.
c. $r = .50$ to 1.0 or $r = -.50$ to -1.0 are considered large.

As shown in Table 10, the results indicate that four of the factors' dimensions were positively correlated with the intention to use value. Performance expectancy is a variable that has a very high positive correlation with intention to use ($r = 0.828$, $p < 0.5$). Effort expectancy was found to have a moderate positive correlation with intention to use ($r = 0.573$, $p < 0.5$). In addition, facilitating conditions had a high positive correlation with the intention to use ($r = 0.745$, $p < 0.5$). After that, social influence was found to have a small significant positive correlation with intention to use ($r = 0.695$, $p < 0.5$). Therefore, the four factors dimensions which are performance expectancy, effort expectancy, facilitating conditions, and social influence correlated with intention to use. The values of the correlation coefficient were in the range of range of 0.573 to 0.828 between the independent variable and dependent variable.

Table 10 *Pearson correlation matrix of study variables (n=384)*

		PE1	EE1	FC1	SI1	IT
PE1	Pearson Correlation	1	.760**	.782**	.706**	.828**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	384	384	384	384	384
EE1	Pearson Correlation	.760**	1	.639**	.528**	.573**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	384	384	384	384	384
FC1	Pearson Correlation	.782**	.639**	1	.654**	.745**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	384	384	384	384	384
SI1	Pearson Correlation	.706**	.528**	.654**	1	.695**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	384	384	384	384	384
IT	Pearson Correlation	.828**	.573**	.745**	.695**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	384	384	384	384	384

**. Correlation is significant at the 0.01 level (2-tailed).
** $p<0.01$; * $p<0.05$

4.6 Discussion

4.6.1 Objective 1: The Level of Self-Service Restaurant Ordering System (SROS) Received is Expected by Customers

The primary objective of this study was to assess customers' inclination to utilize SROS. Descriptive analysis was employed for this purpose, and Table 11 presents the mean and standard deviation for the intention-to-use items. The mean values ranged from 4.08 to 4.20, with traditional deviation values falling between 0.886 and 1.036. Despite potential determinants influencing customers' intention to use SROS, the results indicated a high level of choice among customers. Regarding preferences among the three SROS systems (kiosk, QR code, and tablet), 205 respondents (53.4%) preferred using kiosks. Furthermore, 321 respondents (83.6%) liked SROS over the traditional manual ordering system, while 63 respondents (16.4%) preferred the traditional manual ordering system. Previous researchers have proven that customers' intention to use self-service restaurant ordering systems (SROS) can be influenced by a range of factors, such as trust and perceived value, as stated by (Cheah *et al.*, 2013). Besides that, as well as perceived risk and innovativeness declared by (Jeon *et al.*, 2020; Williams *et al.*, 2015).

Table 11 *Summary of the descriptive analysis*

Intention to use	Mean	Std. Deviation	Interpretation
IT1	4.08	0.886	High
IT2	4.20	0.980	High
IT3	4.15	1.036	High
Average mean	**4.14**		**High**

4.6.2 Objective 2: The Determinants Influencing Customers' Intention to Use Self-Service Restaurant Ordering System (SROS) in Johor Restaurants

The second objective of this study was to discern the factors influencing customers' intention to utilize SROS in Johor restaurants. According to the findings in Table 12, all identified determinants exhibited correlations with the intention to use. The data analysis underscored that performance expectancy stands out as the most influential factor affecting customers' intention to use. This result aligns with earlier studies conducted by Arianeinejad & Archer (2014), Escobar-Rodríguez & Carvajal-Trujillo (2014), Abdul Razak *et al.* (2021), and Utomo *et al.* (2021). Seo (2020) further supports the idea that performance expectancy has the greatest impact on SROS adoption among the four fundamental constructs: performance expectancy, effort expectancy, social influence, and facilitation conditions. Furthermore, the study highlights a favorable association between performance expectancy and behavioral intention. Users perceive the use of SROS for payments as advantageous and supportive in their transactions, leading to time efficiency. The smooth and effective SROS payment process has solidified its reputation as a valuable tool, contributing to a positive perception of this payment method (Rosli *et al.*, 2020). Consequently, the positive correlation between customer performance expectancy regarding SROS usage and their intention to use supports hypothesis 1.

Moreover, the research identified a substantial correlation between effort expectancy and the intention to use SROS. This discovery is consistent with prior studies that consistently indicate a significant impact of effort expectancy within the Unified Theory of Acceptance and Use of Technology (UTAUT) framework (Shukry *et al.*, 2023, Yaacob *et al.*, 2021, Imani & Anggono, 2020). Conversely, in line with previous research, there is also consistent evidence of the substantial influence of perceived ease of use on perceived usefulness within the Technology Acceptance Model (TAM) (Basak *et al.*, 2015; Featherman *et al.*, 2010). Past research by Moya *et al.* (2017) asserts that when customers perceive the system as requiring minimal mental effort for use, their inclination to respond favourably increases, leading to actual usage of the system. Ting (2022) reported that Hong Kong young adults strongly agree with the simplicity of using SROS systems. Therefore, the positive correlation between customers' effort expectancy regarding SROS usage and their intention to use supports hypothesis 2.

Additionally, the findings indicate a positive and significant relationship between social influence and the intention to use, consistent with studies conducted by Seo (2020), Chaouali *et al.* (2016), and Okumus *et al.* (2018). Consumers, having grown up in the era of modern technologies, demonstrate a fundamental willingness to adopt SROS in restaurants. Their familiarity with technology instills confidence, making them more adept than older generations in using such systems. They actively seek out SROS, perceiving it as straightforward and efficient, aligning with a study by Chow *et al.* (2022), and supporting the researchers' findings. Certain market segments stand to benefit from SROS, including consumers with accessibility challenges, such as those with hearing impairments or language limitations (Barua *et al.*, 2018). For individuals within these categories, the potential for a face-to-face encounter may serve as a deterrent, dissuading them from patronizing the restaurant

due to concerns about communication barriers. In conclusion, the positive correlation between customers' social influence in using SROS and their intention to use supports hypothesis 3.

Subsequently, the study identified a significant correlation between facilitating conditions and the intention to use SROS. This discovery is in line with prior studies that consistently highlight the substantial influence of facilitating conditions, as indicated by Palau-Saumell *et al.* (2019), and Siwela *et al.* (2022). The functionalities inherent in self-service ordering systems suggest a readiness to adopt such systems. The acceptance of these machines' spans across all age groups, with users appreciating their convenient features, including a comprehensive menu display that provides accurate information on food items, prices, and discounts. Additionally, customers using self-service ordering systems can utilize the devices to innovate and create new menu items (Jeon *et al.*, 2020). In summary, the positive correlation between customers' facilitating conditions regarding SROS usage and their intention to use supports hypothesis 4.

Table 12 *Summary of the results of the hypothesis*

Hypothesis	Pearson correlation coefficients	Result
H1: Customer' performance expectancy on using SROS has a positive correlation with their intention to use	0.828	Supported
H2: Customer' effort expectancy on using SROS has a positive correlation with their intention to use	0.573	Supported
H3: Customer' consideration of social influence on using SROS has a positive correlation with their intention to use	0.745	Supported
H4: Customer' consideration of facilitating conditions on using SROS has a positive correlation with their intention to use	0.695	Supported

5. Conclusion

At the closure of this research, the two research objectives and the four hypotheses had been satisfactorily achieved. The first research objective determined the level of customers' intention to use SROS. Results indicated that the level of customers' intention to use the SROS system is high although several determinants influenced customers' intention to use the SROS system. Moreover, the second research objective identified the determinants influencing customers' intention to use SROS in Johor Bahru restaurants. Results showed that all the determinants were significantly correlated with intention to use. In addition, this research provides a valuable contribution to customers and restaurant practitioners. From the customers' perspectives, this study can help customers increase their intention to use the SROS system in a restaurant. While from the restaurateurs' perspectives, this study also provides important implications for restaurateurs on how

Future researchers were recommended to gather a larger sample size as well as consider additional determinants that will influence customers' intention to use the SROS system. As a suggestion to the owners of McDonald's and Haidilao hot pot restaurants, it is recommended that the workers always help and teach the old generation how to use the SROS system and provide a useful internet connection. Other than that, the owners must always maintain the SROS system and make sure it's not broken down.

The outcomes of this research offer valuable insights for both customers and restaurant practitioners. For customers, this study serves as a guide to enhance their willingness to adopt self-service restaurant ordering systems (SROS) by focusing on aspects like performance expectancy, effort expectancy, social influence, and facilitating conditions. It provides a deeper understanding of the advantages of SROS, potentially leading to increased adoption among customers who recognize its benefits in a restaurant setting. Furthermore, restaurant practitioners can use this study's findings to assess and refine their business strategies, aligning them with customer expectations. Given the unfamiliarity of local customers with SROS technology, restaurant practitioners should analyze the market acceptance of SROS services to boost the intention of local customers to use these services. The study aids restaurant practitioners in gaining a deeper comprehension of SROS implementation and understanding the factors that influence customers when engaging with advanced technologies. Additionally, the research findings offer crucial insights for restaurateurs on effectively utilizing SROS to enhance service quality. Addressing issues such as the overwhelming number of menu categories, restaurateurs can collaborate with SROS designers to refine the system, ultimately improving the overall consumer experience.

In light of the findings of this study, there are numerous recommendations can be drawn. First, it is suggested that future studies gather a larger sample size to increase the validity of the results. A larger sample size will produce more reliable and precise research data. Therefore, future researchers must include a greater number of respondents. In addition, future researchers are recommended to conduct this field of study in

different geographical locations. For example, The Sushi King in Johor Bahru, KFC in Malacca, and Madam Kwan in Kuala Lumpur provide the SROS system (kiosk, QR code, and tablet. Hence, future studies can consider conducting this field of study in different geographical locations to obtain much better-quality research as well as examine the intention to use the SROS system of customers from different states.

Last but not least, the researcher used a quantitative method in this research which required the respondents to answer the survey questionnaire by selecting the answer that best reflected their opinions for each question. Although the quantitative method was convenient, however, the respondents were unable to contribute comprehensive ideas. Thus, future researchers are recommended to use both research methods which are quantitative and qualitative if they intend to carry out research in this field of study. A comprehensive understanding and clear insight could be provided by combining these two research methods. On the other hand, this study can analyze the moderators to investigate their influence such as gender, age, experience, and voluntariness of use to investigate their influence.

As a suggestion to the owners of McDonald's and Haidilao hot pot restaurants, it is recommended that the workers always help and teach the old generation how to use the SROS system and provide a useful internet connection. Other than that, the owners must always maintain the SROS system and make sure it's not broken down.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm their contribution to the paper as follows: **study conception and design:** *Jie Yee Lim, Shiau Wei Chan;* **data collection:** *Jie Yee Lim;* **analysis and interpretation of results:** *Jie Yee Lim, Md Fauzi Ahmad;* **draft manuscript preparation:** *Fadillah Ismail, Rumaizah Ruslan, Rohaizan Ramlan, Nur Syereenaa Nojumuddin, Izzuddin Zaman. All authors reviewed the results and approved the final version of the manuscript.*

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