

# Investigating The Customer's Intention to Utilize Service Robots in Restaurants: The Moderating Role of Age Generation

Journal of Tourism, Hospitality & Culinary Arts (JTHCA) 2024, Vol. 16 (1) pp 67-90  
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Submit date: 30<sup>th</sup> October 2023  
Accept date: 21<sup>st</sup> December 2023  
Publish date: 30<sup>th</sup> April 2024

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## Proposed citation:

Nazri, N. A. N. M., Baba, N., & Abdullah, N. (2023). Investigating The Customer's Intention to Utilize Service Robots in Restaurants: The Moderating Role of Age Generation. *Journal of Tourism, Hospitality & Culinary Arts*, 16(1), 67-90.

## Abstract

This study aims to investigate the utilization and intention to employ robot service by customers in the restaurant industry. Business enterprises and scholars will persist in examining and modifying their methodologies to effectively incorporate and gain customer acceptance of robotic services within the restaurant industry. Nevertheless, a thorough evaluation of consumer usage and its potential to stimulate future activity remains to be conducted rigorously. The present study employed a cross-sectional design and utilized a quantitative research approach, employing a questionnaire as the major instrument for data collection. The collection and analysis of data will be conducted to get descriptive statistics. The Unified Theory of Acceptance and Use of Technology (UTAUT2) is widely employed in the field of food service and technology studies. The UTAUT2 model was revised to incorporate customer use intention, which serves as the dependent variable, to align with the study design. The literature review is a compilation of seven theoretical frameworks. This study makes a valuable contribution to the field of digital technology and its applications, specifically in the areas of robot service and food service systems.

## Keywords:

Robot Service Restaurant, Usage, Customer Use Intention, UTAUT2

## 1 Introduction

Upon the advent of radio, a considerable number of individuals had the belief that it would precipitate the demise of books. Upon the advent of television, several individuals had the belief that it would herald the demise of radio (Ivanov et al., 2017). The enduring presence of robots prompts speculation regarding their potential to supplant all human occupations (Decker et al., 2017). According to the findings of Zemke et al. (2020), a service robot can be defined as an autonomous entity that performs tasks of practical value for individuals and machines, excluding instances where human involvement is necessary, except in the context of industrial automation applications. Indeed, a significant proportion of robots employed in the tourism and hospitality sectors were initially developed for application in the manufacturing industry. According to Zemke et al. (2020), subsequent modifications were made to accommodate the demands of travel-related industries, resulting in the development of robots specifically designed for tasks such as luggage handling, previously employed for material transportation, housekeeping duties, formerly carried out in factory settings and the creation of robotic barista arms capable of preparing coffee or cocktails. The growing viability of technology in recent times has led to a heightened focus on the field of robot service among scholars and professionals in various industries (Jang & Lee, 2020). The field of hospitality has sparked much debate over the feasibility of substituting human workers with robots in customer-facing roles. This topic has elicited persuasive arguments from proponents and critics (Kim et al., 2021).

This study examines customers' intentions to utilize service robots in restaurants, focusing on the moderating role of age generation (Kim et al., 2021). The research aims to understand how different age groups perceive and interact with service robots in restaurant settings. By investigating the intentions of various age generations, the study seeks to uncover potential differences in acceptance and adoption rates (Kautonen et al., 2015). The findings will provide insights into how age influences customers' attitudes and behaviors toward service robots, ultimately contributing to a better understanding of the role of generation gaps in the adoption of robotic technologies in hospitality settings (Zemke et al., 2020).

Significance of this study first, adding customers' intention to use the UTAUT2 model boosts tech acceptance research (Venkatesh et al., 2012). It strengthens theory and links findings to real-world evidence. This study also betters how restaurants adopt digital tech and robots (Zemke et al., 2020).

Knowing if diners will accept service robots helps restaurants plan better (Kim et al., 2021). Understanding what customers want helps make robot systems that improve dining (Kautonen et al., 2015). This smart approach saves money and makes restaurants more efficient. Robots that customers like can attract more tech-friendly diners, boosting competition (Zemke et al., 2020).

This research can ease worries about robots in restaurants (Kim et al., 2021). Innovating and adapting to what customers want makes them happier and drives social change. By keeping up with new trends, restaurants can offer better, more

personalized service, creating positive change in the food industry.

### **1.1 Issues in the Context Setting**

Over the past decade, Malaysia has witnessed a significant surge in the proliferation of several restaurant classifications, including high-end, fast-food, themed, ethnic, and casual establishments. Based on the findings of Shahzadi et al. (2018), it can be deduced that the restaurant industry's notable expansion acts as a driving force for economic growth, stimulating many industries and creating a significant amount of job prospects.

The robotics industry is quickly evolving, with corporations and research organizations worldwide designing and manufacturing new robots daily. New technologies are steadily filling gaps and creating new industry opportunities (Garcia-Haro et al., 2021). Recent advances in robot technology have led to the development of mechanisms that can read human thoughts and interpret their gestures (Asif et al., 2015).

Several robots have been created to assist individuals in physical and social interactions (Ivanov et al., 2017). Service robots are widely used. One example is the deployment of robot waiters in restaurants (Asif et al., 2015). Due to the challenging nature of server work in restaurants (Hamdany et al., 2019). Service efficiency in the food and beverage industry is increasing due to robot technology (Hwang et al., 2021). Robot waiters can take orders and serve food and beverages while roaming the restaurant (Garcia-Haro et al., 2021).

However, the COVID-19 epidemic quickly slowed the global economy (UNWTO, 2020). The pandemic is causing major problems for the hospitality business. In response to the COVID-19 pandemic, community lockdowns, social distancing, stay-at-home orders, and travel and mobility restrictions have closed many hospitality businesses and reduced demand for those that remain (Bartik et al., 2020). Most restaurants must only serve takeaway. People's preferences changed quickly after the epidemic (Kim et al., 2021; Wang & Wang, 2021). According to Al-Mughairi et al. (2021), consumer attendance dropped significantly in numerous high-contact service industries, such as restaurants. (Hou et al., 2021; Lee et al., 2021; Wan et al., 2020; Salem et al., 2021; García-Gomez, 2021). Due to concerns about viral infections, people frequented restaurants with fewer social chances (Wan et al., 2020). Thus, the demand for robotic service providers increased (Wang & Wang, 2021).

Due to public awareness of worldwide health hazards, Kim et al. (2021) and Wang and Wang (2021) believe that the hotel industry's perspective has changed permanently. Kim et al. (2021) found that people are aware of pandemic threats and are cautious even without the virus. Matthews (2020) predicts that more restaurants will use robots to suit technology demands. Restaurants confront several risks. (Guarente, 2020). According to Zeng et al. (2020), restaurant operators are implementing technological solutions to move from high-touch to high-tech. Service robots are important inventions because they can interact, communicate, and provide

services to an organization's customers, according to Wirtz et al. (2018). Lu et al. (2021) and Seyitoglu Ivanov (2020b) discovered that robot chefs and waiters improve food safety and cleanliness by reducing human contact. The fact that robots cannot contract viruses is the main reason. According to Hazée et al. (2017), the worldwide pandemic has raised susceptibility, illness concerns, and social isolation. By maximizing potential, the service robot sector grew (Willems et al., 2021).

The restaurant's procedure also requires waiters to hand transcribe orders. Thus, orders and documents may be lost. Isa et al. (2022) found that well-made computers make fewer mistakes. Restaurants globally are also struggling due to the global coronavirus pandemic, which has reduced income and labor. This study shows that hotel service robots reduce interpersonal contact and infection risk. Customers worry about restaurant robot sanitation due to the pandemic. Hwang et al. (2021) define "performance risk" as the fear of financial losses from robot service failure. Hwang et al. (2021) found that overlearning services is risky. Brengman et al. (2021) found that customers preferred service robots to kiosks. Robotic technology has advanced, yet many people have yet to use it.

Due to the novelty of robot service in restaurants, few scientific studies have examined consumer happiness and acceptability (Lee et al., 2018; Park, 2020; Seo & Lee, 2021). Few research has evaluated post-experience behaviors (Hwang et al., 2020; Jang & Lee, 2020). Due to the COVID-19 epidemic, empirical studies on customer satisfaction and intention to return to robotic service providers are few. The hospitality industry must use robotic services to keep up with the technology's rise to stay profitable. Industry stakeholders must also examine robot service deployment considering global health issues. To create a comprehensive body of research that may inform practice during and after the COVID-19 pandemic, past findings must be validated and expanded.

To fully understand how technology affects individuals and organizations, Zulkifly (2017) suggests studying technology's impact on adoption. Researchers must study how people's views of technology change as they use it. How can a bad experience with technology affect how someone uses it? Does consumers' anger or displeasure with technology affect their future usage patterns or decisions? Modern technology adoption study emphasizes systems too much. However, even modest changes in a customer's demeanor can influence their final choice. Many individual-dependent variables are needed to explain customers' cognitive mechanisms of visual experiences.

This study used theoretical frameworks to evaluate Malaysian customers' views on robot waitstaff. Marketers struggle to understand and predict customer behaviour. The lack of studies on customer acceptance of technology-driven services, particularly on the underlying reasons that influence their behaviour, causes this problem (Meuter et al., 2003, Parasuraman, 2000, Venkatesh et al., 2007, Parasuraman & Colby 2015).

## **2 Literature Review**

### **2.1 Restaurant Industry and Technology**

The restaurant industry is inherently characterized by competition, prompting restaurant proprietors to continually seek novel strategies for enhancing sales and ensuring customer satisfaction (Huber et al., 2010). As a result, the restaurant industry has experienced significant growth due to the increasing number of individuals opting to dine outside of their residences. Many individuals find themselves dedicating a significant portion of their time to their professional obligations, resulting in little availability for personal activities within the confines of their residences. The most effective approach to address this matter is to dine in a restaurant. Furthermore, as a result of these prevailing patterns, proprietors of restaurants are actively seeking novel approaches to market their establishments (Barrish, 2012).

The food service industry in Malaysia has experienced increasing challenges throughout time, characterized by a proliferation of diverse international cuisines (Harrington & Schaefer, 2014). The excessive influx of food has presented a significant challenge for eateries to sustain their operations. Currently, the food service business is widely recognized as a global economic sector, with a broad range of producers and customers spanning many geographical locations (Lee & Ha, 2012). Based on the available data, it appears that Malaysia's economy is poised for sustained growth, particularly within the food service sector. Considering the rapid growth of the sector, firms must employ assertive marketing methods to attract new clients and retain existing ones (Kimes, 2008). One approach employed by restaurant proprietors involves the integration of technology inside their operations. Restaurateurs have begun using technology in their operations to revolutionize how they provide to their clientele. For instance, the inclusion of visual representations and detailed nutritional data on menus has been documented in several studies (Buchanan, 2011; Huber et al., 2010; Hsu & Wu, 2013).

### **2.2 Robot Service in the Food Service Industry**

According to the International Organization for Standardization (ISO) standard, there are officially defined terms related to robots. The standard defines a robot as an actuated mechanism that is programmable in multiple axes and possesses a certain level of autonomy. There are two main classifications of robots: industrial robots and service robots. According to the definition provided by the International Federation of Robotics (2016), a service robot is characterized as an autonomous entity that carries out beneficial duties for humans or equipment in non-industrial automation settings without requiring human interaction. Robots are commonly classified into two distinct categories, namely personal service robots and professional service robots. Personal service robots are employed in non-commercial environments and encompass various instances, such as automated wheelchairs and personal mobility assistance robots. On the other hand, professional service robots are employed for commercial purposes, such as facilitating deliveries or doing cleaning jobs. Furthermore, the operation of

professional service robots necessitates the involvement of a human operator who is responsible for initiating, overseeing, and terminating the robot's activities (Zemke et al., 2020).

According to Chan and Tung (2019), service robots are automated and programmable devices designed to augment human productivity and engage in social interactions through the processes of sensing, cognition, and action. Prior to the implementation of service robots, the use of industrial robots in the manufacturing sector was considered a predecessor to the integration of robots in the service industry (Bard, 1986; Chan & Tung, 2019). The integration of robotic technology within the industrial and manufacturing domains commenced as early as the 1960s, with the primary objective of reducing production expenses and ensuring the safety of people in hazardous operations (Bard, 1986). Industrial robots have been employed for the execution of manufacturing operations, including but not limited to welding, polishing, and assembling. The primary objective behind their implementation has been the substitution of human labor and manual chores (Chan & Tung, 2019). In response to the swift advancement of robotic technology, service organizations have made proactive efforts to integrate robotics into service interactions, to support employees and deliver services to consumers (Chan & Tung, 2019).

The potential benefits associated with the implementation of robotic restaurants encompass the following considerations. According to Ivanov et al. (2017), there is a possibility that robotic restaurants could appeal to individuals who are interested in technology and possess a strong inclination toward technical advancements. According to Eksiri and Kimura (2015), contemporary cohorts of technology enthusiasts exhibit a strong inclination toward adopting a favorable perspective on the utilization of robotic systems in the context of restaurants. As a result, robotic restaurants can be differentiated from their competitors. According to Berezina et al. (2019), the implementation of robotic restaurants can address this problem effectively, as robots are not susceptible to illnesses, do not require vacations, and do not express complaints like human employees.

## **2.3 Factors that Contribute to Customer's Willingness toward Robot Usage**

### *2.3.1 Performance Expectancy*

To gain insights into customers' usage patterns of technology, it is advisable to examine their expectations regarding its functionality (Ariaeinejad & Archer, 2014; Escobar-Rodriguez & Carvajal-Trujillo, 2014; Raman & Don, 2013; Venkatesh et al., 2012). In this instance, the term "performance expectancy" refers to the extent to which individuals perceive that the utilization of technology will facilitate the accomplishment of specific tasks (Venkatesh et al., 2012). In the context of technology utilization, customers are influenced, to some extent, by external factors. The rationale behind this phenomenon can be attributed to the utilitarian principles that underlie technology, including its perceived utility and anticipated outcomes

(Venkatesh et al., 2003).

The concept referred to as "perceived utility" (Phonthanakitithaworn et al., 2016) encompasses customers' expectations regarding the service's influence on their capacity to successfully finalize a transaction. The prevailing belief is that utilizing technology to minimize time and energy use is advantageous. Hence, this study proposes that individuals' beliefs about the usefulness of AI-powered food service establishments have a significant influence on their perspectives, as supported by previous research conducted by Liébana-Cabanillas et al. (2017) and Upadhyay & Jahanyan (2016).

### *2.3.2 Effort Expectancy*

According to Venkatesh et al. (2012), effort expectancy pertains to the perceived ease of use associated with a certain tool. With the continuous advancement of technology, there is an increasing utilization of sophisticated features. According to Mroz (2013), the concept of "ease of use" may be demonstrated through the use of various features such as graphical interfaces, touchscreen displays, and touchpads of varying dimensions. Significantly, within the scope of this study, the concept of effort expectancy pertains to the perceived ease of utilizing a robot service, which is widely acknowledged as a crucial factor influencing customers' initial adoption and subsequent continued usage of the robot.

Prior research has indicated that the perception of effort required by users is a significant determinant of their acceptability and behavior towards a particular system (Ariaeinejad & Archer, 2014; Escobar-Rodriguez & Carvajal-Trujillo, 2013; Raman & Don, 2013; Venkatesh et al., 2012). According to Alalwan et al. (2017), empirical evidence suggests that users consistently demonstrate a high level of ease and efficiency while transitioning to the latest system. Other researchers suggest that the component of ease of use, often referred to as effort prediction, has been identified as significant (Davis et al., 1989; Alagoz & Hekimoglu, 2012; Alalwan et al., 2016; Okumus & Bilgihan, 2014). According to Ivanov et al. (2017), computer services have been found to enhance the efficiency and effectiveness of the service sector by diminishing the workload required of individuals. Moreover, Kwak and Park (2012), enhance service quality while simultaneously reducing expenses. Wirtz et al. (2018) also state that the acceptance of service robots by consumers is contingent upon the extent to which these robots effectively fulfill the functional, social, and relational demands associated with their respective tasks.

### *2.3.3 Social Influence*

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#### *2.3.4 Facilitating Conditions*

According to Venkatesh et al. (2012), facilitating conditions refer to the consumers' perceptions regarding the resources and support that are accessible to them to carry out a particular behavior. This phenomenon is commonly recognized as a significant indicator of user acceptance and behavior across various research domains, such as healthcare (Ariaeinejad & Archer, 2014; Zhou et al., 2010), mobile tour guides (Lai, 2013), and internet banking industry (Foon & Fah, 2011).

Customers are more inclined to utilize the automated service, experience positive outcomes, and express recommendations if they have the perception that favorable circumstances are present. One potential facilitating factor that could enhance customer happiness is the provision of clear guidelines and support for utilizing the robot service within the restaurant. This may include the implementation of a user-friendly interface and the availability of attentive staff members who can promptly resolve any concerns or difficulties that may arise. Customers who are provided with comprehensive information and adequate support to effectively utilize the robot service are more inclined to develop a favorable perception of the restaurant because of their engagement with the robot.

#### *2.3.5 Hedonic Motivation*

Hedonic motivation, one of the initial three additional components incorporated into the original Unified Theory of Acceptance and Use of Technology (UTAUT), is characterized as the enjoyment or satisfaction obtained from the utilization of technology (Venkatesh et al., 2012). Drawing upon motivation theory, the current model is enhanced by incorporating intrinsic motivation to complement its existing focus on extrinsic motivation linked to performance expectancy (Venkatesh et al., 2012). The significance of hedonic motivation in technology acceptance models has been established by various studies examining customer technology acceptance and use (Wang et al., 2013; Lewis et al., 2013; Venkatesh et al., 2012; Magni et al., 2010; To et al., 2007).

According to several scholars, hedonic motivation plays a significant role in the



adoption and utilization of technology, as it is closely associated with the enjoyment and pleasure derived from such activities (Arenas Gaitán et al., 2015; Baptista & Oliveira, 2015; Huang & Kao, 2015). From a hedonistic standpoint, it may be argued that customers seek to derive pleasure and satisfaction when engaging with a product or service, encompassing emotions like contentment and enjoyment. The utilization of robotic systems for the sake of food delivery or customer interaction has the potential to yield a favorable hedonic encounter and heightened levels of client contentment.

### *2.3.6 Habit*

The notion of habit was subsequently incorporated into the original Unified Theory of Acceptance and Use of Technology (UTAUT) framework by Venkatesh et al. (2012). The concept of habit pertains to the anticipation and forecast of patterns in technology utilization behavior, as discussed by Escobar-Rodriguez and Carvajal-Trujillo (2014) and Lewis et al. (2013). There are two separate theoretical perspectives that emphasize the impact of habit on the use of technology (Kim et al., 2005; Limayem et al., 2007; Venkatesh et al., 2012). One perspective, known as the "habit/automaticity perspective" (HAP), posits that the utilization of technology is driven by individuals' automatic response to habitualized actions rather than a deliberate cognitive process (Kim et al., 2005; Limayem et al., 2007; Venkatesh et al., 2012). The second perspective is referred to as the "instant activation perspective" (IAP), which pertains to the formation of habits through cognitive processes (Kim et al., 2005). This perspective emphasizes the continuous utilization of technology, wherein the inclination to use technology becomes temporarily ingrained in the minds of users and is reinforced through ongoing usage (Kim et al., 2005; Venkatesh et al., 2012).

In their study, Venkatesh et al. (2012) identified two significant correlations between individuals' desire to engage in a certain activity and their subsequent behavioral enactment of that activity. Morosan and DeFranco (2016) discovered that the utilization of a system is significantly influenced by a customer's habits. According to Singh and Matsui (2017), customers have the potential to develop habitual behaviors because of their frequency of engagement with a business and their level of technological proficiency. As indicated by Palau-Saumell et al. (2019), how individuals employ technology inside restaurant settings serves as a robust determinant of their actual usage patterns.

### *2.3.7 Trust*

Trust can be elucidated as the condition characterized by placing confidence in the competency of another individual or entity to discharge their duties and satisfy expectations as necessitated. When individuals can consistently rely upon a party, they tend to sustain allegiance and uphold a connection with said party. Confidence constitutes a foundational prerequisite for the facilitation of effective collaboration,

whereas the significance of loyalty is commonly underscored and accorded priority. Individuals may manifest fidelity towards an individual, a relationship, or an organization that instills a sense of security within them, even in the presence of transient self-doubt. Trust can be delineated as a state of experiencing assurance and self-assuredness in something that is obscured, dreaded, or inscrutable, thereby empowering individuals to make well-informed decisions and engage in apt actions in the immediate moment.

Trust has been proposed as a significant predictor of technology acceptance and customer behavior due to its impact on customers' perceptions of safety, ambiguity, and risk. According to Liébana-Cabanillas et al. (2016), trust plays a crucial role in enhancing the level of enjoyment experienced by users of mobile banking services. Numerous scholarly investigations have been conducted to explore the factors contributing to trust (Kaushik et al., 2015). However, it is worth noting that most studies predominantly rely on subjective measures to assess the antecedent, thus introducing bias into the obtained results. The advent of recent developments in machine learning and artificial intelligence has facilitated the emergence of computational models for predicting trust.

#### **2.4 Age Generation**

The relationship between customers' technical attitudes and everyday use is influenced by their age and gender, as demonstrated by studies conducted by Palau-Saumell et al. (2019) and Venkatesh et al. (2003). The age factor will exert a substantial influence on the uptake of technology. According to a study conducted by Jaradat et al. (2018), a significant body of empirical data indicates that age is the most influential factor in predicting the utilization of self-service tools. Counterargument: According to Operationalizing technological adoption trends about chronological age facilitates a more streamlined analysis. Empirical evidence suggests that older individuals encounter greater challenges in adopting novel technologies.

Jaradat et al. (2018) state that individuals of retirement age may encounter difficulties in utilizing new technologies due to a diminished capacity for learning. Other than that, the findings of Rojas-Méndez et al. (2017), it was observed that younger individuals have a greater inclination towards adopting technology, potentially indicating that older adults prefer engaging in interactive conversations. Meanwhile, the findings of Clark and Marchi (2017), show there is a notable preference among younger clients for purchasing aircraft tickets through online platforms, whereas older customers tend to choose the utilization of traditional travel agents.

Moreover, in a study conducted by Clark and Marchi (2017), there are variations in the interpretation of new technology between younger and older clients. The disparities observed in the adoption and perception of new services, such as mobile app purchases for food and drink, might be attributed to generational variations in customer awareness and acceptability. The findings of the research indicate that there

is a correlation between age and the adoption of technology. Diverse generations exhibit distinct cognitive and behavioral patterns. Therefore, it is imperative to consider the differences associated with them.

The millennial generation comprises approximately 82 million individuals who were born between the years 1980 and 1994. In contrast to Generation Z, who are the initial cohort to come of age alongside smartphones and other digital technologies, this phenomenon can be examined. The contemporary labor force offers advantages to the present generation due to their heightened receptiveness to novel concepts. Both generations place importance on receiving input in the workplace. According to Zoya and Chitrao (2021), there is a discernible trend among millennials towards valuing cooperation, whereas Generation Z is increasingly exhibiting a preference for independence. The younger demographic, encompassing Millennials and Generation Z, encounter challenges in adapting to contemporary work environments.

According to Baharudin et al. (2017) and Maioli (2016), there is a belief among certain writers that Millennials and Generation Z exhibit common characteristics as a result of their keen interest in emerging technology and their willingness to explore diverse employment opportunities. It is evident that individuals belonging to the Millennial and Generation Z cohorts exhibit a pronounced appreciation for and reliance on technology across several aspects of their daily existence. Sinead (2018) claims that, due to the shared characteristics of Millennials and Generation Z, these two generations collectively constitute 75% of the worldwide labor market. Consequently, organizations are required to develop an engagement strategy that aligns with the communication and work preferences of these cohorts.

The selection of Generation Z customers as subjects for investigating robot customer assessment was based on their status as digital natives, their constant online presence, their proficiency in technology, and their willingness to engage with novel products and services. Limited research has been conducted on the attitudes of Generation Z towards robots. According to a study conducted by Ivkov et al. (2020), there is a belief among hospitality students from Generation Z, who are expected to play a significant role in the future of the business, that robots could potentially be used to do service-related duties. Hence, the extensive knowledge individuals possess regarding technology might potentially facilitate the acceptance of robotic systems as clients, as they would be able to discern and appreciate the advantages associated with such systems.

Nevertheless, this age cohort may not possess a predilection towards robotics. According to Fenech et al. (2020), there is a higher prevalence of fear and anxiety. In studies focused on age-controlled research, scholars have discovered contrasting perspectives about the utilization of hospitality robots among younger individuals. One study conducted by Cha (2020) highlights counterintuitive factors that motivate younger individuals to engage with these robots. Conversely, another study by Belanche et al. (2019) suggests that age does not significantly influence the adoption of hospitality robots. The literature on preventive healthcare during the COVID-19

pandemic within the context of Generation Z does not extensively discuss the inclusion of robots and other technological advancements. In contrast, the study conducted by Kamenidou et al. (2020) investigates the most suitable media platforms for effectively disseminating information to the present generation regarding the problem.

## **2.5 Customer Behaviour**

Multiple unique definitions of customer behavior exist. According to Madichie (2009), the concept under consideration pertains to the cognitive and affective states individuals undergo, as well as the actions they engage in during the process of consumption. This phenomenon is characterized as dynamic in nature, involving many forms of partnerships and exchanges. When doing research on consumer behavior, whether at an individual or group level, the primary emphasis lies on the selection, acquisition, utilization, and disposal of products or services to fulfill their wants and aspirations. This may encompass several entities, such as products, services, ideas, or experiences (Madichie, 2009). The interaction between workers and consumers can have a substantial influence on customer behavior. A customer behavior model is a theoretical framework that elucidates the underlying factors and mechanisms driving customer decision-making processes. According to Mandel et al. (2017), this tool is employed to support organizations in their decision-making endeavors by offering a comprehensive analysis of client behavior.

Customer behavior refers to the actions undertaken by individuals when they engage in the process of seeking, purchasing, utilizing, evaluating, and disposing of products and services that they see as capable of fulfilling their needs. The behavior of customers is influenced by various aspects, including social and personal elements inside their environment. The behavior of customers can be influenced by various factors, including personality traits, self-perception, motivational factors, level of involvement, cognitive processes such as learning and memory, as well as their attitudes. Social scientists have developed theoretical frameworks to comprehend human behavior across various contexts. The concepts of stimulus and action matrix are frequently discussed in the existing models. The prevalence of consumerism and demarketing strategies has intensified market competition.

Consumerism is a socio-economic phenomenon characterized by the collective efforts of individuals and governmental entities to enhance the rights and influence of consumers vis-à-vis sellers. This encompasses the various measures undertaken by governmental bodies, commercial enterprises, and autonomous organizations to safeguard the rights of consumers. Consumerism entails ensuring the safety of clients in all transactions conducted with various organizations. Conversely, demarketing has an impact on consumer purchasing behavior (Bhalerao & Pandey, 2017). The significance of consumers' behavior is acknowledged to be influenced by perceptions, attitudes, and motivation (Güler, 2014; Haq & Abbasi, 2016). Additionally, a connection has been identified between perceptions, attitudes, motivation, and customers' values (Güler, 2014).

Previous studies have indicated that marketers have consistently exhibited a strong inclination toward understanding human behavior. The comprehension of consumer behavior enables marketers to get insights into the cognitive processes, emotional responses, and decision-making mechanisms employed by customers when faced with a plethora of product and brand options. Additionally, this aids in the comprehension of how customers are impacted by various factors such as their surroundings, social circles, familial relationships, and interactions with sales personnel. The purchasing behavior of customers is influenced by a multitude of factors, including cultural, social, personal, and psychological elements. Marketing is an academic discipline concerned with the analysis of individuals, collectives, and organizations in their decision-making processes about the acquisition, consumption, and disposal of concepts, commodities, and services to satisfy their needs and desires.

Numerous factors elude the marketer's influence and remain beyond their control, yet it is important to meticulously consider the intricate nature of customer behavior. Market professionals believe that by contemplating the factors influencing consumer purchasing behavior, they can effectively manage product offerings, ensuring the prominence of popular items while eliminating obsolete ones. According to Das (2020), this will also contribute to enhancing the visual appeal of the products when they are presented to buyers. One notable differentiation between service robots and service personnel resides in the fact that service personnel are human beings who offer genuine responses (Wirtz et al., 2018). The absence of this characteristic is seen in service robots. The impact of customers' use, communication, or neglect of robots has no significance. The perspective presented in this study carries substantial ramifications for consumer behavior (Lu et al., 2020).

## **2.6 Customer Willingness to Use**

Customer use intention refers to the probability or inclination of a customer to utilize a particular product or service. The consideration of product development and marketing holds significance due to its potential impact on business performance and financial outcomes. The intentions of customers to utilize a product or service can be influenced by various factors, including their perceived utility, ease of use, quality, and overall satisfaction. The utilization of purpose can also be influenced by the customer's prior encounters with comparable products, the cost of the product, and the marketing and promotional endeavors of the firm. To enhance product utilization, organizations may employ strategies aimed at enhancing perceived product quality, utility, and usability. Furthermore, enhancing the quality of service and support provided to clients has the potential to foster increased satisfaction and loyalty, hence heightening the probability of continued product utilization.

The efficacy of a restaurant employing robotic service is contingent upon several determinants, including public sentiment towards the substitution of human labor with robots, the user-friendliness of the robotic system, and the overall quality of the restaurant. To enhance consumer patronage in robot-service restaurants, enterprises may prioritize the provision of a superior dining experience that effectively

amalgamates the advantages of robotic technology with exceptional customer service and delectable cuisine. The restaurant's potential client base may potentially expand if it implements a strategy of providing discounts or exclusive offers to patrons who avail themselves of the robot service.

In contrast to the extensive body of research on early adoption, there exists a paucity of studies examining post-acceptance customer behavior. According to Lai (2017), empirical investigations conducted on IT systems emphasize the significance of practical usage as a critical determinant in assessing the efficacy of a system. A prior investigation of the utilization of acceptance has revealed a prevalent trend in service utilization that impacts marketing-related behaviors, including contentment, interest in novel technologies, and intentions to make future purchases or repeat purchases. Ajzen and Fishbein (2005) conducted an initial investigation into behavioral reactions, which revealed that the inclination to engage in a particular behavior could serve as a reliable predictor of said behavior (Kautonen et al., 2015).

## **2.7 Unified Theory of Acceptance**

In 2012, Venkatesh et al. modified the UTAUT model to shift its emphasis from facilitating employees' comprehension and utilization of technology to examining customers' technology usage patterns. The emergence of UTAUT2 has resulted from the inclusion of three additional dimensions, including Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions, in addition to the original three. The three factors under consideration are Hedonic Motivation, Price Value, and Habit. In summary, the study conducted by Venkatesh et al. (2012) identified seven distinct aspects that influence the acceptance and utilization of technology among customers. These factors are performance expectations, effort expectations, social influence, facilitating conditions, hedonic motivation, habits, and trust. The UTAUT2 model is expanded to include trust as a variable, with a specific focus on technological and experiential aspects. Lewis et al. (2013) employ the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model as a foundational framework. Additionally, various studies in the field of organizational technology have also utilized this model.

## **2.8 Proposed Conceptual Framework**

A conceptual framework has been built based on the arguments and propositions. The framework encompasses seven dimensions derived from Venkatesh's (2012) Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), as shown by prior scholarly research. The hypotheses regarding the relationship between the seven characteristics of customer usage and post-purchase behavior have been formulated based on the assertions put forth by previous researchers. The conceptual framework is depicted in Figure 1.

Based on the chosen paradigms and the study's contextual factors, a quantitative approach is deemed the most suitable methodology. This study suggests the utilization of a cross-sectional research design to examine the links between predictor variables, specifically the characteristics that influence consumers' usage and their

desire to use. The survey instrument utilized in this study should be based on the survey questionnaires administered to individual consumers who have had firsthand experience with robot service in restaurant settings.

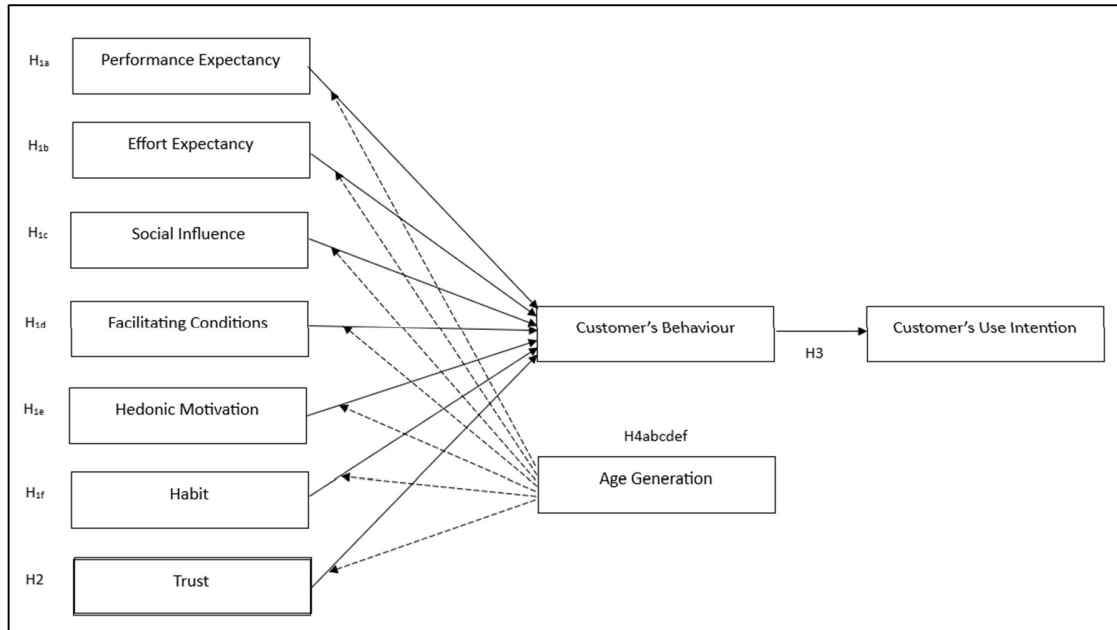


Figure 1: Proposed Theoretical Framework

### 3 Methodology

Methods show how the questionnaire was developed, data was collected and analyzed.

#### 3.1 The Questionnaire Design

Certain rules must be followed when making a questionnaire to measure all the most important traits and aspects. This will help get more answers, make sure the right things are being measured, and make sure the right people are being surveyed using reliable questionnaires that have been adopted, accepted, or made. The poll questionnaire for this study was taken from other studies and slightly changed to meet the research goals (Kurki & Wight, 2007; Lee & Huang, 2004; Lien et al., 2011; Parasuraman & Colby, 2015; Parasuraman et al., 2005). However, the expert changed a few things to make them better for the study.

Table 1: Instrument Development

Section	Measurement	Number of Items	Sources
<b>A: (UTAUT2) with extending (Trust)</b>	Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition, Hedonic Motivation, Habit	30	(Venkatesh et al., 2012; Lankton et al, 2014; McKnight et al. 2011; Gursoy et al.,2019; Thompson, Higgins, & Howell, 1991; van Doorn et al., 2016; Yang 2013; To et al. 2007)
<b>B: Trust</b>	Trust	5	(Gefen et al., 2003; McKnight et al.2011)
<b>C: (Customer Behaviour)</b>	Customer Behaviour	4	(Venkatesh et al., 2012; Kaushik et al., 2015)
<b>D: (Customer Usage Intention)</b>	Customer Usage Intention	5	(Venkatesh et al., 2012; Davis, 1989; Akour,2010)
<b>E: (Respondent's Information)</b>	Gender, Age Group, Marital Status, Education Level, Ethnic Origin, Occupation, Monthly Income and Frequency of Visit	8	(Blaise et al., 2018); Researcher

### 3.2 Sample and Data Collection

The population chosen for this research was the people who had experienced robot service at restaurants. Convenience sampling was chosen as the sampling technique with a sample size of 30 people. Perneger et al. (2015) mentioned that a sample size of 30 or more should be used whenever possible for a pilot study to have a good chance of finding a problem. The researchers employed a questionnaire survey instrument to gather pertinent information and data for this study. The researchers provided a detailed explanation to the respondents regarding the aim of the pre-test, as well as the overall purpose and process of the study. Additionally, the respondents were instructed to conscientiously respond to and examine the questionnaires. Following the conclusion of the session, the researchers initiated a conversation with



the customers, wherein they were prompted to provide feedback and suggestions regarding the aspects of the session that posed challenges for them to address. Recommendations for improving the phrasing and descriptions of the instrument's scales were supplied. The questionnaire underwent minor modifications after the identification of its weaknesses.

### **3.3 Data Analysis**

To assess the internal consistency of the study instrument, a reliability analysis will be conducted as part of the pilot study. A Cronbach's alpha coefficient of 0.7 or higher is generally seen as indicative of satisfactory internal consistency. The significance of this analysis lies in its ability to ascertain the reliability of the study instrument. A Likert scale consisting of five points was utilized, requiring respondents to indicate their level of agreement or disagreement with the provided assertions. The present study employed the Statistical Package for Social Science (SPSS) and SmartPLS software for data analysis. The principal analytical methodology utilized in this study was Partial Least Squares Structural Equation Modelling (PLS-SEM) for hypothesis testing.

## **4 Conclusion**

The rapid progression of service robots has led to an unparalleled technological capacity for cost reduction and efficiency enhancement, but the willingness of customers for robot service users in the food service sector is scarce in the literature. This research aims to systematically construct and verify a theoretical framework that examines the impact of the Unified Theory of Acceptance and Use of Technology (UTAUT) on customers' intention to use and actual usage of robot services in the context of restaurants. This study provides several significant theoretical and managerial contributions by addressing key deficiencies in the existing body of knowledge.

## **5 Acknowledgement**

The authors would like to express their gratitude and extend their sincere thanks to their supervisor, Dr. Noradzhar Bin Baba, as well as their co-supervisor, Dr. Norhidayah Binti Abdullah, for their invaluable guidance and support throughout the authors' academic journey. The authors would also like to express their gratitude to Universiti Teknologi MARA (UiTM) for the resources and facilities provided in support of this research.

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