

Self-service Kiosks in Fast Food Restaurants: A Study on Customers' Usage Intentions

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Abstract

This study examines the determinants of usage intention on self-service kiosks in fast food restaurants in Malaysia. The five factors incorporated in this study are performance expectancy, effort expectancy, social influence, promotion, and attitude. Partial Least Square-Structured Equation Modeling (PLS-SEM) has been employed to analyze the framework based on survey data collected from 196 respondents. The analysis confirms that only effort expectancy, promotion, and attitude toward technology significantly influence the usage intention of self-service kiosks in fast food restaurants. This study also confirms that the UTAUT (Unified Theory of Acceptance and Use of Technology) can be modified with new variables to predict consumers' intention to use technology in the fast-food industry. The outcome of the study provides insights and theoretical contributions in developing theories, as well as practical implications for the food and beverage industry. Additionally, this study recommends several potential directions for future research.

Keywords:

Self-service kiosk, self-service technology, consumer's intention, fast food restaurant

1 Introduction

Self-service technology (SST) has been increasingly integrated into today's service industry (Park et al., 2021), and it is crucial to understand consumers' intentions regarding self-service kiosks. According to Park et al. (2021), with the continuous expansion of the technology era, the fast-food industry recognizes the significance of utilizing technology to constantly enhance their services.

According to Law et al. (2019), information technology has transformed the delivery of service quality in the hospitality industry, making it more effective and efficient for customers. In today's service industry, self-service technology (SST) is becoming increasingly prevalent. Self-service kiosks (SSK), such as cashless touch screen kiosks or self-order and pay tablets in restaurants, are being adopted by several restaurant brands, particularly in the fast food sector (Hanks et al., 2016). Self-service technologies (SSTs) are technological interfaces that enable consumers to access services without direct contact with service employees (Yoon & Choi, 2020). The use of technology, such as self-service kiosks, generally elicits a positive response from consumers.

According to Kim & Kim (2019), technologically-based self-service (TBSS), including self-order kiosks, is gaining popularity due to the increasing burden of labor costs in the restaurant industry. The implementation of SST in restaurants has resulted in higher profits, as customers tend to purchase more food items while reducing the need for human servers (Hanks et al., 2016). Furthermore, it serves as a valuable tool for collecting consumer consumption data (Filloon, 2017) and allows for increased customization options on the menu.

However, there is a risk of malfunctioning self-service kiosks and other related issues that can lead to consumer dissatisfaction. Therefore, SST providers must ensure that the devices are functional and user-friendly (Antwi et al., 2021) to meet higher performance expectations.

Additionally, the introduction of SSTs appears to place more responsibility on customers (Ugwuanyi et al., 2021). This is because the widespread use of self-service technology, such as self-service kiosks, in fast food restaurants can create certain challenges. Some customers may avoid using the services due to unfamiliarity with the technology or perceive the self-service kiosk as less user-friendly, resulting in dissatisfaction with the service.

Indeed, family, friends, and the community play a significant role in the technology adoption process. According to Günay et al. (2014), negative emotions such as irritation and fear were more prevalent when using self-service kiosks due to factors like queuing and being surrounded by people. Interestingly, when individuals are alone while using self-service kiosks, they may experience stronger negative emotions as they have less influence from others around them (Günay et al., 2014).

In the context of self-service kiosks (SSKs), customers may impulsively operate them due to promotional effects, even if they initially did not plan to use them (Hong & Slevitch, 2018). This implies that the use of coupons can create perceptions of cost-effectiveness, with such concerns being more pronounced for coupons compared to standard discounts (Ashworth et al., 2005).

Particularly, individuals who are more susceptible to experiencing a cultural lag, such as the elderly and the disabled, may be reluctant to adopt new and unfamiliar technologies and prefer traditional face-to-face contact services (Na et al., 2021). This is because they perceive the instructions for ordering meals from a self-service kiosk as complex and requiring significant effort.

For restaurants to achieve optimum customer satisfaction, repeat visits, and positive word-of-mouth, they must consistently plan, implement, evaluate, and improve various aspects of their service operations (Kanyan et al., 2016). Therefore, it is essential to examine the factors influencing consumers' intentions to use self-service kiosks in fast food restaurants in Malaysia in order to enhance the technological capabilities of the food and beverage industry (Widodo, 2019).

Therefore, the objective of this study is to identify the determinants that influence consumers' intention to use self-service kiosks in fast food restaurants in Malaysia. The specific aims of this study are as follows:

- 1) To identify the factors that have an influence on consumers' intention to use self-service kiosks in fast food restaurants in Malaysia.
- 2) To determine the strongest factor among the identified factors that significantly influences consumers' intention to use self-service kiosks in fast food restaurants in Malaysia.

2 Literature Review

2.1 Underpinning theory (UTAUT)

The transfer of Information Technology (IT) and Information System (IS) applications to institutions has become an unavoidable requirement for achieving organizational performance. However, investments in such technology-intensive systems come with inherent costs and risks. It is crucial to determine whether these investments will contribute to improving organizational performance in the absence of IT and IS applications.

The Unified Theory of Acceptance and Use of Technology (UTAUT), as proposed by Schwarz and Chin (2007), addresses the ongoing management challenge of ensuring user acceptance of technology. UTAUT, formulated by Venkatesh et al. (2003), consists of four key concepts: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). These independent variables influence

dependent variables, such as behaviors and usage. UTAUT also includes four intermediate individual variation variables - gender, age, experience, and voluntariness of use - which predict the relationship between primary factors and behavioral intention and use behavior (Venkatesh et al., 2003). The UTAUT framework incorporates determining factors that directly impact intention or use.

According to William et al. (2015), the UTAUT theory was developed through the review and integration of eight dominant theories and models, namely: the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model, the Theory of Planned Behavior (TPB), a combined TBP/TAM, the Model of PC Utilization, Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT). These contributing theories and models have been widely and successfully utilized in numerous previous studies of technology or innovation adoption and diffusion across various disciplines, including information systems, marketing, social psychology, and management.

According to the literature review, it has been empirically identified that Facilitating Conditions (FC) are the direct determinants of adopting the behavior. Additionally, it has been found that behavioral intentions do not have a direct effect on behavioral intention (Venkatesh et al., 2003). These factors, including FC, play a significant role as direct determinants of user acceptance and usage behavior. Several researchers, such as Afonso et al. (2012), Kabanda & Brown (2017), Sezer & Yilmaz (2019), and Wang, Wu, & Wang (2009), have increasingly utilized UTAUT to explain technology compatibility (Venkatesh et al., 2003).

2.2 Variable of the study

Performance expectancy refers to the perceived benefit or usefulness that consumers associate with using online technology to perform activities such as information search and other tasks in the purchasing process (Loureiro et al., 2018).

Effort expectancy is defined as the perceived level of ease or simplicity associated with the use of a technology. It is consistently recognized as a critical predictor of a user's behavioral intention, indicating that users are more likely to adopt and use a technology if they perceive it as easy to use (Chua et al., 2018).

Social influence refers to the extent to which individuals perceive that others in their reference groups have participated or endorsed a particular behavior. The strength of social influence depends on various factors such as the relationship among individuals, network distances, timing, and characteristics of networks and individuals (Xu et al., 2017; Peng et al., 2017).

Promotion refers to the process of communication between a company and its target market (consumers) in order to create positive attitudes and preferences towards its products and services. It involves marketing activities aimed at generating favorable perceptions and increasing consumer interest in purchasing (Novak, 2011).

Attitude toward technology is the individual's inclination, ranging from favor to disfavor, regarding the adoption of a particular technology based on their user experiences and perceptions. It reflects the individual's overall evaluation and attitude towards using the technology (Cheng & Guo, 2021).

Intention to use refers to the degree to which a person has consciously planned to perform or not perform a specific behavior in the future. It is a measure of the individual's readiness and commitment to engage in the behavior, such as using a particular product or service (Hwang et al., 2019). Positive reviews and experiences can contribute to the formation of an intention to use.

2.3 Performance expectancy and intention to use self-service kiosk in fast food restaurant

According to prior studies, performance expectancy has been consistently identified as a significant variable influencing behavior (Na et al., 2021). Empirical research conducted by Na et al. (2021) indicates that performance expectancy refers to the extent to which individuals perceive that using a system will help them work efficiently. It has been found that customers are more likely to have a positive attitude towards a system if they perceive it as easy to use, even if it requires minimal time and effort to learn (Na et al., 2021). However, it should be noted that some studies disagree with this finding (Okumus et al., 2018).

In order to promote the acceptance of self-service technologies (SSTs), it is important to cater to customers who strongly desire personal contact by offering simple, reliable, and enjoyable options compared to customers who do not prioritize personal contact (Gelderman et al., 2011). This is because when customers adopt new technologies, they can enhance their productivity and efficiency. Research conducted in various fields consistently suggests that performance expectancy has a significant influence on users' intention to adopt and subsequent actual use of technology (Jeon et al., 2020). Based on the aforementioned findings, this study proposes the following hypothesis:

H1) Performance expectancy influences the intention to use self-service kiosks in fast food restaurants.

2.4 Effort expectancy and intention to use self-service kiosk in fast food restaurant

Effort expectancy is a crucial factor that significantly impacts the behavioral intention to use new technology. It refers to the consumer's expectation of how easy it will be to use the new system (Na et al., 2021). According to Slade et al. (2015), effort expectancy in the consumer context is similar to the perceived ease of use in the Technology Acceptance Model (TAM). Effort expectancy has consistently been found to have a positive effect on the behavior of technology adopters, although there are some studies that disagree with this finding (Na et al., 2021).

Previous studies, such as those conducted by Basak et al. (2015), Featherman et al. (2010), and Kim & Qu (2014), have suggested that perceived ease of use has a significant influence on perceived usefulness in the TAM. Additionally, research by Gelderman et al. (2011) indicates that customers' attitudes towards technology in general can be reflected in their need for interaction and dimensions of technology readiness. An easy and user-friendly service system can attract consumers and enhance their commitment to the service providers (Hsiao & Tang, 2015). Therefore, it is assumed that if a self-service kiosk in a Quick Service Restaurant is perceived as easy to use and convenient, it can activate the acceptance behavior of technology (Seo, 2020). Furthermore, a study by Han et al. (2020) demonstrated that perceived ease of use has a positive influence on the behavioral intention to use kiosks at fast food restaurants. Based on the aforementioned findings, this study proposes the following hypothesis:

H2) Effort expectancy influences the intention to use self-service kiosks in fast food restaurants.

2.5 Social influence and intention to use self-service kiosk in fast food restaurant

Social influence refers to an individual's perception of the extent to which important others agree with their specific behaviors (Wang et al., 2020). It is the degree to which a user believes that others who are important to them think they should use a new information system (Venkatesh et al., 2012). Na et al. (2021) also define social influence as the influence of people around an individual who are using a new system, which in turn affects the individual's own behavior. Social influence involves intentional and unintentional efforts to change another person's beliefs, attitudes, or behavior (Gass, 2015). An individual is likely to be influenced and persuaded by those who are close to them and perceive the use of new technology as important (Jeon et al., 2020). People often conform to social norms and may change their opinions and behaviors to align with the majority, even if it goes against their personal preference (Cialdini and Goldstein, 2004; Morgan and Laland, 2012; Haun et al., 2013).

The acceptance of an innovation is significantly influenced by friends and colleagues, as it is seen as a form of public consumption (López-Nicolás et al., 2008). The presence of other customers can have a positive impact in certain situations, such as in a restaurant, but a negative impact in others, such as overcrowded warehouses, and it can lead to social anxiety among shoppers (Gelderman et al., 2011). Multiple studies have reported a positive effect of social influence on acceptance intention (Jeon et al., 2020). Based on the aforementioned literature, the following hypothesis is proposed:

H3) Social influence influences the intention to use self-service kiosks in fast food restaurants.

2.6 Promotion and intention to use self-service kiosk in fast food restaurant

Promotion is recognized as an effective strategy for encouraging individuals to try out new technology. Sales promotions, as a marketing strategy, aim to prompt

immediate customer purchase behavior (Hong & Slevitch, 2018). Promotions often have a positive impact on purchasing decisions. Price promotions, such as discounts or percentage discounts, can significantly influence consumers' purchasing decisions (Büyükdag et al., 2020). In a retail context, promotional effects are related to providing factual information, which can be particularly useful when consumers need to understand the product and want to know what they are buying (Zhou & Wong, 2004).

In the context of self-service kiosks (SSKs), customers may be motivated to use SSKs impulsively due to promotional effects, even if they did not originally intend to use them (Hong & Slevitch, 2018). When making a purchase, consumers consider both product promotion stimulus factors directly related to the products and environmental stimulus factors indirectly related to the products (Chen & Li, 2020). Researchers have recommended this type of promotion because it does not have any harmful impact on the brand value of a product and, in fact, can enhance the brand value (Sinha & Verma, 2017). Based on the literature, the following hypothesis is proposed:

H4) Promotion influences the intention to use self-service kiosks in fast food restaurants.

2.7 Attitude toward technology and intention to use self-service kiosk in fast food restaurant

Attitude refers to an individual's positive or negative feelings about performing a target behavior, such as using technology, or towards the object itself, such as technology, within the TAM framework (Teo & Noyes, 2011). Various existing theories, including the technology acceptance model, the theory of reasoned action, the theory of planned behavior, and the theory of repurchase decision-making, have demonstrated a significant relationship between attitude and behavioral intentions (Hwang et al., 2019).

The effect of consumer use on attitudes regarding self-service technology (SST) has been analyzed in various fields, and it has been recommended that companies should continuously emphasize the attractiveness of using SST to consumers (Liu, 2012; Jeon et al., 2020). The literature on technology adoption has also confirmed the relationship between attitude and behavioral intentions (Hsiao & Tang, 2015). While attitude alone may modestly predict technology acceptance, individuals may still use a technology even if they do not have a positive attitude toward technology itself, as long as they perceive it to be useful and/or easy to use in ways that enhance their productivity (Teo & Noyes, 2011).

Furthermore, being impressed and excited about using a new high-tech device has a positive impact on a consumer's attitude toward technology acceptance, which in turn influences their attitude toward using technology (Kulviewat et al., n.d). Thus, attitude toward technology is a significant predictor of intention to use technology, particularly self-service kiosks in fast food restaurants. Based on the literature, the following hypothesis is proposed:

H5) Attitude toward technology influences the intention to use self-service kiosks in fast food restaurants.

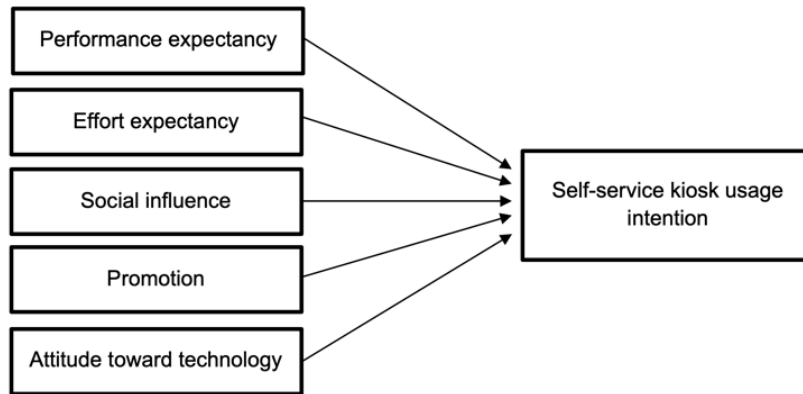


Figure 1: Research framework

3 Methodology

In this study, a quantitative approach was employed using primary data collected through an administered questionnaire. The research design used a correlational study with a non-contrived and cross-sectional method. The target population for the study was consumers in Malaysia who were 18 years old and above. Due to the absence of an accessible sampling frame, a non-probability convenience sampling method was utilized. The objective of the study was to identify the significant factors and the strongest factors influencing consumers' intention to use self-service kiosks in fast food restaurants. All participants voluntarily agreed to participate in the survey.

A five-point Likert scale was used for measurement in order to ensure that respondents could easily define their positions on the scale without it being too complex or too limited (Briggs et al., 2012). The survey instrument was prepared in English and adopted and adapted from previous empirical studies related to self-service kiosks (Na et al., 2021; Joe et al., 2020; Hong & Slevitch, 2018; Park et al., 2021; Cho et al., 2018).

Due to the COVID-19 pandemic and concerns about physical distancing, data collection was conducted using convenience sampling through an online platform. Direct contact was avoided, and the survey was shared and distributed to online groups via social media platforms, particularly WhatsApp. A pilot test involving 35 respondents was conducted to assess the reliability of the research instrument, which yielded a Cronbach's alpha score of 0.50 and above for all proposed variables (Sajed & Amgain, 2020).

G*Power is recommended for sample size and power calculations for various statistical methods (F, t, χ^2 , Z, and exact tests), because it is easy to use and free (Kang, 2021). A fixed model R² increase under the F test family was applied with a medium effect size f^2 of 0.15, significance value of 0.05, 0.95 confidence intervals, and five

numbers of tested predictors (independent variables). With the actual power after analysis of 0.95, and 5 numbers of predictors, the minimum sample size required by the study is 138 samples.

In this study, the Statistical Package for Social Science (SPSS) and SmartPLS software were utilized for data analysis. The primary analytical technique employed was Partial Least Squares Structural Equation Modeling (PLS-SEM) for hypothesis testing.

Prior to analysis, the data underwent a screening and cleaning process to ensure data quality. This involved conducting minimum and maximum analysis to identify and address any data entry errors or inconsistencies. Additionally, a filtration process was implemented by checking the email addresses of respondents to ensure that none of them participated in the survey multiple times.

A total of 196 responses were received for the study. The data were then coded and decoded before analysis. To address any missing data, Missing Complete at Random (MCAR) analysis was performed using the Expectation Maximization (EM) method. After removing outliers through box plot analysis, a total of 181 valid responses remained, which met the minimum sample size requirement for the study.

The normality of the data was assessed using skewness and kurtosis. Acceptable values for skewness typically range from -3 to +3, while values for kurtosis within -10 to +10 are considered appropriate (Griffin & Steinbrecher, 2013). The data in Table 1 indicated that the skewness and kurtosis values for all variables fell within the range of +1 to -1, suggesting a normal distribution of the data.

3.1 Coefficient of determination

The coefficient of determination (R^2) value of 0.644 indicates that approximately 64.4% of the variability in the dependent variable can be explained by the independent variable(s) included in the analysis. This means that the independent variables have a moderate level of influence on the dependent variable.

A higher R^2 value suggests a stronger relationship between the independent and dependent variables, indicating that the independent variables can better explain and predict the variability in the dependent variable. In this case, the R^2 value of 0.644 suggests that the independent variables included in the study have a moderate level of explanatory power in relation to the dependent variable.

However, it's important to note that the interpretation of R^2 values may vary depending on the field of study and the specific context of the research. Researchers often consider other factors such as effect size, practical significance, and the theoretical framework when interpreting the R^2 value.

Overall, the R² value of 0.644 in this study suggests a moderately strong relationship between the independent and dependent variables, providing valuable insights for future research and potential applications in the studied area.

3.2 Reliability and validity assessment

Through the use of confirmatory factor analysis and the calculation of Average Variance Extracted (AVE), this research has demonstrated high composite reliability and convergent validity for the measurement instrument used to assess the targeted construct. These results provide strong evidence for the reliability and validity of the instrument and support the robustness of subsequent analyses. Based on the data presented in Table 1, the composite reliability of all constructs scored 0.65 and above, indicating good internal consistency. Additionally, the AVE values scored above 0.5, indicating convergent validity of the constructs (Hair et al., 2017). Thus, the reliability and convergent validity of the instrument were confirmed.

Table 1: Summary of normality analysis, composite reliability, and convergent validity.

Variables	Skewness	Kurtosis	Composite reliability	AVE
Performance expectancy (PE)	-0.734	-0.250	0.827	0.711
Effort expectancy (EE)	-0.586	-0.714	0.911	0.785
Social influence (SI)	-0.495	-0.864	0.847	0.650
Promotion (PRO)	-0.620	-0.778	0.623	0.668
Attitude toward technology (ATT)	-0.251	-0.757	0.822	0.713
Consumer usage intention (CI)	-0.562	-0.911	0.922	0.810

The present study has analyzed the concurrent validity of the measurement instrument by examining its correlation with a criterion measure. The results have demonstrated strong concurrent validity, indicating that the instrument accurately measures the intended construct and is consistent with established measures. This provides valuable evidence for the utility of the instrument in future research and practice. The concurrent validity was assessed using the Fornell-Larcker criterion, which is a commonly used method supported by Hair et al. (2017). The findings in Table 2 support the concurrent validity of the instrument.

Table 2: Summary of concurrent validity analysis

CONSTRUCTS	ATT	EE	PE	PRO	SI	CI
Attitude toward technology (ATT)	0.845					
Effort expectancy (EE)	0.641	0.886				
Performance expectancy (PE)	0.612	0.615	0.843			
Promotion (PRO)	0.520	0.465	0.461	0.818		
Social influence (SI)	0.548	0.504	0.466	0.537	0.806	
Consumer usage intention (CI)	0.750	0.634	0.530	0.548	0.623	0.900

3.3 Demographic analysis

The analysis of respondents' demographic profiles revealed that the majority of the respondents were female (79.6%), while male respondents accounted for 20.4% of the sample. In terms of age distribution, the largest group of respondents fell within the 18 to 24 years old category (76.2%), followed by 17.7% aged between 25 to 40 years old, 4.4% aged 41 to 56 years old, and 1.7% aged between 57 to 66 years old.

Regarding education level, 55.8% of respondents held bachelor's degrees, 28.2% had diplomas, 10.5% had completed SPM (a secondary school examination in Malaysia), 2.2% had completed STPM/Matriculation/Vocational College or equivalent, and 1.7% had either a Master's/PhD degree or equivalent. The remaining 1.7% of respondents had other educational backgrounds. In terms of occupation, the majority of respondents identified as students (58.6%), followed by private employees (23.8%), government employees (9.9%), non-employed individuals (6.1%), and others (1.7%).

In terms of income level, the largest proportion of respondents (58.0%) reported having no income, likely due to the high number of students in the sample. Among those with an income, 19.9% reported earning below RM1,500 per month, 9.9% had a monthly income between RM1,501 and RM2,500, 2.8% had a monthly income between RM2,501 and RM3,500, 3.9% fell within the income range of RM3,501 to RM4,500, and 1.7% fell within each of the income ranges of RM4,501 to RM5,500, RM5,501 to RM6,500, RM6,501 to RM7,500. Lastly, 0.6% of respondents reported earning a monthly income of RM7,501 and above.

Based on these demographic characteristics, it can be concluded that the majority of the respondents in the study have a good educational background and are predominantly students with limited or no income.

Table 3: Respondents' profile

Variables		n	Percent
Gender	Male	37	20.4
	Female	144	79.6
Age	18 - 24	138	76.2
	25 - 40	32	17.7
	41 - 56	8	4.4
	57 - 66	3	1.7
Education Level	SPM	19	10.5
	STPM/Matriculation/Vocational College or equivalent	4	2.2
	Diploma	51	28.2
	Bachelor Degree or equivalent	101	55.8
	Master/PHD or equivalent	3	1.7
	Other	3	1.7
Occupation	Student	106	58.6
	Non-employed	11	6.1
	Government employed	18	9.9
	Private employed	43	23.8
	Other	3	1.7
Income	No income	105	58.0
	Below RM1,500	36	19.9
	RM1,501 - RM2,500	18	9.9
	RM2,501 - RM3,500	5	2.8
	RM3,501 - RM4,500	7	3.9
	RM4,501 - RM5,500	3	1.7
	RM 5,501 - RM 6,500	3	1.7
	RM6,501 - RM7,500	3	1.7
	RM7,501 and above	1	0.6

3.4 Hypothesis testing

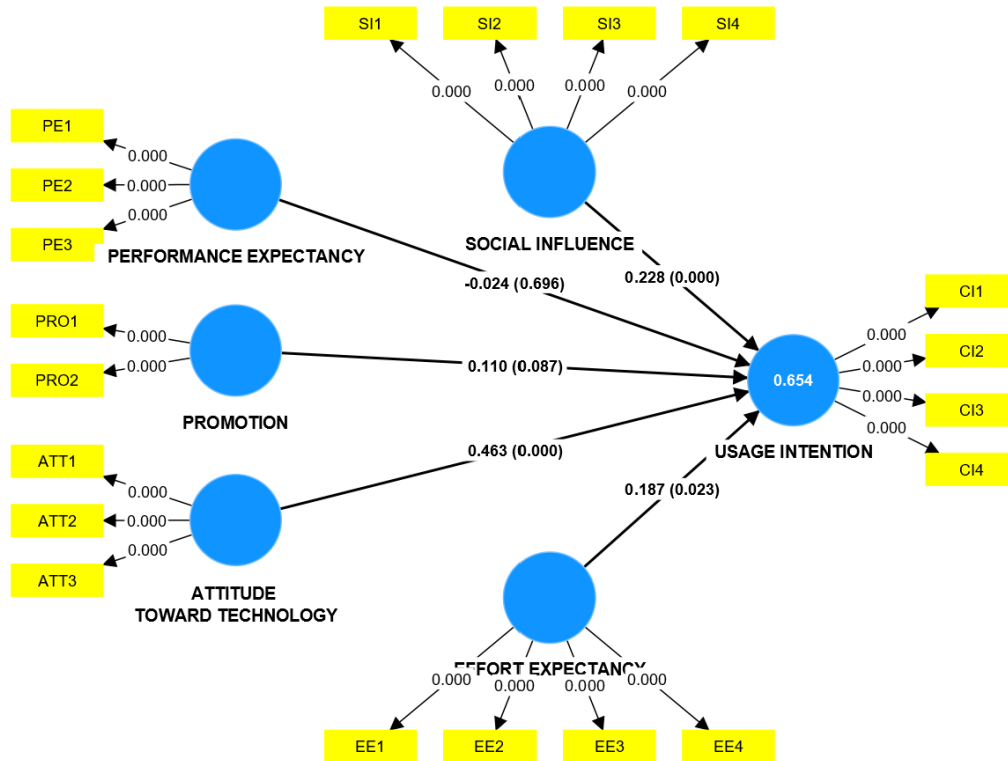


Figure 2: Hypothesis testing analysis

Table 4 provides an overview of the research findings. The results indicate that performance expectancy did not have a statistically significant relationship with consumer intention ($\beta = -0.024$; $p = 0.696$), therefore H1 was not supported.

On the other hand, an increase of one standard deviation in effort expectancy was associated with a 0.187 increase in usage intention ($\beta = 0.187$; $p = 0.023$), supporting H2. Similarly, when social influence increased by one standard deviation, the usage intention also increased by 0.228, supporting H3 ($\beta = 0.228$; $p = 0.000$).

However, the analysis revealed that promotion was not statistically significant in relation to consumer intention to use self-service kiosks ($\beta = 0.110$; $p = 0.087$), leading to the rejection of H4 as the p-value was greater than 0.05.

Lastly, the results demonstrated a positive and statistically significant effect of attitude toward technology on consumer intention ($\beta = 0.463$; $p = 0.000$). A one standard deviation increase in attitude toward technology led to a 0.463 increase in usage intention. Thus, H5 was supported.

Based on the analysis, attitude toward technology was identified as the strongest factor influencing the usage intention of self-service kiosks, with a coefficient value of 0.463.

Table 4: Hypothesis testing

H	Relationship tested	Coefficient	T-values	P-values
H1	Performance expectancy -> Usage intention	-0.024	0.391	0.696
H2	Effort expectancy->Usage intention	0.187	2.282	0.023
H3	Social influence -> Usage intention	0.228	3.512	0.000
H4	Promotion -> Usage intention	0.110	1.711	0.087
H5	Attitude toward technology -> Usage intention	0.463	6.194	0.000

3.5 Predictive relevance

In addition, the study assessed the predictive relevance of the model using the Q² metric, which should have a value greater than zero to indicate its significance in predicting outcomes (Kamarudin et al., 2021). In this study, all the Q² values were found to be above 0 (refer to table 5). To further evaluate the predictive power, the root mean square error (RMSE) and mean absolute error (MAE) of the Partial Least Squares Structural Equation Modeling (PLS-SEM) and linear regression model (LM) scores were compared for the relevant items, following the recommendations of Shmueli et al. (2019) and supported by Hair (2021). The results indicated that the relevant items scored higher on the LM compared to PLS-SEM, suggesting that the model has strong predictive power (Shmueli et al., 2019).

Table 5: Predictive relevance

ITEMS	Q ² PREDICT	PLS-SEM_RMSE	LM_RMSE	PLS-SEM_MAE	LM_MAE
CI1	0.526	0.512	0.552	0.386	0.406
CI2	0.489	0.564	0.598	0.431	0.446
CI3	0.537	0.427	0.443	0.315	0.322
CI4	0.456	0.466	0.492	0.341	0.353

4 Finding and Discussion

Based on the conducted analyses, the study found a statistically significant relationship between consumer intention to use self-service kiosks and three variables:

effort expectancy, social influence, and attitude toward technology. Notably, attitude toward technology emerged as the strongest factor influencing customer usage intention of self-service kiosks.

Unfortunately, the study did not find a significant relationship between performance expectancy (H1) and consumers' intention to use self-service kiosks in fast food restaurants. This finding contrasts with previous studies that have consistently shown a significant association between performance expectancy and consumer intention to use self-service kiosks (Na et al., 2021; Gelderman et al., 2011; Jeon et al., 2020). In this study, participants perceived the system as difficult to use and requiring time to understand the technology, which may explain the lack of significance. Furthermore, the non-significant effect of facilitating conditions on users' intention could be attributed to its frequent portrayal as a limiting factor (Okumus et al., 2018).

Furthermore, the study found a significant relationship between effort expectancy and intention to use self-service kiosks in fast food restaurants (H2). This finding aligns with previous studies that have consistently suggested a significant influence of perceived ease of use on perceived usefulness within the Technology Acceptance Model (TAM) (Basak et al., 2015; Featherman et al., 2010; Kim & Qu., 2014). Another study conducted in the hotel industry also discovered a significant impact of effort expectancy on accepting kiosk technology, demonstrating that perceived ease of use positively influences behavioral intention toward kiosks at fast food restaurants (Han et al., 2020).

Moreover, the study supported the positive effect of social influence on the intention to use self-service kiosks in fast food restaurants (H3). Theoretically, social influence involves deliberate and unintentional efforts to alter another person's beliefs, attitudes, or behavior (Gass, 2015). Such social influence can strongly influence consumers' intentions to use self-service kiosks. People often modify their opinions and behaviors to conform to social norms, even if the majority decision contradicts their personal preferences (Cialdini and Goldstein, 2004; Morgan and Laland, 2012; Haun et al., 2013).

However, the relationship between promotion and consumers' intention to use self-service kiosks was found to be statistically insignificant based on the collected data. This result contradicts previous studies conducted by Büyükdağ et al. (2020), Zhou & Wong (2004), Chen & Li (2020), and Sinha & Verma (2017). However, it is worth noting that Hong & Slevitch (2018) supported the finding of insignificance. One possible explanation for this discrepancy is that when customers are satisfied with the self-service kiosk service, they may not be influenced by promotional offers. Another factor could be that the promotions offered are unattractive, resulting in a lack of interest among customers in using self-service kiosks for their purchases.

On the other hand, attitude toward technology was found to be significant in relation to the intention to use self-service kiosks in fast food restaurants (H5). The collected data showed a significant value of 0.000, indicating that attitude toward technology plays a crucial role in individuals' beliefs and their inclination to use self-

service kiosks in fast food restaurants in Malaysia. Being impressed and excited about using a new high-tech device has a positive impact on consumers' attitude toward technology acceptance (Kulviewat et al., n.d.), and this positive influence further translates into a favorable attitude toward using self-service kiosks.

5 Conclusion

In conclusion, this study aimed to identify the factors influencing consumers' intention to use self-service kiosks in fast food restaurants in Malaysia and determine the strongest influencing factor. As Malaysia undergoes digital transformation as a rapidly developing country, it is crucial for its population to be proficient in using current technology, which can greatly facilitate daily activities. For the fast food industry, the adoption of technology such as self-service kiosks can bring numerous benefits, including increased revenue and reduced labor costs.

The study's findings have important implications for the food and beverage industry, particularly in fast food restaurants. To encourage the adoption and usage of self-service kiosks, it is vital for restaurants to provide devices that are easy to use, reliable, and offer a user-friendly interface. By portraying a seamless and straightforward self-service ordering process, customer effort expectancy in using self-service kiosks can be enhanced.

Furthermore, the study revealed that customers are more likely to use self-service kiosks when they are influenced by their social environment. Restaurants can leverage this by designing their layouts to encourage social interactions and making the kiosks more visible to other customers. Additionally, social media campaigns can harness the power of social influence by showcasing positive reviews and recommendations from influencers and other customers.

By understanding these factors and implementing appropriate strategies, fast food restaurants in Malaysia can effectively promote the adoption and usage of self-service kiosks, providing a seamless and satisfying customer experience while reaping the benefits of technological advancements in the hospitality industry.

This study on customers' usage intentions of self-service kiosks in fast food restaurants provides valuable insights, but it is important to acknowledge its limitations. These limitations include a limited sample size, potential social desirability bias, reliance on stated intentions rather than actual usage behavior, and the omission of certain demographic factors that could impact perceptions and intentions. Considering these limitations is crucial when interpreting the study's findings and planning future research in this area.

Moving forward, there are several potential avenues for future research. First, it would be beneficial to investigate the factors that drive or hinder the actual usage of self-service kiosks, going beyond customers' intentions alone. Understanding the reasons behind customers' actual usage behavior can provide deeper insights into the effectiveness and acceptance of self-service kiosks.

Second, research could focus on improving the design and functionality of self-service kiosks to better align with customers' needs and preferences. Exploring features such as user interface, customization options, and convenience can contribute to enhancing the overall customer experience and increasing adoption rates. Third, examining how different demographic groups perceive and use self-service kiosks can uncover potential variations in attitudes and behaviors. Factors like age, income, and education level can influence customers' acceptance and utilization of self-service kiosks, and understanding these differences can inform targeted strategies and interventions.

Lastly, conducting longitudinal studies that track changes in customers' attitudes and usage patterns over time can provide insights into the long-term effects of self-service kiosk implementation. This approach can help identify trends, adaptations, and potential challenges that arise as self-service kiosks become more prevalent in the fast food industry.

By addressing these research gaps and considering the limitations of the current study, future research can further advance our understanding of customers' usage intentions and behaviors regarding self-service kiosks in fast food restaurants.

6 References

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