

ENHANCING CUSTOMER LOYALTY THROUGH QR CODE MENU SYSTEM: THE SATISFACTION IN URBAN MALAYSIAN RESTAURANTS

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Abstract. This study investigates the impact of QR code menu system on customers' intentions to return to restaurants in urban Selangor, with customer satisfaction as a mediating variable. The digitalization of the food and beverage sector has positioned QR menus as a key innovation for enhancing efficiency and customer experience. Nonetheless, the extent of acceptability and the influence of this system on consumer satisfaction and loyalty remain underexplored, in the Malaysian context. A quantitative survey was conducted among restaurant patrons who had used QR menus, yielding 296 valid responses. Data were analysed using SPSS through Pearson correlation, multiple regression, and mediation analysis via PROCESS Macro. The study's findings indicated that perceived ease of use (PEOU) and perceived usefulness (PU) significantly enhanced consumer satisfaction which in turn mediates the relationship between these factors and the intention to revisit. This suggests that satisfied patrons who are pleased with QR systems are more likely to revisit establishments offering this service. This study's findings carry important implications for stakeholders. Restaurant owners are encouraged to design intuitive QR systems to maximise satisfaction, while policymakers may consider incentives to promote digital adoption in the sector. Future research should extend the model by incorporating factors such as service quality and digital literacy to better understand drivers of customer loyalty in digital dining environments.

Keywords: *QR code menus, customer satisfaction, revisit intention, Technology Acceptance Model, hospitality management, Malaysia*

Introduction

The restaurant industry is constantly evolving, necessitating the adoption of new technologies to enhance customer experiences and drive business growth. One such innovation is the QR menu ordering system, which holds the potential to revolutionise the dining experience for both patrons and restaurant proprietors. QR code menu ordering is a prime example of contemporary technology that provides convenience by enabling patrons to view restaurant menus by only scanning a code at the table (Prawirayudha et al., 2025). Many consumers prefer this technology as it allows for contactless use without requiring human interaction. This study is grounded in the increasing demand for a more efficient, user-friendly, and contactless ordering systems within the restaurant industry. This need has become especially pronounced in the wake of the COVID-19 pandemic. Previous research has underscored the benefits of self-service devices in quick-service restaurants, highlighting that these kiosks empower customers to have greater control over their dining experiences, thereby increasing customer satisfaction and revenue (Shahril et al., 2021). Similarly, QR-based ordering systems in restaurants have been found to improve the patron experience by providing a more streamlined and personalised ordering process (Popescu and Neacșu, 2024). These

systems minimise the need for direct staff interaction by enabling customers to use their mobile devices to access digital menus, customise their orders, and process payments. For restaurant owners, integrating data analytics with QR ordering systems offers significant advantages. Such integration enables for a deeper understanding of customer preferences, the optimisation of menu offerings, and ultimately, increased sales and customer loyalty (Popescu and Neacșu, 2024).

In Malaysia, the adoption of QR-based ordering systems has gained traction across various segments of the restaurant industry, including fast food chains, casual dining establishments, and high-end restaurants. Accordingly, many restaurants in Malaysia have transitioned to QR code menus as part of their digital transformation efforts, driven by customer demand for faster and safer ordering experiences. Well-known brands such as McDonald's Malaysia, KFC, and Tealive have implemented QR-based self-ordering systems that allow customers to browse menus, customize orders, and make payments directly from their smartphones. These systems not only improve efficiency but also support the broader national agenda of encouraging cashless transactions and digital innovation in the service sector. Additionally, QR ordering systems have played a key role in addressing operational challenges in Malaysia's food and beverage industry. According to Abdul Majid et al. (2024), restaurant operators in urban centers such as Kuala Lumpur and Penang have adopted QR technology to reduce reliance on printed menus, streamline order processing, and minimize staff workload. This shift has resulted to greater operational efficiency and improved customer satisfaction, as patrons no longer need to wait for service staff to take orders manually. Moreover, the integration of QR menus with e-wallet payment systems such as Touch 'n Go eWallet and GrabPay has further facilitated seamless transactions, reinforcing the appeal of digital dining solutions (Intal et al., 2022).

From a consumer behavior perspective, the increased adoption of QR-based ordering in Malaysia reflects shifting dining preferences and technological acceptance. Shahril et al. (2024) found that younger demographics, particularly millennials and Gen Z consumers, exhibit a strong preference for digital interactions when dining out. Their research revealed that over 70% of respondents preferred using QR codes for ordering due to factors such as speed, convenience, and reduced physical contact with staff. Additionally, the study noted that customers value the ability to review menu descriptions, images, and nutritional information at their own pace, which contributes to a more informed and satisfying dining experience. Beyond efficiency and customer convenience, the implementation of QR ordering systems has also contributed to enhancing restaurant sustainability efforts in Malaysia. Traditional printed menus require frequent reprinting due to menu changes, promotions, or wear and tear, leading to unnecessary paper waste. By transitioning to QR-based digital menus, restaurants have significantly reduced their environmental footprint while also lowering operational costs (Kumar et al., 2020). The sustainability aspect of QR code menus also aligns with the Malaysian government's broader initiatives to encourage digital transformation and environmentally friendly business practices (Meng and Bhutia, 2025).

In the wake of the COVID-19 pandemic, technology acceptance has re-emerged as a central theme of research among hospitality and tourism scholars, alongside emerging themes such as resilience, sustainability, forecasting, impact monitoring, strategic management, and response (Wibisono et al., 2023). Restaurants, as a key service domain, have undergone significant changes in their business models and environments, incorporating both non-technological and technological adaptations in response to the

pandemic. These adaptations include reduced customer capacity to the introduction of digital menus, expanded outdoor dining areas, and the implementation of contactless payment systems (Lai et al., 2020). The increased adoption of QR code menus in restaurant settings was the empirical focus of this study. Given the popularity of QR code menus, this region was chosen in order to gain deeper insights into public sentiments towards the usage of technology. To capture these sentiments effectively, restaurant contexts were prioritized over other hospitality settings. Since dining out typically occurs in familiar surroundings without the need for travel, the adoption of technology in restaurants during the COVID-19 epidemic was more prevalent than in other contexts, such as hotels and airports. Moreover, the pandemic caused significant financial losses for the restaurant, hotel, and tourism sectors. The industry's efforts to adopt and promote this cost-effective technology, which reduces printing costs and enhances operational efficiency, were significantly bolstered by the adoption of QR code technology, which proved more affordable than previous technologies.

Accordingly, QR-coded menus contribute substantial added value to both customers and business owners alike. For customers, instant access to digital menus enhances convenience and aligns with the contemporary pace of life, providing a seamless and efficient dining experience. Simultaneously, for business owners QR menus streamline operations, reduce printing costs, and allow for more flexible and dynamic menu adjustments. This technological integration not only responds to evolving industry demands but also addresses hygiene and safety concerns, especially during health crises such as COVID-19. Despite these advancements, further research is required to ascertain the specific impact of QR ordering systems on customer satisfaction and intention to return. While prior studies have explored the factors influencing the intention to order food online, limited evidence exists on the specific effects of QR-based systems on customer satisfaction and return intentions in restaurant context. Given the gaps identified in existing literature, particularly the lack of empirical data on how QR menu systems influence satisfaction and revisit intention in Malaysian urban settings, this study seeks to address this issue. Specifically, the research investigates the relationships between perceived ease of use, perceived usefulness, customer satisfaction, and revisit intention. The study further examines the mediating role of customer satisfaction in shaping revisit intentions. By doing so, it provides practical insights for restaurateurs while also contributing to the broader theoretical discourse on technology adoption in the hospitality industry.

Literature review

Quick Response (QR) code menu system

The significance of Quick Response (QR) codes as accessible, non-patented technologies that became increasingly relevant, especially during the COVID-19 pandemic. Their flexibility and convenience have led to widespread adoption across various sectors, including the food and beverage industry. Previous projects that their usage could reach 80% in the near future due to their application in contactless payments, check-ins, and providing real-time menu information. Previous study also emphasised that QR codes provide a low-cost and contactless solution that aligns with consumers' preference for safer, hygienic service experiences. Several researchers have underscored the user-friendly and effective nature of QR menu systems. A noted that ease of navigation and practical benefits directly influence customer satisfaction.

Further observed that QR codes enhance the overall dining experience by simplifying payment and offering promotions. Despite their growing popularity, limited studies have explored the adoption of QR menus in rural and semi-urban settings, where digital familiarity may vary significantly. The origin of QR codes to Japan in 1994, noting their development by Denso. The rapid proliferation of smartphones and demand for touchless experiences have made QR menus particularly relevant. QR systems encapsulate business functionality by enabling instant menu access, thereby facilitating faster and more responsive service. Added that digital menus eliminate the need for printed materials, streamlining both transactions and service delivery.

QR menus create value for both patrons and operators by minimising wait times and operational burdens. Their flexibility allows restaurants to update offerings easily, reduce costs, and comply with safety protocols. QR menus provide detailed information like ingredient lists and nutritional facts, features particularly useful for health-conscious diners. Technological advancements, including the integration of QR codes with location-based services or surveillance systems, have facilitated innovations like tailored promotions and pre-ordering options. QR menu systems also contribute to environmental sustainability by eliminating the need for printed menus, reducing both waste and printing costs. In summary, QR menus symbolize a shift toward digitized and efficient service delivery in the restaurant industry. Their growing acceptance indicates not only a technological trend, but also a deeper transformation in customer service expectations and business operations.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), serves as a foundational framework for understanding user acceptance of new technologies. It identifies perceived usefulness (PU) and perceived ease of use (PEOU) as key predictors of user behavior. PU refers to how well a system enhances performance, while PEOU measures how effortless users perceive the system to be. TAM has been extensively validated across various domains, including e-commerce, mobile apps, and restaurant technologies. In the context of QR menus, the ease with which customers can scan and navigate the interface, and the system's perceived value in streamlining service, directly influence acceptance. TAM in hospitality contexts to understand why technologies such as digital kiosks are adopted. TAM to analyze the acceptance of virtual agents, revealing how design simplicity and perceived service quality affect technology uptake. However, existing literature lacks depth regarding the specific factors that drive QR menu adoption in semi-urban or developing settings. There is a growing need to consider variables like technological readiness, social influence, and risk perception. This study draws upon TAM as a conceptual lens to explore QR code menu systems in Malaysia, offering new insights into user behavior in a unique regional context.

Perceived ease of use of QR code menu system

Perceived ease of use (PEOU) refers to the degree to which individuals believe a system can be used effortlessly. Mobile website usability positively correlates with customer satisfaction. Similar findings in access-control systems, reinforcing the significance of user-friendly interfaces. In the context of QR ordering systems, ease of navigation significantly affects user satisfaction and intention to adopt the technology. Research supports the idea that intuitive design promotes acceptance across multiple

platforms. Perceived effort influences user attitudes, particularly for applications like QR menus where interaction needs to be seamless. Studies indicate that intuitive digital services led to greater experimentation and engagement. In the context of QR menus, show that clear interfaces encourage users to adopt assistant technologies. Further research highlight that technologies that meet user expectations for convenience are more likely to be accepted. Given Malaysia's varied technological readiness, especially in semi-urban areas, understanding how PEOU shapes QR code adoption is essential. The literature affirms its central role in shaping both user satisfaction and behavioral intention.

Perceived usefulness of QR code menu system

Perceived usefulness (PU) is defined as the belief that using a technology will enhance performance. website quality to PU, showing how layout and responsiveness influence users' perceived value. Similarly, British consumers' willingness to adopt mobile payments was tied to PU. In the restaurant context, menu clarity and faster service increase satisfaction with self-ordering systems. Fewer order errors and better integration with kitchens also strengthen perceptions of usefulness. Further argued that enjoyment from digital interactions can positively influence PU. Nonetheless, challenges remain, particularly among older users or individuals with lower levels of digital literacy. Cost-benefit considerations also impact perceptions. Overall, the literature highlights the importance of investigating PU in Malaysia's semi-urban dining sector to better understand how functionality and efficiency influence adoption.

Customer satisfaction

Customer satisfaction reflects the extent to which a service meets or exceeds customer expectations. Previous study introduced the SERVQUAL model, which evaluates service quality across five dimensions; tangibility, reliability, responsiveness, assurance, and empathy. Later developed the SERPERF model, which focuses on perceived service quality. In Malaysia, QR ordering increases satisfaction through better design, speed, and fewer errors. Further identified convenience and usability as core factors. Recent models suggest satisfaction mediates the link between TAM constructs and behavioral intention. Satisfaction is more predictive of return visits than convenience alone. As QR systems become increasingly mainstream in Selangor's urban dining, understanding satisfaction's mediating role becomes vital.

Revisit intention

Revisit intention refers to the likelihood of a customer returning, shaped by satisfaction, perceived value, and service quality. In Selangor, QR menus are central to the digital transformation of restaurants. QR systems increase order accuracy and reduce wait times, encouraging repeat business. Identified service quality and perceived value as revisit drivers. For tech-savvy diners in Selangor, QR usability and speed significantly affect loyalty. User satisfaction with revisit behavior, reinforcing QR systems' strategic importance. Loyalty stems not just from convenience but also from emotional and experiential satisfaction. In summary, QR menu systems can drive long-term patronage if perceived as useful, easy to use, and satisfying. Understanding these dimensions in Malaysia's urban context is key to digital service optimization.

Study framework and hypothesis

After reviewing the existing literature, the study has determined the variables for investigation. The key variables include perceived ease of use and perceived usefulness, with customer satisfaction acting as the mediating variable, and revisit intention as the outcome variable. The study posits that the perceived ease of use and perceived usefulness will significantly influence revisit intention, mediated by customer satisfaction. *Figure 1* illustrates the proposed conceptual framework for the study. By referring to the above conceptual framework, following hypotheses for this research are developed; (H1): Perceived usefulness of QR codes positively influences customer revisit intention; (H2): Perceived ease of use of QR codes positively influences customer revisit intention; (H3): Perceived usefulness of QR codes positively influences customer satisfaction; (H4): Perceived ease of use of QR codes positively influences customer satisfaction; (H5): Customer satisfaction positively influences customer revisit intention; (H6): Customer satisfaction mediates the relationship between perceived usefulness of QR codes and customer revisit intention; (H7): Customer satisfaction mediate the relationship between perceive ease of use QR code and customer revisit intention.

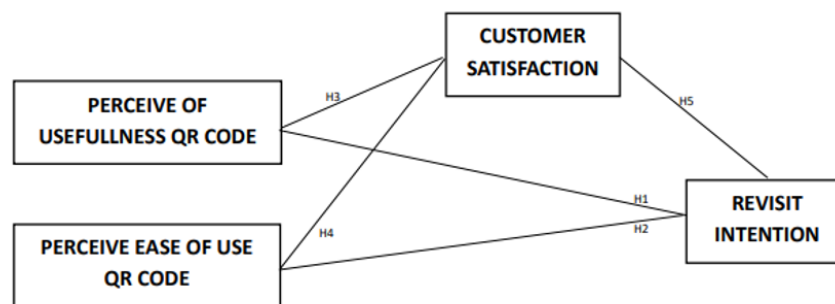


Figure 1. Study framework.

Materials and Methods

For the purpose of this research, a quantitative approach was adopted, drawing from the post-positivist paradigm that emphasises objectivity, measurement, and hypothesis testing. As outlines, research design begins with philosophical assumptions and extends to concrete methods for data collection and analysis. Among the three dominant approaches; quantitative, qualitative, and mixed methods, the quantitative method was selected to address the objectives of this study best: to assess how QR code menu systems influence customer satisfaction and revisit intention among restaurant patrons in urban Selangor. A cross-sectional survey design was employed, enabling data to be collected at a single point in time. This method is both cost- and time-effective and aligns well with studies requiring insights into relationships among multiple variables. A self-administered questionnaire was selected due to its efficiency in gathering structured data from a large sample, thus enabling robust statistical analysis. This approach allows for an objective examination of causal relationships between variables such as perceived ease of use, perceived usefulness, customer satisfaction, and revisit intention.

The study targeted individuals aged 18 and above who have experience using QR code-based menu ordering systems in restaurants located in urban areas of Selangor. Selangor, Malaysia's most urbanised and demographically diverse state, was deemed an appropriate research site. The 2020 Population and Housing Census highlights Selangor's robust population of approximately 6.9 million, which includes a high concentration of working adults across various ethnic and socioeconomic backgrounds. This diversity provides fertile ground for examining how different customer segments perceive and interact with QR menu technologies. Non-probability sampling was used for participant recruitment, specifically targeting individuals with prior experience using QR menus. To ensure an adequate sample size, G*Power 3.1 was used for power analysis, setting a significance level (α) of 0.05 and power ($1-\beta$) of 0.95 as per Figure 2. This guided the sample size determination necessary for multiple regression analysis, focusing on the model's segment with the highest number of predictors.

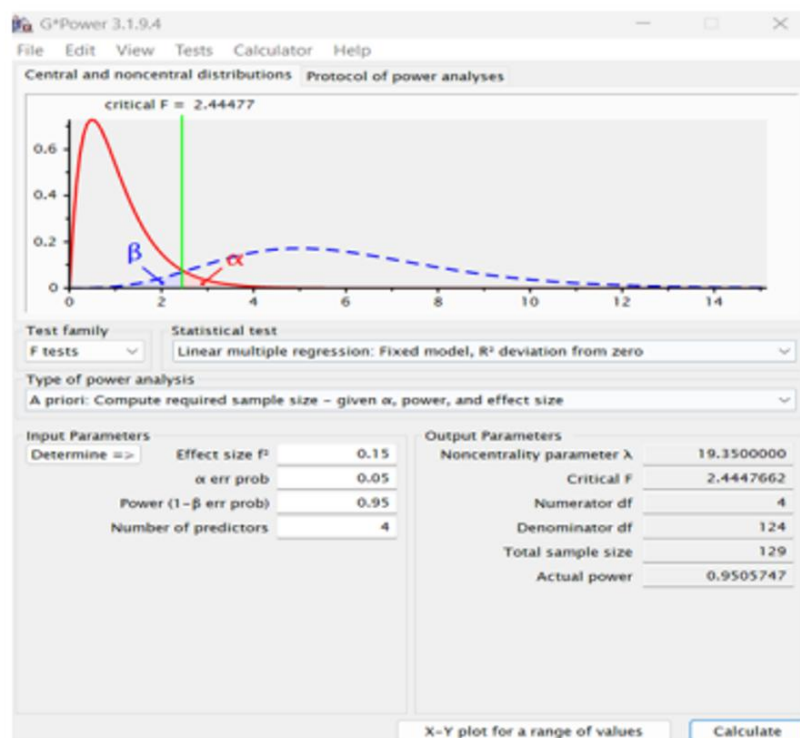


Figure 2. Power sample size calculation.

A structured questionnaire served as the primary research instrument. It was divided into five sections: screening questions, perceived ease of use and usefulness, customer satisfaction, revisit intention, and socio-demographic information. The survey utilized a 5-point Likert scale for most items, ranging from 1 (strongly disagree) to 5 (strongly agree), and was available in both English and Malay to accommodate the linguistic diversity of the population. The constructs for perceived ease of use and perceived usefulness were adapted Technology Acceptance Model (TAM) and further refined using items. Customer satisfaction metrics were drawn, while revisit intention items were based on previous study. Demographic variables such as age, gender, income, and education were captured to contextualize the findings. A pilot study with 30 respondents was conducted before the main survey to test the reliability and validity of the

instrument. Cronbach's Alpha values for all constructs exceeded the recommended 0.80 threshold, indicating strong internal consistency. Specifically, reliability coefficients for perceived ease of use (.884), perceived usefulness (.940), customer satisfaction (.929), and revisit intention (.941) confirmed the robustness of the instrument. Each variable was assessed individually for the reliability test. The outcome of the reliability assessment is presented in the *Table 1*.

Table 1. Result for reliability test.

Variables/Section	Number of items	Alpha coefficient, a
Section A		
Perceived ease of use QR	5	.884
Menu ordering		
Perceived ease of usefulness	4	.940
QR menu ordering		
Section B		
Customer satisfaction	4	.929
Section C		
Revisit intention	4	.941

Data collection was carried out via an online self-administered questionnaire hosted on Google Forms. The survey was distributed through various digital platforms such as WhatsApp, Facebook, Telegram, and email to reach a broad audience of the urban Selangor population. Ethical approval was obtained from the Research Ethics Committee (REC) in October 2024, and the data collection was carried out between November and December 2024. Out of 333 total responses, 296 were deemed valid, meeting the inclusion criteria of having prior experience with QR menu systems. To answer the research questions and test the hypotheses, Pearson correlation analysis was used to measure the strength and direction of relationships between variables. A coefficient close to ± 1 indicates a strong relationship, while one near 0 suggests little or no linear link. This helped examine connections between QR code adoptions, customer satisfaction, and revisit intention. Multiple regression analysis was also applied to determine the influence of independent variables on dependent variables. Additionally, the PROCESS Macro in SPSS supported path analysis and tested mediation effects, offering a clear view of how the factors interacted. By using SPSS and these statistical techniques, the study ensured reliable and valid results, providing strong evidence about the drivers of QR code adoption, satisfaction, and revisit intention in urban Selangor restaurants.

Results and Discussion

The study targeted individuals aged 18 years and above who had prior experience using QR code menu ordering systems in urban restaurants in Selangor, Malaysia. This demographic was chosen due to higher smartphone penetration, familiarity with cashless transactions, and the increasing digitalization of the local food and beverage sector. Only respondents with prior QR menu experience were included to ensure the findings reflect genuine user perceptions of perceived ease of use (PEOU), perceived usefulness (PU), customer satisfaction, and revisit intention. Out of 333 responses, 296 met the inclusion criteria. Among these, 85.5% reported frequent QR menu use, indicating the growing role of contactless ordering post-pandemic.

Respondent profile

Demographic analysis (Table 2) revealed a majority aged 18–35 (55.4%), with females constituting 65.5% of the sample. Education levels were high, with 71.6% holding a diploma or bachelor’s degree. Most respondents were employed (62.8%), dined out 2–3 times weekly (48.9%), and preferred peak-hour dining (52.3%). These findings align with literature suggesting that younger, educated, and time-conscious consumers are more inclined toward digital ordering solutions.

Table 2. Respondents’ background profile (n = 296).

Factor	Categories	Frequency (n)	Percentage (%)
Gender	Female	194	65.5
	Male	102	34.5
Age	18–35 years	164	55.4
	36–45 years	84	28.4
	46–55 years	37	12.5
	56 years and above	11	3.7
Education Level	No formal education	0	0.0
	Primary/Secondary school	22	7.4
	Certificate	20	6.8
	Diploma	97	32.8
	Bachelor’s degree	130	43.9
	Master’s degree/PhD	27	9.1
Employment	Government servant	110	37.2
	Private sector	134	45.3
	Self-employed	21	7.1
	Student	18	6.1
	Unemployed	7	2.4
	Retiree	6	2.0
Monthly Income	No income	19	6.4
	< RM1,000	17	5.7
	RM1,001–RM2,999	101	34.1
	RM3,000–RM4,999	81	27.4
	RM5,000 and above	78	26.4
Preferred Meal Time	Breakfast	7	2.4
	Lunch	133	44.9
	Dinner	124	41.9
	Others	32	10.8
Typical Dining Companions	Alone	9	3.0
	Family members	194	65.5
	Group of friends	77	26.0
	Others	16	5.4

Descriptive analysis

Perceived ease of use (PEOU) and Perceived Usefulness (PU)

Respondents rated PEOU and PU items positively, with PEOU4 (“Payment transactions are easy using QR menus”) receiving the highest mean score (M = 4.10, SD = 0.909). Items related to reduced ordering mistakes (PEOU3, M = 3.96) and shorter waiting times (PEOU2, M = 3.94) also scored highly. PU items confirmed efficiency

perceptions, though “QR menus are easier than menu booklets” scored lowest (PU4, M = 3.59), indicating a lingering preference for traditional menus among some users. This highlights the need for intuitive design and hybrid options.

Customer Satisfaction (CS)

(CS1, M = 3.78). The lowest satisfaction score was for overall system experience (CS4, M = 3.65), suggesting technical reliability and interface quality remain areas for improvement.

Revisit Intention (RI)

Respondents were moderately inclined to revisit QR menu restaurants (RI1, M = 3.58) and to recommend them (RI4, M = 3.40). However, choosing a QR menu restaurant as a primary destination scored lowest (RI2, M = 3.31), indicating that QR menus alone may not drive dining decisions.

Correlation analysis

Pearson correlations revealed strong, significant relationships between variables. These results affirm TAM’s assertion that perceived ease of use and usefulness influence user satisfaction and behavioral intentions. The correlation analysis presented in *Table 3* examines the relationship between "Perceived Ease of Use" and "Customer Satisfaction." The Pearson correlation coefficient for this relationship is 0.740, which indicates a strong positive correlation. This means that as the perceived ease of use improves, customer satisfaction also increases significantly. The p-value (<0.001) confirms that this relationship is statistically significant, implying that the observed correlation is not due to chance. This result is based on a sample of 296 respondents, ensuring that the findings are robust and representative.

Table 3. Correlation between Perceived Ease of Use (PEOU) and Customer Satisfaction (CS).

		Perceived ease of use	Customer satisfaction
Perceived ease of use	Pearson correlation	1	.740**
	Sig (2-tailed)		<.001
	N	296	296
Customer satisfaction	Pearson correlation	.740**	1
	Sig (2-tailed)	.000	
	N	296	296

The results in *Table 4* highlight a strong positive correlation between Perceived Ease of Use and Revisit Intention. The Pearson correlation coefficient of 0.652, indicating a significant association. This value suggests a significant association, indicating that users who find a service or system easy to use are more likely to intend to revisit it in the future. In other words, the easier and more intuitive a service is to use, the more likely customers are to return and engage again. This relationship emphasizes the role of user experience in fostering long-term customer loyalty. The statistical significance of the correlation is confirmed by the p-value of <0.001, which indicates that the association between ease of use and revisit intention is not due to random chance. The high level of statistical significance, coupled with the correlation coefficient, suggests a robust and meaningful connection.

Table 4. Correlation between Perceived Ease of Use (PEOU) and Revisit Intention (RI).

		Perceived ease of use	Revisit intention
Perceived ease of use	Pearson correlation	1	.652**
	Sig (2-tailed)		<.001
	N	296	296
Revisit intention	Pearson correlation	.652**	1
	Sig (2-tailed)	.000	
	N	296	96

The results presented in *Table 5* demonstrate a strong positive correlation between Perceived Usefulness of the QR menu and Customer Satisfaction, with a Pearson correlation coefficient of 0.772. This indicates that as users perceive the QR menu to be more useful, their satisfaction with the service or experience increases significantly. The high correlation coefficient suggests a robust relationship, meaning that customers who find the QR menu beneficial are more likely to report higher levels of satisfaction.

Table 5. Correlation between Perceived Usefulness (PU) and Customer Satisfaction (CS).

		Perceived of usefulness	Customer Satisfaction
Perceived of usefulness	Pearson correlation	1	.727**
	Sig (2-tailed)		<.001
	N	296	296
Customer Satisfaction	Pearson correlation	.772*	1
	Sig (2-tailed)	.000	
	N	296	296

The data presented in *Table 6* illustrates a strong positive correlation between Perceived Usefulness of the QR menu and Revisit Intention, with a Pearson correlation coefficient of 0.683. This indicates that as customers perceive the QR menu to be more useful, their intention to revisit the service or system increases as well. The correlation coefficient reflects a substantial relationship, suggesting that users who find the QR menu valuable are more likely to return and engage again.

Table 6. Correlation between Perceived Usefulness (PU) and Revisit Intention (RI).

		Perceived of usefulness	Revisit intention
Perceived of usefulness	Pearson correlation	1	.683**
	Sig (2-tailed)		<.001
	N	296	296
Revisit intention	Pearson correlation	.772**	1
	Sig (2-tailed)	.000	
	N	296	296

The correlation analysis between customer satisfaction and revisit intention reveals a statistically significant positive relationship. The Pearson correlation coefficient of 0.776 indicates a strong correlation between the two variables. The p-value (<0.001) demonstrates that this relationship is statistically significant at the 0.01 level, meaning the observed correlation is highly unlikely to occur by chance. This result implies that as customer satisfaction with the QR menu ordering system increases, their intention to revisit the restaurant also rises. The strong correlation highlights the importance of ensuring a positive customer experience to drive repeat patronage.

Table 7. Correlation between Customer Satisfaction (CS) and Revisit Intention (RI).

		Customer satisfaction	Revisit intention
Customer satisfaction	Pearson correlation	1	.776**
	Sig (2-tailed)		<.001
	N	296	296
Revisit intention	Pearson correlation	.776**	1
	Sig (2-tailed)	.000	

Mediation analysis

PROCESS Macro results confirmed that customer satisfaction mediates the relationship between both PEOU and PEU and revisit intention. The *table 8* presents the mediation analysis results for the relationship between Perceived Ease of Use (PEOU), Customer Satisfaction (CS), and Revisit Intention (RI) in the context of QR menu usage. The direct relationship between PEOU and CS is significant, with a coefficient of 0.8053 (SE = 0.0427, $p < 0.05$, standardized $\beta = 0.7396$). This indicates that an increase in perceived ease of use positively and significantly enhances customer satisfaction. Similarly, the relationship between CS and RI is also significant, with a coefficient of 0.6863 (SE = 0.057, $p < 0.05$, standardized $\beta = 0.7846$), demonstrating that higher customer satisfaction strongly influences revisit intention.

Table 8. Mediation between Perceived ease of use QR menu, Customer Satisfaction and Revisit Intention.

Antecedent		β	SE	p	β		β	SE	P	β
X (Perceived ease of use)	a	0.8053	0.0427	0.0	0.7396	c	0.1992	0.0621	0.0015	
						b	0.6863	0.0570	0.0	0.7846
M (Customer Satisfaction)		0.6863	0.0570	0.0	0.7846					

Table 9 depicts the mediation analysis results for the relationship between Perceived Usefulness (PU), Customer Satisfaction (CS), and Revisit Intention (RI) in the context of QR menu usage. The direct relationship between PU and CS is significant, with a coefficient of 0.7347 (SE = 0.0353, $p < 0.05$, standardized $\beta = 0.7722$). This indicates that an increase in perceived usefulness positively and significantly enhances customer satisfaction. Similarly, the relationship between CS and RI is also significant, with a coefficient of 0.6524 (SE = 0.0601, $p < 0.05$, standardized $\beta = 0.7870$), demonstrating that higher customer satisfaction strongly influences revisit intention.

Table 9. Mediation between Perceived Usefulness of QR menu, Customer Satisfaction and Revisit Intention.

Antecedent		β	SE	p	β		β	SE	P	β
X (Perceived ease of usefulness)	a	0.7347	0.0353	0.0	0.7722	c	0.2086	0.0572	0.0003	
						b	0.6524	0.0601	0.0	0.7870
M (Customer Satisfaction)		0.6524	0.0601	0.0	0.7870					

Summary of hypothesis testing

These results confirm that all direct and mediated relationships proposed in the conceptual framework were statistically significant, reinforcing the central role of customer satisfaction as a mediator between technology perceptions and revisit intentions. *Table 10* depict the hypotheses, relationship between variable and result of the hypothesis testing.

Table 10. Summary of hypothesis testing.

Hypo	Relationship	Result	Significance
H1	Perceived Ease of Use → Customer Satisfaction	Supported	$p < .001$
H2	Perceived Ease of Use → Revisit Intention	Supported	$p < .001$
H3	Perceived Usefulness → Customer Satisfaction	Supported	$p < .001$
H4	Perceived Usefulness → Revisit Intention	Supported	$p < .001$
H5	Customer Satisfaction → Revisit Intention	Supported	$p < .001$

H6	Perceived Ease of Use → Revisit Intention (mediated by Customer Satisfaction)	Supported	p < .001
H7	Perceived Usefulness → Revisit Intention (mediated by Customer Satisfaction)	Supported	p < .001

Findings show that QR menu adoption in urban Selangor is largely driven by a young, educated, and tech-savvy consumer base. Perceived ease of use and perceived usefulness significantly enhance satisfaction, which in turn drives revisit intention. However, the relatively lower scores for replacing traditional menus indicate that complete digital substitution may alienate certain user segments. For restaurant operators, these results underscore the need for user-friendly design, reliable system performance, and hybrid service models. Meanwhile, policymakers and technology developers should focus on digital inclusivity, ensuring QR menus remain accessible to customers with varying levels of digital literacy.

Conclusion

This study offers valuable insights into how QR code menu systems influence customer behavior in urban Malaysian restaurants. By applying the Technology Acceptance Model (TAM), the findings confirm that perceived ease of use and perceived usefulness directly influence customer satisfaction, which in turn significantly predicts revisit intention. Together, these findings establish a nuanced understanding of the mechanisms that drive customer loyalty in an increasingly digitized dining environment. The significance of this research lies not only in its empirical contribution but also in its contextual relevance. As Malaysia continues its digital transformation agenda across various service sectors, understanding consumer responses to technological innovation is crucial. The findings suggest that QR code menus are not merely a response to pandemic-era constraints but a sustainable innovation with long-term relevance.

Practical Implications

For restaurant managers and business owners, these insights highlight the necessity of prioritizing user experience in digital menu system implementation. Features such as intuitive navigation, fast loading times, multilingual options, and integration with popular digital wallets (e.g., Touch 'n Go, GrabPay) can significantly enhance perceived ease of use and usefulness. Moreover, incorporating customer feedback into iterative system improvements can foster greater satisfaction and, ultimately, drive loyalty. Technology developers, particularly those designing hospitality solutions, should focus on creating adaptive and user-centric QR menu interfaces. Systems that personalize menu recommendations based on previous orders or dietary preferences can enhance perceived usefulness. Additionally, leveraging AI and analytics tools to monitor usage patterns can enable businesses to optimize operational flow and enhance customer engagement. From a policy perspective, government stakeholders and local authorities can play a facilitative role by incentivizing the adoption of digital technologies in the hospitality sector. Subsidies, tax breaks, or digital literacy workshops for small- and medium-sized enterprises (SMEs) could accelerate the integration of QR code systems, particularly in areas where digital adoption remains uneven.

Theoretical contributions

This study extends the application of TAM by validating the mediating role of customer satisfaction in the hospitality context, specifically in Malaysia. It demonstrates that while ease of use and usefulness are foundational, satisfaction serves as the bridge between technology interaction and customer retention. These findings encourage researchers to explore further mediators and moderators, such as trust, digital literacy, and service personalization, in similar contexts.

Limitations and future research

While the research offers robust insights, its focus on urban areas within Selangor limits generalizability of findings to rural or international settings. Future studies could adopt mixed-methods or longitudinal approach to explore how customer attitudes evolve over time. Additionally, comparative studies across different types of restaurant formats (e.g., fine dining vs. quick service) or age cohorts (e.g., Gen Z vs. Baby Boomers) could yield deeper behavioral insights. In conclusion, this study affirms the growing importance of digital menu systems in shaping customer experience and loyalty. By highlighting satisfaction as a mediating factor, it provides a strategic framework for restaurants aiming to thrive in a tech-driven, post-pandemic hospitality industry. Prioritizing both technological usability and emotional fulfillment will be key to building sustainable customer relationships in the evolving landscape of Malaysian dining.

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Conflict of interest

The authors confirm that there is no conflict of interest involved with any parties in this research study.

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