

Implementation of Quick Response (Qr) Code in Indonesian Restaurants: Integration Of Protection Motivation Theory (Pmt) And Theory Of Planned Behavior (Tpb)

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ABSTRACT

Covid 19 has devastated the restaurant industry, including in Indonesia, which has prompted some of them to transform to improve service quality through the application of QR codes. The purpose of this study is to analyze consumer behavior towards the application of QR codes in restaurants in Indonesia by integrating Protection Motivation Theory (PMT) and Theory of Planned Behavior (TPB). Research data was collected through online questionnaire distribution with a total sample of 215 respondents who met certain criteria. The hypotheses were tested empirically through Smart PLS which met the criteria for the outer model and the inner model. The results of the study revealed that PMT through threat appraisal (perceived severity and perceived vulnerability) and coping appraisal (self-efficacy, response efficacy, and response cost) statistically affected attitudes on the QR code. Furthermore, the integration of PMT and TPB through attitudes to QR codes has been shown to have an effect on intentions to use QR codes. In addition, subjective norms statistically affect behavioral intentions using QR codes and behavioral intentions using QR codes are able to encourage actual behavior.

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1. Introduction

The COVID-19 pandemic has significantly altered the restaurant industry's landscape. In numerous nations, various forms of public health prevention measures, such as quarantine, social distancing, and regional closures, have been implemented to suppress transmission (Tandon, 2020). During the pandemic, the restaurant industry is of particular concern because the virus spreads through respiratory droplets produced by breathing, speaking, coughing, and sneezing (CDC COVID-19 Response Team., 2020). The rapid spread of the virus will cause consumers to pay more attention to their health in order to avoid exposure to Covid 19, thereby decreasing the number of visitors. Brizek et al. (2021) discovered that 25 % of the restaurants surveyed were unable to survive a nearly two-month closure, and less than a quarter were unable to return their company employees to pre-pandemic levels, causing restaurant sales to decline. According to Industry Data (2021), the food and beverage accommodation provider industry, which includes the restaurant industry, contracted by 10.22% in 2020 based on the growth rate of business fields in Indonesia.

Consumers are becoming increasingly concerned about visiting restaurants, particularly when dining in, because they are extremely vulnerable to Covid 19 transmission. Therefore, companies should employ effective strategies to preserve consumer trust. Protection Motivation Theory (PMT) is a theory of health behavior that can change a person's behavior regarding risk perception and assess behavioral intentions to adopt protective measures that are influenced by the high level of risk received regarding a disease (Mortada et al., 2021). According to Patil & Karekar (2019) the restaurant industry can improve service quality by implementing Quick Response (QR) code technology, which can be used for viewing and ordering menus, transacting, and receiving periodic updates on records. QR code is an optical label that can be read by a matrix barcode machine or a two-dimensional barcode machine to store information from a system that is installed or associated (Yang et al., 2017). The application is highly effective at minimizing direct contact

and eliminating the risk of transmission, which is anticipated to increase the number of visitors. Employees in the supply chain suggest that by improving this service system, it can increase sales and service quality standards (Kocaman, 2021).

Alsaad & Al-Okaily (2022) demonstrate that application acceptance is triggered by the perception of Covid 19 risk, which heightens a person's fear and motivates them to protect themselves from threats by behaving adaptively, thereby increasing the intention to use detection applications. Rad et al. (2021) conducted a study by correlating PMT with cultural factors including visiting family and friends, shaking hands, and touching cheeks. The results of this study suggest that everyone chooses to remain indoors during a pandemic. Prasetyo et al. (2020) analyzed the effectiveness of Covid 19 prevention measures by integrating PMT and Theory of Planned Behavior (TPB). The outcome demonstrates that a person's perceived vulnerability and perceived severity can indirectly affect behavioral intentions and lead to actual behavior. The relationship between PMT and TPB in the application of QR codes in the restaurant industry has never been studied, especially in Indonesia. Consequently, the objective of this study is to provide insight into the restaurant industry, particularly in Indonesia, by integrating PMT and TPB theories to evaluate consumer perceptions regarding the application of QR codes. It is anticipated that the results of this study will serve as an illustration and recommendation for the restaurant industry, particularly those that have not implemented a QR code service system, in order to increase consumer confidence through technology-based service system enhancements, thereby having a regular impact on increasing company sales.

Literature Review protection motivation Theory (PMT) dan Theory of Planned Behavior (TPB) PMT is a health theory with a broad scope that attempts to explain behavior change and reduce response costs, while also considering the communal aspect of action (Ibrahim & Al-Ajlouni, 2018). Rogers introduced the PMT in 1975 to assess a person's intention to behave in a protective manner based on two factors: threat appraisal and coping (Milakovi & Miocevic, 2022). The threat appraisal includes perceived severity and perceived vulnerability, whereas the coping appraisal includes self-efficacy, response efficacy, and response cost (Cho et al., 2020; Miraja et al., 2019). In contrast to previous research on technology acceptance using PMT during Covid 19 (Alsaad & Al-Okaily, 2022), we integrated PMT and TPB to predict causality between variables determined to evaluate the effectiveness of using QR code technology to view restaurant menus. TPB is a theory used to forecast the behavior of consumers who intend to engage in specific behaviors (Yang et al., 2017). TPB is used to measure consumer perceptions of restaurants adopting QR codes. We employ TPB variables, which include attitudes, subjective norms, behavioral intentions, and actual behavior.

Effect of Perceived Severity on Attitude, Perceived severity is the level of threat a person perceives in response to a specific threat (Cho et al., 2020). During a restaurant visit, the perceived severity is measured by the severity of the threat of Covid-19 transmission. The virus is easily transmitted through the air, posing a risk to human health and even causing death. People decide to accomplish a certain behavior if they believe that the behavior is under control or that they have the support of those who are important to them (Ataei et al., 2021). When they perceive the severity of a threat, they tend to develop favorable attitudes toward technology adoption (Yang et al., 2017; Tu et al., 2015). To avoid the virus, QR codes are an alternative to improving service quality for online menu viewing. Previous research has demonstrated that the greater the perceived severity, the more positive a person's attitude will be (Wu, 2020). In light of these factors, we hypothesize as follows:

H1: Perceived severity has positive effect on attitudes.

Effect of Perceived Vulnerability on Attitude, Perceived vulnerability to unfavorable outcomes is the subjective perception of the likelihood that something undesirable will occur (Ibrahim & Al-Ajlouni, 2018). Covid 19 is highly susceptible to infection when in direct contact with another person in a restaurant where health issues, such as coughs and colds, may be prevalent. The threat perception of Covid 19 exposure is greater, indicating a greater likelihood of adaptive behavior (Cho et al., 2020). This will encourage the use of QR codes when viewing menus in an effort to prevent transmission. Multiple researchers have demonstrated that the greater the perceived severity, the more positive a person's attitude will be (Ong et al., 2021; Wu, 2020; Yang et al., 2017). In light of these factors, we hypothesize as follows:

H2: Perceived vulnerability has a positive effect on attitudes.

Effect of Self-Efficacy on Attitude, Self-efficacy is used to assess an individual's beliefs regarding their capacity to behave in a protective manner (Okuhara et al., 2020). A person will engage in a behavior that he believes is simple and beneficial (Wu, 2020; Deng & Liu, 2017; Yang et al., 2017). A person who can learn QR codes with minimal effort will be more inclined to utilize them when dining in restaurants. Previous

research demonstrated that self-efficacy can shape positive attitudes towards technology use (Deng & Liu, 2017; Guo et al., 2015). Yang et al. (2017) discovered that self-efficacy can influence a person's attitude toward using QR codes. Therefore, we hypothesize as follows:

H3: self-efficacy has a positive effect on attitudes.

Effect of Response Efficacy on Attitude, Crossler & Bélanger (2014) define response efficacy as a person's belief that the recommended behavior can prevent a threatening event. Individuals with positive response efficacy will have positive attitudes toward healthy behavior (Guo et al., 2015). The benefits obtained by using QR codes are referred to as response efficacy. Someone believes that if they receive significant benefits from using QR codes, they will develop a favorable attitude toward using them. Previous research has shown that high response efficacy can influence people's attitudes toward using QR codes (Wu, 2020; Yang et al., 2017). Based on these considerations, we propose the following hypothesis.

H4: response efficacy has a positive effect on attitudes.

Effect of Response Costs on Attitude, Response costs can decrease an individual's willingness to act in the face of a threat (Zhang et al., 2020). Response costs refer to the time, effort, and money required to accomplish the use of QR codes. People believe that if they invest a great deal of time, effort, and money into learning a new technology, they will be less likely to use it (Sun et al., 2013). In addition, if the use of QR codes is complicated and fraught with obstacles, it discourages people from employing them. However, if the time, effort, and costs required to learn QR codes are minimal, they will adopt the technology. The findings of Yang et al. (2017) evidenced that the greater the response cost, the less receptive individuals are to adopting new technology. In light of these factors, we hypothesize as follows:

H5: response costs have a negative effect on attitudes.

Effect of Attitude on Behavioral Intention to Use, According to Yang et al. (2017), attitude is utilized to integrate theory in order to comprehend the advantages of QR codes for users. The attitude is utilized to integrate PMT and TPB. A person's intent to act may be influenced by their predictable attitudes. The greater the benefits obtained from the use of QR codes when viewing restaurant menus, the more likely someone will be to adopt a positive attitude toward their use. This is accomplished to prevent the transmission of Covid 19. Previous research has demonstrated that a positive outlook can statistically increase a person's behavioral intent to use (Wu, 2020; Yang et al., 2017). In accordance with the findings of Prasetyo et al. (2020), which demonstrate that an individual's attitude can encourage behavioral intentions to avoid Covid 19, Based on these factors, we hypothesize as follows:

H6: attitude has a positive effect on behavioral intention to use.

Effect of Subjective Norm on Behavioral Intention to Use, Subjective norm is a person's perception of whether or not to undertake a behavior that can be influenced by the external environment (Wu, 2020). The social influence of friends, family, and relatives is evaluated based on subjective norms. The social environment can influence a person's decision to act, particularly regarding QR code-related behavioral intentions. Friends, family, and coworkers who have used the QR code may have a favorable opinion of it if it offers numerous advantages. They will relay their experience and recommend it to others. However, if the use of QR codes is viewed negatively due to the numerous obstacles associated with their use, individuals will spread negative information and advise others not to utilize them. Previous research has demonstrated that subjective norms can influence an individual's intent to adopt an application (Man et al., 2021; Wu, 2020; Yang et al., 2017). According to these factors, we hypothesize as follows:

H7: subjective norm has a positive effect on behavioral intention to use.

Effect of Behavioral intention to use on Actual Behavior, Behavioral intentions are used to measure a person's perception of a certain behavior, according to Mahardika et al. The greater a person's intention to use a QR code, the more likely they are to actually do so. If the application provides numerous advantages, QR codes are typically utilized. Previous research provides empirical evidence that behavioral intention to use can motivate actual behavior (Man et al., 2021; Prasetyo et al., 2020). In light of these factors, we hypothesize as follows:

H8: behavioral intention to use has positive effect on actual behavior.

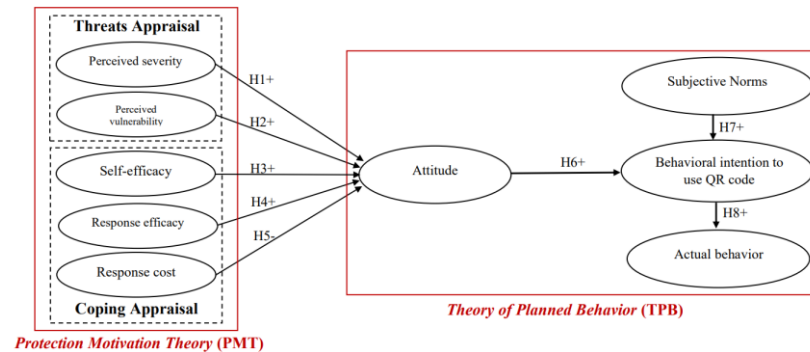


Figure 1. Research Model Framework

2. Research Method

This study is a quantitative causality study that is statistically evaluated using Smart PLS. The research sample consisted of 215 respondents who viewed menus at Indonesian restaurants using a QR code. Online questionnaires are distributed in order to collect data. Questionnaires are distributed in order to determine the characteristics and perceptions of perceived severity, perceived vulnerability, self-efficacy, response efficacy, response costs, attitudes, subjective norms, behavioral intentions, and actual behavior among respondents. Methods for measuring research variables are as follows.

Table 1.
Measuring Research's Variables

Variable	Code	Measurement	Source
Perceived Severity	KP1	Covid 19 is harmful to my health	Zhang et al. (2020); Laato et al. (2020); Ling et al. (2019)
	KP2	Covid 19 is a disease that poses a life-threat to me	
	KP3	Covid 19 can significantly diminish health	
Perceived Vulnerability	KR1	I am very vulnerable to Covid 19	Zhang et al. (2020); Laato et al. (2020); Ling et al. (2019); Sun et al. (2013)
	KR2	I'm at risk to contracting Covid 19	
	KR3	I will experience health issues if I contract Covid 19	
Self-Efficacy	ED1	The use of QR codes to view the menu is understandable to me	Zhang et al. (2020); Sun et al. (2013)
	ED2	I was able to view the menu using the QR code	
	ED3	I didn't make a big effort to use the QR code to view the menu	
Response Efficacy	ER1	QR code to view the menu as a solution to the Covid 19 problem	Zhang et al. (2020); Sun et al. (2013)
	ER2	Using a QR code to view a menu effectively solves the Covid 19 problem	
	ER3	The use of a QR code to access the menu is guaranteed to solve the Covid 19 problem	

Continued Table 1. Measuring Research Variables

Variable	Code	Measurement	Source
Response Cost	BR1	It takes a long time to learn the QR code to view the menu	Yang et al. (2017)
	BR2	It takes a lot of effort to learn the QR code in order to see the menu	
	BR3	The inconvenience of using QR codes to view menus outweighs the benefits	
Attitude	S1	It is a good idea to use a QR code while viewing the menu	Zhang et al. (2020); Deng & Liu (2017)
	S2	Using QR codes to view menus can improve health management	
	S3	I enjoy using the QR code to access the menu	
Subjective Norms	NS1	If my close friends use QR codes to protect themselves when viewing menus, so will I	Yang et al. (2017)
	NS2	If prominent people use QR codes on menus to protect themselves from potential threats, so will I	
	NS3	If my colleague suggests using a QR code to view the menu, I will do so	
Behavioral intention to use QR code	NP1	I will frequently use the QR code when reviewing the menu	Zhang et al. (2020)
	NP2	I will recommend others to use the QR code to view the menu	
	NP3	In the future, I will continue to use the QR code to view the menu	
Actual Behavior	PS1	I practice viewing the menu using the QR code	Prasetyo et al. (2020)
	PS2	I ever more use QR codes to view menus	
	PS3	I always use the QR code to view the menu	

This study was statistically analyzed in three stages. The first stage is to run the convergent validity test on the outer model to determine the instrument's feasibility (loading factor value ≥ 0.70), discriminant validity test (Average Variance Extracted (AVE) ≥ 0.50 , and composite reliability test (cronbach's alpha ≥ 0.60 dan composite reliability value (ρ_c) ≥ 0.70). The second stage is to test the inner model to determine the structural model's feasibility by conducting three tests, namely: R Square (R²), (R² = 0.67 is considered strong, R² = 0.33 is considered moderate, and R² = 0.19 is considered weak), Q Square (Q²) (Q² = 0.02 is considered weak, Q² = 0.15 is considered moderate, and Q² = 0.35 is considered strong), and Goodness of Fit (GoF) (Gof = 0.10 is considered small, GoF = 0.25 is considered moderate, and GoF = 0.36 is considered large). The third step involves statistically testing the hypothesis using the Estimation of Path Coefficients (β) and T Statistics. If the value of sig $\leq 0,05$ and t statistic $\geq$ t table, then the hypothesis can be accepted. Nevertheless, if the value of sig $\geq 0,05$ and nilai t statistic $\leq$ t table, therefore the hypothesis can be rejected.

3. Results and Discussion

3.1 Outer Model Evaluation

The evaluation of the outer model in Table 2 shows that all values of λ are greater than 0.70, which strengthens convergent validity. The test results demonstrate that each variable has an AVE value that is greater than 0.50 and close to 0.70, indicating that the research data meets the discriminant validity requirements. In addition, the overall Cronbach's alpha value is greater than 0.60 and the ρ_c value is greater than 0.70, meeting the composite reliability criterion.

Table 2.
Outer Model Evaluation Results

Outer Model Evaluation Results					
Variable	Item	λ	Cronbach's Alpha	pc	AVE
Perceived Severity	KP1	0.781	0.804	0.884	0.718
	KP2	0.852			
	KP3	0.795			
Continued Table 2. Outer Model Evaluation Results					
Variable	Item	λ	Cronbach's Alpha	pc	AVE
Perceived Vulnerability	KR1	0.790	0.731	0.849	0.652
	KR2	0.872			
	KR3	0.753			
Self-Efficacy	ED1	0.794	0.783	0.874	0.699
	ED2	0.862			
	ED3	0.763			
Response Efficacy	ER1	0.782	0.737	0.851	0.656
	ER2	0.834			
	ER3	0.889			
Response Cost	BR1	0.863	0.729	0.848	0.650
	BR2	0.870			
	BR3	0.808			
Attitude	S1	0.914	0.819	0.893	0.738
	S2	0.914			
	S3	0.750			
Subjective Norms	NS1	0.759	0.729	0.847	0.648
	NS2	0.857			
	NS3	0.797			
Behavioral Intention to Use QR Code	NP1	0.889	0.816	0.892	0.735
	NP2	0.914			
	NP3	0.766			
Actual Behavior	PS1	0.920	0.823	0.897	0.744
	PS2	0.728			
	PS3	0.911			

3.2 Inner Model Evaluation

The evaluation of the inner model in Table 3 reveals that the R² value of the attitude variable is 0.571, indicating that the attitude variable can be explained by the perceived severity, perceived vulnerability, self-efficacy, response efficacy, and response cost to the extent of 57.1 %, with the remaining 42.9 % explained

by unstudied variables. The behavioral intention variable utilizing the QR code has an R^2 of 0.094, indicating that 9.4 % of its variance can be explained by the attitude and subjective norm variables, while the remaining 90.6% can be explained by variables that were not studied.

Table 3.
Inner Model Evaluation Results

Model	R^2	Q^2	GoF
Attitude	0.571		
Behavioral Intention to Use QR Code	0.094	0.740	0.479
Actual Behavior	0.329		

Table 3 information that the behavioral variable has an R^2 of 0.329, indicating that 32.9 % of its variance can be explained by the behavioral intention variable using a QR code, while the remaining 67.1 percent is explained by unstudied variables. The Q^2 value is derived from the R^2 value, and the GoF value is derived from the AVE and R^2 values. The results demonstrated that the research model has a Q^2 value of 0.740 and a GoF value of 0.479, placing it in the strong category and allowing for the research hypothesis test to be conducted.

3.3 Hypothesis Test Results

This study investigates the integration of PMT and TPB on the use of QR codes in Indonesian restaurants through the Smart PLS approach. The test results in Table 4 show that the perceived severity (KP) ($\beta = 0.142$, $t = 2.357$, $p = 0.019$), perceived vulnerability (KR) ($\beta = 0.310$, $t = 4.782$, $p = 0.000$), self-efficacy (ED) ($\beta = 0.320$, $t = 5.456$, $p = 0.000$), response efficacy (ER) ($\beta = 0.159$, $t = 2.735$, $p = 0.006$) partially positive significant effect on attitude (S). Therefore, H1, H2, H3, dan H4 are accepted. While response cost (BR) ($\beta = -0.118$, $t = 2.146$, $p = 0.032$) proved a negative significant effect on attitude (S), hence, H5 is accepted. Attitude (S) ($\beta = 0.260$, $t = 4.006$, $p = 0.000$) and subjective norms (NS) ($\beta = 0.417$, $t = 7.295$, $p = 0.000$) partially have positive significant effect on behavioral intention to use QR code (NP), thus H6 and H7 are accepted. In the other hand behavioral intention to use QR code (NP) ($\beta = 0.307$, $t = 4.942$, $p = 0.000$) has a positive significant effect on actual behavior (PS), so H8 is accepted.

Table 4.
Hypothesis Test Results

Variable	Expected Effect	β	T Stat	P Values	Conclusion
KP → S	+	0.142	2.357	0.019*	H1 is accepted
KR → S	+	0.310	4.782	0.000**	H2 is accepted
ED → S	+	0.320	5.456	0.000**	H3 is accepted
ER → S	+	0.159	2.735	0.006**	H4 is accepted
BR → S	-	-0.118	2.146	0.032*	H5 is accepted
S → NP	+	0.260	4.006	0.000**	H6 is accepted
NS → NP	+	0.417	7.295	0.000**	H7 is accepted
NP → PS	+	0.307	4.942	0.000**	H8 is accepted

Notes:

significant at $\alpha 0,01$ (1%)

significant at $\alpha 0,05$ (5%).

3.4 Discussion

The study's findings were statistically tested using a strong and supportive Bayesian model related to the integration of PMT and TPB on the use of QR codes in Indonesian restaurants. PMT and TPB are two theories that are frequently used to study consumer attitudes toward new technologies (Yang et al., 2017). Through the use of QR codes to view restaurant menus, PMT is used to understand a person's behavior in order to protect themselves from the threat of Covid 19. PMT is the foundation for appraising disease risk and coping. Threat appraisal based on perceived vulnerability and severity (Zhang et al., 2020). The findings revealed that perceived severity and perceived vulnerability could partially influence attitudes toward the use of QR codes. The findings of this study are supported by Zhang et al (2020) 's research, which found that people who perceive the perceived severity and vulnerability of their Covid 19 illness have a positive attitude toward using technology. These findings indicate that Covid 19 can endanger a person's health by causing symptoms such as rising body temperature, colds, coughs, asthma, and even death. To avoid the threat of transmission, consumers adopt an adaptive behavior by scanning a QR code to view the menu. A person can

avoid transmitting Covid 19 because the application can reduce direct contact for consumers when visiting restaurants where customers can order menus virtually without queuing. Wu (2020) confirmed that the perceived severity and vulnerability of a threat could indeed shape a person's attitude toward technology in order to avoid threats.

Self-efficacy, response efficacy, and response costs are three aspects of coping appraisal that have the potential to affect attitudes. According to the findings of the study, self-efficacy and response efficacy can contribute to a positive attitude toward using QR codes. According to the findings of Zhang et al. (2020), self-efficacy and response efficacy encourage an individual's attitude toward adopting technology. Someone determined that they had the ability to learn the application because ordering food was simple. In addition, the application provides additional benefits when viewing the menu, where the user can view the menu and place an order by scanning a QR code with a smartphone. The application's convenience and benefits influence a user's decision to adopt it (Yang et al., 2017). Statistically, the response cost was shown to decrease a person's attitude toward adopting a QR code, although the effect was very weak in comparison to self-efficacy and response efficacy. This finding demonstrates that a person will not use QR codes if the effort and time required to learn and use them are excessive. This study's findings support Yang et al (2017)'s assertion that response costs can influence a person's negative attitude toward the use of QR codes. Contrary to Zhang et al (2020)'s conclusion that response costs have no significant effect on attitudes toward technology use, we find that response costs have a significant impact on attitudes toward technology use.

In the context of this study, attitude serves as a bridge between PMT and TPB. The study's findings indicate that a positive attitude can increase a person's intent to use a QR code. Zhang et al. (2020) and Yang et al. (2017) found that attitude is a predictor that can encourage a person's intention to use new technology, which supports the findings of this study. Wu (2020) confirmed that a person's attitudes can influence their intention to use technology. Therefore, a person who intends to utilize QR codes because they have a favorable view of the technology. A positive attitude can be formed because the application provides numerous benefits, is simple to use, and eliminates the risk of Covid 19 transmission. Statistically, subjective norms influence QR code-based behavior intentions. This study demonstrates that the influence of subjective norms is greater than the influence of QR attitudes. The behavioral intention of an individual to use a QR code will be increased if friends, family, and relatives provide positive information about its use. Consistent with the findings of Wu (2020), Zhang et al. (2020), and Yang et al. (2017), subjective norms have a positive impact on an individual's behavioral intent to use technology. Consequently, the formation of a person's behavioral intention to utilize a QR code can statistically result in actual behavior. Previous research demonstrates that a person's behavioral intentions have a substantial impact on their actual behavior in the context of technology use (Man et al., 2021; Prasetyo et al., 2020).

4 Conclusion

The Covid 19 phenomenon has had a devastating effect on the restaurant industry. In order to survive in the midst of a pandemic, several restaurants in Indonesia are transforming by enhancing service quality by implementing QR codes to view menus. This study analyzes consumer behavior using a QR code-based PMT and TPB. The findings indicate that PMT through threat appraisal (perceived severity and perceived vulnerability) affected attitudes. While the coping appraisal (self-efficacy, response efficacy, and response costs) was found to influence attitudes. The findings of the study indicate that subjective attitudes and social norms statistically influence behavioral intentions using QR codes, and that behavioral intentions using QR codes can motivate actual behavior.

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