

# **ONLINE FOOD SHOPPING BEHAVIOR AMID COVID-19 PANDEMIC IN THE PHILIPPINES: INTEGRATED THEORIES OF PROTECTION MOTIVATION AND PLANNED BEHAVIOR**

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(Date received: December 18, 2023; Accepted: May 3, 2024)

## **ABSTRACT**

Consumer behavior was significantly affected by the COVID-19 pandemic, prompting increased online food usage. This shift raised a growing interest in understanding the factors influencing consumer choices in this domain. Thus, the study analyzed specific factors based on the integrated theories of Protection Motivation and Planned Behavior. Data were collected from respondents in the Philippines (n=285) through widely used social media platforms from July 2021 to January 2022. The study contributed to bridging the gap between intention and actual behavior, demonstrating the applicability of the underlying theories with 39% of the variance in online food shopping behavior explained by intention. Structural equation modeling revealed that attitude emerged as the most significant factor driving consumer intention, particularly influenced by response efficacy to engage in online food shopping. This further emphasized the significance for food retailers to develop an online platform that prioritizes a convenient, safe, and practical food shopping experience. Such findings not only cater to shifting consumer behavior but also enhance retailers' resilience and preparedness for other potential crises. Future studies could delve into specifying food categories to understand consumer preferences and consider the inclusion of moderating variables, such as demographic data.

**Key words:** planned behavior, protection motivation, digital platform, PLS-SEM

## **INTRODUCTION**

The use of e-commerce by consumers is on the rise due to their willingness to pay for convenience (Jensen et al. 2021). This trend has been particularly evident in the agribusiness sector, where e-commerce has significantly navigated environmental complexity (Lin et al. 2020). The COVID-19 pandemic has led to an accelerated use of e-commerce by businesses due to the increasing online shopping behavior (Gu et al. 2021). Therefore, this consumer predisposition toward online shopping has become a fundamental aspect of contemporary consumer behavior (Richards and Rickard 2020). In this context, online food shopping behavior refers to the actions and decisions made by individuals when purchasing food products through digital channels such as websites and mobile applications (Kim et al. 2018). Understanding this behavior has become increasingly important as technology continues to influence the food purchasing decisions of consumers (Liu and Lin 2020).

In the Philippines, retailers have responded by strategically reconfiguring their operations through online services to improve food retail sales post-pandemic (United States Department of Agriculture 2022). The expected growth of food e-commerce in the country is highly optimistic as it demonstrated a compounded annual growth rate of 226.14% from 2016 to 2021 (United States

Department of Agriculture 2022). Such significant growth in the domestic market is attributed to retail businesses increasingly leveraging online platforms provided by websites and mobile applications (United States Department of Agriculture 2021). For instance, the top preferred online shopping channels in the country include online marketplaces (*e.g.*, Grabmart, MetroMart), social commerce (*e.g.*, Facebook, Instagram), and proprietary retail platforms (*e.g.*, SM Supermarket, Landers) (Statista and Rakuten Insight 2022). In addition, there was a consistent growth in smartphone adoption within Philippine households, resulting in a 74.1% penetration rate in 2021 (International Trade Administration 2022). This positive trajectory makes the Philippines an exemplary case for assessing online food purchasing behaviors. The study follows the definition of food by the Philippine Statistics Authority (2009), encompassing products for home consumption such as fresh, cooked, packaged, chilled, frozen, preserved, or processed items, as the majority of food e-commerce in the Philippines offered a wide range of food types falling within this definition.

In recent years, more research has been conducted to study the effects of the COVID-19 pandemic on consumer behavior, specifically online food shopping. This phenomenon has been predominantly evaluated according to the Theory of Planned Behavior, as evidenced by studies conducted by Janssens and Semeijin (2023), and Theodorou et al. (2023). The Theory of Planned Behavior (TPB) stands as a widely recognized framework in consumer research due to the high predictive validity of actual behavior (Ahmmadi et al. 2021). It predicts human behavior by establishing a connection between their beliefs and actions within specific contextual conditions. Fundamentally, the theory posits that the action hinges upon the intention to perform such behavior, shaped by subjective norms, perceived behavioral control, and attitudes (Ajzen 1985).

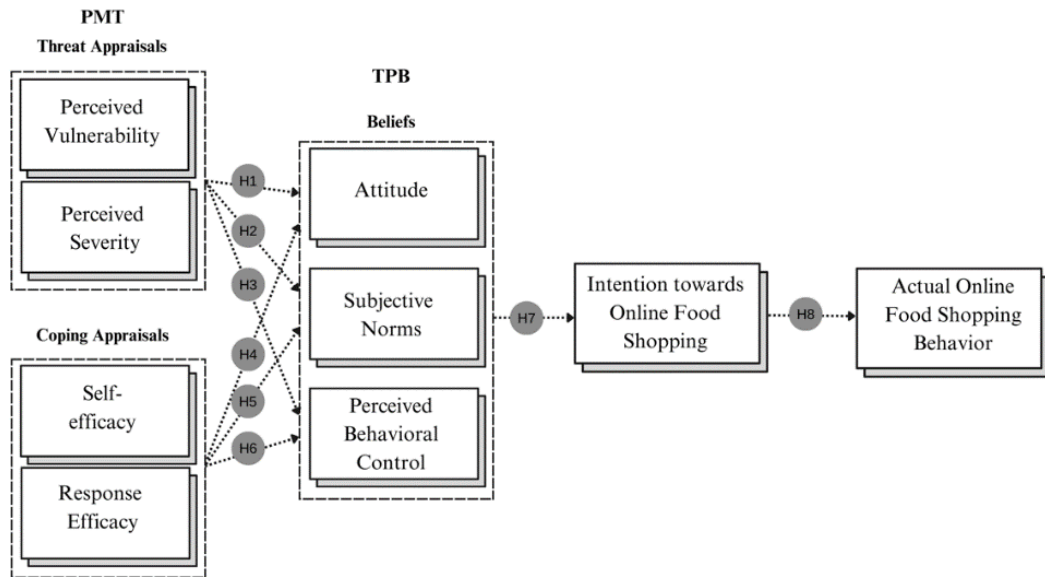
While this framework has provided valuable insights, recent research by Youn et al. (2021) suggests that incorporating the Theory of Protection Motivation can offer a more comprehensive understanding of the risks posed by COVID-19 pandemic on consumer behavior and effective measures to mitigate these threats. The Protection Motivation Theory (PMT) emphasizes anticipating risks and finding ways to reduce fear (Rogers 1975). During the COVID-19 pandemic, PMT became vital for understanding fear appeals. It involves threat assessment (*i.e.*, evaluating vulnerability and severity) to prevent harmful reactions and coping appraisal (*i.e.*, identifying solutions and factors affecting response effectiveness) (Conner and Norman 2015). There have been numerous studies that demonstrated the effectiveness of PMT in understanding consumer behavior amid the COVID-19 pandemic (Byrd et al. 2021; Soon et al. 2022; Wen and Liu-Lastres 2022).

Despite the growing body of literature, there is a notable gap in research conducted in the Philippines, particularly in the integration of theories to assess consumer behavior beyond the domains of health and risk management (Jou et al. 2022; Ong et al. 2021; Prasetyo et al. 2020). This study acknowledges the theoretical advancements and seeks to address the gap within the Philippine context. The practical application of integrated theories endeavors to comprehend consumer behavior amid the pandemic, offering valuable perspectives that contribute to enriching existing literature. These insights are particularly grounded in a market characterized by substantial digital activity. Therefore, this study aimed to assess several factors that influence online food shopping behavior amid COVID-19 pandemic in accordance to the theories of Planned Behavior and Protection Motivation.

## **THEORETICAL FRAMEWORK**

**Research hypotheses.** The study developed eight hypotheses to explore relationships between constructs (Fig. 1). Perceived vulnerability and severity positively impact attitudes towards health and environmental threats (Lin and Bautista 2016). During the pandemic, vulnerability and severity influenced positive attitudes towards drone food delivery as a protective measure (Singh et al. 2022). Vulnerable consumers, feeling threatened by COVID-19, engaged in panic buying and favored online

shopping (Yuen et al., 2021). When perceiving high risks, consumers tend to hold positive attitudes towards online food shopping for risk reduction and protection.



**Fig. 1.** Theoretical framework integrating PMT and TPB.

Source: Adopted from Ajzen 1985; Rogers 1975; Youn et al. 2021

**H1:** Consumers who perceive COVID-19 pandemic as a severe threat in terms of (a) vulnerability and (b) severity develop positive attitudes toward online food shopping.

When close peers undergo significant changes related to a new phenomenon, it can encourage wider adoption of current practices (Sparkman and Walton 2017). For example, when the majority perceives staying at home as crucial during the pandemic, this could lead to widespread adoption of this behavior (Bavel et al. 2020). Perceiving risk from a significant threat can lead to strong subjective norms, shaping attitudes and guiding consumers towards socially acceptable actions, as seen in the rapid uptake of digital food delivery services during COVID-19 pandemic (Jun et al. 2021). Consumers' increased use of online platforms for food shopping may stem from strong social influence, particularly in reducing pandemic risks.

**H2:** Consumers who perceive COVID-19 pandemic as a severe threat in terms of (a) vulnerability and (b) severity become highly subjective towards online food shopping.

Perceptions of vulnerability and severity are associated with higher adoption of protective behaviors (González-Castro et al. 2021). Increased feelings of vulnerability to severe threats prompt individuals to adopt risk-reduction behaviors and seek out safety-oriented products (Lisjak and Lee 2014). These perceptions contribute to a sense of control over online food platforms, enhancing perceived behavioral control and mitigating risks.

**H3:** Consumers who perceive COVID-19 pandemic as a severe threat in terms of (a) vulnerability and (b) severity develop high behavioral control towards online food shopping.

The capacity of an individual to perform a specific action yields a positive impact on their attitude as it empowers them to leverage their skills effectively, e.g., individuals use their skills to pursue endeavors that positively support the environment (Yoong et al. 2018). This belief can motivate

individuals towards activities such as online food shopping, perceiving it as a mitigation for the pandemic challenges (Youn et al. 2022). Thus, developing the hypothesis:

**H4:** *Consumers who can (a) perform online food shopping (self-efficacy) and (b) have appraised it as an effective coping strategy against COVID-19 pandemic (response efficacy) develop a positive attitude toward online food shopping.*

Consumers frequently base their purchasing choices on the recommendations of peers with strong social connections (Luan et al. 2017). Consumers who want to buy a particular product yet encounter divergent recommendations from their social network tend to decide not to buy it (Bhatti and Akram 2020). In addition, as the pandemic posed an immense risk to consumers, they became reluctant to shop offline (Grashuis et al. 2020). Thus, the following hypothesis:

**H5:** *Consumers who can (a) perform online food shopping (self-efficacy) and (b) have appraised it as an effective coping strategy against COVID-19 pandemic (response efficacy) become highly subjective toward online food shopping.*

Consumers who believe in their ability to proficiently navigate online shopping platforms, view online shopping as an effective way to manage risks, and perceive it as a valuable coping strategy are prone to exhibit a stronger sense of control over the situation compared to their offline shopping experiences (Brand et al. 2020). Thus, formulating the hypothesis:

**H6:** *Consumers who can (a) perform online food shopping (self-efficacy) and (b) have appraised it as an effective coping strategy against COVID-19 pandemic (response efficacy) develop high behavioral control toward online food shopping.*

The favorable attitudes of consumers often translate significantly and positively to online shopping intention (Zuelseptia et al. 2018). Likewise, subjective norms and behavioral control are crucial in shaping positive intentions toward online shopping (Bhatti and Akram 2020). The intensity of the intention to engage in the behavior is significantly impacted by attitude, subjective norm, and perceived behavioral control (Hrubes et al. 2001). Thus, proposing the hypothesis:

**H7:** *Consumers who have positive (a) attitudes, (b) subjective norms, and (c) perceived behavioral control develop positive intentions toward online food shopping.*

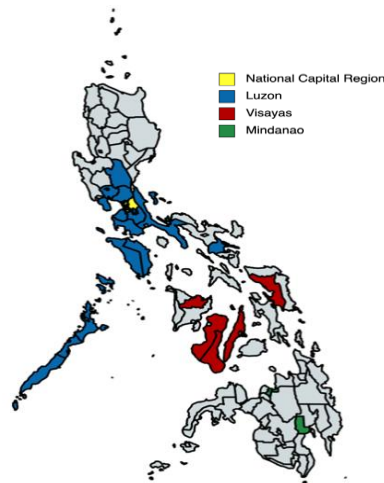
Intention is a key determinant of future behavior as it represents a motivation and readiness to participate in a specific behavior (Keshtidar and Behzadnia 2017). Individuals with strong intentions to engage in certain behaviors are more likely to overcome any challenges and ultimately follow through with the behavior (Conner and Norman 2022). Thus, the final hypothesis:

**H8:** *Consumers intending to perform online food shopping are more likely to transform their intentions into actual behavior.*

## **METHODOLOGY**

**Study area.** The survey responses for this study were collected from various regions in the Philippines (Fig. 2). The distribution of respondents was as follows: National Capital Region (58.9%), Luzon (35.8%), Visayas (3.5%), and Mindanao (1.8%). The National Capital Region (NCR) encompasses a significant portion of the consumer population, with an estimated annual food expenditure of USD 9.3 billion (Robins et al. 2020). Despite the limitation of being unable to extend the study area due to mobility restrictions during the study period, this managed to represent the consumer behavior in the

country, with a population density of 363 persons per square kilometer in 2020 (Philippine Statistics Authority 2021).



**Fig. 2.** Distribution map of the respondents.  
Source: Online survey (2022)

**Data collection and sampling design.** A web-based survey was designed and distributed across various social media platforms to solicit consumer responses using a snowball sampling approach. A pilot survey was undertaken with 50 participants to assess the validity and reliability of the survey. After ensuring the measures were acceptable, the data collection via Google form began on July 5, 2021, and was closed on January 31, 2022. The survey was shared on platforms such as Facebook and LinkedIn. The snowball non-probability convenience sampling was used to distribute the survey within the main author's Facebook residential association group, which comprised of respondents mostly from the NCR. The assistance of colleagues extended the survey's reach to diverse participants in other regions, leveraging professional, educational, and business networks. Throughout the data collection period, the survey was actively shared within numerous groups, including research survey, lifestyle, and other public groups. A total of 327 responses were gathered, noting that 42 respondents reported not using online channels to purchase food items during COVID-19 pandemic. Adhering to the criteria of selecting consumers with online shopping experience, the final analysis used the data from 285 respondents.

**Survey design.** The survey was structured into two distinct sections—comprising of socio-demographic information, and elucidation of the determinants influencing the online shopping behavior of consumers. Respondents assessed these determinants utilizing a five-point Likert scale, wherein 1 signified strong disagreement and 5 indicated strong agreement.

**Data analyses and model estimation.** Descriptive statistics illustrated respondent profiles and delineated patterns in online shopping behavior. Structural equation modeling, specifically, partial least squares structural equation modeling (PLS-SEM) was selected for its appropriateness in prediction and exploratory studies (Hair et al. 2017).

**Measurement model evaluation.** Assessing the model constituted a prerequisite for interpreting the results of PLS-SEM. These parameters measured item reliability, internal consistency, convergent validity, discriminant validity, and collinearity. The study used the following parameters: Composite reliability (CR), Cronbach's alpha ( $\alpha$ ), average variance extracted (AVE), Fornell-Larcker method, Heterotrait-Monotrait (HTMT) ratio, and variance inflation factor (VIF).

**Structural model evaluation.** Employing a bootstrapping technique with 5,000 samples at a 0.05 significance level enabled the evaluation of the significance and values of path coefficients ( $\beta$ ). Subsequently, the PLSpredict procedure assessed the structural model of this study. Conforming to the guideline of Sarstedt and Mooi (2014), the evaluation criteria included explaining the endogenous latent variables ( $R^2$ ) and assessing predictive relevance ( $Q^2$ ). Another method to measure predictive accuracy involved obtaining  $Q^2$  values through a blindfolding procedure. After confirming the model's predictive and exploratory capabilities, the conclusive analysis included testing the hypotheses by evaluating statistical significance and path coefficients.

## RESULTS AND DISCUSSION

**Profile of the respondents.** The study assessed 285 respondents, following several sample size heuristics. Barclay et al. (1995) recommended a minimum of ten times the number of inner model paths directed at a specific construct, implying a need for at least 140 respondents, considering 14 inner paths in this study (Fig. 1). Moreover, Kline (2005) suggested a minimum sample size of over 100. The sample size exceeded both criteria, ensuring suitability for structural equation modeling. Table 1 outlines the profiles of the respondents, aligning closely with the typical online shoppers identified by Song and Sun (2020) such as youngsters between 18 and 29 years old (57.5%), female (64.9%), residing in urban areas (58.9%), and college educated (82.5%). However, this study deviated from this archetype as it comprised of single (64.9%) and average income earners (29.8%), indicating broader acceptance of online shopping across diverse economic and marital demographics. The respondents were categorized as primary decision-makers (64.9%) who played significant roles in household decision-making activities. A substantial portion of respondents had received COVID-19 vaccination (64.9%) and engaged in shopping activities once every two weeks (31.9%).

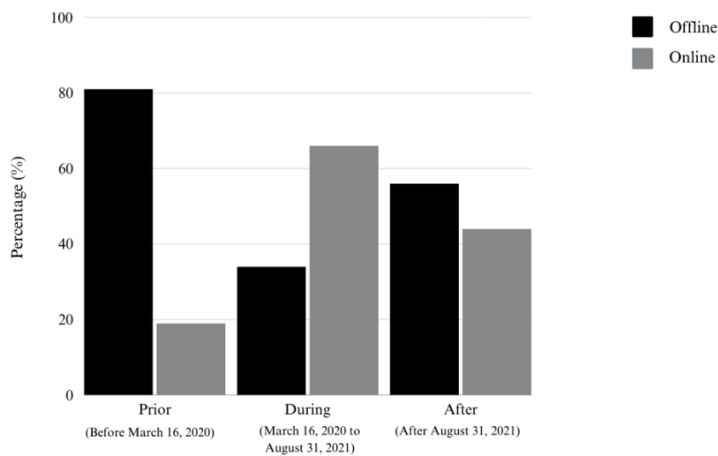
**Table 1.** Descriptive statistics of online food shoppers. (n=285)

Profile	Category	Frequency	Share (%)
Age	18-29	164	57.5
	30-44	100	35.1
	45-60	20	7.0
	$\geq 60$	1	0.4
Gender	Male	100	35.1
	Female	185	64.9
Location	National Capital Region	168	58.9
	Luzon	102	35.8
	Visayas	10	3.5
	Mindanao	5	1.8
Marital status	Single	185	64.9
	Married	100	35.1
Education	Undergraduate	235	82.5
	Graduate/post-graduate	50	17.5
Vaccination status	Yes	185	64.9
	No	100	35.1
Monthly household income (PHP)	Less than 50,000	85	29.8

Profile	Category	Frequency	Share (%)
	50,000 to 80,000	84	29.5
	80,000 to 100,000	35	12.3
	100,000 to 150,000	28	9.8
	150,000 to 200,000	17	6.0
	More than 200,000	36	12.6
Decision-making	Primary	184	64.6
	Non-primary	101	35.4
Frequency of online food shopping	Once a month	77	27.0
	Once every two weeks	91	31.9
	Once a week	69	24.2
	More than once a week	48	16.9

Note: USD 1.00 is equivalent to PHP 56.90 (as of 31 October 2023).

**Online food shopping behavior.** The COVID-19 pandemic had a substantial impact on consumer behavior in the Philippines. Before the pandemic, 81% of consumers primarily used traditional offline food retail channels, but government-imposed quarantine measures triggered a shift to online food shopping, which was adopted by 66% of consumers (Fig. 3). These measures from March 16, 2020, led to increased online food shopping (66%), with heightened restrictions from May 15, 2021, to August 31, 2021 (Rosales 2021). During this period, there were 93,318 new online business registrations, highlighting the importance of businesses leveraging digital platforms to meet consumer needs amid the pandemic (Department of Trade and Industry 2021). Additionally, 44% of consumers continued using online channels for food purchases post-quarantine, resulting in a 25% increase. Top attributes cited by the respondents for this shift included straightforward pricing policies, flexible payment options (credit card, cash on delivery), and clear, accurate descriptions of prices and fees.



**Fig. 3.** Consumer behavior towards food shopping prior, during, and after COVID-19 community quarantine (n=285).

Source: Online survey (2021-2022)

**Measurement model results.** The model ensured item reliability and internal consistency with values of  $\alpha$  and CR exceeded 0.70 (Table 2). The convergent validity was sufficient with AVE exceeding 0.50,

which implied that the measures of the same construct are related to each other. These findings suggested confidence in the reliability and validity of the model.

**Table 2.** Measurement of reliability and validity using Cronbach’s alpha, Composite Reliability and Average Variance Extracted.

Constructs	Cronbach's alpha ( $\alpha$ )	Composite reliability (CR)	Average variance extracted (AVE)
Attitude (AT)	0.87	0.87	0.68
Behavior (SB)	0.73	0.74	0.58
Intention (SI)	0.86	0.88	0.77
Behavioral Control (BC)	0.81	0.82	0.58
Perceived Severity (PS)	0.92	0.97	0.88
Perceived Vulnerability (PV)	0.73	0.73	0.57
Response Efficacy (RE)	0.77	0.77	0.63
Self-Efficacy (SE)	0.76	0.76	0.62
Subjective Norms (SN)	0.81	0.81	0.68

Note:  $\alpha$  and CR > 0.70 (Hair et. al 2021); AVE > 0.50 (Henseler et al. 2015).

Table 3 shows the factor loadings were above 0.70, signifying that the factor has adequate variance from its corresponding variable. Additionally, the collinearity test revealed that all constructs had VIF values below the 5.0 threshold, indicating the absence of collinearity issues in the study.

**Table 3.** Measurement of reliability and collinearity using Factor Loadings and Variance Inflation Factor.

Latent Variables	References	Factor Loadings	VIF Values
<b>Perceived Vulnerability</b>			
PV1: I am highly susceptible to get infected by the COVID-19.	Singh et al. 2022	0.76	1.48
PV2: I am at risk of acquiring COVID-19 when I go out to do food shopping.		0.74	1.48
<b>Perceived Severity</b>			
PS1: My health can be affected by COVID-19.	Rothan et al. 2020	0.8	3.52
PS2: My family can also be affected by COVID-19.		1.06	3.52
<b>Self-Efficacy</b>			
SE1: It is easy to shop food online during COVID-19	Youn et al. 2021	0.79	1.62
SE2: I have the capability to do online food shopping during COVID-19.		0.78	1.62
<b>Response Efficacy</b>			
RE1: I can stay at home and access online channels to do food shopping to not get infected by COVID-19.	Bavel et al. 2020	0.79	1.65
RE2: Food shopping through online channels can prevent the spread of COVID-19.		0.79	1.65
<b>Attitude</b>			
AT1: Performing online food shopping is favorable.	Sheeja and Smitha 2022	0.81	2.21
AT2: Performing online food shopping is helpful.		0.81	2.66
AT3: Performing online shopping is practical.		0.86	2.12
<b>Perceived Behavioral Control</b>			
BC1: I can easily perform online food shopping.		0.85	1.91



BC2: I am confident in food shopping through online channels.	Youn et al. 2021	0.69	2.01
BC3: I have the resources, knowledge, and ability to do food shopping through online channels.		0.74	1.54
<b>Subjective Norms</b>			
SN1: Family and friends believe that performing online food shopping is a good idea.	Grashuis et al. 2020	0.87	1.83
SN2: Most people whose opinions I value encourage me to perform online food shopping.		0.78	1.83
<b>Online Food Shopping Intention</b>			
SI1: I will use online channels to do food shopping.	Jun et al. 2021	0.94	2.36
SI2: I will continue to use online channels to do food shopping even after the COVID-19 pandemic.		0.81	2.36
<b>Online Food Shopping Behavior</b>			
SB1: I perform online food shopping more frequently than before.	Lu et al. 2021	0.82	1.5
SB2: I regularly shop for food items via online channels.		0.70	1.5

Notes: Factor loadings  $\geq 0.70$  (Sarmiento and Costa 2017) and VIF  $< 5.0$  (Hair et al. 2021)

Employing the Fornell-Larcker method, the study confirmed to have lower AVEs, all of which were below the square root of each construct (Table 4). This outcome substantiated the questionnaire’s validity.

**Table 4.** Measurement of discriminant validity using the Fornell-Larcker criteria.

Constructs	AT	SB	SI	BC	PS	PV	RE	SE	SN
AT	<b>0.83</b>								
SB	0.51	<b>0.76</b>							
SI	0.73	0.62	<b>0.88</b>						
BC	0.75	0.46	0.72	<b>0.76</b>					
PS	0.21	0.09	0.21	0.33	<b>0.94</b>				
PV	0.64	0.35	0.61	0.69	0.61	<b>0.75</b>			
RE	0.78	0.50	0.62	0.73	0.15	0.55	<b>0.79</b>		
SE	0.72	0.49	0.60	0.75	0.21	0.55	0.77	<b>0.79</b>	
SN	0.70	0.53	0.80	0.71	0.24	0.50	0.60	0.55	<b>0.82</b>

Note: The correlation values must be lower than the values of the square root of the AVE in bold.

Another way to measure discriminant validity is the HTMT ratio. The HTMT ratio has a sensitivity rate of 97% to 99%, which is considered a more accurate parameter for evaluating discriminant validity compared to the Fornell-Larcker method (Henseler et al. 2015). Hence, the study also obtained the HTMT ratio, ranging from 0.08 to 0.79 as the lowest and highest values respectively (Table 5). This indicated that the study guaranteed discriminant validity, affirming that the constructs are indeed distinct from each other.

**Table 5.** Measurement of discriminant validity using the HTMT ratio.

Constructs	AT	BC	PS	PV	RE	SB	SE	SI	SN
AT									
BC	0.75								
PS	0.21	0.34							
PV	0.64	0.69	0.64						

Constructs	AT	BC	PS	PV	RE	SB	SE	SI	SN
RE	0.78	0.73	0.15	0.55					
SB	0.51	0.47	0.08	0.35	0.51				
SE	0.72	0.75	0.22	0.55	0.77	0.49			
SI	0.73	0.72	0.22	0.61	0.62	0.63	0.60		
SN	0.70	0.71	0.24	0.50	0.60	0.54	0.55	0.79	

Note: AVE should be <0.85 (Kline 2011).

**Structural model results.** Bootstrapping revealed the interrelationships among the constructs depicted by path coefficients ( $\beta$ ) and corresponding p-values (Table 6). Consumers perceived COVID-19 as a significant threat in terms of vulnerability, leading to positive attitudes toward online food shopping, thereby supporting H1<sub>a</sub> ( $\beta = 0.36$ ,  $p < 0.01$ ). However, perceived severity did not influence attitudes, leading to the rejection of H1<sub>b</sub>. Threat appraisals, including perceived severity and vulnerability, did not exert any influence on subjective norms, resulting in the rejection of both H2<sub>a</sub> and H2<sub>b</sub>. Consumers who perceived COVID-19 as a threat and felt vulnerable demonstrated a high behavioral control towards online food shopping but did not consider it severe enough to impact health. This supported H3<sub>a</sub> ( $\beta = 0.35$ ,  $p < 0.01$ ) and rejected H3<sub>b</sub>. Self-efficacy and response efficacy positively affected attitudes toward online food shopping, corroborating H4<sub>a</sub> ( $\beta = 0.23$ ,  $p < 0.05$ ) and H4<sub>b</sub> ( $\beta = 0.42$ ,  $p < 0.01$ ).

Consumers with the ability to perform online food shopping (self-efficacy) were not influenced by subjective norms, while those who perceived online food shopping (response efficacy) as an effective strategy to prevent COVID-19 were influenced by subjective norms. This resulted in the rejection of H5<sub>a</sub> and confirmation of H5<sub>b</sub> ( $\beta = 0.37$ ,  $p < 0.01$ ). Threat appraisals positively impacted behavioral control, supporting H6<sub>a</sub> ( $\beta = 0.36$ ,  $p < 0.01$ ) and H6<sub>b</sub> ( $\beta = 0.26$ ,  $p < 0.01$ ). Positive attitudes demonstrated a positive relationship with intentions to engage in online food shopping, confirming H7<sub>a</sub> ( $\beta = 0.24$ ,  $p < 0.01$ ). Similarly, positive behavioral control signified positive intentions towards online food shopping, validating H7<sub>b</sub> ( $\beta = 0.20$ ,  $p < 0.05$ ). Positive subjective norms had a favorable effect on intentions to do online food shopping, accepting H7<sub>c</sub> ( $\beta = 0.49$ ,  $p < 0.01$ ). Consumers with positive intentions translated them into actual behavior, supporting H8 ( $\beta = 0.62$ ,  $p < 0.01$ ).

At the onset, subjective norms emerged as the predominant factor influencing the intention to engage in online food shopping. This could be attributed to the significant role of family cohesiveness in Filipino culture, where collective decision-making within families holds value (Cura 2015). However, it was noted that the impact of perceived severity was deemed insignificant on consumer beliefs, rejecting H1<sub>b</sub> ( $\beta = -0.12$ ,  $p < 0.08$ ), H2<sub>b</sub> ( $\beta = 0.03$ ,  $p < 0.37$ ), and H3<sub>b</sub> ( $\beta = 0.00$ ,  $p < 0.49$ ). Previous studies indicated that perceived severity was the significant factor in consumer behavior during COVID-19 pandemic (Yuen et al. 2021). It was also emphasized that perceived severity increased consumers' concerns about contracting COVID-19, prompting a favorable and convenient inclination toward online food shopping (Ghodsi et al. 2022).

This study provided a different perspective as it considered the level of immunization of consumers against COVID-19. Since a significant portion of the respondents had received immunization (*i.e.*, 65% of the respondents received COVID-19 vaccine), they tended to perceive COVID-19 as less severe regarding its potential health impact. This reduced severity perception did not exert any influence on their online food shopping behavior, rejecting hypotheses H1<sub>b</sub>, H2<sub>b</sub>, and H3<sub>b</sub>. Interestingly, even after the community quarantine was lifted, many consumers continued with online food shopping practices in this study. Therefore, vaccinated consumers in the Philippines were not affected by the severity of COVID-19 pandemic in terms of their beliefs towards online food shopping. This is in contrast to earlier studies that revealed vaccinated consumers were more influenced to pursue offline shopping as they reduced the fear of the pandemic (Salam et al. 2022).

**Table 6.** Results of hypotheses testing.

Hypotheses	$\beta$	p (> z )	Decision
<b>H1a:</b> Perceived Vulnerability → Attitude	0.36	0.01	Supported
<b>H1b:</b> Perceived Severity → Attitude	-0.12	0.08	Not supported
<b>H2a:</b> Perceived Vulnerability → Subjective Norms	0.20	0.08	Not supported
<b>H2b:</b> Perceived Severity → Subjective Norms	0.03	0.37	Not supported
<b>H3a:</b> Perceived Vulnerability → Behavioral Control	0.35	0.00	Supported
<b>H3b:</b> Perceived Severity → Behavioral Control	0.00	0.49	Not supported
<b>H4a:</b> Self-Efficacy → Attitude	0.23	0.03	Supported
<b>H4b:</b> Response Efficacy → Attitude	0.42	0.00	Supported
<b>H5a:</b> Self-Efficacy → Subjective Norms	0.15	0.16	Not supported
<b>H5b:</b> Response Efficacy → Subjective Norms	0.37	0.01	Supported
<b>H6a:</b> Self-Efficacy → Behavioral Control	0.36	0.00	Supported
<b>H6b:</b> Response Efficacy → Behavioral Control	0.26	0.00	Supported
<b>H7a:</b> Attitude → Shopping Intention	0.24	0.01	Supported
<b>H7b:</b> Perceived Behavioral Control → Shopping Intention	0.20	0.05	Supported
<b>H7c:</b> Subjective Norms → Shopping Intention	0.49	0.00	Supported
<b>H8:</b> Shopping Intention → Shopping Behavior	0.62	0.00	Supported

Self-efficacy and response efficacy played significant roles in influencing the attitude and behavioral control of consumers towards online food shopping (H4<sub>a</sub>, H4<sub>b</sub>, H6<sub>a</sub>, and H6<sub>b</sub>). For instance, self-efficacy was cited as an imperative factor in achieving a change in behavior (Meland et al. 1999). The widespread usage of smartphones in the Philippines has facilitated the ease of online food shopping for consumers, with their proficiency contributing to an enhanced ability to participate in such activities. However, self-efficacy did not affect subjective norms (H5<sub>a</sub>), which was in line with previous research findings, implying that having the capacity to conduct online shopping could potentially override the impact of external factors such as social influences because of inherent competence (Youn et al. 2021).

In examining the determinants of online food shopping behavior, the study affirmed that intention played a positive and significant role in influencing actual behavior (H8). Although intention may not reliably predict actual behavior, this finding aligns with prior studies, suggesting that when consumers possess a strong intention to perform online food shopping, it is more likely that this intention will translate into actual behavior (Peña-Garcia et al. 2020). Additionally, this enhances the current literature by bridging the existing gap in consumer studies to clarify the relationship between intention and subsequent behavior.

PLSPredict results in Table 7 revealed the high predictive accuracy of the model, explaining 39% of the variance in online food shopping behavior, while a consumer study generally accepts a variance of 11% (Peterson et al. 1985). The findings indicated that changes in attitude ( $\beta = 0.24$ ,  $R^2 = 0.70$ ) had a relatively more substantial impact on the variations in online food shopping intention compared to shifts in subjective norms ( $\beta = 0.49$ ,  $R^2 = 0.27$ ) and perceived behavioral control ( $\beta = 0.20$ ,  $R^2 = 0.70$ ). Further, attitude had high levels predictive accuracy ( $R^2 = 0.70$ ) and out-of-sample prediction ( $Q^2 = 0.51$ ), with values close to 0.75 and 0.50, respectively (Hair et al. 2021).

Upon assessing the predictor of attitude, perceived vulnerability ( $\beta = 0.36$ ) and response efficacy ( $\beta = 0.42$ ) were found to be significant variables, with the latter demonstrating a higher level of influence. These findings suggest that retailers or food producers should prioritize the practicality and favorability of online food shopping (*i.e.*, attitude). Specifically, highlighting its role in preventing

consumers from contracting COVID-19 (*i.e.*, response efficacy) becomes crucial. This insight underscored the significance of addressing consumer concerns related to safety, positioning online food shopping as a preventive measure against the ongoing pandemic, and emphasizing its positive impact on public health.

**Table 7.** Measurement of predictive accuracy using Q-square and R-square values.

<b>Latent Variables</b>	<b>Q<sup>2</sup></b>	<b>R<sup>2</sup></b>
Attitude	0.51	0.70
Perceived Behavioral Control	0.48	0.70
Subjective Norms	0.27	0.41
Online Food Shopping Intention	0.36	0.71
Online Food Shopping Behavior	0.15	0.39

## CONCLUSION

The results demonstrated the effectiveness of the PMT and TPB integrated theories in assessing consumer behavior amid the pandemic. The strong intention of consumers to shop online explained their actual utilization of food e-commerce, thereby contributing to closing the gap between intention and actual behavior in the literature. This substantiated a high predictive accuracy within the consumer study, explaining 39% of the variance of online food shopping behavior.

The majority of factors examined in the study had a positive influence on online food shopping intention, which translated into actual behavior. Attitude had a strong influence in the intention to do online food shopping, with its prediction rooted in response efficacy. The emphasis on this implies that individuals in the Philippines, where digital activity is prominent, likely possess a high degree of digital proficiency. This aligns with the widespread use of technology in the country, indicative of the consumers' recognition of its utility and preference for engaging in online activities. However, the study revealed that perceived severity did not positively influence consumer beliefs, and self-efficacy did not affect subjective norms contrary to previous literature. This observation can be attributed, in part, to a substantial proportion of respondents having received vaccination and their strong inherent competence. The results further highlighted the significance of creating a digital platform that emphasizes a favorable, practical, and safe food shopping option to mitigate the risk of COVID-19 transmission. Retailers and food producers can formulate strategies that prioritize such aspects to address consumer vulnerabilities. Additionally, it is crucial for digital platforms to provide comprehensive product information, including details on product safety and handling. This proactive approach serves as a preventive measure against potential crises or pandemics in the future, enhancing consumer attitude and the adaptability of the online food shopping ecosystem amid evolving challenges.

While the study provides significant insights into consumer preferences, it is essential to acknowledge the inherent limitations associated with employing an expansive definition of food and the restrictions during the study period, potentially affecting the representation of the entire population. Future studies may focus on specific food categories, such as fresh produce, dairy products, or processed foods, to better understand consumer preferences. Furthermore, enriching the comprehensiveness in this domain could involve incorporating additional factors (*e.g.*, promotions, discounts, loyalty programs) that act as incentives for online shopping. Additionally, the inclusion of demographic data (*e.g.*, location, age) could be valuable to moderate the research model.

## ACKNOWLEDGEMENT

The authors would like to extend their gratitude to the Society for Agricultural Education Research Development Abroad (SAEDA), the Tokyo University of Agriculture Graduate School

Doctoral Program Research Support System, the Research Center for Agricultural and Life Science, and the Department of International Agribusiness Management for the funding support this research received.

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