

The Behavioral Intention of Using Online Food Delivery Services During the COVID-19 Pandemic in Vietnam: A Test of Integrating TAM and HBM Framework

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ABSTRACT

Growing internet technology has incurred variations in customer way of life and online shopping habits. Originating from the integrated framework of technology acceptance model and health belief model, the purpose of this study is to investigate the influence of determinants, such as perceived usefulness, perceived ease of use, trust, social influence, perceived susceptibility, and perceived severity on customers' intentions of using online food delivery (OFD) services. By employing a total of 459 usable responses in Vietnam, the research hypotheses were empirically validated using structural equation modeling (SEM) approach. The results of this study exhibited that the constructs all have positive influences on the usage behavior of OFD services, while perceived ease of use is found to influence users' perceived usefulness. This study complements key insights into the literature on the acceptance of technology during the pandemic in general, the online food delivery technology in particular.

KEYWORDS

COVID-19, Health Belief Model, Online Food Delivery Services (OFD), Technology Acceptance Model, Vietnam

INTRODUCTION

The speedy advancement of internet technology has created a motivating force for the development of online food delivery services (OFD), which has incurred the sustainable transition in people's lifestyles and community generally (Suhartanto et al., 2019). In the electronic commerce environment, online food delivery services (OFD) are of increasingly popular in recent years, suggesting that food or drink is prepared and delivered to customers from various restaurants/food establishments via websites or apps. This convenience helps customers to seek a favourite restaurant, selects the available menu

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items, and provides their delivery address (Pigatto et al., 2017). In other words, the rising popularity of internet providers and increasing usage of smartphones has sustained the development of various online food delivery applications, namely Foodpanda, Uber Eats, Zomato, etc.

Vietnam is a developing country with the high annual economic growth rate in Asia and around the world. Moreover, Vietnamese government also promotes the digital transformation in the economic activities, and Vietnam is transformed into a high-growth digital economic market in Southeast Asia (Ministry of Information and Communications of the Socialist Republic of Vietnam, 2021). The trend for digital transformation spreads across Vietnamese people's daily life, especially the rise of mobile digital platforms on smartphone, such as ride-hailing apps and food delivery apps, which is also expedited by the high usage rate of internet and smartphone in Vietnam compared to the surrounding regions (Minh Ngoc Nguyen, 2021). For instance, the number of internet users in Vietnam reaches 69,24 million, while internet penetration rate and mobile internet penetration rate in Vietnam are 77,4% and 69% respectively (Minh Ngoc Nguyen, 2021). On the other hand, the market for OFD industry in Vietnam has experienced a growing trend in recent years, especially during the pandemic. According to Statista Report (2021a), Vietnam's revenue in the food delivery market reaches US\$274 million in 2020, paralleled with a compound annual growth rate (CAGR 2021 – 2024) of 16.5%, leading to an expected market volume of US\$ 505 million by 2024. Within that, the online food delivery market has seen a fierce competition among several domestic and foreign investors, especially Grabfood, Shoppefood, Gojek, Baemin, etc. The COVID-19 pandemic has pushed the OFD market to grow further as most Vietnamese people are currently adapting social distancing measures and thereafter transferring to home delivery, meaning a big business opportunity for delivery company. Consequently, Vietnam is an interesting research context and a study on Vietnam will provide the valuable findings about the predictors of using digital platforms on smartphone in general, online food delivery apps in particular.

To date, a few empirical studies provided the salient insights about OFD customers' decision-making process and their behavioral intention to use OFD services (Troise et al., 2021) and determinants influencing OFD usages (Zhao & Bacao, 2020). However, the research findings pertaining to the pandemic's affection on customers' OFD purchasing behavior and decision-making process of using OFD services remain ambiguous (Muangmee et al., 2021). Considering the impact of COVID-19 pandemic on recent human behavior fluctuations (Laato et al., 2020), it is important to analyze the health threat perceptions of COVID-19 pandemic as an additional factor influencing customers' OFD usages (Hong et al., 2021; Kim et al., 2021). In other words, given that people's perceptions of health risk may incur their preventive way of thinking (Ali et al., 2019), customers may utilize OFD services to circumvent human contact with restaurant employees and other customers during the period of COVID-19 pandemic and post-pandemic. To the best of our knowledge, this study is among the first to consider the impact of customers' perceptions about health risk on customer's intention to use OFD during the COVID-19 pandemic. In addition, this study also incorporated other mental perceptions of customers, such as trust on food quality and information security and social influence, to explain decision-making process of customers. They remain less explored in the field of Online Food Delivery (OFD) services (Pitchay et al., 2021; Hong et al., 2021). From then, this study aims to fill these gaps by answering the research question as follows: "What determinants influence customers' behavioral intention of using OFD service in the context of COVID-19 pandemic?"

The overall impact of this study ranges from theoretical to practical aspects. First, this study addresses the significant gap by examining the technological and psychological motives which influence the usage behavior of OFD services during COVID-19 pandemic in Vietnam and makes a major theoretical contribution to the literature on the online food delivery technologies. For practical recommendations, managers would benefit from the evaluation of factors influencing Vietnamese users' usage behaviour during the pandemic. Indeed, in the stage of the outbreaks of COVID-19 in Vietnam, Vietnamese people have been more prone to make an online purchase about the basic necessities and fresh products, especially the food and drink products, because they could not dine

out. Accordingly, the rise of users towards online food delivery apps due to the pandemic has drawn the attention of managers providing OFD services. They would adjust the promotional strategies and improve the quality and variety of food and drinks to retain the existing customers. Besides, the regulators and governmental agencies can increase the efficiency of surveillance system about the service quality and the operational way of OFD companies. More details about the theoretical and managerial implications will be suggested in the conclusion part.

LITERATURE REVIEW

Online Food Delivery (OFD)

Online food delivery (OFD) is defined as “the process by which food that was ordered online is prepared and delivered to the customer” (Li et al., 2020). The emergence of OFD services was endorsed by the advancement of combined OFD platforms, such as UberEast, Grabfood, etc. When a customer order a food and/or drink from a variety of restaurant options through an OFD service platform on its mobile application or website and make a payment for the order, the restaurant accepts the order and prepares the food/drink. As a next step, a delivery driver brings the ordered food to the customer. Customers can trace the status of their orders and call their drivers on the app. OFD services provide several benefits to their users, involving no spending time in waiting, no traveling time for pick-up, no mistakes of the order which sometimes occur in restaurants or phone call orders, and discounts from daily offers (Hong et al., 2021).

Theoretical Foundations

Technology Acceptance Model (TAM)

The well-known framework for examining and explaining individual intentions to accept new technology is the technology acceptance model (TAM), as suggested by Davis et al. (1989). The author presented that a user’s attitude towards employing a new technology influences behavioral intention. In which, two major impact determinants on an individual’s adoption include perceived usefulness and perceived ease of use.

In addition, Venkatesh et al. (2003) proposed the unified theory of acceptance and use of technology (UTAUT) as an expanded version of TAM because TAM lacks several main variables for expounding a user’ intention. This study integrated social influence into TAM model to depict behavioral intention. Inheriting from Alalwan et al. (2017), this study also added trust into the extended version of TAM to estimate the factor of usage behavior more accurately.

Health Belief Model (HBM)

In health behavior studies, the HBM is considered as a well-known and popularly used framework (Norman & Conner, 2016). The HBM was formulated by a group of social psychologists in the early 1950s in the United States; they tended to comprehend the underpinning rationales deterring people from adopting prophylactic health approaches (Carpenter, 2010; Janz & Becker, 1984). The model provides meaningful understanding about the way of people’s psychological response to health hazards and explains their approaches to tackle a health circumstance (Shang et al., 2021). The HBM is theoretically rooted in cognitive factors, meaning that behavioral decisions are made based on rational viewpoint (Chandler & Krajcsák, 2021). People’s anticipation about a health risk is a major catalyst for their engagement in a specific health conduct (Champion & Skinner, 2008). The two main elements of HBM comprise perceived susceptibility (P-SUS) and perceived severity (P-SEV), which has been used in many empirical studies in the field of technology acceptance (Sreelakshmi & Prathap, 2020; Daragmeh et al., 2021). While perceived severity is the people’s belief about the degree of harm which will result from a negative outcome of a particular outcome, perceived

susceptibility is the people's belief that they may acquire an adverse health outcome as a result of a particular behavior (Gaube et al., 2019).

Discussion of Unifying Two Theoretical Frameworks

According to previous interpretations, the TAM framework solely concentrates on estimating users' initial adoption of a new information technology from users' technological perceptions rather than psychological perceptions, meaning a paucity of the variables of users' psychological perceptions influencing behavioral usage intention (Troise et al., 2021; Venkatesh et al., 2012; Zhao & Bacao, 2020). To tackle this dilemma, the variables of psychological perceptions need to be added into this study. Of all psychological determinants, it is worthwhile that the psychological factors of health threat perceptions during COVID-19 pandemic is gaining more attentions from the scholars in the new technology acceptance literature (Daragmeh et al., 2021). Similar to the field of mobile payment, this viewpoint is entirely appropriate for OFD services because customers using OFD may find it less likely to be in close contact of COVID-19 cases (Hong et al., 2021). Specifically, the contactless characteristic and convenience of OFD make a significant contribution to users perceiving technological and psychological benefits of using OFD in the context of COVID-19 pandemic. Hence, the combination of TAM and HBM is a good fit to assess the determinants influencing users' behavioral intention of using OFD during the COVID-19 pandemic.

HYPOTHESES DEVELOPMENT

Revisiting Technology Acceptance Model (TAM)

Perceived Usefulness

Based on Technology Acceptance Model (TAM), behavioral intention is directly influenced by perceived usefulness (PU). PU is specifically defined as "the degree to which a person believes that employing a particular system would increase his or her task performance" (Davis et al., 1989). Vijayasathy (2004) construes perceived usefulness as "the degree to which the customer contends that the online purchase will deliver them with useful information, help to ease offer comparison, and will accelerate the pace of purchasing process. In the online environment, perceived usefulness will elucidate that the use of a given technology might provide fruitful benefit for someone to attain a specific outcome (Liébana-Cabanillas et al., 2014). Troise et al. (2021) found that perceived usefulness become a strong predictor of intention to use online food delivery (OFD). Given that, when customers find OFD to be useful, they are more likely to employ it. Therefore, the authors suggest the following hypothesis:

Hypothesis 1: Perceived usefulness enhances the behavioral intention to use OFD.

Perceived Ease of Use

Perceived ease of use as a fundamental concept of TAM relates to the perception of an individual associated with the easiness of conducting a certain task (Davis et al., 1989). In essence, ease of use serves as a main catalyst of adopting a new technology (Kim et al., 2010; Liébana-Cabanillas et al., 2018). Furthermore, perceived ease of use can be featured by perceived skills needed to resolve the challenges caused by information systems (Venkatesh, 2000). It is related to users' degree of making an effort to use a technology over time (Venkatesh, 2000). Several studies have confirmed the perceived ease of use as a critical determinant affecting customers' usage intentions towards a broad array of technologies. In the OFD context, Roh & Park (2019) explained a sense of easing customers' usage experience as a significant motivator to use OFD services. Ray et al. (2019) also exhibited that ease of use in the OFD process, such as the order process, order tracking, and filtering options of

the interface, is found to be main trigger for accepting OFD services. Within theoretical framework of TAM, some studies have identified a significant correlation between perceived usefulness and perceived ease of use (Srite, 2006; Troise et al., 2021). Applying such conceptual interpretation to the OFD context, this study proposes the following hypotheses:

Hypothesis 2: Perceived ease of use has a significant positive impact on the behavioral intention to use OFD.

Hypothesis 3: Perceived ease of use has a significant positive impact on the perceived usefulness of OFD.

Trust

Trust is measured by the users' degree to which they are willing to expect a positive outcome of technology's future performance and their subjective belief on the service provider's obligations to be fulfilled (Gefen, 2000). In the meantime, the contact-free transaction processes are superior to traditional contact-based ones in the context of COVID-19 pandemic, implying that users have a high level of trust in smartphone applications to make contactless transactions (Zhu & Chang, 2017; Marinković et al., 2020). Trust in the system has been confirmed as a driving force in accepting new technology in a variety of electronic fields, ranging from self-service kiosks during check-in/out in hotels (Kaushik et al., 2015) to electronic payments (Zhu & Chang, 2017). Trust plays an important role in producing passions about the use of technology-based service (Liu, 2012), and customers with low trust about the service are uncertain of adopting it (Grabner-Kraeuter, 2002).

In terms of OFD platforms, Hong et al. (2021) have validated the variable of trust as a key driver of affecting behavioral intention to use OFD, a lot of studies have maintained that trust is found to be one of the most pivotal determinants positively influencing behavioral intention to use (Cho et al., 2019; Ray et al., 2019; Zhao & Bacao, 2021). Hence, this study proposed the following hypotheses:

Hypothesis 4: Trust has a significant positive impact on behavioral intention to use OFD services.

Social Influence

Social Influence is described as a main determinant of extended technology acceptance model, and more broadly in models of customer behavior, such as the Theory of Planned Behavior and Theory of Reasoned Action (Koenig-Lewis et al., 2015). In line with Shin (2009), Technology Acceptance Model (TAM) is likely to ignore the social determinants in which a technology is accepted. Yet, social influence can motivate people to adopt new technologies (Koenig-Lewis et al., 2015). Particularly, the role of social influence in the field of e-commerce and e-mail was initially found to have a direct effect on usage (Fang, 1998). It has been recently evidenced that social influence affected individuals' behavioral adoption of mobile social network sites (Zhou & Li, 2014), shopping apps (Chopdar & Sivakumar, 2019), and mobile payment systems (Nguyen, 2021). Incorporating social influence into the context of OFD services, Zhao & Bacao (2020) conjectured that social influence has a positive influence on behavioral intention to use OFD platforms. Consequently, this study postulates the following hypothesis:

Hypothesis 5: Social influence has a significant positive impact on behavioral intention to use OFD.

Revisiting Health Belief Model (HBM)

HBM postulates that individuals' sense of susceptibility and severity of disease results in conducting a specific course of preventive behavior (Sreelakshmi & Prathap, 2020). Several studies have integrated HBM into studying technology acceptance. In the course of analyzing the acceptance of mobile

health services, Sun et al. (2013) examined the influence of perceived vulnerability and perceived severity on technology adoption intention. In HBM model, the term of perceived vulnerability is identical to perceived susceptibility (Sreelakshmi & Prathap, 2020). Sun et al. (2013) showed that perceived vulnerability is found to have a positive effect on the adoption intention of using mobile health services, while they found the absence of perceived severity's impact on such an adoption. In the context of COVID-19 pandemic, Nguyen (2021) related the perceived health threat through perceived severity and perceived susceptibility to the epidemic to the adoption of using technology-based devices as a solution to avoid the infection. Because OFD applications are technology-based services through using smartphones (Hong et al., 2021; Troise et al., 2021), this study posits that customers decide to choose the online services of ordering food to avoid the risk of getting infected by COVID-19. Accordingly, the hypotheses are developed as follows:

Hypothesis 6: Perceived Susceptibility to Covid-19 has a significant positive impact on behavioral intention to use OFD.

Hypothesis 7: Perceived severity of Covid-19 has a significant positive impact on behavioral intention to use OFD.

In virtue of a high risk of COVID-19 infection, people may develop higher perception concerning the usefulness of OFD services which help to deter social contacts. More specifically, OFD platforms would help in avoiding dining out and physical cash transactions and thus decrease the possibility of Covid-19 infection. Daragmeh et al. (2021) discovered that perceived health threat exerted a significant positive influence into perceived usefulness of mobile payment, a technology-based platform like OFD on smartphones. For that reason, the study proposes the following hypotheses:

Hypothesis 8: Perceived susceptibility to Covid-19 has a significant positive impact on perceived usefulness of OFD.

Hypothesis 9: Perceived severity of Covid-19 has a significant positive impact on perceived usefulness of OFD.

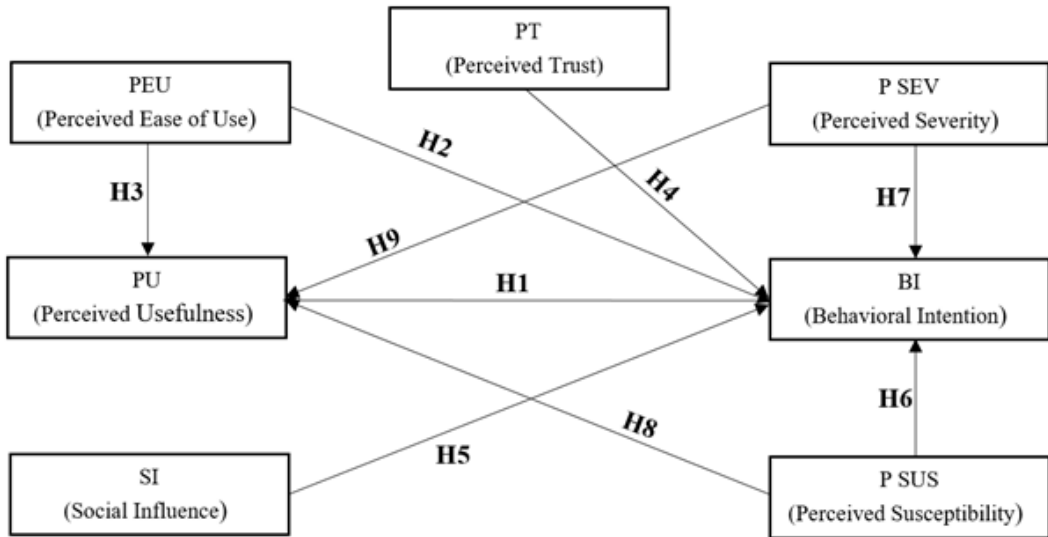
METHODOLOGY

Figure 1 describes the research model which can be employed to obtain the goal of this study. The development of this model relies on explanations in the hypotheses development section.

A questionnaire survey was utilized for data collection to confirm the conceptual model and evaluate the research hypotheses. The content of questionnaire included two parts. The first part focused on the demographic information of respondents with close-ended questions, such as gender, age, education, and occupation. The second part included constructs and items obtained from pre-validated literature, comprising 24 measurement items as indicators of variables, namely perceived usefulness (PU), perceived ease of use (PEU), social influence (SI), trust (TR), Perceived Severity (P-SEV), Perceived Susceptibility (P-SUS), behavioral intention of using OFD (BI), and the scale items and their references are suggested in the Appendix Table 5. For measurement purpose, it is believed that a five-point scale show less degree of confusion and time-saving for participants to increase the response rate (Bouranta et al., 2009). Therefore, all measurement indicators of the constructs in the survey were rated by employing a five-point Likert scale, ranging from strongly disagree "1" to strongly agree "5". Such measurements have been adopted in several studies on the behavioral intention of using a new technology, namely mobile payment (Wei et al., 2021), food delivery apps (Kumar & Shah, 2021).

This study adopted the convenience sampling technique for two main reasons. First, at the time of collecting data, people adhere to the social distancing guidelines and restrict going out for

Figure 1. The Conceptual Framework



enjoying food or drinks. Therefore, we could not have access to them in the face-to-face manner and the demographic data is unavailable to us. Second, the convenience sampling technique is entirely appropriate for applying the research theory to other backgrounds (Calder et al., 1981). Also, convenience sampling technique dominates the research in many fields such as marketing or advertising (Sarstedt et al., 2018).

The main survey respondents of this study concentrates on smartphone users who accepted OFD services in the times of the COVID-19 virus outbreak in Vietnam. The questionnaire was translated into the Vietnamese language by a professional translator to restrict the influence of cultural and language discrepancies. For the translation equivalence, the questionnaire was then reversely translated into English. The questionnaire data were collected via an online survey and inquiry via Zalo (Vietnamese social media platform), Facebook, Gmail over a 3-week period, from 22 September 2021 to 13 October 2021. Collectively, a total of 500 online questionnaires were allocated and 480 questionnaires were received. After deleting the answers with missing values, a total of 459 valid questionnaires were selected, obtaining a final response rate of 91,8%. Bentler & Chou (1987) suggested a ratio as low as 5 cases per indicator variable would be enough for the SEM analysis, namely 120 observations (24×5). Consequently, 459 respondents are entirely appropriate for the analysis requirement.

In table 1, the sample size of this study is unbalanced between male (29,41%) and female (70,59%), suggesting that female participants are more willing to fill in the questionnaire rather than male participants. With reference to other sample characteristics, the respondent group of the sample are almost the people aged under 25 (74,29%), student (38,34%), and under bachelor (70,37%). Such distribution proves that the sample size is mainly dominated by the customers of generation Z. They have the high chances and more dynamic of experiencing the lasted technology achievements. When it comes to the usage frequency, the category of “at least once per week” constitutes a most percentage with 38,13%, followed by the category of “at least once two weeks” with 30,94%. The category of “at least once per day” comprises 21,78%, while the category of “at least once per month” obtains the lowest percentage of 9,15%. This indicates the frequent selection of customers towards online food delivery in Vietnam.

Table 1. Demographic distribution of participants

Measure	Item	N	%
Gender	Male	135	29,41
	Female	324	70,59
Age	Under 25	341	74,29
	From 25 to 30	21	4,58
	From 30 to 35	17	3,70
	Over 35	80	17,43
Education	Under Bachelor	323	70,37%
	Bachelor	116	25,27%
	Master	15	3,27%
	Over Master	5	1,09%
Occupation	Student	176	38,34%
	Government official	95	20,7%
	Employee, officer	18	3,92%
	Freelance	7	1,53%
	Unemployed	34	7,41%
	Retired	4	0,87%
	Others	125	27,23%
Usage Frequency	At least once per day	100	21,78%
	At least once one week	175	38,13%
	At least once two weeks	142	30,94%
	At least once per month	42	9,15%

Source: Author's calculation from research data

RESULTS

This study employs SPSS 26 and AMOS 25 for data analysis in two following steps: The first step analyzed the reliability and validity of the measurement model, followed by examining the structural model and testing research hypotheses. The maximum likelihood approach was carried out as the model estimation method in this study. The software program for data analysis, namely SPSS 26 and AMOS 25, has been demonstrated to be suitable for the analyses of questionnaire data and structural equation modelling (Blunch, 2012; Yun & Cho, 2021).

The reliability and validity of the measurement model were gauged in table 2. The results exhibit that all CAs are higher than 0.7. Also, the CR and AVE values of all variables are greater than the acceptable thresholds of 0.7 and 0.5 respectively. Further, the measurement model of the seven variables achieved a good measurement fit ($\chi^2/DF=1.588<3$, $GFI=0.938>0.9$, $AGFI=0.919>0.9$, $NFI=0.975>0.9$, $CFI=0.991>0.9$, $TLI=0.989>0.9$, $RMSEA=0.036<0.08$, $SRMR= 0.026<0.08$). As a result, the convergent validity of the measurement model is satisfied.

To examine discriminant validity in table 3, the square roots of AVE of each latent variable go beyond any two pairs of its inter-construct correlation. In the meantime, the values of the average variance extract (AVE) of each variable exceed its maximum shared squared variance (MSV). Therefore, the discriminant validity of the measurement model is also well fitted.

Table 2. The factor loadings, Cronbach's Alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE)

Variables	Items	CA	CR	AVE
Perceived Usefulness (PU)	4	0.9552	0.9207	0.7440
Perceived Ease of Use (PEU)	4	0.9291	0.8786	0.6440
TRUST (TR)	3	0.9918	0.9254	0.8053
Social Influence (SI)	3	0.9910	0.9394	0.8378
Behavioral Intention (BI)	4	0.9647	0.8697	0.6254
Perceived Susceptibility (P-SUS)	3	0.8814	0.9181	0.7890
Perceived Severity (P-SEV)	3	0.9242	0.8615	0.6748

Source: Author's calculation from research data

Table 3. Descriptive statistics and correlation among constructs

	MSV	BI	PU	PEU	SI	TR	P-SUS	P-SEV
BI	0.404	0.790						
PU	0.338	0.527	0.862					
PEU	0.339	0.583	0.582	0.802				
SI	0.314	0.561	0.357	0.447	0.915			
TR	0.332	0.577	0.388	0.526	0.437	0.897		
P-SUS	0.061	0.248	0.216	0.091	0.158	0.114	0.888	
P-SEV	0.404	0.636	0.477	0.510	0.445	0.487	0.189	0.8214

Notes: Diagonal values are the square root of AVE; correlations of the constructs are below the diagonals

Source: Author's calculation from research data

Further, this study conducted two tests to examine the potential common method bias. First, Harman's one-factor test (Podsakoff et al., 2003) was implemented by conducting EFA analysis. The results showcase that the largest variance explained by one individual factor is 47.54% (<50%). Hence, none of the factors can individually explain a major percentage of variance. Second, a CFA was utilized to examine the fitness of a single-factor model (all items as the indicators of one factor) (Malhotra et al., 2006). The results of model-fit exhibit a poor fitness ($X^2/df=35.984>3$; $GFI=0.397<0.9$; $AGFI=0.282<0.9$; $CFI=0.395<0.9$; $TLI=0.337<0.9$; $NFI=0.389<0.9$; $RMSEA=0.276>0.08$; $SRMR=0.146>0.08$). Thus, both tests declare that this study suffers from no common bias. The model fit of structural model was examined through the statistical values as follows: $\chi^2/DF=1.576<3$, $GFI=0.938>0.9$, $AGFI=0.920>0.9$, $NFI=0.975>0.9$, $CFI=0.991>0.9$, $TLI=0.989>0.9$, $RMSEA=0.035<0.08$, $SRMR=0.026<0.08$). Accordingly, the fit results for structural model is deemed to be satisfactory.

The results in table 5 present that all nine hypotheses are supported. According to the significant estimates outcomes, H1, H2, H4, H5, H6 and H7 are supported. Likewise, H3, H8 and H9 are also confirmed.

DISCUSSION

This study found that perceived usefulness promotes behavioral intention ($\beta=0.127$, $p\text{-value}<0.01$). This finding aligns with Hong et al. (2021), but incompatible with the study of Troise et al. (2021).

This indicates that when customers perceive the use of OFD to be useful, they will be inclined to adopt it as their frequent service of ordering food during COVID-19 pandemic. Similarly, perceived ease of use drives positively behavioral intention ($\beta=0.178$, $p\text{-value}<0.001$), suggesting that the easy process of ordering food on smartphone apps will be a significant trigger for adopting it. For instance, if customers find it easy to select ordering menu, order food, and trace the ordering routine, they will decide to use OFD services more frequently.

The positive effect of trust on behavioral intention is found in this study ($\beta=0.184$, $p\text{-value}<0.001$). This finding is consistent with Zhao & Bacao (2020) and Hong et al. (2021), but inconsistent with Troise et al. (2021). Taken together, it is shown that if customers's trust about the food hygiene, food nutrition, and personal information security is high, they will adopt the OFD services at ease.

In relation to social influence, such variable is found to trigger behavioral intention ($\beta=0.192$, $p\text{-value}<0.001$). This finding is paralleled with the study of Muangmee et al. (2021), proposing that social influence serve as a major role to stimulate customers' intention to employ OFD. It is shown that the influence and advice of customers' parents, relatives, friends, colleagues and surrounding people have a major role in directing their way of behaving to use online food ordering services.

For the perception of health threat, the enhancing effect of perceived susceptibility and perceived severity on behavioral intention is statistically found ($\beta=0.071$, $p\text{-value}<0.05$ and $\beta=0.360$, $p\text{-value}<0.001$ respectively). This result contradicts the finding of Hong et al. (2021), emphasizing that OFD usage is itself considered to be a health-protective behavior. Such standpoint agrees with the notion of using mobile payment as a means of protecting users' health during COVID-19 pandemic (Nguyen, 2021; Zhao & Bacao, 2021).

Furthermore, perceived usefulness is significantly influenced by three constructs, namely perceived ease of use, perceived susceptibility, and perceived severity. As shown in table 5, perceived ease of use has a positive effect on perceived usefulness ($\beta=0.537$, $p\text{-value}<0.001$). The result also echoes Troise et al. (2021), revealing that the easy experience of online food ordering process on smartphones appears to be an antecedent of feeling the use of OFD to be useful. Similarly, perceived severity and perceived susceptibility enhance customers' perceived usefulness ($\beta=0.230$ and 0.119 at $p\text{-value}<0.001$ respectively), confirming that when customers perceive the health threat from the epidemic, they are active in using OFD platforms and avoid eating out. In other words, OFD's usefulness lies in restricting the frequency of going out and facilitates customers' daily eating and drinking activities.

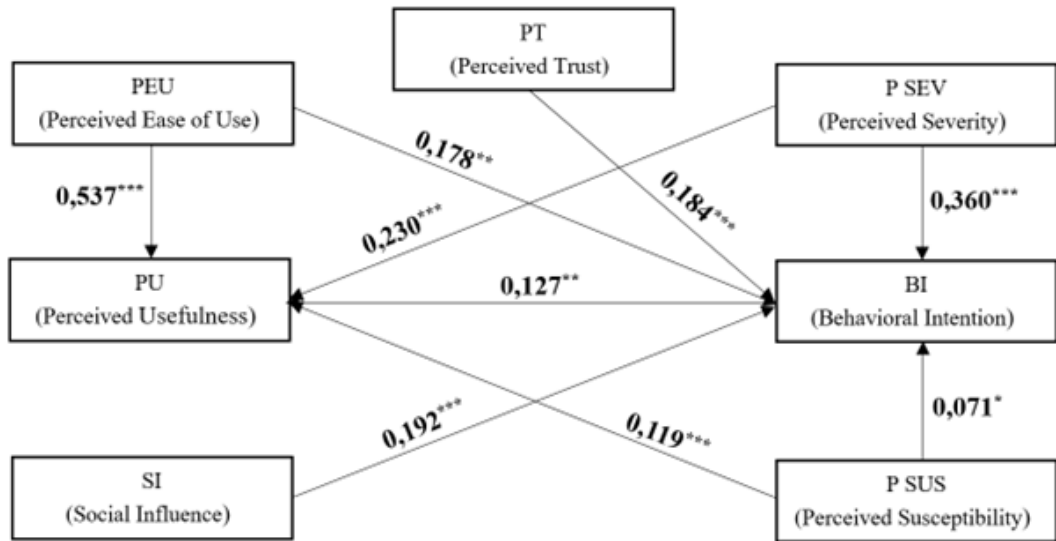
Table 4. Summary of hypotheses testing

Hypotheses	Relations	Estimate	S.E.	T-values	P-values	Decisions
H1	PU -> BI	0.127	0.043	2.928	0.003	Supported
H2	PEU -> BI	0.178	0.054	3.273	0.001	Supported
H3	PEU -> PU	0.537	0.055	9.709	0.000	Supported
H4	TR -> BI	0.184	0.038	4.889	0.000	Supported
H5	SI -> BI	0.192	0.034	5.691	0.000	Supported
H6	P-SUS ->BI	0.071	0.029	2.443	0.015	Supported
H7	P-SEV -> BI	0.360	0.049	7.373	0.000	Supported
H8	P-SUS -> PU	0.119	0.034	3.475	0.000	Supported
H9	P-SEV -> PU	0.230	0.054	4.282	0.000	Supported

Source: Author's calculation from research data

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Figure 2. The Structural model



CONCLUSION

The Summary on Research Findings

Along with the boom of technology applicability in comforting people's daily life, the technology on ordering online food has been significantly paid attention in recent years, especially the high usage rate in developing country as Vietnam. Therefore, this study seeks to examine the factors influencing Vietnamese users' behavioral intention of using online food delivery technology in the context of the outbreak of COVID-19 epidemic in Vietnam. The determinants contained in a joint framework of health belief model (HBM) and technology acceptance model (TAM) were used to predict the behavioral intention, namely perceived usefulness, perceived ease of use, perceived trust, social influence, perceived severity, and perceived susceptibility. By applying structural equation modelling for a sample data of 459 respondents, perceived usefulness and perceived ease of use are found to be the critical predictors for the behavioral intention of employing online food delivery technology in Vietnam. This result echoes the predictive power of these two basic constructs in the traditional framework of TAM towards the new technology acceptance behavior (Davis et al., 1989). Likewise, two other constructs, such as trust and social influence, are in favor of the acceptance of OFD technology. In response to the influence of the COVID-19 pandemic, this study further integrated perceived severity and perceived susceptibility to COVID-19 into the behavioral intention of using online food delivery technology, which confirms their effect on intention and behavior towards the use of online food delivery apps in Vietnam. The result endorsed a belief of recognizing the usage of online food delivery technology as a safety measure in the context of COVID-19 pandemic because such technology can diminish people's worriness and chance about the risk of infection while they still can enjoy their favorite food at home.

Theoretical Contribution

The current study makes a major contribution to the extant literature associated with online food delivery technology particularly, the field of technology acceptance generally. Specifically, the research on online food delivery technology has been insufficiently evaluated in the Vietnamese context. Hence, this study contributes to the knowledge and literature on technology acceptance in Vietnam by examining more on OFD technology because of its rising popularity in Vietnamese context.

Technology acceptance model and health belief model have been chosen as the theoretical fundamentals for the conceptual model. As a result, this study makes a significant contribution by pioneering to build the conceptual model based on a new combination of two theoretical foundations fitting customers' perception during the pandemic and seizing the most crucial determinants shaping users' behavioral intention towards online food delivery technology. This study is among the first to extend the new applicability of a joint framework of TAM and HBM by understanding new technology (online food delivery) in a new field (food sector) in a developing country (Vietnam).

This study also develops the TAM theory of Davis et al. (1989) by consisting of new constructs (trust and social influence) together with basic TAM constructs (TRUST-> BI, SI-> BI). In addition, little is known about a trilateral relationship between perceived usefulness, perceived ease of use and behavioral intention (Troise et al., 2021). This study fills a gap by discovering that the easy use of OFD platforms via perceived ease of use is conducive to customers' sense of its usefulness, and then leads to the behavioral intention to use online food delivery apps. This then represents a substantial contribution to the extension of the theoretical scope of TAM. Furthermore, the pandemic has resulted in a research call for the inclusion of health perception-related constructs (Daragmeh et al., 2021); yet they receive less attention in research on the field of online food delivery technology. This study also fills this research gap by finding the new causal paths between these health constructs and other constructs in conceptual model (P-SEV -> PU, P-SUS -> PU, P-SEV-> BI, P-SUS -> BI).

Managerial Implications

This study offers several fruitful practical implications for managers of companies supplying OFD services in Vietnam. The result in this study shows that Vietnamese users prefer to choose the online food delivery services over the traditional services of dining out during the pandemic, suggesting that the managers can be benefited from the preference of Vietnamese users towards this technology. From then, managers can collect and analyze the right data about their users to understand the demand and taste of food and drinks on online food delivery apps on customers' smartphone. This would create a convenience for them to adjust the variety of their menu based on customers' favorite. Also, the statistical result of this study about the significant impact of social influence provides managers with the useful recommendations. Specifically, managers can be aware of the source of information which influences users' behavioral intention to use OFD platforms. This helps them to develop their advertising strategies to utilize group pressures. Managers can generate appropriate marketing campaigns via social platforms. Moreover, the tools of social marketing should be utilized to advance the benefits of OFD services regarding the pandemic and favorable situation to enjoy food and drinks anywhere to create a reputable image of OFD providers for increasing customers' usage behavior. This in turn create a "domino" effect of spreading its popularity across the existing and new customers. In this way, if one user finds it useful to use online food delivery platforms, they will recommend that service to their family, relatives, colleagues, and friends. If there is also a community of users toward OFD services, one individual is more likely to follow this trend. Managers can also design promotional strategies through "Refer-a-Friend" voucher/coupon schemes, to reward existing users as the active supporters of diffusing the apps if they order food or drinks together with their friends or introduce the platform to other potential users.

On the other hand, managers can have a major focus on advancing current and/or potential customers' sense of the business and advertising service efficiency to their customers. Marketing strategies should stress on the usefulness of OFD platforms by the charming message as follows: regardless of where you can stay, you are likely to enjoy their food anywhere you would like. Furthermore, the managers can simplify the usage process to increase customers' experience, involving the easy account registration, the easy food ordering task, and the easy food delivery tracking task, paralleled with the fitted food delivery time. In addition, a high level of customers' trust in OFD services will be an impulse for their increased willingness to use them and trust plays an essential role in helping managers to build the relationships with their customers. The determinant of trust for OFD managers can be related to the hygiene and quality of food and drinks, guaranteeing the security of personal information, and customers' health safety. Owing to this, managers can cooperate with

reliable restaurants or food venues to provide high-quality food or drinks. Furthermore, managers can make a major effort into the customer relationship management (CRM) system via various communication platforms such as social media and newsletters. In doing so, customers' voice will be respected, and their response will be transparently and authentically dealt with. In addition, the doubt and apprehension of new customers about OFD services might place a question on how they operate or how the personal information will be safeguarded. Therefore, managers can declare publicly the way of operation and the way of restoring and protecting personal and payment information.

The findings also provide regulators and government agencies with useful suggestions. The OFD services are becoming increasingly widespread and gradually feasible platforms for the existence of the foodservice industry in a specific emergency (COVID-19 pandemic), and continuously evolve after crunch. This universality can be achieved by customers' increasing habit to enjoy food and drink at home as well as their feeling of self-protection during the pandemic, very likely to become new consumption habits for usage continuation after epidemic. Therefore, government agencies and regulators can develop the monitoring processes for the quality of food, such as the hygiene and origin of food. Additionally, they can build an official rating system of information transparency for the OFD platforms to deal with the information asymmetries issue pertaining to the services.

Limitations and Future Research

The limitations of this study are unavoidable. The aim of this study is to provide the general perceptions of OFD rather than centering on a particular OFD platform. Owing to different perception of each OFD service platform, future studies can investigate whether the effect of significant predictors on behavioral intention is contingent upon the different OFD services. Additionally, this study only investigated the platform-to-customer delivery type of OFD services (e.g., Baemin, Shoppefood, Grabfood, GoJek, etc.) and did not evaluate restaurant-to-customer OFD (e.g., Pizza Hut, Lotte, etc.). It is worth analyzing whether the impact of factors on behavioral intention might vary replying upon the type of OFD for future research. Extra constructs relevant to the adoption of OFD should be taken into account. Particularly, the service companies might provide the prizes and reward points to existing and new customers with the goal of improving their usage excitement. This indicates the future research call for the involvement of enjoyment variable into the OFD usage intention of customers. Besides, other attitudinal constructs, such as customer satisfaction, positive word-of-mouth, also need to be added into the model. Lastly, the sample size should be more balanced among gender, occupation, education and age. It seems to be that the size sample mainly focuses on the usage behavior of generation Z's customers, and the results suggest that they are the respondent most willing to accept new technology. However, the sample size of future research should be directed to the adults to check whether the pattern of usage behavior remains unchanged. In pararell, comparing the groups between unmarried and married individuals will provide a valuable contribution about this line of research in the future.

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DECLARATION OF CONFLICT OF INTERESTS

The authors declares that there is no conflict of interests.

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APPENDIX

Table 5. Questionnaire with constructs, items and references

Items	Item Code	References
Perceived Usefulness		
Using an OFD service is an efficient way to ordering my meals during COVID-19 pandemic	PU1	(Carlos Martins Rodrigues Pinho & Soares, 2011; Roh & Park, 2019)
Using an OFD service makes my daily eating and drinking lifestyles easier and more convenient during COVID-19 pandemic	PU2	
Using an OFD service is a quicker way to ordering my meals rather than dining out during COVID-19 pandemic	PU3	
I have multiple choices about food and drink when using an OFD service during COVID-19 pandemic	PU4	
Perceived ease of use		
It is easy and convenient to use OFD services	PEU1	(Liébana-Cabanillas et al., 2018; Troise et al., 2021)
Learning to use OFD is easy	PEU2	
OFD services are understandable and clear	PEU3	
Using OFD requires minimum effort and time	PEU4	
Social influence		
People who is important to me think that I should use OFD during COVID-19 pandemic	SI1	(Nuangjamnong, 2021; Venkatesh et al., 2003)
People who I know think that I should use OFD during COVID-19 pandemic	SI2	
People surrounding me think that I should use OFD during COVID-19 pandemic	SI3	
Trust		
I believe that using an OFD service guarantees my health safety during COVID-19 pandemic	TR1	(Cho et al., 2019)
I believe that the food hygiene and quality are guaranteed during COVID-19 pandemic	TR2	
I believe that using an OFD service guarantees my personal information security (debit/ credit cards, transaction historical record)	TR3	
Perceived severity		
Thinking about getting infected by COVID-19 due to dining out and using cash or physical contact payment tools makes me nervous	P-SEV1	(Gaube et al., 2019)
Thinking about getting infected by COVID-19 due to dining out and using cash or physical contact payment tools majorly influences my work and life	P-SEV2	
If I get infected by COVID-19 due to dining out and using physical contact payment tools, my personal relationships are severely damaged	P-SEV3	
Perceived Susceptibility		
There is a very high possibility to get infected by COVID-19 at my living place	P-SUS1	(Gaube et al., 2019)
If I dine out and use physical contact payment tools, my possibility of getting infected by COVID-19 is high	P-SUS2	
I feel that COVID-19 will develop health problems to me in the future	P-SUS3	
Behavioral Intention		
I am willing to use OFD service during COVID-19 pandemic	BI1	(Bhattacharjee, 2001; Hong et al., 2021; Roh & Park, 2019; Zhao & Bacao, 2020b)
I tend to use OFD service in the future	BI2	
I will use OFD service as a my daily habit	BI3	
I am continuously using OFD service in the “new normal” way of living	BI4	

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