Panic Purchasing: Food Hoarding in a City under Lockdown during the COVID-19 Pandemic

*Nhan Nguyen[*a], Cuong Nguyen[b], Phat Khut[c], Kha Nguyen[d]*
[a]FPT University, Vietnam
[b]Industrial University of Ho Chi Minh City, Vietnam
[c]HT Trading and Production Company Limited, Vietnam
[d]Kantar Worldpanel, Vietnam

Abstract: This research aimed to investigate the determinants of panic purchasing to hoard food in Ho Chi Minh City during the lockdown caused by the COVID-19 pandemic. Pragmatism and the deduction approach were used for the research. During the lockdown period in Ho Chi Minh City, the purposive sampling technique was the first method used to reach the population that needed to be measured. Then, simple sampling was the second technique to collect data in the city in July and August 2021. Data were collected from 584 participants—higher than the required minimum sample size—who fulfilled the essential criteria to be included in the sample's population. Multi-quantitative methods, including descriptive statistics, reliability tests for items, exploratory factor analysis, and linear regression analysis, were used to analyze the data obtained. The main findings are that perceived scarcity, susceptibility, severity, cues to action, and self-efficacy impacted panic purchasing to hoard foods. The results of this study are compared to the literature review in order to discuss panic buying behaviour, and recommendations are offered to policymakers and researchers in the future.

Keywords: perceived scarcity, perceived susceptibility, perceived severity, cues to action, self-efficacy

JEL Classification: L230, M210, M290

Introduction

The COVID-19 virus, which was declared a global pandemic in 2020, has had an unprecedented impact on almost every aspect of society. It has had many consequences for society and for economic development. The rapidly spreading COVID-19 virus has resulted in many severe impacts around the world and has been one of the biggest disasters of the past decade. A variety of measures, particularly social distancing and lockdown, have been imposed by governments worldwide to contain the spread of the virus.

In Vietnam, from the first COVID-19 wave in 2020 to the fourth one in April 2021, the Vietnamese government performed pretty well in preventing COVID-19. During the pandemic's fourth wave, many cities and regions were under lockdown, labourers had to work from home, and their choices with regard to consumption were limited. Although the strategies that were used to protect citizens against the virus have been successful, at the time of writing, many industries were still struggling. The number of cases and deaths was steadily increasing in different provinces on a daily basis in Vietnam, leading to the urgent need to control the panic this was causing. Several aspects of the economy and society were undergoing rapid changes in response to disruptions in their activities, including service and production shutdowns, resulting in many businesses facing bankruptcy. The complexity of managing a public health crisis and allaying public fears is evident in the uncoordinated international response to organizational challenges (Wang and Na, 2020).

Ho Chi Minh City is one of the economic centres in Vietnam. After the government's application of the lockdown and social distancing policies to control the epidemic, a consequence of this highly uncertain situation was an unprecedented level of panic buying. Many people could not control their behaviour and they panicked about buying food. In addition, food suppliers exploited manufactured and natural disasters through manipulation and profiteering through price increases during the supply and demand shocks, leading to a scarcity of goods and the creation of virtual effects in the economy and everyday life. People were willing to hoard and did not follow instructions from the government (Nguyen and Bui, 2020). Consumers exploited all possible channels for panic buying. The purchase and sale of food and foodstuffs caused by the pandemic had a seriously negative effect on society. It created a series of adverse impacts on society when perishable goods and necessary household items were purchased in too large quantities and left to waste, making a person unable to consume such goods or give them to other consumers (Zhang et al., 2020). It reduced the efficient allocation of resources, leading to a loss of social weight and inventory potential, and this harmed society (Nguyen and Bui, 2020).

According to practical problem statements, undeniably, many factors influenced the panic buying of foods. The topic of what determinants had an impact on the panic buying and hoarding of food is an urgent issue that needs to be considered. This research aims to estimate the determinants of panic purchasing and food hoarding during the COVID-19 pandemic when Ho Chi Minh City was under lockdown. The authors have reviewed many of the studies in the literature in order to develop hypotheses and design a conceptual framework. The research methodology is described in detail. The findings are critically and logically presented.

Literature Review

Perceived scarcity and panic purchasing

According to Chua, the consumers' conception of the degree of resource availability is the definition of perceived scarcity (Chua, 2021). Chua et al. (2021) drew on the theoretical contributions of the health belief model, perceived scarcity, and anticipated regret theories and identified various determinants of panic purchasing. Some of the variables identified were perceived susceptibility, perceived severity, outcome expectation, cues to action, and self-efficacy. According to the research, perceived scarcity was found to positively impact customers' panic buying intention (Singh et al., 2021; Chua et al., 2021). Yuen et al. (2020) identified and synthesized the psychological causes of panic buying as individuals' perception of the threat of a health crisis and scarcity of products, fear of the unknown, coping behavior, and social-psychological factors, and argued that perceived scarcity increases panic buying due to psychological reactance and anticipated regret. The first hypothesis has been developed as follows:

Hypothesis 1 (H1): *The perceived scarcity of contracting COVID-19 positively impacts panic purchasing.*

Perceived susceptibility and panic purchasing

Perceived susceptibility is said to be the consumers' perception of risk of contracting COVID-19. The level of perceived vulnerability depends on the state of people's physiological and psychological health in dealing with the pandemic. Wang and Na (2020) investigated the psychological factors affecting Chinese customers' food hoarding behaviors

and found that getting infected (oneself or family members) had a significant positive effect on panic buying. Nguyen and Bui (2020) and Khan (2020) argued that risk perception—of which perceived susceptibility and perceived severity are components that have an indirect positive influence on the intention to hoard food—positively affects perceived behavior which, in turn, leads to the intention to hoard food. Similarly, perceived susceptibility was also found by Chua et al. (2021) to indirectly increase the tendency to engage in panic buying through its positive impact on perceived scarcity. For this research, the second hypothesis is stated as follows:

Hypothesis 2 (H2): *Perceived susceptibility of contracting COVID-19 has a positive impact on panic purchasing*

Perceived severity and panic purchasing

There are some differences between the empirical studies. The degree of detriment suffered from contracting COVID-19 is defined for perceived severity, and it also affects the level of fear when faced with the virus. As a component of risk perception, perceived severity also indirectly influences food hoarding strategies (Nguyen and Bui, 2020; Khan, 2020). However, in the study of Chua et al. (2021), unlike perceived susceptibility, perceived severity was not found to influence perceived scarcity which increases panic buying positively. The authors have developed the third hypothesis as follows:

Hypothesis 3 (H3): *Perceived severity of contracting COVID-19 has a positive impact on panic purchasing*

Cues to action and panic purchasing

Cues to action are past experiences,

mass media, and social influences—such as family, friends, neighbours, and colleagues—which act as activators of consumers' readiness to engage in panic buying. There are many findings regarding the relationship between cues to action and panic buying. Firstly, cues to action positively influence perceived scarcity, which increases panic buying behaviour (Chua et al., 2021). Secondly, Prentice, Quach, and Thaichon (2020) addressed the antecedents and consequences of panic buying and confirmed that social media and peer influence have a significant positive impact on panic buying. In addition, Loxton et al. (2020) confirmed that panic buying mentalities exhibited in previous crises would manifest, and customers would exhibit herd mentality behaviours during the COVID-19 pandemic. Moreover, Wijaya (2020) described the factors that shaped Indonesian consumers' panic buying during COVID-19 and divided them into four categories: (1) information and knowledge; (2) a family; (3) other people; and (4) a risk avoidance factor. For the research, the fourth hypothesis has been developed as follows:

Hypothesis 4 (H4)*: Cues to action have a positive impact on panic purchasing*

Self-efficacy and panic purchasing

Self-efficacy is defined as consumers' perceived ability to protect themselves from COVID-19 and cope during the pandemic. Undeniably, people who experience lower self-efficacy find it undermines their capacity to handle problems and they have weaker coping mechanisms to manage their social anxiety and stress. Mahmood et al. (2021) found that self-efficacy has a significant positive effect on preventive behaviours. Furthermore, self-efficacy was found to positively influence panic buying through perceived scarcity (Chua et al., 2021). This is the main reason why the fifth hypothesis has been developed as follows:

Hypothesis 5 (H5)*: Self-efficacy in protecting oneself from COVID-19 has a positive impact on panic purchasing*

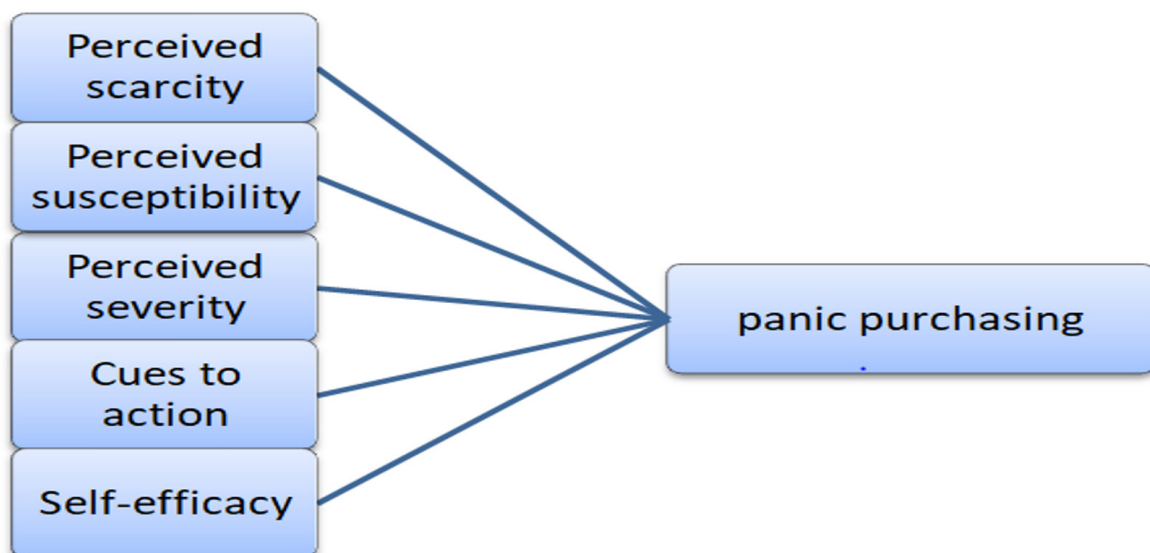The hypotheses were built for the research. They are cited with clear directions.

Figure 1. Conceptual framework

Methods

Pragmatism is the best research philosophy for this research topic (Easterby-Smith et al., 2008; Guba, 1990). A deductive approach is applied to build a conceptual framework and to test the hypotheses (Utley et al., 2017).

First, the purposive sampling technique was used to choose suitable participants for this research. The simple random sampling technique was the second step to obtain data (Utley et al., 2017). The author guarantees that all participants in the survey were volunteers and were without any influence. In addition, all information provided was confidential, and accessible only to the author. Furthermore, the author constantly respected the participants' viewpoints. The period to collect data was in July and August 2021. To evaluate the required minimum sample size, the formula constructed by Krejcie and Morgan (1970) was used:

$$s = \frac{X^2 NP(1-P)}{d^2(N-1)+X^2P}(1-P)$$

(Source: Krejcie and Morgan (1970))

In this formula, the required minimum sample size is denoted by 's'. X is known as a value of the desired confidence level. In the research, 95% is the significant level. It means that X is 1.96. P stands for the population proportion. Krejcie and Morgan (1970) suggested that P should be 0.5. The accuracy degree is called 'd', which is usually equal to 0.05 (Utley et al., 2017). According to the General Statistics Office (2019), the workforce over the age of 15 in Ho Chi Minh City numbers about 4,826,000 employees. Therefore, N is 4,826,000. Based on the above formula, the minimum sample size for this research is calculated as being about 563 participants in Ho Chi Minh City.

Questionnaires were carefully selected to obtain data. The survey link was created by using the Google Forms app. A Likert-Scale is used to discover the determinants measured from (1) "Strongly disagree" to (5) "Strongly agree".

Descriptive statistics have been used to describe the relationships between variables in a sample or population from which data will be systematically summarized (Kaur, 2018). Critical demographic factors been summarized and evaluated. To measure reliability for scales, Cronbach's alpha coefficient was chosen. It is a measure of consistency for scales with many items (Bartlett, 1950). The exploratory factor analysis (EFA) was used before running regression for the research. There are several types of regression models. Multiple linear regression analysis was the last method used to test the hypothesis (Uyanık, 2013). SPSS and Excel software was used.

Results

Descriptive statistics

The data were collected in Ho Chi Minh City, with 584 participants. The data have reached the basic requirements in terms of sample size and cover enough for the population. The findings for hoarding foods show that about 71% of participants had the concept of hoarding food during the pandemic. Based on the participants' responses, all of them have experienced online shopping. The highest frequency of online shopping is about 38.2% for 2-3 times per week. The second choice is once a week. The next group of frequencies is 5 times per week. Descriptions of income, age, education level, and occupation are shown in the below table.

Table 1. Income, age, education, occupation

Income	Frequency	Percent
< 3.000.000VND	51	8.7
From 3.000.000 VND to lower 10.000.000VND	299	51.2
From 10.000.000 VND to 20.000.000VND	166	28.4
> 20.000.000VND	68	11.6
Total	584	100.0
Age	Frequency	Percent
From 16 to 34	243	41.6
From 35 to 65	315	53.9
From 66 and above	26	4.5
Total	584	100.0
Education	Frequency	Percent
Primary	4	.7
Secondary	55	9.4
High school	167	28.6
Diploma?/Bachelor degree	243	41.6
Postgraduate degree	97	16.6
Others	18	3.1
Total	584	100.0
Occupation	Frequency	Percent
Student	39	6.7
Office worker	135	23.1
Teacher	98	16.8
Household	46	7.9
Businessman	116	19.9
Others	150	25.7
Total	584	100.0

(source: author's analysis)

For the sample, 186 men accounted for 31.8%, 346 women accounted for 59.2%, and 52 people preferred not to say, accounting for 8.9%.

About 51.2% of participants had income ranging from VND 3 million to VND 10 million. The poorest group of participants accounted for 8.7% who had less than VND 3 million. The results show that all participants can meet their primary demand in terms of physiological needs during the city lockdown.

The group of age from 35 to 65 years old is the highest, about 53.9%. The second group is from 16 to 34 years old accounting for about 41.6%. According to the statistics, most participants are between 16 and 65 years old, the typical age range for Ho Chi Minh City workers.

The most common level of education is a diploma or bachelor's degree. The largest occupational group is office workers. The second largest group is "others", and the next is businesspersons. The occupations included basic popular jobs in Ho Chi Minh City.

Reliability tests for items

Cronbach's Alpha coefficient is a measure of consistency for scales with many items. It is based on the mean and average correlations between the different items on the scale. Alpha forms a score or scale for the Likert questionnaires with the exclusion items aggregated (Leech, Barrett & Morgan, 2005). All Cronbach's Alpha values are higher than 0.6 and are acceptable levels. Besides, the corrected item-total correlation is greater than 0.4, so there is a strong correlation among items.

Table 2. Cronbach's Alpha

Independent Variables	Cronbach's Alpha
Perceived susceptibility (SS)	0.951
Self-efficacy (SE)	0.917
Perceived scarcity (PS)	0.942
Perceived severity (PSE)	0.837
Cues to action (CA)	0.688
Dependent Variable	Cronbach's Alpha
Panic purchasing (PP)	0.736

(source: author's analysis)

For all items, the responses range from strongly disagree to strongly agree. The mean ranges from 3.00 to 4.00, which means most of the participants agree or strongly agree with the perspective of each question. How-

Exploratory Factor Analysis (EFA)

For the independent variables

According to KMO and Bartlett's Test, KMO equals 0.852 so it is greater than 0.5,

Table 3. KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.852
Bartlett's Test of Sphericity	Approx. Chi-Square	6658.248
	df	105
	Sig.	.000

(source: author's analysis)

ever, some participants revealed opposite perspectives.

meaning the value of KMO is accepted. This result shows that items respond adequately to

the five independent variables. Besides, the Sig. of Bartlett's Test as 0.000 which is less than 0.05. So, the result is accepted, and the

of their independent variable because the loading factor of all items is greater than 0.3, and no items are discarded.

Table 4. KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.674
Bartlett's Test of Sphericity	Approx. Chi-Square	383.971
	df	3
	Sig.	.000

(source: author's analysis)

independent variables have a high correlation for factor analysis. Furthermore, the test for initial eigenvalues of the first five components is greater than 1.0 and is extracted in this analysis. The cumulative percentage for the first five components is evaluated to accumulate to 81.707%.

The Rotated Component Matrix. Because the sample size of the study is 584, the factor loading is set to 0.3. The information highlights that all the items of the independent variables converge to the exact position

For the dependent variable, its KMO is 0.674, which is greater than 0.5 and less than 1. Therefore, the index is adopted to ensure that the factor analysis is appropriate—additionally, Bartlett's Test with Sig. An index of 0.000 is much smaller than 0.05. Its eigenvalue is greater than 1. Only one factor is extracted.

Correlation analysis

The Pearson correlation coefficient between the dependent and independent vari-

Table 5. Correlations

Correlations		PP	SS	SE	PS	PSE	CA
PP	Pearson Correlation	1	.331**	.159**	.542**	.199**	.168**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
SS	Pearson Correlation	.331**	1	.000	.000	.000	.000
	Sig. (2-tailed)	.000		1.000	1.000	1.000	1.000
SE	Pearson Correlation	.159**	.000	1	.000	.000	.000
	Sig. (2-tailed)	.000	1.000		1.000	1.000	1.000
PS	Pearson Correlation	.542**	.000	.000	1	.000	.000
	Sig. (2-tailed)	.000	1.000	1.000		1.000	1.000
PSE	Pearson Correlation	.199**	.000	.000	.000	1	.000
	Sig. (2-tailed)	.000	1.000	1.000	1.000		1.000
CA	Pearson Correlation	.168**	.000	.000	.000	.000	1
	Sig. (2-tailed)	.000	1.000	1.000	1.000	1.000	
**. Correlation is significant at the 0.01 level (2-tailed).							

(source: author's analysis)

ables is **p equivalent to 99% accuracy.

According to the results, the Pearson correlation coefficient is greater than 0.0 and less than 0.7, so there is a correlation between the dependent variable and the independent variables, but there will be different levels of correlation.

Multiple linear regression analysis

The R-Square is used to evaluate the strength of the model. The adjusted R-Square of this model is at approximately 0.5. This value is equivalent to 49.2% of the influence of the independent variables

on the dependent variable, and the rest are other variables. Besides, Durbin-Watson is 1.527, close to 2, so there is no close correlation between the residuals.

Sig. based on the above table, F-test is used to evaluate whether betas for independent variables are different together and not equal to zero. Value is 0.000, being smaller than 0.05 represents the null hypothesis for test is rejected, and the alternative hypothesis is supported (Sarstedt & Mooi, 2014).

The VIF values of the independent variables are all less than 5, so there is no multi-collinearity among the variables (Akinwande, Dikko & Samson, 2015). In addi-

Table 6. Model Summary

R Square	Adjusted R Square	Std. The error of the Estimate	Sig. F Change	Durbin-Watson
.496	.492	.71298475	.000	1.527

(source: author's analysis)

Table 7. ANOVA test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	289.175	5	57.835	113.771	.000a
	Residual	293.825	578	.508		
	Total	583.000	583			

a. Predictors: (Constant), CA, PSE, PS, SE, SS

b. Dependent Variable: Panic purchasing

(source: author's analysis)

Table 8. Regression analysis

	t	Beta	Sig.	VIF
(Constant)	.000		1.000	
SS	11.194	.331	.000	1.000
SE	5.386	.159	.000	1.000
PS	18.352	.542	.000	1.000
PSE	6.736	.199	.000	1.000
CA	5.691	.168	.000	1.000

(source: author's analysis)

tion, the Sig. SS, SE, PS and PSE, and CA are equal to 0.000 and less than 0.05, so all null hypotheses are rejected. It means that the alternative hypotheses are accepted. The relationship between the dependent variable and the five independent variables are shown in the standardized coefficients equation as follows:

PP = 0.331*SS + 0.159*SE + 0.542*PS + 0.199*PSE + 0.168*CA

Hypotheses testing

The standardized coefficient beta can be converted to a percentage, which shows that the rank of each independent variable

Discussion

This study set out to explore the determinants of the food hoarding behaviour during the COVID-19 lockdown. The above analysis has established that panic purchasing is significantly influenced by perceived scarcity, perceived susceptibility, perceived severity, cues to action and self-efficacy, in decreasing order.

From the regression findings, it could be deduced that perceived scarcity plays a more significant role than the other factors that affect food hoarding. One possible explanation for this may be that food shortages are an immediate consequence and create a sense

Table 9. Level of Influence on panic purchasing

Dependent variable	Independent variables	(H)	%	Decision
Panic purchasing	Perceived susceptibility	H2 (+)	33.1%	Supported
	Self-efficacy	H5 (+)	15.9%	Supported
	Perceived scarcity	H1 (+)	54.2%	Supported
	Perceived severity	H3 (+)	19.9%	Supported
	Cues to action	H4 (+)	16.8%	Supported

(source: author's analysis)

influences the dependent variables. All hypotheses were supported and accepted. The findings show that perceived scarcity, susceptibility, severity, cues to action, and self-efficacy had an impact on panic purchasing to hoard food during the COVID-19 pandemic period with the Ho Chi Minh City lockdown.

of urgency that drives customers to hoard food. In addition, the results have also been found that show the influence of perceived severity, cues to action, and self-efficacy on food hoarding behaviour to be roughly the same and far less than the two remaining factors, which indicates that risks which can be perceived as being immediate, such as the scarcity of product and the susceptibility to

COVID-19, contribute more significantly to decisions to engage in food hoarding. It can also be concluded that individuals' perceptions of a health crisis, including the perception of scarcity and perception of threats, motivate them to hoard food to a greater extent than individuals' perceptions of their own capacity.

The findings of this study are consistent with previous literature which explored the possible psychological variables as determinants of panic buying. The positive correlation between perceived scarcity and panic buying has been confirmed in the studies by Chua et al. (2021), Yue-Qian et al. (2021), Yuen et al. (2020), Arafat (2020). This study has, once again, consolidated the positive relationship between perceived scarcity and panic buying. Prentice et al. (2020) argued that panic buying is a response to the anticipation of resource scarcity because of the sense of security resulting from such behaviour. The phenomenon may be explained as a remedial response to reduce the fear and anxiety of losing control over the surrounding environment (Dholakia, 2020). In a study by Chua et al. (2021), it was proposed that all factors in the health belief model had an indirect positive impact on consumers' panic buying behaviour; specifically, they have a positive impact on perceived scarcity, and perceived scarcity, which, in turn, led to panic buying. The study took a further step to confirm that the factors in the health belief model also have a direct positive influence on panic buying behaviour. The findings significantly contribute to the literature on customers' panic buying behaviour during a global pandemic which remained limited according to Yuen et al. (2020). The revealed positive relationship between perceived scarcity, the factors in the health belief model, and panic buying supports earlier studies.

This study has implications for policymakers, retailers, and customers. These findings have highlighted the need to ensure the adequacy of supplies, especially necessities. This entails effective collaboration between policymakers and retailers. Measures need to be taken by the government to stop the spread of misinformation, to disseminate verified information, and most importantly, to discourage food hoarding behaviour. Besides, psychological and welfare support needs to be delivered to those who are vulnerable. The ultimate goal is to build trust in the government and reassure customers not to anticipate the scarcity of supplies.

Conclusion

Based on the regression findings, it can be concluded that the critical position is that panic buying is directly affected by perceived scarcity, perceived susceptibility, perceived severity, cues to action, and self-efficacy. The effect of perceived scarcity on panic buying is the most important. The government can reduce irrational hoarding through public education to decrease incentives for panic buying. Furthermore, social media or traditional media can consider showing more images of fully stocked shelves instead of empty ones. Policymakers can invest in marketing campaigns that improve consumers' awareness of the actual level of availability of national stockpiles to convince consumers that the level of scarcity is not as high as they initially perceived it to be. Moreover, family and friends could give each other mental health protection prompts instead of panic buying products. Some practical ways to prepare for COVID-19, such as maintaining physical, mental, and emotional well-being, should be improved for its effect on people's awareness. For perceived susceptibility, policymakers can

institute rules on social distancing and mandatory mask-wearing to reduce the population's general risk of contracting COVID-19. In addition, the government should provide people with clear and timely information to stock up on food and essential household items to be ready before disaster strikes. The government should adopt targeted policies to mitigate mindless panic buying.

Limitation

This research also has some limitations that need to be improved upon in the future. Due to the stressful situation surrounding the pandemic, it was impossible to interact and conduct the survey directly to collect, receive and share practical information, and the comments of participants. In addition, the research duration was short, so it was not possible to deploy more variables to increase the feasibility of the study. The other limitation is in regard to the independent variables. Although five factors all have a positive impact on panic purchasing, with the adjusted R-Square being 0.496 which is equivalent to 49.6% of the influence of the independent variables on the dependent variable, future research would need to be explore more independent variables in its research model to increase the adjusted R squared and regression's results. During the COVID-19 pandemic, this study collected the data from the sample only in Ho Chi Minh City. Although there are these limitations, the research objectives have been reached. All independent variables have strong relationships with panic purchasing to hoard food. Future research could eliminate the limitations and improve the literature review to support the theoretical framework and research models.

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