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PANIC BUYING FACTORS AMONG MALAYSIAN HOUSEHOLDS DURING FIRST PHASE OF MOVEMENT CONTROL ORDER

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Abstract: *The coronavirus epidemic also known as COVID-19 had posed major public health and governance concerns worldwide including Malaysia. To break the chain of COVID-19, lockdowns are implemented in many places with the Malaysian government imposing a Movement Control Order (MCO), igniting fear and panic buying among consumers. The objectives of this study are first, to determine the contributing factors that influence the type of goods during panic buying and then to identify the significant factors that contribute to panic buying. This study used secondary data based on a questionnaire given to 300 respondents among Malaysian households. Principal component analysis extracted two main components, named as basic needs and other needs. By comparing the mean of these two components, basic needs are found to be the most important factor that contributes to panic buying. Next, binary logistic regression analysis is compared between forward and backward selection method with backward selection method as best model due to the lower AIC value. Only two significant variables among Malaysian households are involved in panic buying; they are young adults and the B40 groups. These findings on consumers' panic buying behaviours during COVID-19 pandemic may give a better understanding and managerial insights for retailers and policy-makers.*

Keywords: *Movement Control Order, panic buying, herd behaviour, consumer behaviour, principal component analysis, binary logistic regression.*

Introduction

Coronavirus, also known as COVID-19, started to emerge in Wuhan City, Hubei Province, China on 31 December 2019. The World Health Organization (WHO) has affirmed the COVID-19 as a new pandemic and affected the whole world in March 2020 (Mucci et al., 2020). Due to this pandemic, many countries have implemented restrictions on movement, travel, and

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social contact in response to the COVID-19 pandemic. China is the first country to implement a regional lockdown of cities in Hubei Province as a control measure followed by the other countries including Italy, Spain, Russia, India, and the Philippines (Oraby et al., 2021). Since March 2020, Malaysians were imposed to various phases of lockdown or called Movement Control Order (MCO) as the government struggles to deal with the spread of the virus (Yusof, 2021). The first phase of MCO which started on 18 March 2020 until 3 May 2020 has led to panic buying behaviour which has occurred in all states in Malaysia. Panic buying is socially undesirable herd behaviour, buying large quantities of daily necessities and medicines from retailers. COVID-19 caused widespread fear, which led to a major change in household behaviour and consumption habits. Many households have resorted to panic buying because of widespread anxiety and uncertainty. Retailers faced a sudden and strong demand for toilet paper and noodles in Singapore (Billore & Anisimova, 2021). Media from Australia, United States, China, United Kingdom and India also reported that panic buying has created chaos and herd behaviour (Billore & Anisimova, 2021) while in Malaysia, after announcing that a nationwide total lockdown will be implemented, people in many areas went on panic buying, with long queues at supermarkets. There were many photos of people queueing at supermarkets to buy goods that spread on social media (Zainal et al., 2021). In reality, panic buying has been reported in the past during other disasters such as extreme weather and natural disasters such as earthquakes (Kassas & Nayga, 2020).

Panic buying has been reported everywhere with households flocking to the nearby supermarkets or marts to buy necessity goods in bulk as the result of the Movement Control Order (MCO) announcement by the government during the COVID-19 outbreak. As predicted, this action will give consequences to retailers. Panic buying creates more instability in supply chains from the supermarket standpoint. Road closures or traffic jams due to sudden huge numbers of people going out for panic buying will make it hard for ordering, restore, and deliver goods to the retailers. As a result, the stockout situation worsened and also led to a rise in consumer goods prices. Furthermore, panic buying has become a “new normal” consumer behaviour and now developed into a coping mechanism to address actual and potential COVID-19 threats. In addition, wastage is another side effect of panic buying where Australians reported that COVID-19 made them waste more food mainly due to panic buying and food delivery services. Different individuals may react to dissimilar actions towards the panic buying. Thus, it is important to know how the different groups of gender, income, age, and also marital status respond to the panic buying. The stereotype of females who tends to buy more may change when panic buy involves. A recent study by (Lins & Aquino, 2020) reported that male Brazilians practice a greater level of panic buying than female Brazilians. This is because males tend to feel more worried about purchasing during COVID-19 pandemic rather than females although they have less fear than females (Clemens et al., 2020). Hence, a study on panic buying for the different groups should be conducted rather than conclude that their behaviours is identical during normal days before the lockdown.

Besides, despite many kinds of research that have been carried out, there is far too little attention has been paid to panic buying factors in Malaysia. Currently, there is still a lack of study investigating the demographic factors that contribute to panic buying in Malaysia. Thus, to bridge this knowledge gap, this study went ahead to focus on investigating the factors that contribute to panic buying among Malaysian households during the COVID-19 pandemic which includes demographic factors. The findings of this study will help retailers to prepare for future situations that might trigger another panic buying behaviour among households in Malaysia.

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Methodology

This study used secondary data collected by Khairunesa Isa, Nurliyana Md Rosni, Azmi Abdul Latiff, and Fadzlunesa Isa from Universiti Tun Hussein Onn Malaysia, a public university in Batu Pahat, Johor, Malaysia (Isa et al., 2020) and made feasible online. The data consist of 300 respondents from all cities in Malaysia.

Table 1: Data Description

Variable	Description	Measurement Scale
Panic buying (Dependent)	Involvement of the households in panic buying during MCO (Categorical: 0–No Panic Buying, 1–Panic Buying)	Binary
Gender	Gender of the respondents (Categorical: 1–Male, 2–Female)	Nominal
Age	Age of the respondents (Categorical: 1–Young Adults, 2–Middle-aged Adults, 3–Old-aged Adults)	Ordinal
Income	Income of the households (Categorical: 1–B40, 2–M40, 3–T20)	Ordinal
Marital Status	Marital status of respondents (Categorical:1–Single, 2–Married, 3–Divorce)	Nominal
Residential Area	Residential area of respondents (Categorical:1–Rural, 2–Suburbs, 3–City)	Nominal
Household Size	Number of people in the house	Interval
Buying Center	The main choice of center/ ecommerce to buy necessities. (Categorical: 1–Supermarkets, 2–Convenience Store, 3–Grocery Store, 4–Public Market, 5–Buy Online)	Nominal
Type of goods	The main type of items that are sought after the movement control instructions are made. A four-point Likert Scale was used for each type of goods with 1 = Not Important at all, 2 = Not Really Important, 3 = Important, and 4 = Most Important.	Interval

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The list of variables used for the analysis is shown in Table 1. The dependent variable is panic buying which is a binary variable. The independent variables are gender, age, income, household size, main buying center, and type of goods which includes dry food, wet food, medications, clothes, personal hygiene, home appliances, petrol, electronic goods, vehicle, and accessories. In order to analyze which factor most influences the type of goods during panic buying, this study used principal component analysis. Then a binary logistic regression analysis is carried out to identify the significant factors that contribute to panic buying among Malaysian households.

Result and Discussion

Table 2 gives the descriptive statistics on the overall frequency for the demographic profile of the respondents. Out of 300 respondents, there are more females with 60.7% (182) than males with 39.3% (118). The age of respondents were mostly young adults (55.3%), followed by middle-aged adults (26%) and old-aged adults (18.7%). Respondents that are married are 53.7% (161) is higher than those who are single with 44.7% (134) and divorced people, 1.7% (5). Most respondents come from the city area (50.3%), followed by the rural area (26.7%) and suburbs area (23%). The income group of Malaysian households was mostly in the B40 group (68%) followed by M40 (24.7%) and T20 (7.3%). The number of Malaysian households was mostly 4 people in one house with 21.7% (65) followed closely by 5 people (18.3%), 3 people (14%), and 6 people (13.3%). There is only one household among the respondents (0.3% or 1 household) who have 20 people in one house. This observation can be a potential outlier to the dataset. Hence, Cook's Distance value and Standardized Residual value were used to check for the influential outlier. Since Cook's Distance value is less than 1 and Standardized Residual value is less than 3 and more than -3, there is no influential outlier in this study. 89.7% (269) of the respondents did panic buying while only 10.3% (31) were not triggered with panic buying. Since this survey was done during the first phase of Movement Control Order (MCO), this might be the reason why individuals undergo behavioural changes such as panic buying due to disease outbreaks like COVID-19.

Table 2: Frequency table for demographic profile of the respondents

	Variable	Frequency (n)	Percentage (%)
Gender	Male	118	39.3
	Female	182	60.7
Age	Young Adults	166	55.3
	Middle-aged Adults	78	26.0
	Old-aged Adults	56	18.7
Marital Status	Single	134	44.7
	Married	161	53.7
	Divorce	5	1.7
Residential Area	Rural	80	26.7
	Suburbs	69	23.0
	City	151	50.3
Income	B40	204	68.0
	M40	74	24.7
	T20	22	7.3

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Household Size	1	12	4.0
	2	21	7.0
	3	42	14.0
	4	65	21.7
	5	55	18.3
	6	40	13.3
	7	26	8.7
	8	22	7.3
	9	8	2.7
	10	6	2.0
	11	2	0.7
	20	1	0.3
Panic Buying	Yes	269	89.7
	No	31	10.3

Figure 1 shows the buying center among Malaysian households during panic buying. The highest percentage of buying centers are supermarkets (43.7%) followed by the grocery stores (32.0%). The least percentage with 7.3% is the convenience store.

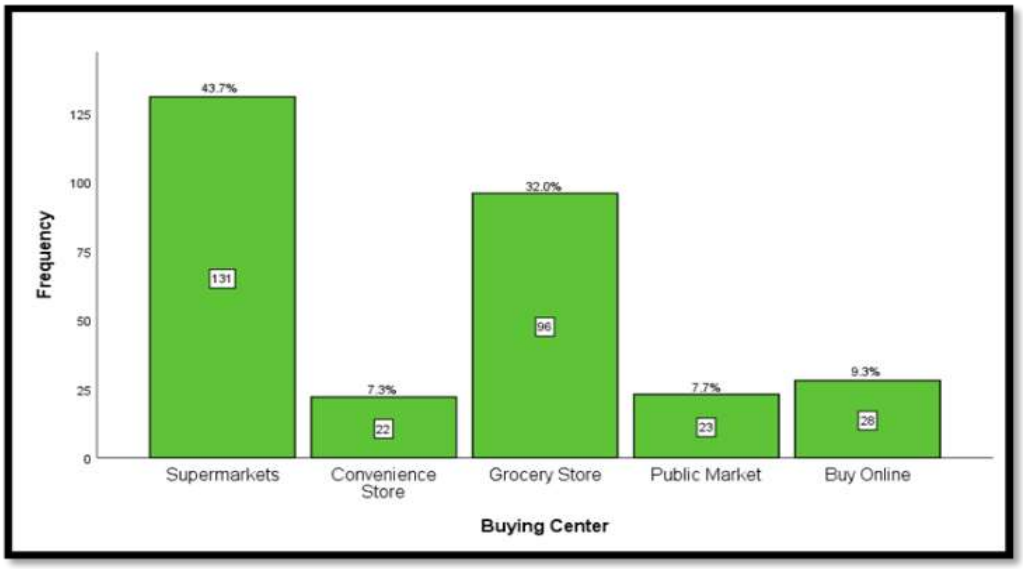

Figure 1: Distribution of buying center during panic buying

Principal Component Analysis

Table 3 shows Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for the complete model and Barlett's test of sphericity. (Kaiser, 1974) recommends accepting values greater than 0.5 as acceptable. As for this study, the value is 0.828, which falls into the range of goods based on (Field et al., 2009). So, the sample size is adequate for principal component analysis. A relationship between variables is required for principal component analysis, and if the matrix is an identity matrix, all correlation coefficients are 0. This test is required to be significant because it indicates that the matrix is not an identity matrix. Bartlett's test is highly significant in this study, with a p-value of 0.000 less than 0.05, indicating that there is a relationship between the variables. So, this data is suitable for data reduction.

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International Journal of Accounting, Finance and Business (IJAFB)
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Table 3: Kaiser-Meyer-Olkin (KMO) and Barlett's Test of Sphericity

Kaiser-Meyer-Olkin (KMO) of Sampling Adequacy		**0.828**
Barlett's Test of Sphericity	Approx. Chi-Square	810.164
	Df	36
	Sig.	0.000

Table 4 shows how much of the variability in the data has been modelled by the extracted components. The result indicates that two components have eigenvalues greater than 1, which is a standard criterion for determining whether a component is beneficial. Fig. 2 shows that the eigenvalues of the first two principal components are greater than 1. According to Table V, these two components explain 54.813% of the variation in the data. After the second principal component, the eigenvalues begin to form a straight line, as shown in the scree plot. If 54.813 % of the variation in the data can be explained, the first two principal components should be used.

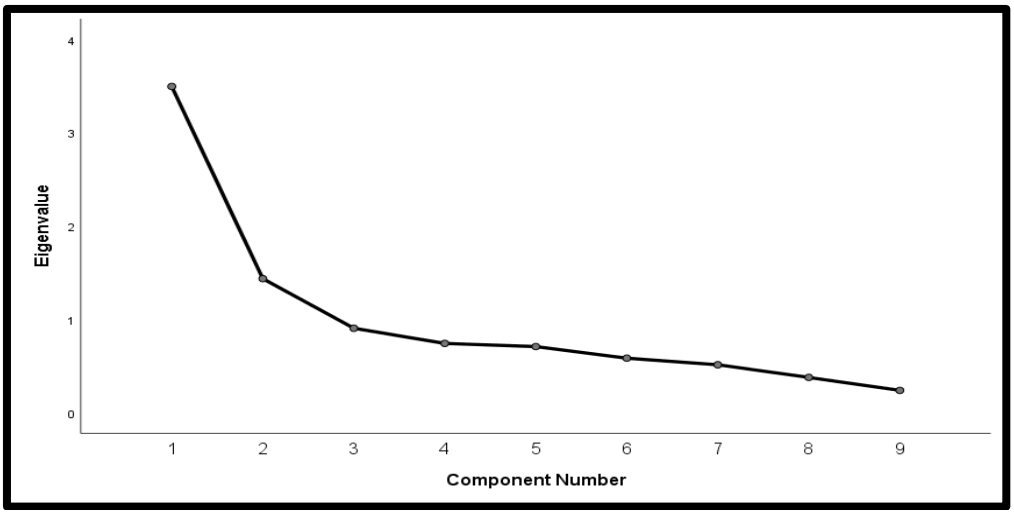

Figure 2: Scree plot of the number of components in the principal components analysis

Table 4: The Total Variance Explained

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	3.497	38.851	38.851	3.497	38.851	38.851
2	1.437	15.962	54.813	1.437	15.962	54.813
3	0.905	10.052	64.866	NA	NA	NA
4	0.742	8.244	73.110	NA	NA	NA
5	0.708	7.863	80.973	NA	NA	NA
6	0.584	6.486	87.459	NA	NA	NA
7	0.513	5.701	93.160	NA	NA	NA
8	0.377	4.192	97.352	NA	NA	NA
9	0.238	2.648	100.00	NA	NA	NA

Extraction Method: Principal Component Analysis

Based on Table 5, the first principal component has large positive associations with Electronic Goods, Vehicle accessories, Clothes, Home Appliances, Petrol and Personal Hygiene, so this component primarily measures and categorizes as Other Needs. The second component has a

Volume: 7 Issues: 41 [July, 2022] Special Issues pp. 327 - 339
International Journal of Accounting, Finance and Business (IJAFB)
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large positive association with Wet Food, Dry Food, and Medications, so this component primarily measures and categorizes as Basic Needs.

Table 5: Component Matrix Of 2 Components Extracted

	Component	
	1	2
Electronic Goods	0.856	
Vehicle accessories	0.814	
Clothes	0.757	-0.303
Home Appliances	0.708	
Petrol	0.605	
Personal Hygiene	0.531	0.475
Wet Food		0.606
Dry Food	0.303	0.550
Medications	0.510	0.522

Extraction Method: Principal Component Analysis

Determining the most contributing factor that influences the type of goods during panic buying Fig. 3 shows that the mean of Basic needs (3.38) is higher than mean of other needs (2.22). According to (PÃ¤rson & Vancic, 2020), in Austria, sales of storable foods increased by 20% in week 9 of 2020 as compared to week 9 of 2019. Ready meals, pasta sauces, pasta, wheat, canned vegetables, and fish are among the items on this list. Frozen products show a clear increase as well, but not as much as those that can be stored without further refrigeration. In Malaysia, panic buyers use their lunch breaks to stock up on milk, instant noodles, sugar, flour, and, of course, bread but not Gardenia bread, because the early buyers had already grabbed up all the Gardenia bread (Rashid, 2020). Since it's the first phase of Movement Control Order (MCO), more people stock up on basic needs such as dry food, wet food, and medications.

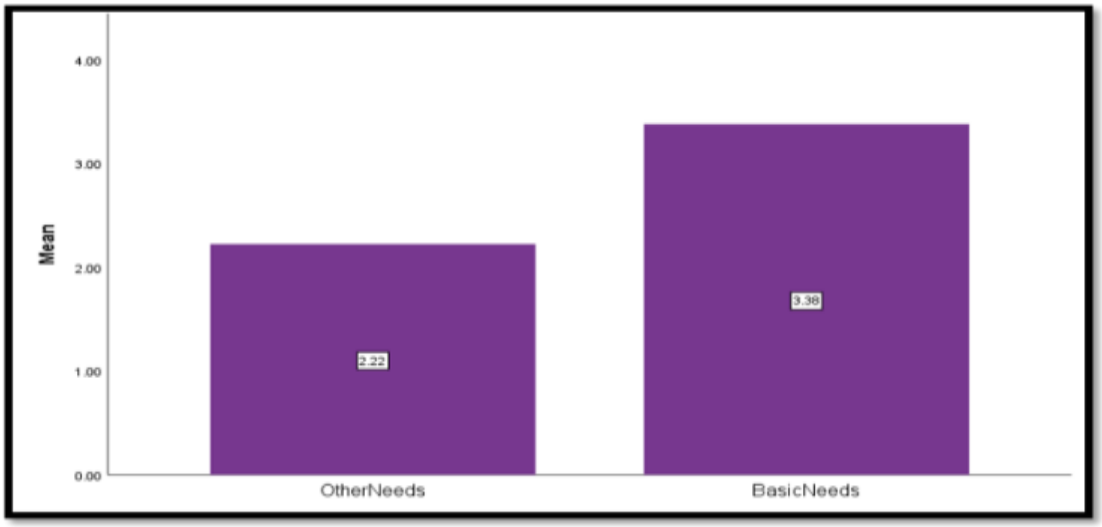

Figure 3: Overall sample of the average response for the type of Goods in each component from the Principal Component Analysis

Volume: 7 Issues: 41 [July, 2022] Special Issues pp. 327 - 339
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Binary Logistic Regression Analysis Using Forward Selection Method

Table VI shows the Cox & Snell R2 and Nagelkerke R2 values which test the overall goodness of fit of the model. In this study, we rely on the Nagelkerke R2 measure, which is the modified form of Cox & Snell R2. The Nagelkerke R2 value is 13% which indicates a poor fit of the model. The poor fit is acceptable as the low value in R2 for binary logistic regression is normal (Hosmer et al., n.d.).

Table 6: The Pseudo R2 For Forward Selection Method

Cox & Snell R^2	Nagelkerke R^2
0.06315	0.1300

Table 7 displays the Hosmer-Lemeshow test which is a goodness of fit test for logistic regression. The result shows that the p-value is equal to 0.2695 which is greater than the level of significance at 5%. This indicates that the data fit the model well.

Table 7: Hosmer-Lemeshow Test For Forward Selection Method

Chi-Square	df	Sig.
9.9369	8	0.2695

Table 8 displays the results of the binary logistic regression model using the forward selection method. Only one variable is significant. The significant variable is B40 with a p-value equal to 0.0314. The Akaike Information Criterion (AIC) value for fitted models using the forward selection method is 209.8395.

Table 8: Results of binary logistic regression model using forward selection method

	β	S.E (β)	Z value	Sig.
Constant	3.6105	1.9101	1.8900	0.05870
Gender				
Male	-0.03391	0.4335	-0.07800	0.9377
Female (Ref)				
Age				
Young Adults	-0.9160	0.6390	-1.4340	0.1517
Middle-aged Adults	1.2558	0.8938	1.4050	0.1600
Old-aged Adults (Ref)				
Income				
B40	1.6280	0.7564	2.1520	0.0314
M40	1.2421	0.7868	1.5790	0.1144
T20 (Ref)				
Residential Area				
Rural	0.3851	0.4841	0.7950	0.4264
Suburbs	0.5464	0.5523	0.9890	0.3226
City (Ref)				
Buying Center				
Supermarket	0.1945	0.6478	0.3000	0.7639
Convenience Store	1.2765	1.1927	1.07000	0.2845
Grocery Store	0.3351	0.7003	0.4790	0.6323
Public Market	-0.04212	0.8889	-0.04700	0.9622
Buy Online (Ref)				

Volume: 7 Issues: 41 [July, 2022] Special Issues pp. 327 - 339
International Journal of Accounting, Finance and Business (IJAFB)
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Household Size	-0.02536	0.09011	-0.2810	0.7784
Other Needs	0.1312	0.4052	0.3240	0.7461
Basic Needs	-0.8783	0.5331	-1.6470	0.0995

Binary Logistic Regression Analysis Using Backward Selection Method

In Table 9, the Nagelkerke R2 value is equal to 9.68% which indicates a poor fit of the model. The poor fit is acceptable as the low value in R2 for binary logistic regression is normal (Hosmer et al., n.d.).

Table 9: The Pseudo R2 For Backward Selection Method

Cox & Snell R^2	Nagelkerke R^2
0.04702	0.09683

The result in Table 10 shows that the p-value is equal to 0.2290 which is greater than the level of significance at 5%. This indicates that the data fit the model well.

Table 10: Hosmer-Lemeshow Test For Backward Selection Method

Chi-Square	df	Sig.
10.5430	8	0.2290

Table 11 displays the results of the binary logistic regression model using the backward selection method with 2 variables being significant. The significant variables are Young Adults with a p-value equal to 0.0051 and B40 with a p-value equal to 0.0114. Variable M40 and Basic Needs are not significant since the p-value is more than 0.05. The Akaike Information Criterion (AIC) value for fitted models using the backward selection method is 194.9593.

Table 11: Results Of Binary Logistic Regression Model Using Backward Selection Method

	β	S.E (β)	Z value	Sig.
Constant	4.1454	1.6844	2.4610	0.0139
Age				
Young Adults	-1.5036	0.5371	-2.7990	0.0051
Old-aged Adults (Ref)				
Income				
B40	1.8659	0.7374	2.5300	0.0114
M40	1.4178	0.7553	1.8770	0.0605
T20 (Ref)				
Basic Needs	-0.7484	0.4971	-1.5060	0.1322

Comparison between Forward Method and Backward Method

Table 12 shows the comparison of two fitted models which are the Forward Selection Method and Backward Selection Method. The best model was chosen with the lowest Akaike Information Criterion (AIC) value. Thus, the backward selection method is the best model with a lower AIC value of 194.9593 as compared to the forward selection method with AIC value equals to 209.8395. Since the backward selection method is the better fitted model, therefore the significant factors that contribute to panic buying are determined by Young Adults and B40 households.

Volume: 7 Issues: 41 [July, 2022] Special Issues pp. 327 - 339
International Journal of Accounting, Finance and Business (IJAFB)
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Table 12: Comparison of The Two Models

	Forward Selection Method	Backward Selection Method
Cox & Snell R^2	0.06315	0.04702
Nagelkerke R^2	0.1300	0.09683
Hosmer-Lemeshow (p-value)	0.2695	0.2290
Significant Variables	B40	Young Adults, B40
AIC	209.8395	194.9593

Table 13: Results of Binary Logistic Regression Model Using Backward Selection Method With Odds Ratio

	β	S.E (β)	Z value	Sig.	Odds Ratio
Constant	4.1454	1.6844	2.4610	0.0139	63.1418
Age					
Young Adults	-1.5036	0.5371	-2.7990	0.0051	0.2223
Old-aged Adults (Ref)					
Income					
B40	1.8659	0.7374	2.5300	0.0114	6.4619
M40	1.4178	0.7553	1.8770	0.0605	4.1279
T20 (Ref)					
Basic Needs	-0.7484	0.4971	-1.5060	0.1322	0.4731

In this study, the only significant factors that contribute to panic buying is determined by Young Adults and B40 households, whereas other factors are not significant. This result is aligned with the findings in Germany where younger groups scored higher on panic buying behaviour than the older groups (Zhang & Zhou, 2019). The results obtained in this study is also supported by (Yoshizaki et al., 2020) where it is found that there is a relationship between panic buying and per capita income where the low incomes regions in Sao Paulo City tend to panic buy more than the high-income regions. This study does not find any significance between gender and panic buying which is supported by a study from Nanyang Technological University in Singapore (Jessie, 2021). The study reported that gender does not have a significant impact on panic buying and only individuals with higher incomes are more likely to panic buy as they have more buying power and are able to spend more on the goods. In terms of household size not being a significant factor, similar result was obtained by (Ralte et al., 2021) where the number of family members was reported to be not significant with panic buying during COVID-19 pandemic.

However, the results of this study do defer from a study carried out in the United States, where it is reported that younger generations do not practice panic buying and they believe themselves to be less vulnerable to get COVID-19 (Chua et al., 2021). There seem to be a contrast in the result of residential area where a research done by (Bentall et al., 2021) found that residential areas were associated with panic buying and over purchasing and people living in urban areas having higher purchasing scores than in rural areas.

Conclusion and Recommendation

As a conclusion, this study shows the panic buying behaviour of Malaysian households at the first phase of MCO during the COVID-19 pandemic. According to (Eva et al., 2020), panic buying has also been related to emotions of uncertainty and instability in situations where

Volume: 7 Issues: 41 [July, 2022] Special Issues pp. 327 - 339
International Journal of Accounting, Finance and Business (IJAFB)
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people are worried about the pandemic. People are unsure when the pandemic will stop, so stocking up on basic needs is one way to alleviate their worry. This behaviour may affect the retailers in preparing enough supply of their goods and preventing stockouts. A principal component analysis test was performed to determine the most important contributing factor that influences the type of goods purchased during panic buying. The result based on 300 respondents shows that the data can be divided into two components; categorized as other needs and basic needs. By comparing the means of these two components, basic needs were found to be the most important factor that contributes to panic buying for the type of goods. After that, a binary logistic regression model was done to identify significant factors that contribute to panic buying. Forward and backward selection method was used for this study. After comparing both selection methods, it is found that the backward method is the best model due to the lower AIC value. As a result, the significant variables where Malaysian households were involved in panic buying was found to be young adults and B40 groups.

People often buy more foods and medicine as it is a crucial thing for survival and there were many empty shelves of foods such as bread and canned foods. Hence, it is aligned with our result where the households are more prone to buy basic needs which includes wet food, dry food, and medications rather than other needs such as electronic goods, vehicle accessories, clothes, home appliances, petrol and personal hygiene which people can live without. Besides, young adults have more social media exposure and they tend to easily follow behaviour of the crowds. As a consequence, they panic buy after hearing the news of the crowds hoarding and news of empty shelves on the net. People from M40 and T20 groups tend to shops more on a normal day because they have more money to be spent on. However, during the MCO, the low-income group, B40 tends to panic buy instead of the high-income group. The reason is because the B40 groups are quick to analyze the situation and only spent more when it is in an emergency.

For future research, other factors that may lead to panic buying should be considered such as psychological factors including depression, anxiety, and stress. Moreover, it is recommended for future research to include other demographic profiles such as the individual's nature of the occupation. There is a possibility that individuals with medical backgrounds do not practice panic buying as they are more aware of how the crowds from supermarkets would affect them and their families. Besides that, other essential workers may also not practice panic buying because they are working during office hours and by the time they clock out of work, there is limited time to panic buy since most stores are almost close because of the short operation hours during a pandemic. In addition, it is recommended for future studies to adopt a longitudinal study on panic buying behaviour. This is because the panic buying behaviours of an individual may change from time to time because of many changeable influences. This also includes conducting studies for other phases of Movement of Control Order (MCO) as well. Panic buying may be decreasing the later the MCO phase because most of the respondents must have been well prepared with stocks of goods unlike during the first MCO phase. Last but not least, panic buying may again occur in the future because there are many new variants of COVID-19 discovered from time to time. Thus, it is important to continue analyzing future developments surrounding this new global phenomenon, so that it can give some implications to the policymakers, retailers, and health professionals for developing suitable policies and strategies to prevent panic buying.

Volume: 7 Issues: 41 [July, 2022] Special Issues pp. 327 - 339
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