An E-Commerce Marketing Decision Matrix Tool Using Consumer-Behavior Analysis During Pandemic

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Abstract

Nowadays, Filipino online consumers are turning towards e-Commerce for retail acquisition, especially in the pandemic where Micro, Small, and Medium Enterprises or MSMEs are affected. MSMEs make up 99.5% of the total businesses in the Country. Due to the pandemic, most MSMEs in the Country faced adversities that resulted in temporary closures or running on limited operations in compliance with the government protocols imposed for restricting the spread of the virus. The proponents focused on the Wholesale and Retail sectors since they are the most affected by the setbacks brought on by the pandemic. Hence, the study aims to identify the significant factors affecting consumers' purchase intention. The results gathered are analyzed using Exploratory Factor Analysis to assess the underlying factors present in the study. A total of thirteen (13) variables were selected from the review of related literature. Exploratory Factor Analysis revealed that only nine (9) variables were significant. Moreover, the nine variables were divided into two (2) resulting factors. The two resulting underlying factors were analyzed based on the relationship of the variables under these factors and were named Present Hedonism and Platform Reliability through Thematic Analysis. The proponents utilized Analytic Hierarchy Process to determine the designated weights per variable under the two factors to complete the e-Commerce marketing decision matrix tools. The e-Commerce marketing decision matrix tools would help MSMEs maximize their digital footfall and profits.

Keywords

Analytic Hierarchy Process, Decision Matrix, Exploratory Factor Analysis, MSME, Purchase Intention

1. Introduction

Globally, MSMEs are responsible for 70% of global employment and 50% of the GDP, which shows their significance in the global economy. Unfortunately, the pandemic affected MSMEs significantly with out of the 1000 MSMEs surveyed, 75% of them are struggling in terms of their revenue, and 70% of them had to shut down (International Labour Organization, 2021). In the Philippine Setting, MSMEs make up 99.5% of the Country's total businesses, which would show how significant MSMEs are in the business sector. However, most MSMEs resulted in temporary closures or ran on limited operations (Kapunan, 2021). In addition, Shinozaki and Rao (2021) conducted a study showing that the wholesale and retail sectors were the most affected by the pandemic, where 21.8% of the firms were temporarily closed. Those MSMEs who continued their operations during the lockdown had to face a significant drop in sales, with 27.7% of them being microenterprises, 43.6% being small firms, and 41.0% being medium-sized firms encountered a decrease in sales of over 30%. The reduction of sales happened in March 2020, the start of the lockdown. The study can contribute specific approaches and tactics analyzed from prevailing businesses that MSMEs can use to release the reins towards maximizing their potential. They can also tap their competitiveness as they indulge their business ventures from the transition they would take part in from the traditional brick-and-mortar store into the eCommerce market. MSMEs could also determine the necessary ways of adapting and catering to how customers behave. Moreover, the study could also offer marketing strategies that would help MSMEs regain their footing from the adversity that the pandemic has brought upon the economy.

1.1 Objectives

The present study aims to establish a decision matrix tool for MSME wholesale and retail owners to help them with their marketing strategies to prevent temporary closures when a crisis arises. This research can aid new MSME entrants in the eCommerce industry by maximizing their digital footfall using the marketing decision matrix.

The study also wishes to pursue the following objectives: (1) To assess the dominant factors that influence the purchasing behavior of the consumers through the review of related literature. (2) Identify the significant factors prevalent during and before the pandemic. (3) Utilize Exploratory Factor Analysis of the gathered data. (4) Identify the underlying factors from the set of measured variables that affect purchase intention. (5) Translate the findings into a decision matrix that MSME owners can use to help with the effects of the pandemic on their business.

2. Literature Review

2.1 Effect of the Pandemic on MSMEs

In a report published by the Lagasca (2020) from the Congressional Policy and Budget Research Department of the Philippines or CPBRD, MSMEs are deemed a vital part of the economy in the Philippines and different parts of the world. MSMEs alone generated 35.7 percent of the country's GDP in 2018, according to the Department of Trade and Industry (DTI). MSMEs produced 5.7 million jobs in 2018 and are classified into three (3) categories: Micro, Small, and Medium Enterprises. Altogether, MSMEs are enterprises with employee sizes of less than 200 with less than P100 million in asset size. The current pandemic has brought an unanticipated situation for the whole world, specifically, for major industries that forced the business setting to be altered. Due to this phenomenon, micro, small, and medium enterprises (MSME) face drastic impacts, unlike more prominent organizations. MSMEs are usually the ones who run into hurdles and challenges when faced with a crisis. They suffer longer and experience recovery much slower, according to the United Nations Office for Disaster Risk Reduction (UNDRR) (Flaminiano et al. 2021).

2.2 Factors affecting purchase intention in eCommerce (Pre and During Pandemic)

Throughout the years, countless studies have been conducted studying factors affecting consumer behavior towards online shopping. Some elements were only present before the COVID-19 pandemic, while some are still prevalent, such as hedonic values, convenience, and product characteristics. Hedonic values are described as the experience-based enjoyment that the consumer feels during online shopping. Korkut and Sokic (2020) and Tunsakul (2020) identified hedonic values as one of the most significant factors that play a vital role in consumer behavior. Furthermore, Koch et al. (2020) has also determined in their studies that hedonic values are still present today among online shoppers. Lastly, convenience is the ease of use in online shopping services. It positively affects the purchase intention of the consumer shopping online. Nowadays,

since people online are more accustomed to using online applications, they are most likely to purchase everything online since it is easier for them to do so (Pham et al. 2020). It is deemed as a huge contributor to motivate consumers' behavior in the online shopping platform due to its benefits of time-saving, 24/7 availability, flexibility, and the ability to avoid crowds of people while in the confines of their own homes (Akram 2018).

2.3 Theoretical Framework

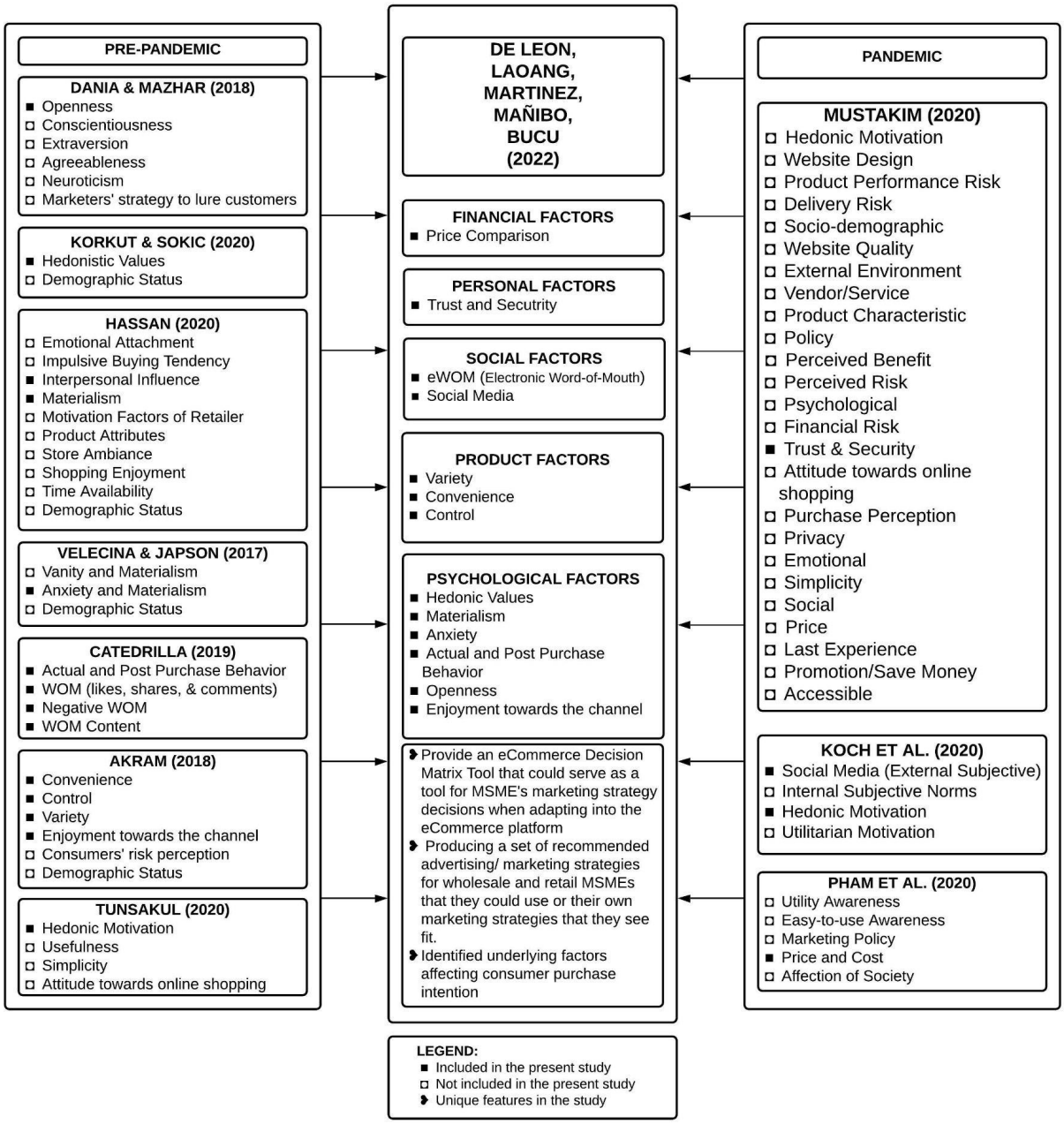

Figure 1. Theoretical framework

Figure 1 shows the theoretical framework wherein it displays the factors present pre-pandemic and during the pandemic based on the review of related literature. Compared to the previous related literature, the present study can provide a decision matrix that could serve as a strategic marketing tool for MSMEs entering the eCommerce

industry. The decision matrix will enable the MSME owners to decide which marketing strategy alternative they should utilize for their respective businesses in terms of the criterion of analyzed factors.

3. Methods

Upon accomplishing the review of related literature, the proponents identified different problems that can be formulated, along with the filtering of associated variables tested in the study; the variables in question are modified into a survey questionnaire to test for the hypotheses. The study used a survey questionnaire method for data collection; the said technique is used for the target respondents to assess the different factors that influence purchase intention among consumers. The survey questionnaires are disseminated through social media platforms such as Facebook and Instagram, where a "call for respondents" is posted. After receiving the questionnaire, respondents were asked to complete a structured questionnaire containing measurement items of the identified factors that affect consumers' purchase intention towards online shopping. The measurement items included 14 questions, as presented in Table 1. A six-point Likert scale ranging from "strongly disagree" to "strongly agree" was used to measure the items. Second, the study also used an individual interview with MSME owners, which is held via zoom meetings to discuss the allocation of the weights with the identified factors.

Table 1. Survey question references

	QUESTIONS	SOURCE
Social		
1.	Products that are spoken favorably and positively on social media affect my purchase intention	(Catedrilla, 2019)
2.	The opinion/s on a product from those people whom I value affects my purchase intention.	(Koch, 2020)
Personal		
1.	Feeling secure in providing my bank card details to a payment platform when shopping online affects my purchase intention	(Zhang, 2011)
Financial		
1.	Having the ability to compare prices online to find cheaper items affects my purchase intention.	(Zhang, 2011)
Product		
1.	Having a wide variety of products to choose from when shopping online affects my purchase intention.	(Zhang, 2011)
2.	Having the ability to purchase products online whenever or wherever you are affects my purchase intention.	(Zhang, 2011)
3.	Having the option to go back and forth easily between website pages whenever I want affects my purchase intention	(Zhang, 2011)
Psychological		
1.	When the thought of buying a product gives me a sense of enjoyment, it affects my purchase intention.	(Koch, 2020)
2.	Purchasing a product that I think impresses other people affects my purchase intention.	(Velecina, et al., 2017) (Velecina, et al., 2017)
3.	The feeling of pressure or anxiety affects my purchase intention.	
4.	Whenever I come across products that are suggested by online shopping websites and platforms (ex. Shopee, Lazada, Facebook, Instagram, etc.), it affects my purchase intention.	(Catedrilla, 2019)
5.	My satisfaction with the products that I've purchased before affects my purchase intention.	(Catedrilla, 2019)
6.	Products that are new/unique in the market affect my purchase intention.	(Dania and Mazhar, 2018)
7.	When I enjoy browsing for products on websites that are aesthetically attractive, it affects my purchase intention.	(Zhang, 2011)

3.1 Subject and Study Site

The study subjects are female Filipinos, specifically at the age of 25-39 years old, with a stable income that currently resides within the vicinity of Metro Manila. The said group is selected based upon the inferred data from the study conducted by Masigan (2020). It states that Female consumers hold the majority of the Filipino online shoppers, having 72% of the total demographics of the Country, consisting of age ranges between 25-35 years old yielding 45% of the total respondent and 38% of e-commerce transactions occur in Metro Manila alone.

The present study incorporated the Stratified Sampling of Female online shoppers ages 25-39 years old residing in Metro Manila. They have been deemed the primary respondents since they are the leading online shopping consumers. The proponents performed Stratified Sampling based on their local residency. The proponents clustered the respondents based on the 17 different cities and municipalities of NCR. Stratified sampling is applied to get the best representation of the data gathered, as seen in Table 2. The proponents used 100 samples as the minimum for the study. As Winter et al. (2009) suggested, the absolute minimum acceptable sample size is N = 50 for the Exploratory Factor Analysis, which is the technique that the proponents utilized.

Table 2. National Capital Region (NCR) population breakdown

Cities and Municipalities (Stratum)	Female (25-39 y/o)	Percentage	Target No. of Respondents
City of Caloocan	104,851	10.41%	10
City of Las Pinas	47,901	4.75%	5
City of Makati	61,612	6.12%	6
City of Malabon	23,544	2.34%	2
City of Mandaluyong	34,956	3.47%	3
City of Manila	131,591	13.06%	13
City of Marikina	35,663	3.54%	4
City of Muntinlupa	39,746	3.95%	4
City of Navotas	15,080	1.50%	1
City of Paranaque	58,832	5.84%	6
City of Pasig	65,976	6.55%	7
City of San Juan	11,813	1.17%	1
City of Taguig	63,466	6.30%	6
City of Valenzuela	44,647	4.43%	4
City of Pasay	36,884	3.66%	4
Pateros	5,095	0.51%	1
Quezon City	225,818	22.41%	22
TOTAL	**1,007,475**	**100.00%**	**100**

3.2 Mode of Data Analysis

The study used the following analysis for the completion of the study: (1) **Multivariate Analysis** (MVA), (2) **Exploratory Factor Analysis**, (3) **Analytic Hierarchy Process** (AHP), and (4) **Thematic Analysis**. Multivariate Analysis is a set of analyzing techniques used for more than one variable data analysis. MVA is used in the study, specifically the Analysis of Interdependence, since several independent variables are analyzed in terms of their relationship.

On the other hand, Exploratory Factor Analysis is applied to identify the underlying factors (latent variables) that influence observed variables or, in the present study, the purchase intention of consumers (Watkins, 2018). Analytic Hierarchy Process (AHP) is then utilized to identify the associated weights that each variable or element possessed. The determined weights are then used to complete the e-Commerce Marketing Matrix Tools. Lastly,

the study used. Thematic Analysis to relate the variables resulting from the factors produced in the exploratory factor analysis and determine the relationship between the variables under these factors.

4. Results and Discussion

4.1 Numerical Results

4.1.1 Communality Analysis

Table 3. Initial communality analysis

Communalities (First Attempt)		
Variables Identified	**Initial**	**Extraction**
Price Comparison	0.433	0.304
Trust and Security	0.324	0.286
Electronic Word-of-Mouth	0.436	0.409
Social Media	0.461	0.387
Variety	0.422	0.389
Convenience	0.666	0.686
Control	0.626	0.664
Hedonic	0.643	0.699
Materialism	0.500	0.571
Anxiety	0.486	0.546
Actual and Post Purchase Behavior	0.578	0.658
Openness	0.575	0.511
Enjoyment towards the Channel	0.591	0.562
Extraction Method: Principal Axis Factoring		

Table 4. Final communality analysis

Communalities (Second Attempt)		
Variables Identified	**Initial**	**Extraction**
Price Comparison	**Removed**	
Trust and Security	**Removed**	
Electronic Word-of-Mouth	0.382	0.402
Social Media	**Removed**	
Variety	**Removed**	
Convenience	0.651	0.752
Control	0.581	0.635
Hedonic	0.592	0.669
Materialism	0.485	0.558
Anxiety	0.462	0.557
Actual and Post Purchase Behavior	0.567	0.660
Openness	0.518	0.533
Enjoyment towards the Channel	0.579	0.589
Extraction Method: Principal Axis Factoring		

As the present study applied the research of Osborne, Costello, and Kellow (2008), the values shown in the communality table should have values of no less than 0.4; otherwise, they should be excluded. On the other hand, the communality values below 0.2 should be excluded from the analysis (the values under the extraction column as seen in the result tables above) Child (2006). The proponents used the value of 0.4 as the reference on when to exclude variables from the analysis (Table 3).

From a study conducted by Pett et al. (2003), it is indicated that several criteria exist to determine if an item is to be included or excluded. The researcher should examine first the communalities in each variable. The values indicated in the communality serve as the amount of variance. Problems are present when the value results of the communality are either too high or too low. Communality values equal to or surpassing 1.0 indicate a situation where the researcher either extracted too many factors or the initial sample size from the data collected was too small. If the communality values are close to zero, associated variables might be an outlier and distract the model. Communality values between .4 and 1.0 indicate that these variables should be retained, as the extracted factors explain much of the common variance. As seen in Table 3, the communality value for variables Price Comparison

(0.304), Trust and Security (0.286), Social Media (0.387), and Variety (0.389) indicate that they should be excluded from the analysis. Their values are less than 0.4, which suggests that these variables might be an outlier and distracting to the model. Hence, the proponents removed these variables and modified the data. The adjusted results are shown in Table 4; communality values are over 0.4 for all variables.

4.1.2 Total Variance Explained

Table 5. Total variance

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
Factor	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**
1	4.281	47.569	47.569	3.886	43.181	43.181	3.312
2	1.855	20.608	68.177	1.467	16.298	59.479	2.811
3	0.668	7.426	75.604				
4	0.521	5.786	81.389				
5	0.426	4.731	86.121				
6	0.396	4.399	90.520				
7	0.346	3.843	94.363				
8	0.273	3.029	97.392				
9	0.235	2.608	100.000				

Extraction Method: Principal Axis Factoring

In general, factors consisting of an eigenvalue of 1 and above can be considered significant because most of the variance between the data is encompassed within these factors. In Table 5, Factor 1 and Factor 2 show that most of the variance between the variables is seen within the two factors. Factor 1 has a total eigenvalue of 4.281, and when divided by the number of variables, it depicts a total variance of 47.57%. Meanwhile, Factor 2 has a total eigenvalue of 1.855 and accounts for about 20.61% of the total variance between the factors when divided by the total number of variables (n = 9).

4.1.3 Structure Matrix

According to Statistics Solutions (2021), the structure pattern matrix presents the correlations between the variables and the factors. Table 6 illustrates the correlation of variables in the study and their correlation to the factors identified in the analysis. Based on the figure on the left, Factor 1 comprises Electronic Word-of-Mouth (eWOM), Convenience, Control, and Hedonic Values. On the other hand, Factor 2 contains Materialism, Openness, Anxiety, Actual and Post Purchase Behavior, and Enjoyment towards the channel. This is based on which column has the highest score in each factor under consideration.

Table 6. Structure matrix

Structure Matrix		
	Factor	
Variables	1	2
Electronic Word-of-Mouth	0.618	0.336
Convenience	0.865	0.219
Control	0.797	0.269
Hedonic	0.817	0.225
Materialism	0.312	0.743
Anxiety	-0.035	0.693
Actual and Post Purchase Behavior	0.439	0.789
Openness	0.457	0.687
Enjoyment	0.618	0.632
Extraction Method: Principal Axis Factoring		

4.2 Graphical Results

Through the results from the Scree Plot, show the eigenvalues on the y-axis and the number of factors on the x-axis, which always shows a downward curve. The data gathered for the study indicates that a total of two (2) factors should be generated by the analysis. It can be seen in the graph where there is a slope of a curve that shows a significant leveling off or an elbow-like shape in Figure 2.

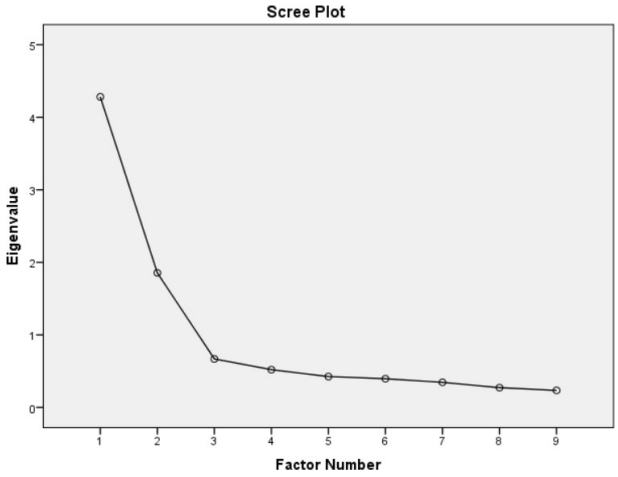

Figure 2. Scree plot

4.3 Thematic Analysis

Thematic Analysis, as identified by Maguire and Delahunt (2017), is the process of relating the variables under a particular termed factor that incorporates the overall patterns and theme that is recognizable throughout the identified factors. As for the present study, the data gathered identified a total of two (2) factors. The researchers relate each factor based on their interpretations in the following subsection.

4.3.1 Present Hedonism

Since Factor 1 comprises Electronic Word-of-Mouth (eWOM), Convenience, Control, and Hedonic Values, it can be said that these specific factors represent the sensation that an individual may have experienced as they get in on the act of e-Commerce transactions. Individuals can feel satisfaction from the convenience and control they possess whenever they browse e-commerce platforms. Concerning eWOM, an individual can empathize with other consumers and feel frustrated if the products they are aiming for are not of good quality in reality. Lastly, hedonic values or immediate gratification are perceived by customers whenever they are done checking out the items that they are hoping to get their hands on. That is why the proponents decided to dub Factor 1 as Present Hedonism. It is labeled as present hedonism because human beings can still experience this fulfillment that breaks down the boundaries of technologies that are widely used by this generation.

4.3.2 Platform Reliability

On the other hand, Factor 2 is coined as Platform Reliability. The second factor envelops the specific variables Materialism, Openness, Anxiety, Actual and Post Purchase Behavior, and Enjoyment towards the channel. This factor is tagged as platform reliability for a few reasons. Individuals would be able to try new products and

new items to ease their anxiety and a strong sense of success concerning their possessions if the platforms they are utilizing give them frequent updates, discounts, and more chances to discover new products. A reliable platform can also offer engagement with its consumers if they can post some reviews and interact with the sellers if there is a problem within the product itself.

4.4 Marketing Decision Matrix

According to Chang (2015), a Decision Matrix defines attributes, gauges them through assigned weights per criterion, and ranks the alternatives based on their respective weighted scores. The variables are rated based on numerical figures. In the proponents' case, the researchers used numerical statistics to rank the attributes or also referred to as the decision criteria.

The proponents produced two (2) marketing decision matrices—a Marketing Decision Matrix on Present Hedonism and a Marketing Decision Matrix on Platform Reliability. The first decision matrix is composed of variables such as Electronic Word-of-Mouth (eWOM), Social Media, Variety, Convenience, Control, and Hedonic Values; and the latter having variables such as Materialism, Openness, Anxiety, Actual and Post Purchase Behavior, and Enjoyment towards the channel as its decision criterion.

With the said variables that have been identified in the study, the decision matrix tool would not be applicable for the food sector since the related literature the proponents have utilized revolves around e-commerce that involves materials.

4.4.1 Analytic Hierarchy Process (AHP)

Analytic Hierarchy Process is a method for decision-making that uses a multi-criterion method that Saaty, 1980, has proposed. This technique includes assembling criteria into a hierarchical structure in assessing a problem. (Huang et al., 2019).

Before identifying the weights of each criterion, the proponents created a decision tree that entails the problem or the goal to be achieved once AHP comes into completion. As presented in figures 4.2.1 and 4.2.2, Present Hedonism (Factor 1) and Platform Reliability (Factor 2) consist of separate decision trees. After stating the goal, the second level of the decision tree comprises the significant variables under that factor. On the last level of the decision tree, the marketing strategies would be included.

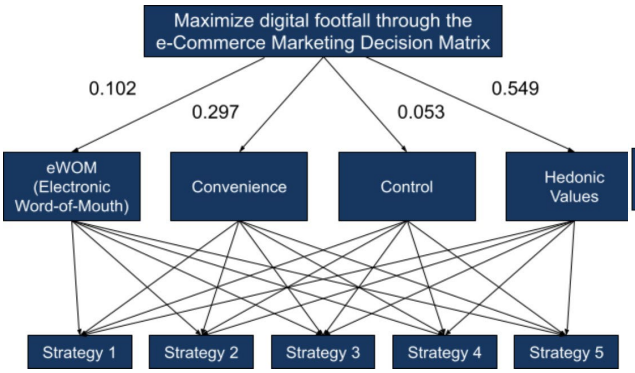

Figure 3. Completed AHP decision tree tree (Present Hedonism)

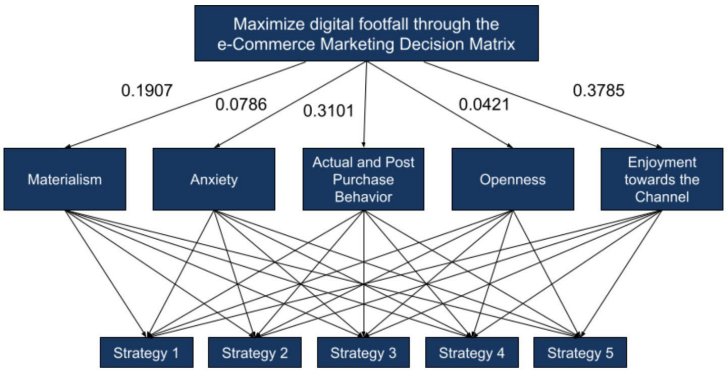

Figure 4. Completed AHP decision (Platform Reliability)

As a result of the Analytic Hierarchy Process, the proponents were able to identify the corresponding weight per criterion, Figures 3 and 4 present the completed decision tree for both Present Hedonism (Factor 1) and Platform Reliability (Factor 2) and final e-Commerce Decision Matrices on Present Hedonism (Table 7) and Platform Reliability (Table 8).

Table 7. e-Commerce decision matrix tool (Present Hedonism)

Marketing Decision Matrix (Present Hedonism)							
CRITERIA	**eWOM**	**Convenience**	**Control**	**Hedonic**	**TOTAL**	**WEIGHTED TOTAL**	**RANK**
Weights	10.20%	29.70%	5.30%	54.90%	100%		
Solution 1					0		
Solution 2					0		
Solution 3					0		
Solution 4					0		
Solution 5					0		

Table 8. e-Commerce decision matrix tool (Platform Reliability)

Marketing Decision Matrix (Platform Reliability)								
CRITERIA	**Materialism**	**Anxiety**	**Actual & Post Purchase Behavior**	**Openness**	**Enjoyment**	**TOTAL**	**WEIGHTED TOTAL**	**RANK**
Weights	19.07%	7.86%	31.01%	4.21%	37.85%	100%		
Solution 1						0		
Solution 2						0		
Solution 3						0		
Solution 4						0		
Solution 5						0		

5. Conclusions and Recommendations

The present study aims to institute a decision matrix tool for MSME wholesale and retail owners in aiding them with their marketing strategies and maximizing their digital footfall using the marketing decision matrix. The study started with thirteen (13) variables in question. IBM SPSS results revealed that the variables Social Media, Trust and Security, Price Comparison, and Variety are insignificant factors or outliers in the study, having communality values of less than 0.4.

The remaining variables were analyzed using Total Variance Explained and Scree Plot in identifying the two (2) underlying factors present. The proponents utilized Thematic Analysis and coined the two underlying factors as (1) Present Hedonism and (2) Platform Reliability. The first factor consists of Electronic Word-of-Mouth (eWOM), Convenience, Control, and Hedonic Values. On the other hand, the second factor incorporates Anxiety, Materialism, Actual and Post Purchase Behavior, Openness, and Enjoyment towards the Channel. Analytic Hierarchy Process (AHP) is used wherein the researchers designed decision matrices and individual interviews with MSME owners to generate and assign weights in the said factors. Afterward, the proponents established the marketing decision matrix tools following the study's primary objectives.

Lastly, the proponents believe that through the marketing decision matrix tools, e-Commerce business owners, specifically MSME owners transitioning from a brick-and-mortar setting, would be able to benefit significantly from the decision matrices because these tools would allow them to increase their digital footfall through the marketing strategies that would result from these tools in compliance with the decision criterion provided. The final product of the study can be seen in this document; Marketing Decision Matrix Tool Instructions.

Future studies could improve the methodology by incorporating other factors influencing purchase intention and identifying who represents most of the e-commerce consumer profile, preferably male and female respondents, based on recent studies and statistical information.

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Biography

Jonas De Leon is a dedicated undergraduate student pursuing a Bachelor of Science in Industrial Engineering at the University of Santo Tomas. He is currently a member of the Industrial Engineering Circle for almost 4 years in the said university. He also has a broad knowledge of using SPSS, SAP Business One, and Office software. His plans would involve aiming for further industrial engineering knowledge and experience.

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