PROBABILITY AND STATISTICAL DATA ANALYSIS

The Increase of Usage in e-Commerce Before and After Pandemic

SECI 2143

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Introduction

The pandemic has definitely taken a toll on every individual across the globe. Businesses are no exception during this pandemic. “Inside of every problem lies an opportunity.” -Robert Kiyosaki, and that’s how e-Commerce started to bloom more than before during this pandemic. In Malaysia, the country was in total lockdown for quite some time during the beginning of the pandemic , and the only source we Malaysians could rely on to get goods and services without contracting Covid-19 was e-Commerce. This is how this particular topic inspired us The Graph Gang to study about.

Therefore, we are interested to know how this pandemic affected people around Johor Residence. In order to solve this situation, we collected the data by spreading several questions to the public using an online survey. The goal of our study is to find the increase of usage in e-Commerce Before and After Pandemic. We noticed that online shopping behaviours are changing due to pandemic as people have embraced social distancing as a way to slow the spread of the Coronavirus. We were excited to know the answers of these questions so that we can analyse the usage of e-Commerce before and after pandemic. As a result, we distributed this questionnaire to the general public in order to reach as many people as possible.

Data Collection/Methodology

The sample data for this study were collected through electronic survey form by creating questions written in ,Google Forms. The link for the google form were then distributed among students for answering via Telegram & Whatsapp Application , with groups for UTM students. The Graph Gang managed to collect a total of 68 sample data after a week of distributing the link in various groups. We have attached the reference in appendix for along with the actual google form link .

Data of quantitative variables such as age, Satisfactory Level with E-commerce, duration of time used in e-Commerce Application, type of things usually bought in e-Commerce, payment method and many more are collected in this project. In other respects, qualitative or categorical variables are also created to allocate necessary information for analysis purposes. For instance, satisfactory level with e-Commerce and reliability of e-Commerce preferences by respondents.

The Questions and Level of measurement

	Questions	Answers	Level of Measurement
1	Gender	Male/female	Nominal
2	Age	Metric value	Ratio
3	Satisfactory Level with E-commerce	Very satisfied /Satisfied/Not Satisfied/Very not satisfied	Ordinal
4	Rate	Difficult/easy	Ordinal
5	Time used	Range of time	Interval
6	Application	shopee/lazada/amazon/others	Nominal
7	Type of things usually buy	Clothing/Electronics/Fashion Accessories/Groceries/Services e.gBill Payment//Others	Nominal
8	Money spent	Less than RM 5.00/ RM 5.00-20.00/ RM 20.00-50.00/ RM 50.00-100.00/ RM 100.00-200.00/ More than 200.00	Interval
9	Payment Method	E-wallet /Cash Payment at 7/11 / Netbanking /Credit/Debit Card/others	Nominal
10	Reliability of E-commerce	Trustworthy /Not trustworthy	Ordinal
11	I am shopping online more often than before pandemic..	Agree/Disagree	Ordinal
12	I tend to spend more on E-commerce during Sales than ordinary days.	Agree/Disagree	Ordinal
13	Payment Options	Installment /Cash on Delivery/Make complete Payment before receive product	Nominal
14	Shipping Option	J&T/City Link Express /Ninja Van/Poslaju/DHL eCommerce	Nominal

15	How this pandemic affected your life	Opinion	Nominal
16	e-commerce improvement	suggestion to improve	Nominal
17	E-commerce or Traditional commerce preference	E-commerce/Traditional commerce	ordinal
18	Why do you think the answer for question number 17 is better	The reasons why they choose the answer	nominal
19	Recommendation e-commerce to friends and family	Very unrecommended - very recommended	Ordinal
20	Safety sharing cards details	Not safe/safe	Ordinal
21	Do you agree that COVID-19 has brought successful financial impact for businesses	Strongly disagree/ Disagree/ Agree/ Strongly agree	Ordinal
22	Is e-commerce way much easier than traditional commerce?	Yes/No	Ordinal
23	When did you start using e-commerce	before pandemic/after pandemic	Ordinal
24	What influence you the most to buy the ecommerce products	Television/ Google advertising/ Social Media advertising/ Online forum/ Friends or Family/ Radio/ Newspaper/ Banner and flyer/ others	Nominal
25	Status	HS Student/ Undergraduate Student /Worker /Unemployee	Nominal

Data Analysis

Demographics

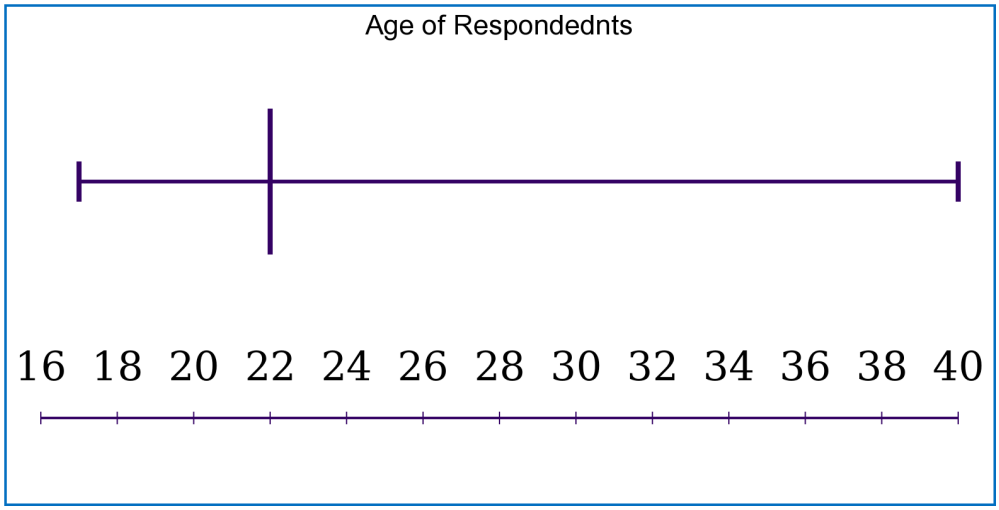

Figure 1: Box Plot of the age of respondents

The Box Plot has proven that the age group that uses e-Commerce application the most comes from the age group 20-24 years old with the percentage of 58.8 %. Meanwhile , the least percentage was from 35-39 years old with 1.15 % only. The respondents were given 6 options to choose from in the survey form which are 15-19 years old , 20-24 years old , 25-29 years old , 30-34 years old , 35-39 years old and above 40 years old. The Upper limit for the box plot is 17, the lower limit for the box plot is 40. Furthermore, the interesting fact about this Box Plot is that the First quartile , Median and Third quartile have the same value which is 22. Due to the same value for Third Quartile and First Quartile the Interquartile Range value is 0.

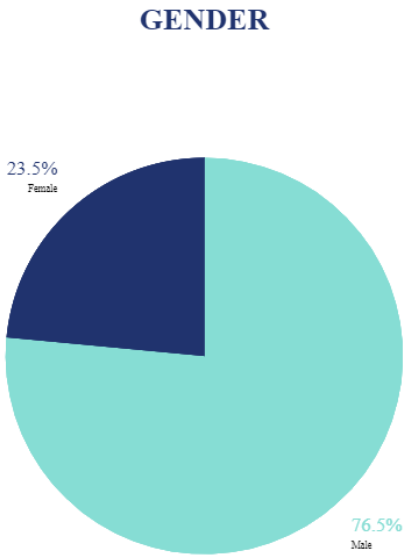

Figure 2: Pie chart of the gender of respondents

The Gender Pie Chart illustrates the proportion of two categories of genders who have answered the online survey conducted . Overall, The gender pie chart shows that the majority of respondents are males at 76.5%, outnumbering the females at 23.5% by 53%.

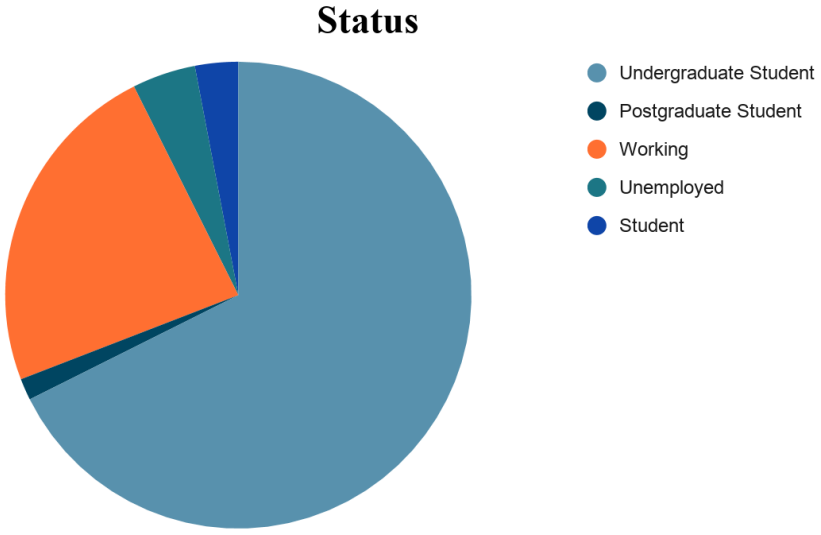

Figure 3: Pie chart of the status of the respondents

The pie chart above illustrates (Figure 3) the status of respondents including Undergraduate Student, Postgraduate Student, Working, Unemployed and Student. However, the highest percentage of status came from Undergraduate Student with 67.7% of the respondents and the rest is as 23.5% is from Working status, 4.4% from the Unemployed respondents, 3% from Student, and 1.5% from the Postgraduate Student.

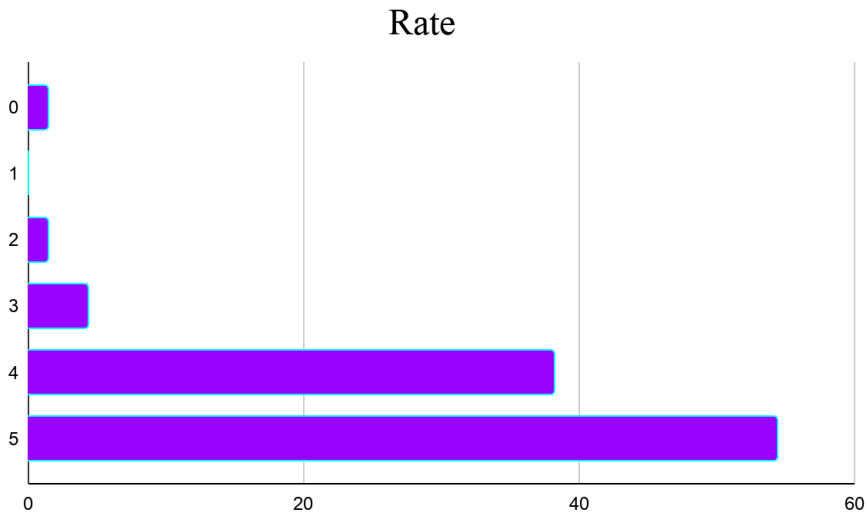

Figure 4: Bar chart of rate rated by respondents

Mode = 5

The respondents also were asked whether the application chosen is difficult or easy to use. Five scales were given from 0 to 5 based on the easiness in using e-Commerce. Based on the bar chart above, the figure shows that most of the respondents found the application is easy to use. As there were more than half respondents which was 54.4% of them rated 5 (very easy). On the other hand, around 38.2% of the respondents claimed that the applications are easy to use as they rated 4. Moreover, 4.4% of them rated number 3 as it was the average rating between easy and difficult. Nevertheless, there were 1.5% respondents rated number 2 and 1 which found that the applications are quite difficult to use. To summarize, the figures above show that most of them knew how to use those applications and were easy for them to use.

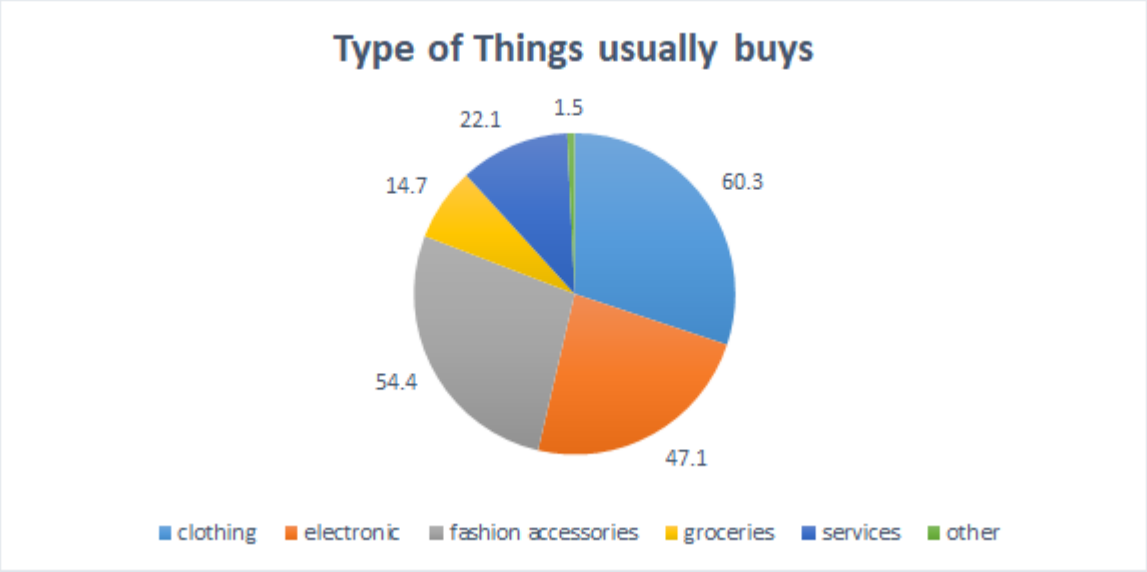

Figure 5: Pie chart of type of things respondents usually buys

The pie chart above represents types of things that 68% of respondents usually buy using e-commerce. As represented by the bar graph, 60.3% of the respondents usually buy clothes using e-commerce while 47.1% usually buy electronics, 54.4% of the respondents usually buy fashion accessories, 14.7% buy groceries and 22.1% of the respondents pay services for example bill payment. Other than that, 1.5% of the respondents include others as the type of things that they usually buy for example health and beauty, stationery, car accessories, skincare, vitamins, book and Kpop merch.

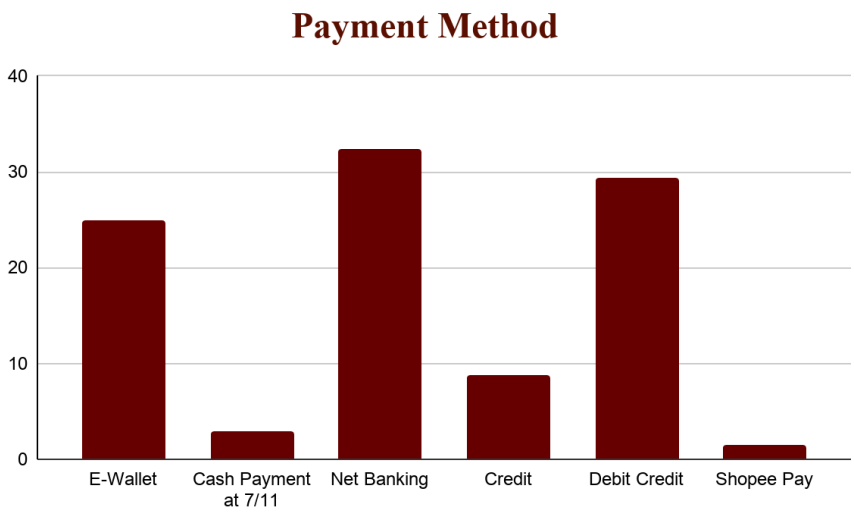

Figure 6: Bar chart of the payment method used by respondents

There were six types of payment methods stated in the bar chart that are usually use by e-Commerce users to pay for products bought. That is E-Wallet, Cash Payment at 7/11, Net Banking, Credit, Debit Card and Shopee Pay. According to this chart, 32.4% respondents chose Net Banking as their payment method. 29.4% of respondents claim that they use a debit card to make the payment. Another 17 (25%) respondents chose E-wallet while 6 (8.8%) said they usually use Credit to do the payment. Nevertheless, 2.9% of respondents always do Cash Payment at 7/11 while the lowest percentage goes to Shopee Pay which was only 1.5% of respondents chose it.

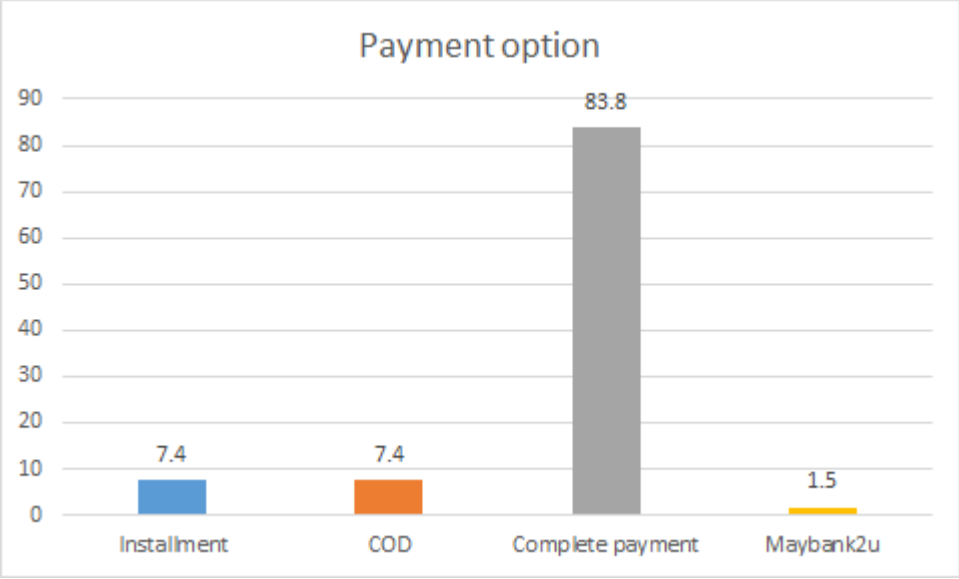

Figure 7: Bar chart of payment option by respondents

The bar chart above illustrates the payment option that 68 of our respondents preferred. Respondents were asked which payment option that they preferred when using e-commerce. The options include instalment, cash on delivery (COD), complete payment and maybank2u. Based on the bar chart above, 7.4% of the respondent preferred instalment and cash on delivery (COD) option, while 83.8% of the respondent which were majority of the respondents preferred to make complete payment before receiving the product. 1.5% percent of the respondent preferred payment option maybank2u.

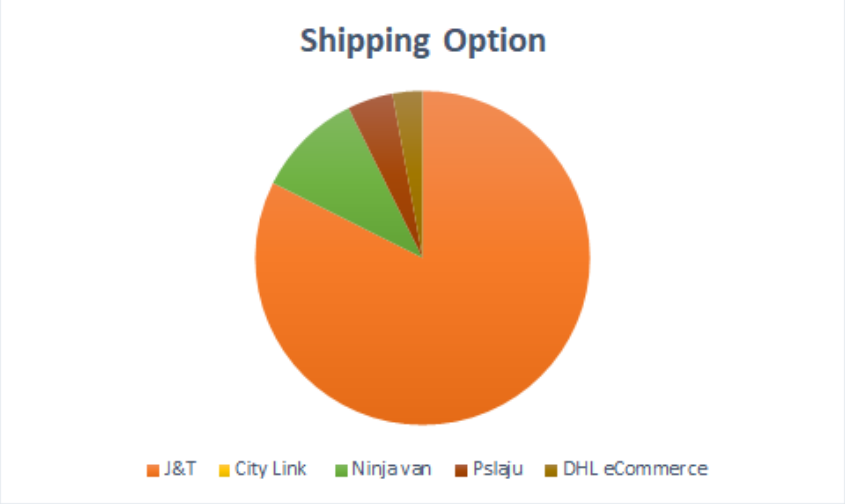

Figure 8: Pie chart of shipping options of the respondents

Based on the pie chart above, 68 respondents were asked about their preferred shipping option which include five options which are J&T, City link express, Ninja van, Poslaju and DHL eCommerce. Majority of the respondents which 82.4% preferred J&T as their courier while none of the respondents choose City link express. 10.3% of the respondents chose Ninja van as their shipping courier, 4.4% and 2.9% were Poslaju and DHL eCommerce respectively.

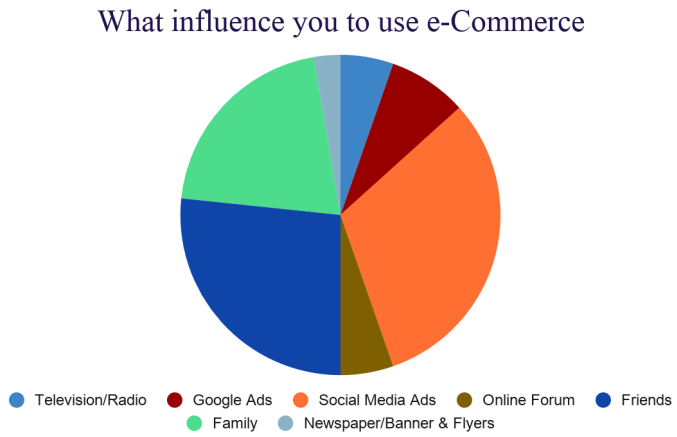

Figure 9: Pie chart of the things that influenced respondents to use e-Commerce

People nowadays gained trust to use e-Commerce in their daily life because of the great influences. Based on the pie chart, there were seven things that would influence e-Commerce users to buy products online, including Television/Radio, Google Ads, Social Media Ads, Online Forum, Friends, Family as well as Newspaper/Banner and Flyer. Social Media Ads occupied the highest percentage which was 69.1%. Other than that, people are also more influenced by Friend (58.8%) and Family (45.6%). While Google Ads recorded 17.6% of respondents influenced with, the other 11.8% for Online Forum, 11.8% for Television/Radio followed by Newspaper/Banner and Flyer occupied lowest percentage which was only 5.9%.

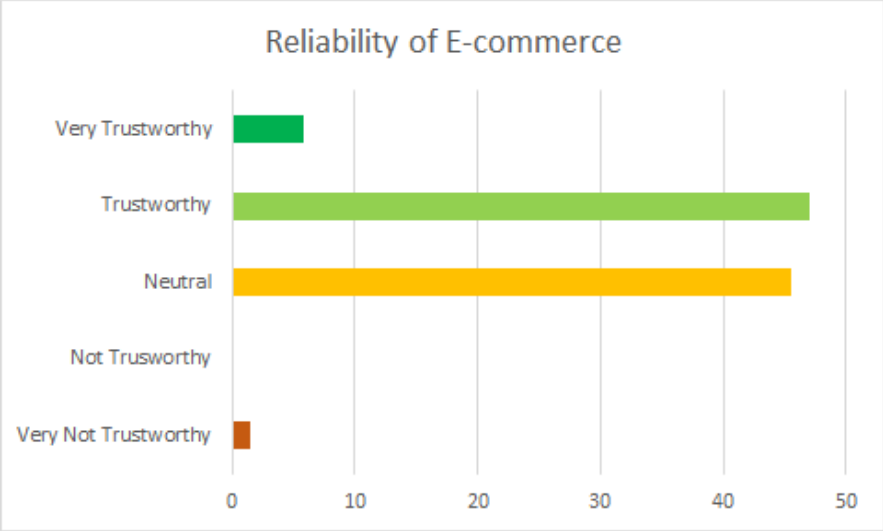

Figure 10: Bar chart of reliability of E-commerce of the respondents

The bar graph above represents the reliability of e-commerce towards the respondents. 68 respondents need to choose the reliability interval from not very trustworthy to very trustworthy. 1.5% of the respondents vote for not very trustworthy, 0% of the respondents vote for not trustworthy, 45.6% of the respondents vote for neutral , 5.6% of the respondents vote for very trustworthy while the most vote from the respondents is neutral which is 46%.

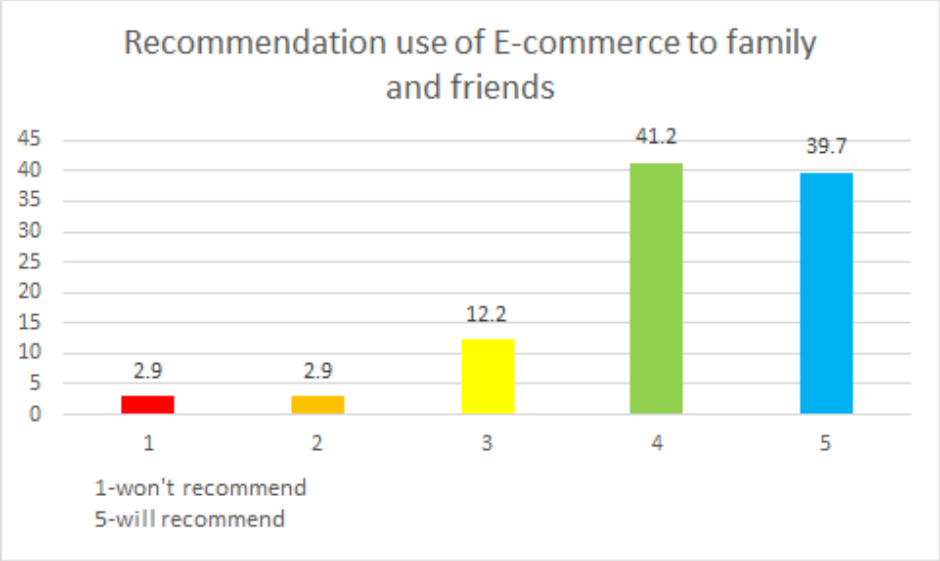

Figure 11: Bar chart of recommendation use of E-commerce to family and friends

The bar chart above illustrates how much the respondents will recommend the use of e-commerce to their friends and family. 68 of respondents have been asked to choose the scale from 1 to 5 where from scale 1 they won't recommend until scale 5 where they will recommend it to their friends and family. 2.9% of the respondents choose scale 1 and 2 where they do not prefer to recommend the use of e-commerce to their friends and family while 41.2% of the respondent where it was the highest percentage choose scale 4 where they likely will recommend it to their friends and family 12.2% of the respondents choose scale 3 where they will recommend to their friends and family and 39.7% of the respondents are very likely to recommend the use of e-commerce to their family and friends.

Figure 12 : Application That is Used for Shopping Online

Application	Frequency	Relative Frequency	Cumulative Frequency	Percentage (%)	Cumulative Percentage
Lazada	23	0.24	23	24.47	24.47
Shopee	61	0.64	84	64.89	89.36
Amazon	2	0.02	86	2.13	91.49
Zalora	2	0.02	88	2.13	93.62
Instagram	2	0.02	90	2.13	95.75
Tokopedia	3	0.03	93	3.19	98.94
Shein	1	0.01	94	1.06	100
Total	94	1.0	-	100	-

Table 1 : Application That is Used for Shopping Online

The Bar Graph shows that the majority of respondents are using Shopee Application at 64.89% , in contrast the application that is used the least is Shein with the percentage at 1.06%. The mode is Shopee Application with the highest frequency.

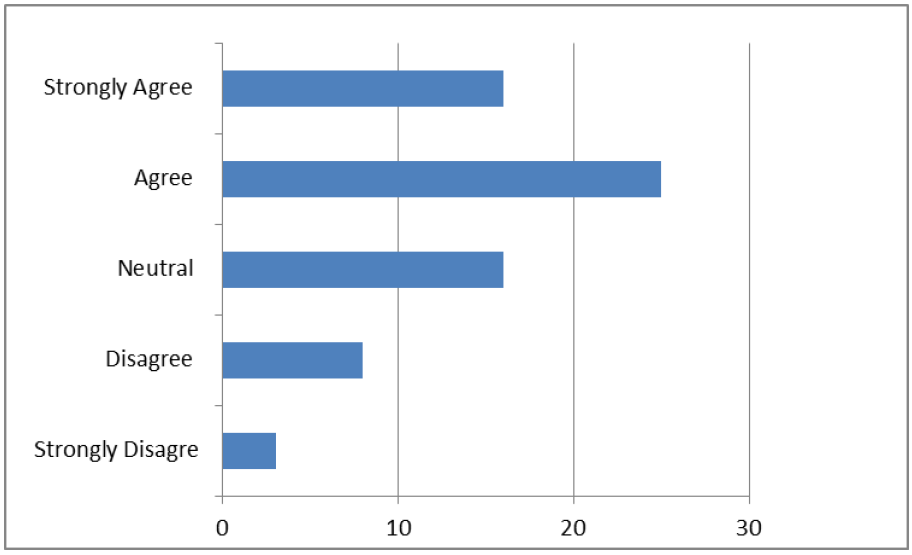

Figure 13 : The Usage of E-Commerce Before and After Pandemic

Based on this study, we found that the total percentage of the people who agree that they do online shopping more often than before pandemic hits approximately 60.28%; whereas 36.76% of the respondents agree and 23.52% strongly agree. On the contrary, 16.17% respondents believe that do less online shopping compared to before pandemic, whom 4.41% strongly disagree, and 11.76% disagree. Thus, we could conclude that most people doing online shopping more during this pandemic.

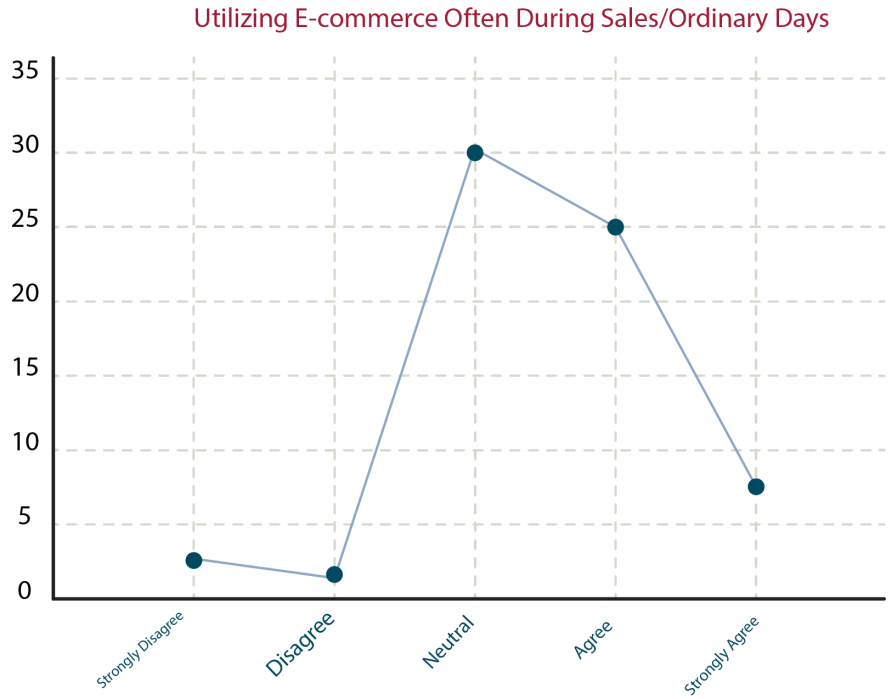

Figure 14 : People Who Spend More Money on E-Commerce During Sales than Ordinary Days

This line graph explores the curves shaped by the amount of people who spend more money on E-Commerce during Sales than ordinary days in order to agree. The graph itself represents the frequencies by the vertical y value axis to quickly show or estimate the number of observations that are less than or equal to some particular values, resulting 4.41% respondents strongly disagree, 2.94% disagree, 44.11 remain neutral, 36.76% agree and last but not least 11.76% strongly agree. As we could see, the graph has a significant increase from disagree, following with neutral, agree, and strongly agree options. It gives us the look on how contrarian the respondents are between agree and disagree which comes to the conclusion that most of the sample tend to spend money on E-commerce during sales than days.

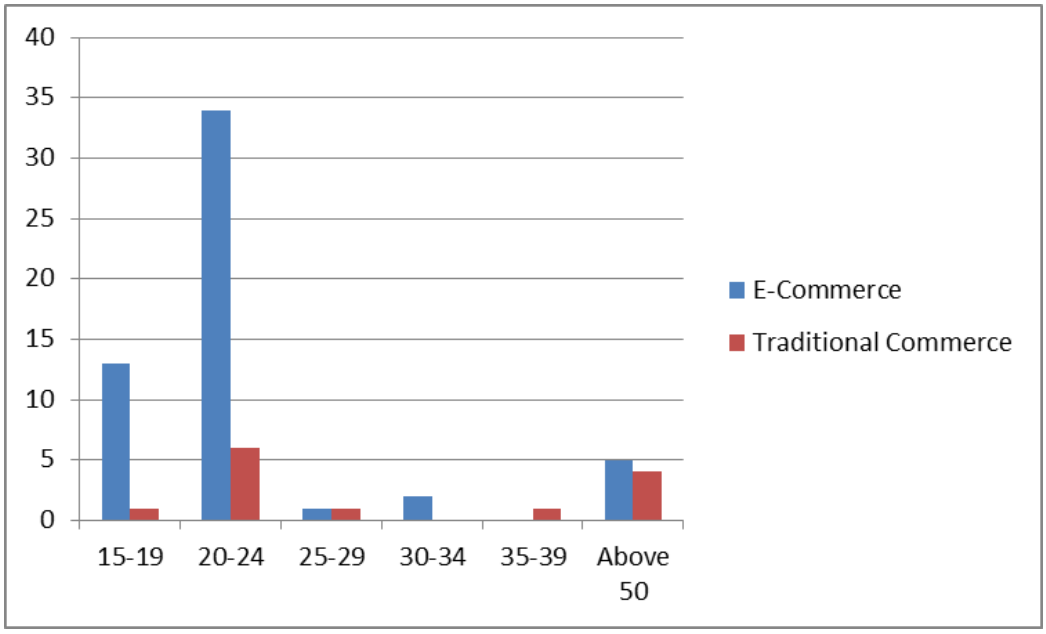

Figure 15: People's Preference of E-Commerce/Traditional Commerce by Their Age

Grouped bar charts play a critical role in comparison of the multiple sets of data to specify series across all sets or to make the data become more detailed. Here we classify the samples into ages and compare them with the two options which are e-commerce or traditional commerce for each sample. Therefore, we would obtain two results per sample and come with the conclusion that the majority of the population prefer utilizing e-commerce to traditional commerce with the ratio of 55:13.

Here we found that 92.85% of the respondents between 15-19 years old choose e-commerce, while 85% of 20-24 years old respondents have the same option with the younger one. However, unlike the respondents from the range 25-29 years old who acquire the ratio of 1:1 or 50% for each option, 30-34 years old audiences obtain 100% for e-commerce only. On the contrary, 35-39 respondents have 100% percent for traditional commerce. Lastly, the sample taken above people 40 years old have 55.5% for e-commerce and 44.4% for traditional commerce. From this data set, we might know how significant the difference is between people who prefer e-commerce to traditional commerce based on the population and specified samples.

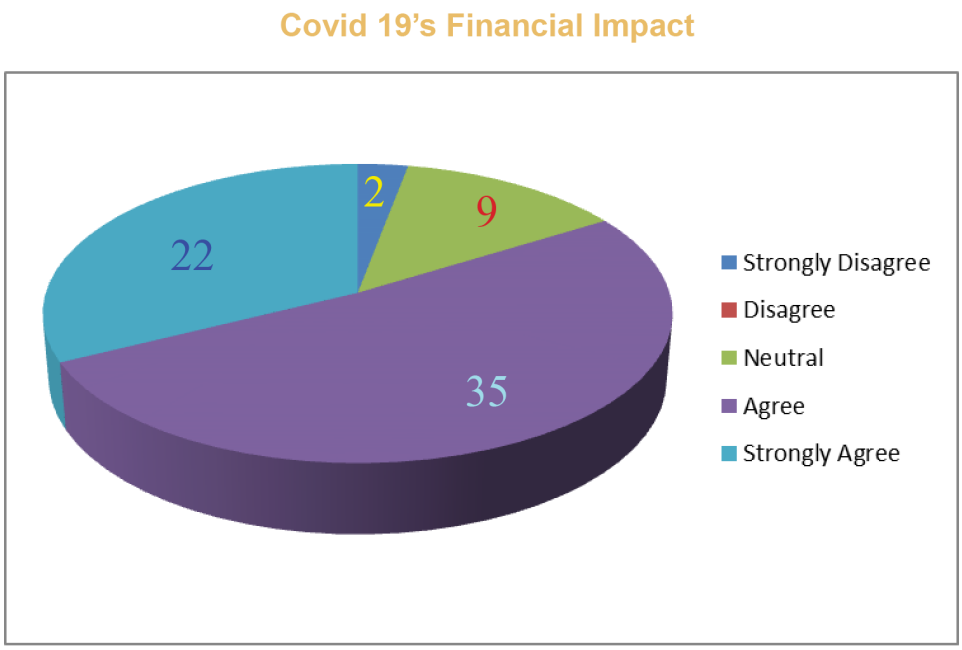

Figure 16: Pie Chart of Respondents' Opinion Regarding Covid 19's Financial Impact

In this bar chart, the amount of audiences who strongly disagree that COVID-19 has brought successful impact for business through e-commerce is 2,94%, while 13,23% remains neutral, and 51,4% of respondents agree. It has the highest percentage among the other options, including the respondents who strongly agree which has the percentage of 32,35%. However, the impact itself could be beneficial either disadvantage according to how it affects the respondents.

Figure 17: Comparison of which is Easier between E-commerce and Traditional Commerce

By perceiving this bar chart, we come up to the conclusion 92.6% of respondents agree that e-commerce is much easier than traditional commerce due to some factors, while 7.4% people seemed to have different opinions regarding this statement. Therefore, this could be one of the benefits or reasons why we have to use e-commerce for future reference and should increase the usage, functions, ideas of e-commerce later on in the near future.

Conclusion

To conclude, the usage of e-Commerce around the world is increasing due to pandemic Covid-19 because it prevents sellers from doing business and other people need to stay at home. The noticeable thing we found in this study is that buying online can help other people's businesses succeed in various ways, especially in finance. Most of them believe that e-Commerce is easier than traditional commerce. Therefore, they use online shopping more often than physical shopping. In context, online shopping has helped people to save their time, lower the risk of going outside and exposed from the Covid-19 viruses as well as helped the government flatten the curve. Apart from that, the applications that provide the most interesting ads will be the preferable applications by them. As a proof, Shopee was in high demand in online shopping because they showed their ads everywhere including television, social media, newspaper, radio and many more. Other than that, we found out that people don't trust online shopping before because the bad courier can cause damage on the item they bought. Fortunately, today we have a lot of couriers that give excellent services to deliver someone's parcel safely.

This study gave us a good insight on how analysis is systematically done when there is a question in mind that needs answers. In addition, we somewhat have new knowledge on something that we have never thought of before, the spread of Coronavirus in Malaysia, and with this knowledge our perspectives have slightly shifted as we see things more clearly than before.

Appendix

Google Form Link: https://forms.gle/6rALNM6VBJ7Y5MtQA

Questionnaire Samples :

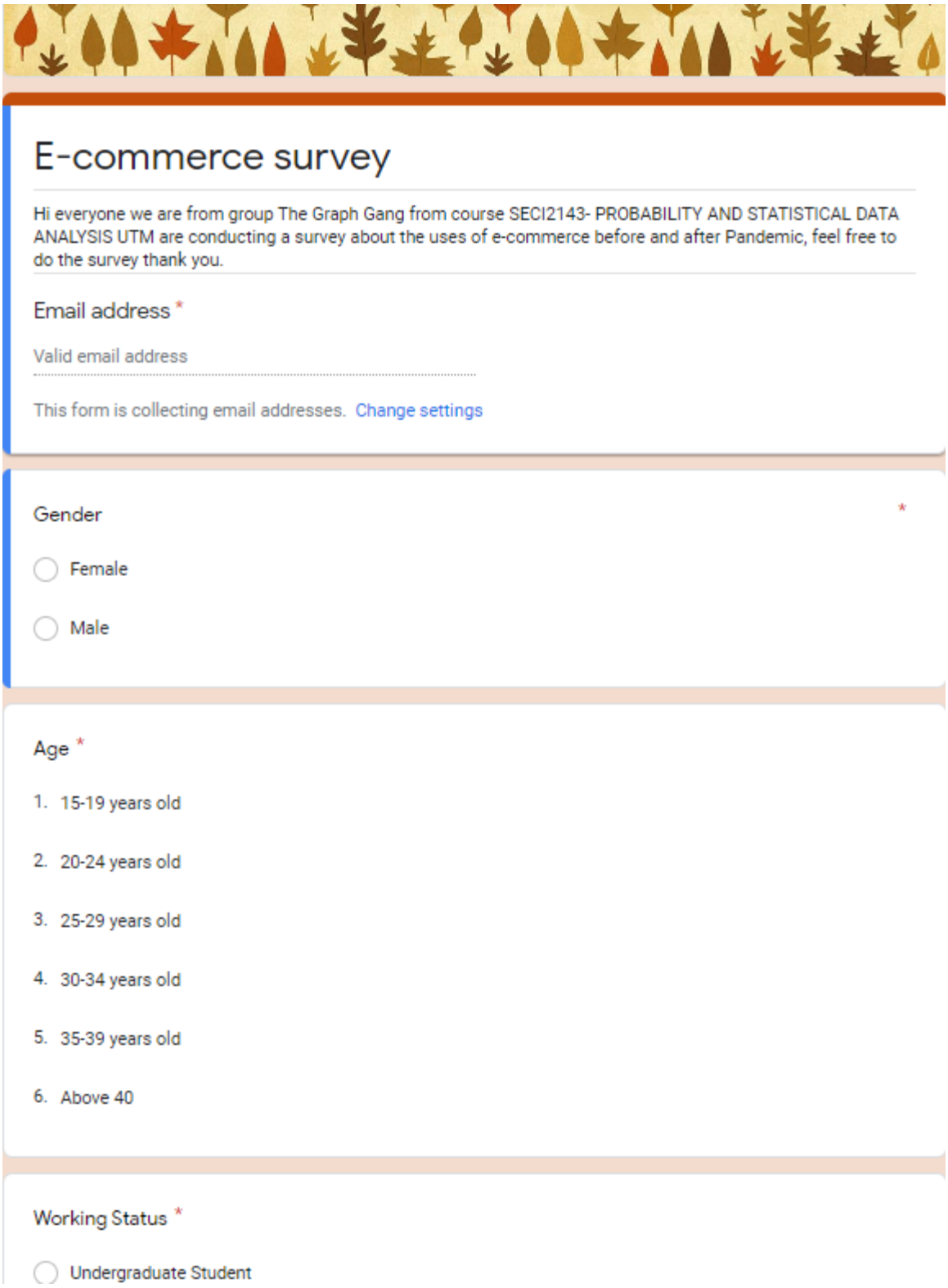

Figure 18: Questionnaire Samples