

MALAYSIAN'S ONLINE SHOPPING
BEHAVIOUR ANALYSIS AFTER COVID-19
PANDEMIC

NUR AINAA NAJIHAH BINTI ABDIL SHAKRI

BACHELOR OF APPLIED SCIENCE IN DATA
ANALYTICS WITH HOHOURS
UNIVERSITI MALAYSIA PAHANG

UNIVERSITI MALAYSIA PAHANG

DECLARATION OF THESIS AND COPYRIGHT

Author's Full Name : NUR AINAA NAJIHAH BINTI ABDIL SHAKRI
Date of Birth : 15/01/1999
Title : MALAYSIAN'S ONLINE SHOPPING BEHAVIOUR
ANALYSIS AFTER COVID-19 PANDEMIC
Academic Session : 2023

I declare that this thesis is classified as:

- ☐ CONFIDENTIAL (Contains confidential information under the Official Secret Act 1997)*
☐ RESTRICTED (Contains restricted information as specified by the organization where research was done)*
☒ OPEN ACCESS I agree that my thesis to be published as online open access (Full Text)

I acknowledge that Universiti Malaysia Pahang reserves the following rights:

1. The Thesis is the Property of Universiti Malaysia Pahang
2. The Library of Universiti Malaysia Pahang has the right to make copies of the thesis for the purpose of research only.
3. The Library has the right to make copies of the thesis for academic exchange.

Certified by:

(Student's Signature)

(Faculty Supervisor's Signature)

990115-01-5102
New IC/Passport Number
Date: 25 FEBRUARY 2023

DR NORAZIAH ADZHAR
Date: 25 FEBRUARY 2023



FACULTY SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project report, and in our opinion, this final report of Data Science Project is adequate in terms of scope and quality for the award of the Bachelor of Applied Science in Data Analytics with Honours.

(Faculty Supervisor's Signature)

Full Name : DR NORAZIAH ADZHAR

Position : FACULTY SUPERVISOR

Date : 25 FEBRUARY 2023



STUDENT'S DECLARATION

I hereby declare that the work in this project report is based on my original work.

(Student's Signature)

Full Name : NUR AINAA NAJIHAH BINTI ABDIL SHAKRI

ID Number : SD19010

Date : 25 FEBRUARY 2023

MALAYSIAN'S ONLINE SHOPPING BEHAVIOUR AFTER COVID-19
PANDEMIC

NUR AINAA NAJIHAH BINTI ABDIL SHAKRI

Data Science Project Report submitted in fulfilment of the requirements
for the award of the degree of
Bachelor of Applied Science in Data Analytics with Honours

Centre for Mathematical Sciences
UNIVERSITI MALAYSIA PAHANG

FEBRUARY 2023

ACKNOWLEDGEMENTS

First and foremost, praise and appreciation to God, the Almighty, for his abundant blessings during my Data Science Project 1, which enable me to successfully complete the research.

My profound gratitude goes to my supervisor, Dr Noraziah Adzhar for her invaluable guidance and time supervising me to the completion of this thesis. Her energy, vision, sincerity and motivation have all made a lasting effect on me. She showed me how to do research and present my results in the simplest and most direct way imaginable. Working and studying under her direction was a great honour and pleasure. I am grateful for everything she has done for me. In addition, I also want to express my gratitude to all lecturers in Centre of Mathematical Science who have taught me during my study's journey. May God continue to shower them with blessings and protect them in every manner.

I owe my family especially my mother, Hayati Johari for their love, prayers, care and sacrifices in teaching and supporting me in every step of my life journey. They have been a source of inspiration towards my academic pursuit. Finally, I want to express my friends for always helping me to reach my goals and pushing me to discover my inner most powerful self. I could not ask for better group of people in my life. Thank you to everyone for always being there for me, for caring, loving, believing in me, and giving me the confident to be and do my best.

ABSTRAK

Audit pemasaran adalah teknik untuk menilai nilai, risiko, dan kejayaan operasi pemasaran syarikat. Strategi perniagaan atau strategi pemasaran syarikat harus merangkumi bahagian analisis pelanggan. Analisis pelanggan digunakan untuk mengukur nilai, keberkesanan, dan risiko pemasaran. Untuk melakukan analisis pelanggan, data kualitatif dan data kuantitatif akan digunakan. Analisis pelanggan dapat dilakukan dengan melihat profil pelanggan untuk membantu perniagaan dalam memahami pengguna yang ada dan yang akan datang dengan lebih baik, meningkatkan penjualan dan pertumbuhan perniagaan, mengembangkan program pemasaran yang fokus, dan memastikan bahawa produk memenuhi harapan pelanggan. Oleh kerana populariti membeli-belah dalam talian meningkat di kalangan pengguna internet terutamanya semasa wabak Covid-19, oleh itu syarikat perlu memberi perhatian lebih pada peningkatan kualiti produk mereka kepada pelanggan yang berpuas hati. Tujuan kajian ini adalah untuk melakukan analisis mengenai tingkah laku membeli-belah dalam talian rakyat Malaysia selepas pandemik Covid-19 dan memaparkan hasilnya di papan pemuka. Analisis ini menyelidik empat pemboleh ubah iaitu kemudahan, harga, risiko dan kepuasan pelanggan. Soal selidik diedarkan untuk pengumpulan data dari 4 November 2022 hingga 18 November 2022 dan kaedah yang digunakan untuk melakukan analisis adalah analisis regresi linear berganda (MLR). Antara semua pemboleh ubah, kepuasan pelanggan didapati signifikan sementara pemboleh ubah yang lain tidak.

ABSTRACT

A marketing audit is a technique to assess the value, risk, and the success of a company's marketing operation. A company's business strategy or marketing strategy should include a customer analysis part. Customer analysis is used to measure value, effectiveness, and risk of the marketing. To do a customer analysis, qualitative data and quantitative data will be used. Customer analysis can be done by looking at the customer profile to assist businesses in better understanding existing and future consumers, increasing sales and business growth, developing focused marketing programmes, and ensuring that products fulfil client expectations. As the popularity of online shopping has risen among internet users especially during the Covid-19 pandemic, hence the company needs to give more attention on increasing the quality of their products to satisfied customers need. The purpose of this study is to do an analysis on Malaysian's online shopping behaviour after Covid-19 pandemic and display the output in a dashboard. This paper investigates four independent namely convenience, price, risk and customer satisfaction. A questionnaire was distributed for data collection from 4th November 2022 until 18th November 2022 and the method that is used to do the analysis is multiple linear regression (MLR) analysis. Among all the variables, customer satisfaction was found to be significant while the rest of the variables were not.

TABLE OF CONTENT

STUDENT DECLARATION	
TITLE PAGE	i
ACKNOWLEDGEMENTS	ii
ABSTRAK	iii
ABSTRACT	iv
TABLE OF CONTENT	v
LIST OF TABLE	viii
LIST OF FIGURES	ix
LIST OF SYMBOLS	x
LIST OF ABBREVIATIONS	xi
LIST OF APPENDICES	xii
CHAPTER 1 INTRODUCTION	1
1.1 Research Background	1
1.2 Problem Statement	2
1.3 Research Questions	2
1.4 Research Objectives	3
1.5 Research Scopes	3

1.6	Significance of Study	3
CHAPTER 2 LITERATURE REVIEW		4
2.1	Introduction	4
2.2	Online Shopping Trend	4
2.3	Factors of Online Shopping Behaviour	5
2.4	Statistical Method for Analysis	7
2.5	Summary	13
CHAPTER 3 RESEARCH METHODOLOGY		14
3.1	Introduction	14
3.2	Research Plan	14
3.3	Data Collection	15
3.4	Data Understanding	18
3.5	Data Preparation	19
3.5.1	Cronbach's Alpha	19
3.6	Modelling	19
3.6.1	Strength of Multiple Linear Relationship Using Multiple <i>R</i> Value	20
3.6.2	Percentage of The Variation Using Coefficient of Multiple Determination and Adjusted R^2	20
3.6.3	Residual Analysis	21
3.7	Summary	21
CHAPTER 4 DATA ANALYSIS, RESULTS AND DISCUSSION		22
4.1	Introduction	22
4.2	Data Analysis	22
4.3	Convenience	24

4.4	Price	26
4.5	Risk	28
4.6	Customer Satisfaction	30
4.7	Customer Behaviour	32
4.8	Reliability Test	34
4.9	Pearson Correlation Analysis	35
4.10	Multiple Linear Regression Analysis	36
CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS		39
5.1	Introduction	39
5.2	Summary and Conclusions	39
5.3	Recommendations	40
REFERENCES		41
APPENDICES		44

LIST OF TABLES

Table 2.1	List of previous research paper	6-7
Table 3.1	Demographic profile	15-17
Table 3.2	Questions for independent variables	17-18
Table 3.3	Questions for dependent variables	18
Table 4.1	Demographic profile of respondents	23-34
Table 4.2	Descriptive statistic for convenience	25-26
Table 4.3	Descriptive statistic for price	27
Table 4.4	Descriptive statistic for risk	29
Table 4.5	Descriptive statistic for customer satisfaction	31
Table 4.6	Descriptive statistic for customer behaviour	33
Table 4.7	Cronbach's alpha results	35
Table 4.8	Correlation among variables	36
Table 4.9	Results for factors influencing Malaysian's online shopping behaviour	37
Table 4.10	Summary of hypothesis results	38

LIST OF FIGURES

Figure 3.1	Research framework flowchart	14
Figure 4.1	Convenience's visualization	26
Figure 4.2	Price's visualization	28
Figure 4.3	Risk's visualization	30
Figure 4.4	Customer satisfaction's visualization	32
Figure 4.5	Customer behaviour's visualization	34

LIST OF SYMBOLS

α	Alpha
N	Number of item
\bar{c}	Average of covariance
\bar{v}	Average of variance
\hat{Y}	Predicted value of dependent variable
X_p	Independent variable
b_p	Regression coefficient
r	Correlation coefficient
r^2	Coefficient of multiple correlation

LIST OF ABBREVIATIONS

MLR	Multiple linear regression
WHO	World Health Organisation
EMCO	Enhanced Movement Control Order
CMCO	Conditional Movement Control Order
RMCO	Recovery Movement Control Order
ISO/EC 38500	Information Technology-Government of IT for organizations
OFODPs	Online food ordering and delivery systems
LCC	Low-Cost Carrier
FSNC	Full-Service Network Carrier
SA	Airport staff
SP	Flight attendants
CS	Customer satisfaction
CL	Customer loyalty
RSE	Residual Standard Error
RSME	Root Squared Mean Error

LIST OF APPENDICES

Appendix A: Questionnaire

Appendix B: Data analysis source code

Appendix C: Tableau visualization

CHAPTER 1

INTRODUCTION

1.1 Research Background

Today's retail environment is growing increasingly competitive, and every business continues to employ inventive and innovative techniques. Even in the present conditions and after the Covid-19 pandemic, every company acknowledges the changes that are occurring and works to build consumer confidence, quality of service and sales promotion methods that may please their consumers to survive. Customer satisfaction is influenced by several elements that the company may use as a benchmark, including brand trust, service quality and marketing mix.

In the last two decades, the popularity of online shopping has grown among internet users since it is more convenient, advantageous, and less burdensome for customers than physical interactions. The practice or act of purchasing goods or services through the internet is known as online shopping. Going online, arriving on a seller's website, completing a purchase, and scheduling delivery are all part of the process. The buyer can pay for the goods or service online or at the time of delivery using a digital wallet. E-commerce, which stands for Electronic Commerce, includes online shopping. The ability to purchase from anywhere in the world is one of the most major advantages of internet shopping.

Roughly 91 percent of Malaysians have connection to the web, and the country has a high mobile phone usage rate. Due to its fast-growing economy and great internet connectivity, Malaysia, with a demographic of over 30 million citizens, is an ideal prospect for e-commerce in Asian countries (Wee et al., 2021). For industrial development, approximately 200 industrial areas and speciality parks have been constructed in Malaysia. For example, Technology Park Malaysia and Kulim Hi-Tech Park have been built with the objective of growth of industry. Malaysia's e-commerce

industry has been expanding at a faster rate than ever before, keeping up with the country's massive development.

Our government has announced that our country has ended Covid-19 pandemic phase. On April 1st, Malaysia began the endemic phase of Covid-19 where several activities restriction has been removed. Thus, Malaysians can resume to shop physically at any store without social distancing but Malaysians still choose online shopping even though there is no more movement control order by the government. This sparks the interest and the contributing factors that lead to this situation is investigated.

1.2 Problem Statement

Online shopping has been very popular during Covid-19 pandemic as the government has carried out Movement Control Order (MCO) that limit peoples to go shopping in physical store. Due to the MCO, people do not have any choice but to buy online. Since online shopping is the only choice, there are many online shopping platforms has been established and make retails competition grow increasingly competitive. After the MCO period ended, many people are still continue to shop through online platform rather than in physical store. Therefore, the factors that lead to this kind of situation are interested to be investigate. A questionnaire was distributed, and the factors were analysed using multiple linear regression (MLR) method. MLR method is chosen for this study as there are more than one independent variables and one dependent variable. The end results is then visualized through a dashboard using Tableau.

1.3 Research Questions

The questions that arise from this research are

1. What are the contributing factors that influenced online shopping behaviour among Malaysians?
2. What is the factor and relationship between factors that influenced online shopping behaviour among Malaysians?
3. How to visualize the final analysis through a dashboard?

1.4 Research Objectives

The objectives behind this study were

1. To identify the contributing factors that influenced online shopping behaviour among Malaysians.
2. To analyse the factors and relationship factors that influenced online shopping behaviour among Malaysians.
3. To visualize the analysis through a dashboard.

1.5 Research Scopes

This study focusses on Malaysian of any age that have experience in online shopping. The demographic profile of customer such as gender, marital status, education, occupation, monthly income and living area also have been collected through questionnaire that is distributed from 4th November 2022 until 18th November 2022 which is after the Covid-19 pandemic. Through the questionnaire, data were collected and analysed using multiple linear regression (MLR) method. The analysis were done using Jupyter Notebook software that used Python programming language and visualized using Tableau software.

1.6 Significance of Study

The significance of this study is to analyse Malaysian's perception towards online shopping behaviour after Covid-19 pandemic. The outcome of this study also help the online shopping platform developer to understand the needs and expectation of the customer which can contribute to expending their business and competitiveness among other market players. In addition, online seller can improve their services or products in order to meet customer needs and plan for their next marketing strategies.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The chapter reviews the online shopping trend, factors of online shopping behaviour, and statistical method for analysis.

2.2 Online Shopping Trend

The Director General of the World Health Organization (WHO) revealed on April 10th, 2020, that the Covid-19 outbreak has spread to 213 countries, resulting in 1,524,162 reported positive cases and 92,941 mortalities (Wee et al., 2021). Residents of Wuhan City, Hubei Province, China, became infected with the virus quickly. Malaysia's government has decided the Movement Control Order 1.0 (MCO), which will be in application from March 18, 2020 to August 31, 2020. On January 25, 2020, the virus was initially discovered in Malaysia (Wee et al., 2021). On March 18, 2020, the Malaysian government imposed a Movement Management Order 1.0 (MCO) to ban interstate highways and completely block the country as the first step in responding to the spread of the disease.

The government then imposed a Enhanced Movement Control Order (EMCO) on the impacted locations, as well as a Conditional Movement Control Order (CMCO) and a Recovery Movement Control Order (RMCO) to boost the country's economy (Naszariah et al., 2021). All companies must close during MCO 1.0, which has had an impact on sales operations in order for Malaysia to remain at home. Working from home has become the new standard for all jobs. As a result, more businesses are turning to the internet to market their goods and services. Malaysia's internet shopping saw a 28.9% growth in April 2020 (Wee et al., 2021). During the MCO phase, consumer behaviour in online shopping changed, resulting in an increase in the percentage of sales that included

items other than everyday necessities, such as household equipment, jewels, and apparel (K, 2020). Many researchers contend that the increase in e-commerce is the silver lining of this new norm. It may be seen in the 9.3% increase in e-commerce value that began in April 2020 (Naszariah et al., 2021).

Numerous e-commerce websites, such as Happy Fresh and Lazada, claim that during the MCO period, their sales increased by 10-15% compared to regular operations. Other ecommerce websites, like Mydin Mart, Tesco Online, Lazada, My Grocer, and Happy Fresh, have said that high-demand items are now unavailable include merchandising equipment and computer accessories, owing to the notion of working from home that has been implemented since the establishment of MCO (K, 2020). Based on the research by (K, 2020), it is shown that Johor had the biggest proportion of online shoppers, with 74 (26.4%), followed by Selangor with 36 (12.9%) and Sabah with 36 (12.9%). According to the data, the majority of students (76.4%) engaged in active online purchase during MCO, followed by public officials (12.1 %).

2.3 Factors of Online Shopping Behaviour

Several factors have been used in order to analysis customer behaviour towards online shopping. A research paper by Mokhtar et al. 2019 used four variables to analyse customer behaviour. They are convenience, risk, customer satisfaction and price. At the end of the research, it has found that only one of the variables is not significant which is customer satisfaction while the others were found to be significant. In the other research by Sudiartha Athar et al. in (2021), four variables have been identified to analysed customer satisfaction at Lotte Mart Branch Mataram. The variables are trust in brand, service quality, promotion in mix and customer satisfaction. The result from the analysis shows that trust in brand, service quality and promotion in mix are significantly impact on customer satisfaction. Online purchase intention, trust, perceived risk, guarantee return policy, perceived image of website, transaction security and customer database security are the variables used (Wagner, 2019). Lastly, (Gupta et al., 1996) used logistic regression to analyse channel risk perceptions, risk search intentions, search and evaluation effort and delivery time. The findings of this study assist to understand the

attitudes of consumers who have diverse shopping channel preferences. Table 2.1 shows the list of previous research paper with the variables identified.

Table 2.1 List of previous research paper

No.	Research title/Author	Variable	Method
1	Mokhtar, M., Yusoff, S., Asmuni, S., Ain, N., & Fauzi, M. (2019). An insight into online shopping behaviour among young adults in Malaysia.	i) Convenience	Multiple linear regression
		ii) Perceived risk	
		iii) Customer Satisfaction	
		iv) Price	
2	Sudiartha Athar, H., Basuki, P., & Santoso, B. (2021). The Analysis of Customer Satisfaction Post Covid-19.	i) Trust in brand	Multiple linear regression
		ii) Service quality	
		iii) Promotion in mix	
		iv) Customer satisfaction	
3	Wagner, D. (2019). A Study of Factors Influencing the Online Purchasing Intention toward Online Shopping in Thailand.	i) Online purchase intention	Multiple linear regression
		ii) Trust	
		iii) Perceived risk	
		iv) Guarantee return policy	

		v)	Perceived image of website	
		vi)	Transaction security	
		vii)	Customer database security	
4	Gupta, A., Su, B.-C., & Walter, Z. (1996). An Empirical Study of Consumer Switching from Traditional to Electronic Channel: A Purchase Decision Process Perspective. In International Journal of Flexible Manufacturing Systems, Information Technology Management, and Journal of Communications of the ACM. Decision Support Systems.	i)	Channel risk perceptions.	Logistic regression
		ii)	Price search intentions.	
		iii)	Search and evaluation efforts.	
			Delivery time	

2.4 Statistical Method for Analysis

Statistical analysis refers to the method of gathering the data and analyse the gathered data into a form of valuable information. In other words, statistical analysis is a method of analysing the data into a conclusion that is useful. Mean, standard deviation and regression are one of the most used methods in statistical analysis. One of the benefits

of statistical analysis is it can help to carry out market research and create a profitable strategy for marketing and sales.

A case study done by Mokhtar et al. (2019) proposed a multiple linear regression analysis based on the data obtained. Multiple linear regression analysis is used to determine the degree to which the four suggested independent variables explain online shopping behaviour and to determine the significance of each independent variable. The suggested independent variables are risks, price level, customer satisfaction, and convenience. A preliminary evaluation is performed before to the multiple linear regression analysis to confirm that the assumptions of normality, linearity, multicollinearity, and homoscedasticity is not violated. The result of the study shows that convenience, customer satisfaction and price level all have a favourable impact on customer online shopping behaviour. Perceived danger, on the other hand, has a negative effect on internet purchasing. Convenience, perceived risk, and price level were shown to be significant among the four factors. However, customer satisfaction factor was not significant (Mokhtar et al., 2019).

Research by Sudiartha Athar et al. (2021) also conducted multiple linear regression analysis as their statistical method to analyse customer satisfaction after Covid-19. Questionnaires and interviews were used to collect the data, which was then analyse using the SPSS Program to adapt multiple linear regression model. As there are two variables, the independent variable X and dependent variable Y , multiple linear regression is utilised, and another Y value is calculated or sought based on the current X value. The finding revealed that Trust In Brand, Promotion Mix and Service Quality has a favourable and considerable influence on consumer satisfaction at Lotte Mart Branch Mantaram after Covid-19. According to the conclusions of the survey, it is suggested to the company to enhance the level of service they provide to customers in order to improve customer satisfaction (Sudiartha Athar et al., 2021).

A case study by Wagner, (2019) was done to study the essential aspects that impacts people's intentions to shop online at Lazada.co.th. Determine the impact of perceived risk, guarantee return policy, perceived image website, transaction security, consumer's database safety, and trust towards online shopping preference towards

Thailand's Lazada.co.th are the main objective of the study. Based on the analysis, the researcher discovers that perceived risk, guarantee return policy, website image, transaction security, consumer's database safety, and trust have positive correlation. Perceived risk, and transaction security both exhibit level of significance over 0.05, indicating that they are not dependent on trust. The multi regression line indicates that if the e-commerce website delivers superior information security for customers, perceive image of website, and guarantee return policy, customer have a greater sense of trustworthiness. It is the most major psychological barrier for customers, as most are concerned about their personally identifiable information being utilised without their authorization by other parties. As a result, the researcher recommends that Lazada.co.th develop a data ethics standard based on Information technology - Governance of IT for the organization (ISO / IEC 38500). The researchers also recommend adopting two-factor validation in online database security to provide efficient user authentication and enhanced safety (Wagner, 2019).

A case study has been done to investigate the linkage between quality of the service, consumer satisfaction, and price reference and repurchase intent (Kadang & Sukati, 2012). Data is gathered by handing out questionnaires and conducting interviews with Garuda Indonesia and Lion Air passengers. The findings of this study show that service quality has an impact on both airlines repurchase intentions. However, price reference has no bearing on whether or not both airlines' services would be repurchased. Both the pricing reference and the relationship between service quality and customer happiness have a negative parameter asset value, according to the regression analysis results. Due to multicollinearity among the independent variables, the function of consumer satisfaction as a moderating variable between service quality and repurchase intention could not be tested in this study. The findings of the interviews show that the flight schedule conformity with the passengers' chosen time is one of the elements that influences purchase intention, re-ticketing, or using the services of a return flight. According to Lion Air customers, travellers frequently prefer flying service since ticket rates are quite low intent (Kadang & Sukati, 2012).

The study by Michael Clemes Christopher Gan et al. (2008) looks at the elements that impact passenger happiness and behaviour intentions when flying internationally.

The study explores which variables have a positive influence on service quality and which variables have the largest and least significant effect on service quality in air transportation, according to airline customers. The variables that have been studied by the authors are timeliness, assurance, convenience, helpfulness, comfort, meals, and safety and security. All investigated variables are positively linked to perceived service quality in international air travel, with safety and security being the most significant of these characteristics. According to airline passengers, the least significant variable is timeliness. Furthermore, the data demonstrate that passengers' impressions of the quality of air travel across foreign borders services vary depending on their age, gender, income, employment, and marital status. According to the findings, passengers in their youth or those with low earners are more price sensitive, ordering tickets based on the minimum rate offered and having varying degrees of expectations. In terms of occupation, the group of passengers that are semi-professional is happier with the safety and security factor than the other categories, according to the findings of this study (Michael Clemes Christopher Gan et al., 2008).

The approach of assessing customers' experiences using a multiple linear regression machine learning model is presented in the paper by David Acheme et al. (2021). There are six variables in the research which are website design quality, post order support, product quality, online stores' facilities, hedonic factor, and online stores' image. The purpose of correlation analysis is to determine the relation between each predictor variable and the anticipated variable which is customer satisfaction. The correlation shows that the six predictor variable and the anticipated variable have a significant relation. The applicability of this method in constructing models of complex systems that may successfully act as decision-making aids for company management teams for inference and prediction that supports decision making is demonstrated by simulation results (David Acheme et al., 2021).

Research by Guci et al. (2020) used multiple linear regression to investigate the impact of brand image and advertising on the choice to open a bank account with BNI Batam Branch. The method instrument consisted of five variables and used questionnaires. The distributed questionnaires had three variables, two of which were independent variables and one of which was a dependent variable. The independent

variables are brand image and advertisement. The coefficient of determination of (R^2) 0.760 is shown in the regression findings. This suggests that the choice to become a client at the Bank BNI Batam Branch can be explained by its independent variables, namely brand image and advertisement, for 76.0 % of the dependent variable. Other variables, such as systems, locations, rival banks, and others, impact 24.0 %. According to the results of the multiple regression analysis and coefficient of determination test, each independent variable has a substantial connection with the single variable. It may be argued that the link between brand image and advertising is beneficial (Guci et al., 2020).

When calculating premium trend using linear and nonlinear regression, a paper by Rusov et al. (2017) presented an example of planning and forecast of business outcomes in insurance. In experimental study, the number and quantity of policies acquired by linear, logarithmic, exponential, and polynomial regression for twelve insurance lines are compared. Polynomial regression has the largest determination coefficient of expected number of influenced policies ($R^2 = 0.90$), whereas logarithmic regression has the lowest ($R^2 = 0.69$, which is in reality regarded to be the typical model) (Rusov et al., 2017).

Research by Almahdi & Alsayed, (2021) examined how utility, information quality, visual appeal, and social presence affect satisfaction and loyalty to online food ordering and delivery systems (OFODPs). The findings revealed that the OFODP's pleasure is influenced by utility, content quality, and visual appeal, but not by social presence. After adjusting for gender, age, frequency of usage, and preferred platform, the correlations between utility, content quality, visual appeal, social presence, and satisfaction with loyalty toward OFODP were studied using a multiple linear regression model. A mediation study was used to see if satisfaction had a mediating influence on the connection between the independent variables and loyalty. The findings reveal that satisfaction mediated the association between all of the independent variables and loyalty to OFODP, with the exception of social presence, which had a negligible relationship with satisfaction to begin with (Almahdi & Alsayed, 2021).

The goal of Alshammeri et al.(2021) research is to look into the aspects that have a major impact on customer happiness and service quality for Low-Cost Carrier (LCC) and Full-Service Network Carrier (FSNC) airlines in Kuwait. Furthermore, the goal of

this research is to see if there is a difference in LCC and FSNC passengers' expectations and satisfaction levels. The overall goal of this study is examined from various perspectives, including determining the contributing variables to passenger satisfaction and service quality in Kuwait Airways based on passenger survey results, as well as determining the relative importance of customer satisfaction and service quality determinants. There are six variables that has been considered in the study which are tangible characteristics, time management, services offered by airport staff (SA), services provided by flight attendants (SP), online services and food services. The findings revealed that there is a relation and a major influence in FSNC flight company services including time management, airport staff services, flight attendant services [plane], and online service. However, there is no relation between the variables and the client, as evidenced by tangible qualities and the food service factor (Alshammeri et al., 2021).

The primary factors determining Vietnam's client experience on online food delivery were identified and evaluated using multiple linear regression in this study by Hsu et al. (2021). According to the findings, there are six elements that influence consumer satisfaction with online food delivery services. Only five elements, however, have an influence on customer happiness. In such case, the most important factor is service quality, followed by food quality, price, promotion, and privacy. Customer Repurchase, Positive Word of Mouth, and Switching are all shown to have a direct impact on satisfaction. Switching is influenced by consumer satisfaction in a negative way. When clients are dissatisfied with a service, the likelihood of them choosing a different brand for their next purchase is quite high (Hsu et al., 2021).

A multiple linear regression forecasting model for fast moving products was suggested in Farizal et al. (2020) research. Climate, promotion, cannibalization, holidays, product pricing, number of stores, population, and income are all independent variables that alter over time. The number of stores, rainfall, population, income level, product sales price, holiday (number of days of delivery), cannibalization, and price differential against competitor were shown to impact demand for the insecticide product based on the analysis. This is further corroborated by the results of the original model's regression, which show a R^2 value of 88.8%, indicating that the effect of independent factors on the dependent variable is 88.8%. Multiple linear regression prediction is so much more

precise than corporate forecasting. Multiple linear regression forecasting error is 9.17 %, whereas corporate forecast is 28.87 % (Farizal et al., 2020).

The purpose of Khuong & Dai, (2016) research was to explore the element which influence customer satisfaction (CS) and loyalty (CL) in order to help local taxi firms in Ho Chi Minh City, Vietnam in increasing profitability. There were five independent variables in the research which were reliability, responsiveness, comfort, cost, and information. Multiple regressions analysis was used to determine the effects of independent factors on customer satisfaction. At the 99% confidence level, just two elements, comfort, and cost, have a positive influence on consumer satisfaction. To evaluate the effects of independent factors on customer loyalty, a multiple regressions analysis was used. At the 99% confidence level, four predictors, namely dependability, responsiveness, cost, and customer satisfaction, all have a positive relationship with customer loyalty (Khuong & Dai, 2016).

In order to forecast the eventual price of each dwelling in the dataset, (Abdulhafedh, 2022) conducted a multiple linear regression analysis. The goal of the study is to create an optimum linear regression model that can predict the final price of each house using the test data's attributes. With an adjusted R^2 value of 0.9283, a residual standard error (RSE) of 0.094, and a root squared mean error (RSME) of 0.12792, the model accuracy evaluations yielded positive findings. Furthermore, using multiple cross validation strategies, such as the validation set approach, the K-fold strategy, and the Leave-One-Out-Cross Validation (LOOCV) approach, the final model's prediction error (Mean Squared Error, MSE) was found to be very modest (12 %) (Abdulhafedh, 2022).

2.5 Summary

Previous research paper shows that there are many investigating factors that is often used to analyse online shopping behaviour. Most research article that related to this paper use Multiple Linear Regression (MLR) to analyse the contributing factors that influence the dependent variable. Therefore, Multiple Linear Regression (MLR) method is used in order to investigate Malaysians behaviour towards online shopping after Covid-19 pandemic. The method used in this research will be explain further in the next chapter.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlined the data collection process, attributes, and MLR method. It contains information on the research design that was adopted for this study's goal. It also discusses the features of the data as well as the data preparation method and technique.

3.2 Research Plan

Figure below shows the research framework of this study to answer all research questions.

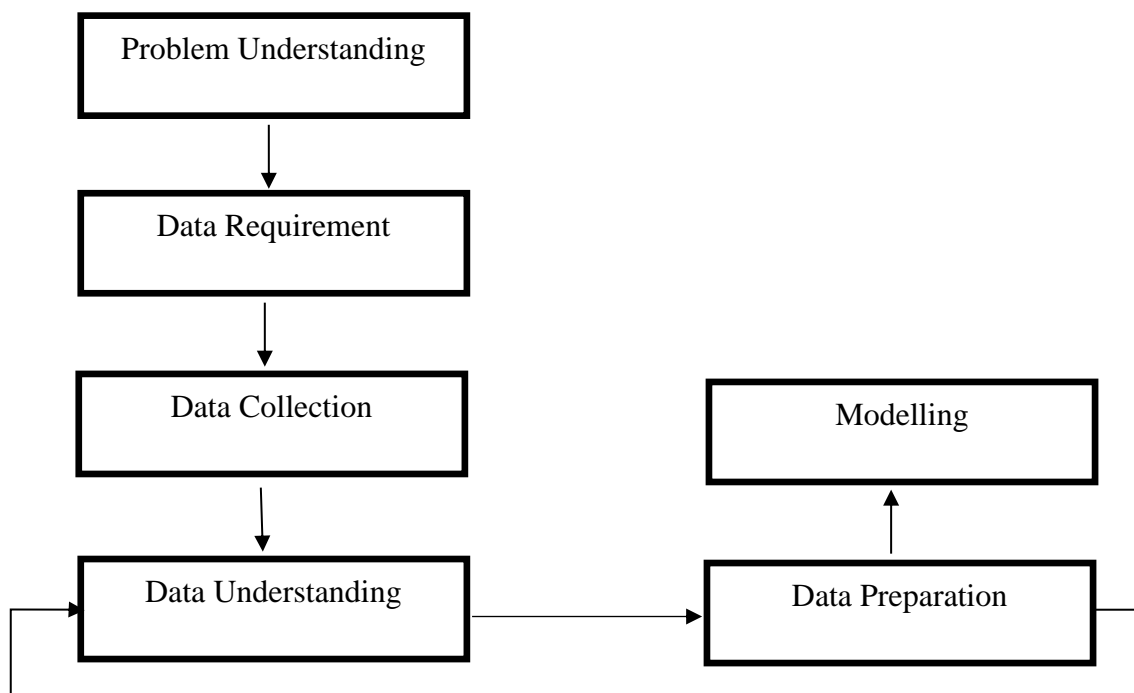


Figure 3.1: Research Framework Flow Chart

3.3 Data Collection

In this study, a questionnaire that contains six section was distributed in a google form through WhatsApp, and Instagram. The period of data collection is 4th November 2022 until 18th November 2022 which is after the Covid-19 pandemic phase. 100 respondents answered the questions, and the data was saved in a Microsoft Excel. The questionnaire gathered demographic information from respondents among Malaysians only such as gender, age, marital status, level of education, occupation, monthly income, source of income, living location, and preferred web store and online purchasing habits. There are four Likert-scale used in the questionnaire to rank accordingly each statement. There were strongly disagree, disagree, agree, and strongly agree. In the questionnaire, there were four variables that consists of four questions for each variable. The variables were convenience, price, risk, customer satisfaction and customer behaviour. Table below shows the demographic profile that will be consider in this research:

Table 3.1 Demographic profile

Gender	1) Gender
	2) Female
Age	1) Below 21
	2) 21-30
	3) 31-40
	4) 41-50
	5) 51 and above
Marital status	1) Single
	2) Married
Level of education	1) SPM
	2) STPM
	3) Diploma
	4) Degree
	5) Master
	6) PhD

Occupation	1) Student 2) Employed 3) Self- employed 4) Unemployed
Monthly income	1) RM500 and below 2) RM501-RM1000 3) RM1001-RM3000 4) RM3001-RM5000 5) RM5001 and above
Source of income	1) Parents 2) Employer 3) Scholarship/PTPTN 4) Profit from own business
Living area	1) Urban 2) Suburban 3) Rural
How often do you shop online per month?	1) Once 2) Twice 3) Thrice 4) More than thrice
Which category you often shop online?	1) Health and beauty 2) Mobile and accessories 3) Home and living 4) Baby and toys 5) Fashion
How much do you spend online shopping per month?	1) Below RM100 2) RM101-RM300 3) RM301-RM500 4) RM501 and above
Favourite online store	1) Shopee 2) Lazada 3) Zalora

4) Facebook
5) Instagram
6) Others

In the google form, there are four sections represent each variable in the study. Each respondent is required to answer all question in every section. The questions in the google form are as below:

Table 3.2 Question for independent variable

Independent Variable	Questions
Convenience	1) Online shopping saves time. 2) Online shopping apps is user friendly. 3) Online shopping allows us to find a product from many stores. 4) Online shopping let the users compare price easily.
Price	1) Online store's product is cheaper. 2) Online shopping shipping fee is affordable. 3) Online shopping constantly has promotion. 4) Online shopping saves more money.
Risk	1) Online shopping is fully trusted and not a scam. 2) Online shopping's purchase may arrive in damage condition/in complete items/never arrive. 3) The quality of the product may not same as in the product description.

	4) Online shopping offers easy process for return or refund of a damage product.
Customer satisfaction	1) There is no breach of personal information. 2) The speed of delivery is bad. 3) Online shopping apps show good description of the product. 4) Online shopping has a lot more choice.

Table 3.3 Question for dependent variable

Dependent Variable	Question
Customer behaviour	1) I prefer to shop through the internet because it is more convenient for me. 2) I prefer to shop through the internet because it saves more money. 3) I prefer to shop through the internet even though there still some risks of online shopping. 4) I prefer to shop through the internet because the services and the products are satisfied.

3.4 Data Understanding

The aims of data understanding are to comprehend the characteristics each of the data and to summarize the data by identifying important elements such as data volume and total number of variables in the data. Data understanding help us to pinpoint which part of the data should us prioritize in order to make our analyses more accurate. This study used real data to evaluate the approach. There are 100 data that have been collected

and ready for data processing. The total data is close with the minimum data from the previous study (Mokhtar et al., 2019).

3.5 Data Preparation

The process of cleaning and processing raw data is known as data preparation. In data preparation step, it is required for us to check missing data or null value, delete column, delete null value and other data wrangling process in order to get a high-quality data. However, in this research there will be no data cleaning such as clean all the null value as the questionnaire that will be distributed required respondent to answer all question. Hence, there will be no missing value in the data. However, the data collected from a survey need to check the reliability so that the data is trusted to use for the analysis. Therefore, the Cronbach's alpha method will be applied.

3.5.1 Cronbach's Alpha

Cronbach's alpha is used to make sure each of question in Likert scale have reliability or in other word is consistency. The equation of Cronbach's alpha is as below:

$$\alpha = \frac{N.\bar{c}}{\bar{v}+(N-1).\bar{c}} \quad (3.1)$$

N in equation 3.1 resemble the number of items, \bar{c} is the average covariance between item pairs and \bar{v} is average of variance. The best Cronbach's alpha is when the value of α is same or more than 0.9 while the unacceptable Cronbach's alpha when the value of α is less than 0.5. In this paper, the first 30 dataset are chosen for Cronbach's alpha calculation to check the reliability. Only the first 30 dataset chosen for Cronbach's alpha as it is only for pilot study.

3.6 Modelling

After the collected data has been go through data preparation process, the data has a better and meaningful data to continue for modelling part which is Multiple linear regression (MLR). Data modelling enables a company to make the most of its data in order to satisfy its information demands. In this study, multiple linear regression and correlation analysis is used to answer the research's objectives.

The equation for multiple linear regression as shown below:

$$\hat{Y} = b_0 + b_1X_1 + b_2X_2 + \dots + b_pX_p \quad (3.2)$$

\hat{Y} is the predicted value of dependent variable. X_1 until X_p are the predictor variable or independent variable that is used in the research. For the research, there will be four variables. The value of Y when all of the independent variables (X_1 through X_p) are zero is b_0 , and the calculated regression coefficients are b_1 through b_p . Every regression coefficient indicates the change in Y when the independent variable is changed by one unit. By using this statistical analysis method, we can get the results of which factors contribute the most on Malaysian's behaviour towards online shopping especially during Covid-19 phase. In this paper, X_1 is convenience, X_2 is price, X_3 is risk and X_4 is customer satisfaction while Y_1 is customer behaviour.

3.6.1 Strength of Multiple Linear Relationship Using Multiple R Value

The positive square root of R^2 is known as the coefficient of multiple correlation R . R 's value can be between 0 and +1. The correlation is stronger the closer it is to +1 while a correlation is weaker the closer it is to 0. The equation of multiple R is as follow:

$$r = \sqrt{r^2} \quad (3.3)$$

3.6.2 Percentage of The Variation Using Coefficient of Multiple Determination and Adjusted R^2

Coefficient of multiple determinations R^2 refers to the step where we measure the percentage of variation in the yvariable associated with the use of the set x variables. A percentage that shows the variation in the y variable that's explain by its relation to the combination of x_1 and x_2 . The adjusted coefficient of determination is the multiple coefficients of determination R^2 modified to account for the number of variables and the sample size. It is preferable to use the adjusted R^2 when contrasting a multiple regression equation against others. Any number that is less than or equal to 1 can be used for the adjusted R^2 which also include negative number. It is specifying a better fit when the

results of adjusted R^2 is close to 1. However, it is specifying that the particular model contains terms that do not help to predict the response when the adjusted R^2 is negative.

3.6.3 Residual Analysis

Residual analysis is used in order to ensure the requirements for making conclusions regarding the coefficients of a linear model have been satisfied. A good linear model must have a constant variance, be approximately normally distributed and be independent of one another over time. The residual by predicted plot reveals that there is no observable non-random pattern and that the residuals are randomly distributed around the centre line of zero.

3.6.4 Correlation Matrix

The correlation coefficients between the independent variables in a model are determined by the correlation matrix. There are three types of correlation coefficients which are sample correlation coefficients, population correlation coefficients and lastly Pearson correlation coefficients. By the end of the results, we can see if the correlation are either positive, negative or neutral relationship. 1 indicates a positive relationship, 0 indicates neutral relationship while -1 indicates negative relationship.

$$r = \frac{S_{xy}}{\sqrt{S_{xx}S_{yy}}}, -1 \leq r \leq 1 \quad (3.4)$$

3.7 Summary

In this research, multiple factors that lead to this investigation. Based on the dataset collected and previous study, MLR is the best method to be used for data analysis. The reason behind it is because this research have more than one independent variable and one dependent variable which means MLR is the method that can be used instead of other regression method. The results is explained in the next chapter.

CHAPTER 4

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter will discuss data analysis that have been done based on the collected data. The results will also discuss in this chapter to answer all objectives of this study.

4.2 Data Analysis

Referring to Table 4.1, it shows that majority of the respondents are female which indicates 67% from 100 respondents. There are five age group of the respondents which are below 21 (7%), 21 to 30 years old (50%), 31 to 40 years old (26%), 41 to 50 years old (12%) and lastly 51 and above (5%). Most of the respondents are single (66%) while the rest are married (34%). As for the occupation, half of the respondents are students (50%), 35 respondents are employed (35%), 11 respondents are self-employed (11%) and followed by unemployed (4%). In addition, it shows that most of the respondents lives in suburban area which represents 69% of the total number of respondents while the rest are urban (25%) and rural (6%). Table 4.1 also shows that Shopee (63%) still in the top tier among online shopping website and followed by other website (38%) which include official website and TikTok shop. Among the five categories, fashion lead as the most popular categories that the respondents often shop with 63% and followed by health and beauty categories (47%).

Table 4.1 Demographic profile of respondents

		Frequency	Percentage (%)
Gender	Male	33	33.0
	Female	67	67.0
Age	Below 21	7	7.0
	21-30	50	50.0
	31-40	26	26.0
	41-50	12	12.0
	51 and above	5	5.0
Marital status	Single	66	66.0
	Married	34	34.0
Level of education	SPM	10	10.0
	STPM	11	11.0
	Diploma	14	14.0
	Degree	58	58.0
	Master	3	3.0
	PhD	4	4.0
Occupation	Student	50	50.0
	Employed	35	35.0
	Self- employed	11	11.0
	Unemployed	4	4.0
Monthly income	RM500 and below	24	24.0
	RM501-RM1000	27	27.0
	RM1001-RM3000	14	14.0
	RM3001-RM5000	22	22.0
	RM5001 and above	13	13.0
Source of income	Parents	35	35.0
	Employer	40	40.0
	Scholarship/PTPTN	14	14.0

	Profit from own business	11	11.0
Living area	Urban	25	25.0
	Suburban	69	69.0
	Rural	6	6.0
How often do you shop online per month?	Once	37	37.0
	Twice	37	37.0
	Thrice	12	12.0
	More than thrice	14	14.0
Which category you often shop online?	Health and beauty	47	47.0
	Mobile and accessories	25	25.0
	Home and living	37	37.0
	Baby and toys	14	14.0
	Fashion	63	63.0
How much do you spend online shopping per month?	Below RM100	43	43.0
	RM101-RM300	36	36.0
	RM301-RM500	16	16.0
	RM501 and above	5	5.0
Favourite online store	Shopee	63	63.0
	Lazada	26	26.0
	Zalora	15	15.0
	Facebook	16	16.0
	Instagram	19	19.0
	Others	38	38.0

4.3 Convenience

Table 4.2 shows the descriptive statistics for the first independent variable which convenience. Based on the results, it shows that 70% of the respondents are strongly agree with the statement of online shopping saves time while the rest of the respondents answer agree with the statement. Next, majority of the respondents (82%) are agreed that online shopping apps is user friendly and 63% also strongly agree that online shopping allows

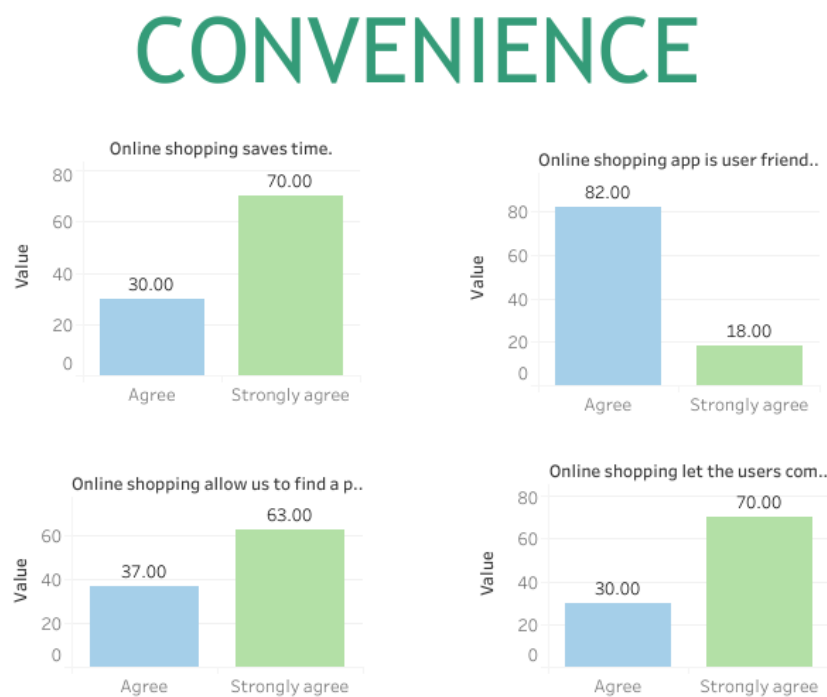
them to find product from many stores. For the last statement, 70% of respondents are strongly agree and 30% of respondents are agree. In addition, online shopping saves time and online shopping let the user compare price easily is the most positive statement as both of them have the highest mean value which is 3.70. The total mean score for all statements is 3.50. Table 4.2 shows the descriptive statistics for convenience:

Table 4.2 Descriptive statistics for convenience

Questions	Mean	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)
Online shopping saves time.	3.70	70	30	0	0
Online shopping apps is user friendly.	3.18	18	82	0	0
Online shopping allows us to find a product from many stores.	3.63	63	37	0	0
Online shopping let the users compare	3.70	70	30	0	0

price easily.	
Mean	3.55
scores for all 4 items	

Figure 4.1 Convenience's visualization



4.4 Price

According to Table 4.3, we can see that most of the respondents (63.0%) are strongly agree that online stores products is cheaper with the mean 3.50. However, 92.0% are agree that online shopping shipping fee is affordable while the rest of the respondents are strongly agree. The results indicate the lowest mean among all four statement which

is 3.10. Moreover, Malaysians are strongly agree that online shopping constantly has promotion (57.0%) and online shopping saves more money (74.0%). The highest mean score among all statements goes to online shopping saves more money with the mean score 3.70.

Table 4.3 Descriptive statistics for Price

Question	Mean	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)
Online store's product is cheaper.	3.63	63	37	0	0
Online shopping shipping fee is affordable.	3.08	8	92	0	0
Online shopping constantly has promotion	3.57	57	43	0	0
Online shopping saves more money.	3.74	74	26	0	0

Mean 3.51

scores for

all 4 items

Figure 4.2 Price's visualization



4.5 Risk

Based on the results, it shows that majority of the respondents are agree (70%) that online shopping is fully trusted and not a scam while the others are strongly agree (29%) with the statement. 93% of the respondents are agree with online shopping's purchase may arrive in damage, incomplete item or never arrive and the quality of the products may not same as in the description. By this results, it shows that online shoppers or online store should improve their services or their products. There are only 7% of respondents who are strongly agree that online shopping offers easy process for return or refund of damage product. Among all of the statements, the first statement gain the highest mean value which is 3.28 and the total mean score for risk is 3.03.

Table 4.4 Descriptive statistics for Risk

Question	Mean	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)
Online shopping is fully trusted and not a scam.	3.28	29	70	0	0
Online shopping's purchase may arrive in damage condition/incomplete item/never arrive.	3.05	6	93	1	0
The quality of the product may not same as in the description.	3.07	7	93	0	0
Online shopping offers easy process for return or refund of damage product.	2.73	7	60	32	1
Mean scores for all 4 items	3.03				

Figure 4.3 Risk's visualization



4.6 Customer Satisfaction

Table 4.5 shows majority of Malaysians are agree (61.0%) that there is no breach of personal information when they practice online shopping 79.0% disagree that the speed delivery is bad which means that the delivery service of online shopping is good and satisfied the consumers. Most of respondent's answer agree that online shopping apps shows good description of the product and online shopping has a lot more choice with the percentage of 93.0% and 54.0% respectively. On the other hand, the speed delivery is bad indicates the lowest mean score which is 1.80 while online shopping has a lot more choice indicates the highest mean score which is 3.40.

Table 4.5 Descriptive statistics for Customer Satisfaction

Question	Mean	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)
There is no breach of personal information.	3.35	38	61	0	0
The speed of delivery is bad.	1.79	0	0	79	21
Online shopping apps show good description of the product.	3.07	7	93	0	0
Online shopping has a lot more choice.	3.46	46	54	0	0
Mean scores for all 4 items	2.92				

Figure 4.4 Customer satisfaction's visualization



4.7 Customer Behaviour

According to the Table 4.6, it shows that 63.0% agree and 37.0% strongly agree that Malaysians prefer to shop through the internet because it is more convenient for them. In addition, majority of Malaysian who respond the survey agree that they prefer to shop through the internet because it saves more money (59.0%), they prefer to shop through the internet even though there is still some risk of online shopping (59.0%) and they prefer to shop through the internet because the services and the products are satisfied (77.0%). The total mean score for all statement is 3.20.

Table 4.6 Descriptive statistics for Customer Behaviour

Questions	Mean	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)
I prefer to shop through the internet because it is more convenient for me.	3.30	37.0	63.0	0	0
I prefer to shop through the internet because it saves more money	3.30	41.0	59.0	0	0
I prefer to shop through the internet even though there still some risks of online shopping.	3.10	16.0	83.0	0	0
I prefer to shop through the internet because the services and the products are satisfied.	3.20	23.0	77.0	0	0
Mean scores for all 4 items	3.20				

Figure 4.5 Customer behaviour's visualization



4.8 Reliability Test

The first step towards data analysis is reliability test which is Cronbach's alpha method. In order to calculate Cronbach's alpha, the first 30 respondents have been chosen. All the responds are in qualitative data, hence author has converted it into qualitative data which indicates strongly agree as 4, agree as 3, disagree as 2 and strongly disagree as 1. A library package is used to calculate Cronbach's alpha in Jupyter notebook which is pip install pingouin. The results of Cronbach's alpha are as follows:

Table 4.7 Cronbach's alpha result

Variables	Cronbach's alpha	N of items
Convenience	0.6	4
Price	0.5	4
Risk	-0.03	4
Customer satisfaction	0.5	4
Customer behaviour	0.7	4

Based on the results of Cronbach's alpha, it shows that convenience, price, and customer satisfaction are acceptable for further analysis as the value of the Cronbach's alpha is between 0.5 and above. It also can be seen that the data for risk factor is not reliable and not fit for data analysis. Therefore, this factor is excluded for data analysis part.

4.9 Pearson Correlation Analysis

Table 4.8 shows the correlation among three independent variables which are convenience, price and customer satisfaction with one dependent variable, customer behaviour. According to the results, it shows that price and customer satisfaction have R-value of 0.109 and 0.220 respectively. The results reflecting a moderately positive relationship between them and customer behaviour. In addition, R-value for convenience is 0.109 which resembles a strong relationship with dependent variable, customer behaviour as the value is near to 1. The results show that among all independent variables,

convenience have a stronger relationship with customer behaviour than price and customer satisfaction.

Table 4.8 Correlation among variables

	Convenience	Price	Customer satisfaction	Customer behaviour
Convenience	1	0.495	0.288	0.109
Price	0.495	1	0.134	0.190
Customer satisfaction	0.288	0.134	1	0.220
Customer behaviour	0.109	0.190	0.220	1

4.10 Multiple Linear Regression Analysis

Aside from the mean score analysis, the significant of each variable was also examined by using multiple linear regression analysis. The results of multiple linear regression method is shown in Table 4.9.

Table 4.9 Results for factors influencing Malaysian's online shopping behaviour

	Unstandardized Coefficients Beta	Standard Error	T statistics	Significance
Constant		0.530	3.627	0.000
Convenience		0.127	-0.350	0.727
Price		0.128	1.615	0.110
Customer satisfaction		0.135	2.027	0.045
R-squared	0.076			
Adjusted R- squared	0.047			
F-statistics	2.629			
Prob (F- statistic)	0.0546			

The results shows that R-squared is 0.076 which indicated 7.6%. The results show the changes in all independents variables which are convenience, price, and customer satisfaction. Adjusted R-squared is 0.047 which mean 4.7% of the changes in customer behaviour. Independents variables, convenience, price, and customer satisfaction explained all the changes. According to the analysis, F-statistic is 1.989 while probability F-statistic is 0.0546. Probability F-statistic refers to the accuracy of the null hypothesis whether it is accurate that the variables' effect is 0. Based on the P-value, customer satisfaction is the significant variable since the value is less than 0.05 which is 0.045. However, the other two independent variables are found to be not significant to customer behaviour as their P-value is above than 0.05. Overall. The result of the multiple linear regression shows in Table 4.9 above can be summarized as given in Table 4.10.

Table 4.10 Summary of hypothesis results

	Hypothesis	Results
H1	There is a significant relationship between convenience and online shopping behaviour among Malaysians.	Not supported
H2	There is a significant relationship between price and online shopping behaviour among Malaysians.	Not supported
H3	There is significant relationship between customer satisfaction and online shopping behaviour among Malaysians.	Supported

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter will discuss the overall results of the analysis that has been done using multiple linear regression (MLR) method.

5.2 Summary and Conclusions

In summary, we can see that there are still lots of people who still practice online shopping even though Covid-19 pandemic has ended where movement control order is not being imposed anymore. According to the results of the demographic profile, we can see that most people who purchase goods from the internet are mostly female compared to male. Majority of the Malaysian who practice online shopping are from age 21 to 30 years old which we can consider as youth and young adults. The least respondents are from age group 51, and above which can be understand they might prefer to practice physical shopping instead due to personal issue. Most of respondents lives in suburban area and single.

Overall, the highest total mean score among four independent variables is convenience with value 3.55. It is also shown that the strongest correlation among the variables is convenience while the weakest correlation is customer satisfaction as its value is 0.220. Based on the results, it is shown that customer satisfaction has the most significant relationship with customer behaviour since it has the closest significance value which is 0.045. The total mean score for customer satisfaction is 3.03 and the highest mean score among the statement is 3.46 which refer to online shopping has a lot more choice. This shows that customer satisfaction gives a high impact to Malaysians online shopping behaviour even the Covid-19 pandemic has ended.

5.3 Recommendations

In short, the analysis on online shopping behaviour among Malaysians can help other organization directly or indirectly to improve their marketing strategies in order to increase their business profit. The analysis can also help them to create new idea to promote their services or products as there are many products created day by day and to make sure that their services or products are still relevant in market. Moreover, the data of Malaysians shopping behaviour can also help government organization to keep updated with the issue arise regarding between online stores and online shoppers to make sure that both parties rights always reserved. As the visualization dashboards are published to the public, all parties can access the visualization easily without any limitations. It is recommended to have more questions for each variables in the questionnaire to avoid any excluded factor or variable for further study to get better results than this paper.

REFERENCES

- Abdulhafedh, A. (2022). Incorporating Multiple Linear Regression in Predicting the House Prices Using a Big Real Estate Dataset with 80 Independent Variables. *OALib*, 09(01), 1–21. <https://doi.org/10.4236/oalib.1108346>
- Almahdi, M., & Alsayed, N. (2021). Customer Experiences Using Online Food Ordering and Delivery Platforms (OFODPs): An S-O-R Perspective (Issue 93999).
- Alshammeri, E., Alahmad, D., Dashti, A., Alajlan, R., Alameer, Z., & Kizilaslan, R. (2021). Determination Passenger Satisfaction of a Kuwait Airline Company by Using Multivariate Data Analysis Models.
- David Acheme, I., Osemengbe, U., Samuel Makinde, A., & Rebecca Vincent, O. (2021). Online Stores: Analysis of user Experience with Multiple Linear Regression Model.
- Farizal, Qaradhwai, Y., Cornelis, C. I., & Dachyar, M. (2020). Fast moving product demand forecasting model with multi linear regression. *AIP Conference Proceedings*, 2227. <https://doi.org/10.1063/5.0001031>
- Guci, D. A., Ghazali, P. L., Nst, A. M., Fajrillah, Abas, S., & Fadhli, M. (2020). Analyze the Relationship of Brand Image and Advertisement towards Decision to Become a Customer on Bank BNI Batam Branch. *Journal of Physics: Conference Series*, 1477(2). <https://doi.org/10.1088/1742-6596/1477/2/022008>
- Gupta, A., Su, B.-C., & Walter, Z. (n.d.). An Empirical Study of Consumer Switching from Traditional to Electronic Channel: A Purchase Decision Process Perspective. In *International Journal of Flexible Manufacturing Systems, Information Technology Management, and Journal of Communications of the ACM. Decision Support Systems*.
- Hsu, Y., Loan, T., & Student, L. G. (2021). Factors Influencing Customer Satisfaction with Online Food Delivery Services in Vietnam. *International Journal of Business and Social Science*, 12(11). <https://doi.org/10.30845/ijbss.v12n11p5>

- K, I. (2020). Malaysians' Popular Online Shopping Websites during Movement Control Order (MCO). *International Journal of Advanced Trends in Computer Science and Engineering*, 9(2), 2154–2158. <https://doi.org/10.30534/ijatcse/2020/190922020>
- Kadang, H., & Sukati, I. (2012). A STUDY OF SERVICE QUALITY: AN EMPIRICAL INVESTIGATION OF INDONESIAN AIRLINES SERVICES. *South East Asian Journal of Contemporary Business, Economics and Law*, 1.
- Khuong, M. N., & Dai, N. Q. (2016). The Factors Affecting Customer Satisfaction and Customer Loyalty — A Study of Local Taxi Companies in Ho Chi Minh City, Vietnam. *International Journal of Innovation, Management and Technology*, 228–233. <https://doi.org/10.18178/ijimt.2016.7.5.678>
- Michael Clemes Christopher Gan, A. D., Kao Michelle Choong, T.-H., Clemes, M. D., Gan, C., Kao, T.-H., & Choong, M. (2008). “An empirical analysis of customer satisfaction in international air travel.” <https://orcid.org/0000-0002-5618-1651>
- Mokhtar, M., Yusoff, S., Asmuni, S., Ain, N., & Fauzi, M. (2019). An insight into online shopping behaviour among young adults in Malaysia. *Islamic Research Journal of Emerging Economies & Islamic Research*, 8(1), 77–88. <http://myjms.moe.gov.my/index.php/JEEIRwww.jeeir.com>
- Naszariah, R., Naseri, N., Zamratul, N., Ahmad, A., Shariff, S., Hussin, H., & Norazmi Bin Nordin, M. (2021). Issues And Challenges Of Online Shoppingactivities On The Impact Of Corona Pandemic :A Study On Malaysia Retail Industry. In *Turkish Journal of Computer and Mathematics Education* (Vol. 12, Issue 10). https://www.abeam.com/my/en/topics/insights/covid19_retail
- Rusov, J., Misita, M., Milanovic, D. D., & Milanovic, D. L. (2017). Applying regression models to predict business results. *FME Transactions*, 45(1), 198–202. <https://doi.org/10.5937/fmet1701198R>
- Sudiartha Athar, H., Basuki, P., & Santoso, B. (2021). The Analysis of Customer Satisfaction Post Covid-19.
- Wagner, D. (2019). A Study of Factors Influencing the Online Purchasing Intention toward Online Shopping in Thailand.

Wee, M., Suparman, N. S., Sadik, M. Z., Jamaluddin, N. L., & Hassian, U. K. (2021). Stay at Home: Malaysian Youth Perception towards Online Shopping as The New Norms. *International Journal of Academic Research in Business and Social Sciences*, 11(6). <https://doi.org/10.6007/ijarbss/v11-i6/10199>

APPENDICES

APPENDIX A: QUESTIONNAIRE

MALAYSIAN'S ONLINE SHOPPING BEHAVIOUR ANALYSIS AFTER COVID- 19 PANDEMIC

This survey questions mainly purpose to identify customer behaviour towards online shopping among Malaysians. This survey only for Malaysia citizens without any age limit. You are required to answer all questions. I hope you can spare few minutes to answer this survey. Thank you.

Further inquiries,
Nur Ainaa Najihah Binti Abdil Shakri
Bachelor of Applied Science in Data Analytics with Honours
Universiti Malaysia Pahang.
ainaanajihah99@gmail.com
[013-5058682](tel:013-5058682)

* Required

1. Gender *

Mark only one oval.

- ☐ Male
☐ Female

2. Age *

Mark only one oval.

- ☐ Below 21
☐ 21-30
☐ 31-40
☐ 41-50
☐ 51 and above

3. Marital status *

Mark only one oval.

- ☐ Single
☐ Married

4. Level of education *

Mark only one oval.

- ☐ SPM
☐ STPM
☐ Diploma
☐ Degree
☐ Master
☐ PhD

5. Occupation *

Mark only one oval.

- ☐ Student
☐ Employed
☐ Self-employed
☐ Unemployed

6. Monthly income *

Mark only one oval.

- ☐ RM500 and below
☐ RM501-RM1000
☐ RM1001-RM3000
☐ RM3001-RM5000
☐ RM5001 and above

7. Source of income *

Mark only one oval.

- ☐ Parents
☐ Employer
☐ Scholarship/PTPTN
☐ Profit from own business

8. Living area *

Mark only one oval.

- ☐ Urban
☐ Suburban
☐ Rural

9. How often do you shop online shopping per month? *

Mark only one oval.

- ☐ Once
☐ Twice
☐ Thrice
☐ More than thrice

10. Which category do you often shop online? *

Check all that apply.

- ☐ Health and beauty
☐ Mobile and accessories
☐ Home and living
☐ Baby and toys
☐ Fashion

11. How much do you spend for online shopping per month? *

Mark only one oval.

- ☐ Below RM100
☐ RM101-RM300
☐ RM301-RM500
☐ RM501 and above

12. Favourite online store *

Check all that apply.

☐ Shopee

☐ Lazada

☐ Zalora

☐ Facebook

☐ Instagram

☐ Other: _____

Convenience

The first factor to analyse online shopping behaviour is convenience.

13. *

Mark only one oval per row.

	Strongly agree	Agree	Disagree	Strongly disagree
Online shopping saves time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping app is user friendly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping allow us to find a product from many stores.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping let the users compare price easier.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Price

The second factor to analyse online shopping behaviour is price.

14. *

Mark only one oval per row.

	Strongly agree	Agree	Disagree	Strongly disagree
Online store's product is cheaper.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping shipping fee is affordable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping constantly has promotion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping saves more money.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Risks

The third factor to analyse online shopping behaviour is risk.

Mark only one oval per row.

	Strongly agree	Agree	Disagree	Strongly disagree
Online shopping is fully trusted and not a scam.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping's purchase may arrive in damage condition/incomplete item/never arrive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The quality of the product may not same as in the product description.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping offers easy process for return or refund of damage product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Customer
satisfaction

The last factor to analyse online shopping behaviour is
customer satisfaction.

16. *

Mark only one oval per row.

	Strongly agree	Agree	Disagree	Strongly disagree
There is no breach of personal information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The speed of delivery is bad.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping apps show good description of the product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online shopping has a lot more choice.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Customer
behaviour

This section's questions are mainly to analyse customer behaviour towards online shopping.

	Strongly agree	Agree	Disagree	Strongly disagree
I prefer to shop through the internet because it is more convenient for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer to shop through the internet because it save more money.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer to shop through the internet even though there still some risks of online shopping.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer to shop through the internet because the services and the products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<https://docs.google.com/forms/d/1fY6L1UvfJoJ71KIKy6uGYMKm1F0GAHg4I4b6-N04hY/edit?pli=1>

10/11

1/25/23, 11:35 AM

MALAYSIAN'S ONLINE SHOPPING BEHAVIOUR ANALYSIS AFTER COVID-19 PANDEMIC

are
satisfied.

APPENDIX B: DATA ANALYSIS SOURCE CODE

DEMOGRAPHIC PROFILE ANALYSIS

In [1]:

```
1 import pandas as pd
2 import numpy as np
3 import matplotlib.pyplot as plt
4 from matplotlib.colors import ListedColormap, LinearSegmentedColormap
5 import seaborn as sns
6 from sklearn.preprocessing import LabelEncoder
7 LE = LabelEncoder()
8 import warnings
9 warnings.filterwarnings('ignore')
```

In [2]:

```
1 #import data
2 Data= pd.read_csv('MALAYSIAN'S ONLINE SHOPPING BEHAVIOUR ANALYSIS AFTER COVID-19 PANDEMIC.csv')
3 Data
```

Out[2]:

	Gender	Age	Marital status	Level of education	Occupation	Monthly income	Source of income	Living area	How often do you shop online shopping per month?	Which category do you often shop online?	...	The quality of the product may not same as in the product description.	Online shopping offers easy process for return or refund of damage product.	There brees per informs
0	Female	41-50	Married	Degree	Employed	RM3001-RM5000	Employer	Urban	Twice	Health and beauty,Fashion	...	Agree	Disagree	
1	Female	21-30	Single	Degree	Employed	RM5001 and above	Employer	Suburban	Thrice	Health and beauty;Home and living;Fashion	...	Agree	Disagree	
2	Female	31-40	Single	Master	Employed	RM5001 and above	Employer	Suburban	Twice	Fashion	...	Agree	Agree	
3	Female	21-30	Single	Degree	Student	RM501-RM1000	Scholarship/PTPTN	Suburban	More than thrice	Health and beauty;Fashion	...	Agree	Agree	
4	Female	31-40	Married	Diploma	Employed	RM1001-RM3000	Employer	Suburban	Twice	Home and living;Baby and toys	...	Agree	Agree	
...
95	Female	31-40	Married	Degree	Employed	RM5001 and above	Employer	Suburban	More than thrice	Home and living;Baby and toys;Fashion	...	Agree	Agree	Sti
96	Female	21-30	Single	Degree	Student	RM500 and below	Scholarship/PTPTN	Suburban	Once	Health and beauty	...	Agree	Disagree	Sti
97	Female	31-40	Married	STPM	Employed	RM3001-RM5000	Employer	Suburban	Twice	Health and beauty;Home and living;Fashion	...	Agree	Agree	Sti
98	Female	21-30	Single	Degree	Student	RM501-RM1000	Parents	Suburban	Once	Health and beauty;Mobile and accessories;Fashion	...	Agree	Disagree	Sti
99	Male	41-50	Single	Degree	Employed	RM5001 and above	Employer	Suburban	Once	Home and living	...	Agree	Agree	

100 rows x 32 columns

In [3]:

```
1 Data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 32 columns):
#   Column                                                                                               Non-Null Count  Dtype
---  -
0   Gender                                                                                               100 non-null    object
1   Age                                                                                                   100 non-null    object
2   Marital status                                                                                       100 non-null    object
3   Level of education                                                                                   100 non-null    object
4   Occupation                                                                                           100 non-null    object
5   Monthly income                                                                                       100 non-null    object
6   Source of income                                                                                     100 non-null    object
7   Living area                                                                                           100 non-null    object
8   How often do you shop online shopping per month?          100 non-null    object
9   Which category do you often shop online?                  100 non-null    object
10  How much do you spend for online shopping per month?      100 non-null    object
11  Favourite online store                                      100 non-null    object
12  Online shopping saves time.                                100 non-null    object
13  Online shopping app is user friendly.                      100 non-null    object
14  Online shopping allow us to find a product from many stores. 100 non-null    object
15  Online shopping let the users compare price easier.         100 non-null    object
16  Online stores product is cheaper.                           100 non-null    object
17  Online shopping shipping fee is affordable.                 100 non-null    object
18  Online shopping constantly has promotion.                   100 non-null    object
19  Online shopping saves more money.                           100 non-null    object
20  Online shopping is fully trusted and not a scam.            100 non-null    object
21  Online shoppings purchase may arrive in damage condition/incomplete item/never arrive. 100 non-null    object
22  The quality of the product may not same as in the product description. 100 non-null    object
23  Online shopping offers easy process for return or refund of damage product. 100 non-null    object
24  There is no breach of personal information.                 100 non-null    object
25  The speed of delivery is bad.                                100 non-null    object
26  Online shopping apps show good description of the product. 100 non-null    object
27  Online shopping has a lot more choice.                      100 non-null    object
28  I prefer to shop through the internet because it is more convenient for me. 100 non-null    object
29  I prefer to shop through the internet because it save more money. 100 non-null    object
30  I prefer to shop through the internet even though there still some risks of online shopping. 100 non-null    object
31  I prefer to shop through the internet because the services and the products are satisfied. 100 non-null    object
dtypes: object(32)
memory usage: 25.1+ KB
```

In [4]:

```
1 Data.describe()
```

Out[4]:

	Gender	Age	Marital status	Level of education	Occupation	Monthly income	Source of income	Living area	How often do you shop online shopping per month?	Which category do you often shop online?	...	The quality of the product may not same as in the product description.	Online shopping offers easy process for return or refund of damage product.	There is no breach of personal information.	s
count	100	100	100	100	100	100	100	100	100	100	...	100	100	100	
unique	2	5	2	6	4	5	4	3	4	17	...	2	4	3	
top	Female	21-30	Single	Degree	Student	RM501-RM1000	Employer	Suburban	Once	Health and beauty,Fashion	...	Agree	Agree	Agree	Dis
freq	67	50	66	58	50	27	40	69	37	23	...	93	60	61	

4 rows × 32 columns

In [5]:

```
1 len(Data)
```

Out[5]:

100

In [6]:

```
1 #Check unique values for Gender
2 Data['Gender'].value_counts()
```

Out[6]:

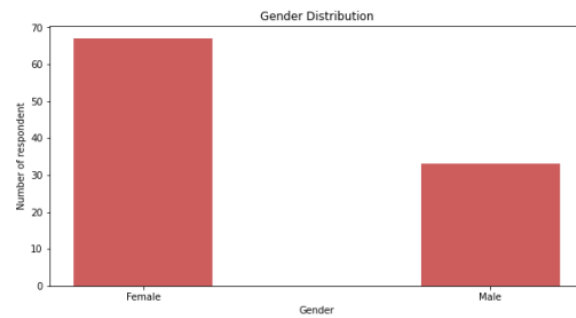
```
Female    67
Male      33
Name: Gender, dtype: int64
```

In [7]:

```
1 #Gender distribution
2 #creating the dataset
3 data = {'Female': 67, 'Male': 33}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Gender")
13 plt.ylabel("Number of respondent")
14 plt.title("Gender Distribution")
```

Out[7]:

Text(0.5, 1.0, 'Gender Distribution')



In [8]:

```
1 #Check unique values for Age
2 Data['Age'].value_counts()
```

Out[8]:

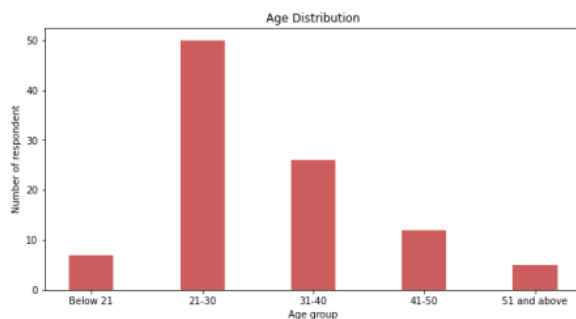
```
21-30      50
31-40      26
41-50      12
Below 21     7
51 and above  5
Name: Age, dtype: int64
```

In [9]:

```
1 #Age distribution
2 #creating the dataset
3 data = {'Below 21': 7, '21-30': 50, '31-40': 26, '41-50': 12, '51 and above': 5}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Age group")
13 plt.ylabel("Number of respondent")
14 plt.title("Age Distribution")
```

Out[9]:

Text(0.5, 1.0, 'Age Distribution')



In [10]:

```
1 #Check unique values for Marital Status
2 Data['Marital status'].value_counts()
```

Out[10]:

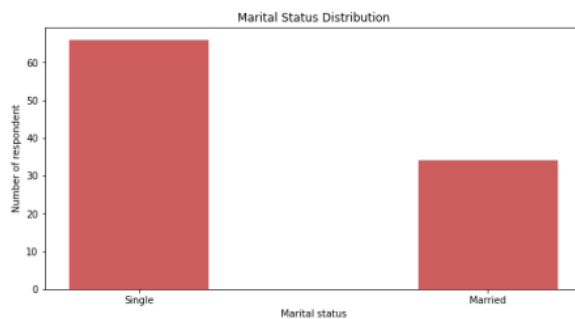
```
Single      66
Married     34
Name: Marital status, dtype: int64
```

In [11]:

```
1 #Marital status distribution
2 #creating the dataset
3 data = {'Single': 66, 'Married': 34}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Marital status")
13 plt.ylabel("Number of respondent")
14 plt.title("Marital Status Distribution")
```

Out[11]:

Text(0.5, 1.0, 'Marital Status Distribution')



In [12]:

```
1 #Check unique values for Level of Education
2 Data['Level of education'].value_counts()
```

Out[12]:

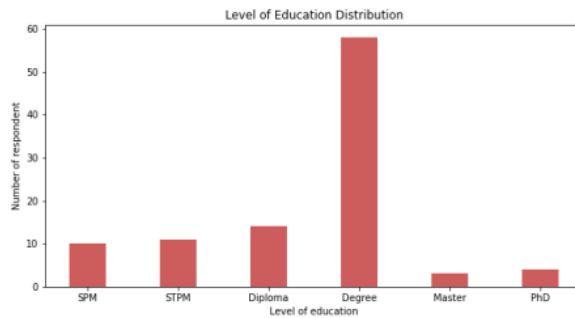
```
Degree      58
Diploma     14
STPM         11
SPM          9
PhD          4
Master       3
Name: Level of education, dtype: int64
```

In [13]:

```
1 #Level of education distribution
2 #creating the dataset
3 data = {'SPM': 10, 'STPM': 11, 'Diploma': 14, 'Degree': 58, 'Master': 3, 'PhD': 4}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Level of education")
13 plt.ylabel("Number of respondent")
14 plt.title("Level of Education Distribution")
```

Out[13]:

Text(0.5, 1.0, 'Level of Education Distribution')



In [14]:

```
1 #Check unique values for Occupation
2 Data['Occupation'].value_counts()
```

Out[14]:

```
Student      50
Employed     35
Self-employed 11
Unemployed   4
Name: Occupation, dtype: int64
```

In [15]:

```
1 #Occupation distribution
2 #creating the dataset
3 data = {'Unemployed': 4, 'Self-employed': 11, 'Employed': 35, 'Student': 50}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Occupation category")
13 plt.ylabel("Number of respondent")
14 plt.title("Occupation Distribution")
```

Out[15]:

Text(0.5, 1.0, 'Occupation Distribution')



In [16]:

```
1 #Check unique values for Monthly income
2 Data['Monthly income'].value_counts()
```

Out[16]:

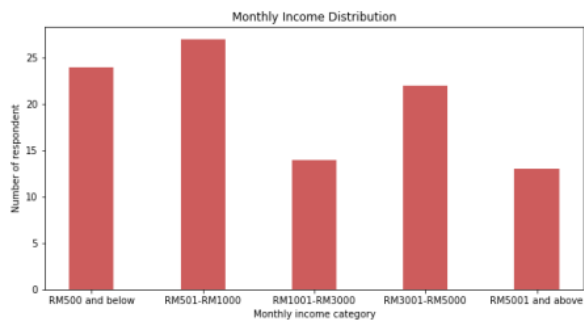
```
RM501-RM1000      27
RM500 and below    24
RM3001-RM5000     22
RM1001-RM3000     14
RM5001 and above   13
Name: Monthly income, dtype: int64
```

In [17]:

```
1 #Monthly income distribution
2 #creating the dataset
3 data = {'RM500 and below': 24, 'RM501-RM1000': 27, 'RM1001-RM3000': 14, 'RM3001-RM5000': 22, 'RM5001 and above': 13}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Monthly income category")
13 plt.ylabel("Number of respondent")
14 plt.title("Monthly Income Distribution")
```

Out[17]:

Text(0.5, 1.0, 'Monthly Income Distribution')



In [18]:

```
1 #Check unique values for Source of income
2 Data['Source of income'].value_counts()
```

Out[18]:

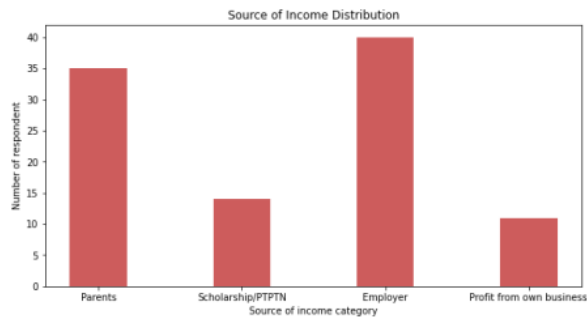
```
Employer          40
Parents           35
Scholarship/PTPTN 14
Profit from own business 11
Name: Source of income, dtype: int64
```

In [19]:

```
1 #Source of income distribution
2 #creating the dataset
3 data = {'Parents': 35, 'Scholarship/PTPTN': 14, 'Employer': 40, 'Profit from own business': 11}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Source of income category")
13 plt.ylabel("Number of respondent")
14 plt.title("Source of Income Distribution")
```

Out[19]:

Text(0.5, 1.0, 'Source of Income Distribution')



In [20]:

```
1 #Check unique values for Living area
2 Data['Living area'].value_counts()
```

Out[20]:

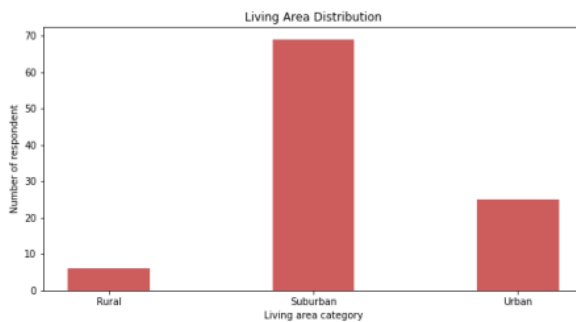
```
Suburban    69
Urban       25
Rural        6
Name: Living area, dtype: int64
```

In [21]:

```
1 #Living area distribution
2 #creating the dataset
3 data = {'Rural': 6, 'Suburban': 69, 'Urban': 25}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Living area category")
13 plt.ylabel("Number of respondent")
14 plt.title("Living Area Distribution")
```

Out[21]:

Text(0.5, 1.0, 'Living Area Distribution')



In [22]:

```
1 #Check unique values for How often do you shop online shopping per month?
2 Data['How often do you shop online shopping per month?'].value_counts()
```

Out[22]:

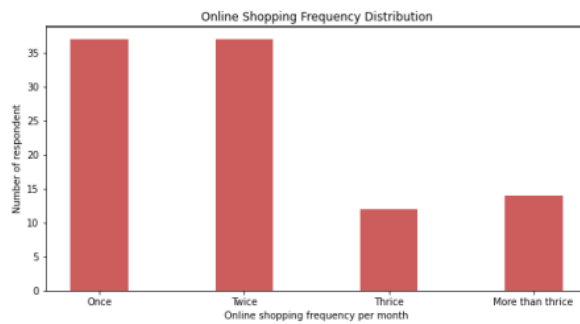
```
Once      37
Twice     37
More than thrice  14
Thrice    12
Name: How often do you shop online shopping per month?, dtype: int64
```

In [23]:

```
1 #How often do you shop online shopping per month? distribution
2 #creating the dataset
3 data = {'Once': 37, 'Twice': 37, 'Thrice': 12, 'More than thrice': 14}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#D5C5C5', width = 0.4)
11
12 plt.xlabel("Online shopping frequency per month")
13 plt.ylabel("Number of respondent")
14 plt.title("Online Shopping Frequency Distribution")
```

Out[23]:

Text(0.5, 1.0, 'Online Shopping Frequency Distribution')



In [24]:

```
1 #Check unique values for How much do you spend for online shopping per month?
2 Data['How much do you spend for online shopping per month?'].value_counts()
```

Out[24]:

```
Below RM100      43
RM101-RM300     36
RM301-RM500     16
RM501 and above   5
Name: How much do you spend for online shopping per month?, dtype: int64
```

In [25]:

```
1 #How much do you spend for online shopping per month? distribution
2 #creating the dataset
3 data = {'Below RM100': 43, 'RM101-RM300': 36, 'RM301-RM500': 16, 'RM501 and above': 5}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Online shopping spending per month")
13 plt.ylabel("Number of respondent")
14 plt.title("Money Spend On Online Shopping Distribution")
```

Out[25]:

Text(0.5, 1.0, 'Money Spend On Online Shopping Distribution')



In [26]:

```
1 #import data shopping category
2 Data1= pd.read_csv('Shopping Category.csv')
3 Data1
```

Out[26]:

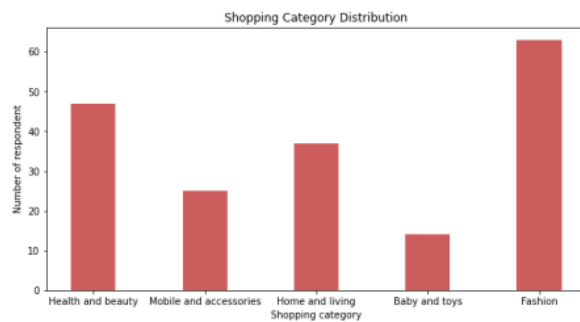
	Shopping category	Number of respondent
0	Health and beauty	47
1	Mobile and accessories	25
2	Home and living	37
3	Baby and toys	14
4	Fashion	63

In [27]:

```
1 #Shopping category distribution
2 #creating the dataset
3 data = {'Health and beauty': 47, 'Mobile and accessories': 25, 'Home and living': 37, 'Baby and toys': 14, 'Fashion': 63}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Shopping category")
13 plt.ylabel("Number of respondent")
14 plt.title("Shopping Category Distribution")
```

Out[27]:

Text(0.5, 1.0, 'Shopping Category Distribution')



In [28]:

```
1 #import data favourite online store
2 Data2= pd.read_csv('Favourite Online Store.csv')
3 Data2
```

Out[28]:

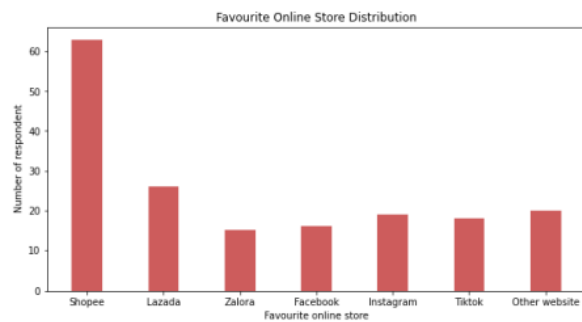
	Favourite online store	Number of respondent
0	Shopee	63
1	Lazada	26
2	Zalora	15
3	Facebook	16
4	Instagram	19
5	TikTok	18
6	Other website	20

In [29]:

```
1 #Favourite online store distribution
2 #creating the dataset
3 data = {'Shopee': 63, 'Lazada': 26, 'Zalora': 15, 'Facebook': 16, 'Instagram': 19, 'Tiktok': 18, 'Other website': 20}
4 courses = list(data.keys())
5 values = list(data.values())
6
7 fig = plt.figure(figsize = (10, 5))
8
9 # creating the bar plot
10 plt.bar(courses, values, color = '#CD5C5C', width = 0.4)
11
12 plt.xlabel("Favourite online store")
13 plt.ylabel("Number of respondent")
14 plt.title("Favourite Online Store Distribution")
```

Out[29]:

Text(0.5, 1.0, 'Favourite Online Store Distribution')



- 1) STRONGLY AGREE = 4
- 2) AGREE = 3
- 3) DISAGREE = 2
- 4) STRONGLY DISAGREE = 1

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

```

1 pip install pinguin

Requirement already satisfied: pinguin in c:\users\owner\anaconda3\new\lib\site-packages (0.5.2)
Requirement already satisfied: scipy>1.7 in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (1.9.3)
Requirement already satisfied: pandas>1.0 in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (1.1.3)
Requirement already satisfied: scikit-learn<1.1.0 in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (0.23.2)
Requirement already satisfied: matplotlib>=3.0.2 in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (3.3.2)
Requirement already satisfied: outdated in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (0.2.2)
Requirement already satisfied: numpy>1.19 in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (1.23.5)
Requirement already satisfied: seaborn>=0.11 in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (0.11.0)
Requirement already satisfied: pandas-flavor>=0.2.0 in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (0.3.0)
Requirement already satisfied: statsmodels>=0.13 in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (0.13.5)
Requirement already satisfied: tabulate in c:\users\owner\anaconda3\new\lib\site-packages (from pinguin) (0.9.0)
Requirement already satisfied: pytz>=2017.2 in c:\users\owner\anaconda3\new\lib\site-packages (from pandas>1.0->pinguin) (2020.1)
Requirement already satisfied: python-dateutil>=2.7.3 in c:\users\owner\anaconda3\new\lib\site-packages (from pandas>1.0->pinguin) (2.8.1)
Requirement already satisfied: joblib>=0.11 in c:\users\owner\anaconda3\new\lib\site-packages (from scikit-learn<1.1.0->pinguin) (0.17.0)
Requirement already satisfied: threadpoolctl>=2.0.0 in c:\users\owner\anaconda3\new\lib\site-packages (from scikit-learn<1.1.0->pinguin) (2.1.0)
Requirement already satisfied: pillow>=6.2.0 in c:\users\owner\anaconda3\new\lib\site-packages (from matplotlib>=3.0.2->pinguin) (8.0.1)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\owner\anaconda3\new\lib\site-packages (from matplotlib>=3.0.2->pinguin) (1.3.0)
Requirement already satisfied: cycler>=0.10 in c:\users\owner\anaconda3\new\lib\site-packages (from matplotlib>=3.0.2->pinguin) (0.10.0)
Requirement already satisfied: certifi>=2020.06.20 in c:\users\owner\anaconda3\new\lib\site-packages (from matplotlib>=3.0.2->pinguin) (2020.6.20)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.3 in c:\users\owner\anaconda3\new\lib\site-packages (from matplotlib>=3.0.2->pinguin) (2.4.7)
Requirement already satisfied: littleutils in c:\users\owner\anaconda3\new\lib\site-packages (from outdated->pinguin) (0.2.2)
Requirement already satisfied: setuptools>=44 in c:\users\owner\anaconda3\new\lib\site-packages (from outdated->pinguin) (50.3.1.post20201107)
Requirement already satisfied: requests in c:\users\owner\anaconda3\new\lib\site-packages (from outdated->pinguin) (2.24.0)
Requirement already satisfied: xarray in c:\users\owner\anaconda3\new\lib\site-packages (from pandas-flavor>=0.2.0->pinguin) (2022.12.0)
Requirement already satisfied: lazy-loader==0.1rc2 in c:\users\owner\anaconda3\new\lib\site-packages (from pandas-flavor>=0.2.0->pinguin) (0.1rc2)
Requirement already satisfied: packaging>=21.3 in c:\users\owner\anaconda3\new\lib\site-packages (from statsmodels>=0.13->pinguin) (22.0)
Requirement already satisfied: patsy>=0.5.2 in c:\users\owner\anaconda3\new\lib\site-packages (from statsmodels>=0.13->pinguin) (0.5.3)
Requirement already satisfied: six>=1.5 in c:\users\owner\anaconda3\new\lib\site-packages (from python-dateutil>=2.7.3->pandas>1.0->pinguin) (1.15.0)
Requirement already satisfied: idna<3,>=2.5 in c:\users\owner\anaconda3\new\lib\site-packages (from requests>outdated->pinguin) (2.10)
Requirement already satisfied: chardet<4,>=3.0.2 in c:\users\owner\anaconda3\new\lib\site-packages (from requests>outdated->pinguin) (3.0.4)
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in c:\users\owner\anaconda3\new\lib\site-packages (from requests>outdated->pinguin) (1.25.11)
Note: you may need to restart the kernel to use updated packages.

```

```
1 import pandas as pd
2 #VARIABLE:CONVENIENCE
3 #enter survey responses as a data frame
4 Data1 = pd.DataFrame({'Q1':[4, 4, 4, 3, 3, 4, 4, 3, 4, 4, 4, 3, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 3, 4, 3, 4, 3, 4, 4],
5                        'Q2':[3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 4],
6                        'Q3':[3, 4, 4, 3, 4, 4, 3, 4, 4, 3, 3, 3, 4, 4, 4, 4, 4, 3, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4],
7                        'Q4':[4, 4, 4, 4, 4, 3, 3, 4, 4, 4, 3, 3, 4, 4, 4, 4, 4, 4, 4, 4, 3, 3, 4, 3, 3, 4, 4, 4]})
8 #Load data frame
9 Data1
```

	Q1	Q2	Q3	Q4
0	4	3	3	4
1	4	3	4	4
2	4	3	4	4
3	3	3	3	4
4	3	3	4	4
5	4	3	4	3
6	3	3	3	3
7	4	3	4	4
8	4	3	4	4
9	4	3	3	4
10	4	3	3	3
11	3	3	3	3
12	4	3	4	4
13	4	3	4	4
14	4	3	4	4
15	4	3	4	4
16	4	3	3	3
17	4	3	4	4
18	4	3	4	4
19	4	3	4	4
20	4	3	3	4
21	4	3	3	3
22	3	3	3	3
23	4	3	3	4
24	3	3	3	3
25	4	3	3	3
26	3	3	4	4
27	3	3	4	4
28	4	3	4	4
29	4	4	4	4

In [32]:

```
1 import pingouin as pg
2 pg.cronbach_alpha(data=Data1)
```

Out[32]:

```
(0.5939284640817553, array([0.291, 0.788]))
```

In [33]:

```
1 import pandas as pd
2 #VARIABLE:PRICE
3 #Enter survey responses as a data frame
4 Data2 = pd.DataFrame({'Q1':[3, 3, 3, 4, 3, 3, 3, 4, 3, 3, 3, 3, 4, 4, 4, 4, 3, 4, 4, 3, 3, 4, 4, 4],
5                        'Q2':[3, 3, 4, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 4, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3],
6                        'Q3':[4, 4, 3, 4, 3, 4, 3, 3, 4, 3, 4, 3, 4, 4, 4, 4, 4, 3, 4, 4, 3, 3, 3, 3],
7                        'Q4':[4, 4, 4, 4, 4, 4, 3, 4, 4, 3, 4, 3, 4, 4, 4, 4, 4, 4, 4, 3, 3, 3, 3, 4]})
8 #Load data frame
9 Data2
```

Out[33]:

	Q1	Q2	Q3	Q4
0	3	3	4	4
1	3	3	4	4
2	3	4	3	4
3	4	3	4	4
4	3	3	3	4
5	3	3	4	4
6	3	3	3	3
7	4	3	3	4
8	3	3	4	4
9	3	3	3	3
10	3	3	4	4
11	3	3	3	3
12	4	3	4	4
13	4	3	4	4
14	4	4	4	4
15	4	3	4	4
16	4	3	4	4
17	4	3	3	4
18	3	3	4	4
19	4	3	4	4
20	4	3	3	4
21	4	3	3	3
22	3	3	3	3
23	4	3	3	3
24	4	3	3	3
25	3	3	3	3
26	3	3	3	3
27	4	3	4	4
28	4	3	4	4
29	4	3	3	3

In [34]:

```
1 import pingouin as pg
2 pg.cronbach_alpha(data=Data2)
```

Out[34]:

```
(0.5373976855771945, array([0.192, 0.758]))
```

In [35]:

```
1 import pandas as pd
2 #VARIABLE: CUSTOMER SATISFACTION
3 #Enter survey responses as a data frame
4 Data3 = pd.DataFrame({'Q1': [3, 3, 3, 3, 3, 3, 3, 3, 4, 4, 4, 3, 3, 4, 3, 3, 3, 3, 4, 4, 3, 3, 3, 3, 3, 4, 3, 3, 4],
5                        'Q2': [2, 2, 1, 2, 2, 2, 1, 2, 2, 2, 2, 2, 2, 2, 2, 1, 2, 2, 2, 2, 1, 2, 2, 2, 2, 1, 2, 2],
6                        'Q3': [3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 4, 3, 3, 3, 3, 3, 3, 3, 3, 3],
7                        'Q4': [4, 4, 3, 4, 3, 3, 3, 3, 3, 4, 3, 4, 3, 4, 3, 3, 3, 3, 4, 4, 3, 3, 3, 3, 4, 3, 4, 3, 4]})
8 #Load data frame
9 Data3
```

Out[35]:

	Q1	Q2	Q3	Q4
0	4	4	3	3
1	3	3	3	3
2	3	3	3	3
3	3	3	3	3
4	3	3	3	3
5	3	3	3	3
6	3	3	3	3
7	3	3	3	3
8	4	3	3	4
9	3	3	3	3
10	4	3	3	4
11	4	3	3	4
12	4	4	4	4
13	3	4	4	3
14	3	3	3	3
15	3	3	3	3
16	4	3	3	4
17	4	4	3	4
18	3	3	3	3
19	3	3	3	3
20	3	3	3	3
21	3	3	3	3
22	3	3	3	3
23	3	4	3	3
24	3	4	3	3
25	3	3	3	3
26	3	3	3	3
27	3	4	4	3
28	4	4	3	3
29	3	3	3	3

In [38]:

```
1 import pingouin as pg
2 pg.cronbach_alpha(data=Data4)
```

Out[38]:

```
(0.6614264919941777, array([0.489, 0.823]))
```

MULTIPLE LINEAR REGRESSION ANALYSIS

In [39]:

```
1 #Import data (mean of each variable)
2 Data=pd.read_csv("DATA SCIENCE PROJECT.csv")
3 Data
```

Out[39]:

	Gender	Age	Marital status	Level of education	Occupation	Monthly income	Source of income	Living area	How often do you shop online shopping per month?	Which category do you often shop online?	How much do you spend for online shopping per month?	Favourite online
0	Female	41-50	Married	Degree	Employed	RM3001-RM5000	Employer	Urban	Twice	Health and beauty,Fashion	RM101-RM300	Shopee;Z
1	Female	21-30	Single	Degree	Employed	RM5001 and above	Employer	Suburban	Thrice	Health and beauty;Home and living,Fashion	RM301-RM500	Shopee;Tiktok
2	Female	31-40	Single	Master	Employed	RM5001 and above	Employer	Suburban	Twice	Fashion	Below RM100	Shopee;Instagram;Duck,C h
3	Female	21-30	Single	Degree	Student	RM501-RM1000	Scholarship/PTPTN	Suburban	More than thrice	Health and beauty,Fashion	RM101-RM300	Shopee;Zalora;'
4	Female	31-40	Married	Diploma	Employed	RM1001-RM3000	Employer	Suburban	Twice	Home and living,Baby and toys	RM301-RM500	S#
...
95	Female	31-40	Married	Degree	Employed	RM5001 and above	Employer	Suburban	More than thrice	Home and living;Baby and toys;Fashion	RM301-RM500	Shopee;Lazada;Insta
96	Female	21-30	Single	Degree	Student	RM500 and below	Scholarship/PTPTN	Suburban	Once	Health and beauty	Below RM100	S#
97	Female	31-40	Married	STPM	Employed	RM3001-RM5000	Employer	Suburban	Twice	Health and beauty;Home and living,Fashion	RM101-RM300	Shopee;Fact
98	Female	21-30	Single	Degree	Student	RM501-RM1000	Parents	Suburban	Once	Health and beauty;Mobile and accessories;Fashion	Below RM100	S#
99	Male	41-50	Single	Degree	Employed	RM5001 and above	Employer	Suburban	Once	Home and living	Below RM100	Shopee;Li

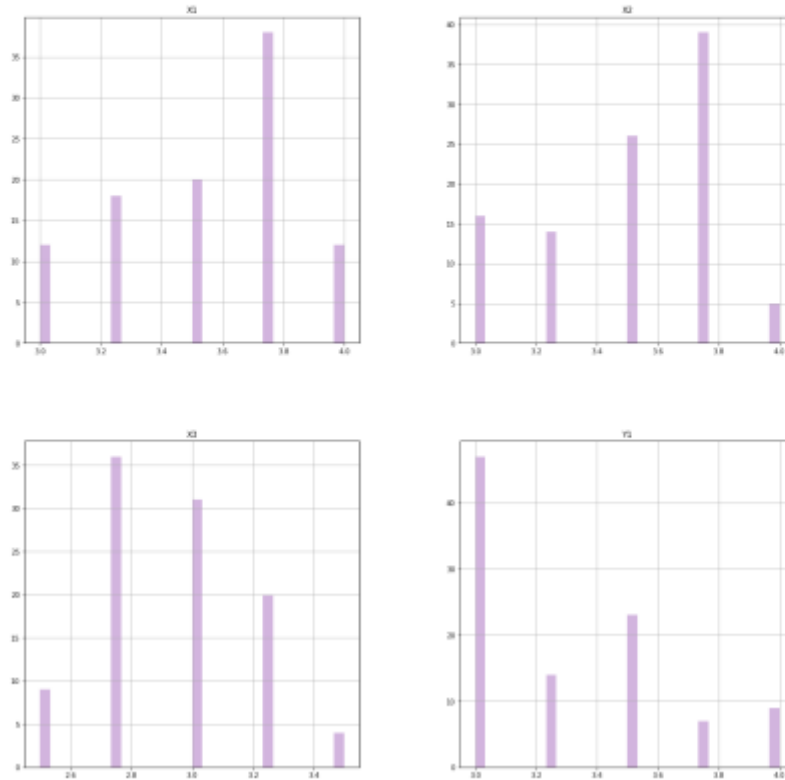
100 rows × 17 columns

In [40]:

```
1 Data.hist(bins=30, figsize=(20, 20), color = '#D2B4DE')
```

Out[40]:

```
array([[<AxesSubplot:title={'center':'X1'}>,  
       <AxesSubplot:title={'center':'X2'}>],  
       [<AxesSubplot:title={'center':'X3'}>,  
       <AxesSubplot:title={'center':'Y1'}>]], dtype=object)
```

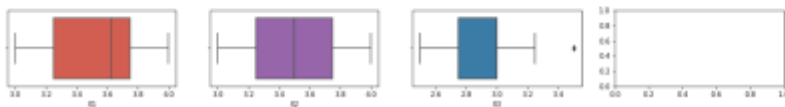


In [41]:

```
1 #Detect outliers
2 fig, axs = plt.subplots(ncols = 4, figsize=(20, 2))
3 sns.boxplot(x = Data['X1'], color = '#E74C3C', ax=axs[0])
4 sns.boxplot(x = Data['X2'], color = '#9B59B6', ax=axs[1])
5 sns.boxplot(x = Data['X3'], color = '#2980B9', ax=axs[2])
```

Out[41]:

<AxesSubplot:xlabel='X3'>



In [42]:

```
1 import statsmodels.api as sm
2
3 #define predictor and response variables
4 #Independent variable
5 X = Data[['X1', 'X2', 'X3']]
6 #Dependent variable
7 Y = Data['Y1']
8
9 #add constant to predictor variables
10 X = sm.add_constant(X)
11
12 #fit linear regression model
13 model = sm.OLS(Y, X).fit()
14
15 #view model summary
16 print(model.summary())
```

OLS Regression Results

```
=====
Dep. Variable:          Y1      R-squared:          0.076
Model:                  OLS      Adj. R-squared:       0.047
Method:                 Least Squares      F-statistic:       2.629
Date:                  Tue, 31 Jan 2023      Prob (F-statistic):    0.0546
Time:                  16:06:51      Log-Likelihood:      -27.614
No. Observations:      100      AIC:                63.23
Df Residuals:          96      BIC:                73.65
Df Model:               3
Covariance Type:       nonrobust
=====
               coef    std err          t      P>|t|      [0.025    0.975]
-----
const          1.9217     0.530      3.627     0.000     0.870     2.973
X1             -0.0446     0.127     -0.350     0.727    -0.297     0.208
X2              0.2067     0.128      1.615     0.110    -0.047     0.461
X3              0.2739     0.135      2.027     0.045     0.006     0.542
=====
Omnibus:            9.948    Durbin-Watson:       1.545
Prob(Omnibus):      0.007    Jarque-Bera (JB):     10.728
Skew:               0.775    Prob(JB):             0.00468
Kurtosis:           2.584    Cond. No.             97.5
=====
```

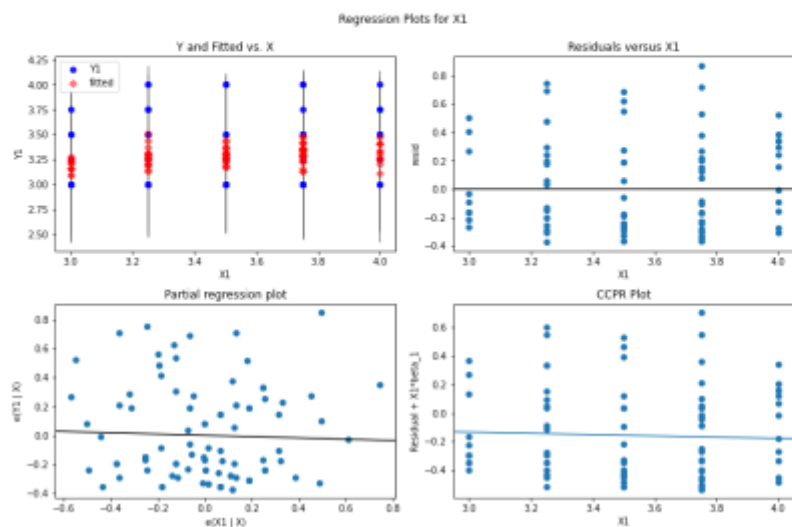
Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

In [43]:

```
1 #define figure size
2 fig = plt.figure(figsize=(12,8))
3
4 #produce regression plots
5 fig = sm.graphics.plot_regress_exog(model, 'X1', fig=fig)
```

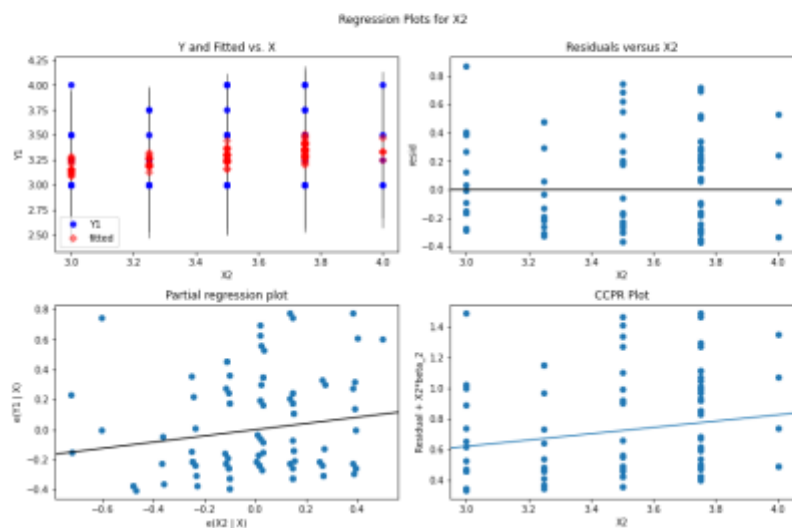
eval_env: 1



In [44]:

```
1 #define figure size
2 fig = plt.figure(figsize=(12,8))
3
4 #produce regression plots
5 fig = sm.graphics.plot_regress_exog(model, 'X2', fig=fig)
```

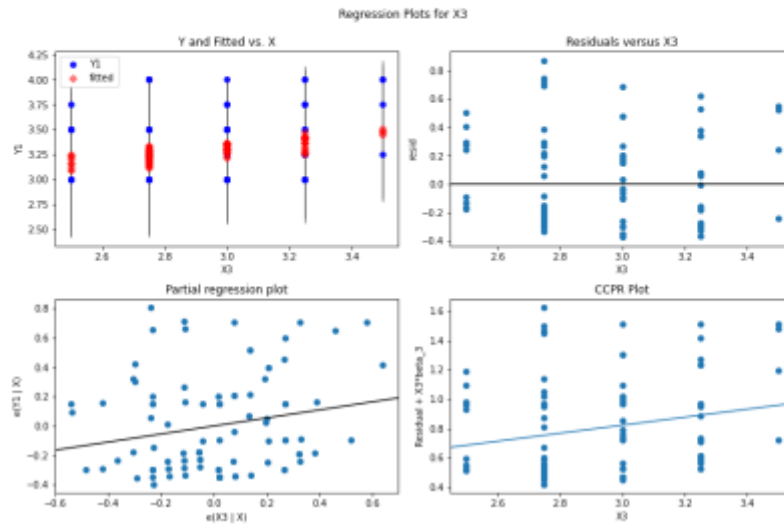
eval_env: 1



In [45]:

```
1 #define figure size
2 fig = plt.figure(figsize=(12,8))
3
4 #produce regression plots
5 fig = sm.graphics.plot_regress_exog(model, 'X3', fig=fig)
```

eval_env: 1



In [46]:

```
1 #Correlation matrix
2 matrix=Data.corr()
3 print(matrix)
```

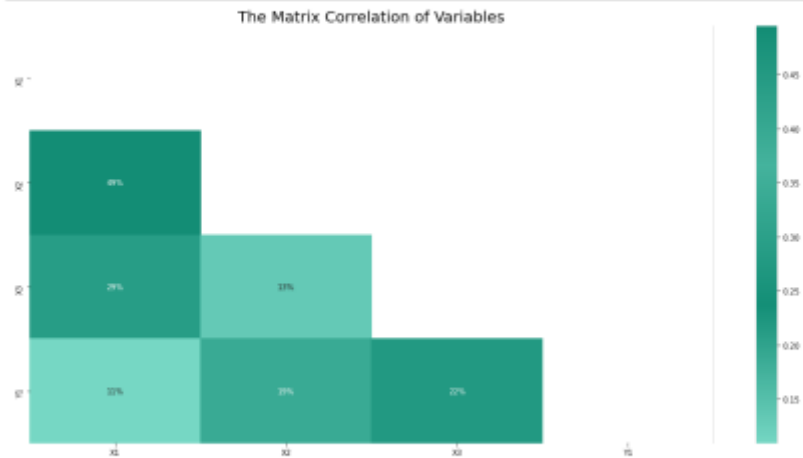
	X1	X2	X3	Y1
X1	1.000000	0.494566	0.287565	0.109016
X2	0.494566	1.000000	0.134033	0.189918
X3	0.287565	0.134033	1.000000	0.220330
Y1	0.109016	0.189918	0.220330	1.000000

The closer the value is to 1 (or -1), the stronger a relationship.

The closer a number is to 0, the weaker the relationship.

In [47]:

```
1 mask = np.triu(np.ones_like(Data.corr()))
2 plt.figure(figsize=(20, 10))
3 cmap = LinearSegmentedColormap.from_list('TurPink', ['#76D7C4', '#148F77', '#45B39D'],
4 plt.title("The Matrix Correlation of Variables", fontsize=20)
5 dataplot = sns.heatmap(Data.corr(), cmap = cmap, annot = True, mask = mask, fmt = '.0%'
6 plt.show()
```



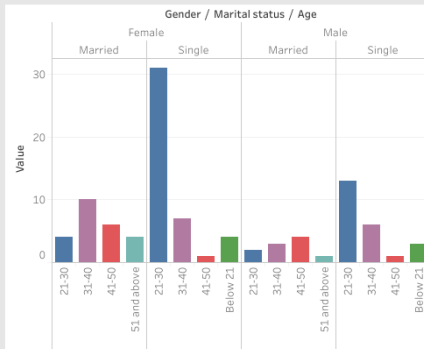
In []:

1

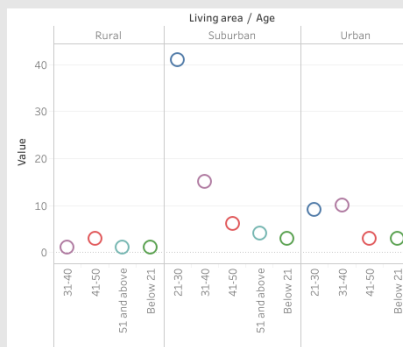
APPENDIX C: TABLEAU VISUALIZATION

MALAYSIAN'S ONLINE SHOPPING BEHAVIOUR ANALYSIS AFTER COVID-19 PANDEMIC

NUMBER OF RESPONDENT BY GENDER, AGE AND MARITAL STATUS



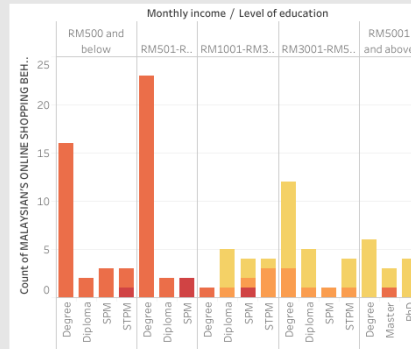
RESPONDENTS LIVING AREA BY AGE



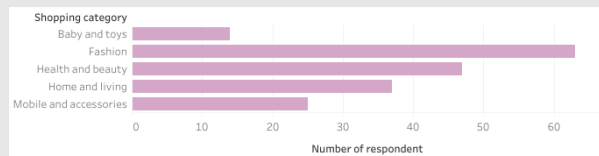
RESPONDENT'S FAVOURITE
ONLINE STORE



RESPONDENTS MONTHLY INCOME BASED ON THEIR OCCUPATION AND LEVEL OF EDUCATION



RESPONDENT'S FAVORITE SHOPPING CATEGORY



RESPONDENTS ONLINE SHOPPING EXPENSES PER MONTH BY AGE GROUP

