



**Analyzing Factors of Influencing Consumer Behaviour
during COVID-19 Pandemic Outbreak: A Case Study in
Perlis**

by

**Ahmad Tarmizi bin Mohd Asarani
(1933433014)**

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**ANALYZING FACTORS OF INFLUENCING CONSUMER BEHAVIOUR DURING
COVID-19 PANDEMIC OUTBREAK: A CASE STUDY IN PERLIS**

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"In the Name of Allah, Most gracious, Most Merciful"

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LIST OF ABBREVIATIONS

PSD	Public Service Department of Malaysia
MCO	Movement Controlled Order
SRS	Simple Random Sampling

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Menganalisa Faktor-faktor yang Mempengaruhi Tingkahlaku Pengguna Semasa Wabak Pandemik COVID-19: Kajian Kes di Negeri Perlis

ABSTRAK

Kajian ini dilaksanakan untuk menganalisa faktor-faktor yang mempengaruhi tingkahlaku pengguna semasa wabak pandemik COVID-19 di Negeri Perlis. Sampel seramai 266 penjawat awam di Perlis telah menjawab soalan tentang penggunaan ICT, reaksi dan tindakan berkaitan pandemik, demografi dan faktor psikososial melalui tinjauan dalam talian serta soal selidik secara fizikal. Ujian statistik yang dijalankan dalam penyelidikan ini termasuk analisis kekerapan, ujian Alpha Cronbach untuk kebolehpercayaan soal selidik, analisis korelasi untuk menguji kekuatan hubungan antara pembolehubah, dan analisis regresi untuk mencari hubungan di antara faktor-faktor yang dinyatakan terhadap pembolehubah bersandar. Dalam konteks ini, penyelidik mendapati bahawa semua pembolehubah tidak bersandar iaitu wabak pandemik, e-dagang dan aplikasi ICT mempunyai hubungan positif kepada perubahan tingkah laku pengguna semasa COVID-19. Secara keseluruhannya, keputusan ini adalah konsisten dengan idea bahawa teknologi ialah alat bantuan yang mengubah perspektif tingkah laku pengguna dan penggunaan yang seimbang mampu mengurangkan kebimbangan semasa berlakunya wabak penyakit. Kajian ini juga menyokong idea bahawa penjawat awam dari segi ekonomi kekal tidak terjejas semasa pandemik berdasarkan hasil tinjauan yang menunjukkan kecenderungan mereka untuk menggunakan sepenuhnya platform e-dagang walaupun berhadapan dengan COVID-19. Oleh itu, analisis yang telah dilaksanakan di dalam penyelidikan ini boleh membantu pihak berkuasa untuk membuat penyelarasan dasar berkaitan kepenggunaan semasa berlakunya wabak penyakit berdasarkan pertimbangan perbelanjaan dan kesihatan pengguna melalui saluran ICT pada masa hadapan.

Analyzing Factors of Influencing Consumer Behaviour during COVID-19 Pandemic Outbreak: A Case Study in Perlis

ABSTRACT

This study was designed to analyze factors influencing consumer behaviour in Perlis during COVID-19 pandemic outbreak. A sample of 266 civil servants in Perlis answered questions about ICT use, pandemic-related reactions and actions, demographics, and psychosocial factors via an online survey as well as physical questionnaires. The statistical tests that were conducted in this research included demographics via frequency analysis, Cronbach's Alpha test for the questionnaire reliability, correlation analysis to test the strength of the relationship between variables, and regression analysis for finding the relationship between the mentioned factors with the dependent variable. In this context, the research found that all independent variables namely pandemic outbreak, e-commerce, and ICT applications have positive relationship with consumer behaviour changes during COVID-19. Overall, results are consistent with the idea that technology is a coping tool that shifts the consumer behaviour perspectives and balanced use can lead to feelings of less future anxiety during the pandemic. This study also supports the idea that civil servants economically remain unaffected during a pandemic based on the survey result that shows their tendency to fully utilize e-commerce platforms despite COVID-19. Therefore, the analysis in this research can help authorities to align consumerism-related policies during pandemics based on consumers' buying and health considerations through ICT channels in the future.

CHAPTER 1 : INTRODUCTION

1.1 Overview

In this section there are explanations about the area of the study which is consumer behavior trends among civil servants in Perlis during COVID-19 pandemic as well as concept that has been chosen. As the requirement of the study is to meet the management and engineering concept in Information and Communication Technology (ICT) as one of the elements to be discussed besides the arguments and discussion of this topic since the beginning of the pandemic. Besides, there are objectives and contributions of the study that issued and tends to be fulfilled after completing the study.

1.2 Background of Study

The 2019 Coronavirus outbreak or COVID-19 is a pandemic that has infected millions of humans and claimed over a million lives on a global scale. COVID-19 is a disease caused by severe acute respiratory syndrome (SARS-CoV-2) virus and has been declared a pandemic by the World Health Organization (WHO) on 11 March 2020 (Bavel et al., 2020). The outbreak of this virus, started in Wuhan, China in the beginning of December 2019 (Md Shah et al., 2020), has spread rapidly around the world. As of the end of August 2021 over 4 million deaths worldwide have been reported to the WHO (<https://covid19.who.int/>).

The first case of COVID-19 infection in Malaysia was recorded on the January 25, 2020 and as of February 16, 2020, the number of cases increased to 22 representing cases the first wave of the epidemic. The second wave of cases began on February 27, 2020 and since then the number of individuals affected has increased to more of a

thousand people. The first death from the outbreak was recorded on March 17, 2020. As of the beginning of August 2021, a total of 1,163,291 confirmed cases with 9,598 deaths reported (<https://covid19.who.int/region/wpro/country/my>).

The growing pandemic has forced most countries including Malaysia implementing a curfew (lockdown) in stages aimed at controlling the movement of people to minimize the risk of COVID-19 infection. In Malaysia, the implementation of the Movement Control Order (MCO) has started on March 16, 2020 consists of six phases and the first four phases take time 14 days, while the 5th and 6th phases take more than 30 days. The 1st MCO was heavily regulated with multi enforcement agency involvement and has succeeded at flattening the initial COVID-19 curve in Malaysia with only 277 cases recorded (MHM, 2020).

In few areas where a higher COVID-19 infection rate were found, the Government operates Enhanced MCO which is more stringent order than the MCO. This is followed by Conditional MCO that have more relaxed SOPs to reopen economy for specific locations where the rate of infectivity was significantly dropped. Finally, the Recovery MCO will be introduced once the Government managed to achieve 'flattening of the curve' level by having number of daily cases consistently below the number of cases projected by the health authority within specific period. The RMCO then was implemented on 10th of June 2020 lifting of most restrictions such as interstate travel, socioeconomic activities and allow for school reopening.

Although the MCO implementation can curb and reduce cases of infection, however it has affected the socio-economic development of Malaysia. Various business premises mainly involve micro, small enterprises and moderate suffered losses and even had to roll over while struggling to get on with life due to loss of source of income. These circumstances are forcing them to change their business model and strategy to ensure

their business survival. For instance, most of the businesses that cannot operate from their own premises due to MCO currently have shifted their operation to online platform. This approach not only limited on product selling, but involves other aspect of operation such as working from home, online video meeting and marketing strategy.

In line with digital transition among business entities during the pandemic, the MCO also has made an impact towards consumer habits as well. For example, increased of digital consumption such as online learning, online shopping, and online payments is suddenly becoming the new normal for the country. As stated by Kodama (2020), pandemics and curfew enforcement (lockdown) and restrictions by a country can lead to behavior change consumers and the way businesses operate in the future. This transformation is becoming faster and easier with the availability of high-speed internet connection facility throughout the country.

Information and communication technologies (ICTs) have now become vital in people's lives (Hennig-Thurau et al., 2010; Karanasios & Parker, 2018). According to Yang et al. (2020), "ICTs, broadly defined here to include internet, platforms, networks, phones, apps, and databases, as well as underlying infrastructure, are a pivotal factor in the existing social order, particularly during the COVID-19 global pandemic." As Gërguri Rashiti et al. (2017) noted: "ICT has become an intrinsic part of everyday life to the extent that, like electricity, modern society could not function in its absence". Its advantages and significance for the growth of businesses, especially informal home-based firms, are well documented (Pant & Odame, 2017; Philip & Williams, 2019). ICTs assist firms in terms of innovation and performance improvement (Emami, Molaei & Khajeheian, 2019; Karakara & Osabuohien, 2020), boost your competitive advantages (Frederick et al., 2012), to promote and sell their goods (Ramadani et al., 2014a, 2014b) and to engage and entice more clients (Palalic et al., 2020).

Those advantages bring a transformational impact that creates a new paradigm in the business world known as "Electronic Commerce" or known as e-commerce. E-commerce refers to any type of business transaction involving the transmission of data via the internet. E-commerce is defined as the use of a transaction or a commercial transaction that involves the exchange of value in exchange for a product or service (Nakhate & Jain, 2020). E-commerce aspects include: (a) a variety of standardised items or services; (b) packaging; (c) payment methods; (d) inbound/outbound shipping logistics; (e) promotion and marketing; and (f) security and sanitary fulfilment. (Rural, 2021)

E-commerce emerged 70 years ago (Zwass, 2019; Santos et al., 2017), originating as a conduit for the exchange of business documents, such as orders or invoices, between suppliers and their commercial clients, with a system of ordering items mostly through telex. E-commerce evolved into simple electronic commercial transactions and teleshopping in the 1970s and 1980s, mostly through computer-to-computer electronic data interchange (Miva, 2011).

However, internet buying over the Internet did not become possible until 1990s (Agileinfoways, 2018). Book Stacks Unlimited began as a dial-up bulletin board-based online bookstore in 1992, before transitioning to the Internet in 1994 and operating under books.com domain. Amazon launched as an e-commerce platform for books in 1995 (History, 2021), and later as one of the first e-commerce sites for general merchandise. In the same year, eBay, a web-based auction marketplace, was created (eBay, 2020). PayPal first appeared on the e-commerce scene in 1998 as a money transfer service, while Alibaba Online was created the following year as an online marketplace (Alibaba Group, 2021).

E-commerce has grown significantly since then (Marfice, 2020), with new platforms/technologies and innovations in business models and marketplaces, transforming the way we live, shop, and do business. Traders use e-commerce platform to buy and sell goods and services, create higher corporate awareness, and provide customer service. These basic but yet powerful properties of e-commerce make it the most resilient business type in the most challenging time in modern human history. This finding is supported by The Commerce. Asia Group of Companies, a company with technology and big data solutions in e-commerce ecosystem, reported a 149 percent increase in Gross Merchandise Volume (GMV) year over year in the first quarter since the MCO was implemented (TCAG, 2020).

In response to the pandemic, it is very well known that consumer purchasing, financial situation, and a variety of other aspects of consumer life have all been influenced by the pandemic. As a result of the current circumstances, consumers, which include any ordinary person buying products and services, have modified their shopping habits. Abe (2021) observed trends such as people raiding grocery store walkways, the cancellation of the world's most important events, and mandates for 'non-essential' businesses to be temporarily closed to prevent the spread of infection in her report on 'Market Trends and D2C Opportunities in the COVID-19.' People are spending less of their income on products that are considered nice-to-have or non-essential during the pandemic (such as clothing, shoes, make-up, jewellery, games and electronics). According to the survey, food products will see a rise in demand while non-edible products would have a mild increase in demand, resulting in lower demand for homecare, cosmetics, and personal care products.

The strict implementation of SOP by the government in many public areas also discouraging consumers to buy their groceries at shopping mall or supermarket.

According to a multidimensional poll performed by Rakuten Insight in Malaysia, 63 percent of respondents said they increased their online shopping to avoid queues at supermarkets and other stores. They were also exercising social distancing and intended to spend as little time outside the house as possible (Statista, 2021). These reasons are coherent with human natural response against any contagious disease such as COVID-19 by reducing their direct exposure with public in order to reduce the threat of infection, as Dannenberg et. al. (2020) suggest in his research that the fear of sickness due to the coronavirus was the main reason for many people to buy food online during the pandemic. Therefore, the consumers are left with no option but to leverage the existing e-commerce platforms such as Shopee or Lazada to buy their necessities.

E-commerce platforms is becoming increasingly popular among consumers to purchase essential goods during the period of the MCO. Malaysian consumers gradually turned to e-commerce for their needs following the closure of physical stores due to lockdown. Many of them who never had online shopping experienced started shopping things online as well. This new norm as suggested by GlobalData's (2020) has been accelerated e-commerce market growth in Malaysia to reach up to RM51.6 billion by 2024 at a 14.3% increase of compound annual growth rate (CAGR) between 2020 and 2024.

Previous research in Malaysia focusing on shopping website that has been mostly visited by the consumers during the MCO phase one and phase two throughout the country including Sabah and Sarawak. It also mentioned about the influencing factors of selected websites to purchase during MCO (Isa et. al., 2020). However, there are still no findings on how certain specific group of consumers such as civil servants deal with their needs during the pandemic. According to ILO (2020) on the impact of the pandemic based on economic sector as shown in Table 1.1, it has mentioned that public

administration, defense and compulsory social workers is the sector that experienced the lowest economic impact during the pandemic. Employees in this sector especially in Malaysia enjoyed many benefits and guaranteed salary due to their employment nature by the government. Based on these advantages makes civil servants remain unchanged in terms of their financial aspects during the COVID-19 pandemic compare to workers in other sectors that heavily impacted such as wholesale/retail trade sector with many informal workers employed in the sector as street vendors. Therefore, by choosing civil servants as the target group in this study is relevant based on their ability to maintain their purchasing power despite the fact that many measures to minimize the risk of COVID-19 infection were imposed by the government.

Table 1.1 Impact of the crisis on the hardest hit sectors

Economic Sector	Impact
Wholesale and retail trade, repair of motor vehicles and motorcycles	High
Manufacturing	High
Accommodation and food services	High
Real estate, business and administrative activities	High
Arts, entertainment and recreation and other services	Medium – High
Transport, storage and communication	Medium – High
Construction	Medium
Financial and insurance services	Medium
Mining and quarrying	Medium
Agriculture, forestry and fishing	Medium – Low
Human health and social work activities	Low
Education	Low
Utilities	Low
Public administration, defence and compulsory social security	Low

Source: ILO (2020)

The ICT and E-commerce Survey 2019 report published by the Department of Statistics of Malaysia (DOSM) stated that Perlis is in the last position among other states in Malaysia in terms of computer usage, internet, and web presence. Based on the data as shown in Figure 1.1, Perlis has only recorded computer usage around 62.0% followed by internet usage at 54.7% and web presence at 28.7%. This low usage of ICT also directly caused the state to record the lowest revenue and expenditure in terms of e-commerce transactions in Malaysia for the same year with RM1,086 million (revenue) and RM625 million (expenditure) as shown both in Figure 1.2 and Figure 1.3. Therefore, with the financial advantage possessed by civil servants as discussed in the previous paragraph, it is interesting to note whether the current use of ICT in Perlis has an impact on changes in consumer behavior among civil servants in Perlis during the COVID-19 pandemic. This is the reason why Perlis that covers roughly 819 km² of Malaysia's total land area, and has a population of about 255,800 people (DOSM, 2021) was chosen as the location for this study on the assumption that the pandemic situation is the same in other states due to the standard SOPs and MCOs implemented by the government throughout Malaysia (MKN, 2020).

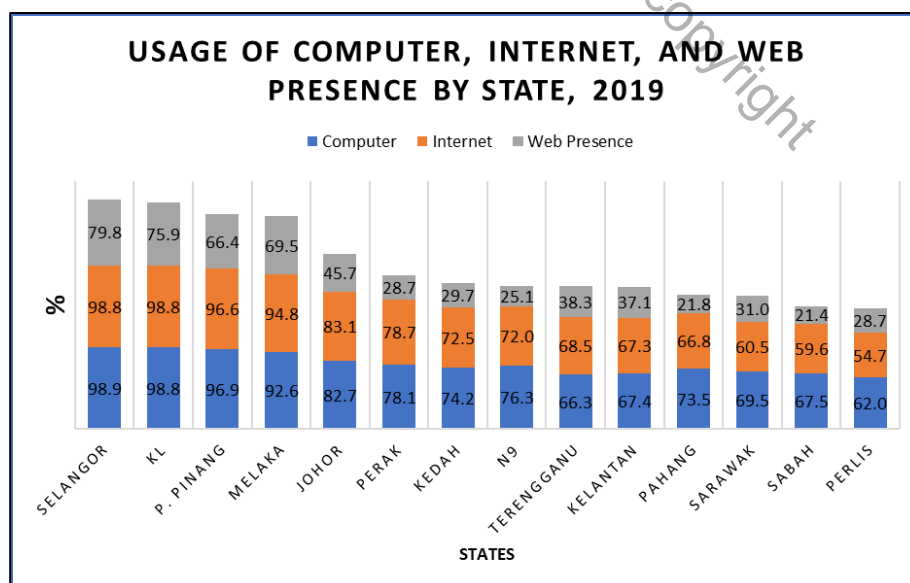


Figure 1.1 Usage of computer, internet, and web presence by state 2019 (DOSM, 2020)

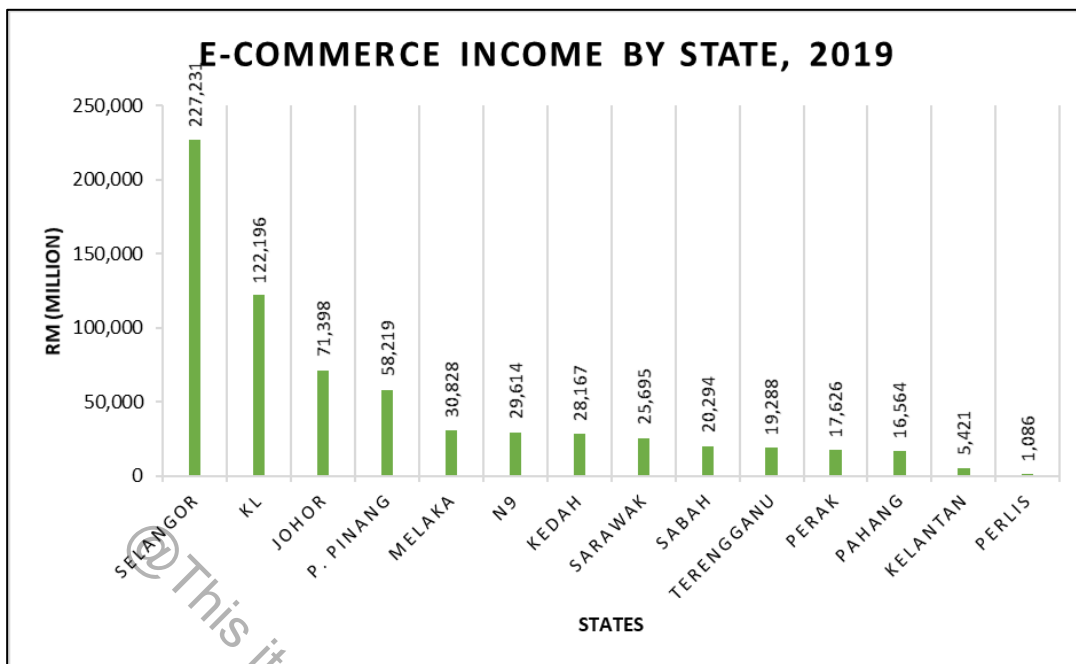


Figure 1.2 E-commerce income by state, 2019 (DOSM, 2020)

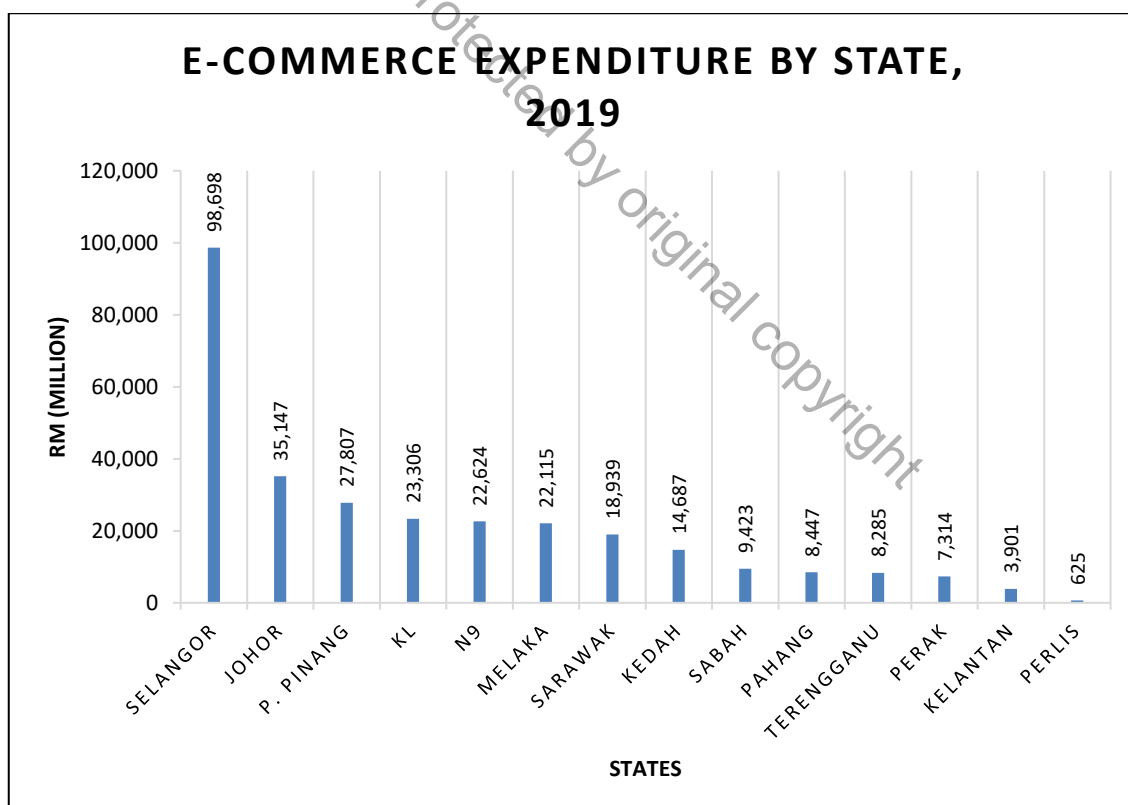


Figure 1.3 E-commerce expenditure by state, 2019 (DOSM, 2020)

1.3 Scope of Study

The whole world was shocked by the devastating outbreak of the COVID-19 pandemic and it spread so fast. In the term, COVID-19 is a disease caused by a new strain of coronavirus. 'CO' stands for corona, 'VI' for virus, and 'D' for disease. Formerly, this disease was referred to as '2019 novel coronavirus' or '2019-nCoV.' The COVID-19 virus is a new virus linked to the same family of viruses as Severe Acute Respiratory Syndrome (SARS) and some types of common cold (Bender, 2020). The growing pandemic has forced Malaysia to implement a Movement-Controlled Order (MCO) in stages aimed at controlling the movement of people to minimize the risk of COVID-19 infection. The implementation of MCO which began in March 2020 has seen a shift in the trend of consumers behaviour by taking full advantage of ICT to curb the spread of this virus. In view of this situation, the present study analyses the impact of ICT on consumer behaviour among civil servants. To this end, the study will also cover the changes in the usage of e-commerce platforms over the time period during the pandemic. The empirical study in this research is restricted to the public sector segment across the Perlis, wherein the opinion of 266 respondents among civil servants were studied in survey sessions via physical and online questionnaire as a research instrument. Further, the study also involves an analysis of respondents' perspectives as consumers on how they respond and perceive the impact of ICT usage during the pandemic in Perlis. Therefore, the scope of this study is limited to Perlis, and more specifically to those working as civil servants in the public sector in Perlis.

1.4 Problem Statement

Since the beginning of the pandemic there are a lot of research and discussion on how consumers' response to it especially when the mass movement was restricted by the government, and lockdown was tightly enforced in order to control its infection. Bharat and Nerita (2020) through their study found that various factors influenced customers' purchasing behaviour under lockdown situations including fear about the COVID-19 disease, fear shortage of essential items and beliefs or attitude towards some brands. From the research study, it is also proposed that consumers be encouraged to engage in online transactions to minimize the risk of being infected by COVID-19.

Besides different factors that contribute to consumer behaviours during the pandemic, the most fundamental issue is about the safest way to shop or buy the necessities in this challenging time is still debatable. According to Shumsky and Debo (2020), conventional shopping such as at retail stores face a variety of standards that differ by state due to differences in virus frequency, local views toward social distancing, and political influences. Given these differences as well as the difficulty of having a "one-size-fits-all" set of guidelines will leave e-commerce as the only best option in the time of COVID-19. However, there are a lot of issues in e-commerce such as lack of security, delivery and logistics, digital payment failures and so on. These issues create dilemma to consumers whether or not they have to fully utilise this platform for their shopping activities. Therefore, it would be interesting to know how e-commerce environment affect consumer behavioural patterns especially among civil servant in Perlis

E-commerce is a type of activity that allow consumers to purchase goods or services directly from a seller via the internet or other electronic means. Currently a lot of companies in Malaysia emerged as e-commerce service provider with the emergence of the internet. These companies using different online applications by leveraging their

strength in their respective fields. Astro Malaysia Berhad for example, a Malaysia's leading entertainment company - is taking advantage of their 74% of Malaysian TV household coverage to provide Go Shop shoppers channel across its TV, radio and digital platforms. If we are looking for a website-based application that connect buyers and sellers within one community, Shopee and Lazada are the answer. Delivery services such as Food Panda, Bungkusit and Grab Food also are gaining popularity especially when they have become available online. These kinds of applications are saving us more time and hassle as compared to traditional way of shopping and will affect consumer behaviour response particularly during these days with the ongoing MCO.

1.5 Research Questions

This study tends to answer the research questions as follow:

- a) What is the relationship between pandemic (COVID-19) outbreak and consumer behaviour?
- b) What is the relationship between e-commerce and consumer behaviour?
- c) What is the relationship between ICT application and consumer behaviour?

1.6 Research Objectives

The research objectives are to find either the independent variables have relationship with dependent variable. The objectives are as follow:

- a) To determine whether pandemic (COVID-19) outbreak have relationship with consumer behaviour.
- b) To evaluate whether e-commerce have relationship with consumer behaviour.

- c) To synthesize whether ICT applications have relationship with consumer behaviour.

1.7 Hypotheses

H₁ : Pandemic (COVID-19) outbreak has significance relationship with consumer behaviour.

H₂ : E-Commerce has significance relationship with consumer behaviour.

H₃ : ICT applications has significance relationship with consumer behaviour.

1.8 Theoretical Framework

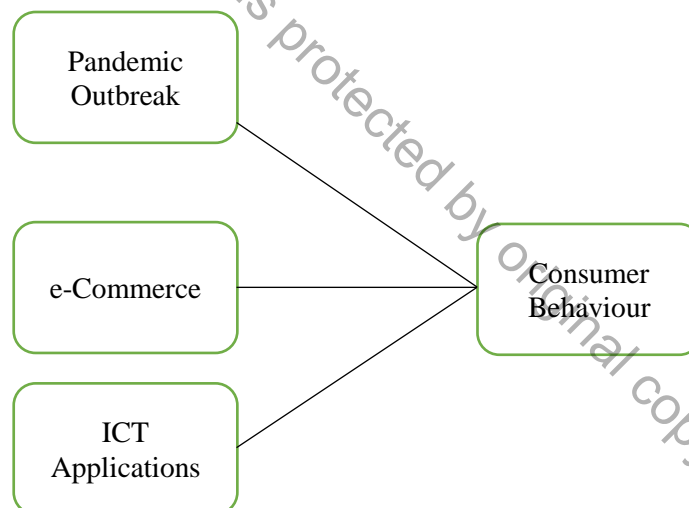


Figure 1.4 Theoretical Framework

1.9 Contribution of the Study

Theoretically, this study contributes to the understanding of the consumer's reaction among civil servant in Perlis during unprecedented situation such as COVID-19 pandemic. Based on the discussed topic and reviewed literatures readers are served with development of ideas, discussion of issues and test conducted towards consumer

behavior. This study is in purpose of serving the readers with knowledge of ICT applications during the pandemic besides the research that are applicable for every policy maker, academic people or as reference. Besides, this study tends to contribute to the gap that existed in the consumer field.

In addition, by conducting research on the field or research area, this study tends to answer the research questions that arise to determine the relationship of the studied variables. On the other hand, through the finding of this study, it helps to serve readers with a proper design, planning, implementation and application of knowledge in the consumer management especially in e-Commerce and ICT as well. Therefore, it will definitely lead to the improvement in managing consumer behavior trend in crisis management field.

As mentioned by our Prime Minister, the COVID-19 situation we are now facing is unprecedented in Malaysian history and it requires unprecedented measures. Therefore, for deeper aspect, the findings from this study might be useful to help the policy makers in the Government agencies, economist as well as academicians to identify better consumer management approach during pandemic with the adoption and application of the ideas contributed in the study.

1.10 Summary

In this chapter, readers are served with the general situation of COVID-19 pandemic that is currently ongoing include what is the Government response to it, how it has fundamentally impacted our daily routine and changed the way how people travel, work and consume beside the problems that issued in the study. Moreover, there are direction of the study that will drive the study to what to be achieved after finishing this

study. While in other aspect, readers are served with the researcher contribution for future study, crisis management strategy or academic work.

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CHAPTER 2 : LITERATURE REVIEW

2.1 Overview

In this chapter, there are more explanations and discussion on literature review that related to this study. The literature review also referred to deeper understanding on the concept including the variables that drive the research including the strategy and contribution of the research overall.

2.2 Consumer Behaviour

Several studies have been conducted to reflect consumer behaviour changes during the COVID-19 pandemic. The pandemic's global catastrophe has impacted global economic and health-care system, instilling dread, terror, and uncertainty among people in the world. In this context, it is also plausible to speculate that customers' shopping patterns will shift over time. Sheth (2020) asserts, for example, that there are four key contexts that regulate or disrupt consumer behaviour. They are the social context (e.g., changes in the working environment and communications with friends or neighbours), the application of new know-how (including online shopping and delivery), the impact of new regulations on consumerism, and the seriousness of the global COVID-19 pandemic risk.

Accenture and McKinsey (2020) through their research found consumers are extremely worried about the impact of COVID-19 in terms of health and economic standpoint. The study's findings revealed that consumers' buying trend were focused on the most essential necessities, shopped more locally and mindfully, and at the same time they were embracing online shopping. Consumers have been utilizing ICT to interact,

study, and play in order to follow regulations imposed by the authority, and they will likely continue to do so in the future.

Since the early stage of COVID-19 pandemic in 2020, people have shown uncommon behaviour that greatly differs from their regular shopping habits. Cox et al. (2020) analysed data from US bank accounts from March to early April to examine the effects of saving and spending during the pandemic shows that consumption as well as spending on relatively less-priority items, fell dramatically in contrast to the same period in 2019. Following the onset of COVID-19, overall spending fell sharply in all industries, with a slow recovery over time. Grocery spending rate has returned to pre-pandemic phase, and its recovery pace has been faster than in other industries.

Following the declaration of COVID-19 as a pandemic, Anderson et al. (2020) examined bank transaction data to assess the present economic conditions in Denmark. Based on their research shows that spending on basic necessities and medications in normal or conventional shopping mall are soared, whereas spending in all other industries are declined dramatically. Travel, groceries, petrol, and telephones all saw significant income drops. As opposed to the e-commerce, basic foods, groceries, trade and distribution of commodities sectors, all saw an increase in their income, whereas travel-related companies saw a significant drop.

Based on bank transaction data in New Zealand, Hall et al. (2020) found changes in spending due to COVID-19. Overall consumption trends remained stable in January 2020, but sharply decreased after the implementation of lockdown at the end of March. Medical care, department store shopping, and electronic appliances spending all fell sharply, with no signs of recovery. However, following a significant drop, expenditure on food and beverages eventually recovered. With the end of the lockdowns, online

purchasing has progressively expanded. Growth rates in the e-commerce sector have also accelerated.

An immediate increase in demand for alternative distribution platforms has resulted from the lower accessibility of store premises, combined with consumers' increased health concerns. Unprecedented rules causing social distancing are also having a significant impact on consumers' preferred buying approach. While online grocery channel has grown steadily but slowly over the last decade (Harris et al., 2017), it has surged dramatically during the COVID-19 outbreak (Pantano et al., 2020). Chang and Meyerhoefer (2020) used regression analysis to examine the impact of COVID-19 on online grocery retailers utilizing Taiwanese e-commerce platform data. Revenues from online stores growth by 5.7 percent, while the number of clients surged by 4.9 percent. The social media supported with content created by online retailers have a significant impact on online purchases, according to this study.

Grashuis et al. (2020) conducted a study of online buying clients to determine their characteristics. They found that as restaurants closed due to the pandemic, people tend bought more groceries on daily basis. The number of confirmed cases influenced respondents' preferences for shopping the groceries over dining out, and they indicated that direct purchases from stores was the least option to do. To conclude of their study, they found that the changes of shopping preference are depending on the severity of the pandemic in the respondents' area.

Consumers' price sensitivity was also affected by the panic hoarding. A wide range of determinants of consumers' price elasticity have been studied in the past (Huang et al., 2017; Wakefield & Inman, 2003). One of these factors is an emergency scenario. As a result, it's no surprise that during the crises, many consumers had to face price increases up to 300 percent for specific product categories. While consumer prices

stabilized soon after the end of the MERS wave, Chang (2020) predicted that COVID-19 would have a longer effect. Fear of infection risk among consumers will hamper the stabilization of prices as the virus infectivity surge quickly.

The pandemic catastrophe has impacted the global economy and health-care system, instilling dread, terror, and uncertainty within communities. A previously unknown panic purchase by customers arose and became a phenomenon, as confirmed by Laato et al. (2020). Consumer panic shopping behaviour at a time of crisis was investigated by Islam et al. (2021) in their previous research. They explore on premise how environmental factors affect consumers' impulsive and obsessive shopping behaviour and reported their answers to traders or managers for them to better comprehend the phenomena; Prentice et al. (2020) offer another perspective on panic shopping during the COVID-19 pandemic based on the scarcity principle, crowd psychology, and the repercussions of panic shopping. Government action plans, the media's influence, society's dread of scarcity, and the fear of scarcity have all contributed to consumer behaviour shifting and create panic shopping situation. The findings of their research suggest that a continuous supply of goods gives consumers a sense of security.

2.3 Pandemic Outbreak

COVID-19, which has been linked to the Huanan Wholesale Market in China, may have been transmitted from animals to people, according to Li et al. (2020). Clusters of affected family members and medical staff have confirmed the occurrence of person-to-person transmission have been confirmed based on evidence that the existence of many clusters among family member and medical workers (Chan et al., 2019). The virus will be spread to close contact via respiratory droplets from an infected person who are sneezing or coughing. Several studies, like Shereen et al. (2020), have demonstrated that

the COVID-19 disease is infecting not just through direct contact, but it can be through COVID-19 biomedical waste. This is supported by G. Kampf, Todt, Pfaender, and Steinmann (2020) who mentioned that COVID-19 has been observed to remain on surfaces for up to 96 hours.

Efforts to control the infection of COVID-19 include through implementing quarantine regulations, social distancing measures, and properly managing COVID-19 patients all require suitable screening and diagnosing equipment. Other respiratory related diseases may be more common in a particular community while COVID-19 is spreading. Based on the guideline on COVID-19 case surveillance published by WHO stated that given the season and location, WHO recommends screening for more prevalent causes of respiratory disease in those who match certain criteria. If the test results are negative, the sample should be forwarded to a referral lab for COVID-19 testing (WHO, 2020).

Based on case definitions by WHO (2020), a) patients with severe acute respiratory infections (history of fever and cough that require hospitalization) and no other aetiology that fully explains the clinical presentation, as well as a history of travel to or residence in China during the 14 days prior to symptom onset, are suspected cases of COVID-19; or (b) patients with any acute respiratory illness and at least one of the following during the 14 days prior to symptom onset: worked at or attended a health care facility where patients with proven or suspected COVID-19 acute respiratory disease were being treated, or had contact with a confirmed or probable case of COVID-19 infection. Those with inconclusive COVID-19 testing or who test positive utilizing a pan-coronavirus assay but no other respiratory pathogens in the lab are considered probable cases. A confirmed case is one in which COVID-19 infection has been verified in the laboratory, regardless of clinical signs and symptoms.

The CDC recommendation to healthcare practitioners to collect specimen from the upper respiratory tract (nasopharyngeal and oropharyngeal swabs) and, if possible, the lower respiratory tract (sputum, tracheal aspirate, or bronchoalveolar lavage) as well for patients who satisfy diagnostic criteria for COVID-19 testing (Patel & Jernigan, 2020). The testing should be carried out by the government-designated laboratories in each country.

Same like MERS-CoV and SARS-CoV, there is no particular antiviral therapy for COVID-19 (Tang et al., 2020). Isolation and supportive treatment, such as the use of high-flow oxygen, hydration management, and antibiotics for subsequent bacterial infections, are advised (Habibzadeh & Stoneman, 2020). Some COVID-19 patients had ARDS and septic shock quickly, which was followed by multi-organ failure (Huang et al., 2020; Chen et al., 2020). Hence, the focus of initial COVID-19 therapy should be on early detection and containing the disease's infection must be through prompt quarantine and other infection control procedures (WHO, 2020).

COVID-19 is unquestionably a serious threat that causing people to feel danger and worried internationally. Based on estimations by some experts, it has a greater reproductive number than SARS (Liu et al., 2020), and it has infected and killed more individuals than SARS (Mahase, 2020). Breaking the chain of transmission is crucial to halting the disease from spreading (Chan et al., 2015). Several measures should be applied in terms of healthcare management not at international and national level.

2.4 E-commerce

In the global economy, electronic commerce (e-commerce) is getting more prominence. It all started in 1995, when there was a need for company to digitize their transactions in terms of buying and selling products. Digital products are things that can

be sent through digital networks (Laudon & Laudon, 2015). E-commerce also refers to sales conducted through the internet. Similarly, e-commerce is one sort of online platform that concentrate on customer-based business transactions using the Internet as a channel for transferring services or goods (Surawiguna, 2010). Due to its more interactive nature, lower costs, and offering unique experience for customers, e-commerce create a lot of opportunities to businesses such as goods and services sales via online platform as well as increasing revenue (Rohm & Swaminathan, 2004; Santos-Vijande et al., 2013).

Due to its potential in improving the efficiency of a company's operations, e-commerce has become one of the most strategic requirements in every business today. According to Abdu'a and Wasiyanti (2019), there are 4 categories of e-commerce based on the type of relationship as follows:

- a. Business to Business (B2B) is a sort of inter-corporation transaction in which two companies trade with each other. A supplier for example, buys its items from a producer. Prices are frequently altered in response to the amount of orders and negotiations;
- b. Business to Consumer (B2C). The seller can be a distributor, a producer, or a retailer, and the transactions are usually addressed to end consumers. The company's website will become an online shopping platform to fulfil customer's transaction such as placing an order based on items that offered in its digital catalogue;
- c. Consumer to Business (C2B). This transaction is opposite of the B2C transaction. The corporation acts as the buyer, while the end customer acts as the seller. This action takes place through the Internet such as Google Play. Users can develop

and upload their apps to Google's servers, so that they can sell it to other Google Play users; and

- d. Consumer to Consumer (C2C). Consumer-to-consumer transactions happened, such as those that take place in a market place. Consumers sell goods or services they have to other consumers in a market place.

Conventionally, business transaction conducted by face-to-face conversation or agreement between sellers and buyers. As time passes, the introduction of technology makes business transactions considerably more thorough, more pleasant, and internationally connected, radically altering the traditional business process. Having IT and tech savvy employee is necessary to improve e-commerce usage in the firm. The organisational direction in terms of e-commerce usage will be determined by the competency of employee in the tech and IT field. According to Teo, Ranganathan, and Dhaliwal (2006), e-commerce expertise has a considerable favourable effect on e-commerce adoption in business. Furthermore, firms with IT experts have superior commercial performance than organisations without technical staff who is competence enough in the same field (Chang & Wong, 2004).

COVID-19's presence in Wuhan has had a significant impact not only on the health sector, but also on the economy, including economic activities associated to the process of purchasing goods or services. Following the outbreak of the COVID-19 pandemic and implementation of social distancing, new consumer behaviour in determining purchasing patterns has emerged. (<https://nasional.kompas.com/read/2020/04/25/15472271/update-25-april-kasus-covid-19-di-indonesiamencapai-8607>). Consumers are increasingly using internet tools and

searching for online platforms to study and purchase the items or services they required (Dirgantari et al., 2019). This increases the level of competition among online businesses.

Economic activities that involve close physical contact have been severely curtailed in effort to curb COVID-19 infection. World Bank Group (2020) listed 13 critical initiatives that governments can adopt in the short term to utilise e-commerce during the current COVID-19 pandemic. The international organization's recommendations aim to accomplish two goals: helping more firms and households connect to the digital economy during the crisis, and ensuring that e-commerce can continue to serve the public in a secure manner even during the COVID-19 lockdown.

The pandemic has resulted a significant growth in the number of customers purchasing online, as well as first-time e-commerce users (Halan, 2020). According to UNCTAD (2020) poll, the pandemic has led in an increase of e-commerce website sales. Between March and July 2020, the survey reported about 64 percent of third-party marketplaces had an increase in sales. Bain and Company (2020) in their study also mentioned, the demand and usage of e-commerce platforms will extremely grow in the post-pandemic period as buyers seek safety and convenience.

2.5 ICT Applications

The usage of ICT during the COVID-19 pandemic has been reported in many news platforms. ICT allows users to access and search for pertinent updates and sharing information and facts related with the disease (Chan et al., 2020). Given the uncertainty nature of the pandemic, the difficulty is figuring out how to efficiently transfer and deliver the most up-to-date information to public. Traditional methods such as static websites and email are thought to be slower than the use of news media and social media (Brownson et al., 2018). When compared to traditional means, the utilisation of