UNDERGRADUATE THESIS

THE EFFECTS OF CHANGES IN ONLINE ACTIVITY-PATTERN ON MENTAL HEALTH IN DIFFERENT STAGES OF COVID-19 PANDEMICS IN INDONESIA AND THAILAND

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PERNYATAAN

Yang bertanda tangan di bawah ini, saya dengan data diri sebagai berikut:

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Menyatakan bahwa skripsi dengan judul:

"***The Effects of Changes in Online Activity-pattern on Mental Health in Different Stages of COVID-19 Pandemics in Indonesia and Thailand***" adalah benar-benar karya saya sendiri di bawah bimbingan dosen pembimbing. Saya tidak melakukan penjiplakan atau pengutipan dengan cara-cara yang tidak sesuai dengan etika keilmuan yang berlaku dalam masyarakat keilmuan. Apabila di kemudian hari ditemukan adanya pelanggaran terhadap etika keilmuan dalam karya saya, atau jika ada tuntutan formal atau non formal dari pihak lain berkaitan dengan keaslian karya saya ini, saya siap menanggung segala resiko, akibat, dan/atau sanksi yang dijatuhkan kepada saya, termasuk pembatalan gelar akademik yang saya peroleh dari Universitas Katolik Parahyangan.

Bandung, 18 Juli 2022

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ABSTRACT

A global health emergency known as a pandemic was declared by World Health Organization (WHO) in March 2020 due to the emerging cases of a new infectious virus called COVID-19. Travel restrictions are applied to prevent the spread of this virus. People's behaviour is also affected due to this constraint. Their online activities are increasing since then. Some argue that mental health could be affected by those external factors. This study explored the correlation between online activity-pattern on mental health in Indonesia and Thailand based on three different stages of COVID-19 using Exploratory Factor Analysis (EFA) and Multilevel Structural Equation Modeling (SEM). This study found out that online activities, as well as behavioural changes and sociodemographic characteristics, have significant correlations to a person's mental health depending on the type of characteristics and activities performed. Different correlation between online activity-pattern and mental health are occurred between the Indonesian and Thailand model. Higher use of social media and online shopping related activities correlates with a lower mental health condition in the Indonesian model. Whereas in the Thailand model, online gaming and online food delivery related activities correlates with a higher mental health condition in the Thailand model.

Keywords: Time-space Prism, Activity-travel Behaviour, Online Activity-pattern, Mental Health, COVID-19 in Indonesia, COVID-19 in Thailand, Exploratory Factor Analysis (EFA), Multilevel Structural Equation Method (SEM)

DAMPAK PERUBAHAN POLA AKTIVITAS DARING PADA KESEHATAN MENTAL DALAM BEBERAPA PERIODE PANDEMI COVID-19 DI INDONESIA DAN THAILAND

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ABSTRAK

Keadaan darurat kesehatan global yang dikenal sebagai pandemi dinyatakan oleh Organisasi Kesehatan Dunia (WHO) pada Maret 2020 karena munculnya virus baru yang menular yang disebut COVID-19. Pembatasan perjalanan diterapkan untuk mencegah penyebaran virus ini. Perilaku masyarakat juga terpengaruh karena kendala ini. Aktivitas daring mereka meningkat sejak saat itu. Ada yang berpendapat bahwa kesehatan mental dapat dipengaruhi oleh faktor eksternal tersebut. Studi ini mengeksplorasi korelasi pola aktivitas daring pada kesehatan mental di Indonesia dan Thailand berdasarkan tiga periode pandemi COVID-19 yang berbeda menggunakan *Exploratory Factor Analysis* (EFA) dan *Multilevel Structural Equation Modeling* (SEM). Studi ini menemukan bahwa aktivitas daring, serta perubahan perilaku dan karakteristik sosiodemografi, memiliki korelasi yang signifikan terhadap kesehatan mental seseorang tergantung pada jenis karakteristik dan aktivitas yang dilakukan. Perbedaan korelasi antara pola aktivitas daring dan kesehatan mental terjadi antara model Indonesia dan Thailand. Tingginya penggunaan media sosial dan aktivitas terkait belanja daring berkorelasi dengan kondisi kesehatan mental yang lebih rendah dalam model Indonesia. Sedangkan pada model Thailand, aktivitas terkait *online gaming* dan pemesanan makanan melalui aplikasi penyedia layanan antar makanan daring berkorelasi dengan kondisi kesehatan mental yang lebih tinggi pada model Thailand.

Kata kunci: *Time-space Prism*, Pola Aktivitas dan Perjalanan, Pola Aktivitas Daring, Kesehatan Mental, COVID-19 di Indonesia, COVID-19 di Thailand, Analisis Faktor Eksploratori, *Multilevel Structural Equation Modeling (SEM)*

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The author realized that this undergraduate thesis is not perfect and is open to any critics and suggestions in the future. Thank you.

Bandung, July 2022

Fakhri Bayuaji

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LIST OF NOTATIONS AND ABBREVIATION

α = Intercept Value

β = Coefficient Parameter

e = Margin of Error

η = Endogenous Variables

N = Population Size

n = Minimum Sample Size

r_{ik} = Original Correlation of Variable (i, k)

q_{ik} = Anti-image Correlation of Variable (i, k)

u = Specific Error Terms

ε = Error Terms

ξ = Exogenous Variables

x = Independent Variables

y = Dependent Variables

AHK = *Auslandshandelskammer* 'German Chambers of Commerce Abroad'

BC = Behavioural Changes

BMA = Bandung Metropolitan Area

BMR = Bangkok Metropolitan Region

CFA = Confirmatory Factor Analysis

COVID-19 = Coronavirus Disease

CSSE = Center for System Science and Engineering

EFA = Exploratory Factor Analysis

ICT = Information and Communications Technology

Jabodetabek = Jakarta, Bogor, Depok, Tangerang, and Bekasi

JHU = John Hopkins University

JMA = Jakarta Metropolitan Area

KMO = Kaiser-Meyer-Olkin

LME = Linear Mixed Effect

MERS = Middle East Respiratory Syndrome

MH = Mental Health

OA = Online Activity

OTT = Over-the-top

PCA = Principal Component Analysis

PPA = Potential Path Area

PPKM = *Pemberlakuan Pembatasan Kegiatan Masyarakat*

PSBB = *Pembatasan Sosial Berskala Besar*

SARS = Severe Acute Respiratory Syndrome

SC = Sociodemographic Characteristic

SEM = Structural Equation Method

WFH = Work from Home

WHO = World Health Organization

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CHAPTER 1
INTRODUCTION

1.1 Background

A global health emergency known as a pandemic was declared by World Health Organization (WHO) in March 2020 due to the emerging cases of a new infectious virus called COVID-19 (WHO, 2020). People are forced to implement health protocols such as washing hands, wearing masks, disinfecting, and avoiding social contact to prevent themselves from being infected by the virus (Chen et al., 2020). Following the emergency condition, at the beginning of the pandemic, the Indonesian government limited the activity and mobility of its people, some of which are school closure, offices, and public space capacity limitations (AHK Indonesien, 2020; Ministry of Health of Indonesia, 2020). The restrictions were aimed to reduce out-of-home activities and prevent the spread of the virus that has resulted in people's activity-travel behaviour changes (de Haas et al., 2020).

One of the changes in activity-travel behaviour since the COVID-19 pandemic can be seen in the decrease in out-of-home activities due to travel restrictions. Out-of-home activities have been replaced by online activities (e.g., online meetings or teleworking/work-from-home/online schools) benefited from the information & communication technology (ICT) industries (Dcode Economic and Financial Consulting, 2020; Irawan et al., 2020). A survey by McKinsey (2020) showed that 53% of customer interactions in Asia-Pacific are digital. Meanwhile, before the COVID-19 pandemic, digital interaction in Asia-Pacific was only 32%. Online activities for work and leisure purposes including online gaming and movie streaming have been found to increase during the early stage of COVID-19 (Javed, 2020; Perez; 2020; King et al., 2020). This shows a sudden increase in online activities and changes in people's activity behaviour and those online activities, including work, study, socialising, shopping, and training are to replace out-of-home activities (Zamboni et al., 2021).

The increasing activity on the internet has brought people closer than ever but also has a set of challenges to a person's mental health issues such as low self-esteem as a consequence of social comparison or feeling anxious as a result of misinformation (Vogel et al., 2015; Sahni & Sharma, 2020). Previous studies showed that the use of social media increased the risk of exposure to harm, social isolation, depressive symptoms, exposure to cyberbullying, anxiety, loneliness, and suicide (Naslund et al., 2020). Besides the use of social media, the risk level of anxiety, depression, stress, suicide, and post-traumatic stress rate elevates during the COVID-19 pandemic (O'Connor et al., 2021). Allardt (1975; 1993) explained the three dimensions to fulfilling human needs in terms of their well-being which are to 'have', to 'love', and to 'be'. Activities or trips for shopping or seeing a doctor are considered would satisfy the having dimension while socializing or interacting with loved ones are the needs of the loving dimension and participating in leisure activities is to fulfil human needs in the being dimension (Nordbakke & Schwanen, 2015).

Time-space prism perspective has highlighted the trade-off mechanisms between activities on weekdays and weekends or between a day with tighter and more flexible time-space constraints (Susilo & Kitamura, 2005; Dharmowijoyo et al., 2014; Kang & Scott, 2010). Moreover, the time-space prism perspective has also shown the trade-off mechanism between offline and online activities due to travel restrictions (Wee & Witlox, 2021). The travel restriction is a representation of authority constraint. The occurrence of additional coupling constraints might make people have more flexible time at home. The flexible time can make people do some leisure activities after working from home (WFH) such as visiting parks or grocery shopping more often (Wee & Witlox, 2021). Moreover, the unavailability of performing out-of-home leisure activities might generate new online activities that might have never been done before the pandemic. Different people might have different preferences for the performed online activities due to different constraints. Those who have high capability constraints (e.g., people that have a serious medical condition or a comorbid disease) may have more online activities in the health sector, such as consulting with their doctor via online telemedicine to control their disease. People who have higher coupling constraints

(e.g., couples that are living in different cities) could spend more time in video call activities. While those who have high authority constraints (e.g., people in a full-lockdown area) might have more time on social media and online streaming platforms due to the lack of out-of-home activities. Online activities might also be shaped by the stages of life. People who have different stages of life might have different constraints and needs/preferences. Those interactions might be shaped by a different set of online activities that can be undertaken on the days constrained by the pandemic situations. This is the research gap that the author will study.

The advantage of discussing online activity-pattern and their relation to mental health are to know people's responses to a sudden change in travel regulation and maintain people's social and mental health despite the massive changes in activity-travel patterns. It is hypothesised that there is a set of online activities that correlate with poor mental health conditions, whereas another set has an opposite effect. Extending the research on how the effects of performing a different set of online activities is another research gap studied. Another benefit of the current research is to better understand the effects of ICTs on people's activity-travel patterns with conceptualizations of space-time in the physical and virtual worlds.

An individual activity-travel pattern is affected by many factors, one of which is socio-economic background and geographical context (Dharmowijoyo, 2016; Dijst et al., 2008; Miller, 2017). In this case, Indonesia and Thailand have different backgrounds regardless of the fact that both nations are in Southeast Asia and are considered as developing countries (Glahan, 2019; Handayani, 2020). In the geographical context, Indonesia is an archipelago country with more than 16,000 islands and separated from Southeast Asia's mainland (Ministry of Marine Affairs and Fishery of Indonesia, 2020), whereas Thailand is located in the middle of Southeast Asia's mainland. This geographical difference might affect the way people travel which can correlate with capability constraints and resources. In the economical context, Indonesia has a US$ 3,869 GDP per capita, while Thailand has a US$7,186 GDP per capita (World Bank, 2022). The difference in GDP per capita may affect people's types of consumption that can correlate with coupling and capability constraints. On the social background, Indonesia is a Muslim-dominated country and Thailand is a Buddhist-dominated country (Office of International

Religious Freedom, 2021). The differences in religious culture made a different coupling constraint, for instance, Muslims had to pray five times a day so the need to set aside other activities to pray might be higher. During the COVID-19 pandemic, Indonesia's and Thailand's governments also made different regulations that correlate with different authority constraints. Indonesia never implements a full lockdown policy meanwhile Thailand had implanted a full-lockdown policy from March 2020 until May 2020 (Haddawy et al., 2021). Those differences might set a distinct constraint and activity-travel behaviour in each country. It is very interesting to learn about how two countries in Southeast Asia changed their online activity pattern since the beginning of the COVID-19 pandemic.

1.2 Problem Statement

The COVID-19 pandemic has triggered a sudden massive change in activity-travel behaviour (Barbieri et al., 2021). People's travel behaviour changed due to restrictions to prevent the spread of the virus and risk perception toward COVID-19 (de Haas et al., 2020; Hotle et al., 2020). Out-of-home activities and mobility have decreased to reduce the risk of being infected with the virus (Dcode Economic and Financial Consulting, 2020; Irawan et al., 2020). The result is increasing ICT use during the COVID-19 pandemic (Irawan et al., 2020). Working from home and e-learning may increase an individual's free time because the travel time to work or school has been reduced. Therefore, people's online activity might change since the COVID-19 pandemic struck.

The ICTs have relaxed space-time constraints and led to the fact that activities that were formerly related to a certain location are now spread across numerous geographical scales (Couclelis, 2000; Neutens et al., 2011). The time-space prims might be able to describe why people perform different sets of online activities. The uniqueness of every individual's constraints, resources, and needs might have affected their set of activities on the internet. It is hypothesised that an individual with a high coupling constraint may have more time socializing online with friends/relatives than those who have fewer coupling constraints. Stage of life represented by age and income is also hypothesised to significantly correlate with different set of online activities. For instance, people in productive age might be

strained to do more working activities like teleconferencing. Whereas those who are not in productive age might have more flexible time. Moreover, more flexible time and boredom are hypothesised to make individuals exposed to leisure activities, such as movie streaming and scrolling social media. This is the first problem statements that will be answered by this study.

Besides its benefit, the interaction in a different set of online activities might bring disadvantages to an individual's mental health. Replacing socialising with e-meeting for leisure purposes is hypothesised to correlate with feeling lonely since there is a lack of physical and eye contact. On the other hand, performing online activities alone such as streaming movies might correlate with a boost in happiness and increased mental health (Javier, 2021). Some evidence shows that people may develop touch starvation during COVID-19 because of the social distancing policy. This impact results in anxiety, stress, or depression (Benisek, 2021). This is the second problem statements that will be answered by this study.

1.3 Objective of the Study

The objectives of the study are as follows:

1. To compare the trends of online activity-pattern and mental health in three different stages of COVID-19 pandemics between Indonesia and Thailand dataset using bivariate analysis.
2. To compare the correlation of online activity-patterns and mental health in three different stages of COVID-19 pandemics between Indonesia and Thailand dataset using multivariate analysis.

1.4 Scope of the Study

The scope of the study is as follows:

1. The research object is Jakarta Metropolitan Area (JMA), Bandung Metropolitan Area (BMA), and Bangkok Metropolitan Region (BMR) people.
2. Indonesian model in this research is limited to JMA and BMA.
3. Thailand model in this research is limited to BMR.

4. Activity-travel behaviour changes in this research mean respondent's differences in activity and travel behaviour namely before and after the COVID-19 pandemic strike.
5. Online activity in this research is limited to activities on Youtube, Twitter, Instagram, Facebook, Tiktok, and Tinder. Other activities covered in this research are online investment or trading, blogging or microblogging, online gaming, online meeting, movie streaming, online shopping, and online grocery shopping.
6. Mental health in this research refers to happiness, nervousness, depression, and anxiety.
7. The primary data is obtained by doing a survey based on an online questionnaire to the research object.
8. The secondary data is obtained from previous research regarding activity-travel pattern changes since the COVID-19 pandemic in Thailand.
9. The analysis methodology that is used in this study is Exploratory Factor Analysis (EFA) and Multilevel Structural Equation Modeling (SEM).

1.5 Research Methodology

To perform the research, we need to create the background of the study, determine the questions of the study, and create the purposes of the research. The next step is to define the limits of the study and review works of literature about Time-space Prism, Activity-travel Behaviour, Online Activity-pattern, Mental Health, COVID-19 in Indonesia, COVID-19 in Thailand, Exploratory Factor Analysis (EFA), and Multilevel Structural Equation Modeling (SEM) to have a better understanding of the analysis.

The data that will be retrieved are primary data and secondary data. The primary data consists of the respondent's sociodemographic characteristics, activity-travel behaviour including online activity behaviour, and their mental health. All of those data will be asked in three different periods of COVID-19 pancemic that all compared to pre-pandemic condition. The primary data will be spread using an online questionnaire towards the research object. The secondary data for this research is the data set of the impact of COVID-19 on the activity-

travel pattern in Thailand. The primary data will be analysed using bivariate and multivariate analysis involving EFA and Multilevel SEM.

Conclusions and suggestions from the research would be made after the primary data has been analysed and also compared the result with the secondary data. The research process is visualized using a schematic diagram shown in Figure 1.1 below.

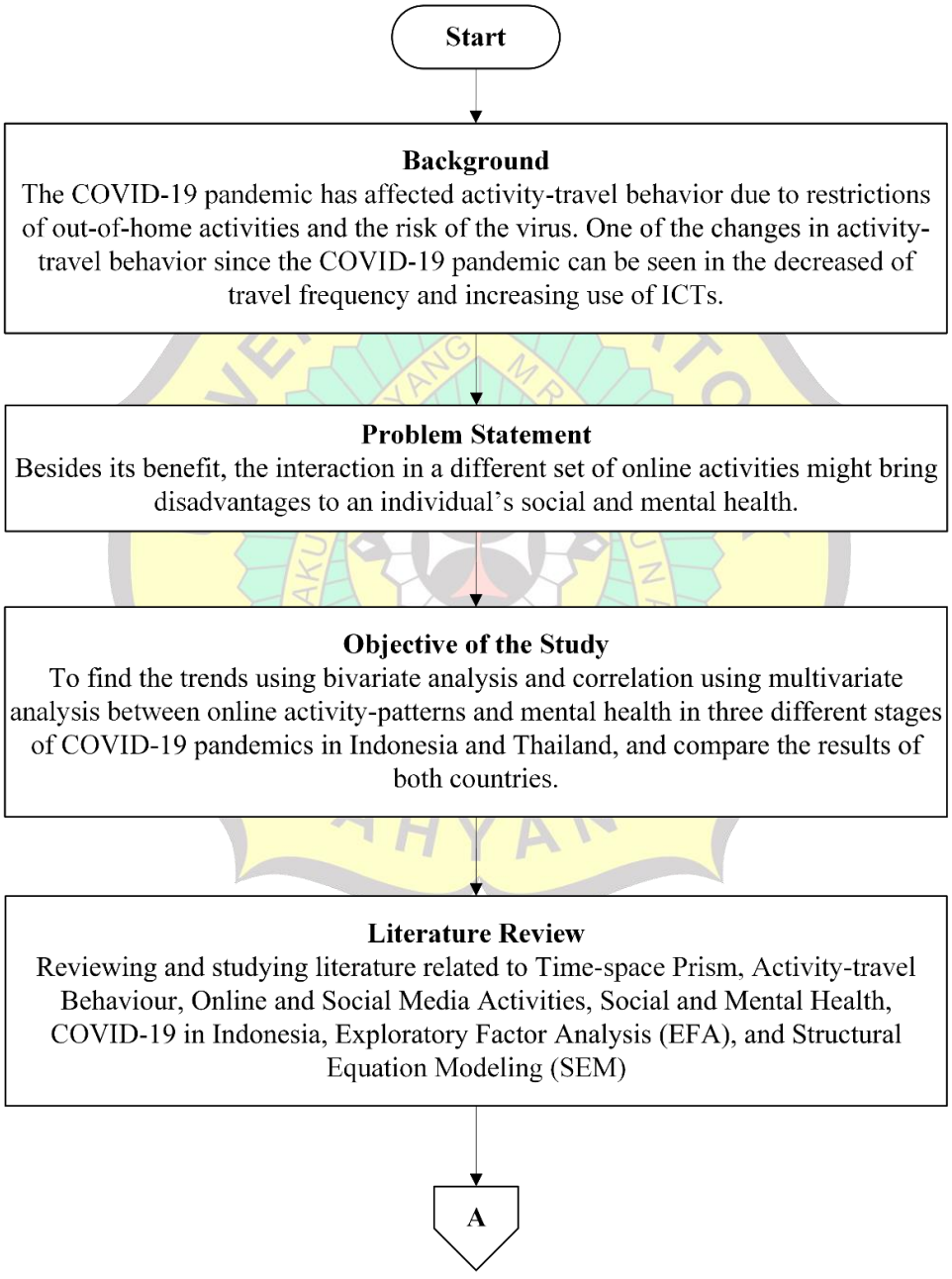

Figure 1.1 Schematic Diagram

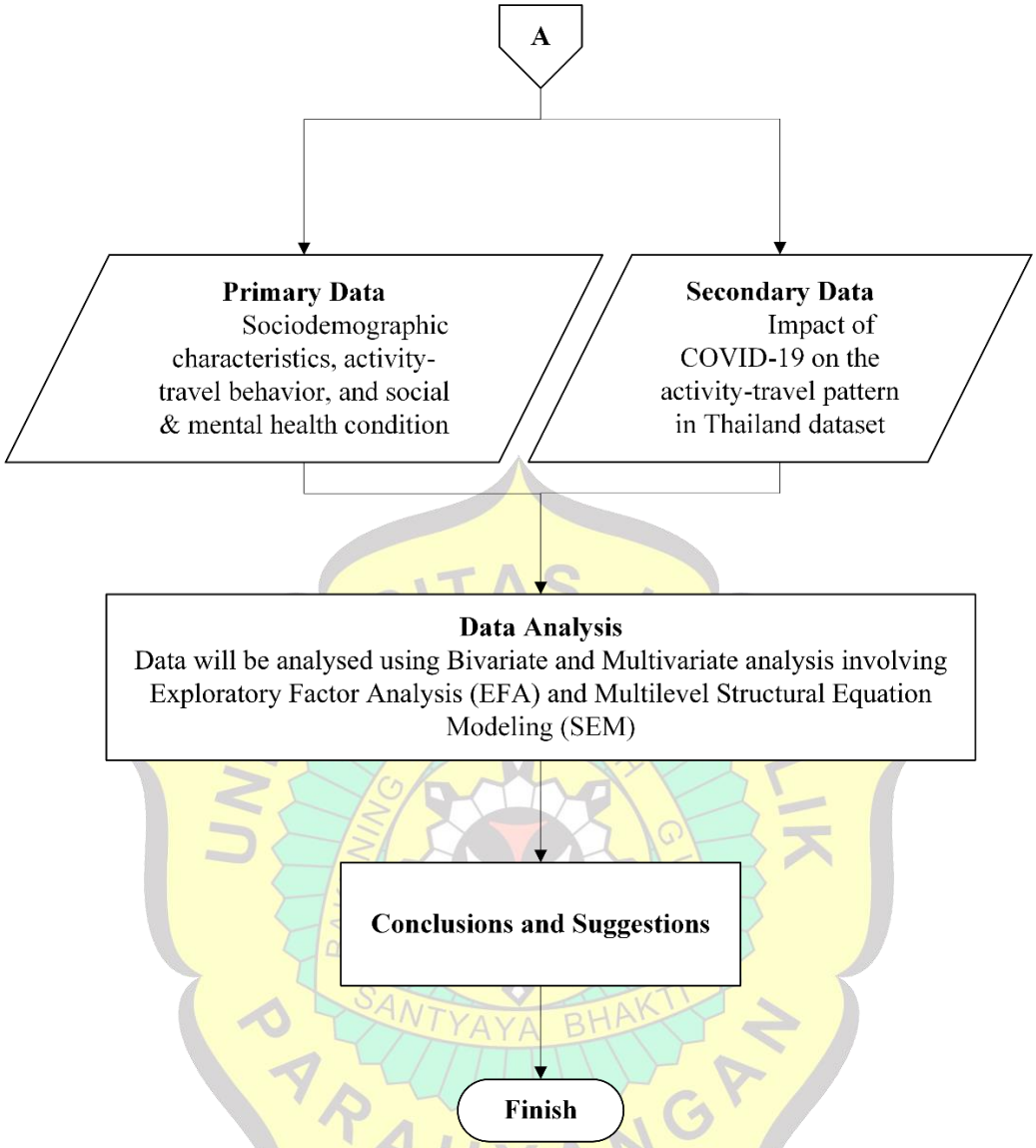

Figure 1.1 Schematic Diagram (*continuation*)