Message from the Editor

Dear Readers,

The NIDA Development Journal (NDJ) Volume 2/2022 issue is the first online issue which features six articles covering a variety of interesting topics. They range from the health issues related to the COVID-19 pandemic, environmental aspects of investment, rainfall dispersion in Thailand, legal aspects of social enterprise and the Korean National Anthem. The articles represent our main academic interest, namely development studies from various areas, as well as sustainable development which is one of the foundations in the preservation of the environment and natural resources.

The first article by *Associate Professor Pornpun Prajaknate* and *Assistant Professor Kirati Kachentawa* is entitled "**Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy, Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior**". It examines the influences of eHealth literacy, self-efficacy, social support, perceived risk of Covid-19 infection and health information seeking behavior on self-management of individuals living with non-communicable diseases (NCDs) during Covid-19. The second article, entitled "**The Factors Influencing Trust in Health and Safety Amid the COVID-19 Pandemic in the Case of Prachuap Khiri Khan Province, Thailand**" by *Pattaraporn Jumporm*, explores how the Covid-19 pandemic affected the tourism sector in Prachuap Khiri Khan Province in terms of tourists' trust in health and safety.

The next two articles present issues in the closely associated areas of the environment and natural resources. One article entitled "**Environment-Growth Nexus: Revisiting Prosperity and Challenges Associated with Foreign Direct Investment**" was written by *Iqra Arshad* and *Muhammad Azhar Khalil*. The authors develop a model to investigate the interactions between foreign direct investment (FDI), carbon emission (CO_2), fixed capital accumulation (FCA), and economic growth by analyzing the sample from Pakistan during 1970-2017. The other article, which was written by *Associate Professor Wararit Panichkitkosolkul* deals with droughts which are regular natural disasters that happen nearly every year due to several factors such as precipitation deficiency, human activity, and global warming. Entitled "**Testing the Ratio of the Coefficients of Variation for the Inverse Gamma Distributions with an Application to Rainfall Dispersion in Thailand**", the paper tests

annual rainfall dispersion via the ratio of the coefficients of variation (CVs) of the inverse gamma (IG) distributions in Buriram and Chaiyaphum Provinces in Thailand.

The fifth article entitled "**Development of Social Enterprises in Thailand: A Critical Investigation of the Social Enterprise Promotion Act 2019 within a Theoretical Framework of Law and Development**" by *Associate Professor Dhiyathad Prateeppornnarong* and *Assistant Professor Prapin Nuchpiam* analyses the Social Enterprise Promotion Act of Thailand based on the theory of law and development. The final article focuses on Korean values in South Korea's national anthem video, which presents the image of South Korea from the perspective which shows not only national pride and honor but national unity and identity in several aspects from the past until now. The article, entitled "**The Dissemination of Korean Values: From the "National Anthem" to "Cultural Exports""**" was written by *Jirasin Tinbang*. These six articles can be accessed online at www.tci-thaijo.org.

We hope that the readers of this NDJ Vol. 2/2022 issue will gain significant benefits from the contents of these articles. The editor also would like to thank all members of the editorial board, the scholars who have kindly reviewed the articles, and the support staff of the Research Center of NIDA, who have contributed to the production of this issue of the NIDA Development Journal, and, last but not least, the journal subscribers and all its readers.

<div align="right">

Patthareeya Lakpetch

Editor

</div>

NIDA Development Journal
วารสารพัฒนบริหารศาสตร์

NIDA WISDOM *for* Sustainable Development

NIDA Development Journal NIDA Development Journal NIDA Development Journal NIDA Development Journal NIDA Development Journal
NIDA Development Journal NIDA Development Journal NIDA Development Journal NIDA Development Journal NIDA Development Journal
NIDA Development Journal NIDA Development Journal NIDA Development Journal NIDA Development Journal NIDA Development Journal

Contents

Volume 62 Number 2 (July-December 2022)

Research Articles:

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy, Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

Pornpun Prajaknate* and Kirati Kachentawa**

Abstract

The research objectives of this study were to examine the influences of eHealth literacy, self-efficacy, social support, perceived risk of Covid-19 infection and health information seeking behavior on self-management of individuals living with non-communicable diseases (NCDs) during Covid-19.

Mixed research methods were employed in this study. With regard to the qualitative research method, in-depth interview were conducted among 5 key informants who were public health professionals, journalists and community health care volunteer. Regarding quantitative research method, online questionnaires were distributed to 180 respondents who were report having chronic NCDs in the past year.

The qualitative findings showed that the most critical problem confronting individuals with NCDs during Covid-19 was poverty and unemployment. Individuals

---

* Graduate School of Communication Arts and Management Innovation, National Institute of Department Administration

  148 Serithai Road, Khlong-Chan, Bangkapi, Bangkok 10240, THAILAND.

  E-mail: pornpun.p@nida.ac.th

** Faculty of Mass Communication, Ramkhamhaeng University

  282 Ramkhamhaeng Road, Hua Mak, Bangkapi, Bangkok 10240, THAILAND.

  E-mail: latterrepolka2011@gmail.com

with NCDs sought for health information from online media and health care volunteer in their community. Therefore, it is necessary for them to have a high eHealth literacy skills, particularly, the ability to access reliable information sources, as well as the capacity to access the quality of health information.

Finding from survey demonstrated that perceived self-efficacy was the most powerful factor that directly influenced the self-management of individuals with NCDs during Covid-19 which explained at least 13% of the variances.

Keywords: Noncommunicable Ciseases (NCDs), Covid-19, Self-management

การจัดการตนเองของบุคคลที่เป็นโรคไม่ติดต่อเรื้อรัง ในช่วงโควิด-19 และบทบาทของการรู้เท่าทันสื่อสุขภาพ แบบออนไลน์ การรับรู้ความสามารถตนเอง การสนับสนุนจากสังคม การรับรู้ความเสี่ยง และพฤติกรรมการค้นหาข้อมูลข่าวสาร

พรพรรณ ประจักษ์เนตร* และ กิรติ คเชนทวา**

บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์ศึกษาอิทธิพลของปัจจัยการรู้เท่าทันสื่อสุขภาพแบบออนไลน์ การรับรู้ความสามารถตนเอง การสนับสนุนจากสังคม การรับรู้ความเสี่ยง และพฤติกรรมการค้นหา ข้อมูลข่าวสารที่มีต่อการจัดการตนเองของบุคคลที่เป็นโรคไม่ติดต่อเรื้อรังในช่วงโควิด-19 โดยใช้ ระเบียบวิธีวิจัยแบบผสมผสาน ได้แก่ วิธีการวิจัยเชิงคุณภาพ โดยมีผู้ให้ข้อมูลหลักจำนวน 5 คน คือ เจ้าหน้าที่สาธารณสุขระดับชำนาญการ ผู้เชี่ยวชาญด้านสื่อสุขภาพ และอาสาสมัครสาธารณสุข และ วิธีการวิจัยเชิงสำรวจด้วยการเก็บแบบสอบถามแบบออนไลน์กับกลุ่มตัวอย่างจำนวน 180 คนที่รายงาน ว่าเป็นโรคไม่ติดต่อเรื้อรังในช่วง 1 ปีที่ผ่านมา

ผลการวิจัยเชิงคุณภาพ พบว่า ปัญหาสำคัญที่สุดที่บุคคลที่เป็นโรคไม่ติดต่อเรื้อรังเผชิญ ในช่วงการแพร่ระบาดของโควิด-19 คือ ความยากจนและการตกงาน ในส่วนของค้นหาข้อมูล ข่าวสารสำหรับการจัดการตนเองในช่วงโควิด-19 พบว่า ผู้ที่เป็นโรคไม่ติดต่อเรื้อรังค้นหาข้อมูลข่าวสาร เพื่อการดูแลสุขภาพผ่านสื่อออนไลน์และอาสาสมัครสาธารณสุข ดังนั้น การรู้เท่าทันสื่อสุขภาพแบบ

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy,
Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

4

ออนไลน์ ได้แก่ ทักษะในการเข้าถึงแหล่งข้อมูลที่น่าเชื่อถือ และการประเมินคุณภาพของข้อมูล
ด้านสุขภาพจึงเป็นสิ่งจำเป็น

สำหรับผลการวิจัยเชิงปริมาณ พบว่า การรับรู้ความสามารถตนเองของผู้ที่เป็นโรคไม่ติดต่อ
เรื้อรังเป็นปัจจัยที่มีประสิทธิภาพมากที่สุดในการอธิบายความแปรปรวนของการจัดการตนเองในช่วง
โควิด-19 โดยมีค่าสัมประสิทธิ์พยากรณ์ที่ร้อยละ 13

คำสำคัญ : โรคไม่ติดต่อเรื้อรัง โรคติดเชื้อโคโรนาไวรัส 2019 การจัดการตนเอง

1. Introduction

Noncommunicable diseases (NCDs) have been recognized as a chronic diseases, mental health and physical health symptoms that occur more than one year period. NCDs, such as heart disease and stroke, cancer, asthma and diabetes, are caused of long hospitalization (World Health Organization, 2021). Moreover, NCDs have been acknowledged as the leading cause of death in Thailand and worldwide. In 2018, the top three leading causes of death in Thailand were: cancer; cerebrovascular disease; and ischemic heart disease (Department of Mental Health, 2021).

The Department of Disease Control, Thailand reports that an approximately 400,000 Thai people died from NCDs every year, or at least 1,000 per day (National Statistical Office, 2021). The NCDs mortality rate is 427.4 per 100,000 population (Department of Mental Health, 2021). Cardiovascular diseases and stroke account for the majority of NCD deaths, followed by ischemic heart disease, chronic obstructive airway disease, diabetes and high blood pressure (World Health Organization, 2018).

According to the report of the Thai Health Check-up 2019-2020, NCDs are driven by several risk factors such as unhealthy diet, physical inactivity, smoking and alcohol consuming (Aekplakorn, 2021). It is important for individuals suffering from NCDs to receive long-term personalizing medical treatments. Therefore, frequent attendance in primary health care can greatly alleviate the symptoms of NCDs (Budreviciute et al., 2020).

However, the health care system has been significantly affected by Covid-19 pandemic (Thaler et al., 2020). Several hospitals in Thailand have a shortage of health care providers as well as hospital beds. As a consequence, individuals with NCDs have limited access to health care services. Moreover, World Health Organization announced that individuals suffering from NCDs were one of the most vulnerable with high risk of severe illness from Covid-19 (U.S. Agency for International Development, 2021). Therefore, self-management behavior during Covid-19 outbreak is crucial for maintaining good health among individuals' with NCDs.

Self-efficacy, which is one of important factor in determining self-management of NCDs, is a belief of individual's set of belief in their own capacity to manage their health. Existing literature demonstrates that people with a higher level of self-efficacy are more likely to successfully change their unhealthy behavior lifestyle that influence the risk

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy, Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

6

of NCDs (Akdeniz Kudubes et al., 2022). Another key factor associated with self-management of NCDs is eHealth literacy. There is an empirical evidence that shows the association between eHealth literacy, mobile digital skills and self-management of diabetes patients. Those with higher eHealth literacy skills are more likely to engage in self-management of NCDs (Guo et al., 2021). There is also evidence that perceived risk plays a pivotal role in the self-management process among patients with NCDs. Recent qualitative study about self-management of NCDs during Covid-19 indicates that diabetes patients with high level of risk perception tend to develop more severe symptom during Covid-19. Such this perception enhance their needs for enhancing self-management behavior during Covid-19 pandemic (Upsher et al., 2022).

Moreover, there are some evidences show that health information seeking behavior may help individuals who are at risk of NCDs make more well-informed decisions about health plan and treatment (Neter & Brainin, 2012; Norman & Skinner, 2006; Patel et al., 2015; Stellefson et al., 2018). Family, friends and children are crucial sources of social support which foster self-management among diabetes patients (Tusubira et al., 2021).

To sum up, previous research on self-management of NCDs found that eHealth literacy, self-efficacy, social support, perceived risk and health information seeking behavior were factors that influenced self-management of NCDs. However, to our knowledge, there are no studies investigating the effects of stress level, eHealth literacy, self-efficacy, health information seeking behavior, social support and perceived risk on self-management of individuals with NCDs during Covid-19 pandemic in Thailand. Inspired by Wilson's model of information seeking behavior, the objectives of this study were to examine the role of eHealth literacy, self-efficacy, social support, perceived risk of Covid-19 infection and health information seeking behavior on self-management of NCDs during Covid-19 pandemic.

2. Literature Review

2.1 Factors Influencing Health Information Seeking Behavior

The theoretical framework of this research is formulated based upon Wilson's information seeking behavior model. This model consists of six elements which develop in cycle starting from information need to the information processing and use (Wilson, 1999). When individual perceived some needs, they will engage in information seeking

behavior by obtaining data from information communication technology and interpersonal communication channels (Wilson, 1981). Understanding information helps individuals reduce their uncertainty toward problems that occur in their life (Wilson, 1981). However, the information seeking behavior is influenced not only by needs of information but also by individual's stress level (Wang, 2011). In addition, Wilson proposes some factors that may impede or support individual to use the information, including psychological, demographic, personal, attribute of information sources and environmental factors (Wilson, 1999).

The model also incorporates stress coping theory, risk/reward theory and social learning theory to explain the relationship between perceived risk, perceived self-efficacy and information seeking behavior (Xie, 2008). In particular, there are four types of information seeking behavior: (1) passive attention, (2) passive search, (3) active search, and (4) on-going search. Passive attention refers to individual's action to passively gather information. Passive search is an unintentionally behavior to obtain data. Whereas active search is an individual's action to actively seek for information and extend their search with a continuum of information seeking behavior (See Figure 1) (Tella, 2016).
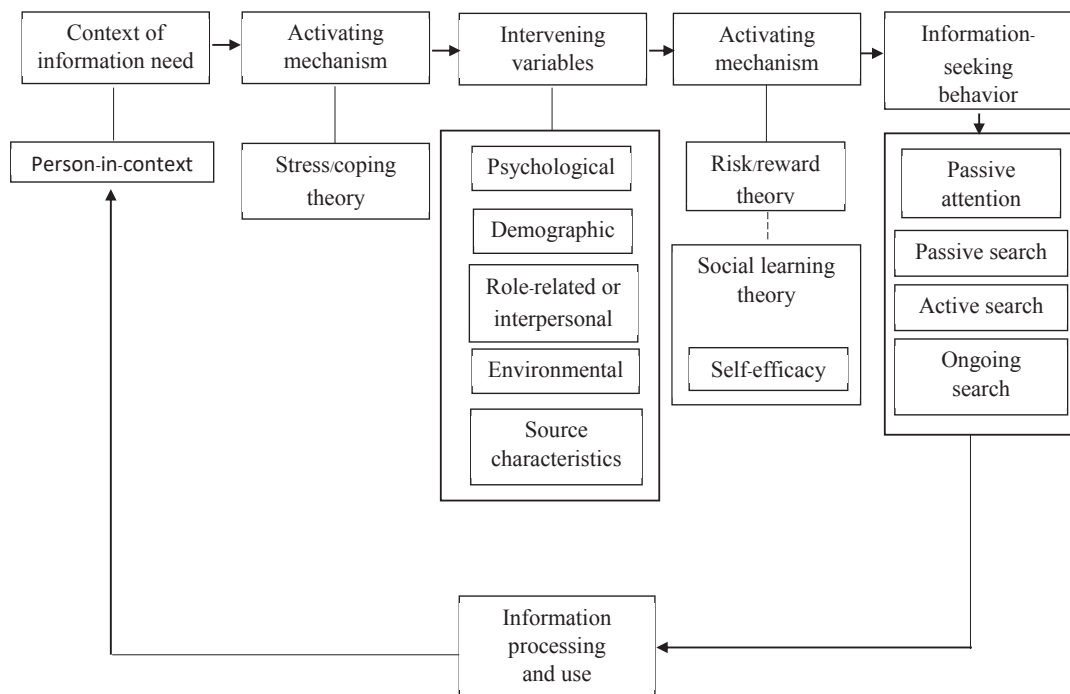

Figure 1: The Health Information Seeking Model
Noted: (Wilson, 1999)

2.2 eHealth Literacy, Social Support, Self-efficacy and Perceived Risk of Covid-19 Infections as Direct and Indirect Factors

In the current study, individuals with NCDs may experience stress during Covid-19, which lead to a greater need for health information. According to the Wilson's model of information seeking behavior (1999), the stress plays an important role in people's psychological, personal and environmental functions, and significantly influences their information seeking behavior. There is an empirical evidence on the influence of perceived stress on self-efficacy, social support, eHealth Literacy and health information seeking behaviors. Stellefson and his colleague (2018) demonstrate that respondents who report moderate to high level of suffering from Chronic Obstructive Pulmonary Disease (COPD) are more likely to have a high level of eHealth literacy. In particular, patients with severe COPD have a high capacity to search for high quality online health sources and utilize health information to fulfil their needs. COPD patient with high self-efficacy are more likely to have greater understanding on searching good health information from an online sources and assessing online sources for medical decision making. Therefore, the following hypotheses are proposed:

H1: Influence of health related stress of individuals with NCDs on health information seeking behavior is mediated through eHealth Literacy (H1a), social support (H1b), perceived self-efficacy (H1c), and perceived risk of Covid-19 infection (H1d).

H2: eHealth Literacy has a significantly positive effect on health information seeking behavior.

H3: social support has a significantly positive effect on health information seeking behavior.

H4: Perceived self-efficacy has a significantly positive effect on health information seeking behavior.

H5: Perceived risk of Covid-19 has a significantly positive effect on health information seeking behavior.

2.2.1 Health Related Stress of Individuals with NCDs and Psychological Factors

Bandura (1982) stated that human cognition, behavior and emotion are influenced

by perceived self-efficacy. Previous studies indicate the association between health related stress and self-efficacy. Guerra et al., (2018) shows that adolescents who frequently use active coping strategies to handle sexual assault tend to have high level of self-efficacy. Moreover, there are empirical evidences that Covid-19 pandemic related coping stress is associated with the self-efficacy. A physical restrain during Covid-19 pandemic force people to cope with their unpleasant emotions such as sad and fear (Cattelino et al., 2021). In particular, people who have high concern about Covid-19 prevention are more likely to have high level of perceived self-efficacy (Meyer et al., 2022; Simegn et al., 2021). Perceived self-efficacy in handling negative emotion is related to Covid-19 lockdown coping strategies. People with high level of perceived self-efficacy have high capacity to utilize several coping strategies to handle their difficult circumstance. Consequently, the following hypothesis is developed:

H6: health related stress of individuals with NCDs has a significantly positive effect on perceived self-efficacy.

Previous studies demonstrate the association between stress level and perceived risk of Covid-19 infection among general populations (e.g., González Ramírez et al., 2020; Karatzias et al., 2020; Xin et al., 2020). For example, the study among undergraduate students in China shows the significant correlation between mental health problems and perceived risk of Covid-19 infection. Covid-19 quarantined Chinese students who experience high level of stress and emotional distress tend to perceived greater risk of Covid-19 infection (Xin et al., 2020). There have been few studies examine the association between patient's stress level and perception of health risk during Covid-19 pandemic. Pregnant women with high stress level show high levels of risk perception, for health problem, financial vulnerabilities, Covid-19 infection and treatment delays (Preis et al., 2020). The longitudinal study among adults residing in south Africa demonstrates that the high level of depression is associated with the risk perception of Covid-19 infection. In particular, depression symptom is found to contribute to greater perceived risk of Covid-19 infection among respondents experience childhood trauma (Kim et al., 2020). Consequently, the following hypothesis is developed:

H7: health related stress of individual with NCDs has a significantly positive effect on perceived risk of Covid-19 infection.

10

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy, Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

2.2.2 Health Related Stress of Individuals with NCDs and Social Support

Stress level has been found to be associated with social support. Perceived stress among parents who have children suffering from chronic kidney disease can be decreased if they received social support during the treatment (Zengin et al., 2018). The stressful and fear about Covid-19 pandemic occurs in patients, relatives, and health populations, resulting in need of social support. Agbaria and Mokh (2021) demonstrate the correlation between problem-approached coping strategies and social support. Having someone to share distress experiences is a source of social support that could help to enhance capacity of Israeli-Palestinian university students to cope with their stress during Covid-19. Ye et al., (2020) found that perceived stress during Covid-19 has significant positive effects on the level acute stress disorder symptom among Chinese undergraduate students. However, social support from friend, family, and teacher plays a mediator role in alleviating acute stress disorder symptom when facing Covid-19 related stressful experience. Likewise, the study of factors influencing psychological problems among parent with special needs children during the Covid-19 outbreak indicates that social support from friends, family and community members is a key factor in reducing the level of anxiety among parents (Ren et al., 2020).

H8: health related stress of individuals with NCDs has a significantly positive effect on social support.

2.2.3 Health Related Stress of Individual with NCDs and eHealth Literacy

eHealth literacy is defined as a individuals' capacity to find, seek, understand, and assess the reliability of social media (Norman & Skinner, 2006). eHealth literacy combines various facets of literacy skills that individuals use for their self-management. This concept consists of six core skills: (1) traditional literacy, (2) information literacy, (3) media literacy, (4) health literacy, (5) computer literacy, and (6) scientific literacy. Previous research demonstrates that stress levels are negatively correlated with the eHealth literacy. Chinese residents with greater level of eHealth literacy are less likely to have post-traumatic stress symptom related to Covid-19. Respondents who report a high level of PTSD have a high tendency to fully utilize online health resources for medical and behavioral health care during Covid-19 pandemic (Yang et al., 2021). Consequently, the following hypothesis is developed:

H9: health related stress of individuals with NCDs has a significantly positive effect on eHealth Literacy

2.2 Factors influencing self-management

There is an ample evidence to support the influence of psychology factors on self-management of NCDs (Cameron et al., 2018; Jones & Riazi, 2011; Saad et al., 2018). The survey of patients with diabetes in Saudi reports the association between self-efficacy and self-management of medication and treatment (Saad et al., 2018). Cameron et al., (2018) indicates that participants who have a higher level of self-efficacy for handling chronic disease are more likely to have better health outcomes. A systematic review study demonstrates that patients with diabetes who participate in self-efficacy focused intervention successfully improve their level of self-management behavior (Jiang et al., 2019).

H10: Perceived self-efficacy among individuals with NCDs has a significantly positive effect on self-management with Covid-19.

Previous research has identified a relationship between eHealth literacy and health information seeking among individual living with health problems. People suffering from chronic disease in Hongkong tends to have high level of eHealth literacy scores and frequently seek for information from online health source (Wong & Cheung, 2019). Numerous research findings have demonstrated that people with high eHealth literacy skills have a high capacity to use electronic devices to search for health information from a truthful sources and to make appropriate health decision during Covid-19 outbreak (Martinez et al., 2014; Neter & Brainin, 2012; Norman & Skinner, 2006; Patel et al., 2015; Stellefson et al., 2018). Moreover, there are ample evidences that reported the association between health information seeking and self-management of patient with health problems. Given the results of systematic review study, health information seeking behavior on internet enables patients with health problems to make a decision on their health treatment and increase the frequent of doctor visit (Thapa et al., 2021). Consequently, the following hypothesis is developed:

H11: Health information seeking among individuals with NCDs has a significantly positive effect on self-management with Covid-19.

2.7 Theoretical Framework

Theoretical framework of this study is formulated based upon Wilson's model of information seeking behavior and existing literatures (Figure 2).
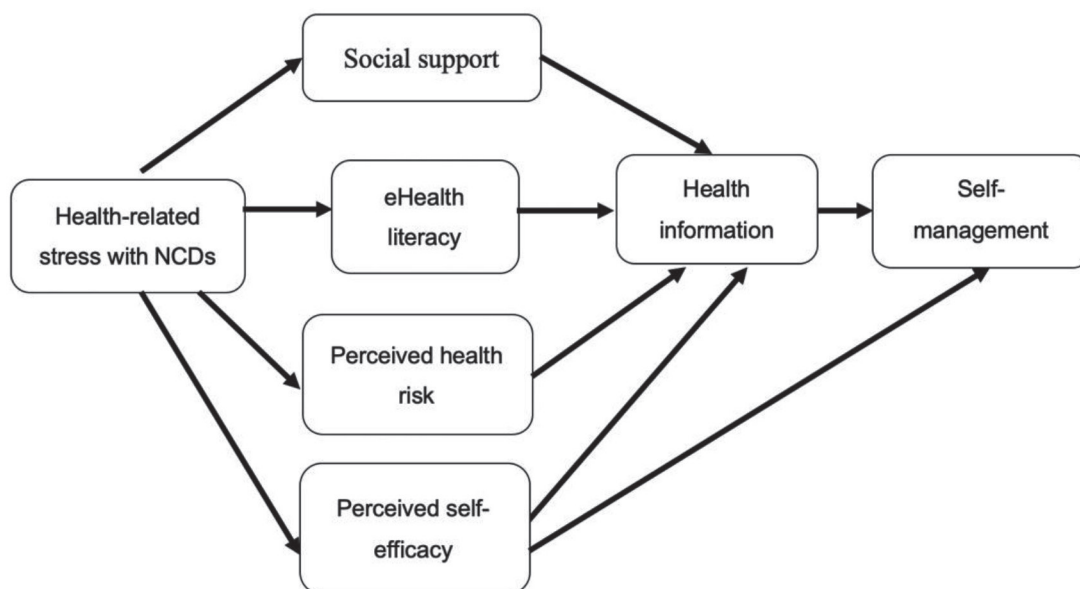
Figure 2: Theoretical Framework of Factors Influencing Individuals with NCDs on Self-management during Covid-19 Pandemic

3. Methodology

3.1 Research Design

Mixed research approach combines qualitative and quantitative data were employed in this study. Qualitative research method is used to investigate in-depth insight into factors associated with self-management during Covid-19. Quantitative method is utilized to discern the effects of health related stress among people with NCDs on self-management during Covid-19 through social support, e-health literacy, perceived self-efficacy, perceived risk and health information seeking.

3.2 Qualitative Method

3.2.1 In-depth Interview

In-depth interviews were conducted with selective sample of current health service providers who are in-charge of NCDs management in primary care, pharmacist, public health officer, physician and health journalists. Five key informants were asked to reviewed and signed consent forms prior to interview session. Permission to audio record the interview was obtained before the interview proceeded. The interviews were held in June 2022, each lasting between 30-45 minutes. The interviews were recorded and transcribed verbatim for further analysis.

3.2.2 Interview Instrument

Semi-structured interviews were used to examine factors influencing self-management with Covid-19 among people with NCDs. Key informants were asked to identified risk perception concerning Covid-19 and investigate sources of health information individuals with NCDs used during Covid-19. The following questions were asked: What are forms of social support that people with NCDs need during Covid-19?; What are the most important skills required for seeking health related to NCDs information and Covid-19 on internet?; What are the way of helping people with NCDs to improve their self-efficacy during Covid-19?; and How do people with NCD take care of themselves during Covid-19?

3.2.3 Interview Analysis

Thematic analysis was used to analyze the in-depth interview data. This technique enables researchers to identify key themes from a set of data and helps researcher understand the real world context (Guest et al., 2012). Thematic analysis consists of four steps: Getting familiar with the data, theme identification, coding, code and theme analysis (Green & Thorogood, 2018).

3.3 Quantitative Method

3.3.1 Population, Sampling Procedures and Data Screening

An online self-administrative questionnaire was developed to gather responses with regard to the factors that affect the self-management of individuals with NCDs during Covid-19. The respondents of this study were individuals with NCDs who were at that time

14

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy,
Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

residing in Bangkok and five adjacent provinces, including Nonthaburi, Pathum Thani, Nakhon Pathom, Samut Prakarn and Samuth Sakhon provinces.

3.3.2 Sample Size Determination

The estimation for sample size of this study is derived from Hair et al. (2022), a widely accepted rule of thumbs for calculating the number of respondents. The ratio is 20 cases/observations per indicator variables. The proposed model has 7 observed variables, therefore, the number of minimum sample size for undertaking path analysis model is 140 cases (7×20) (Wang & Wang, 2019). In particular, the researchers decided to increase the sample size to be 180 samples in order to be consistent with sampling procedures, prevent the missing data and obtained more reliable results.

3.3.3 Measurements

1) **Demographic factors** includes gender, age, income, career, health status, and health insurance were collected using multiple choice questions.

2) **Health related stress of individuals with NCDs** refers to how often the stress occurs when handling with life events and life planning during the Covid-19. Scale was developed based on 10 questionnaire items by AlAteeq et al., (2020). Respondents were asked to respond on a 5-point Likert scale, ranging from 5 = very often to 1= never. In addition, the scores for the negative items were reversed before analyzing the data.

3) **Social support** refers to the perception level of respondents towards receiving help and support from family, friends and significant others. The 12-items Multidimensional Scale of Perceived Social Support (MSPSS) was used to assess social support (Grey et al., 2020; Zimet et al., 1990). Respondents were required to choose a five-point Likert scale, ranging from 5 = very strongly agree to 1 very strongly disagree. Scores below 48 are considered to be perceived low level of social support, scores from 49-68 shows moderate level of perceived social support, and scores from 69 and above demonstrates high level of perceived social support.

4) **eHealth literacy** refers to the perception levels of respondents toward their capabilities to choose, assess, and use health information obtained from the social media for their self-management during Covid-19. Scales were adapted from 5 questionnaire items formulated by Norman and Skinner (2006) and translated into Thai. For each item,

respondents responded on a 5-point Likert scale, ranging from 5 = strongly agree to 1= strongly disagree.

      5) Perceived self-efficacy refers to the perception level of respondents toward their capacity to actively manage their health, set goals for their health, accentuate on self-healthcare and learn to take care of their own health. Five items health self-efficacy scale were adapted from Lee et al., (2008). Respondents responded on a 5 points of Likert scale, ranging from 1=strongly disagree to 5 = strongly agree.

      6) Perceived risk of Covid-19 infection refers to the degree to which respondents perceived risk of contracting Covid-19. Questionnaire consists of 6 items derived from Yan et al., (2020) and expert advices. Respondents were asked to respond a 5-point Likert scale, ranging from 1 = not worried at all to 5=very worried.

      7) Health information seeking behavior refers to how often respondents seek for health information from traditional media, interpersonal media, and social media in the past one month. Twenty items scale to measure health information seeking channel were derived from Zakar et al., (2021). Respondents were asked to respond a 5-pointed Likert scale which range from 1= never to 5 = very often.

      8) Self-Management during Covid-19 refers to the frequency level of respondents to manage their own physical and mental health during the Covid-19 pandemic. Scale was adapted from eleven questionnaire items developed by Yeoh et al., (2021). Respondents were asked to respond a 5-point Likert scale, ranging from 1 = never to 5=very often.

3.3.4 Validity and Reliability Testing

      The questionnaires items were evaluated by five experts who involved in health care and health communication. The index of item-objective congruence (IOC) was conducted. Each questionnaire item score above 0.67, indicating positive content validity (Hambleton & Rovinelli, 1986).

      Prior to data collection, pre-test study was conducted from a sample of 30 individuals living with NCDs. The internal consistency was performed using Cronbach's alpha. It was suggested by Cronbach & Shavelson (2004) that a scores above 0.70 are acceptable. The Cronbach's Alpha scores for each variable, health-related stress with NCDs, social support, eHealth literacy, perceived self-efficacy, perceived health risk, health information

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy,
Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

16

seeking, and self-management during Covid-19 respectively, are 0.771, 0.928, 0.949, 0.895, 0.786, 0.867, and 0.902.

3.3.5 Ethical Approval

Ethical approval for this research was approved from Ethics Committee in Human Research of National Institute of Development Administration with the protocol ID NO. ECNIDA 2022/0059.

3.3.6 Statistical Analysis

SPSS v.23 and LISREL v.8.72 were used to perform descriptive statistical analysis and path analysis model. The statistical method employed to determine the reliability and validity of the all the scales were Cronbach's alpha coefficients and inter item-total correlations. (Brown, 2015).

3.3.7 Indicator Criteria to Examine the Congruence between the Path Analysis Model and Empirical Data

The Structural equation model (SEM) criteria were utilized to validate the congruence between the path analysis model and empirical data. The criteria include Chi-square/df $\leq$ 3.00, p-value $\geq$ 0.05, 3), CN $\geq$ 200, RMR $\leq$ 0.08, RMSEA $\leq$0.08, SRMR $\leq$ 0.05, SRMR $\leq$ 0.05, IFI $\geq$ 0.90, CFI $\geq$ 0.90, NFI $\geq$ 0.90, NNFI $\geq$ 0.90, GFI $\geq$ 0.90, and AGFI $\geq$ 0.90 (Hair et al., 2019; Hu & Bentler, 1999).

4. Results

This research sought to understand factors that affect individuals with NCDs on self-management during Covid-19. The qualitative findings from health care providers enable researchers to better understand self-management pattern of individuals' with NCDs during Covid-19, while the quantitative results help researchers to examine the factors influencing self-management of individuals with NCDs during Covid-19.

4.1 Qualitative Findings

Several reasons emerged from the data analysis that helped researchers gain in-depth understanding on factors related self-management of individuals with NCDs during

Covid-19. Key informants highlighted the crucial issues that related to risk perception, stress level, health information seeking behavior, eHealth literacy skill, social support and self-management as following:

4.1.1 Health Related Stress of Individual with NCDs and Risk in Self-management during Covid-19

The result from the in-depth interview with health care providers, public health officers and journalist demonstrated that individuals with NCDs aged 60 years and older have been identified by the government as one of the most risk of having serious illness during Covid-19. Most of key informants expressed economic recession as an important factor that heighten stress level among individuals with NCDs. Some key informants highlighted that the most critical problem confronting individuals with NCDs during Covid-19 was poverty. In particular, economic downturn leads to an increase in unemployment in Thailand. Low incomes individuals with NCDs focused more on earning their income rather than visiting the hospital. In addition, regular treatment delay due to limit of hospital bed and health care providers during Covid-19 was one of the most critical reason that increased the risk of severe illnesses among individuals with NCDs.

4.1.2 Health information seeking behavior during Covid-19

Key informants addressed that individuals with NCDs residing in Bangkok have been seeking for health information from online media which include google, Facebook, Line, YouTube and Mohpromt application, whereas patients who live in rural area and older populations relied heavily on face-to-face communication with health care volunteer in their community.

4.1.3 eHealth literacy skills

It was found that ability to assess the quality of health information, knowledge on health care terminology, and digital competency were three critical skills required for health information seeking among individuals with NCDs during Covid-19. In particular, almost all of key informants indicated that individuals with NCDs aged 60 and above always distribute health care fake news via Line application. This is because they believe that the health information sent among themselves were a reliable sources of health care information.

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy,
Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

18

4.1.4 Social Support among Individual with NCDs

All of key informants stated that the most important social support for NCDs patients during Covid-19 pandemic was community health care volunteer. On-going medical delivery, home visiting and online consultation have helped individuals with NCDs became aware of their own symptoms and managed their self-management during Covid-19.

4.2 Quantitative Results

4.2.1 Descriptive Statistics

1) Demographic characteristics: A total of 260 respondents responded to the survey, nevertheless, 180 were considered to have suffered from NCDs in the past year. Therefore, a total of 180 respondents living with NCDs were recruited in this study. Hypertension was the most common NCDs condition reported by respondents (44.1%), followed by hyperlipidemia (31.2%), and metabolism (23.1%). The majority of respondents were females (84.9%), aged between 31-40 years (23.3%), and held a bachelor's degree (39.8%). One in four respondents were self-employed (25.3%) with average monthly income of 15,001-30,000 baht (26.9%).

2) Health-related stress among individuals with NCDs: The overall mean score were 3.18. The two highest mean score of health-related stress among individuals with NCDs were "they lacked ability to control the crucial things in their lives" (Mean = 3.59, S.D. = 1.218) and "they felt nervous and stressed" (Mean = 3.28, S.D. = 1.233).

3) Social support: The overall mean scores of social support were 3.58. The mean score of social support from family was the highest (Mean = 3.75, SD = 1.12); whereas the mean score of social support from significant others was the lowest (3.50, SD=1.28).

4) eHealth literacy: The overall mean scores of eHealth literacy were 3.75. The two highest mean score of eHealth literacy among individuals with NCDs were "they know where to find helpful health resources on the internet and social media" (Mean = 3.89, S.D. = 1.141) and "they know how to use the internet and social media to answer their health questions." (Mean = 3.78, S.D. = 1.216).

5) Perceived self-efficacy: The overall mean scores of perceived self-efficacy were 3.23. The two highest mean score of perceived self-efficacy among individuals with NCDs were "they can learn how to take care of their help" (Mean = 3.83, S.D. = .888) and "they are confident that they can bring a positive effect on their health." (Mean = 3.49, S.D. = .983).

6) Perceived risk of Covid-19 infection: The overall mean scores of perceived risk of Covid-19 infection were 3.23. The two highest mean score of perceived risk of Covid-19 infection among individuals with NCDs were "they are at a high risk for Covid-19 infection" (Mean = 3.98, S.D. = 1.123) and "they are concerned that their family members might be infected with Covid-19." (Mean = 3.37, S.D. = 1.191).

7) Health information seeking: The overall mean scores of health information seeking were 2.22. The mean score of health information seeking from social media was the highest (Mean = 3.21, SD = 1.389); whereas the mean score of health information seeking from traditional media was the lowest (Mean = 1.69, SD = .943).

8) Self-management during COVID-19: The overall mean scores of self-management during Covid-19 were 3.58. The two highest mean score of self-management among individuals with NCDs were "they eat hot food, take a serving spoon, and wash their hands" (Mean = 4.01, S.D. = .972) and "they are able to take care of themselves during sick days." (Mean = 3.87, S.D. = .983).

The Path Analysis Model of Individual at Risk of Non-communicable Diseases (NCDs) on Self-Management during Covid-19

From Figure 2 and 3 illustrated that the path analysis model of individuals at risk of NCDs on self-management during Covid-19 was in accordance with empirical data according to assumed hypothesis, by passing the determined criteria of the structural equation model (Chi-square/df = 1.68 ($\leq$3.00), *p-value* = 0.10088 ($\geq$0.05), CN = 282.22 ($\geq$200), = RMSEA = 0.063 ($\leq$0.08), RMR = 0.065 ($\leq$0.08), SRMR = 0.046 ($\leq$0.05), IFI = 0.98 ($\geq$0.90), CFI = 0.98 ($\geq$0.90), NFI = 0.96 ($\geq$0.90), NNFI = 0.95 ($\geq$0.90), GFI = 0.98 ($\geq$0.90), AGFI = 0.92 ($\geq$0.90)). Perceived self-efficacy was the most powerful factor that could explain the variation of self-management during Covid-19 at 13% (R^2 = 0.13).

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy, Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

20
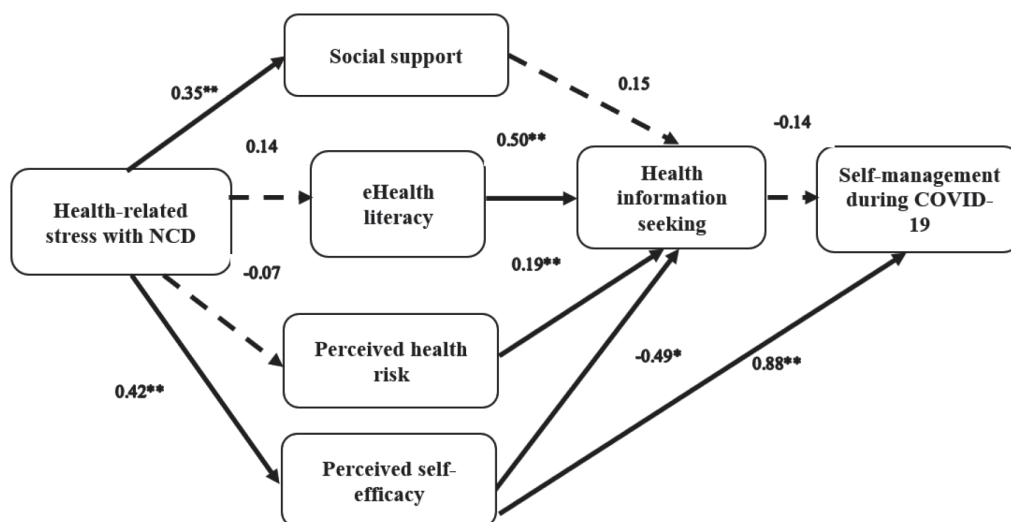
Figure 3: Direct Effect and Path Coefficient Effect Values within the Path Analysis Model

Note: ** *p-value* = .01 (t-value ≥ 2.576), * *p-value* = .05 (t-value ≥ 1.960)

�> Coefficient effect value is significant, ▪▪➤ Coefficient effect value is not significant

Figure 4: The Path Analysis Model from LISREL's Output Analysis

Note: 1) STRESS = Health- related stress with NCDs, 2) eHEALTH = eHealth literacy,
3) EFFICACY = Perceived self-efficacy, 4) RISK = Perceived health risk,
5) SUPPORT = Social support, 6) MEDIA = Health information seeking and
7) SELFM = Self-management during Covid-19

Table 1: The Analysis of Direct Effect, Indirect Effect and Total Effect among Endogenous and Exogenous Variables within the Path Analysis Model

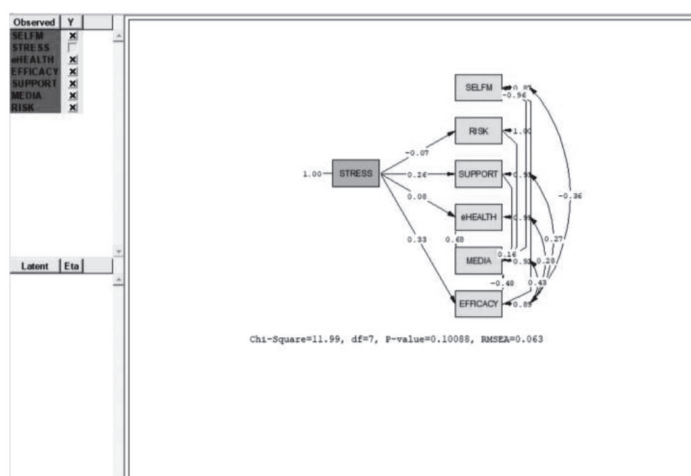| Independent Variables	Effect	Causal Variables					
		Health-related stress	Perceived self-efficacy	Perceived Health risk	eHealth literacy	Social support	Health information seeking
Perceived self-efficacy	DE	0.42**	-			-	-
	IE	-	-			-	-
	TE	0.42**	-			-	-
Perceived Health risk	DE	0.07	-			-	-
	IE	-	-			-	-
	TE	0.07	-			-	-
eHealth literacy	DE	0.14	-			-	-
	IE	-	-			-	-
	TE	0.14	-			-	-
Social support	DE	0.35**	-			-	-
	IE	-	-			-	-
	TE	0.35**	-			-	-
Health information seeking	DE	-	-0.49*	0.19**	0.50**	0.15	-
	IE	-0.10	-	-	-	-	-
	TE	-0.10	-0.49*	0.19**	0.50**	0.15	-
Self-management during COVID-19	DE	-	0.88**	-	-	-	-0.14
	IE	0.38**	0.07	-0.03	-0.07	-0.02	-
	TE	0.38**	0.95**	-0.03	-0.07	-0.02	-0.14

Note: ** *p-value* = .01 (t-value ≥ 2.576), * *p-value* = .05 (t-value ≥ 1.960), DE = Direct Effect, IE = Indirect Effect, TE = Total Effect

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy, Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

22

4.2.2 Hypothesis Testing

It was found that health-related stress of individuals with NCDs had a positive direct effect on perceived self-efficacy and social support, path coefficient at 0.35 and 0.42 respectively. Thus, H6 and H8 were supported. Similarly, eHealth literacy and perceived risk of Covid-19 had positive direct effects on health information seeking behavior, path coefficient at 0.50 and 0.19 respectively. Therefore, H2 and H5 were supported. In addition, perceived self-efficacy had a positive direct effect on self-management during Covid-19, path coefficient at 0.88. Therefore, H10 was supported.

However, eHealth literacy, social support and perceived risk of Covid-19 infection did not significantly mediated the effect of stress level on health information seeking behavior; thus, H1a, H1b and H1C were not supported. Similarly, health-related stress with NCDs had no effect on eHealth literacy and perceived risk of Covid-19 infection, rejecting H7 and H9. In addition, health information seeking behavior had no effect on self-management during Covid-19, rejecting H11. Whereas perceived self-efficacy had a negative effect on health information seeking behavior, path coefficient at -0.49, rejecting H4.

5. Discussion

5.1 Key Findings

This study provides several insights into the self-management of individuals with NCDs during Covid-19. Health-related stress of individuals with NCDs were found to be showing positive direct effect on perceived self-efficacy. In addition, this factor also had a positive indirect effect on self-management during Covid-19 through perceived self-efficacy. This is in line with the previous research which demonstrates that Stress deduction coping strategies were associated with self-efficacy (Ebner et al., 2018). People who have high level of stress toward Covid-19 infection tend to have high level of perceived self-efficacy (Meyer et al., 2022; Simegn et al., 2021).

It is interesting to noted that perceived self-efficacy was the most powerful factor that directly influences the self-management of individuals with NCDs during Covid-19 which explains at least 13% of the variances in the model. The majority of respondents reported that they have high capacity to manage their health. In particular, people who

have high level of stress during Covid-19 were more likely to have high perception toward self-efficacy. Such this situation enabled them to handle with their emotion during Covid-19 (Cattelino et al., 2021; Meyer et al., 2022; Simegn et al., 2021). NCDs patients with high self-efficacy have a better self-management of medication and treatment which lead to a better health outcomes (Cameron et al., 2018; Saad et al., 2018). Thus, the findings in this current research provide new insights into the self-management during pandemic. The individuals with high self-efficacy are confident in their ability to manage their health, set goals to enhance their health and seek for health care and medication. As a consequence, they become more effective in their self-management during Covid-19.

Wilson (1999) proposes that psychological and personal factors have had an effect on health information seeking behavior. Previous studies also confirmed the influence of eHealth literacy on health information seeking among individuals with NCDs. Hongkonger with NCDs who have high level of eHealth literacy skills were more likely to seek for health information form online platforms (Wong & Cheung, 2019). The result of current study corresponds to the Wilson's model of health information seeking and previous study. eHealth literacy and perceived health risk were found to have positive direct effects on health information seeking behavior. eHealth literacy skills would affect the ability of individuals with NCDs to use online media for searching, analyzing, evaluating health information and applying those available health information for their self-management during Covid-19 pandemic (Martinez et al., 2014; Neter & Brainin, 2012; Norman & Skinner, 2006; Patel et al., 2015; Stellefson et al., 2018).

According to the Wilson's information seeking behavior model, the information seeking behavior is derived from the needs of information, individual's stress level, social support and self-efficacy (Wang, 2011; T. D. Wilson, 1999; Tom D Wilson, 1999). Findings of the current study do not correspond to the model, since health-related stress had no effect on eHealth literacy and perceived health risk. Perceived social support had no effect on health information seeking. Similarly, health information seeking had no effect on self-management of individuals with NCDs during Covid-19. Conversely, perceived self-efficacy had a negative effect on health information seeking behavior. This finding is consistent with the concept of Wilson's information seeking behavior model which stated that individuals who have low self-efficacy tend to seek more healthcare information. On the other hand, individual with high self-efficacy, higher education, good income

and receive enough information, tend to have confidence in their own thoughts and decisions in health management (Wilson, 1999).

However, the in-depth interview with key informants who were health care providers and journalists yield an important result that significantly elaborate the finding of current study. Covid-19 pandemic has caused the unusual and unexpected circumstances and changed the way people live and their life style. As it was found from in-depth interview that stress level among individuals with NCDs were increased because of economic crisis, poverty and unemployment during Covid-19 pandemic. As a result, this group of population prioritized on making their living over health. From their perspective, the most crucial things in their lives during pandemic were earning money for living. Therefore, the first priority is not given to health information seeking. Thus, this findings suggest a pivotal role of economic factors in supporting or hindering the health information seeking behavior and self-management.

Although, prior studies and Wilson's model of information seeking behavior have demonstrated that health information seeking behavior plays a key role in self-management of NCDs. The limitation of this study was that individuals with NCDs were excluded from the in-depth interview because of Covid-19 travel restriction. It is difficult to gather information form this group of population. Further in-depth examination among individuals with NCDs is needed to elaborate the health information seeking and self-management from the patients' perspective. Furthermore, the majority of the respondents who report that they were suffering from NCDs were female. Therefore, the future study should be distributed among the samples with more diverse demographic characteristics.

5.2 Implication

In light of the finding of current study, public health agencies and government should focus on establishing home-visiting program throughout the country to ensure that individuals with NCDs could receive and on-going treatment. Education programmes that enhance self-efficacy by integrating self-care and peer support should be established to ensure that individuals with NCDs could manage their health care during Covid-19. Moreover, eHealth literacy fostering program is needed among individuals with NCDs to enhance their skills in assessing and validating the quality of health care information.

6. Conclusion

Individuals with NCDs including cardiovascular diseases, diabetes and cancer have a higher risk of severe Covid-19 diseases and are more likely to die from Covid-19. Therefore, this researchers examine factors that could make this group of population take good care of their health during the Covid-19 epidemic. The findings showed that self-management of individuals with NCDs during Covid-19 has been affected by perceived self-efficacy, perceived stress, perceived social support and the level of eHealth literacy. The research results suggest that fostering self-efficacy to seek health care and enhancing eHealth literacy skill for evaluating the quality of the health information are effective ways for individuals with NCDs to manage their own health during the Covid-19.

References

Aekplakorn, W., Puckcharern, H., Satheannoppakao, W. (2021). *The 6t^h Thai people's health survey by physical examination, 2019-2020*.

Agbaria, Q., & Mokh, A. A. (2021). Coping with stress during the coronavirus outbreak: the contribution of big five personality traits and social support. *International Journal of Mental Health and Addiction*. https://doi.org/10.1007/s11469-021-00486-2

Akdeniz Kudubes, A., Ayar, D., Bektas, İ., & Bektas, M. (2022). Predicting the effect of healthy lifestyle belief on attitude toward nutrition, exercise, physical activity, and weight-related self-efficacy in Turkish adolescents. *Archives de Pédiatrie*, *29*(1), 44-50. https://doi.org/https://doi.org/10.1016/j.arcped.2021.11.001

AlAteeq, D. A., Aljhani, S., & AlEesa, D. (2020). Perceived stress among students in virtual classrooms during the COVID-19 outbreak in KSA. *Journal of Taibah University Medical Sciences*, *15*(5), 398-403. https://doi.org/https://doi.org/10.1016/j.jtumed.2020.07.004

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American psychologist*, *37*(2), 122.

Brown, T. A. (2015). *Confirmatory factor analysis for applied research, Second Edition*. Guilford Publications.

Budreviciute, A., Damiati, S., Sabir, D. K., Onder, K., Schuller-Goetzburg, P., Plakys, G., . . . Kodzius, R. (2020). Management and prevention strategies for non-communicable diseases (NCDs) and their risk factors. *Frontiers in public health*, 788.

Cameron, J. E., Voth, J., Jaglal, S. B., Guilcher, S. J. T., Hawker, G., & Salbach, N. M. (2018). "In this together": Social identification predicts health outcomes (via self-efficacy) in a chronic disease self-management program. *Social Science & Medicine*, *208*, 172-179. https://doi.org/https://doi.org/10.1016/j.socscimed.2018.03.007

Cattelino, E., Testa, S., Calandri, E., Fedi, A., Gattino, S., Graziano, F., . . . Begotti, T. (2021). Self-efficacy, subjective well-being and positive coping in adolescents with regard to Covid-19 lockdown. *Current Psychology*. https://doi.org/10.1007/s12144-021-01965-4

Cronbach, L. J., & Shavelson, R. J. (2004). My current thoughts on coefficient alpha and successor procedures. *Educational and psychological measurement*, *64*(3), 391-418.

Department of Mental Health. (2021). *Modify healthy behaviors for reducing premature mortality in lifestyle medicine*. Retrieved May 2, from https://www.dmh.go.th/news-dmh/view.asp?id=31214

Ebner, K., Schulte, E.-M., Soucek, R., & Kauffeld, S. (2018). Coaching as stress-management intervention: The mediating role of self-efficacy in a framework of self-management and coping. *International Journal of Stress Management*, *25*(3), 209.

González Ramírez, L. P., Martínez Arriaga, R. J., Hernández-Gonzalez, M. A., & De la Roca-Chiapas, J. M. (2020). Psychological distress and signs of post-traumatic stress in response to the Covid-19 health emergency in a Mexican sample. *Psychology research and behavior management*, *13*, 589-597. https://doi.org/10.2147/PRBM.S259563

Green, J., & Thorogood, N. (2018). *Qualitative methods for health research*. SAGE Publications.

Grey, I., Arora, T., Thomas, J., Saneh, A., Tohme, P., & Abi-Habib, R. (2020). The role of perceived social support on depression and sleep during the COVID-19 pandemic. *Psychiatry research*, *293*, 113452-113452. https://doi.org/10.1016/j.psychres.2020.113452

Guerra, C., Farkas, C., & Moncada, L. (2018). Depression, anxiety and PTSD in sexually abused adolescents: Association with self-efficacy, coping and family support. *Child Abuse & Neglect*, *76*, 310-320. https://doi.org/https://doi.org/10.1016/j.chiabu.2017.11.013

Guest, G., MacQueen, K. M., & Namey, E. E. (2012). *Applied thematic analysis*. SAGE Publications.

Guo, S. H.-M., Hsing, H.-C., Lin, J.-L., & Lee, C.-C. (2021). Relationships between mobile eHealth literacy, diabetes self-care, and glycemic outcomes in Taiwanese patients with Type 2 diabetes: Cross-sectional study [Original Paper]. *JMIR Mhealth Uhealth*, *9*(2), e18404. https://doi.org/10.2196/18404

Hair, J. F., Babin, B. J., Anderson, R. E., & Black, W. C. (2022). *Multivariate data analysis*. Cengage Learning.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, *31*(1), 2-24.

Hambleton, R. K., & Rovinelli, R. J. (1986). Assessing the dimensionality of a set of test items. *Applied psychological measurement*, *10*(3), 287-302.

Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, *6*(1), 1-55.

Jiang, X., Wang, J., Lu, Y., Jiang, H., & Li, M. (2019). Self-efficacy-focused education in persons with diabetes: a systematic review and meta-analysis. *Psychology research and behavior management*, *12*, 67.

Jones, F., & Riazi, A. (2011). Self-efficacy and self-management after stroke: a systematic review. *Disability and Rehabilitation*, *33*(10), 797-810. https://doi.org/10.3109/0963 8288.2010.511415

Karatzias, T., Shevlin, M., Murphy, J., McBride, O., Ben-Ezra, M., Bentall, R. P., . . . Hyland, P. (2020). Posttraumatic stress symptoms and associated comorbidity during the Covid-19 pandemic in Ireland: A population-based study. *Journal of traumatic stress*, *33*(4), 365-370.

Kim, A. W., Nyengerai, T., & Mendenhall, E. (2020). Evaluating the mental health impacts of the Covid-19 pandemic: Perceived risk of Covid-19 infection and childhood trauma predict adult depressive symptoms in urban South Africa. *Psychological Medicine*, 1-13.

Lee, S. Y., Hwang, H., Hawkins, R., & Pingree, S. (2008). Interplay of negative emotion and health self-efficacy on the use of health information and its outcomes. *Communication Research*, *35*(3), 358-381.

Martinez, C. H., St Jean, B. L., Plauschinat, C. A., Rogers, B., Beresford, J., Martinez, F. J., . . . Han, M. K. (2014). Internet access and use by COPD patients in the National Emphysema/COPD Association Survey. *BMC Pulmonary Medicine*, *14*(1), 1-11.

Meyer, N., Niemand, T., Davila, A., & Kraus, S. (2022). Biting the bullet: When self-efficacy mediates the stressful effects of Covid-19 beliefs. *Plos one*, *17*(1), e0263022.

National Statistical Office. (2021). *Joining the national statistical office academic cooperation signing health behavior survey of Thai people in 2021*. Retrieved May 3, from http://www.nso.go.th/sites/2014/Pages/Press_Release/2564/p30-06-64. aspx

Neter, E., & Brainin, E. (2012). eHealth literacy: extending the digital divide to the realm of health information. *Journal of medical Internet research*, *14*(1), e1619.

Norman, C. D., & Skinner, H. A. (2006). eHEALS: the eHealth literacy scale. *Journal of medical Internet research*, *8*(4), e507.

Patel, R., Chang, T., Greysen, S. R., & Chopra, V. (2015). Social media use in chronic disease: a systematic review and novel taxonomy. *The American journal of medicine*, *128*(12), 1335-1350.

Preis, H., Mahaffey, B., Heiselman, C., & Lobel, M. (2020). Vulnerability and resilience to pandemic-related stress among U.S. women pregnant at the start of the Covid-19 pandemic. *Social Science & Medicine*, *266*, 113348. https://doi.org/https://doi. org/10.1016/j.socscimed.2020.113348

Ren, J., Li, X., Chen, S., Chen, S., & Nie, Y. (2020). The influence of factors such as parenting stress and social support on the state anxiety in parents of special needs children during the COVID-19 epidemic. *Frontiers in psychology*, *11*, 3413.

Saad, A. M. J., Younes, Z. M. H., Ahmed, H., Brown, J. A., Al Owesie, R. M., & Hassoun, A. A. K. (2018). Self-efficacy, self-care and glycemic control in Saudi Arabian patients with type 2 diabetes mellitus: A cross-sectional survey. *Diabetes Research and Clinical Practice*, *137*, 28-36. https://doi.org/https://doi.org/10.1016/j.diabres. 2017.12.014

Simegn, W., Dagnew, B., Yeshaw, Y., Yitayih, S., Woldegerima, B., & Dagne, H. (2021). Depression, anxiety, stress and their associated factors among Ethiopian University students during an early stage of Covid-19 pandemic: An online-based cross-sectional survey. *PloS one*, *16*(5), e0251670.

Stellefson, M. L., Shuster, J. J., Chaney, B. H., Paige, S. R., Alber, J. M., Chaney, J. D., & Sriram, P. (2018). Web-based health information seeking and eHealth literacy among patients living with chronic obstructive pulmonary disease (COPD). *Health communication*, *33*(12), 1410-1424.

Tella, A. (2016). *Information seeking behavior and challenges in digital libraries*. IGI Global.

Thaler, M., Khosravi, I., Leithner, A., Papagelopoulos, P. J., & Ruggieri, P. (2020). Impact of the Covid-19 pandemic on patients suffering from musculoskeletal tumours. *International Orthopaedics*, *44*(8), 1503-1509. https://doi.org/10.1007/s00264-020-04636-4

Thapa, D. K., Visentin, D. C., Kornhaber, R., West, S., & Cleary, M. (2021). The influence of online health information on health decisions: A systematic review. *Patient Education and Counseling*, *104*(4), 770-784. https://doi.org/https://doi.org/10.1016/j.pec.2020.11.016

Tusubira, A. K., Nalwadda, C. K., Akiteng, A. R., Hsieh, E., Ngaruiya, C., Rabin, T. L., . . . Armstrong-Hough, M. (2021). Social Support for Self-Care: Patient Strategies for Managing Diabetes and Hypertension in Rural Uganda. *Annals of global health*, *87*(1), 86-86. https://doi.org/10.5334/aogh.3308

U.S. Agency for International Development. (2021). *The effects of Covid-19 on non-communicable diseases: A case study of six countries*. Retrieved May 5, from https://reliefweb.int/report/bangladesh/effects-covid-19-non-communicable-diseases-case-study-six-countries

Upsher, R., Noori, Y., Kuriakose, L., Vassiliadou, I., Winkley, K., & Ismail, K. (2022). Needs, concerns and self-management experiences of people with type 2 diabetes during the Covid-19 pandemic: A qualitative study. *Diabetic Medicine*, e14883.

Wang, J., & Wang, X. (2019). *Structural equation modeling: Applications using Mplus*. Wiley.

Wang, P. (2011). *Information behavior and seeking*. Facet Publishing.

Wilson, T. D. (1981). On user studies and information needs. *Journal of documentation*.

Wilson, T. D. (1999). Models in information behaviour research. *Journal of Documentation*, *55*(3), 249-270. https://doi.org/10.1108/EUM0000000007145

Wilson, T. D. (1999). Models in information behaviour research. *Journal of documentation*.

Wong, D. K.-K., & Cheung, M.-K. (2019). Online health information seeking and eHealth literacy among patients attending a primary care clinic in Hong Kong: A Cross-Sectional Survey. *Journal Medical Internet Research*, *21*(3), e10831. https://doi.org/10.2196/10831

World Health Organization. (2018). *Noncommunicable diseases: Keyfacts*. Retrieved

May 5, from https://www.who.int/news- room/fact-sheets/detail/noncommunicable-diseases

World Health Organization. (2021). *Noncommunicable diseases*. Retrieved May 15 from https://www.who.int/news-room/fact-s heets/detail/noncommunicable-diseases

Xie, I. (2008). *Interactive information retrieval in digital environments*. IGI Pub.

Xin, M., Luo, S., She, R., Yu, Y., Li, L., Wang, S., . . . Zhao, J. (2020). Negative cognitive and psychological correlates of mandatory quarantine during the initial COVID-19 outbreak in China. *American Psychologist*, *75*(5), 607.

Yan, A. F., Sun, X., Zheng, J., Mi, B., Zuo, H., Ruan, G., . . . Shi, Z. (2020). Perceived risk, behavior changes and Health-related outcomes during COVID-19 pandemic: Findingsamong adults with and without diabetesin China. *Diabetes research and clinical practice*, *167*, 108350-108350. https://doi.org/10.1016/j.diabres.2020.108350

Yang, B. X., Xia, L., Huang, R., Chen, P., Luo, D., Liu, Q., . . . Yu, S. (2021). Relationship between eHealth literacy and psychological status during COVID-19 pandemic: A survey of Chinese residents. *Journal of nursing management*, *29*(4), 805-812.

Ye, Z., Yang, X., Zeng, C., Wang, Y., Shen, Z., Li, X., & Lin, D. (2020). Resilience, social support, and coping as mediators between COVID-19-related stressful experiences and acute stress disorder among college students in China. *Applied Psychology: Health and Well-Being*, *12*(4), 1074-1094.

Yeoh, E., Tan, S. G., Lee, Y. S., Tan, H. H., Low, Y. Y., Lim, S. C., . . . Wee, H. L. (2021). Impact of COVID-19 and partial lockdown on access to care, self-management and psychological well-being among people with diabetes: A cross-sectional study. *International journal of clinical practice*, *75*(8), e14319-e14319. https://doi.org/ 10.1111/ijcp.14319

Zakar, R., Iqbal, S., Zakar, M. Z., & Fischer, F. (2021). COVID-19 and health information seeking behavior: Digital health literacy survey amongst university students in Pakistan. *International Journal of Environmental Research and Public Health*, *18*(8), 4009.

Zengin, O., Erbay, E., & YILDIRIM, B. (2018). Anxiety, coping and social support among parents who have children with chronic kidney disease. *Konuralp Medical Journal*, *10*(3), 311-317.

Zimet, G. D., Powell, S. S., Farley, G. K., Werkman, S., & Berkoff, K. A. (1990). Psychometric characteristics of the multidimensional scale of perceived social support. *Journal of personality assessment*, *55*(3-4), 610-617.

Appendix 1: Mean and SD of Health-related Stress of Individuals with NCDs, perceived Social Support, eHealth Literacy, perceived self-efficacy, perceived Risk of Covid-19 Infection, Health Information Seeking during Covid-19 Pandemic, and Self-management with Covid-19

Code	Questionnaire Items	Mean	S.D
	Health-related stress of individuals with NCDs **In the last month, how often have you experienced the following forms of stress?**		
S1	During Covid-19 pandemic, how often have you been upset because of something that happened unexpectedly?	2.89	1.184
S2	During Covid-19 pandemic, how often have you felt that you were unable to control the important things in your life?	3.59	1.218
S3	During Covid-19 pandemic, how often have you felt nervous and stressed?	3.27	1.233
S4	During Covid-19 pandemic, how often have you felt confident about your ability to handle your personal problems?	3.14	1.097
S5	During Covid-19 pandemic, how often have you felt that things were going your way?	2.86	1.024
S6	During Covid-19 pandemic, how often you can control yourself because you are able to manage everything according to your need.	3.07	1.044
S7	During Covid-19 pandemic, how often have you been able to control irritations in your life?	2.94	1.050
S8	During Covid-19 pandemic, how often you can manage your emotion that occurs because of achieving a lot of things.	3.18	1.027
S9	During Covid-19 pandemic, how often have you been angered because of things that happened that were outside of your control?	3.59	1.218
S10	During Covid-19 pandemic, how often have you felt difficulties were piling up so high that you could not overcome them?	3.28	1.233
	Overall for Health-related stress with NCDs	**3.18**	**1.133**

Code	Questionnaire Items	Mean	S.D
	Perceived Social Support		
	Family		
SS1	During Covid-19 pandemic, my family really tries to help me.	3.58	1.129
SS2	During Covid-19 pandemic, I get the emotional help and support I need from my family.	3.82	1.124
SS3	During Covid-19 pandemic, I can talk about my problems with my family.	3.73	1.181
SS4	During Covid-19 pandemic, my family is willing to help me make decisions.	3.87	1.079
	Overall for Family	**3.75**	**1.128**
	Friends		
SS5	During Covid-19 pandemic, my friends really try to help me.	3.54	1.064
SS6	During Covid-19 pandemic, I can count on my friends when things go wrong.	3.41	1.087
SS7	During Covid-19 pandemic, I have friends with whom I can share my joys and sorrows.	3.51	1.136
SS8	During Covid-19 pandemic, I can talk about my problems with my friends.	3.56	1.125
	Overall for Friends	**3.51**	**1.103**
	Significant others		
SS9	During Covid-19 pandemic, there is a special person who is around when I am in need.	3.46	1.266
SS10	During Covid-19 pandemic, there is a special person with whom I can share my joys, and sorrows.	3.51	1.275
SS11	During Covid-19 pandemic, I have a special person who is a real source of comfort to me.	3.44	1.300
SS12	During Covid-19 pandemic, there is a special person in my life who cares about my feelings.	3.58	1.290
	Overall for Significant others	**3.50**	**1.283**
	Overall for Perceived Social Support	**3.58**	**1.171**

Code	Questionnaires Items	Mean	S.D
	eHealth Literacy		
E1	I know where to find helpful health resources regarding how to cope with Covid-19 on the internet and social media.	3.89	1.141
E2	I know how to use the internet and social media to answer my health questions regarding how to cope with Covid-19.	3.78	1.216
E3	I feel confident in using health information regarding how to cope with Covid-19 from the internet and social media to make health decisions.	3.76	1.156
E4	I have the skills I need to evaluate Covid-19 resources I find on the internet and social media.	3.61	1.188
E5	You search, compare and follow the recommendation of health information regarding how to cope with Covid-19 provided in various platforms such as internet and social media.	3.73	1.217
	Overall for eHealth Literacy	**3.75**	**1.184**
	Perceived self-efficacy		
G1	I am confident I can have a positive effect on my health during Covid-19 pandemic.	3.49	.983
G2	I have set some definite goals to improve my health during Covid-19 pandemic.	3.24	.961
G3	I have been able to meet the goals I set for myself to improve my health during Covid-19 pandemic.	2.96	.977
G4	I believe that I can critically manage my health during Covid-19	3.42	1.019
G5	I am able to learn how to take care of my health during Covid-19 pandemic.	3.83	.888
	Overall for Perceived self-efficacy	**3.39**	**.966**
	Perceived risk of Covid-19 infection		
R1	How worried are you about being infected with Covid-19?	3.13	1.168
R2	How likely do you think it is that you or someone in your family may get infected with the coronavirus this year?	3.37	1.191
R3	I do believe that people of my age are not at risk of Covid-19 infection	2.44	1.355

Self-management of Individuals with Noncommunicable Diseases during Covid-19: The Role of eHealth Literacy,
Self-efficacy, Social Support, Perceived Risk and Health Information Seeking Behavior

34

Code	Questionnaire Items	Mean	S.D
R4	Although, my family put so much effort to protect themselves, there is high possibility that they are at risk of Covid-19 infection.	3.98	1.123
R5	I am not at risk of Covid-19 infection because I have been fully vaccinated.	3.30	1.209
R6	I am at risk of Covid-19 infection because I am working closely with a lot of people.	3.13	1.412
	Overall for Perceived risk of Covid-19 infection	**3.23**	**1.243**
	Health information seeking during Covid-19 pandemic		
	Traditional media		
MD1	Television/Cable TV	2.39	1.140
MD2	Radio/Community Radio	1.53	.977
MD3	Newspapers	1.27	.631
MD4	Magazine/Journal	1.43	.826
MD5	Leaflet/Flyer	1.57	.859
MD6	Poster	1.64	.920
MD7	Book/Manual	1.94	1.071
MD8	Banner (Fabric banner, Vinyl banner)	1.83	1.024
MD9	Exhibition/Events	1.77	1.035
MD10	Line audio/News tower	1.56	.947
	Overall for Traditional media	**1.69**	**.943**
	Personal media		
MD11	Public health officers (Doctors, Nurses, Pharmacists, Public health workers)	2.53	1.257
MD12	Village health volunteers (VHVs)	1.91	1.220
MD13	Friends/relatives/family members	3.47	1.198
MD14	People in the community/Monk/Village philosopher	1.68	1.011
MD15	Teacher/Professor	1.79	1.171

Code	Questionnaire items	Mean	S.D
	Overall for Personal media	**2.28**	**1.171**
	Social media		
MD16	Websites of health authorities, such as Ministry of Public Health, Hospitals,	3.09	1.389
MD17	Search engines, such as Google, Yahoo	3.71	1.401
MD18	Encyclopedic sites, such as Wikipedia	2.68	1.436
MD19	News sites, such as Thairath, and News agencies facebook fanpage	2.91	1.409
MD20	Social media such, as Line, Facebook, Twitter. Youtube, Instagram and TikTok	3.68	1.306
	Overall for Social Media	**3.21**	**1.389**
	Overall for Health information seeking	**2.22**	**1.050**
	Self-Management with Covid-19		
SM1	I try to keep myself mentally active during Covid-19 pandemic.	3.78	.949
SM2	Even though there are a lot of new Covid-19 infected, I am trying to think positively.	3.77	.939
SM3	I am able to eat a healthy diet during Covid-19 pandemic.	3.73	.920
SM4	I follow the guidance of the government during Covid-19 pandemic which are "Eat Hot Food, Use a Serving Spoon and Always Wash your Hands".	4.01	.972
SM5	I always take care of my health during Covid-19 pandemic.	3.87	.936
SM6	I am able to keep physically active during Covid-19 pandemic.	3.68	.990
SM7	I check my blood glucose/sugar level during Covid-19 pandemic.	3.01	1.400
SM8	I am able to take medication as instructed during Covid-19 pandemic.	3.51	.994
SM9	I check my blood pressure during Covid-19 pandemic.	3.18	1.387
SM10	I am able to look after myself during sick days during Covid-19 pandemic.	3.87	.983
SM11	I am able to take care of myself during Covid-19 pandemic by using the alternative medicine such as dietary supplementary product and herbs .	3.00	1.378
	Overall for Self-Management with Covid-19	**3.58**	**1.077**

The Factors Influencing Trust in Health and Safety Amid the COVID-19 Pandemic: In the Case of Prachuap Khiri Khan Province, Thailand

Pattaraporn Jumporm*

Abstract

The current global situation of COVID-19 has severely affected Thailand's tourism. This study aims 1) to study the levels of tourists' trust in health and safety amid the COVID-19 pandemic in Prachuap Khiri Khan Province; and 2) to study the factors that affect tourists' trust in health and safety amid the pandemic there. This study employed quantitative research methodology, and a questionnaire was used as the instrument for collecting the data. The sample groups were tourists for a total of 214 people from Prachuap Khiri Khan Province. The data analysis method employs frequency, percentage, standard deviation distribution, and inferential statistics, such as Pearson's correlation coefficient analysis and path analysis using multiple regression analysis techniques. The findings of this research reveal that tourists who decided to travel to Prachuap Khiri Khan Province amid the COVID-19 pandemic have a high level of trust in the overall health and safety measures. The factors that were seen to significantly influence the tourists' trust in health and safety were their perception and attitude. Personal factors such as income, perception and attitude also indirectly influenced tourist decisions with trust variables. The only age factor did not directly or indirectly influence tourist decisions, was age.

Keywords: Tourist, Trust, Health, Safety, Decision, COVID-19 Pandemic

* Independent researcher, National Institute of Development Administration
  148 Serithai Road, Khlong-Chan, Bangkapi, Bangkok 10240, THAILAND.
  E-mail: Jumporm.p@gmail.com

ปัจจัยที่มีอิทธิพลต่อความไว้วางใจของนักท่องเที่ยว
ที่มีต่อมาตรการความปลอดภัยทางสุขอนามัยช่วงโควิด-19 :
กรณีศึกษาเขตพื้นที่จังหวัดประจวบคีรีขันธ์

ภัทราภรณ์ จุมพรหม*

บทคัดย่อ

ท่ามกลางสถานการณ์การแพร่ระบาดของโควิด-19 ส่งผลกระทบต่อสถานการณ์การ
ท่องเที่ยวไทยเป็นอย่างมาก การวิจัยครั้งนี้จึงมีวัตถุประสงค์เพื่อศึกษาระดับความเชื่อมั่นไว้วางใจ
ด้านความปลอดภัยทางสุขอนามัยของนักท่องเที่ยวท่ามกลางสถานการณ์การแพร่ระบาดโควิด-19
ในเขตพื้นที่จังหวัดประจวบคีรีขันธ์ และศึกษาปัจจัยที่ส่งผลความเชื่อมั่นไว้วางใจด้านความปลอดภัย
ทางสุขอนามัยของนักท่องเที่ยวท่ามกลางสถานการณ์การแพร่ระบาดโควิด-19 ในเขตพื้นที่จังหวัด
ประจวบคีรีขันธ์ ดำเนินวิธีวิจัยเชิงปริมาณโดยใช้แบบสอบถามเป็นเครื่องมือเก็บรวบรวมข้อมูล
จากกลุ่มตัวอย่างคือ นักท่องเที่ยวจังหวัดประจวบคีรีขันธ์ จำนวน 214 คน และวิเคราะห์ข้อมูลโดย
ใช้สถิติเชิงพรรณนา ได้แก่ การแจกแจงความถี่ ค่าร้อยละ ส่วนเบี่ยงเบนมาตรฐาน และสถิติเชิงอนุมาน
ได้แก่ การวิเคราะห์สัมประสิทธิ์สหสัมพันธ์แบบ Pearson และการวิเคราะห์เส้นทาง (Path analysis)
โดยใช้เทคนิคการวิเคราะห์ถดถอยพหุคูณ ผลการศึกษา พบว่า นักท่องเที่ยวมีความเชื่อมั่นไว้วางใจ
ในภาพรวมอยู่ในระดับมาก โดยปัจจัยที่มีอิทธิพลต่อความเชื่อมั่นไว้วางใจด้านความปลอดภัย
ทางสุขอนามัย คือ การรับรู้และทัศนคติของนักท่องเที่ยวอย่างมีนัยสำคัญ และปัจจัยส่วนบุคคล
ด้านรายได้ การรับรู้และทัศนคติของนักท่องเที่ยวมีอิทธิพลทางอ้อมต่อการตัดสินใจท่องเที่ยว
ของนักท่องเที่ยวผ่านความเชื่อมั่นไว้วางใจด้วย มีเพียงปัจจัยส่วนบุคคลด้านอายุที่ไม่มีอิทธิพล
ทั้งทางตรงและทางอ้อมต่อการตัดสินใจท่องเที่ยวของนักท่องเที่ยว

คำสำคัญ : นักท่องเที่ยว ความเชื่อมั่นไว้วางใจ ความปลอดภัยทางสุขอนามัย การตัดสินใจ
การแพร่ระบาดของโควิด-19

* นักวิจัยอิสระ สถาบันบัณฑิตพัฒนบริหารศาสตร์
  เลขที่ 148 ถนนเสรีไทย แขวงคลองจั่น เขตบางกะปิ กรุงเทพมหานคร 10240
  อีเมล : Jumporm.p@gmail.com

1. Introduction

The current COVID-19 situation has severely affected Thailand's economy and society. The global economy is slowed down thanks to the inability to perform economic activities as a source of income. The tourism industry is one of the huge revenue-generating industries in many countries. With the outbreak of the pandemic, the number of tourists has dropped sharply, and in the first quarter of 2020, the number of tourists dropped by more than 22% and was expected to continue to decline between 60 and 80 % by the end of 2020 (UNWTO, 2022).

In Thailand, the tourism industry is the main income of the country, accounting for 16% of the total national product in 2019 (Gross Domestic Product: GDP). The income from foreign tourists, at 10% of the total national product, is 61% of the total tourism revenue. In 2013, Thailand was unable to accept foreign tourists, resulting in a loss of income from foreign tourists and having to rely on tourism within the country. In addition, the country has experienced a new wave of pandemic outbreaks, affecting plans to stimulate tourism in Thailand in the form of a "travel bubble," which is open to tourists from any country with a low number of new infections (Krungthai, 2020). However, the COVID-19 situation in Thailand is still unstable. Furthermore, the re-pandemic has caused the Tourism Authority of Thailand (TAT) to postpone the tourism incentive plan by enforcing travel restrictions across the area of COVID-19 in the country.

Such a situation, therefore, affects the trust in the health and safety of tourists who want to visit. Tourists' trust in health and safety is of paramount importance amid the COVID-19 pandemic. If tourists lack trust, it results in their not traveling at all, which will cause tourism-related business operators to suffer a loss of income and risk bankruptcy. This also will affect a lot of workers. In particular, Prachuap Khiri Khan, the province with the highest income from tourism in the central region of Thailand in 2020, earned 2,317.85 million baht, with a total of 3,641,101 tourists from January to November, ranked 6th in the country. Revenue reached 16,045.76 million baht, ranked 8th in the country (Department of Tourism, 2020). Therefore, if there is a lack of trust on the part of tourists, it will cause a massive loss in the country's income.

Therefore, the researcher is interested in studying the factors influencing the trust in the health safety of tourists amid the COVID-19 pandemic in the area of Prachuap Khiri Khan

Province. The aim is to provide business groups related to tourism in the aforementioned area with useful information. Additionally, the information provided can be used to formulate health safety measures in order to meet the needs of tourists, including setting up government policies and measures at the local level related to tourist attractions in the future.

1.1 Research Objectives

1.1.1 To study the level of trust in the health safety of tourists amid the COVID-19 pandemic situation in the area of Prachuap Khiri Khan Province

1.1.2 To study the factors affecting the trust in the health safety of tourists amid the COVID-19 pandemic situation in the area of Prachuap Khiri Khan Province

1.2 Research Hypotheses

1.2.1 The age and income of tourists influence trust in health safety.

1.2.2 The perception of tourists influences their trust in health safety.

1.2.3 The attitude of tourists influences their trust in health safety.

1.2.4 The trust in health safety influences tourists' traveling decisions.

1.2.5 Age, income, perception, and the attitude of tourists indirectly influence tourists' traveling decisions through trust.

2. Literature Review and Conceptual Framework

2.1 Literature Review

2.1.1 Concepts and Theories about Tourist's Behavior

The concepts and theories of tourist behavior are based on the concept of consumer behavior, focusing on the service sector as a form of consumption. Consumers of tourism are, therefore, called "tourists," which means a person that is a visitor that travels to a primary destination outside his or her area of primary residence for less than a year for business, leisure, or other personal purposes (UNWTO, 2008). Tourist behavior is, therefore, a tourist's decision to use a service in the tourism industry for satisfaction by considering all internal and external factors related to decision-making processes, activities, ideas, and experiences. Tourist behavior consists of nine key concepts: 1) the complicated decision-making of the tourists; 2) guided values; 3) motivation for decision-making;

4) personality as a key factor in the decision-making process; 5) expectations about the upcoming experiences; 6) attitudes determined by the relationship between tourists and material attributes; 7) tourists' perceptions tending to focus on perceived risks and safety, crime, terrorism, or the pandemic of some disease; 8) satisfaction as an important factor in assessing decision-making; and 9) trust and loyalty related in the consumer behavior model (Juvan, Omerzel, and Maravic, 2017). There are also four factors that influence tourist behavior: 1. cultural factors, 2. social factors, 3. personal factors, and 4. psychological factors (psychological factors) (Kotler, 2000).

2.1.2 Concept and Theory about Health and Safety

Safety is one of the human needs according to Maslow's hierarchical needs theory regarding both physical and mental safety. This is why tourists are all in need of safety, especially health and safety amid the COVID-19 pandemic situation, which has affected global tourism, stagnating tourism due to hygiene concerns. The World Health Organization (WHO, 2014) defines health as the state of complete physical, mental, and social well-being, not just being strong and infirm. Tianprapakun (2013) mentioned that safety means the state of being free from danger or being out of danger, including injury, risk, or loss. Therefore, health and safety mean that a person is free from disease. The physical and mental integrity of the body can survive in society well through protection, monitoring, and surveillance. Ukpabi, Olaleye, and Karjaluoto (2021) also stated that a clean and safe destination will ensure the trust of tourists. Hygiene safety has thus become an important criterion in the decision-making process of travelers. Tourists will prioritize and consider hygiene safety before deciding to travel in the midst of the COVID-19 pandemic (OECD, 2020). Each country's government must work with the private sector to set new standards in health safety to restore trust and stimulate the demands of tourists.

2.1.3 Concept and Theory about Tourist Trust

Trust is a matter of the mental state of a tourist who intends to accept something based on the positive expectation that the attraction will proceed in the direction he or she expects (Mcshane and Von Glinow, 2005). It is related to feelings, perceptions, and attitudes. A tourist's trust is the willingness of the tourist to visit a specific destination due to the expectation that the attractions will meet his or her needs. (Tassawa &

Banjongprasert, 2019). This is also related to the traveler's belief in physical and mental safety based on the cognitive and emotional aspects of being willing to travel (McAllister, 1995). Tourists trust that they are getting full-service quality. Furthermore, they expect that tourism-related businesses will be able to satisfy them with credibility, fairness, and honesty (Reina and Reina, 1999 cited in Woranat Samart, 2014). Discussing the elements of trustworthiness, there are three components of tourists' trust: 1. the ability or potential to build trust in the security policy of the government; 2. maintaining commitment or straightforwardness in accordance with the measures of relevant sectors; and 3. attention to the safety of tourists. The trust of tourists is very important to all involved in travel. Once tourists have faith in a business, it can lead them to make travel decisions and even bring them back, which can bring money and profits to businesses at all level.
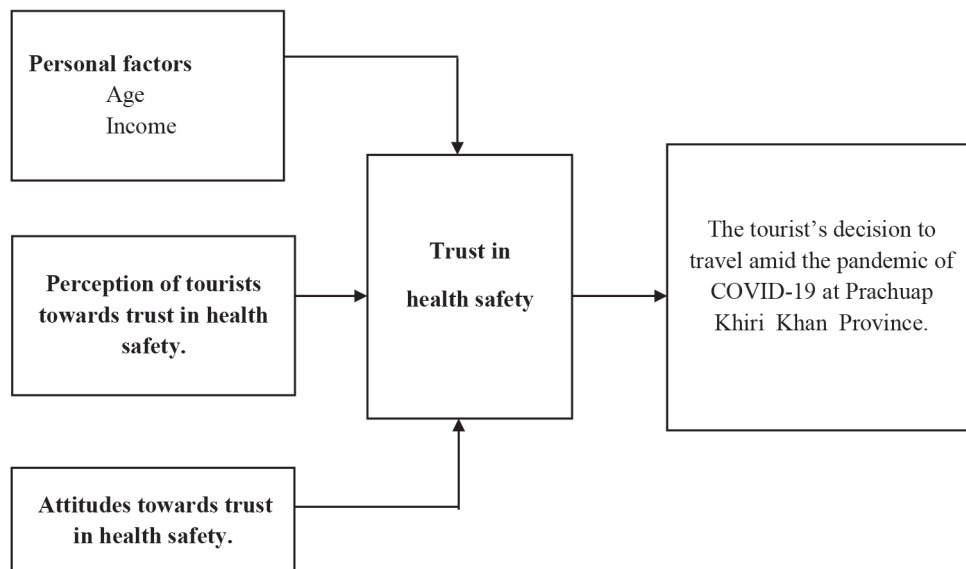
Conceptual Framework

Figure 1: Conceptual Framework

3. Research Methodology

This is quantitative research which studies tourists in Prachuap Khiri Khan Province. As Prachuap Khiri Khan, the Province with the highest number of tourists, ranked 6th in the country. In 2020, from January to November, there were a total of 3,641,101 tourists.

The Factors Influencing Trust in Health and Safety Amid the COVID-19 Pandemic:
In the Case of Prachuap Khiri Khan Province, Thailand

42

The sample group was calculated using Taro's formula to get a sample number of 385 people. This research used questionnaires as the data collection tool.

The questionnaire was created based on a conceptual literature review and related theories. The questionnaire was divided into six parts. Part I is the respondents' personal information questionnaire, consisting of six questions. Part II is a questionnaire for assessing the level of tourists' perceptions of health and safety in tourism, consisting of 15 questions. Part III is a questionnaire about tourists' attitudes toward health and safety in tourism, consisting of 10 questions. Part IV is a questionnaire for assessing the level of trust of tourists regarding health safety in tourism, consisting of five questions. Part V is a questionnaire evaluating tourists' travel decisions amid the COVID-19 pandemic, consisting of six questions. Part VI is comments or additional recommendations for the tourists' health safety measures.

Assessing the Questionnaire

In this study, the researcher developed a questionnaire and then verified its validity and reliability. 1. To assess validity, the questionnaire prepared by the researcher was presented to a research advisor to verify the correctness of the content and the use of idioms and words for the understanding of the respondents. After that, it was improved and processed in the next step. Then, construct validity was determined by using statistical techniques such as factor analysis for the researcher to consider the consistency of the questions and the initial variables from the Eigenvalues greater than 1 in order to eliminate the factor components at a level of 0.5. The results of the analysis revealed that the question items and variables had a KMO value of 0.918 and Eigenvalues greater than 1 for all variables. 2. To assess reliability, the researcher applied a modified questionnaire to be tried out with tourists in Hua Hin District, a sample group that was similar to the sample studied, numbering to 30 people. After that, the researcher used the data to ascertain the coefficient (Cronbach's Alpha was 0.907, with 35 questions and a coefficient value of between 0.899-0.923, divided into 4 variables, each variable having a coefficient greater than 0.75, so the questionnaire was considered acceptable according to the criteria.)

Data Analysis

For the data analysis and quantitative interpretation of the research data, the researcher used the questionnaires received to perform action on the data. Data analysis was performed by using a statistical computer program for statistical calculations, SPSS (Statistical Package for the Social Sciences), which employs the following methods:

1. The analysis of the sample's personal data: gender, age, status, education level, and income, using frequency distribution and percentage

2. The data were analyzed using percentage (percentage), mean (x), and standard deviation (SD).

3. A correlation analysis was employed for the variables of age, income, perceptions, and attitudes of tourists to determine their relationship with tourists' trust in health safety using Pearson's correlation coefficient analysis by considering the correlation coefficient. If the relationship the variables does not exceed .80, there will be problems with the independent variable's having multicollinearity.

4. Path analysis was used to find the causal relationships of the factors influencing tourists' trust in health safety that might affect their travel decisions. this research uses multiple regression analysis techniques to find Path analysis. To determine the standard regression coefficient, which was used to estimate influence, and the t-value to test the significance of the regression coefficient.

5. Result

5.1 The General Condition of the Sample Group

From the data collection of the sample group, the researcher conducted the data collection by distributing questionnaires to the tourists. travel, food, and accommodation in Prachuap Khiri Khan's group from Facebook with a response rate of 235 questionnaires, categorized as 214 sets of tourists who had traveled to Prachuap Khiri Khan during the COVID-19 pandemic and 21 sets of tourists who had never been to Prachuap Khiri Khan Province. However, in this study, the researcher analyzed only the data from tourists that had with been to Prachuap Khiri Khan Province. It was found that most of the respondents were female with 152 people aged 21-30 years. It represents 71%, and 142 people are single,

The Factors Influencing Trust in Health and Safety Amid the COVID-19 Pandemic:
In the Case of Prachuap Khiri Khan Province, Thailand

44

representing 66.4%. 171 people are employees of private companies, representing 79.9%. 86 people have a bachelor's degree, representing 40.2%. 160 people who earn between 10,001 and 20,000 baht per month, representing 74.8%. 111 people, representing 51.9%.

5.2 The Results of the Analysis of the Opinions of the Respondents

5.2.1 Tourist Perceptions of Health Safety in Tourism

When looking at the respondents' opinion levels on their perceptions of each question individually, the top-three questions revealed that the average question was "How much do you know about social distancing measures?" with an average of 4.54, followed by "Tourist attractions providing hand sanitizer with 70% alcohol or more in common areas such as entrance-exit information points or in front of the elevator, etc.," with an average of 4.30, and "You expect to receive health safety from traveling in Prachuap Khiri Khan Province" with an average of 4.25.

5.2.2 Tourist Attitudes Regarding Health Safety in Tourism

When considering the opinion levels of the respondents about their attitudes toward each of the top-three questions, it was found that the average question was "Do you agree with the social distancing measure?," with an average of 4.29, followed by a mean score of 4.29. The next ones were "To what extent do you accept and comply with the Tourism Health Safety Measures Policy?" with an average of 4.29, and "Do you have a good understanding of the Tourism Health Safety Measures Policy?" How much?," with an average of 4.26.

5.2.3 Tourists' Trust in Tourism Health Safety

When considering the opinion levels of the respondents regarding trust in each of the top-three questions, it was found that the question with the highest average was, "You believe that the tourist attractions in Prachuap Khiri Khan Province comply with the policy on measures for strict government tourism health safety," with an average value of 4.05, followed by "You believe that the tourist attractions in Prachuap Khiri Khan Province have the potential to manage health safety for tourists." The average was 4.05, and "You believe that a tourist attraction will honestly disclose information related to health safety for tourism" at an average of 4.03.

5.2.4 Tourist Decision Making Amid the COVID-19 Pandemic Situation

When considering the opinion levels of respondents regarding the travel decisions of tourists in each of the top-three questions, it was found that the average question was, "You decide to travel to a tourist attraction in Prachuap Khiri Khan Province after having comments on health safety in a positive direction," with an average of 3.90, followed by "You plan to travel to tourist attractions in Prachuap Khiri Khan in the near future," with an average of 3.71, and "The frequency of your travel is in the range of 5.3. The results of the data analysis of the tourists' health safety trust level use percentage, mean (x), and standard deviation (SD). From the sample, 214 people in general, have trust in health safety at an average of 3.43.

5.3 The Results of the Data Analysis of the Tourists' Trust Level of Health Safety Using Percentage, Mean, and Standard Deviation

Trust in the health safety of tourists amid the COVID-19 pandemic in the area of Prachuap Khiri Khan Province using the mean (x) and standard deviation (SD) from a sample of 214 people. Overall, it was found that the average level of trust in the health safety of the tourists who decided to travel to Prachuap Khiri Khan Province amid the COVID-19 pandemic was 3.43.

5.4 Results of the Analysis of the Relationship among the Independent Variables, the Mediator Variables, and the Dependent Variables

The correlations among the three independent variables were: 1. age and income as personal factors; 2. perceptions; and 3. attitudes. The central variable was the level of trust in health safety, and the dependent variable was the travel decisions of tourists. Pearson's coefficient was used to find the relationship among the variables and to consider the correlation coefficient of each pair of variables such that they were not so correlated that caused multicollinearity. It was found that independent variables, including tourist perceptions and attitudes, were related to the central variable and were statistically significant at the .01 level. Trust was related to the dependent variable, such as decision-making. The number of tourists was statistically significant at the .01 level. The variable had a correlation coefficient of between -0.03 and 0.633. The most correlated variables were tourist perception and trust. The correlation coefficient was 0.633, followed by attitude and perception. The correlation coefficient was 0.522. The variable with the lowest

correlation were age and perceptions of tourists. It had a correlation coefficient of -0.003 and every pair of variables had a coefficient of less than 0.75, so there was no multicollinearity. Therefore, it can be used for further regression analysis, as seen in the following table.

Table 1: The Correlation Coefficient of Independent Variables, Mediator Variables, and Dependent Variables

Variable	Age	Income	Perception	Attitude	Trust	Decision Making
Age	1					
Income	.249**	1				
Perception	-.003	-0.77	1			
Attitude	.027	.019	.522**	1		
Trust	-.032	.025	.633**	.373**	1	
Decision Making	.169*	.005	.352**	.408**	.409**	1

Note: ** = $P < 0.01$ * = $P < 0.05$

5.5 Results of Regression Analysis of Variables

From the conceptual framework used in the study, the structural equation of the correlation model can be created as follows:

Trust $= \beta$Age $+ \beta$Income $+ \beta$Perception $+ \beta$Attitude   .....(1)
Decision $= \beta$Trust   .....(2)

Table 2: Regression Analysis Results of Independent Variables and Central Variables (Equation 1)

Variable	Regression Coefficient β	t	sig
Age	-0.059	-1.364	0.174
Income	0.053	1.224	0.222
Perception	0.347	7.020	0.000**
Attitude	0.556	11.288	0.000**
Trust		0.139	0.889
R = 0.796 R^2 = 0.633 Adjusted R^2 = 0.626 SEE = 0.392 F = 90.088 Sig. = 0.000			

According to Table 2, two independent variables were found to have a significant positive correlation at the .01 level, namely, tourist perceptions and attitudes. Trust were at 62.6%. The tourists' attitudes had the highest correlation with trust, followed by tourists' perceptions.

Table 3: The Results of the Regression Analysis of the Central Variables and the Dependent Variables (Equation 2)

Variable	Regression Coefficient β	t	Sig
Decision making	0.409	6.531	0.000**
Constant		8.520	0.000**
R = 0.409 R^2 = 0.167 Adjusted R^2 = 0.164 SEE = 0.526 F = 42.650 Sig. = 0.000			

According to Table 3, it was found that trust was positively correlated with travel decision-making (β = 0.409) at the statistically significant .01 level. Trust could explain 16.4% of the variation in travel decisions.
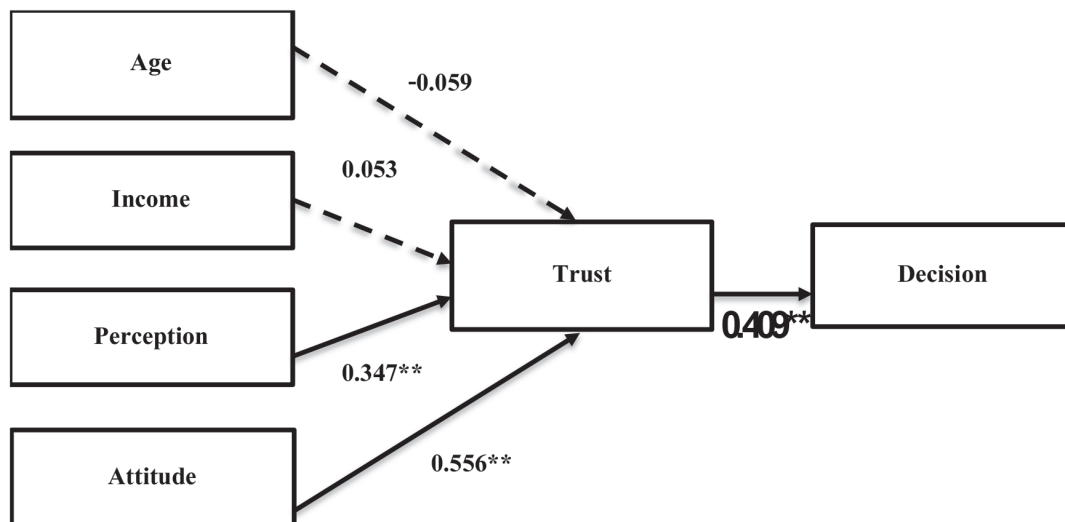
5.6 Path Analysis

Figure 2: Path Analysis Result of Variable Relationship

Note: ——   The correlation path between variables with significant correlation

‑‑‑‑‑‑‑‑   The correlation path between uncorrelated variables

The Factors Influencing Trust in Health and Safety Amid the COVID-19 Pandemic:
In the Case of Prachuap Khiri Khan Province, Thailand

48

The results of the analysis of influence paths of independent variables, central variables, and dependent variables were from 4 independent variables: age, income, perceptions, and attitudes of tourists. Only two variables, namely tourists' perceptions and attitudes, had a significant direct influence on trust at the .01 level, with the central variable being trusted (0.409), having a direct influence on decision-making. Significant tourism is at the .01 level, and independent variables indirectly influence travel decisions through trust. The variables were visitor attitude (0.227), tourist perception (0.142), and income (0.022), respectively. The age variable had no direct or indirect influence on the travel decisions of the tourists. This is displayed in the following table.

Table 4: The Results of the Analysis of the Influence of Independent Variables, Central Variables, and Dependent Variables

Variables	Amount of Influence on Trust			Amount of influence on Decision-making		
	Direct	Indirect	Total	Direct	Indirect	Total
Age	-0.059	-	-0.059	-	-0.024	-0.024
Income	0.053	-	0.053	-	0.022	0.022
Perception	0.347^{**}	-	0.347^{**}	-	0.142	0.142
Attitude	0.556^{**}	-	0.556^{**}	-	0.227	0.227
Trust	-	-	-	0.409^{**}	-	0.409^{**}

5.7 Test Results

From the testing of all five hypotheses, it was found that three hypothesis test results were consistent with the empirical data and two hypotheses were inconsistent with the empirical data, as seen in the following table.

Table 5: The Results of the Hypothesis

Hypothesis	Results
Hypothesis 1 The age and income of tourists influence trust in health safety.	Inconsistent
Hypothesis 2 The perception of tourists influences their trust in health safety.	Consistent
Hypothesis 3 The attitude of tourists influences their trust in health safety.	Consistent
Hypothesis 4 The trust in health safety influences tourists' traveling decisions.	Consistent
Hypothesis 5 Age, income, perception, and the attitude of tourists indirectly influence tourists' traveling decisions through trust.	Inconsistent

5.8 Summary of Additional Comments on Tourist Health Safety Measures

In addition to the quantitative data collection, this research also had an open-ended question section to invite additional opinions or suggestions on security measures. Tourist hygiene, from the respondents, has additional opinions that could be categorized into the following issues:

1. For social distancing measures, there should be more stringent practices as in some tourist attractions. Tourists still can't keep their distance as well as they should. Places should not be crowded; more space should be provided appropriately.

2. For the screening measures, there should be more stringent screening points for tourists traveling across the province from high-risk areas to reduce the chances of spreading COVID-19. Take the screening seriously, don't ignore it. At all tourist attractions, there should be a screening point that strictly screens tourists, with no exceptions. Make tourists wear masks at all times. If there is a removal, there should be serious measures or penalties.

3. For tourist, in each service point of each attraction, there should be enough alcohol gel, liquid soap, and disinfecting equipment, including having a proper place for disposing of hygienic masks is a must, and adding a sign for scanning a QR Code: Thai Chana. There is a sign to warn about social distancing, wearing a mask, and remind tourists to be responsible for themselves and society.

4. For other related departments, they should be ready to deal with tourists during a festival to accommodate their increasing numbers of tourists. During that period, many tourist attractions lack measures to cope with the increasing numbers of tourists. If there is a sufficient budget, masks should be distributed or provided everywhere. In addition, the relevant agencies should be thoroughly monitored. Public relations are needed. Being stricter with restaurants is also important. There should also be a tracking system for tourists that have traveled to Prachuap Khiri Khan province to determine if tourists have been infected with COVID-19.

6. Discussion

6.1 Discussion of the Research Results

6.1.1 Research Results Based on the Hypotheses

Hypothesis 2. Tourist perception influences trust in health safety. This indicates that perception is a psychological factor that affects a person's choices and influences his or her beliefs, experiences, needs, and emotions, including those triggered by stimuli such as smell, hearing, taste, sight, and feelings. Using the five senses, each traveler will have a unique perception based on their belief, experience, emotions, and the five senses. Thus, these senses give tourists a different kind of trust as well. Perception is, therefore, an important factor influencing the level of tourist trust. Generally, tourists want credibility concerning the destination. Most tourist perceptions focus on risk perception and safety, as well as the perception of crime, the perception of terrorism, or the spread of certain diseases (Juvan, Omerzel, and Maravic, 2017).

The results of this hypothesis testing are, therefore, consistent with the research by Janchai (2020) on the trust of tourists in the quality of healthcare businesses. Different needs of customers (empathy) in the environment can be perceived by the five senses. Tangibility and the customer's responsiveness affect the tourists' trust in health businesses with influence values of 0.270, 0.244, and 0.170. Therefore, the development of tourist perception factors in a positive direction will affect the trust of tourists.

Hypothesis 3: Tourist attitude influences trust in health safety. This can be described as an attitude as one of the psychological factors, like perception. It shows that a person's attitude is their derived from social determinants of reference groups such as family. A person's beliefs are composed of understanding (cognitive), feelings (affective), and behavior. Tourist attitudes are often determined by the relationship between tourists and the key attributes of an object, such as the nature of the destination. The measure of tourist attitudes toward destinations has an emotional aspect (behavior) (Schiffman & Kanuk, 2007). The results of this hypothesis testing are therefore consistent with Khwanmuang (2016). It was found that trust and attitude had a significant influence on a person's use of e-wallet transactions at the 0.05 level. Trust and attitude are key factors influencing consumer behavior in demonstrating safety. Therefore, there is a positive correlation between attitude and trust. That is, the higher the level of trust, the more likely

it is that tourists will have a positive attitude.

Hypothesis 4: Health and safety trust influence tourists' travel decisions. This suggests that hygiene, safety, and trust key factors influencing travelers' travel decisions. Trust consists of both the physical and mental perceptions and attitudes of the traveler and is based on the perceptions and emotions of being willing to travel in terms of expectations regarding a destination. Going in a positive direction, tourists tend to have trust in credibility, fairness, honesty, and trust that they will receive quality service, so that they make decisions.

The results of this hypothesis testing are, therefore, consistent with research by Seangsawat (2015) on the trust and loyalty that influence the decision to access department services. It was a case study of the department stores in Bangkok. There has also been a case study of leading department stores in Bangkok, and the results showed that trust factors of consumers had a statistically significant influence on the decision to use shopping malls at the 0.05 level. Additionally, in Rodklin's (2019) research on the factors influencing trust and the decision to buy gems and jewelry products via the Facebook live channel of Thai consumers, it was found that trust affects the decision to buy gems and jewelry products. Facebook Live was significant at the 0.05 level. It can be concluded that trust is a key factor that greatly influences a person's decision-making.

6.1.2 The Research Results that did not Conform to the Assumptions

Hypothesis 1: Personal factors of age and the income aspect influence the trust in health safety. This can be described as the fact that each person has different personal factors of age and income, but this does not mean that people have different trust in their safety. Everyone has the same trust in health safety in the same direction; they need the same assurance of health safety from the destination tourist destination. The difference in age and income does not make the level of trust in the destination high or low either.

The results of this hypothesis test are therefore consistent with the research by Taerungreaung (2019) on the factors that influence the trust of customers in using the applications (the KMA application service) of the Bank of Ayudhya Public Company Limited. It was found that gender, age, and income made no difference in the level of trust in using this service. People with different incomes all need the same trust in purchasing goods and in receiving travel services. Personal factor variables had no influence on health safety

trust, only psychological variables, including tourist perceptions and attitudes had a statistically significant influence.

Hypothesis 5: Tourist' personal factor of age, income, perceptions, and attitudes indirectly influence tourists' travel decisions through trust. This indicates that, from the study of these four factors, it was found that only three influenced tourists' travel decisions through trust, thus making this assumption inconsistent with the set. The fact that age does not indirectly influence a traveler's travel decisions through trust is because it is the only socioeconomic factor that distinguishes people. Age does not reflect any ideas or feelings when talking about making travel decisions. It is different from the perceptions and attitudes of tourists, which are psychological factors. Moreover, all human beings have travel needs as it is a way to create happiness for themselves. Because the matter of man is a matter of the senses because man is not a machine but has a body of flesh and blood, feelings and thoughts (Attanit, 2011).

The results of this hypothesis test are consistent with Lueangthitikanchana (2016) on the factors affecting Thai consumer decisions to travel to Taiwan, which found that age does not affect tourists' decisions to travel there. Further, income was seen to affect the decision of Thai tourists to travel to Taiwan. This is also consistent with Pairojpiriyakul & Taweepornpathomgul's study (2012). They explored the factors affecting the decision-making of Thai tourists traveling to Luang Prabang. It was found that respondents who were Thai tourists traveling to Luang Prabang with different incomes made different decisions. Those with high incomes and stable careers make easier decisions than those with low incomes.

7. Recommendations

Policy Suggestions

From the results of the study, it was found that tourist perceptions and attitudes influence the trust of tourists. Therefore, governments, agencies, and related parties should focus on the perceptions and attitudes of tourists by creating awareness and encouraging them to have a positive attitude toward various measures. The research also found that trust influences tourists' travel decisions. Therefore, strengthening and maintaining trust in the safety of tourists should be complied with. When tourists have trust, it will

lead to the decision to travel to Prachuap Khiri Khan Province. In addition, the government will also need to focus on personal income factors, as a person's income indirectly influences his or her travel decisions. If an individual earns more, it will make it easier for him or her to make travel decisions and to travel more often. As a result, the number of tourists will increase, which will help stimulate the tourism economy of Prachuap Khiri Khan Province and Thailand because tourism plays an important role in generating income and driving the country's development from a middle- to a high-income country in the future.

2. Based on the results of the summary of the additional comments on the safety measures for tourist hygiene, governments and related agencies should organize and enforce more stringent measures during festivals. In order to be ready to accommodate the increasing number of tourists during those periods, budgets should be provided to support masks and cleaning supplies, and tourist attractions should be monitored according to whether the prescribed measures are followed or not thoroughly. In particular, social distancing measures should be enforced more strictly in some tourist destinations. It is still not possible for people to maintain a good distance from each other; and screening measures should have more stringent screening points for tourists traveling across the province from high-risk areas in order to reduce the chance of spreading COVID-19. Take the screening seriously. Do not ignore it. At all tourist attractions, there should be a screening point that strictly screens tourists, with no exceptions. A tracking system for tourists should also be developed that travels within Prachuap Khiri Khan Province to make it easier to track if tourists are infected with COVID-19. Every time a Tourist travels, that they need to scan QR codes, or may be should make apps that can be used on a wide range of devices like smart watches, etc.

Recommendations for Further Research

From the results of the present study, various suggestions can be made as follows.

1. Area sampling should be used by collecting the same amount of sample data for each district in Prachuap Khiri Khan Province in order to obtain more complete data. When concluding the research results, it will reveal the trust of tourists, classified into each district, which can result in improvements or the development of measures that are more relevant to the area.

2. Factors rather than perceptions and attitudes should be investigated as to what factors influence tourists' trust in the safety and hygiene of tourists.

3. Data analysis should be developed using structural equation modeling (SEM) with the AMOS program in order to test the consistency of the variables with the model (model fit) used in the research, which would make the research more efficient and reliable.

Research Limitations

Because this research was conducted in the midst of a new wave of the Covid-19 pandemic, the government has established pandemic control areas, making it more difficult to collect the research data. Therefore, it was necessary to use a method for collecting data from a Facebook group called "The Group of Tourists, Places to eat, and Accommodation in Prachuap Khiri Khan," which is a tourist destination in Prachuap Khiri Khan Province with approximately 10,000 members.

The researcher was unable to collect all of the data according to the sample size of 385 people because the response rate was only 235 sets. Therefore, the researcher had to examine and select only the complete questionnaires to be used in the analysis of 214 data sets, representing 55.58% of the sample group, in order to make this research as complete as possible and be able to proceed efficiently.

References

Attanit, R. 2011. *Employee engagement*. Bangkok: HR Center.

Department of Tourism. (2563). *Tourism statistics in 2020*. Retrieved January 10 2020, from http://www.mots.go.th/more_news_new.php?cid=592.

Janchai, N. (2020) *Tourists' Trust towards Healthcare Service Quality*. Nakhorn Ratchasima: Suranaree University of Technology.

Juvan, E., Omerzel, D. G., and Maravic, M. U. (2017). *Tourist Behaviour: An Overview of Models to Date*. MIC 2017: Managing the Global Economy; Proceedings of the Joint International Conference, Monastier di Treviso Italy, 24-27 May 2017, University of Primorska Press.

Khwanmuang, L. (2016). *Trust Promoting for Continuing to make electronic wallet transactions*. Bangkok: Thammasat University.

Krungthai. (2020). *Delving into tourists' behavior during new normal period: when covid changes our lives*. Retrieved January 26 2020, from https://bit.ly/3cfJM2A

Kotler, P. and Keller, K. (2006). *Marketing Management.* 12ᵗʰ Ed. Prentice Hall, Upper Saddle River.

Lueangthitikanchana, K. (2016). *Factors affecting thai consumer decisions to travel to Taiwan.* Bangkok: Thammasat University.

Mcshane, S. L. and Von Glinow, M. A. (2005). *Organizational Behavior*. 3ʳᵈ ed. New York: McGraw-Hill.

OECD. (2020). *Tourism Policy Responses to the coronavirus (COVID-19) Updated 2 June 2020.* Retrieved January 25 2020, from https://read.oecdilibrary.org/view/?ref=124_1249847uf8nm95se&title=Covid-19_Tourism_Policy_Responses

Pairojpiriyakul, A. and Taweepornpathomgul, S. (2012). Factors Affecting Thai Tourist's Decision to visit Muang Luang Prabang . Journal of Sports Science and Health *13*(1).

Rodkiln, P. (2019). *Factors Influencing Trust and Decision to Buy Gems and Jewelry Products Through Facebook Live Channel of Thai Consumers.* Prince of Songkhla University.

Samart, W. (2014). *Antecedents and Differences between Trust in Team and Organization Engagement between Employees Working in Traditional Team and Virtual Team: A Case Study of Companies in Aviation Industry*. Bangkok: National Institute of Development Administration.

Schiffman, L. G., & Kanuk, L. L. (2007). *Consumer behavior.* 9ᵗʰ ed. New Jersey: Prentice – Hall.

Seangsawat, M. (2015). *The Trust and loyalty that influence the decision to access the department services. A case study of the department stores in Bangkok.* Bangkok: Bangkok University.

Taerungreaung, N. (2019). Factors that influence the trust in using applications (KMA) of Bank of Ayudhya public company limited bank's customers. Nakornpathom: Silpakorn University.

Tassawa, C. and Banjongprasert, J. (2019). The Effects of Destination Competitiveness and Tourist Trust on Destination Advocacy: The Case of International tourists. *Humanities, Social Sciences, and Arts 12*(5).

Tianprapakun, M. (2013). *Factors affecting to safety behavior of Olefins1's officer at PTT Global Chemical Public Company limited Branch 2*. Bangkok: National Institute of Development Administration.

Ukpabi, D., Olaleye, S. and Karjaluoto, H. (2021). Factors Influencing Tourists' Intention to Use COVID-19 Contact Tracing App. *Information and Communication Technologies in Tourism 2021*, 504-516.

United Nations World Tourism Organization. (2008). *International recommendations for statistics 2008*. Retrieved January 15 2020, from https://unstats.un.org/unsd/publication/seriesm/series m_83rev1e.pdf

United Nations World Tourism Organization. (2020). *How are countries supporting tourism recovery?*. Retrieved January 26 2020, from https://webunwto.s3.eu-west-1.amazonaws.com/s3fs-public/2020-06/BFN_V4.pdf

World Health Organization. (2014). *BASIC DOCUMENTS*. 48th ed. Retrieved January 20 2020, from https://apps.who.int/gb/bd/PDF/bd48/basic-documents-48th-edition-en.pdf

Environment-Growth Nexus: Revisiting Prosperity and Challenges Associated with Foreign Direct Investment

Iqra Arshad* and Muhammad Azhar Khalil**

Abstract

In this study, we develop a model to investigate the interactions between foreign direct investment (FDI), carbon emission (CO_2), fixed capital accumulation (FCA), and economic growth by analyzing the sample from one of the emerging economies in Asia i.e., Pakistan during 1970-2017. In particular, the study examines the impact of FDI on both economic growth and environmental degradation. Using Ordinary Least Square and Johansen Juselius Co-integration approach, we observed that all the explanatory variables (i.e., FDI, CO_2, and FCA) are positively related to the gross domestic product (GDP). Further analysis confirmed the widely accepted belief that FDI positively and significantly contributes to economic growth. However, such economic prosperity is generated at the cost of the environment, as the results show that FDI fosters the current level of CO_2 which in turn poses a substantial challenge to the environmental quality. We offer a set of policies that policymakers should consider in Pakistan's environmental protection policy plan to combat environmental degradation and emissions.

Keywords: Economic Growth, Foreign Direct Investment, Carbon Emission, Environmental Policy

* Graduate School of Public Administration, National Institute of Department Administration
   148 Serithai Road, Khlong-Chan, Bangkapi, Bangkok 10240, THAILAND.
   E-mail: iqra.arsh@stu.nida.ac.th
** Department of Finance, Martin de Tours School of Management and Economics, Assumption University
   Samutprakarn Province 10540, THAILAND.
   E-mail: mkhalil@msme.au.edu

จุดเชื่อมสำคัญระหว่างการพัฒนาและสิ่งแวดล้อม :
ทบทวนความรุ่งเรืองและความท้าทาย
การลงทุนโดยตรงจากต่างประเทศ

อิกรา อาชัด และ มูฮำหมัด อัซฮาร คาลิล

บทคัดย่อ

การวิจัยครั้งนี้พัฒนาโมเดลเพื่อศึกษาความสัมพันธ์ระหว่างการลงทุนโดยตรงจากต่างประเทศ การปล่อยก๊าซคาร์บอนไดออกไซด์ การสะสมทุนถาวรและการเจริญเติบโตทางเศรษฐกิจโดยวิเคราะห์จากกลุ่มตัวอย่างประเทศเศรษฐกิจใหม่ของทวีปเอเชีย ได้แก่ ประเทศปากีสถาน ระหว่างช่วง ค.ศ. 1970-2017 ทั้งนี้การวิจัยมุ่งเน้นศึกษาผลกระทบจากการลงทุนโดยตรงจากต่างประเทศที่มีต่อการเจริญเติบโตทางเศรษฐกิจและความเสื่อมโทรมของสิ่งแวดล้อมผ่านวิธีกำลังสองน้อยที่สุดและกระบวนการวิเคราะห์ความสัมพันธ์ระยะยาวของโจฮานเซนและจูซีเลียส โดยสามารถสังเกตได้ว่าตัวแปลอธิบายทั้งหมด (คือ การลงทุนโดยตรงจากต่างประเทศ การปล่อยก๊าซคาร์บอนไดออกไซด์และการสะสมทุนถาวร) มีความสัมพันธ์เชิงบวกกับผลิตภัณฑ์มวลรวมในประเทศ ประกอบกับผลการวิเคราะห์เพิ่มเติมที่ยืนยันความเชื่อว่าการลงทุนโดยตรงจากต่างประเทศนั้นส่งผลต่อการเจริญเติบโตทางเศรษฐกิจเชิงบวกอย่างมีนัยสำคัญ ทั้งนี้ความเจริญทางเศรษฐกิจดังกล่าวต้องแลกกับผลเสียที่อาจเกิดต่อสิ่งแวดล้อม ดังที่ผลการศึกษาชี้ให้เห็นว่าการลงทุนโดยตรงจากต่างประเทศนั้นคือสาเหตุของระดับก๊าซคาร์บอนไดออกไซด์ในปัจจุบัน ซึ่งส่งผลกระทบต่อคุณภาพของสิ่งแวดล้อมเป็นอย่างมาก การวิจัยจึงขอนำเสนอนโยบายให้ผู้วางนโยบายพิจารณานโยบายการป้องกันด้านสิ่งแวดล้อมของประเทศปากีสถานเพื่อวางแผนรับมือกับการเสื่อมโทรมของสิ่งแวดล้อมและการปล่อยก๊าซ

คำสำคัญ : การเจริญเติบโตทางเศรษฐกิจ การลงทุนโดยตรงจากต่างประเทศ การปล่อยก๊าซ
คาร์บอนไดออกไซด์ นโยบายด้านสิ่งแวดล้อม

* คณะรัฐประศาสนศาสตร์ สถาบันบัณฑิตพัฒนบริหารศาสตร์
   เลขที่ 148 ถนนเสรีไทย แขวงคลองจั่น เขตบางกะปิ กรุงเทพมหานคร 10240
   อีเมล : iqra.arsh@stu.nida.ac.th
** แผนกวิชาการเงิน คณะบริหารธุรกิจและเศรษฐศาสตร์ มหาวิทยาลัยอัสสัมชัญ จังหวัดสมุทรปราการ 10540
   อีเมล : mkhalil@msme.au.edu

1. Introduction

Whether pollution goes on increasing as an unavoidable byproduct of manufacturing as our economy grows, or will economic growth allow us to achieve better environmental quality? In the current era, environmental deterioration is the key challenge that the globe has been facing for quite a time (Jingkuang Liu et al., 2020; Jinyu Liu et al., 2021). Environmental deterioration exhibits numerous adverse repercussions on sustainable economic development (Murshed et al., 2021; Rehman et al., 2021). While numerous economies around the globe are exerting tremendous efforts to address the urgency of environmental degradation by lowering their CO2 emissions, which are increasing steadily to an unsustainable level. Imagine the level of carbon emissions in 1980 around the globe was 17.79 billion tons, which will be greater than 33 billion tons in the next forty years. Thus, such an alarming situation brings the attention of the globe towards more viable policies to curb the level of emissions. Over the past couple of decades, the relationship between economic development, FDI, and environmental quality has been a contentious topic discussed in the theoretical and scientific literature. Specifically, whether can maintain sustainability by preserving environmental standards has become a global concern.

The level of FDI is kept on increasing globally and multinationals invest largely in developing economies to gain benefit from cheap labor and less stringent environmental regulations. Until 2009, the total volume of FDI globally accounted for $17 trillion, and 27.5% of this is only invested in developing nations. In the late 1990s, Pakistan was successful enough to attract foreign direct investment, which accounts for more than $1 billion. In Despite having a relatively open liberalized market with less stringent environmental policies, Pakistan was unable to maintain the pace of FDI inflows later. The reason behind low FDI inflow is political instability, inefficient financial structure, corruption, terrorism, and weak institutions. In the whole region and amongst neighboring countries, Pakistan is left behind in the race of growth and capturing FDI inflows.

The relationship between FDI and growth is debatable. The impact of FDI is multifaceted, it brings prosperity and growth while posing some severe challenges to sustainability in terms of environmental deterioration. To a larger extent, FDI is regarded as the primary source of economic development due to the inflows of capital technical

upgradation, and knowledge to growing economies (Murshed, Elheddad, et al., 2021).

The FDI inflows make the host nation more prosperous by reaping benefits from advanced technical knowledge and more developed systems with spillover effects resulting in increased efficiency and productivity improvements. On the other hand, FDI has the potential to degrade environmental quality by exaggerating the emissions level within the host nation (Banerjee & Murshed, 2020;Murshed, Rahman, et al., 2021). The two important notions namely; the pollution halo and the pollution haven hypotheses, can help to understand the impact of FDI in terms of growth and challenges simultaneously (Xue et al., 2021). According to the pollution halo idea, FDI is essential for transferring green technology, hence reducing ecological damage (Ahmad et al., 2021; Zeraibi et al., 2021). On the contrary, as Copeland & Taylor, (1994) point out, the pollution haven hypothesis implies that FDI inflows are likely to exacerbate environmental pollution since developed economies choose to locate manufacturing in developing economies due to the availability of cheap labor. Nevertheless, the reason which makes FDI more hazardous is the less stringent environmental regulation by these least developed nations. such least bothered environmental regulations made it so easy for the developed nations to exploit and it they also provides potential to take advantage and invest in pollution-intensive production methods (Murshed, 2020; Nathaniel et al., 2021). However, FDI might assist host countries to grow larger, but due to its pollution-intensive nature, it can deteriorate the environment. Thus, it is imperative to understand the impact of FDI in both directions and regulations in the host nations. By doing so, economies can reap benefits from the FDIs without getting harmed by its pollution-intensive nature.

There is an ongoing debate on the impact of environmental regulations, many argue in the favor and many against. The negative effect of environmental regulation on economic growth and productivity is highlighted by many authors (e.g., Jorgenson & Wilcoxen, 1990; Jorgenson & Wilcoxen, 2018) and (Tahvonen & Kuuluvainen, 1993). They claim that because the elimination of emissions involves resources that might otherwise use for productive activities, tighter environmental regulations would effectively restrict economic growth by raising the cost of output and reducing the overall efficiency of the economy's total inputs. On the contrary, the significance of environmental protection for the stabilization of economic development is stressed by some scholars (e.g., (Maxwell, 1996; Boyd & McClelland, 1999). Many claim that economic practices associated with

producing emissions without imposing environmental regulations lead to economic collapse due to a catastrophic degradation of environmental quality. Investigating the possible conflict between economic development and the atmosphere's quality might have serious ramifications for optimal strategic policies regarding economic growth and pollution control. Currently, developing countries are anxious about the long-term repercussions of environmental pollution and are trying to enact more rigorous environmental policies. However, it is possible that less-developed nations struggling for rapid economic development would permit less restrictive environmental policies. Because deploying pollution control equipment and implementing clean technology could be very expensive. Pakistan's manufacturing sector is amongst the key contributors to economic development and accounts for 20.3% of gross domestic product (GOP,2019). Increased mobilization of foreign resources is needed to boost industrial production and be considered an important success factor (Khan & Kim, 1999). With prudent macroeconomic policies and many structural reforms, it is imperative for Pakistan to welcomes international investors and local producers (Husain, 2009; Desbordes, 2010).

The association between carbon emissions and FDI has already been explored; however, there is a larger need to understand the impact of FDI in both directions (prosperity and challenges). FDI could bring growth as well as poses challenges to the environment that raises the need towards stringent environmental regulations for the sustainable future in developing economies. Moreover, the given study also examined the Environmental Protection Ordinance of Pakistan to understand the bottlenecks and provide a policy plan that need to be implemented for sustainable future.

1.1 Pakistan's Environmental Protection Ordinance-1983 and Policy Process

The Government of Pakistan created the Pakistan Environmental Protection Ordinance (PEPO) in 1983. Although the Pakistan Environmental Protection Ordinance-1983 is similar to the US National Environmental Policy Act-1969, the reflective practices are different in both countries. However, after 30 years of its enactment by the Government, it did not yield the desired results compared to the USA. PEPO was not a significant success in terms of enforcement, and various factors can be linked to its failure. The main reason behind its failure is the policy mechanism in Pakistan, which is shaped and controlled by leaders of political parties, bureaucracy, and local elites' agendas. In Pakistan's policy

mechanism, the general public's involvement and group influences have secondary importance. Despite significant control over policy initiation, political and bureaucratic considerations are important predictors of the environmental policy system. The execution of the policy is likely to be affected largely by different stakeholders at the community level. Rigidity and elitism are the byproduct of the Bureaucracy in Pakistan, which prohibits the acceptance of reforms. This research aims to provide reliable, authentic, and practical information on PEPO and establish a new Environmental Policy Plan for Pakistan for better implementation.

Even after 1983, Environmental Protection Ordinance was implemented, the term "environment" was obscure to Pakistan's citizens. Awareness of environmental issues was devoid, and due to the low literacy rate, whatever efforts practiced made a slight improvement. This indicates that the evidence related to environmental legislation development was inadequate, especially in the longer term. The challenge faced by the environment must be taken up vigorously by the Central Government and other levels of government and target groups to give the policies a strong start (Malik, 1993). However, Ahmed (2002) argued that the laws are already in place, the implementation of laws and policies is a major issue, and it depends on the country's political will.

1.2 Country Profile

The Islamic Republic of Pakistan, on 14 August 1947, appeared on the World Map. It occupies 796,096 square kilometers and shares borders with India, China, Afghanistan, and Iran. Pakistan's location is of particular importance in South Asia as it shares the Eastern region with the West. Pakistan is the world's 6th largest country and comprises over 220 million individuals. In a middle-income country with a per capita GDP (a current US Dollar) of 1547,853, roughly 24.3 percent people live below the national poverty line.

The volume of Carbon emissions production in Pakistan in 2016 was 0.20 million kilotons, and the level of Foreign Direct Investment in Pakistan was 2.218 billion US dollars. On the contrary, in Thailand, the carbon emission production was 0.283 million kilotons, and its foreign direct investment was 6.316 billion US dollars in Thailand. These figures indicate that foreign direct investment does not fully explain the extent of Co2 emissions in Pakistan, and FDI is not solely responsible for Pakistan being among the most polluted countries. As a practical guide to lawmakers, environmental managers, and political

leaders, this study's findings can help to be informed regarding optimal environmental policy to improve the quality of the environment in Pakistan. It is worth mentioning that the analysis undertaken in the current study is imperative because it serves three purposes concurrently by using secondary time series data from 1970-2017 that had not been used in a single study in the past. Secondly, it investigates the effect of FDI in both directions; prosperity and challenges. The study has explored the impact of FDI on economic growth (prosperity) and challenges poses to environment. Lastly, the analysis shed light on Pakistan's environmental protection laws and provided a potential environment strategy plan.

The rest of our study is organized in the following way: the Review of literature section explains the pertinent literature regarding Energy Usage, Growth, Environmental Deterioration, and Foreign Direct Investment. Moreover, it also includes the hypotheses development section. The third section of the paper include the methodology part, explains model specification, and discusses the econometric estimations for models. The fourth and fifth section of the study discusses the findings, made conclusion, and summarizes the study's policy implications. Lastly, the limitations of the study have also been discussed.

2. Literature Review

In recent times, we have seen scholars pay much more attention towards sustainability and sustainable economic growth. The focus of these studies is on the effective management of hazardous waste, green consumption and production, alternative sources of energy instead of traditional ones, and their impact on the sustainable growth (Musatti et al., 2017; Ahmed et al., 2020; Jingkuang Liu et al., 2020; Zhao et al., 2020; Wu et al., 2021; Li et al., 2021; Yu, 2021; Peng et al., 2021).The studied variable in the given research can be divided into two categories. The first group delves into the intricacies of the relationship between energy consumption, growth, and environmental damage. The second group look at the link between environmental degradation, growth, and foreign direct investment.

2.1 Energy Usage, Growth, and Environmental Deterioration

Grossman & Krueger (1991) make initial attempts to ascertain the veracity of Environmental Kuznets Curve (EKC) and investigate the dynamical impacts of growth on

the quality of environment. The EKC hypothesis presume that initially growth comes on the cost of environmental deterioration but later, the negative effects are offset by the specified level of growth (Ahmad et al., 2021; Murshed, Haseeb, et al., 2021). Many scholars made attempts to investigate the EKC notion in different countries. Mikayilov et al. (2018) and Zambrano-Monserrate et al. (2018) investigated the association between growth and the quality of environment however, they could not find the evidence for EKC hypothesis. Similarly, Richmond & Kaufmann (2006) and Omisakin & Olusegun (2009) explore the growth-environment nexus in 36 countries of South Africa, and findings reveal that there is no relationship between the variables. Many researchers provide the reasons regarding why EKC hypothesis not holding true because it rightly made assumption that growth hinder the sustainability however, a specified level of growth is not enough to offset the adverse impacts of emissions on environment (Bandyopadhyay & Rej, 2021).

On the contrary many researches such as (Alam et al., 2012; Govindaraju & Tang 2013; Katrakilidis et al., 2016) found that the EKC hypothesis holds true, with a rapid economic growth the environmental quality is getting better in Greece, India, Bangladesh, and China. K. Ahmed & Long (2012) and M. U. Rehman & Rashid (2017) pointed out that GDP growth brings betterment in term of environmental quality. The economic growth leads towards lower level of carbon emissions in China (Jalil & Mahmud 2009; He & Lin 2019; Zhu et al. 2019). Adu & Denkyirah (2017) investigate the relationship in West Africa and find that in short-run the economic growth harm the environment but in the long-run the relationship does not exist. The economic growth deteriorates the environment through the creation of carbon emissions in Qatar (Mrabet & Alsamara, 2017).

2.2 Environmental Deterioration, Growth, and Foreign Direct Investment

While various researchers have examined the complex relationship between environmental degradation, FDI, and Growth their outcomes remain uncertain. Additionally, some studies argue for the legitimacy of the pollution haven concept, while others assert the pollution halo idea's validity. This variation in outcomes could be explained by the selection of economies for research, the variables utilized for quality of environment and FDI, the data sources, and the sophistication of econometric techniques (Letchumanan & Kodama, 2000).

Numerous experts believe that, in addition to economic expansion, FDI inflows exhibit negative effects on environment. Panayotou (2016) investigated the association between carbon emissions and GDP; results suggested a direct correlation between GDP growth and environmental degradation. Arcelus & Arocena (2005) examined the relationship between GDP, economic consumption, and carbon emissions using the time series data from 1973 to 2008. The findings show a unidirectional causality flowing from GDP and Carbon emission to growth in the longer term. Nasir et al. (2019) explore the relationship between carbon emissions, growth and FDI in 5 ASEAN countries, the findings suggests that both growth and FDI deteriorating the quality of environment. Consequently, the position of FDI has become contentious and controversial. It is argued that economic growth is stimulated by FDI but not free from negative externalities of the environment (Shahbaz et al., 2015). Through less strict environmental control, weakened environmental apprehensions by developing nations created situations that motivated multinationals to invest in developing countries to increase their production by relaxed environmental policies (Cole & Elliott, 2003). This situation allows multinationals to benefit immensely from decreased production costs; nevertheless, weaker environmental laws and cheaper production costs may result in environmental destruction in the host nation.

FDI contributes to the host economy by enhancing economic growth (Alfaro et al., 2010). FDI fills the gap between domestic savings and targeted investment (Ndikumana & Verick, 2008). FDI also increases economic growth by providing direct access to capital, creating positive externalities, shifting innovative technology, and increasing efficiency benefits (Lee et al. 2013; Shahbaz et al., 2015). FDI delivers innovative and energy-efficient technology and operates under best management practices that improve the host country's environmental quality. International investors who employ technologically advanced equipment can minimize energy consumption and sustain the environment. Conversely, due to energy-intensive equipment and larger emission production, FDI degrades environmental quality. This mismatch in empirical evidence on the FDI-emissions linkage provides a foundation for re-examining the FDI, carbon emissions relationship with growth.

2.3 Hypotheses Development

H1: There is a positive and significant relationship between FDI and Gross Domestic Product in Pakistan

H2: Foreign Direct Investment (FDI) sustains a significantly positive relationship with Carbon Emissions in Pakistan

H3: Fixed Capital Accumulation (FCA) sustains a significantly positive relationship with Gross Domestic Product and with Carbon Emissions

3. Methodology

3.1 Data

Annual time series data **from 1970 to 2020** were used in the given research. The link between Pakistan's Gross Domestic Product, Foreign Direct Investment, Carbon Emissions, and Gross Fixed Capital Formation was investigated in this study. The data was gathered from World Bank indicators. The data on gross domestic product is in real form by using constant prices (2015) to account for the inflationary impact. Similar to GDP, the fixed capital accumulation is also in real form; Carbon emissions are measured in million kilotons. Furthermore, All the data are converted into logarithm forms in order to avoid the problem of skewness and reduce the magnitude of variation since there is usually a problem of large variation when dealing with GDP data.

Table 1: Model Description and Specification

Variables	Abbreviated By	Unit of Variable	Sources
Dependent Variable Gross Domestic Product	GDP	Constant (2015) US Dollars	World Bank
Independent Variables Carbon Emissions	CO_2	Million kilotons	World Bank
Foreign Direct Investment	FDI	Current US Dollars	World Bank
Fixed Capital Accumulation	FCA	Constant (2015) US Dollars	World Bank

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev	Standard Error	Min	Max
CO_2	11.65	0.35	0.06	10.99	26.51
FDI	19.40	2.02	0.29	13.82	22.44
FCA	23.73	0.54	0.08	22.75	24.61
GDP	25.43	0.69	0.10	24.26	26.51
N	50				

The current study examines the link between explanatory and exploratory variables using time series data from 1970 to 2020. The Augmented-Dickey Fuller (ADF) test is used to examine the data's stationary. The concept was endorsed by (Dickey & Fuller, 1979) for working on a non-stationarity test. The co-integration equation would then be approximated using a test created by (Johansen & Juselius, 1990), known as the Johansen Juselius co-integration test.

The following equations is measured to estimate the relationship between variables:

$$LGDP_t = \beta_0 + \beta_1 LCO2t + \beta_2 LFDIt + \beta_3 LFCAt + \varepsilon_t \dots\dots\dots\text{Model 1}$$
$$CO_{2t} = \beta_0 + \beta_1 LFDIt + \beta_2 LFCAt + \varepsilon_t \dots\dots\dots\text{Model 2}$$

3.2 Results and Discussion

3.2.1 Model 1

The statistical findings of the analysis are further divided into tests of stationarity of variables and coefficient estimations of short as well as long run.

3.2.2 Unit Root Test

The first step is to employ the ADF test to check whether the variables have unit root or not. The test result is given in table 3 which indicates that at level $I(0)$, time series data is non-stationary. The rejection of null hypothesis in order to make variables stationary at 1% level of significance; GDP, CO_2, FDI & FCA become stationary at level $I(1)$ which specifies the deterministic trend.

Table 3: Results of Augmented Dickey-Fuller Test (ADF)

Variables	t-Statistics	Probability	Conclusion
LGDP	-4.852646**	0.0000	I (1)
LCO_2	-5.523411**	0.0100	I (1)
LFDI	-6.372233**	0.000	I (1)
LFCA	-5.228289**	0.0000	I (1)

Source: Estimated by author using EViews

Since all the variables are integrated at same order, this implies that the long-run equilibrium relationship exist between these variables. Thus, the co-integration equation measured in the following table.

3.2.3 Unrestricted Co-Integration Rank Test & Lag Selection

Johansen & Juselius (1990) devised one of the most important tests for examining co-integration, which used not only to determine the size and symbols of long-run relationships among variables, but also measures the marginal values for the given equation. The Johansen Juselius co-integration test starts with unrestricted VAR to choose the optimal lag. The selection of lag is based on the Akaike Information Criterion, after determining the appropriate lag, the Johansen cointegration test with (1-p) lag was applied.

Table 4: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.512234	34.91243	32.82345	0.0497
At most 1	0.434678	27.78653	28.59664	0.0771
At most 2	0.283031	15.65324	22.12462	0.4579
At most 3	0.287453	12.75453	13.27890	0.1513
At most 4 *	0.085678	5.564234	4.905623	0.0388

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Source: Estimated by author using EViews

By integrating the Trace Test and Max Eigen Statistics, the Johansen Juselius co-integration test provide evidence for the existence of a long-run relationship between (GDP, FDI, CO2 & FCA). The max-eigen statistics shows there exist one cointegration equation at 5% level of significance.

Table 5: Normalized Co-integrating Coefficients: 1 Co-integrating Equation(s)

LGDP	1.00		
	Coefficients	Standard error	t-statistics
LCO_2	0.136082	0.03674	3.703919
LFDI	1.256742	0.22456	5.596464
LFCA	1.467890	0.21803	6.732513

The findings reveal that all independent variables are positively related to gross domestic product. According to the findings, a 1% rise in carbon emissions results in a 0.13 percent increase in gross domestic product. Besides carbon emissions, the one percent increase in foreign direct investment brought roughly 1.2% percent rise in gross domestic product. The fixed capital accumulation brings 1.4% increase in gross domestic product. The fixed capital accumulation is the major contributor to gross domestic product. Additionally, residual diagnostic tests were used to determine the existence of autocorrelation and heteroskedasticity problems. Serial Correlation LM Test and VEC residual heteroskedasticity tests demonstrate that the autocorrelation and heteroskedasticity problems in the series were non-existent.

Table 6: Serial Correlation LM Tests

Sample: 1970 2020	
Included observations: 48	
Null Hypothesis: no serial correlation at lag order h	
Lag	Prob.
1	0.3385
2	0.3439

Table 7: Heteroskedasticity Tests

No Cross Terms (only levels and squares)	
Sample: 1970 2020	
Included observations: 48	
Joint Test	
Chi Square	Prob
304.2536	0.7824

3.2.4 Granger Causality Test

Lastly, the granger-causality test is employed to look at the direction of causality among variables. The notion of causality was elaborated by (Granger, 1969) and it became most popular in economics and econometrics literature. Granger explained the variable Yt to be caused by other variable Xt if the previous variable can be predicted by past values of Xt. The decision criteria regarding acceptance of the null hypothesis (accept Ho if the p-value is greater than the level of significance) if not then reject the null hypothesis which means there is a causal relationship between variables (since the p-value is less than the level of significance).

Table 8: Granger-Causality Test

Variables	F-Test	P-value
$L(CO_2) \rightarrow L(GDP)$	5.89	0.02*
$L(GDP) \rightarrow L(CO_2)$	1.85	0.16
$L(FDI) \rightarrow L(GDP)$	1.92	0.19
$L(GDP) \rightarrow L(FDI)$	5.90	0.01*
$L(FCA) \rightarrow L(GDP)$	2.68	0.22
$L(GDP) \rightarrow L(FCA)$	3.67	0.01*
$L(FDI) \rightarrow L(CO_2)$	4.78	0.04*
$L(CO_2) \rightarrow L(FDI)$	2.15	0.23

Note: Causality between L(GDP), L(CO2), L(FDI) & L(FCA) of Pakistan from 1970 to 2020

* indicates the rejection of null hypothesis at 5% significance level

The result indicates that FDI and FCA do not granger GDP in the case of Pakistan and the result is consistent with (Attari et al., 2011), in the case of GDP, it does granger FDI and FCA which shows that there is a uni-directional relationship between GDP and FDI; GDP and CO2; consistent with (Faruku et al., 2011; Attari et al., 2011). Wang (2018) explained that in developing nation the carbon emission granger the GDP and there is a one-way causal link between GDP and CO2. Moreover, there is a uni-direction causality between GDP and FCA in Pakistan consistent with (Zahir et al., 2020).

Model 2: Ordinary Least Square

Dependent Variable: LCO_2 Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.322713	3.428511	0.385798	0.7042
LFDI	0.402027	0.094673	4.246471	0.0934
LFCA	0.542202	0.067431	8.040795	0.0000
R-squared	0.988284	Mean dependent var		13.54385
Adjusted R-squared	0.984379	S.D. dependent var		0.443995
S.E. of regression	0.055492	Akaike info criterion		-2.713646
Sum squared resid	0.055429	Schwarz criterion		-2.372361
Log likelihood	40.92058	Hannan-Quinn criter		-2.618988
F-statistic	253.0646	Durbin-Watson stat		1.889079
Prob (F-statistic)	0.000000			

3.2.5 Model 2

The second model was estimated using a different method—ordinary least squares estimation—to compare it to other studies that used OLS estimates, allowing our study to give a comparison and propose policy recommendations. The findings suggested that fixed capital accumulation positively and significantly correlated with carbon emissions. On the contrary, foreign direct investment is also positively correlated with carbon emissions but was statistically significant at the 10% significance level. Pakistan has long been known as the most afflicted and polluted country due to its high air pollution level (Kalim, 2001). According to the Climate Risk Index Study (Eckstein et al., 2017) Pakistan is probably the most harmed nation by climate change in recent years. There could be some other factors behind this the FDI alone is not responsible for the whole carbon emission in Pakistan since the significance of relationship is at 10%.

4. Conclusion

Findings suggested that Carbon emissions, foreign direct investmen kistan's gross domestic product. This imply that emission and foreign direct investment brings

prosperity in term of economic growth. Foreign direct investment sustained a positive significant relationship with carbon emissions at 10%, which indicates that along with prosperity FDI poses some serious challenges to the environment in term of emission and degradation of environmental quality. It is noteworthy that FDI does not granger cause the GDP because of many reasons. Firstly, the impact depends upon the absorptive capacity of human capital and by the extent of spillover effect. Secondly, the level of foreign direct investment (FDI) in Pakistan is low relative to the neighboring countries and even in the South Asian region which results in lower impact on GDP. However, the FDI do contribute in the creation of employment, bringing new technologies and knowledge. Thus, the government should induce lucrative policies to attract the FDI. On the other hand, foreign direct investment is also one of the contributors in the carbon emission in Pakistani economy, henceforth, government need to impose environmental laws and restrictions for foreign investors to safeguard the host economy.

Furthermore, the positive association between fixed capital accumulation and carbon emission indicated that the fixed capital within the country produces a lot of emissions. There is a huge need at the policy level to use better-modified technology and pollution abatement equipment instead of only increasing the low-level fixed capital accumulation. The study's major finding indicated that there is an arising need to alter the energy resources to combat environmental degradation.

5. Policy Recommendations

Being among the most polluted economies, Pakistan needs to review the progress of the environmental policy over the past decades and the measures applied for its implementation. It needs to preview plans and programs for environmental policy to do so. Its re-evaluation is of great importance and needs to be improved and expanded. This research proposes a comprehensive and inclusive policy recommendation for reducing CO2 emissions, which results in improved human capital accumulation and productivity. The government must impose environmentally sound restriction to safeguard the host economy. FDI brings newer and eco-efficient technologies to the host country however, due to less stringent environmental policies, the developing nations did not reap the true essence from FDI. Thus, Pakistan needs to impose strict rules for the foreign investors. FDI should not be considered as an end per se rather it should be considered as a way

to support other initiatives of development so the nation can get benefit from the spillover effect

Limitations of the Study

Data accessibility is a public good (Varian, 1992), and like other public goods, it is immensely intricate. If data availability were a straightforward issue, it would have been addressed long ago. The current study uses time-series data from 1970 to 2020 and encountered many challenges regarding data availability. The present study intended to investigate the impact of foreign direct investment (FDI) on economic growth and carbon emissions. It hypothesized that FDI works in both directions brings prosperity (growth) and poses severe challenges to the environment. Thus, FDI had a positive and significant association with carbon emissions in the Pakistani context at 10% level of significance.

According to the literature, the pollution halo theory asserts that FDI incorporating innovative and energy-efficient technology and operating under best management practices improves the host country's environmental quality. So, it became crucial to examine the fact that if FDI comes with better technology and pollution abatement equipment, does it contribute to reducing the level of emission in Pakistan or not. However, the author was unable to obtain data for these factors (Fixed capital accumulation based on technology) for such a long span; moreover, the data collection is not yet started on such sophisticated variables in Pakistan.

Another vital variable that could be helpful to understand the overall situation of Pakistan might be the province wise data on carbon emission. It would be beneficial to get the data regarding problematic locations with a higher emission volume; however, the sincere efforts to obtain the data went into the vein. To summarize, the issues listed above are the study's shortcomings, which can address in the future with the availability of larger data sets on fixed capital accumulation based on technology and province-level statistics on carbon emissions.

References

Adu, D. T., & Denkyirah, E. K. (2017). *Economic growth and environmental pollution in West Africa: Testing the Environmental Kuznets Curve hypothesis*.

Ahmad, M., Jiang, P., Murshed, M., Shehzad, K., Akram, R., Cui, L., & Khan, Z. (2021). Modelling the dynamic linkages between eco-innovation, urbanization, economic growth and ecological footprints for G7 countries: does financial globalization matter? *Sustainable Cities and Society*, *70*, 102881.

Ahmed, K., & Long, W. (2012). Environmental Kuznets curve and Pakistan: an empirical analysis. *Procedia Economics and Finance*, *1*, 4-13.

Ahmed, Z., Zafar, M. W., & Mansoor, S. (2020). Analyzing the linkage between military spending, economic growth, and ecological footprint in Pakistan: evidence from cointegration and bootstrap causality. *Environmental Science and Pollution Research*, *27*(33), 41551-41567.

Alam, M. J., Begum, I. A., Buysse, J., & Van Huylenbroeck, G. (2012). Energy consumption, carbon emissions and economic growth nexus in Bangladesh: Cointegration and dynamic causality analysis. *Energy Policy*, *45*, 217-225.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2010). Does foreign direct investment promote growth? Exploring the role of financial markets on linkages. *Journal of Development Economics*, *91*(2), 242-256.

Arcelus, F. J., & Arocena, P. (2005). Productivity differences across OECD countries in the presence of environmental constraints. *Journal of the Operational Research Society*, *56*(12), 1352-1362.

Attari, M. I. J., Kamal, Y., & Attaria, S. N. (2011). The causal link between foreign direct investment (FDI) and economic growth in Pakistan economy. *The Journal of Commerce*, *3*(4), 61.

Bandyopadhyay, A., & Rej, S. (2021). Can nuclear energy fuel an environmentally sustainable economic growth? Revisiting the EKC hypothesis for India. *Environmental Science and Pollution Research*, *28*(44), 63065-63086.

Banerjee, S., & Murshed, M. (2020). Do emissions implied in net export validate the pollution haven conjecture? Analysis of G7 and BRICS countries. *International Journal of Sustainable Economy*, *12*(3), 297-319.

Boyd, G. A., & McClelland, J. D. (1999). The impact of environmental constraints on productivity improvement in integrated paper plants. *Journal of Environmental Economics and Management*, *38*(2), 121-142.

Cole, M. A., & Elliott, R. J. R. (2003). Determining the trade–environment composition effect: the role of capital, labor and environmental regulations. *Journal of Environmental Economics and Management*, *46*(3), 363-383.

Copeland, B. R., & Taylor, M. S. (1994). North-South trade and the environment. *The Quarterly Journal of Economics*, *109*(3), 755-787.

Desbordes, R. (2010). Global and diplomatic political risks and foreign direct investment. *Economics & Politics*, *22*(1), 92-125.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, *74*(366a), 427-431.

Eckstein, D., Künzel, V., & Schäfer, L. (2017). Global climate risk index 2018. *Germanwatch, Bonn*.

Faruku, A. Z., Asare, B. K., Yakubu, M., & Shehu, L. (2011). Causality analysis of the impact of foreign direct investment on GDP in Nigeria. *Nigerian Journal of Basic and Applied Sciences*, *19*(1).

Govindaraju, V. G. R. C., & Tang, C. F. (2013). The dynamic links between CO2 emissions, economic growth and coal consumption in China and India. *Applied Energy*, *104*, 310-318.

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: Journal of the Econometric Society*, 424-438.

Grossman, G. M., & Krueger, A. B. (1991). *Environmental impacts of a North American free trade agreement*. National Bureau of economic research Cambridge, Mass., USA.

He, Y., & Lin, B. (2019). Investigating environmental Kuznets curve from an energy intensity perspective: empirical evidence from China. *Journal of Cleaner Production*, *234*, 1013-1022.

Husain, I. (2009). The role of politics in Pakistan's Economy. *Journal of International Affairs*, *63*(1), 1-18.

Jalil, A., & Mahmud, S. F. (2009). Environment Kuznets curve for CO2 emissions: a cointegration analysis for China. *Energy Policy*, *37*(12), 5167-5172.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with appucations to the demand for money. *Oxford Bulletin of Economics and Statistics*, *52*(2), 169-210.

Jorgenson, D. W., & Wilcoxen, P. J. (1990). Environmental regulation and US economic growth. *The Rand Journal of Economics*, 314-340.

Jorgenson, D. W., & Wilcoxen, P. J. (2018). Environmental regulation and US economic growth. In *Economic Costs and Consequences of Environmental Regulation* (pp. 225-252). Taylor and Francis.

Kalim, R. (2001). Capital intensity in the large-scale manufacturing of Pakistan. *Pakistan Economic and Social Review*, 135-151.

Katrakilidis, C., Kyritsis, I., & Patsika, V. (2016). The dynamic linkages between economic growth, environmental quality and health in Greece. *Applied Economics Letters*, *23*(3), 217-221.

Khan, A., & Kim, Y.-H. (1999). *Foreign direct investment in Pakistan: policy issues and operational implications*.

Lee, J., Lapira, E., Bagheri, B., & Kao, H. (2013). Recent advances and trends in predictive manufacturing systems in big data environment. *Manufacturing Letters*, *1*(1), 38-41.

Letchumanan, R., & Kodama, F. (2000). Reconciling the conflict between thepollution-haven'hypothesis and an emerging trajectory of international technology transfer. *Research Policy*, *29*(1), 59-79.

Li, J., Hu, Z., Shi, V., & Wang, Q. (2021). Manufacturer's encroachment strategy with substitutable green products. *International Journal of Production Economics*, *235*, 108102.

Liu, Jingkuang, Yi, Y., & Wang, X. (2020). Exploring factors influencing construction waste reduction: a structural equation modeling approach. *Journal of Cleaner Production*, *276*, 123185.

Liu, Jinyu, Murshed, M., Chen, F., Shahbaz, M., Kirikkaleli, D., & Khan, Z. (2021). An empirical analysis of the household consumption-induced carbon emissions in China. *Sustainable Production and Consumption*, *26*, 943-957.

Maxwell, J. W. (1996). What to do when win-win won't work: Environmental strategies for costly regulation. *Business Horizons*, *39*(5), 60-64.

Mikayilov, J. I., Galeotti, M., & Hasanov, F. J. (2018). The impact of economic growth on CO2 emissions in Azerbaijan. *Journal of Cleaner Production*, *197*, 1558-1572.

Mrabet, Z., & Alsamara, M. (2017). Testing the Kuznets Curve hypothesis for Qatar: A comparison between carbon dioxide and ecological footprint. *Renewable and Sustainable Energy Reviews*, *70*, 1366-1375.

Murshed, M. (2020). An empirical analysis of the non-linear impacts of ICT-trade openness on renewable energy transition, energy efficiency, clean cooking fuel access and environmental sustainability in South Asia. *Environmental Science and Pollution Research*, *27*(29), 36254-36281.

Murshed, M., Ali, S. R., & Banerjee, S. (2021). Consumption of liquefied petroleum gas and the EKC hypothesis in South Asia: evidence from cross-sectionally dependent heterogeneous panel data with structural breaks. *Energy, Ecology and Environment*, *6*(4), 353-377.

Murshed, M., Elheddad, M., Ahmed, R., Bassim, M., & Than, E. T. (2021). Foreign direct investments, renewable electricity output, and ecological footprints: do financial globalization facilitate renewable energy transition and environmental welfare in Bangladesh? *Asia-Pacific Financial Markets*, 1-46.

Murshed, M., Haseeb, M., & Alam, M. (2021). The Environmental Kuznets Curve hypothesis for carbon and ecological footprints in South Asia: the role of renewable energy. *GeoJournal*, 1-28.

Murshed, M., Rahman, M., Alam, M. S., Ahmad, P., & Dagar, V. (2021). The nexus between environmental regulations, economic growth, and environmental sustainability: linking environmental patents to ecological footprint reduction in South Asia. *Environmental Science and Pollution Research*, *28*(36), 49967-49988.

Musatti, A., Ficara, E., Mapelli, C., Sambusiti, C., & Rollini, M. (2017). Use of solid digestate for lignocellulolytic enzymes production through submerged fungal fermentation. *Journal of Environmental Management*, *199*, 1-6.

Nasir, M. A., Huynh, T. L. D., & Tram, H. T. X. (2019). Role of financial development, economic growth & foreign direct investment in driving climate change: A case of emerging ASEAN. *Journal of Environmental Management*, *242*, 131-141.

Nathaniel, S. P., Murshed, M., & Bassim, M. (2021). The nexus between economic growth, energy use, international trade and ecological footprints: the role of environmental regulations in N11 countries. *Energy, Ecology and Environment*, *6*(6), 496-512.

Ndikumana, L., & Verick, S. (2008). The linkages between FDI and domestic investment: Unravelling the developmental impact of foreign investment in Sub-Saharan Africa. *Development Policy Review*, *26*(6), 713-726.

Omisakin, D., & Olusegun, A. (2009). Economic growth and environmental quality in Nigeria: does environmental Kuznets curve hypothesis hold? *Environmental Research Journal*, *3*(1), 14-18.

Panayotou, T. (2016). Economic growth and the environment. *The Environment in Anthropology*, *24*, 140-148.

Peng, X., Liu, Z., & Jiang, D. (2021). A review of multiphase energy conversion in wind power generation. *Renewable and Sustainable Energy Reviews*, *147*, 111172.

Rehman, A., Ulucak, R., Murshed, M., Ma, H., & Isik, C. (2021). An asymmetric analysis of the impacts of forests, livestock and economic progress on CO2 emissions in China. *J Environ Manag*, *294*, 113059.

Rehman, M. U., & Rashid, M. (2017). Energy consumption to environmental degradation, the growth appetite in SAARC nations. *Renewable Energy*, *111*, 284-294.

Richmond, A. K., & Kaufmann, R. K. (2006). Is there a turning point in the relationship between income and energy use and/or carbon emissions? *Ecological Economics*, *56*(2), 176-189.

Shahbaz, M., Nasreen, S., Abbas, F., & Anis, O. (2015). Does foreign direct investment impede environmental quality in high-, middle-, and low-income countries? *Energy Economics*, *51*, 275-287.

Tahvonen, O., & Kuuluvainen, J. (1993). Economic growth, pollution, and renewable resources. *Journal of Environmental Economics and Management*, *24*(2), 101-118.

Varian, H. R. (1992). *Microeconomic analysis* (Issue 338.5 V299m 1992). WW Norton.

Wang, M. (2018). A Granger causality analysis between the GDP and CO2 emissions of major emitters and implications for international climate governance. *Chinese Journal of Urban and Environmental Studies*, *6*(01), 1850004.

Wu, B., Jin, C., Monfort, A., & Hua, D. (2021). Generous charity to preserve green image? Exploring linkage between strategic donations and environmental misconduct. *Journal of Business Research*, *131*, 839-850.

Xue, L., Haseeb, M., Mahmood, H., Alkhateeb, T. T. Y., & Murshed, M. (2021). Renewable energy use and ecological footprints mitigation: evidence from selected South Asian economies. *Sustainability*, *13*(4), 1613.

Yu, B. (2021). Urban spatial structure and total-factor energy efficiency in Chinese provinces. *Ecological Indicators*, *126*, 107662.

Zahir, S., Hayat, K., & Haider, A. (2020). The Causality between Gross Fixed Capital Formation, Trade Deficit, Exchange Rate, and the Economic Growth of Pakistan. *International Review of Management and Business Research*, *09*(04), 138-147. https://irmbrjournal.com/papers/1607856111.pdf

Zambrano-Monserrate, M. A., Silva-Zambrano, C. A., Davalos-Penafiel, J. L., Zambrano-Monserrate, A., & Ruano, M. A. (2018). Testing environmental Kuznets curve hypothesis in Peru: The role of renewable electricity, petroleum and dry natural gas. *Renewable and Sustainable Energy Reviews*, *82*, 4170-4178.

Zeraibi, A., Balsalobre-Lorente, D., & Murshed, M. (2021). The influences of renewable electricity generation, technological innovation, financial development, and economic growth on ecological footprints in ASEAN-5 countries. *Environmental Science and Pollution Research*, *28*(37), 51003-51021.

Zhao, X., Gu, B., Gao, F., & Chen, S. (2020). Matching model of energy supply and demand of the integrated energy system in coastal areas. *Journal of Coastal Research*, *103*(SI), 983-989.

Zhu, L., Hao, Y., Lu, Z.-N., Wu, H., & Ran, Q. (2019). Do economic activities cause air pollution? Evidence from China's major cities. *Sustainable Cities and Society*, *49*, 101593.

Zahir, S., Hayat, K., & Haider, A. (2020). The Causality between Gross Fixed Capital Formation, Trade Deficit, Exchange Rate, and the Economic Growth of Pakistan. *International Review of Management and Business Research*, *09*(04), 138-147. https://irmbrjournal.com/papers/1607856111.pdf

Testing the Ratio of the Coefficients of Variation for the Inverse Gamma Distributions with an Application to Rainfall Dispersion in Thailand

Wararit Panichkitkosolkul*

Abstract

In Thailand, droughts are regular natural disasters that happen nearly every year due to several factors such as precipitation deficiency, human activity, and global warming. Since annual rainfall amounts fit an inverse gamma (IG) distribution, we consider testing annual rainfall dispersion via the ratio of the coefficients of variation (CVs). Herein, we present three statistics for testing the ratio of the CVs of the IG distributions based on the fiducial quantities (FQ) and the Bayesian methods by the Jeffreys and uniform priors. We evaluated their performances by using Monte Carlo simulations conducted under several shape parameter values for the IG distributions based on empirical type I error rates and powers of the tests. The simulation results reveal that the empirical type I error rates of all test statistics were close to the nominal significance level of 0.05 for all situations. In the case of the power of the test, the test statistics based on the Bayesian method by the Jeffreys prior performed better than other test statistics for equal sample sizes. In case of unequal sample sizes, the test statistics based on the Bayesian method by the Jeffreys and uniform priors performed well which based on the hypothesized values of ratio of the CVs. Furthermore, the efficacies of the proposed test statistics were illustrated by applying them to annual rainfall dispersion in Buriram and Chaiyaphum ,Thailand.

Keywords: Statistical Test, Measure of Dispersion, Skew Distribution, Simulation, Meteorology

* Department of Mathematics and Statistics, Faculty of Science and Technology, Thammasat University 99 Moo 18 Paholyothin Road, Khlong Nueng, Khlong Luang, Pathumthani 12120, THAILAND.
  E-mail: wararit@mathstat.sci.tu.ac.th

การทดสอบอัตราส่วนของสัมประสิทธิ์การแปรผัน
ของการแจกแจงแกมมาผกผันกับการประยุกต์ใช้
กับการกระจายของปริมาณน้ำฝนในประเทศไทย

วราฤทธิ์ พานิชกิจโกศลกุล*

บทคัดย่อ

ความแห้งแล้งเป็นภัยธรรมชาติที่เกิดขึ้นเกือบทุกปีของประเทศไทย เนื่องจากปัจจัยหลาย
ประการ เช่น การขาดแคลนน้ำฝน กิจกรรมของมนุษย์ และภาวะโลกร้อน ผู้วิจัยสนใจการทดสอบ
การกระจายของปริมาณน้ำฝนรายปีโดยพิจารณาจากอัตราส่วนของสัมประสิทธิ์การแปรผัน
เนื่องจากปริมาณน้ำฝนรายปีมีการแจกแจงแกมมาผกผัน ในงานวิจัยนี้ได้ใช้ตัวสถิติทดสอบ 3 ตัว เพื่อทดสอบ
อัตราส่วนของสัมประสิทธิ์การแปรผันของการแจกแจงแกมมาผกผัน โดยอิง Fiducial quantities (FQ)
วิธีของเบส์โดยใช้การแจกแจงก่อน Jeffreys และวิธีของเบส์โดยใช้การแจกแจงก่อนเอกรูป สำหรับ
การประเมินประสิทธิภาพของตัวสถิติทดสอบจะใช้การจำลองแบบมอนติคาร์โล โดยจำลองข้อมูล
ให้มีการแจกแจงแกมมาผกผันภายใต้พารามิเตอร์บ่งรูปร่างหลายค่า และพิจารณาอัตราความผิดพลาด
ประเภทที่ 1 เชิงประจักษ์ และกำลังการทดสอบเชิงประจักษ์ ผลการจำลองแสดงให้เห็นว่าอัตรา
ความผิดพลาดประเภทที่ 1 เชิงประจักษ์ของตัวสถิติทดสอบทุกตัวมีค่าเข้าใกล้ระดับนัยสำคัญ 0.05
ในทุกสถานการณ์ เมื่อพิจารณากำลังการทดสอบเชิงประจักษ์ ตัวสถิติทดสอบอิงวิธีของเบส์โดยใช้
การแจกแจงก่อน Jeffreys ให้กำลังการทดสอบเชิงประจักษ์มากกว่ากำลังการทดสอบเชิงประจักษ์ของ
ตัวสถิติอื่น ๆ ในกรณีที่ขนาดตัวอย่างเท่ากัน ส่วนในกรณีที่ขนาดตัวอย่างไม่เท่ากัน ตัวสถิติทดสอบ
อิงวิธีของเบส์โดยใช้การแจกแจงก่อน Jeffreys และการแจกแจงก่อนเอกรูป มีประสิทธิภาพดีซึ่ง
ขึ้นอยู่กับค่าอัตราส่วนของสัมประสิทธิ์การแปรผันที่ทำการทดสอบ นอกจากนั้น ประสิทธิภาพของ
ตัวสถิติทดสอบที่นำเสนอได้แสดงให้เห็นโดยนำไปประยุกต์ใช้กับการกระจายของปริมาณน้ำฝนรายปี
ในจังหวัดบุรีรัมย์และชัยภูมิ

คำสำคัญ : การทดสอบเชิงสถิติ ค่าวัดการกระจาย การแจกแจงเบ้ การจำลอง อุตุนิยมวิทยา

* สาขาวิชาคณิตศาสตร์และสถิติ คณะวิทยาศาสตร์และเทคโนโลยี มหาวิทยาลัยธรรมศาสตร์
  เลขที่ 99 หมู่ 18 ถนนพหลโยธิน ตำบลคลองหนึ่ง อำเภอคลองหลวง จังหวัดปทุมธานี 12120
  อีเมล : wararit@mathstat.sci.tu.ac.th

Introduction

Since damage from natural disasters has increased due to anomalous global climate changes, researchers have become interested in studying their occurrences. Thailand has been divided into six geographical regions by the National Research Council: north, northeast, central, east, west, and south; many of them are prone to droughts but they most often occur in the central northeastern part of Thailand. Drought in Thailand directly affects agriculture and water resources, which has a significant impact on the country's economy since most of the country is agrarian.

Buriram and Chaiyaphum, two provinces of the northeastern in Thailand, are faced with drought every year due to long periods of little rain causing a severe shortage of water for both consumption and farming (Srichaiwong et al., 2020). In June 2015, Farmers in Buriram pleaded for government assistance as more than 50% of their farmlands were attacked by the worst drought in 50 years (Pattayamail, 2022a). Moreover, in July 2019, parts of Chaiyaphum were faced with a severe drought, and the water volume in the Chulabhorn Dam decreased to its lowest level in 30 years (only 25% of its capacity) (Pattayamail, 2022b). Additionally, in January 2020, eight hospitals in Chaiyaphum were impacted by the drought, leading to the Chaiyaphum Provincial Public Health Office drilling artesian wells to reserve water for medical services and sufficient staff consumption for at least three days while also requesting citizens to help by saving water (Nationthailand, 2022).

Whenever there are long periods of rainfall deficiency for one season or more, droughts take place (Eartheclipse, 2022). The coefficient of variation (CV) can be applied to explain rainfall dispersion in different regions since the rainfall amount varies vastly depending on the region and season. The CV is a unit-free statistical measure of variability relative to the population mean (Albatineh et al., 2017). The standard formula for the CV is expressed as $\theta = \sigma / \mu,\ \mu \neq 0$ where σ and μ represent the population standard deviation and population mean, respectively. The CV is a useful statistic for comparison in two or more data sets with different units. The estimation of the CV has been extensively used in several fields of science, medicine, engineering, business, economics and others (see Nairy and Rao, 2003). For example, Faber and Korn (1991) discussed the usage of the CV method for analyzing synaptic plasticity. The CV were used to measure the spatial

and temporal correlation of global solar radiation (Calif and Soubdhan, 2016). Reed et al. (2002) applied the CV for assessing the variability of quantitative assays. The CV were applied to index relative internal variability of work groups on numerous dimensions (Bedeian and Mossholder, 2000). The CV for monitoring variability in statistical process control was discussed by Kang et al. (2007). Castagliola et al. (2011) developed a new approach to monitor the CV by two one-sided exponentially weighted moving average charts of the CV squared. The methodology for adjusting the standard CV to account for the systematic dependence of population variance from the population mean was discussed by Döring and Reckling (2018).

In probability and statistics, the inverse gamma (IG) distribution is a two-parameter continuous distribution on the positive real line. It is the distribution of the reciprocal of a random variable distributed according to the gamma distribution (Abid and Al-Hassany, 2016). The IG distribution is most often used as a conjugate prior distribution in Bayesian statistics. There are several research works to study the distribution of the IG. For example, IG distribution is used as the prior distributions for variance parameters in hierarchical models (Gelman, 2006). Abid and Al-Hassany (2016) studied some points related to the IG distribution. The estimation methods based on the method of moments, maximum likelihood, and Bayesian methodology to estimate the parameters of an IG distribution were discussed by Llera and Beckmann (2016). Glen and Leemis (2017) applied the IG distribution to survival studies.

The review literature on testing the ratio of the CVs for the IG distributions is limited. However, there are several approaches available for calculating the confidence intervals for the CV and the ratio of the CVs of the IG distributions. Three confidence intervals for the CV of the IG distribution using the Score method, the Wald method and the percentile bootstrap confidence interval were presented by Kaewprasert et al. (2020). Later, Kaewprasert et al. (2023) proposed four confidence intervals for the ratio of the CVs of the IG distributions using the percentile bootstrap, fiducial quantities (FQs), and the Bayesian methods by the Jeffreys and uniform priors. We can applied these confidence intervals for the ratio of the CVs to test the statistical hypothesis for the ratio of the CVs.

The main objective of this paper is to propose the statistical methods for testing the ratio of the CVs for the IG distributions by using the interval estimation for the ratio

of the CVs. Three confidence intervals for the ratio of the CVs are considered in order to test the ratio of the CVs: the FQ confidence interval and the Bayesian methods by the Jeffreys and uniform priors. The performance of these statistical methods was conducted by simulation study. By considering the simulation results, statistical methods with high power of a test that attained a nominal significance level are recommended for user.

The structure of this paper is as follows. The point estimation of parameters in an IG distribution are reviewed in the second section. In the third section, we present the methods for testing the ratio of the CVs of the IG distributions. The simulation study and results are discussed in the fourth section. The fifth section shows the application of the proposed statistical tests to the annual rainfall amounts in Buriram and Chaiyaphum, Thailand. Discussion and conclusions are presented in the final section.

Point Estimation of Parameters in an Inverse Gamma Distribution

The point estimation for parameters of an IG distribution is explained in this section. Let $X_1,...,X_n$ be a random sample from the IG distribution with the shape parameter σ and scale parameter β The probability density function of X is given by

$$f(x;\alpha,\beta) = \frac{\beta^\alpha}{\Gamma(\alpha)} x^{-\alpha-1} \exp\left(-\frac{\beta}{x}\right), \quad x > 0, \ \alpha > 0, \ \beta > 0.$$

The population mean $E(X)$ $\beta = /(\alpha - 1)$ for $\alpha > 1$ population variance $Var(X) = \beta^2/ \left[(\alpha - 1)^2 (\alpha - 2)\right]$ for $\alpha > 2$ and the CV, $\tau = 1/\sqrt{\alpha - 2}$.

Suppose that $X_{ij} = (X_{i1},...,X_{in}); \ i = 1,2, \ j = 1,2,...n_i$ is a vector of random samples from an IG distribution denoted as $X_{ij} = IG\,(\sigma_i, \beta_i)$ The CV of X_{ij} is $\tau_i = 1/\sqrt{\alpha_i - 2}$, and the ratio of the CVs and X_{ij} are independent, which can be shown as follows:

$$\theta = \frac{\tau_1}{\tau_2} = \frac{\sqrt{\alpha_2 - 2}}{\sqrt{\alpha_1 - 2}}. \tag{1}$$

The log-likelihood function can be expressed as

$$\ln L(\alpha_i, \beta_i) = -\sum_{j=1}^{n_i} \frac{\beta_i}{X_{ij}} - (\alpha_i + 1)\sum_{j=1}^{n_i} \ln X_{ij} - n_i \ln \Gamma(\alpha_i) + n_i \alpha_i \ln \beta_i.$$

The maximum likelihood estimators of α_i and β_i are given by

$$\hat{\alpha}_i = \psi^{-1}\left(\ln n\alpha_{i0} - \ln\sum_{j=1}^{n_i}X_{ij}^{-1} - \frac{\sum_{j=1}^{n_i}\ln X_{ij}}{n_i}\right) \tag{2}$$

where $\psi(\cdot)$ is the digamma distribution, and $\alpha_{i0} = \dfrac{u_i^2}{v_i} + 2$ based on the moment of method estimation proposed by Llera and Beckmann (2016) for the shape parameter to initialize α_{i0} in (2); where $v_i = \dfrac{1}{n_i}\sum_{j=1}^{n_i}(x_{ij} - u_i)^2$ and $u_i = \dfrac{1}{n_i}\sum_{j=1}^{n_i}x_{ij}$ are the variance and meancalculated from the observed data $x_{ij} = (x_{i1}, x_{i2,...}, x_{in_i})$ and

$$\hat{\beta}_i = \frac{n_i\hat{\alpha}_i}{\sum_{j=1}^{n_i}X_{ij}^{-1}},$$

respectively.

Statistical Methods for Testing the Coefficient of Variation of the Inverse Gamma Distribution

Let $X_1,...,X_n$ be an independent and identically distributed random sample of size n from the IG distribution with the shape parameter α and scale parameter β. We want to test the ratio of CVs. The null and alternative hypotheses are defined as follows:

$$X_0: \theta = \theta_0 \text{ versus } X_1: \theta \neq \theta_0,$$

where $\theta = \tau_1/\tau_2$ and θ_0 is the hypothesized value of the ratio of CVs. In this section, we discuss three test statistics for the ratio of CVs based on the FQ confidence interval and Bayesian method.

The FQ Confidence Interval

Krishnamoorthy and Wang (2016) obtained a gamma distribution based on cube root-transformed samples and approximated fiducial quantities (FQs). The cube root-transformed samples are approximately normally distributed. Let $G: Gamma\ (\alpha_i, \beta_i)$ with shape parameter α_i and scale parameter $1/\beta_i$. Therefore, $X_i = 1/G_i$ is an IG distribution.

Testing the Ratio of the Coefficients of Variation for the Inverse Gamma Distributions with an Application to Rainfall
Dispersion in Thailand

86

Suppose that $Y_i = G_i^{1/3}$; $i = 1, 2$, then Y_i is an approximately normal distribution (Wilson and Hilferty, 1931). Thus, it is transformed to an IG distribution accordingly. From $Y_i = G_i^{1/3}$ and $X_i = 1/G_i$, then $Y_i = (1/G_i)^{-1/3} = X_i^{-1/3}$ is approximately normal distribution with mean μ_i and variance σ_i^2, denoted as Y_i; $N(\mu_i, \sigma_i^2)$ μ_i and σ_i^2 are respectively expressed as σ_i and β_i (Krishnamoorthy and Wang, 2006; Wilson and Hilferty, 1931):

$$\mu_i = \left(\frac{\alpha_i}{\beta_i}\right)^{1/3}\left(1 - \frac{1}{9\alpha_i}\right) \tag{3}$$

and

$$\sigma_i^2 = \frac{1}{9\alpha_i^{1/3}\beta_i^{2/3}}.$$

Define $\bar{Y}_i = \frac{1}{n_i}\sum_{j=1}^{n_i}Y_{ij}$ and $S_i^2 = \frac{1}{n_i - 1}\sum_{j=1}^{n_i}(Y_{ij} - \bar{Y})^2$. Therefore, the sample mean and variance of Y_i are shown as follows:

$$\bar{Y}_i \stackrel{d}{=} \mu_i + Z_i\frac{\sigma_i}{\sqrt{n_i}},$$

$$S_i^2 \stackrel{d}{=} \sigma_i^2\frac{\chi_{n_i-1}^2}{(n_i - 1)},$$

and

where Z_i and χ_{ni-1}^2 are the standard normal and chi-square distributions, respectively. The FQs of μ_i and σ_i^2 are respectively derived as follows:

$$F_{\mu_i} = \bar{y}_i + \frac{Z_i\sqrt{n_i - 1}}{\sqrt{\chi_{n_i-1}^2}}\frac{s_i}{\sqrt{n_i}}$$

$$F_{\sigma_i^2} = \frac{(n_i - 1)s_i^2}{\chi_{n_i-1}^2},$$

and

where $\bar{y}_i$ and s_i^2 denote the observed values of $\bar{Y}_i$ and S_i^2 respectively. The set of Equation (3) was solved for α_i and β_i Then, we obtain

$$\alpha_i = \frac{1}{9}\left[\left(1 + \frac{\mu_i^2}{2\sigma_i^2}\right) + \left(\left(1 + \frac{\mu_i^2}{2\sigma_i^2}\right)^2 - 1\right)^{1/2}\right]$$

$$\beta_i = \frac{1}{27\alpha_i^{1/2}\left(\sigma_i^2\right)^{3/2}}, \tag{4}$$

and

respectively. Hence, the FQs for α_i are be derived as follows: (Krishnamoorthy and Wang, 2016)

$$F_{\alpha_i} = \frac{1}{9}\left[\left(1 + \frac{F_{\mu_i}^2}{2F_{\sigma_i^2}}\right) + \left(\left(1 + \frac{F_{\mu_i}^2}{2F_{\sigma_i^2}}\right)^2 - 1\right)^{1/2}\right].$$

Subsequently, the FQs for θ is

$$F_\theta = \frac{\sqrt{F_{\alpha_2} - 2}}{\sqrt{F_{\alpha_1} - 2}}.$$

Let γ be the significance level. Therefore, the $(1-\gamma)$ 100% confidence interval for θ by the FQs is given by

$$CI_F = \left[L_F, U_F\right] = \left[F_\theta(\gamma/2), F_\theta(1-(\gamma/2))\right], \tag{5}$$

where $F_\theta(\gamma/2)$ and $F_\theta(1-(\gamma/2))$ are the $100(\gamma/2)^{th}$ and $100(1-(\gamma/2))^{th}$ percentiles of the distribution of F_θ respectively. The algorithm for constructing the FQ confidence interval is as follows:

Algorithm 1

Step 1. Generate x_{ij} from $IG(\alpha_i, \beta_i), i = 1,2, j = 1,...,n_i$

Step 2. Calculate $y_{ij} = x_{ij}^{-1/3}$

Step 3. Generate Z_i and $\chi_{n_i-1}^2$

Step 4. Compute $F_{\mu_i}, F_{\alpha_i^2}, F_{\alpha_i}$ and F_θ

Step 5. Repeat Steps 3-4. 5,000 times

Step 6. Compute $(1-\gamma)100\%$ confidence interval for θ by using Equation (5).

Therefore, the null hypothesis, $H_0 : \theta = \theta_0$ will be rejected if

$$\theta_0 < F_\theta(\gamma/2) \text{ or } \theta_0 > F_\theta(1-\gamma/2).$$

The Bayesian methods

We consider a Bayesian posterior density function

$$\pi(\theta/y_i) \propto L(\theta, y_i)\pi(\theta),$$

where $L(\theta, y_i)$ is the likelihood function and $\pi(\theta)$ is the prior. Assume that $Y_i = X_i^{-1/3}$ has a normal distribution, then the likelihood function of Y_i is defined by

$$L(\mu_i, \sigma_i^2) \propto \left(\sigma_i^2\right)^{-n_i/2} \exp\left(-\frac{1}{2\sigma_i^2}\sum_{j=1}^{n_i}(y_{ij}-\mu_i)^2\right).$$

Therefore, the Bayesian method by the Jeffreys and uniform priors are accordingly applied to construct the confidence intervals for θ.

1) The Jeffreys prior

This prior is defined by $\pi(\theta) = \sqrt{\det(I(\theta))}$, where $I(\theta)$ is the Fisher information matrix (Jeffreys, 1961). Therefore, the Fisher information matrix is expressed as

$$I(\mu_i, \sigma_i^2) = \begin{bmatrix} n_i/\sigma_i^2 & 0 \\ 0 & n_i/2\sigma_i^2 \end{bmatrix}$$

Consider $X_i^{-1/3} = Y_i = \left(Y_1 = X_1^{-1/3}, ..., Y_{n_i} = X_{n_i}^{-1/3}\right)$, modeled as Y_i; $N(\mu_i, \sigma_i^2)$ where σ_i^2 is assumed known. The Fisher information of μ_i is defined by $I(\mu_i) = 1/\sigma_i^2$. Then, the Jeffreys prior of μ_i is $\pi(\mu_i|\sigma_i^2) \propto \sqrt{1/\sigma_i^2} \propto$ const. In the same way, the Jeffreys prior of σ_i^2 is $\pi(\sigma_i^2) \propto 1/\sigma_i^2$ Therefore, the Jeffreys prior is obtained by

$$\pi(\mu_i, \sigma_i^2) \propto \text{const} \times 1/\sigma_i^2 \propto \sigma_i^{-2}$$

which is combined with the likelihood function, the posterior density function is given by

$$\pi(\mu_i, \sigma_i^2 \mid y_i) \propto \sigma_i^{-2}\left(\sigma_i^2\right)^{-n_i/2} \exp\left(-\frac{1}{2\sigma_i^2}\sum_{j=1}^{n_i}(y_{ij}-\mu_i)^2\right).$$

The irrespective marginal posteriors are normal and IG distributions because μ_i and σ_i^2 are independent. Dongchu and Keying (1996) defined them as follows:

$$\pi(\mu_i \mid \sigma_i^2, y_i)_J ; N(\hat{\mu}_i, \sigma_i^2/n_i) \tag{6}$$

and

$$\pi(\sigma_i^2 \mid y_i)_J ; IG(n_i/2, y_{n_i}/2), \tag{7}$$

where $\hat{\mu}_i = \dfrac{1}{n_i}\sum_{j=1}^{n_i} y_{ij}$ and $y_{n_i} = \sum_{j=1}^{n_i}(y_{ij}-\bar{y}_{ij})^2$.

To conduct the Bayesian method by the Jeffreys prior, α_1 and α_2 are substituted in Equation (4) by $(\mu_i|\sigma_i^2, y_i)_J$ and $(\sigma_i^2|y_i)_J$ defined in Equations (6) and (7), respectively.

$$(\alpha_i)_J = \frac{1}{9}\left[\left(1 + \frac{(\mu_i \mid \sigma_i^2, y_i)_J^2}{2(\sigma_i^2 \mid y_i)_J}\right) + \left(\left(1 + \frac{(\mu_i \mid \sigma_i^2, y_i)_J^2}{2(\sigma_i^2 \mid y_i)_J}\right)^2 - 1\right)^{1/2}\right], \text{ for } i = 1, 2$$

and we compute θ_J by $(\alpha_i)_J$ based on Equation (1). Then,

$$\theta_J = \frac{\sqrt{(\alpha_2)_J - 2}}{\sqrt{(\alpha_1)_J - 2}}.$$

Therefore, $(1-\gamma)100\%$ confidence interval for θ based on the Bayesian method by the Jeffreys prior is given by

$$CI_J = \left[\theta_J(\gamma/2), \theta_J(1-(\gamma/2))\right], \tag{8}$$

where $\theta_J(\gamma/2)$ and $\theta_J(1-(\gamma/2))$ are the $100(\gamma/2)^{\text{th}}$ and $100-(\gamma/2)^{\text{th}}$ percentiles of the distribution of θ_J, respectively. The algorithm for constructing the Bayesian confidence interval by the Jeffreys prior is as follows:

Algorithm 2

Step 1. Generate x_{ij} from $IG(\alpha_i, \beta_i)$, $i = 1, 2, j = 1, \dots, n_i$

Step 2. Calculate $y_{ij} = x_{ij}^{-1/3}$

Step 3. Computet $(\mu_i \mid \sigma_i^2, y_i)_J$ by using Equation (6)

Step 4. Compute $(\sigma_i^2 \mid y_i)_J$ by using Equation (7)

Step 5. Compute $(\alpha_i)_J$

Step 6. Compute θ_J by using $(\alpha_i)_J$ from Step 5.

Step 7. Repeat Steps 3-6. 5,000 times

Step 8. Compute $(1-\gamma)100\%$ confidence interval for θ by using Equation (8).

Therefore, the null hypothesis, $H_0 : \theta = \theta_0$ will be rejected if
$$\theta_0 < \theta_J(\gamma/2) \text{ or } \theta_0 < \theta_J(1-(\gamma/2)).$$

2) The uniform prior

The uniform priors of μ_i and σ_i^2 are $\pi(\mu_i) \propto 1$, and $\pi(\sigma_i^2) \propto 1$, respectively. Thus, the IG distribution for the Bayesian method based on uniform prior is $\pi(\mu_i, \sigma_i^2) \propto 1$, The respective marginal posteriors of μ_i and σ_i^2 are defined as (Yang and Berger, 1998)

Testing the Ratio of the Coefficients of Variation for the Inverse Gamma Distributions with an Application to Rainfall
Dispersion in Thailand

90

$$\pi(\mu_i \mid \sigma_i^2, y_i)_U \; ; \; N(\hat{\mu}_i, \sigma_i^2 / n_i) \tag{9}$$

and
$$\pi(\sigma_i^2 \mid y_i)_U \; ; \; IG((n_i - 2)/2, y_{n_i}/2), \tag{10}$$

where and $\quad \hat{\mu}_i = \dfrac{1}{n_i} \sum_{j=1}^{n_i} y_{ij}$ and $y_{n_i} = \sum_{j=1}^{n_i} (y_{ij} - \bar{y}_{ij})^2$.

Then, the Bayesian confidence interval is proposed by using $(\mu_i \mid \sigma_i^2, y_i)_U$ and $(\sigma_i^2, \mid y_i)_U$ from Equations (9) and (10), respectively.

$$(\alpha_i)_U = \frac{1}{9}\left[\left(1 + \frac{(\mu_i, \sigma_i^2 \mid y_i)_U^2}{2(\sigma_i^2 \mid y_i)_U}\right) + \left(\left(1 + \frac{(\mu_i, \sigma_i^2 \mid y_i)_U^2}{2(\sigma_i^2 \mid y_i)_U}\right)^2 - 1\right)^{1/2}\right], \text{ for } i = 1, 2$$

and the θ_U is calculated by using $(\alpha_i)_U$ based on Equation (1). Then,

$$\theta_U = \frac{\sqrt{(\alpha_2)_U - 2}}{\sqrt{(\alpha_1)_U - 2}}.$$

Therefore, $(1-\gamma)100\%$ confidence interval for θ based on the Bayesian method by the uniform prior is given by

$$CI_U = \left[\theta_U(\gamma/2), \theta_U(1-(\gamma/2))\right], \tag{11}$$

where $\theta_U(\gamma/2)$ and $\theta_U(1-(\gamma/2))$ are the $100(\gamma/2)^{\text{th}}$ and $100(1-(\gamma/2))^{\text{th}}$ percentiles of the distribution of θ_U respectively. The following algorithm is used to construct the Bayesian confidence interval by the uniform prior:

Algorithm 3

Step 1. Generate x_{ij} from $IG(\alpha_i, \beta_i), i = 1, 2, j = 1, \dots, n_i$

Step 2. Calculate $y_{ij} = x_{ij}^{-1/3}$

Step 3. Compute $(\mu_i \mid \sigma_i^2, y_i)_U$ by using Equation (9)

Step 4. Compute $(\sigma_i^2 \mid y_i)_U$ by using Equation (10)

Step 5. Compute $(\alpha_i)_U$

Step 6. Compute θ_U by using $(\alpha_i)_U$ from Step 5.

Step 7. Repeat Steps 3-6. 5,000 times

Step 8. Compute $(1-\gamma)100\%$ confidence interval for θ by using Equation (10).

Therefore, the null hypothesis, $H_0 : \theta = \theta_0$ will be rejected if

$$\theta_0 < \theta_U(\gamma/2) \text{ or } \theta_0 < \theta_U(1-(\gamma/2)).$$

Simulation Study and Results

In this study, three statistical methods for testing the ratio of the CVs in the IG distributions are considered. Since a theoretical comparison is not possible, a Monte Carlo simulation was proceeded using the R version 4.1.3 statistical software (Ihaka and Gentleman, 1996) to compare the performance of the test statistics. These statistical methods were evaluated in terms of their attainment of empirical type I error rates and the powers of a test of their performance. The simulation results are presented only for the significant level $\gamma = 0.05$, since i) $\gamma = 0.05$ is widely applied to compare the empirical type I error rate and the power of a test ii) similar conclusions were derived for other values of γ.

Equal sample sizes were set as (n_1, n_2) = (25,25), (50,50), (75,75) and (100,100) and unequal sample sizes as (n_1, n_2) = (25,50), (50,75) and (75,100). The number of simulations was fixed at 10,000. The data were generated from two independent IG distributions with $\beta_1 = \beta_2 = 1$ and α_1 and α_2 was adjusted to obtain the required CVs, (τ_1, τ_2) We set (τ_1, τ_2) = (0.05,0.25), (0.10,0.25), (0.05,0.10), (0.15,0.25), (0.20,0.25) and (0.25,0.25). Therefore, the hypothesized values of ratio of the CVs for the IG distributions, θ_0 = 0.2, 0.4, 0.5, 0.6, 0.8 and 1.0. In case of the powers of the tests, we set the values of the ratio of CVs, $\theta = \theta_0 \pm c \times 0.05$ where $c = 0, \pm 1, \pm 2, \pm 3$ and ± 4.

From the simulation results shown in Tables 1-6, the empirical type I error rates of all test statistics were close to the nominal significance level of 0.05 for all situations. The power of a test statistics based on the Bayesian method by the Jeffreys prior were higher than those of other test statistics for equal sample sizes. In case of unequal sample sizes and $\theta < \theta_0$, the Bayesian method by the uniform prior performed well in terms of the power of a test. On the other hand, the Bayesian method by the Jeffreys prior performed better for $\theta > \theta_0$. A general pattern can be observed; when the sample size increases, the power of the test also increases and the empirical type I error rate is close to the nominal level of significance. In addition, the power of a test increases as the value of the ratio of the CVs departs from the hypothesized value of the ratio of the CVs.

Testing the Ratio of the Coefficients of Variation for the Inverse Gamma Distributions with an Application to Rainfall
Dispersion in Thailand

92

We observed that for large sample sizes, the performance of the all test statistics did not differ greatly in terms of power of a test and the attainment of the nominal significance level of the test. Nevertheless, a significant difference was noticed for small sample sizes.

Empirical Application

To illustrate the application of the three statistical methods for testing the ratio of the CVs introduced in the previous section, we used two data sets on the annual rainfall amounts (millimeter: mm.). The first and second data sets were measured from the station at Buriram and Chaiyaphum, Thailand from 1998 to 2020, respectively. The data sets were reported by the Hydrology Irrigation Centers for the Upper and Lower Northeastern Regions, the Royal Irrigation Department, Thailand (http://hydro-3.rid.go.th, http://hydro-4.rid.go.th). The descriptive statistics are shown in Table 7. The distributions of the annual rainfall amounts in both provinces are right-skewed (coefficients of skewness are positive) and they have heavy-tailed distributions (coefficients of kurtosis are positive). By considering the histogram, density plot, Box and Whisker plot, and IG quantile-quantile (Q-Q) plot shown in Figures 1 and 2, the fitted distributions for the annual rainfall amounts of both provinces are not symmetric.

Table 8 reports the Akaike information criterion (AIC) (Akaike, 1974) results to check the fitting of the distributions for the annual rainfall amounts in both provinces. The AIC is defined as $AIC = -2 \ln L + 2k$, where L is the likelihood function and k is the number of parameters. To find the best fitted distribution for the annual rainfall amounts, the AIC values for several distributions were considered. The results show that the annual rainfall amounts of Buriram and Chaiyaphum follow the IG distributions because the AIC values for this distribution were the smallest. The annual rainfall amounts in Buriram had an IG distribution with shape parameter $\hat{\alpha}_1 = 60.4835$ and scale parameter $\hat{\beta}_1 = 62,950.10$, while the MLE for the CV is $\hat{\tau}_1 = 0.1308$. Similarly, the annual rainfall amounts in Chaiyaphum had an IG distribution with shape parameter $\hat{\alpha}_2 = 22.1316$ and scale parameter $\hat{\beta}_2 = 23,026.55$, while the MLE for the CV is $\hat{\tau}_2 = 0.2229$. Therefore, the ratio of the CVs is $\hat{\theta} = 0.5868$.

Table 1: Empirical Type I Error Rates (Bold Numeric) and Powers of Tests (Not Bold Numeric) for
$\theta_0 = 0.20$

(n_1, n_2)	Method	θ								
		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
(25,25)	FQ	1.0000	0.9999	0.8469	0.2247	**0.0474**	0.1776	0.4645	0.7351	0.8921
	Jeffreys	1.0000	0.9999	0.8638	0.2429	**0.0532**	0.1855	0.4774	0.7463	0.8986
	Uniform	1.0000	0.9999	0.8259	0.2059	**0.0432**	0.1678	0.4518	0.7211	0.8871
(50,50)	FQ	1.0000	1.0000	0.9913	0.4413	**0.0475**	0.3111	0.7666	0.9649	0.9952
	Jeffreys	1.0000	1.0000	0.9923	0.4522	**0.0489**	0.3164	0.7700	0.9665	0.9955
	Uniform	1.0000	1.0000	0.9899	0.4296	**0.0444**	0.3058	0.7611	0.9633	0.9948
(75,75)	FQ	1.0000	1.0000	0.9999	0.6201	**0.0529**	0.4546	0.9083	0.9937	1.0000
	Jeffreys	1.0000	1.0000	0.9999	0.6286	**0.0550**	0.4569	0.9102	0.9939	1.0000
	Uniform	1.0000	1.0000	0.9997	0.6116	**0.0516**	0.4517	0.9069	0.9937	1.0000
(100,100)	FQ	1.0000	1.0000	1.0000	0.7524	**0.0475**	0.5616	0.9691	0.9998	1.0000
	Jeffreys	1.0000	1.0000	1.0000	0.7580	**0.0490**	0.5625	0.9703	0.9997	1.0000
	Uniform	1.0000	1.0000	1.0000	0.7468	**0.0470**	0.5569	0.9698	0.9997	1.0000
(25,50)	FQ	1.0000	1.0000	0.9515	0.3434	**0.0496**	0.2049	0.5692	0.8484	0.9618
	Jeffreys	1.0000	1.0000	0.9504	0.3380	**0.0535**	0.2279	0.6077	0.8682	0.9694
	Uniform	1.0000	1.0000	0.9529	0.3511	**0.0462**	0.1790	0.5273	0.8226	0.9500
(50,75)	FQ	1.0000	1.0000	0.9978	0.5521	**0.0479**	0.3584	0.8292	0.9838	0.9990
	Jeffreys	1.0000	1.0000	0.9976	0.5513	**0.0503**	0.3729	0.8409	0.9853	0.9992
	Uniform	1.0000	1.0000	0.9977	0.5523	**0.0467**	0.3427	0.8188	0.9814	0.9990
(75,100)	FQ	1.0000	1.0000	0.9999	0.6998	**0.0477**	0.4932	0.9450	0.9983	1.0000
	Jeffreys	1.0000	1.0000	0.9999	0.6991	**0.0492**	0.5021	0.9476	0.9987	1.0000
	Uniform	1.0000	1.0000	0.9999	0.7002	**0.0472**	0.4840	0.9417	0.9983	1.0000

Testing the Ratio of the Coefficients of Variation for the Inverse Gamma Distributions with an Application to Rainfall
Dispersion in Thailand

94

Table 2: Empirical Type I Error Rates (Bold Numeric) and Powers of Tests (Not Bold Numeric)
for $\theta_0 = 0.40$

(n_1, n_2)	Method	θ								
		0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60
(25,25)	FQ	0.8441	0.5207	0.2333	0.0864	**0.0500**	0.0830	0.1753	0.3072	0.4531
	Jeffreys	0.8610	0.5435	0.2494	0.0949	**0.0541**	0.0891	0.1844	0.3207	0.4673
	Uniform	0.8283	0.4958	0.2137	0.0756	**0.0446**	0.0768	0.1653	0.2951	0.4385
(50,50)	FQ	0.9910	0.8386	0.4466	0.1291	**0.0511**	0.1235	0.3077	0.5433	0.7643
	Jeffreys	0.9919	0.8456	0.4581	0.1351	**0.0532**	0.1263	0.3151	0.5489	0.7685
	Uniform	0.9897	0.8288	0.4357	0.1240	**0.0483**	0.1199	0.3038	0.5381	0.7600
(75,75)	FQ	0.9996	0.9556	0.6201	0.1846	**0.0479**	0.1545	0.4350	0.7316	0.9088
	Jeffreys	0.9997	0.9588	0.6289	0.1899	**0.0501**	0.1574	0.4387	0.7363	0.9090
	Uniform	0.9995	0.9535	0.6102	0.1797	**0.0458**	0.1512	0.4312	0.7285	0.9069
(100,100)	FQ	0.9999	0.9877	0.7453	0.2323	**0.0482**	0.1907	0.5484	0.8458	0.9664
	Jeffreys	0.9999	0.9882	0.7501	0.2368	**0.0508**	0.1909	0.5497	0.8477	0.9673
	Uniform	0.9999	0.9869	0.7397	0.2273	**0.0465**	0.1880	0.5442	0.8445	0.9668
(25,50)	FQ	0.9513	0.7047	0.3454	0.1142	**0.0499**	0.0874	0.2039	0.3769	0.5421
	Jeffreys	0.9495	0.7003	0.3390	0.1123	**0.0520**	0.1001	0.2284	0.4164	0.5788
	Uniform	0.9534	0.7136	0.3530	0.1180	**0.0479**	0.0753	0.1770	0.3405	0.5019
(50,75)	FQ	0.9985	0.9166	0.5319	0.1653	**0.0483**	0.1367	0.3498	0.6246	0.8306
	Jeffreys	0.9986	0.9154	0.5334	0.1657	**0.0496**	0.1449	0.3635	0.6416	0.8401
	Uniform	0.9986	0.9162	0.5343	0.1651	**0.0456**	0.1295	0.3355	0.6104	0.8196
(75,100)	FQ	0.9999	0.9788	0.6938	0.2073	**0.0487**	0.1762	0.4793	0.7789	0.9468
	Jeffreys	0.9999	0.9788	0.6931	0.2075	**0.0493**	0.1812	0.4901	0.7859	0.9490
	Uniform	0.9998	0.9784	0.6918	0.2082	**0.0474**	0.1688	0.4702	0.7719	0.9413

Table 3: Empirical Tpe I Error Rates (Bold Numeric) and Powers of Tests (Not Bold Numeric) for $\theta_0 = 0.50$

(n_1, n_2)	Method	θ								
		0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70
(25,25)	FQ	0.6746	0.3902	0.1804	0.0757	**0.0497**	0.0721	0.1397	0.2414	0.3658
	Jeffreys	0.6903	0.4057	0.1927	0.0828	**0.0533**	0.0792	0.1495	0.2529	0.3812
	Uniform	0.6568	0.3714	0.1689	0.0690	**0.0437**	0.0667	0.1308	0.2288	0.3508
(50,50)	FQ	0.9359	0.6846	0.3227	0.1097	**0.0454**	0.0945	0.2381	0.4361	0.6357
	Jeffreys	0.9380	0.6926	0.3300	0.1121	**0.0485**	0.0982	0.2429	0.4432	0.6442
	Uniform	0.9322	0.6760	0.3164	0.1043	**0.0439**	0.0906	0.2308	0.4286	0.6267
(75,75)	FQ	0.9903	0.8544	0.4745	0.1431	**0.0494**	0.1273	0.3395	0.5997	0.8161
	Jeffreys	0.9911	0.8572	0.4804	0.1474	**0.0504**	0.1304	0.3465	0.6055	0.8191
	Uniform	0.9903	0.8501	0.4667	0.1405	**0.0472**	0.1260	0.3356	0.5928	0.8141
(100,100)	FQ	0.9987	0.9385	0.5796	0.1735	**0.0474**	0.1591	0.4370	0.7311	0.9099
	Jeffreys	0.9987	0.9402	0.5807	0.1770	**0.0495**	0.1593	0.4417	0.7334	0.9111
	Uniform	0.9987	0.9374	0.5740	0.1710	**0.0470**	0.1566	0.4315	0.7268	0.9075
(25,50)	FQ	0.8214	0.5258	0.2471	0.0922	**0.0521**	0.0769	0.1532	0.2728	0.4323
	Jeffreys	0.8137	0.5123	0.2386	0.0893	**0.0553**	0.0894	0.1784	0.3067	0.4735
	Uniform	0.8296	0.5391	0.2571	0.0959	**0.0497**	0.0645	0.1327	0.2382	0.3869
(50,75)	FQ	0.9716	0.7664	0.4061	0.1305	**0.0531**	0.1101	0.2725	0.4964	0.7035
	Jeffreys	0.9717	0.7635	0.4025	0.1297	**0.0556**	0.1181	0.2882	0.5133	0.7193
	Uniform	0.9721	0.7697	0.4099	0.1341	**0.0507**	0.1024	0.2596	0.4799	0.6878
(75,100)	FQ	0.9954	0.9015	0.5255	0.1593	**0.0489**	0.1352	0.3695	0.6526	0.8534
	Jeffreys	0.9955	0.9008	0.5250	0.1605	**0.0499**	0.1416	0.3810	0.6634	0.8574
	Uniform	0.9955	0.9022	0.5268	0.1630	**0.0482**	0.1290	0.3588	0.6418	0.8463

Table 4: Empirical Type I Error Rates (Bold Numeric) and Powers of Tests (Not Bold Numeric) for $\theta_0 = 0.60$

(n_1, n_2)	Method	θ								
		0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80
(25,25)	FQ	0.4089	0.2282	0.1119	0.0666	**0.0485**	0.0617	0.1088	0.1659	0.2526
	Jeffreys	0.4310	0.2441	0.1220	0.0724	**0.0535**	0.0680	0.1158	0.1769	0.2636
	Uniform	0.3836	0.2105	0.1037	0.0595	**0.0446**	0.0567	0.1007	0.1562	0.2373
(50,50)	FQ	0.7175	0.4353	0.2036	0.0840	**0.0472**	0.0825	0.1678	0.2910	0.4618
	Jeffreys	0.7279	0.4440	0.2104	0.0878	**0.0495**	0.0853	0.1723	0.2981	0.4700
	Uniform	0.7066	0.4224	0.1934	0.0791	**0.0464**	0.0799	0.1630	0.2863	0.4540
(75,75)	FQ	0.8816	0.6074	0.2911	0.1021	**0.0478**	0.0953	0.2307	0.4213	0.6333
	Jeffreys	0.8855	0.6160	0.2972	0.1050	**0.0500**	0.0973	0.2341	0.4274	0.6360
	Uniform	0.8757	0.5984	0.2858	0.0980	**0.0475**	0.0933	0.2264	0.4178	0.6288
(100,100)	FQ	0.9552	0.7386	0.3746	0.1208	**0.0507**	0.1185	0.2925	0.5390	0.7542
	Jeffreys	0.9568	0.7428	0.3795	0.1254	**0.0518**	0.1191	0.2945	0.5433	0.7543
	Uniform	0.9538	0.7325	0.3668	0.1191	**0.0504**	0.1163	0.2890	0.5368	0.7493
(25,50)	FQ	0.5863	0.3402	0.1699	0.0766	**0.0485**	0.0650	0.1153	0.2028	0.2897
	Jeffreys	0.5773	0.3329	0.1631	0.0773	**0.0517**	0.0767	0.1348	0.2262	0.3190
	Uniform	0.5937	0.3502	0.1748	0.0791	**0.0458**	0.0567	0.0998	0.1764	0.2576
(50,75)	FQ	0.8199	0.5310	0.2540	0.0945	**0.0494**	0.0782	0.1977	0.3443	0.5189
	Jeffreys	0.8194	0.5281	0.2525	0.0943	**0.0517**	0.0850	0.2084	0.3602	0.5375
	Uniform	0.8197	0.5323	0.2544	0.0950	**0.0484**	0.0736	0.1849	0.3258	0.5022
(75,100)	FQ	0.9312	0.6901	0.3434	0.1134	**0.0500**	0.1024	0.2568	0.4832	0.6892
	Jeffreys	0.9300	0.6920	0.3458	0.1135	**0.0506**	0.1067	0.2635	0.4917	0.6984
	Uniform	0.9306	0.6913	0.3433	0.1135	**0.0485**	0.0994	0.2477	0.4722	0.6804

Table 5: Empirical Type I Error Rates (Bold Numeric) and Powers of Tests (Not Bold Numeric) for $\theta_0 = 0.80$

(n_1, n_2)	Method	θ								
		0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
(25,25)	FQ	0.2326	0.1398	0.0855	0.0569	**0.0488**	0.0565	0.0788	0.1141	0.1646
	Jeffreys	0.2466	0.1501	0.0939	0.0609	**0.0536**	0.0620	0.0854	0.1234	0.1759
	Uniform	0.2148	0.1278	0.0798	0.0523	**0.0449**	0.0503	0.0716	0.1062	0.1546
(50,50)	FQ	0.4275	0.2444	0.1300	0.0637	**0.0526**	0.0627	0.1171	0.1991	0.2885
	Jeffreys	0.4382	0.2541	0.1355	0.0681	**0.0539**	0.0653	0.1216	0.2044	0.2954
	Uniform	0.4160	0.2371	0.1258	0.0623	**0.0490**	0.0589	0.1127	0.1925	0.2803
(75,75)	FQ	0.5969	0.3555	0.1731	0.0745	**0.0496**	0.0783	0.1480	0.2684	0.4207
	Jeffreys	0.6047	0.3626	0.1754	0.0779	**0.0519**	0.0795	0.1517	0.2717	0.4233
	Uniform	0.5906	0.3495	0.1686	0.0723	**0.0482**	0.0767	0.1459	0.2633	0.4142
(100,100)	FQ	0.7369	0.4614	0.2239	0.0844	**0.0521**	0.0899	0.1854	0.3456	0.5323
	Jeffreys	0.7416	0.4694	0.2285	0.0860	**0.0532**	0.0898	0.1871	0.3482	0.5369
	Uniform	0.7311	0.4568	0.2222	0.0812	**0.0509**	0.0886	0.1826	0.3421	0.5284
(25,50)	FQ	0.3402	0.1991	0.1176	0.0668	**0.0517**	0.0615	0.0798	0.1291	0.1895
	Jeffreys	0.3306	0.1942	0.1146	0.0650	**0.0552**	0.0715	0.0953	0.1468	0.2185
	Uniform	0.3499	0.2062	0.1217	0.0661	**0.0488**	0.0527	0.0689	0.1124	0.1639
(50,75)	FQ	0.5352	0.3219	0.1549	0.0758	**0.0477**	0.0695	0.1265	0.2175	0.3327
	Jeffreys	0.5328	0.3185	0.1543	0.0750	**0.0498**	0.0750	0.1361	0.2317	0.3494
	Uniform	0.5355	0.3234	0.1559	0.0758	**0.0466**	0.0634	0.1168	0.2044	0.3156
(75,100)	FQ	0.6776	0.4119	0.2022	0.0867	**0.0511**	0.0779	0.1677	0.2989	0.4473
	Jeffreys	0.6768	0.4136	0.2028	0.0872	**0.0521**	0.0811	0.1728	0.3103	0.4593
	Uniform	0.6744	0.4108	0.2020	0.0869	**0.0492**	0.0763	0.1615	0.2911	0.4360

Table 6: Empirical Type I Error Rates (Bold Numeric) and Powers of Tests (Not Bold Numeric) for $\theta_0 = 1.00$

(n_1, n_2)	Method	θ								
		0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20
(25,25)	FQ	0.1522	0.1039	0.0719	0.0537	**0.0496**	0.0495	0.0691	0.0901	0.1234
	Jeffreys	0.1652	0.1126	0.0788	0.0594	**0.0547**	0.0553	0.0755	0.0972	0.1312
	Uniform	0.1421	0.0961	0.0654	0.0499	**0.0439**	0.0446	0.0632	0.0810	0.1149
(50,50)	FQ	0.2863	0.1639	0.1015	0.0594	**0.0487**	0.0593	0.0937	0.1365	0.1973
	Jeffreys	0.2959	0.1711	0.1054	0.0621	**0.0512**	0.0623	0.0980	0.1425	0.2056
	Uniform	0.2763	0.1594	0.0968	0.0566	**0.0467**	0.0568	0.0902	0.1315	0.1891
(75,75)	FQ	0.3951	0.2308	0.1278	0.0688	**0.0509**	0.0635	0.1116	0.1853	0.2777
	Jeffreys	0.3993	0.2363	0.1305	0.0704	**0.0525**	0.0654	0.1155	0.1900	0.2833
	Uniform	0.3899	0.2265	0.1251	0.0659	**0.0496**	0.0626	0.1075	0.1811	0.2709
(100,100)	FQ	0.5051	0.3018	0.1517	0.0747	**0.0472**	0.0640	0.1344	0.2331	0.3610
	Jeffreys	0.5108	0.3042	0.1560	0.0760	**0.0482**	0.0643	0.1379	0.2373	0.3640
	Uniform	0.5007	0.2984	0.1503	0.0730	**0.0458**	0.0620	0.1330	0.2297	0.3556
(25,50)	FQ	0.2138	0.1405	0.0874	0.0595	**0.0488**	0.0563	0.0717	0.0991	0.1320
	Jeffreys	0.2058	0.1346	0.0842	0.0605	**0.0523**	0.0634	0.0838	0.1148	0.1544
	Uniform	0.2215	0.1464	0.0896	0.0590	**0.0463**	0.0490	0.0605	0.0835	0.1108
(50,75)	FQ	0.3360	0.2036	0.1163	0.0673	**0.0477**	0.0627	0.0947	0.1526	0.2187
	Jeffreys	0.3352	0.2016	0.1130	0.0676	**0.0491**	0.0669	0.1022	0.1617	0.2359
	Uniform	0.3400	0.2060	0.1159	0.0683	**0.0453**	0.0583	0.0876	0.1416	0.2094
(75,100)	FQ	0.4466	0.2615	0.1383	0.0675	**0.0539**	0.0666	0.1198	0.1981	0.3103
	Jeffreys	0.4470	0.2600	0.1382	0.0677	**0.0562**	0.0707	0.1270	0.2077	0.3212
	Uniform	0.4494	0.2627	0.1394	0.0678	**0.0531**	0.0640	0.1147	0.1904	0.2996

Our interest was in testing the ratio of the CVs of the annual rainfall amounts in Buriram and Chaiyaphum. Suppose the researcher wanted to test the claim that the ratio of the CVs equals 0.6. The null and alternative hypotheses are respectively given as follows:

$$H_0: \theta = 0.5 \text{ versus } H_1: \theta \neq 0.5$$

The lower and upper critical values of both test statistics were shown in Table 9. The null hypothesis H_0 did not been rejected since $\theta_0 \in [0.4668. 1/1862]$. $\theta_0 \in [0.4840.$ $1.1848]$ and $\theta_0 \in [0.4618. 1.1944]$. using test statistics based on the FQ and Bayesian methods by the Jeffreys and uniform priors, respectively. We conclude that the ratio of the CVs of the annual rainfall amounts in Buriram and Chaiyaphum does not differ from 0.5 at the 0.05 significance level.

Table 7: Descriptive Statistics of the Annual Rainfall Amounts in Buriram and Chaiyaphum

Provinces	Sample sizes	Mean	SD.	Skewness	Kurtosis
Buriram	23	1069.40	195.49	1.473	2.521
Chaiyaphum	23	1088.44	245.79	0.886	0.946

Table 8: Results of AIC for the Annual Rainfall Amounts in Buriram and Chaiyaphum

Provinces	Normal	Cauchy	Exponential	Weibull	Gamma	Inverse Gamma
Buriram	310.9230	310.3707	368.8432	315.6505	307.7593	**305.3693**
Chaiyaphum	321.4549	328.0113	369.6550	323.7112	319.2704	**318.2490**

Table 9: Critical Values of Test Statistics Based on the FQ and Bayesian Methods by the Jeffreys and Uniform Priors for the Significance Level of 0.05

Method	Critical Values	
	Lower	Upper
FQ	0.4668	1.1862
Jeffreys	0.4840	1.1848
Uniform	0.4618	1.1944
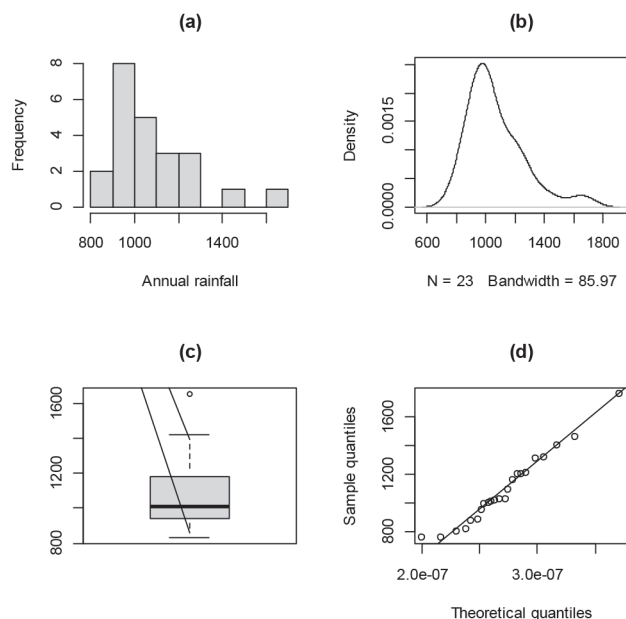
Figure 1: (a) Histogram (b) Density Plot (c) Box and Whisker Plot
(d) Inverse Gamma Q-Q Plot of the Annual Rainfall Amounts in Buriram, Thailand
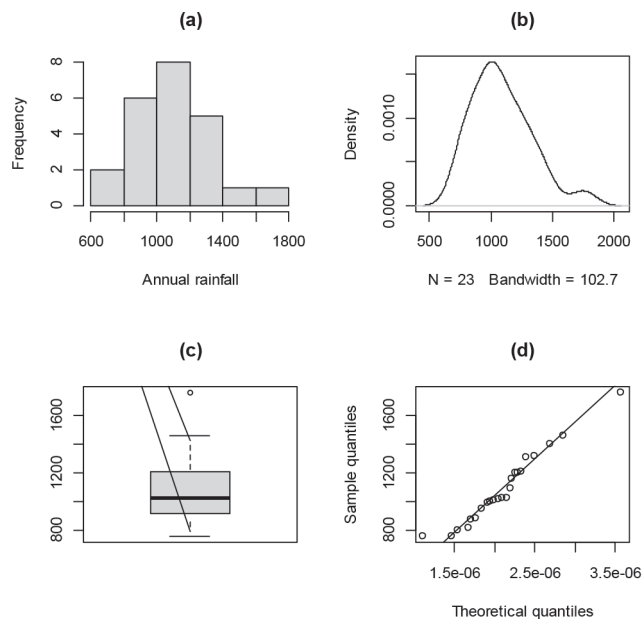

Figure 2: (a) Histogram (b) Density Plot (c) Box and Whisker Plot
(d) Inverse Gamma Q-Q Plot of the Annual Rainfall Amounts in Chaiyaphum, Thailand

Discussion and Conclusions

The goal of this study is to recognize potential statistical methods that can be recommended to researchers or users for testing the ratio of the CVs of the IG distributions. A general pattern was noticed; as the sample size increased, the power of a test also increased and the empirical type I error rates was close to the significance level of 0.05. In addition, the power increased as the value of the ratio of the CVs departed from the hypothesized value of the ratio of the CVs. Furthermore, the researchers can applied the proposed methods for testing the ratio of the CVs in the IG distributions with other data sets fitted well to the IG distributions. For example, the IG distribution has been used for the hitting time distribution of a Wiener process. For the future research, it is interested in the one-tailed hypothesis testing.

The previous research studied by Kaewprasert et al. (2023) found that the confidence intervals for the ratio of the CVs of the IG distributions constructed with the Bayesian method based on the uniform prior and fiducial quantities performed better than those constructed with the Bayesian method based on the Jeffreys prior and percentile bootstrap method. The simulation results from this paper which studied the testing the ratio of the CVs is different from the previous work related the confidence intervals.

In this study, three statistical methods for testing the ratio of the CVs of the IG distributions were derived. Based on the simulation results, it is evident that the test statistics based on Bayesian method by the Jeffreys prior performed well in terms of the empirical type I error rate and power of a test for equal sample sizes. In case of unequal sample sizes, the test statistics based on Bayesian method by the Jeffreys and uniform priors performed well in term of the powers of the tests for $\theta < \theta_0$ and $\theta > \theta_0$ respectively. The annual rainfall amounts from the northeastern of Thailand were applied to illustrate the efficacies of the proposed statistical methods.

Acknowledgment

Testing the Ratio of the Coefficients of Variation for the Inverse Gamma Distributions with an Application to Rainfall
Dispersion in Thailand

102

References

Abid, S. H. & Al-Hassany, S. A. (2016). *On the Inverted Gamma Distributions*. International Journal of Systems Science and Applied Mathematics. *1*(3): 16-22.

Akaike, H. (1974). *A New Look at the Statistical Model Identification*. IEEE Transactions on Automatic Control. *19*(6): 716-723.

Albatineh, A. N., Boubakari, I. & Kibria, B. M. G. (2017). *New Confidence Interval Estimator of the Signal-to-Noise Ratio Based on Asymptotic Sampling Distribution*. Communications in Statistics - Theory and Methods. *46*(2): 574-590.

Bedeian, A. G. & Mossholder, K. W. (2000). *On the Use of the Coefficient of Variation as a Measure of Diversity*. Organizational Research Methods. *3*(3): 285-297.

Calif, R. & Soubdhan, T. (2016). *On the Use of the Coefficient of Variation to Measure Spatial and Temporal Correlation of Global Solar Radiation*. Renew Energy. *88*: 192-199.

Castagliola, P., Celano, G. & Psarakis, S. (2011). *Monitoring the Coefficient of Variation Using EWMA Charts*. Journal of Quality Technology. *43*(3): 249-265.

Dongchu, S. & Keying, Y. (1996). *Frequentist Validity of Posterior Quantiles for a Two-Parameter Exponential Family*. Biometrika, *83*(1): 55-65.

Döring, T. F. & Reckling, M. (2018). *Detecting Global Trends of Cereal Yield Stability by Adjusting the Coefficient of Variation*. European Journal of Agronomy. *99*: 30-36.

Eartheclipse. (2022). *What is a Drought?,"*. Retrieved April 16, 2022. from https://eartheclipse.com/natural-disaster/causes-and-effects-of-drought.html

Faber, D. S. & Korn, H. (1991). *Applicability of the Coefficient of Variation Method for Analyzing Synaptic Plasticity*. Biophysical Journal. *60*(5): 1288-1294.

Gelman, A. (2006). *Prior Distributions for Variance Parameters in Hierarchical Models*. Bayesian Analysis. *1*(3): 515-533.

Glen, A. G. & Leemis, L. M. eds., *Computational Probability Applications*. Cham: Springer, 2017.

Ihaka, R. & Gentleman, R. (1996). *R: A Language for Data Analysis and Graphics.* Journal of Computational and Graphical Statistics. *5*(3): 299-314.

Jeffreys, H. (1961). *Theory of Probability*, 3rd ed. London, England: Oxford University Press.

Kaewprasert, T., Niwitpong, S. A. & Niwitpong, S. (2020). *Confidence Interval for Coefficient of Variation of Inverse Gamma Distributions*. in Lecture Notes in Artificial Intelligence: Integrated Uncertainty in Knowledge Modelling and Decision Making, Huynh, V. N.,

Entani, T., Jeenanunta, C., Inuiguchi, M. & Yenradee, P. Eds. Cham: Springer, 2020, 407-418.

Kaewprasert, T., Niwitpong, S. A. & Niwitpong, S. (2023). *Confidence Intervals for the Ratio of the Coefficients of Variation of Inverse-Gamma Distributions.* Applied Science and Engineering Progress. *16*(1): 5660.

Kang, C. W., Lee, M. S., Seong, Y. J. & Hawkins, D. M. (2007). *A Control Chart for the Coefficient of Variation*. Journal of Quality Technology. *39*(2): 151-158.

Krishnamoorthy, K. & Wang, X. (2016). *Fiducial Confidence Limits and Prediction Limits for a Gamma Distribution: Censored and Uncensored Cases*. Environmetrics, *27*(8): 479-493.

Llera, S. & Beckmann, C. F. (2016). *Estimating an Inverse Gamma Distribution*. Technical report, Radbound University Nijmegen, Donders Institute for Brain Cognition and Behavior. ar.Xiv: 1605.01019v2, 2016.

Nairy, K. S. & Rao, K. A. (2003). *Tests of Coefficients of Variation of Normal Population*. Communications in Statistics - Simulation and Computation. *32*: 641-661.

Nationthailand (2022). *Nine Hospitals in Provinces Suffer Impact from Drought.* Retrieved April 16, 2022. from https://www.nationthailand.com/in-focus/30380811

Pattayamail. (2022a). *Buriram Hit By Worst Drought in 50 Years*. Retrieved April 16, 2022. from https://www.pattayamail.com/thailandnews/buriram-hit-by-worst-drought-in-50-years-48042

Pattayamail. (2022b). Drought Situation in Chaiyaphum Reaches Crisis Point. Retrieved April 15, 2022 from https://www.pattayamail.com/thailandnews/drought-situation-in-chaiyaphum-reaches-crisis-point-260702

Reed, G. F., Lynn, F. & Meade, B. D. (2002). *Use of Coefficient of Variation in Assessing Variability of Quantitative Assays*. Clinical and Diagnostic Laboratory Immunology. *9*(6): 1235-1239.

Srichaiwong, P., Ardwichai, S., Tungchuvong, L. & Kenpahoom, S. (2020). *The live weir innovation at Chi river watershed, Chaiyaphum province, Thailand*. Bioscience Biotechnology Research Communications. *13*(15): 103-107.

Wilson, E. B. & Hilferty, M. M. (1931). *The Distribution of Chi-Squares*. in Proceeding of the National Academy of Sciences. 684-688.

Yang, R. & Berger, J. O. (1998). *A Catalog of Non-Informative Priors*. Retrieved April 11, 2022.

Development of Social Enterprises in Thailand: A Critical Investigation of the Social Enterprise Promotion Act 2019 within a Theoretical Framework of Law and Development

Dhiyathad Prateeppornnarong* and Prapin Nuchpiam**

Abstract

From 2000 onwards, social enterprises (SEs) are growing in number in several countries around the world (e.g. United Kingdom, South Korea, Singapore). In some countries, legislation was passed to ensure the promotion of SEs as well as their good governance. This paper adopts qualitative methodology to investigate the role of law in promoting the development of SEs. It contributes theoretically by adopting a general theory of law and development established by Yong-Shik Lee for analysing how the introduction of SE law in general, and the enforcement of the Social Enterprise Promotion Act (SEPA) of Thailand in particular, may pose challenges to the development of SEs. From the perspective of the general theory of law and development, the "regulatory impact mechanisms" comprising of 'regulatory design,' 'regulatory compliance,' and 'quality of implementation' are of crucial importance for achieving desirable outcomes, particularly sustainable development. Distilled from the theory, we argue that the key challenges of Thailand's SEPA in facilitating development of SEs in the country are consisted of the issues on regulatory design and quality of implementation.

Keywords: Social Enterprises, Social Enterprise Legislation, Law and Development

* Graduate School of Public Administration, National Institute of Development Administration
  148, Serithai Road, Khlong-Chan, Bangkapi, Bangkok 10240, THAILAND.
  E-mail: dhiyathad.pra@nida.ac.th
** Graduate School of Law, National Institute of Development Administration
  148, Serithai Road, Khlong-Chan, Bangkapi, Bangkok 10240, THAILAND.
  E-mail: prapin.nuc@nida.ac.th

พัฒนาการของวิสาหกิจเพื่อสังคมในประเทศไทย: การศึกษาพระราชบัญญัติส่งเสริมวิสาหกิจเพื่อสังคม พ.ศ. 2562 ด้วยกรอบทฤษฎีกฎหมายกับการพัฒนา

ติญทรรศน์ ประทีปพรณรงค์* และ ประพิน นุชเปี่ยม**

บทคัดย่อ

นับตั้งแต่ปี ค.ศ. 2000 เป็นต้นมา วิสาหกิจเพื่อสังคมในหลายประเทศทั่วโลก (เช่น สหราชอาณาจักร เกาหลีใต้ สิงคโปร์) เติบโต และเพิ่มจำนวนมากขึ้นเรื่อย ๆ ในบางประเทศ มีการตรากฎหมายขึ้นบังคับใช้เพื่อเป็นหลักประกันในการส่งเสริมวิสาหกิจเพื่อสังคมและการกำกับดูแลกิจการที่ดีของวิสาหกิจดังกล่าว บทความนี้ใช้ระเบียบวิธีวิจัยเชิงคุณภาพในการศึกษาบทบาทของกฎหมายในการส่งเสริมพัฒนาการของวิสาหกิจเพื่อสังคม การศึกษาบทบาทของกฎหมายตามที่กล่าวข้างต้นสร้างคุณูปการในเชิงทฤษฎีผ่านการประยุกต์กรอบทฤษฎีกฎหมายกับการพัฒนาซึ่งพัฒนาขึ้นโดย Yong-Shik Lee มาใช้ในการวิเคราะห์ว่าการตรากฎหมายเฉพาะสำหรับวิสาหกิจเพื่อสังคมในภาพรวม และการบังคับใช้พระราชบัญญัติส่งเสริมวิสาหกิจเพื่อสังคม พ.ศ. 2562 ของประเทศไทยอาจนำมาซึ่งความท้าทายในการพัฒนาวิสาหกิจเพื่อสังคมได้ จากแนวคิดของทฤษฎีกฎหมายกับการพัฒนา กลไกการสร้างผลกระทบทางกฎหมาย ซึ่งประกอบไปด้วย การออกแบบกฎหมาย การปฏิบัติตามกฎหมาย และคุณภาพของการนำ (กฎหมาย) ไปสู่การปฏิบัติ ล้วนแต่มีความสำคัญส่งผลต่อการบรรลุผลลัพธ์ที่ปรารถนาได้ จากการวิเคราะห์ทฤษฎีดังกล่าว ผู้เขียนมองว่า ความท้าทายสำคัญของ พ.ร.บ.ส่งเสริมวิสาหกิจเพื่อสังคมในการขับเคลื่อนการพัฒนาวิสาหกิจเพื่อสังคมในประเทศไทย ประกอบไปด้วยประเด็นปัญหาในด้านการออกแบบกฎหมาย และคุณภาพของการนำ (กฎหมาย) ไปสู่การปฏิบัติ

คำสำคัญ : วิสาหกิจเพื่อสังคม กฎหมายวิสาหกิจเพื่อสังคม กฎหมายกับการพัฒนา

* คณะรัฐประศาสนศาสตร์ สถาบันบัณฑิตพัฒนบริหารศาสตร์
  เลขที่ 148 ถนนเสรีไทย แขวงคลองจั่น เขตบางกะปิ กรุงเทพมหานคร 10240
  อีเมล : dhiyathad.pra@nida.ac.th
** คณะนิติศาสตร์ สถาบันบัณฑิตพัฒนบริหารศาสตร์
  เลขที่ 148 ถนนเสรีไทย แขวงคลองจั่น เขตบางกะปิ กรุงเทพมหานคร 10240
  อีเมล : prapin.nuc@nida.ac.th

Introduction

Social enterprises (SEs), entrepreneurial entities adopting a market-based approach for addressing social (and/or environmental) issues, are no longer new in many societies (Kerlin, 2009). From 2000 onwards, SEs are growing in number in several countries around the world (e.g. United Kingdom, South Korea, Singapore) (Social Enterprise UK, 2019; Bidet & Defourny, 2019). Notably, the development of SEs in recent years is closely in concert with the driving of Sustainable Development Goals (SDGs) implementation as the fact demonstrates that many SEs (e.g. the Big Issue Foundation, UK) around the globe contribute to employment opportunities and poverty reduction especially for the people who are socially disadvantaged while some others (e.g. Soft Landing Mattress Recycling, Australia) contribute to waste management and environmental protection (see Prateeppornnarong, 2021).

Originally evolved from the non-profit sector, nowadays, SEs in many countries vary in forms and legal statuses. In some jurisdictions, legislation was passed to ensure the promotion of SEs as well as their good governance. Until now, Thailand is one of a few countries to have enacted specific legislation – the Social Enterprise Promotion Act (SEPA), B.E. 2562 (2019) – governing SEs activities in the country. It is argued, however, that having a specific legislation may become a double-edged sword posing challenges to the development of SEs especially in case where the law is not carefully crafted (Nuchpiam *et al.*, 2018) – noting that most SEs in Thailand have started their businesses for less than a decade to date.

This paper adopts qualitative methodology to investigate the role of law in promoting the development of SEs in Thailand. In so doing, it bases the examination and analysis upon a general theory of law and development established by Yong-Shik Lee (2019). The findings of this research, arguably, bring about wider implications for future development of SEs in Thailand as although a marked increase in the numbers of SEs in the country can be noticed in recent years, there is a dearth of comprehensive research on this subject. As a result, the findings of this research could serve as a spur for serious consideration and action of those who involved with SEs, especially the regulator of SEs in Thailand, namely the Office of Social Enterprise Promotion (OSEP) and the government, to formulate a package of policies that would promote and govern SEs in Thailand more effectively.

Following on from this introduction, in Part 2, we briefly review key literature on SEs in general, the development of SEs in Thailand in particular, the SEPA 2019 and other regulations governing SEs in Thailand, and a general theory of law and development established by Yong-Shik Lee. Then, the research method adopted for this paper is explained in Part 3. Next, we analyse the findings from in-depth interviews in Part 4. Finally, in Part 5, the discussion and conclusion are presented.

Research Objectives

1. To briefly examine the concept and practice of social enterprise

2. To investigate the role of law in promoting the development of SEs by adopting a general theory of law and development

3. To offer some recommendations on the promotion and governance of Thai SEs under the Social Enterprise Promotion Act 2019

Literature Review

SEs: Concept and Practice

As noted, in many countries, the practice of SEs is no longer a new phenomenon. Presumably, SE as a concept originated in the European continent in the 1970s; particularly the term "social enterprise" was first coined after *Nikhilesh Dholakia* and *Ruby R. Dholakia* published their article titled – *Marketing planning in a social enterprise: A conceptual approach* – in the European Journal of Marketing. Conceptualizing SE may not be straightforward as the nature, characteristics, forms and practices of numerous SEs around the world are somewhat different (Ridley-Duff & Bull, 2016). That said, in this paper, we argue that SE as a concept refers to an entrepreneurial activity seeking to facilitate social and/or environmental development; thus, SE as an organisation can be simply defined as a business venture with social/environmental purposes. Nevertheless, it should be noted that while the running of SEs is based on a market approach similar to normal business, the ultimate goal of SEs is not profit maximization that would please the owner(s) and/or stakeholders as the majority of profits has to be utilized for the purposes of the running of that particular SE (Prateeppornnarong, 2021).

The emerging of SEs stemmed from that fact that the non-profit sector is financially constrained while several non-profit organisations are arguably operated in a paternalistic

Development of Social Enterprises in Thailand: A Critical Investigation of the Social Enterprise Promotion Act 2019 within a Theoretical Framework of Law and Development

108

fashion – an individual influence of the organisational direction – all of which result in voluntary failure (Salamon, 1987). To enable non-profit organisations to stand on their own feet, a market-based approach was adopted for making these organisations more financially independent so that they can continue to create positive impacts on wider society (Teasdale, 2011; Khieng & Dahles, 2015; Nuchpiam *et al.*, 2018). In the present, however, SEs do not necessarily have their historical roots in the non-profit sector as many of them have registered as commercial entities from the outset. It should also be noted forms and legal statuses of SEs in the countries and jurisdictions without a specific legislation governing SEs are more diverse and varied than those countries having a specific legislation; for example, in the UK, the forms of SEs range from a sole proprietorship to a public limited company (see Richardson, 2015).

In Asia, the concept of SE was well accepted as a trend since 2000 particularly in East Asia (Bidet & Defourny, 2019). South Korea is, arguably, the country that has gone furthest among other Asian countries in terms of promoting SEs as the Social Enterprise Promotion Act (SEPA) was enacted in 2007 with a view to promoting and governing SEs in the country (Bidet *et al.*, 2019). In Southeast Asia, SEs have begun to burgeon in the last five years in Singapore, the Philippines, Malaysia, Indonesia and Thailand (British Council *et al.*, 2021). In Singapore, for instance, SEs are on the rise every year. According to the annual report of Singapore Centre for Social Enterprise (raiSE) (2020), the revenue generated by Singapore's SEs in 2019 was almost double of that of in 2018 with 176 million Singapore dollars (SGD). Overall, SEs in Southeast Asian countries are increasing significantly and are contributing most to social development particularly employment opportunities (British Council *et al.*, 2021).

The Development of SEs in Thailand

Even though SE as a concept and the law have only recently been introduced in Thailand, SE-like organisations have been around in the country for a few decades (Nuchpiam & Punyakumpol, 2019). Established in 2002 as a traditional non-profit body, the Chaophraya Abhaibhubejhr Hospital Foundation has registered with the OSEP as a non-profit-sharing SE[1] in 2019 following the adoption of the SE-like approach for more than a decade. The core objectives of the foundation are to promote the development

---

[1] See the differences between profit-sharing and non-profit-sharing SEs in the next subsection.

of Thai traditional medicine and to subsidise the Chaophraya Abhaibhubejhr Hospital through the production and sale of herbal medicine/ cosmeceuticals (Prateeppornnarong, 2021). Notably, most Thai SEs apparently developed from traditional non-profit organisations. To date, there are 179 SEs and another 52 SE-related groups registered with the OSEP (Office of Social Enterprise Promotion, 2022), while there are many other unregistered SEs running their businesses throughout the country.

Although the number of registered SEs in Thailand increases every year following the introduction of the SEPA, the concept of SE is still something of a novelty in Thai society; thus, some people who are not already familiar with the term mistakenly conflate the concept of SE with that of Corporate Social Responsibility (CSR) while some others conflate SEs with Community-based Enterprises (CBEs) taking root in the country for more than two decades (Nuchpiam & Punyakumpol, 2019; Page & Katz, 2020). Prateeppornnarong (2021) explained, however, that SE and CSR are different in terms of concepts and approaches. First, SE as a concept places importance on addressing social issues which an enterprise does not create from the first place while CSR as a concept distilled from business ethics emphasizing on how a corporate organisation should prevent from creating the impacts, mostly negative ones (e.g. environmental damage), or pay responsibility for the damage it caused. Second, SEs are commercial entities aiming at fulfilling their social purposes while CSR are activities organised by private profit-oriented organisations.

In the Thai context, comparing and contrasting between SEs and CBEs proves much more difficult as these two types of enterprises overlap each other in characteristics and goals (Nuchpiam & Punyakumpol, 2019). In several countries, the differences between SEs and CBEs do not exist as the practice of SEs is predominantly associated with the involvement of local communities; Goodwill Industries, an American SE, for example, can be indicative of how the running of an SE involves the roles of members of local communities its branches located (see Gibbons & Hazy, 2017). Nevertheless, comparing Thailand's SEPA with Community Enterprise Promotion Act (CEPA) B.E.2548 (2005), a number of differences between SEs and CBEs in Thailand can be identified. First, Thailand's CBEs do not have to be a legal entity. Second, the key objective of CBEs in accordance with the CEPA is to improve standard of living, generating income for members of a CBE. Third, the scope of SEs is much wider while the scope of CBEs is concerned with producing and selling goods (Prateeppornnarong, 2021).

SEPA 2019 and Other Regulations Governing SEs in Thailand

Effectively, the Rule of the Office of the Prime Minister on Thai Social Enterprise Promotion B.E. 2554 (2011) was the first law of the land aimed at promoting SEs in Thailand. The introduction of such regulation brought about the establishment of the Thai Social Enterprise Promotion Board (TSEPB) and the Thai Social Enterprise Office (TSEO) as key pillars for promoting SEs. It should be noted that the promotion of SEs under the regulation was mainly concerned with raising public awareness on the concept of SE and SEs as entrepreneurial activities. Noting that, during which time, SE was a novel concept in the country, this was one of the reasons as to why SEs were mostly referred to as "social business" [*Kitchakan Phuea Sangkhom*] in Thai (Nuchpiam *et al*., 2018).

Modelling on Korea's SEPA, Thailand's SEPA has been passed in 2019 as the first statutory law of the country aimed for both the governance and the promotion of SEs. There followed the establishment of the Office of Social Enterprise Promotion (OSEP) as a responsible body for monitoring and promoting SEs in the country. The SEPA introduces the certification system for the governance of SEs. Any organisations practicing SE are encouraged to register with the OSEP as an SE (Section 8).[2] The organisations eligible to register as SEs should satisfy the following key requirements:

- being a juristic person registered under Thai laws (Section 3);
- having its main purposes for paid employment; or addressing social and/or environmental issues; or contributing to the wider society (Section 5(1));
- spending 70 percent of distributable profits gained in each fiscal year for social/ environmental purposes (Section 5(3));
- having good corporate governance (Section 5(4)).

Under the Thai law, however, SEs can be certified as profit-sharing SEs or non-profit-sharing SEs (Section 6). This means only the profit-sharing SEs that are bound by the requirement on distributable profits spending.

When it comes to the promotion of SEs in Thailand, Section 59 of the SEPA prescribes that SEs may be eligible to receive financial aid from the Social Enterprise Promotion Fund, exemption of taxes, preferential procurement terms, and other benefits

---

[2] As of February 2022, there are 179 business ventures certified as SEs, see https://www.osep.or.th/#pll_switcher

as prescribed in other laws and regulations. In terms of the Promotion Fund, the core objective of it is to assist SEs with loans within a minimum and maximum period of two to four years. For the exemption of a corporate tax, it is only the non-profit-sharing SEs that are eligible to receive such benefit while the profit-sharing ones are essentially subjected to regular tax rules. In addition, in 2021, the Ministry of Finance has just passed a ministerial regulation promoting the procurement of goods and services delivered by SEs. Finally, the Thai Capital Market Supervisory Board (CMSB) issued the notification in 2020 allowing SEs to proceed with public offering without being a listed company in the Thai Stock Market. Not only benefits, Thai SEs are also bound to comply with certain duties. First, SEs have to submit to the OSEP a financial report and an impact report annually. In addition, SEs need to contribute to the Social Enterprise Promotion Fund (Prateeppornnarong, 2021).

In respect of SEs governance, there are Social Enterprise Promotion Board (SEPB) and the OSEP. The SEPB governs SEs affairs in Thailand at the macro level, devising policies and laws in relation to both promotion and governance of SEs. As regards the OSEP, its role primarily is concerned with monitoring the operation of SEs on a day-to-day basis. For instance, the OSEP acts as a registrar for Thai SEs. It also has the authority to monitor and inspect whether SEs run their businesses in compliance with the SEPA (Prateeppornnarong, 2021).

Overview of Law and Development

The idea behind law and development can be traced back at least to Max Weber (Krevor, 2018).[3] Even without invoking such an earlier root, we can say that law and development has a relatively longstanding disciplinary basis. Launched more than half a decade ago – though as "more of an adjunct to development policy institutions than an autonomous academic field" (Trubek, 2016: 302) – law and development has now become, as Trubek (2016) characterizes it, "alive and well" as a field of study. However, its academic status has admittedly been far from well established. There is very little clarity as to what this field of study encompasses (Prado, 2010). According to Tamanaha, law and development is better not seen as a field since its work is "more aptly described

---

[3] In Weber's view, the operation of a capitalist market must be supported by a high level of predictability and calculability for actors in the market. This is the product of what Weber called "legal rationality".

as an agglomeration of projects advanced by motivated actors and supported by external funding" (Tamanaha, 2011: 220). It is therefore imperative that we make clear how law and development can serve as an approach for this study.

In doing this, we propose to provide a brief account of the evolution of law and development, which is generally understood as comprising three stages or "moments", and assess its relevance to the subject matter of this study. The three-stage evolution of law and development has been well documented. Despite continuing contention over its disciplinary status, we will, following Trubek, designate law and development as a field of study. Trubek sees this academic field as getting started in the 1960s with the start of support for legal reform projects by international development agencies. Though its evolutionary path came to a halt in the late 1970s, the field experienced a revival in the late 1980s and early 1990s, before entering its current stage at the beginning of the twenty-first century (Trubek, 2016). He calls the three different stages "moments", though the timeline of the evolutionary path has been differently identified in some of his other articles. This is a difference in minor detail (Trubek & Santos, 2006). The main contour of the timeline is unmistakably clear – the period starting roughly from the 1950s to the present.

We will not address the numerous issues being considered or debated in law and development, such as the question why a country like China has achieved impressive economic growth despite its dismal rule of law situation in this brief account of the evolutionary path of law and development. We will only roughly examine the three "moments" along this path, and the associated ideas and reform programs. The three moments have been known, respectively, as the "law and development movement", the "good governance programs", and the "rule of law and development", among other designations (Tamanaha, 2011).

First Moment: The law and development movement

Known as the law and development movement, the first moment focused on the role of the state in managing the economy and transforming traditional societies. Conceived in this way, law simply served as a tool for economic management and a catalyst for social change (Trubek & Santos, 2006). The 1950s and 1960s witnessed rapid decolonization, from which an academic interest in the development of the newly

independent states emerged. Also known as "modernization theory", the academic interest focused on their economic and political development, with legal development forming an integral aspect of both (Tamanaha, 2011). According to Lawrence Friedman, the idea is that "a more highly developed legal system leads to a more highly developed economy and polity" (Friedman, 1969: 58).

The idea led to the initiation of law reform projects, whose number was still small, and which targeted only a few parts of the world. The law and development movement thus took shape on the basis of the assumption that "transplanting law from advanced countries was a shortcut to legal modernization" (Trubek, 2016: 5). This involved transplanting both legal institutions and codes into the developing countries, as well as establishing and/or reforming legal education and professional organizations in accordance with the western models.

The project came to a failure, for which various explanations have been offered (Trubek, 2016). However, it should be noted in this connection that the law and development movement already collapsed at the formative stage of its development as a field; that is, it had no chance to further develop. According to Trubek (2016: 8), "[t]he reason the field declined in the 1970s was that it lost the support of the development agencies before it could build a sustainable base in the academy". Moreover, in academia itself, the movement could not take hold as an academic field, given its tentative and experimental quality that did not fit the current models of authoritative legal scholarship. There was also an absence of an academic career path for this field in U.S. law schools, and students' interest remained limited and critical, especially at the tumultuous time of students' opposition to U.S. intervention abroad.

Second Moment: The good governance programs

The late 1980s ushered in new ideas, which moved law back to the center of development policy making. Under the influence of the neoliberal theory, what is called "the project of markets" came to the fore. Economists who stressed the importance of markets to development came to "rediscover" the significance of institutions (Davis & Trebilcock, 2008: 902);[4] this, in turn, led them to focus on legal institutions needed both

---

[4] The "rediscovery" of law by economists coincided with the emergence of the New Institutional Economics (NIE), which incorporates a theory of institutions – laws, rules, customs, and norms – into economics.

Development of Social Enterprises in Thailand: A Critical Investigation of the Social Enterprise Promotion Act 2019
within a Theoretical Framework of Law and Development

114

to facilitate the operation of markets and limit state intervention in the economy.

> For many who promoted the project of the markets, growth would be best achieved if the state stayed out of the economy except to the extent that – through law – it now provided the institutions needed for the functioning of the market. These include guarantees for property rights, enforcement of contract, protection against arbitrary use of government power and excessive regulation. All this was packaged as "good governance" and deemed important both to stimulate domestic growth and attract foreign investment (Trubek, 2006: 85).

During this second moment the idea was clearly for law to foster private transactions. The focus was naturally on private law that would protect property, facilitate contractual exchanges, impose strict limits on state intervention, and ensure equal treatment for foreign capital. Most notably, this was the moment of a massive increase in both the size and scope of investment and projects to support legal reform: law and development indeed became a "big business".

> The projects of this new second moment in law and development covered all aspects of the legal system from courts and legislatures to bar associations and law schools with reform of the judiciary the top priority. The size and scope of these projects dwarfed the investments in the L&D in the first moment (Trubek, 2016: 12).

Many developing countries actually suffered from the neoliberal policy prescriptions they had to adopt as a condition for receiving development assistance. On the intellectual front, critiques of the neoliberal perspective on development resulted in new ideas about development, particularly the recognition of the limits of the markets and the expansion of the definition of development. Markets could fail and compensatory intervention was required, and development came to mean more than economic growth (Trubek & Santos, 2006). Such new ideas partly provided a basis for the third moment in law and development, which will be dealt with below.

Third Moment: The rule of law and development

The third moment in the evolution of the law and development doctrine still remains in its formative stage (Trubek & Santos, 2006), particularly in so far as it is yet to gain the status of a sub-field of law. Nonetheless, despite its existing affiliation with an amalgam of various ideas on the place of law in development, the emergence in the 1990s of novel views of both law and development has resulted in the transformation of the discipline, especially making it more answerable to the broader challenges of the world today and no longer focused simply on economic growth. In practical terms, the law and development scholarship has actually gone "beyond the instrumental view of law as a tool for development", and "a functioning legal system with basic guarantees" is being regarded as "an element of what should properly be called 'development'" (Trubek, 2016). We will next consider some important aspects of the transformation that has occurred.

The change leading to our current understanding of development is of particular importance. A highly influential view has been presented by Amartya Sen, whose conception of development shifts our focus from economic growth to "freedom" (Sen, 1999). Prado (2010: 5-6) has concisely summarized Sen's conception of development as follows:

> [Proceeding from the] idea that wealth is not an end in itself but a means to realize more choices and therefore more freedom, Sen elaborates on the distinction between the ends and means of development. Thus, economic growth is important because it allows us to live the lives we have a reason to value, which is the end of development. But wealth alone does not guarantee that we will be free. Indeed, there is a series of instrumental freedoms that directly or indirectly allow people to choose to live as they would like. According to Sen, development as freedom requires political freedoms, economic facilities, social opportunities, transparency guarantees, and protective security.

In roughly the same period of time, the legal scholarship also underwent very significant change. In particular, there was a move away from "one-size-fits-all" recipes based upon western models. This led to the broadening of the scope of the legal scholarship to include "socio-legal studies" of all kinds and the "law-and-society" idea – the idea that "law must be studied in its social context using tools of the social sciences"

(Trubek, 2016: 14). This change in the legal scholarship also significantly resulted in a shift in the role of law, which had traditionally been a tool for attaining some other goal, such as economic growth, individual liberty, or social protection. As a result of this important change, law has become an integral part of the new conception of development – this is what we call "law as development".

> [R]ecently, scholars inspired by the work of Amartya Sen have argued that the existence of the rule of law is a goal in itself, a necessary part of the process of empowerment and capability-enhancement that constitutes development. This means that legal protection for constitutional values and human rights, including economic and social rights, must form part of the law and development agenda along with economic law and judicial reform (Trubek, 2016: 20).

Evidently, the new law and development scholarship has come to recognize the role of law not simply as a tool for creating and protecting markets but also as a mechanism for limiting market access, while at the same time catering to social benefits and reliefs for the poor. The neoliberal doctrine of private and development would understandably still be upheld, but the new scholarship at the same time strives to initiate proper regulatory frameworks for market behavior (Trubek & Santos, 2006). Most significantly, it must be emphasized that law as development is intrinsically connected with the concept of development as freedom. As such, legal reforms and rule of law become ends in themselves (Prado, 2010). Citing Trebilcock and Daniels, Prado (2010: 5) provides the following elaboration on this point:

> [In so far as] freedom, in its various dimensions, is both the end and means of development, various freedoms, such as freedom from torture and other abuses of civil liberties by tyrannical rulers, freedom of expression, freedom of political association, freedom of political opposition and dissent, are defining normative characteristics of development; rule of law, to the extent that it guarantees these freedoms, has an intrinsic value, independent of its effect on various other measures of development and does not need to be justified solely on instrumental terms.

Notably, we consider that law and development conceived in this manner is particularly relevant as an approach to the study of the development of social enterprise in Thailand. We found that the general theory of law and development developed by Yong-Shik Lee well serve our purpose. Therefore, we discuss the development of our conceptual framework in the next section.

A General Theory of Law and Development

As mentioned in the previous section, the ultimate goal of law and development, particularly the current third moment, is to prove that the role and impact of law are relevant to sustainable development. Despite five decades of efforts to do so, law and development has yet to become a robust academic field. According to Yong-Shik Lee, the failures of law and development is partly but significantly caused by the lack of an adequate analytical framework and empirical evidence (Lee, 2015). One major difficulty in creating such a framework is that it requires what Tamanaha (2011: 214) calls the "connectedness of law principle". In other words, the success of law and development does not rely only on law and legal institutions, but also on a variety of factors including

> [...] the history, tradition, and culture of a society; its political and economic system; the distribution of wealth and power; the degree of industrialization; the ethnic, language, and religious make-up of the society (the presence of group tensions); the level of education of the populace; the extent of urbanization; and the geo-political surroundings (hostile or unstable neighbors) – everything about a particular society matters (Tamanaha, 2011: 214).

Though Tamanaha believes that law and development is misleading and fated to fail, we share other scholars' views that the law and development discourse is still worth the effort (Trubek & Santos, 2006; Davis & Trebilcock, 2008). As shown in the evidence of the successful cases of Japan, South Korea, and Taiwan, law and development is not a complete disappointment. What we need is an exploration of alternative methods and more empirical studies. Lee's recently developed general theory of law and development is one good example (Lee, 2019).

Development of Social Enterprises in Thailand: A Critical Investigation of the Social Enterprise Promotion Act 2019 within a Theoretical Framework of Law and Development

118

In 2015, Yong-Shik Lee called for a new and comprehensive analytical model for law and development, which assesses the impact of law, legal frameworks, and institutions (LFIs) on development, in response to decades of unsuccessful attempts to advance the law and development discourse. The justification for developing such a model, which works as a legislative and institutional guidance rather than a rigid legal transplant framework adopted in the first law and development movement, is to "bridge the gaps and to establish the field more firmly as an academic discipline that contributes to the economic progress of developing countries" (Lee, 2015: 2). He thus proposed the Analytical Law and Development Model (ADM), which has later been further developed into a general theory of law and development (hereafter the "general theory") (Lee, 2017).

The main purpose of the general theory, which is shared with other law and development concepts, is to prove that the role of law is relevant to development. In doing so, the general theory provides a theoretical framework equipped with certain mechanisms explaining "dynamics among law, institutions, and the existing political, social, and economic conditions" (Lee, 2019: 38). What makes Lee's general theory different is that such a framework is flexible and analytical, rather than prescriptive like the legal transplant model (Lee, 2015). To be more specific, though the general theory has been developed based on the investigations into the successful development case of South Korea, it does not support the idea of transplanting laws and regulations which worked effectively in South Korea into other countries' legal systems.[5] Rather, the Korean case should be used as a working reference for legislation.

What is significant is that the general theory aims to develop a 'general' framework and mechanisms which could work even in other countries adopting different laws, legal frameworks, and institutions (LFIs) in their specific socioeconomic contexts. Though this definitely sounds difficult and needs empirical evidence, the general theory does not seek to dictate what LFIs be worked out and how they should operate. It aims rather to give guidance or a structure for the consideration of what adjustment should be introduced

---

[5] According to Lee (2017), several developing countries, including Vietnam, Cambodia, Myanmar, and Bangladesh, have adopted certain Korean laws such as the Code of Ethics for Government Officials and the Information Disclosure Act. Thailand's Social Enterprise Promotion Act B.E. 2562 (2019) has been heavily influenced by the Korean Social Enterprise Promotion Act No. 8217 of 2007.

in keeping with the local contexts. Needless to say, these local contexts, especially those involving non-economic values, are varied in nature, relating as they do to social, cultural, as well as political factors – all of which are not easy to assess. Instead of making a reluctant effort to explain the whole thing, the general theory, justified by the effective implementation basis, focuses on the economic objectives as a 'necessary condition' to achieve non-economic ones. What differentiates the general theory from the approaches adopted during the first and second law and development moments is that it embraces both economic and social values. In theory, they are both equally important, but to make it work practically, we probably need "short-term economic gain in order to meet long-term development objectives" (Lee, 2017: 456).

The general theory does not provide the default answers to all contexts but rather offers a guiding principle which allows flexibility and adaptability. Some might consider these flexible and adaptable features as limitations. There is in fact no one size that fits all. The general theory developed by Lee is not a means to *solve* developmental issues, but rather to shed some light on what we lack and where we should improve, which could probably lead us to a new framework that fits our own local contexts (Lee, 2015). In particular, as Lee has asserted, "the [law and development framework], if it is to be useful for developing countries, needs to be dynamic, rather than static, in the sense that it should be able to present different sets of LFIs adoptable in different stages of economic development" (Lee, 2015: 30). This is thus an alternative model of law and development which is worth testing.

The general theory is founded on a specific view on the relationship between law and development, one which sees that "law, as well as the policy that it advances, is relevant to development and is subject to a separate analysis" (Lee, 2019: 3). In this regard, law is neither a mere policy instrument for the achievement of development, nor a development goal in itself. Put another way, law is not subordinate to policy; nor is it expected to yield specific results. Lee has developed a general theory proposing that the impact of law on development is real, and he has taken the case of South Koreas evidence of his theoretical view. He however admits that the level of development varies, depending on numerous factors, including what he calls the determining and variable elements – the former involving the disciplinary parameters of "law" and "development", and the latter referring to the "regulatory impact mechanisms" being aimed to explain

120

Development of Social Enterprises in Thailand: A Critical Investigation of the Social Enterprise Promotion Act 2019
within a Theoretical Framework of Law and Development

the existing political, social, and economic conditions. These mechanisms are related to the design, the compliance and implementation of development-facilitating policies and laws (Lee, 2019). The determining and variable elements are nevertheless not mutually exclusive.

As mentioned earlier, the main elements of Lee's general theory are 'law' and 'development'. We are not trying to answer what law is from a philosophical concept of law, but rather from a practical context of law and development. Thus, the main objective of this study is to understand the role of social enterprise law in achieving development. This is because a poorly-designed law could affect development instead of promoting it. However, another important question is what type of development law should promote, whether it is an economic or social development. According to Amartya Sen (1988: 11),

> [T]he success of all [economic growth] has to be judged ultimately in terms of what it does to the lives of human beings. The enhancement of living conditions must clearly be an essential – if not *the* essential – object of the entire economic exercise and that enhancement is an integral part of the concept of development.

As already explained, the first and the second law and development moments, which primarily focused on economic growth alone, proved to be unsuccessful. They seemed to move away from non-economic values such as poverty, misery and well-being since their impact is hard to measure. They also ignored the fulfilment of basic needs and enhancing the quality of life. The general theory instead reflects the third moment of law and development which aims for a holistic and sustainable development. Its framework thus attempts to accommodate both economic and social development objectives since they are equally necessary. Such objectives are the anticipated policy outcomes which development-facilitating laws desire. To be more specific, how should a law be designed to enhance both economic and social development? And how can we prove that? To examine how law can create an impact on development, Lee has proposed a framework for assessing a regulatory impact called "regulatory impact mechanisms", comprised of three main areas: (1) regulatory design, (2) regulatory compliance, and (3) the quality of implementation.

(1) *Regulatory design* investigates the anticipated policy outcome which should be clear and purposeful. The anticipated outcomes are "the specific outcomes that are anticipated as a result of the implementation of [economic and social development] policies" (Lee, 2019: 46). This helps clarify the development objectives of applicable laws and analyze whether such objectives will advance the development expectations. In addition, an effective law needs a balanced structure between legal frameworks and institutional support, which Lee calls LFIs. It is "the quality of the institutions that administer law and not the law *per se*, that offer a chance for development" (Lee, 2015: 18-19). Last but not least, arguably, it is vital for the theoretical framework of law and development to be flexible and adaptable to the changing environment of a range of social, political, economic, and cultural conditions (Lee, 2019). According to Hadfield (2007: 4), "the key insight here is that the capacity for a legal regime to generate value-enhancing legal adaptation to local and changing conditions depends on its capacity to generate and implement adequate expertise about the environment in which law is applied". Such expertise (or socioeconomic conditions) involves legal systems, the judiciary and legal human capital. This is in fact the same as Lee's LFIs. As a result, the analysis of the adaptation of law to socioeconomic conditions cannot be conducted disjointedly from the other elements: the anticipated policy outcome and the LFIs.

(2) *Regulatory compliance* refers to "compliance with law by those who are subject to the application of law" (Lee, 2019: 50). To put it simply, to determine whether a certain law is promoting development requires an effective compliance. As Lee justifies, "a [legal] reform that does not take regulatory compliance into consideration may end up a hollow declaration without real impact...regulatory compliance is [thus] one of the key elements in determining regulatory impact on development" (Lee, 2019: 50). The rule of law is commonly used, in a form of an index, to gage the overall regulatory compliance and development progress;[6] as can be seen that there are currently more than 150 indicators of the rule of law (Versteeg & Ginsburg, 2017). Each indicator generally involves a legal system which embraces democracy, human rights, good governance and anti-corruption. Versteeg and Ginsburg compared and contrasted the rule of law indicators

---

[6] The rule of law, embodied in Goal 16 (peace, justice and strong institutions) of the United Nations' 2030 Sustainable Development Goals (SDGs), is a core element to the achievement of sustainable development.

Development of Social Enterprises in Thailand: A Critical Investigation of the Social Enterprise Promotion Act 2019 within a Theoretical Framework of Law and Development

122

proposed by four influential international organizations, namely the World Bank,[7] the Heritage Foundation,[8] Freedom House,[9] and the World Justice Project (WJP)[10] in order to identify underlying concepts of the rule of law. It was found that all four indicators were remarkably similar to each other, suggesting that they are all valid proxies of the rule of law (Versteeg & Ginsburg, 2017). However, indexes are only a means to an end, not a guarantee in itself.

(3) *Quality of implementation* considers two main factors, namely, state capacity and political will (Lee, 2019). Regulatory implementation shows the actual impact and effectiveness of the laws whether they have achieved the anticipated policy outcome. State capacity means the capability of the state to fulfil its anticipated policy objectives – economic, social, fiscal, political and so on. In his research, Dincecco (2018) points out that greater state capacity can propel economic development, but it is still somewhat difficult to achieve as there are many factors involved (Dincecco, 2018). The core duty of the state is to provide three basic public goods: domestic law and order, secure private property rights, and military defense against external attack threats. However, even though the state can properly provide all resources necessary to implement laws, it does not always guarantee the effective implementation. Political will is another important element, which generally used to describe the success or failure of development policies. Manor defines the term as "the determination of an individual political actor to do and say things that will produce a desired outcome" (Manor, 2004) while Lee refers to it as "the commitment and devotion of a country's political leadership to the implementation of law…[it] is more than a mere interest, which may be demonstrated by the continued implementation of consistent development policies for an extended period of time, allocating substantial political and economic capital" (Lee, 2019: 58). Policy inconsistency has been a major problem in Thailand for a long time. A new government always comes

---

[7] World Bank, *Worldwide Governance Indicators*, available online at: <https://info.worldbank.org/governance/wgi/#home>, accessed January 2, 2022.

[8] Heritage Foundation, *2019 Index of Economic Freedom*, available online at: <www.heritage.org/index/>, accessed August 2, 2019.

[9] Freedom House, *Freedom in the World Countries 2019*, available online at: <https://freedomhouse.org/report/countries-world-freedom-2019>, accessed January 2, 2022.

[10] Word Justice Project, *WJP Rule of Law Index 2019*, available online at: <https://worldjusticeproject.org/our-work/research-and-data/wjp-rule-law-index-2019>, accessed January 2, 2022.

with a new political will (as already seen in the termination of the former Social Enterprise Promotion Office), affecting the promotion of development.

Research Methods

As regards research design, this research adopts qualitative methodology to investigate the role of law in promoting the development of SEs, addressing the research objectives. Using a critical analysis as its design frame. The informants of this research are selected based on their merits; as a result, the interviewees consist of the OSEP's representatives, SEs' owners,[11] academics in the field and a number of legislators knowledgeable about Thailand's SEPA. Data collection for this research is based on an in-depth interview technique.

As yet, only a handful of people in Thailand really understand what social enterprise is all about, especially from the conceptual and legal aspects. Time constraint was another limitation; thus, the total number of interviewees are limited to five only. However, the interviewees are selected based on their depth of knowledge and relevance to the development of SEs in Thailand (Thomas, 2013). Importantly, this research complies with the principles of research ethics; hence, informed consent is given before each interview while the anonymity of all interviewees is also preserved (Prateeppornnarong, 2019). In addition to the in-depth interview, documentary sources remain important for research (Gilbert, 2008). Key documents in this research include relevant laws and regulations, research papers, official reports etc. As a result, when it comes to data analysis both primary and secondary data is used.

Research Findings

The findings of this research demonstrate that the SEPA contributes significantly to promotion and governance of Thai SEs in the way that it incentivizes not just managers of non-profit organizations but also Small and Medium-Sized Enterprises' (SMEs) owners to switch into the realms of the social business sector, offering a number of benefits

---

[11] SEs selected in this study are profit-sharing ones. The reason is this type of SEs neither have a strong foundation nor the same privileges like its non-profit-sharing counterparts. The experience of the owners of profit-sharing SEs are of valuable for reflecting the pros and cons of the SEPA of Thailand.

from loans from the social enterprise promotion funds to preferential purchase by public institutions. One of the OSEP's top managers interviewed for this research further explains other benefits for Thai SEs as follows:

> [Apart from the benefits prescribed by the SEPA] Our office [the OSEP] is now partnering with the Government Savings Bank so as to provide SEs with a source of microcredit. What's more, we are also collaborating with the Securities and Exchange Commission (SEC) of Thailand on giving SEs opportunities in the Stock Market (Interviewee 1, Senior Manager of the OSEP, 12 December 2021).

That said, there are a number of potential pitfalls hidden in the SEPA. Our findings point out that, first, on the whole, the concept of social enterprise and the practice of SEs are somewhat incomprehensible to a sizeable proportion of members of the Thai public as well as those people working in public institutions. As one of our interviewees has highlighted as follows:

> Making people understand what social enterprise is all about is an important task. The key question is how can we explain people to realize that the practice of SEs creates both social and financial values (Interviewee 2, Senior Officer of the OSEP, 20 December 2021).

This interview data is in line with our analysis in that, in Thailand, many people including public officials still understand SEs as "social work," helping people with disabilities, most of them are unaware of the fact that SEs are also business ventures. Add to this, our findings also suggest that, unlike promotion of SEs in other countries, the fact that Thailand's SEs can be classified into profit-sharing and non-profit-sharing SEs makes it harder for the people to comprehend what SEs are actually about. Notably, non-profit-sharing SEs are in absolute majority of all SEs certified (Prateeppornnarong, 2021).

Some SE entrepreneurs interviewed for our research highlighted that there are a number of elements in the SEPA that seem to be more of a hindrance than a help. One of them explains that:

> ...the law [SEPA] requires that, prior to being certified as an SE, the owner needs to show financial statements of the last financial year. This means

you have to be a juristic person in any forms already before you are able to switch to an SE. I think this is not helpful. Why don't you train people how to run an SE (Interviewee 3, SE entrepreneur 1, 25 December 2021).

In addition to this, another entrepreneur also suggests that:

I think those people wanting to run SEs are capable of facing many challenges but the key thing is when it comes to law, it is much better if we, as entrepreneurs, can co-design with the public sector (Interviewee 4, SE entrepreneur 2, 30 December 2021).

All of these data are in line with the comments made by one of the experts on Thailand's SEPA which underlines that: "In Thailand, it is governance of SEs that swings the balance" (Interviewee 5, SEPA's expert, 3 January 2022). This interview data resonates with our analysis that the public sector places emphasis on governing SEs.

Even though the SEPA already prescribes how certified SEs can be benefited from the law, the lack of secondary legislation becomes an obstacle to the implementation. For instance, the social enterprise promotion fund is not in place even though the committee that will be looking after the management of the fund has already been convened (Prateeppornnarong, 2021). In addition, the findings also highlight the fact that the OSEP has not done much in relation to training for those people wanting to run SEs.

Discussion and Conclusion

Through the qualitative research approach, this research briefly examines the concept and practice of SEs while it also investigates the development of SEs in Thailand. More importantly, a general theory of law and development developed by Yong-Shik Lee is applied for the analysis on the role of law in facilitating development, especially the development of SEs in Thailand.

Based on a general theory of law and development, it can be seen that regulatory design, regulatory compliance and quality of implementation are key components for the role of law in facilitating development. Distilled from the theory, we argue that the key challenges of Thailand's SEPA in facilitating development of SEs in the country are consisted of the issues on regulatory design and quality of implementation. First and foremost, as the findings suggest, the SEPA, arguably, promotes SEs in Thailand with very much

Development of Social Enterprises in Thailand: A Critical Investigation of the Social Enterprise Promotion Act 2019 within a Theoretical Framework of Law and Development

126

attachment to the non-profit sector, creating an image for SE as social work. Add to this, most benefits provided by law are available only for non-profit-sharing SEs. All of these elements will make the realms of SEs in this country less attractive to business owners or investors who want to do their business while contributing to the society at the same time.

Although we acknowledge the fact that regulating SEs in a systematic way is necessary, the current form of the SEPA which overemphasizes SEs arguably, however, deters those people from the private sector to invest in SEs. The fact shows that a number of profit-sharing SEs are now switching to non-profit-sharing ones while a few certified SEs are now seeking to stop running as SEs (see, OSEP Announcement dated 3 May 2021). Quality of implementation is another key issue of the SEPA. The fact shows that the SEPA is not in the state of readiness for the full-scale implementation as there is a lack of secondary legislation on many fronts, one of them is the operation of the social enterprise promotion fund. Our analysis points out that this boils down to the fact that the government does not fully understand what SEs are all about and how to utilize the practice of SEs to its utmost benefits. This relates to state capability and political will for propelling and encouraging the growth of SEs in this country (Nuchpiam *et al.*, 2018).

Based on the findings, we offer two key recommendations. Firstly, while the non-profit organisations can make a significant contribution as non-profit-sharing SEs, it is important to note that the private sector can also do the same. We argue that greater involvement of business ventures as SEs will expand the diversity of SEs in Thailand. Noting that SEs in some countries like England, Singapore or South Korea vary considerably in their business sectors from hospitality to financial institutions (Nuchpiam *et al.*, 2018). Importantly, the diversity of SEs will also bring more innovation to the field. For example, Beautiful Store in South Korea or Soft Landing in Australia are some SEs that innovatively contribute to the reduction of waste and dumping fields (see, Prateeppornnarong, 2021). Therefore, the SEPB should push forward the amendment of the SEPA adding more mechanisms for attracting the private sector investment and the across-the-board involvement.

Secondly, raising public awareness on SEs is of vital importance. Leaving aside those people who do not know what an SE is, as the findings suggest, many people

already knew SEs still have mistaken SEs as organisations attached to the non-profit sector. This is arguably another reason that may become an obstacle to the development and growth of SEs in Thailand. It is therefore recommended that the SEPB and the OSEP should put the public awareness issue on their list of priorities, putting the right image on SEs.

Acknowledgement

References

Bidet, E., & Defourny, J. (2019). The Rising Interest for Social Enterprise in Asia, in E. Bidet, & J. Defourny, (Eds.), *Social Enterprise in Asia: Theory, Models and Practice* (pp. 1-13). New York: Routledge.

Bidet, E., Eum, H-S., & Ryu, J-U. (2019). Models of Social Enterprise in South Korea, in E. Bidet, & J. Defourny, (Eds.), *Social Enterprise in Asia: Theory, Models and Practice* (pp. 97-115). New York: Routledge.

British Council., United Nations ESCAP., & Social Enterprise UK. (2021). *The State of Social Enterprise in South East Asia*. British Council.

Davis, E. K., & Trebilcock, J. M. (2008). The Relationship between Law and Development: Optimists and Skeptics. *The American Journal of Comparative Law, 56*(4), 895-946.

Dincecco, M. (2018). *State Capacity and Economic Development: Present and Past*. Cambridge: Cambridge University Press.

Friedman, M. L. (1969). On Legal Development. *Rutgers Law Review, 24*(11), 11-64.

Gibbons, J., & Hazy, K. J. (2017). Leading a large-scale distributed social enterprise: How the leadership culture at Goodwill Industries creates and distributes value in communities. *Nonprofit Management & Leadership, 27*(3), 299-316.

Gilbert, N. (2008). *Researching Social Life* (3rd ed.). SAGE Publications.

Hadfield, K. G. (2007). The Quality of Law: Judicial Incentives, Legal Human Capital and the Evolution of Law. (*University of Southern California CLEO Research Paper No. C07-3*), 1-40.]

Kerlin, A. J. (2009). Introduction, in J. A. Kerlin (Ed.), *Social enterprise: A global comparison* (pp. 1-11). Medford: Tufts University Press.

Khieng, S., & Dahles, H. (2015). Commercialization in the Non-Profit Sector: The Emergence of Social Enterprise in Cambodia. *Journal of Social Entrepreneurship*, *6*(2), 218-243.

Krever, T. (2018). The Rule of Law and the Rise of Capitalism, in C. May., & W. Adam (Eds.) *Handbook on the Rule of Law* (pp. 184-200). Cheltenham: Edward Elgar Publishing.

Manor, J. (2004). Appendix 3 Understanding 'Political Will' in 'Politicking for the Poor': Final Report to the U.K. Department for International Development. Retrieved from: <www.gov.uk/dfid-research-outputs/appendix-3-understanding-political-will> access-ed January 2, 2022.

Nuchpiam, Prapin., Prateeppornnarong, Dhiyathad., & Jenjarrussakul, Bongkot. (2018). Social Enterprise in Thailand: Some Observations on the Social Enterprise Promotion Bill. *Journal of Thai Ombudsman*, *11*(1), 109-141.

Nuchpiam, Prapin., & Punyakumpol, Chanya. (2019). Social Enterprise Landscape in Thailand, in E. Bidet, & J. Defourny, (Eds.), *Social Enterprise in Asia: Theory, Models and Practice* (pp. 137-155). New York: Routledge.

Page, A., & Katz, A. B. (2020). Is Social Enterprise the New Corporate Social Responsibility. *Seattle University Law Review*, *34*, 1351-1384.

Prado, M. M. (2010). What is Law and Development? *Revista Argentina de Teoria Juridica*, *11*(1), 1-20.

Prateeppornnarong, Dhiyathad. (2019). Key Ethical Principles for Researchers in the Field of Criminology and Criminal Justice System. *University of the Thai Chamber of Commerce Journal Humanities and Social Sciences*, *39*(2), 137-150.

Prateeppornnarong, Dhiyathad. (2021). *Sustainable Development and Social Enterprise* (2nd ed.). Nonthaburi: Rattenatrai.

Richardson, M. (2015). *Social Enterprise in the UK: Developing a Thriving Social Enterprise Sector*. London: British Council.

Ridley-Duff, R., & Bull, M. (2016) *Understanding Social Enterprise: Theory and Practice* (2nd ed.). London: SAGE Publications.

Salamon, M. L. (1987). Of market failure, voluntary failure, and third-party government: Toward a theory of government-nonprofit relations in the modern welfare state. *Nonprofit and Voluntary Sector Quarterly*, *16*(1-2), 29-49.

Sen, A. (1988). The Concept of Development, in H. Chenery., & T. Srinivasan (Eds.), *Handbook of Development Economics, Volume 1* (pp. 9-26). Elsevier.

Sen, A. (1999). *Development as Freedom*. New York: Anchor Books.

Singapore Centre for Social Enterprise (raiSE). (2020). *Commemorating Five Years of Advocating for Social Enterprises in Singapore*. Singapore.

Social Enterprise UK. (2019). *Capitalism in Crisis: State of Social Enterprise Survey 2019*. London.

Tamanaha, Z. B. (2011). The Primacy of Society and the Failures of Law and Development, *Cornell International Law Journal*, *44*, 209-247.

Teasdale, S. (2011). What's in a name? Making sense of social enterprise discourses. *Public Policy and Administration*, *27*(2), 99-119.

Thomas, G. (2013). *How to Do Your Research Project: A Guide for Students in Education and Applied Social Sciences* (2nd ed). London: SAGE Publications.

Trubek, M. D. (2016). Law and Development: Forty Years after 'Scholars in Self-Estrangement.' *University of Toronto Law Journal*, *66*(3), 301-329.

Trubek, M. D., & Santos, A. (2006). Introduction: The Third Moment in Law and Development Theory and the Emergence of a New Critical Practice, in D. M. Trubek., & A. Santos (Eds.), *The New Law and Economic Development: A Critical Appraisal* (pp. 1-18). Cambridge: Cambridge University Press.

Trubek, M. D. (2006). The 'Rule of Law' in Development Assistance: Past, Present, and Future, in D. M. Trubek., & A. Santos (Eds.), *The New Law and Economic Development: A Critical Appraisal* (pp. 78-81). Cambridge: Cambridge University Press.

Versteeg, M., & Ginsburg, T. (2017). Measuring the Rule of Law: A Comparison of Indicators. *Law and Social Inquiry*, *42*(1), 100-137.

Yong-Shik, Lee. (2015). Call for a New Analytical Model for Law and Development. *Law and Development Review*, *8*(1), 1-67.

Yong-Shik, Lee. (2017). General Theory of Law and Development. *Cornell International Law Journal*, *50*(3), 415-471.

Yong-Shik, Lee. (2019). *Law and Development Theory and Practice*. New York: Routledge.

Development of Social Enterprises in Thailand: A Critical Investigation of the Social Enterprise Promotion Act 2019
within a Theoretical Framework of Law and Development

130

Law cited

Social Enterprise Promotion Act B.E. 2562 (2019), Thailand

Social Enterprise Promotion Act (Act No. 8217) 2007, South Korea

Community Enterprise Promotion Act B.E. 2548 (2005), Thailand

Rule of the Office of the Prime Minister on Thai Social Enterprise Promotion B.E. 2554
(2011), Thailand

The Dissemination of Korean Values: From the "National Anthem" to "Cultural Exports"

Jirasin Tinbang*

Abstract

This study focuses on Korean values in South Korea's national anthem video. This presents the image of South Korea from the perspective which shows not only national pride and honor but also national unity and identity in several aspects from the past until now. The study has shown that the national anthem video shows many aspects of the country's compositions: the national symbols, topography, history, politics, economy, technology, sports, and culture of South Korean people. These values are also the significant elements to impel South Korea's soft power policy toward exporting Korean culture and finally, the influence of popular trends in Korean contents or the Korean wave is becoming outstanding internationally.

Keywords: South Korea National Anthem, Values, Korean Studies, Cultural Export, Soft Power

* Faculty of Arts, Chulalongkorn University
  254 Phaya Thai Road, Wang Mai, Pathum Wan, Bangkok 10330, THAILAND.
  E-mail: jirasin.tin@gmail.com

การส่งผ่านค่านิยมเกาหลี :
จาก "เพลงชาติ" สู่ "การส่งออกวัฒนธรรม"

จิรสิน ถิ่นบาง*

บทคัดย่อ

บทความนี้เป็นบทความที่ศึกษาเกี่ยวกับค่านิยมเกาหลี ที่ปรากฏในภาพวีดิทัศน์เพลงประจำชาติ ซึ่งสามารถสะท้อนให้เห็นถึงภาพลักษณ์ของประเทศเกาหลีใต้ในมุมมองที่ต้องการแสดงออกให้เห็นถึงความภาคภูมิใจในชาติและบ่งบอกเอกลักษณ์และอัตลักษณ์ประจำชาติของชาวเกาหลีในหลายด้านตั้งแต่อดีตจนถึงปัจจุบัน จากการศึกษา พบว่า ในวีดิทัศน์เพลงชาติได้ปรากฏให้เห็นถึงองค์ประกอบของประเทศในหลากหลายด้าน นับตั้งแต่สัญลักษณ์ประจำชาติ ลักษณะภูมิประเทศ ประวัติศาสตร์ การเมือง เศรษฐกิจ เทคโนโลยี การกีฬาและวัฒนธรรมของชาวเกาหลีใต้ นอกจากนี้แล้วค่านิยมในด้านต่าง ๆ ดังกล่าวยังเป็นองค์ประกอบสำคัญในการขับเคลื่อนนโยบาย Soft Power ของเกาหลีใต้ จนนำไปสู่การส่งออกวัฒนธรรมเกาหลี และในที่สุดอิทธิพลของกระแสคลื่นความนิยมในเนื้อหาความเป็นเกาหลี หรือโคเรียนเวฟ จึงกำลังมีความโดดเด่นในระดับสากล

คำสำคัญ : เพลงชาติเกาหลีใต้ ค่านิยม เกาหลีศึกษา การส่งออกวัฒนธรรม Soft Power

* คณะอักษรศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
  เลขที่ 254 ถนนพญาไท แขวงวังใหม่ เขตปทุมวัน กรุงเทพมหานคร 10240
  อีเมล : jirasin.tin@gmail.com

1. Introduction

A national anthem is a composition that contains music and lyrics which express one's nationality. Its content is often suggestive of the history, art, and culture or the people's struggle for the nation, including the identity or the portrayal of that land. The oldest national anthem is "God Save the Queen", the national anthem of the United Kingdom (Sripanaratanakul & Chansatitporn, 2016, p. 21). A song becomes a true national anthem when it is officially acknowledged by the government of that country or when the people are in agreement that it is one. The book "National Anthem" by Sukree Charoensuk categorizes the meanings of national anthems into four types: (1) the nation of the people; (2) the political position as an independent, sovereign country; (3) a national symbol; and (4) an artistic expression of the people in that ethnic group.

The national anthem of the Republic of Korea (Aegugka) (애국가) can be directly translated as "Patriotic Song" or "Song of Loving the Country." The lyrics of Korea's national anthem were first written sometime around 1907 with the intention of inspiring love and allegiance to the country, as well as a sense of independence at a time when the country was under foreign aggression. Following adaptation by several composers, the lyrics gradually took the form we know today. Initially, the Aegukga was sung to the tune of the Scottish folk song, "Auld Lang Syne." While studying abroad, Korean composer Ahn Eak-tai (안익태) felt that this foreign melody was unfit for Korea's national anthem. In 1935, he composed the Symphonic Fantasy Korea, whose finale became the current melody for the national anthem. Even though the Provisional Government of the Republic of Korea, which had fled to Shanghai, China, adopted this tune as their national anthem, it was only known abroad. In Korea, the lyrics continued to be sung to the Scottish folk song until the Korean government was established in 1948 following the nation's independence from Japan. During the office of President Lee Seung-man (리승만), this national anthem was played at the ceremony to commemorate the occasion, and it was declared the official national anthem. At that time, the current version of Aegukga was sung during official government functions, and gradually, with its inclusion in all student textbooks, it gained popular acceptance. Afterward, the song was widely disseminated abroad and finally became established as the national anthem of Korea. Whenever people sing Aegugka, which, for almost a century, has been part of the people's destiny both in good times and bad, they are reminded of the love that their forefathers

held for the nation. In the analysis of the content of the Korean national song, it was found that imperatives were mainly used, such as praying to God or all the gods to help protect the country. Most importantly, it shows the highly patriotic values of the Korean people. Petasen P. (2021) said that Korean people consider their nation as their priority, followed by family, and finally, themselves (The Secret Sauce, 2021).

For these reasons, the importance of a national anthem lies in its status as a symbol of the nation and its unity. Its main purpose is to rouse patriotic sentiments among people of the same race so that they are loyal to their country, no matter where they live. The national anthem is often played during state ceremonies or important national ceremonies and is symbolically used to express the identity and pride of the nation in activities such as international sporting events. Also, many countries often portray their nation through carefully chosen images in a video, and this is how a video becomes a national anthem video, which aims to help increase feelings of patriotism and understand what the national anthem wants to convey more easily through the combination of visualization and music.

2. Research Objectives

The aims of this study were: (1) to study the values of South Korean people in the national song video, and (2) to analyze the origins and reasons why the images are in the national anthem video and the relation to Korean cultural export.

3. Literature Review

3.1 The Concept of Imagined Communities by Benedict Anderson

The idea of imagined communities first appeared in the book "Imagined Communities: Reflections on the Origin and Spread of Nationalism". This concept is about a nation as a collective imagination of the community, which is a common image of the roots, identity, traditions, and culture of a nation that people in that community or citizens have in common.

According to Benedict Anderson's framework, the nation's determinants were described as an imagined community which can be summarized in four things as follows:

1) The common imagination of the people in the nation. Even though people are scattered in different areas, these people have a common sense of unity under the same principle/ideology (communion). The belief in this common imagination is the nation.

2) The imagination of a nation is placed on a limited border, and thus the nation is imagined through the border area by living in the same place known as the same "home", which can be seen from the creation of "us" or "our being". On the contrary, they create otherness to other people that are different, such as the separation of our nation and a foreign one.

3) The freedom to independently determine the future of the nation through what is known as sovereignty caused the discourse "Nation of all people" or "Nation of the people".

4) The imagination of the nation has a state of being a community even though there is inequality at the political, economic, or social levels. But indigenous people often have the image of their relationship with their compatriots as deep and horizontal comradeship (Anderson 2006, pp. 6-7 as cited in Leawpiroj, 2018).

According to the above theory, it can be analyzed that the use of the national anthem is one of the substitutes for building and maintaining nationalism and national identity with symbols, identity, and national language. This will result in the Korean people being unified in terms of people's values that cause pride in what their own country has or what their own country is.

3.2 The Concept of Soft Power by Joseph S. Nye

Soft power, in the framework of Joseph S. Nye, is described as the ability to attract and convince rather than command or coerce. This means enabling other countries to see their own country's values, interests, and likes or dislikes without having to rely on trade-offs, which is the use of the attractive power to lead to acquiescence, which is different from the influence that requires hard power (Nye, 1990).

Joseph S. Nye (2004) has divided power resources, the source of soft power into three sources:

1) *Culture.* It means that if one country's culture is consistent with the interests and values of another country, the chances that country's culture will become a soft power of another country will be greater. The channels that make one country's culture known to other countries come in many forms, for example through cultural products, trade, visits, communication exchange, and tourism.

2) *Values*. If a country has values in politics, economy, and society that are quite consistent and not in complete conflict with other countries, the soft power of that country will also increase, for example, the recognition of the social and cultural diversity of the other countries. On the other hand, if the values of such countries are against completely the values of other countries, that country's soft power will decrease.

3) *Foreign Policies*. If a country carries out outstanding foreign policy, such as having a policy that emphasizes equality, peace, love, and respect for human rights. The opportunity for a country's soft power will be greater than the country that pursues aggressive foreign policy or uses hard power to ignore the attitude of other countries.

Nye said, "If any state is able to legitimize its power in the eyes of another state, the state becomes less resistant to what it wants and if its culture or ideology is attractive to other states. States will be more willing to be a follower." From the international point of view, one country can achieve the desired goal because other nations appreciate that country's values/wealth and desire to follow in their footsteps as a role model. However, soft power may be more difficult than hard power for two reasons: (1) soft power requires most states to operate through cooperation in both government and non-state actor roles, which can be beyond the extent that the state can control or manage, while hard power is monopolized by the government only; and (2) soft power has indirect results, and it takes a longer time to see explicit results.

Based on Jonathan McClory's research (as cited in Khuhaprema, 2013), five quantitative metrics that can lead to identifying the resources where soft power comes from:

1) Culture. In the dimension of soft power, it refers to a framework of action that makes it meaningful to society including literature, art, education, film, and music that can be accessible to the broader public. If the culture of any country becomes a universal value and well-known, it will have a high attraction to other countries as well. Cultural dimension

indicators, such as the number of tourists visiting a country, the prevalence of the national language, the number of UNESCO World Heritage sites, the number of artists' music in the global market, the popularity of a country's entertainment industry output at the global level, the number of medals of that nation's athletes in international competitions, their role as a host of international sporting events, etc.

2) Government. It is an indication of what government focuses on in the evaluation of the politics of the country and the efficiency of government administration. The success of a government and its values are the significant components that make a country popular and accepted by other countries. If government operates in line with internationally accepted universal values such as transparency, fairness, and effective solutions to social problems, they are likely to gain international admiration and it becomes the soft power of the country.

3) Diplomacy. It is an indicator of legitimate foreign policy implementation and a constructive role in the international community. Diplomacy can be evidenced by the number of active memberships in various international organizations, the establishment of cultural centers in foreign countries, and the efficiency of digital diplomacy policy implementation, such as the use of online platforms to promote diplomatic policies, etc.

4) Education. It can be indicated by the ability of a country to attract foreign students to study in that country, including having policies to promote educational exchange, which is an important method to impel public diplomatic policies because international students can help publicize and promote the image of the country in which they went to study. So, it can cause the popularity of going to study in that country through the fund-supporting policies such as giving scholarships, etc. In addition, the development of education in that country can promote soft power as well from the rankings and quality of universities, etc. These can create an important attraction for foreign students to study in that country more and in effect it increases the country's soft power as well.

5) Business and Innovation. They are indicated by the ability to attract and popularize the country's economy. Including the development of new technologies and innovations that are beneficial. These may include the development of people's lives at the same time.

Jonathan McClory used the above quantitative indicators together with seven other subjective indicators to measure and rank the soft power of 30 countries. The indicators

included the popularity of famous people, the popularity of the country's cultural products, quality of national food and beverages, the quality of national airlines or major airports, constructive diplomatic policy, leadership on the global stage, and national brand strength. The results of the study revealed that the Republic of Korea is one of the top countries with high soft power.

Brand Finance's Global Soft Power Index, the 2022 study for ranking of soft power from different countries around the world, evaluated using many factors: familiarity, reputation, influence, COVID-19 response, and the seven soft power pillars in seven areas, which are business and trade, governance, international relations, culture and heritage, media and communication, education and science, and people and values. The Republic of Korea or South Korea has always maintained the Top 3 ranking in Asia for a long time.

4. Research Methodology

This research is documentary research that has set the research methodology as follows:

4.1 Scope of Research

To achieve the research objectives, the researcher chose to study the Korean identity by observing the pictures in the national anthem video from online channels because of its high accessibility. The video chosen for this study is called 국민이 마음껏 쓸 수 있는 애국가, 비머가 함께 했습니다 / 비디오머그. Published by 비디오머그-VIDEOMUG on March 15, 2019, it has approximately 810,000 views and 3,790 comments as of January 2022. This version of the Korean national song chosen by the author to study can be freely used by the public without copyrights, making it readily accessible to both Koreans and foreigners. In addition, the selected video version of the national song to be studied was shown along with the national anthem during the 101st Anniversary Celebration of the March 1st Independence Movement Day (삼일절) on March 1, 2020 at Paehwa Girls High School, Seoul, South Korea to commemorate the events of the Korean independence movement in the past. But, this version has slightly changed some images in videos.

4.2 Criteria for Selecting the Document

The scope of this study is the analysis of a selected video footage chosen based on the following criteria:

1) *Authenticity*, meaning selected video is an original document. This version of the national anthem is used by the Korean people and can be searched through online channels. The video was also used in government events or the state's important ceremonies such as the March 1st Independence Movement Day in 2019 which President Moon Jae-in himself presided over.

2) *Credibility*, meaning the selected document (the video) for study does not distort information or deviate from reality. The document does not contain any additional comments from the author of the work.

3) *Representativeness*, meaning the selected document (the video) for the study can be representative of the same type of document. Although the South Korean-related authorities or television stations produce video footage of the national anthem every year, it was found that the images in the national anthem video being released were closely similar to one another.

4) *Meaning*, meaning the selected document (the video) can be analyzed with significant data and can create meaning for the research. The document can convey the meaning of Korean values through the image of the national video as well as being able to interpret the relevant concepts in both direct and implicit meanings from the national anthem video illustration and the reason why they chose to use each image.

4.3 Data Analysis and Presentation of Results

This study analyzed the data from the selected document according to the relevant concepts and it presented the results in various issues from the researcher's analysis, which is divided into topics according to the category of visual aspect that was seen to achieve the research objectives and then to present the research results descriptively.

5. Results and Discussions

This chosen video of the Korean national song video comprises images of important past events, symbols, landmarks, landscapes showing the topography, and other elements

that depict the Korean identity from the past to the present in many aspects, making it highly suitable for further studies to better understand the country. In this article, the author has divided the chapters according to the different kinds of images displayed in the videos: symbols of South Korea, South Korea as a country of mountains and waters, South Korea's past, South Korean pride in sports, South Korea as a developed country, and South Korea cultural export. The author also gives further description and explanation of South Korean history to help readers grasp the reasons why these images were selected to be in the national anthem video, which is a song of great national importance and is a guideline for Korean studies from geographical, historical, political, economic, technological, and cultural perspectives.

These values and the culture of Koreans represent a vital part of the country's economic development today which became a crucial reflection of cultural exports, according to the government's soft power policy caused by well-cooperation between the Republic of Korea's government and the country's media industry. Through the export of entertainment products such as movies, dramas, and songs, the South Korean government sector played an essential role as a supporter, while the entertainment industry sector played a position as a producer and distributor of Korean cultural trends. This has become the most important cultural industrial strategy of South Korea, and it is the key to the Republic of Korea's economic development success in the cultural content industry.

Table 1: Results and Image Examples in Each Category

National Anthem Image Category	Count	Labels	Image Example
Symbols of Korean	17	- The National Flower (Mugunghwa) - Korean National Flag (Taegeukgi) - Sejong the Great & Hunminjeongeum (Script of Korean) - Admiral Yi Sun-sin Statue - Korean Armed Force	

National Anthem Image Category	Count	Labels	Image Example
The country of mountains and waters	24	- Korean Peninsula Map - Landmarks in Jeju Province - Paektu Mountain - Korean Peninsula-shaped Cliffs in Gangwon-do - Landscape Pictures of Korea	

Table 1: Results and Image Examples in Each Category (Cont.)

National Anthem Image Category	Count	Labels	Image Example
South Korea in the Past	22	- The way of Korean lives in the Past - Daejeon National Cemetery - Korean Soldiers in Wars - Streetcars in Seoul - Heavy Industrialization in South Korea - Gyeongbu Expressway in the Past - 1977 $10 Billion Export Celebration Day - Gwangju Uprising - The March of the Korean People	

Table 1: Results and Image Examples in Each Category (Cont.)

National Anthem Image Category	Count	Labels	Image Example
South Koreans' Pride in Sports	19	- Seoul 1988 (Olympic) Opening Ceremony - Korean National Athletes - South Korea National Football Team - Baseball Sport Event - Korean Sport Spectators	

Table 1: Results and Image Examples in Each Category (Cont.)

National Anthem Image Category	Count	Labels	Image Example
Country of Development	19	- South Korea's Port Cities - Seoul Special City - Busan Metropolitan City - Korea Train eXpress (KTX) - Korean Cargo Ships - Electric Power Plant in South Korea - Samsung Semiconductor - Science Researcher - Automotive Industry in South Korea - Urban Area - Korea Space Launch Vehicle - BTS Boyband on Stage - Walking Trails along the Hangang River	
Total	101		

5.1 Symbols of Korean

This selected national anthem video presents many symbols and various elements that represent the culture and identity of South Korea. First, there is the image of the Mugunghwa flower (무궁화), the national flower and symbol of South Korea, which means 'the flower that blooms eternally and never withers.' According to ancient records, the Koreans have always viewed the mugunghwa as the flower of the heavenly kingdom since the ancient Joseon or Gojoseon era; they even called their own country "Mugunghwa" during the Silla Kingdom. The significance of the mugunghwa flower is also evident in the lyrics of national songs from the late Joseon Dynasty, in the verse "무궁화 삼천리 화려강산" (Mugunghwa Samcheonri Hwaryeo Gangsan), which means *three thousand ri of splendid rivers and mountains covered with mugunghwa blossoms*. Koreans still valued mugunghwa flowers even during the Japanese colonial period. And after South Korea was liberated from Japan, the Mugunghwa flower was recognized as the national flower. The Mugunghwa flower is a symbol of the nation's honor, its perseverance in the face of hardships, and its will to carry on the noble spirit of its ancestors. It is also a flower that reflects the character of Koreans: determination, strength, patience, delicacy, and perseverance, just like how they remain strong despite numerous obstacles. Because Mugunghwa is a flower that blooms for a long time, it is worth noting that the name mugunghwa is derived from the Korean word 무궁하다 (mugunghada), meaning infinity, and the Korean phrase 무궁한 발전 (mugunghan baljeon) which means endlessly developing. Therefore, this phrase always represents the principle of self-improvement, which is one of the mainstream values of Koreans. At present, mugunghwa flowers can be seen on various important seals of South Korea, including the presidential seal, the coat of arms of the members of the National Assembly, the coat of arms of the court, and one of the components of the coat of arms of the Republic of Korea.

Another important symbol that can be seen in the video of the national anthem is the Korean flag. In Korean, a flag is called Taekeukki (태극기); taekeuk means the universe, and ki means flag. According to Korean beliefs, the white color represents light, purity, love, and pacifism, while the circle in the middle symbolizes the harmony of yin (음) (blue) and yang (양) (red), or the origin of all things. Finally, there are the different black trigram symbols on the diagonal on the four corners, which signify sky (heaven), earth,

water, and fire, and also the four directions or the four seasons of Korea. These trigrams surrounding the central symbols also mean a unified integration and the changes in the universe that occur naturally. The national flag and Taekeuk symbols are intertwined with the way of life of the Korean ancestors, as they reflect continuous development, which are the ideals of the Korean people. The flag of Korea, which was adopted as the national flag during the Korean Empire in 1897, or the late Joseon Dynasty, had a slightly different pattern from the current national flag. Taekeukki is often used on important national holidays or anniversaries: Republic of Korea Independence Movement Day (삼일절), Memorial Day (현충일, 조기), Constitution Day (제헌절), Independence Day (광복절), National Armed Forces Day (국군의 날), National Foundation Day (개천절), Hangeul Proclamation Day (Korean Alphabet Day) (한글날), and even when it is not a national holiday, the Korean flag can be displayed every day in the classrooms of primary and secondary schools. There is always a picture of the Korean flag above the blackboard to instill patriotism in the youth and highlight the importance of the nation, which is one of the long-standing values of Koreans.

The Korean language and characters play a major role in the identity of the Korean people. In the video of the national anthem, a monument of King Sejong the Great (1397-1450), the fourth king of the Joseon Dynasty, is enshrined in Gwanghwamun Square (광화문광장). His hand held a book with Korean characters. King Sejong the Great is highly revered as a great monarch who has left impressive achievements in various fields such as science, economy, and defense. Some of his works in arts and culture were a rain gauge (측우기), a replica of the globe (혼천의), a sundial (해시계), a water clock (물시계), and agricultural tools. Moreover, His Highness ordered the use of the Korean alphabet called Hun Min Jung Eum (훈민정음) in the book of the same name, which appears in the national anthem video. Thanks to its small number of consonants and vowels, Hun Min Jung Eum is easy to learn, and it later became the Korean alphabet or Hangul (한글), which is only slightly different from the original. Hangul, composed of 14 consonants (자음) and 10 vowels (모음), is a systematic and linguistic writing system capable of conveying the full range of both human and natural sounds. This book explains how to create the concepts and characteristics of the new Korean characters in detail, making it a piece of work very important in terms of cultural relevance. In January 1997, the book was selected as a World Heritage Site by UNESCO. The South Korean government attaches great importance

to the Hangul alphabet, so it declared October 9th a public holiday to commemorate when Sejong the Great published the Hangul alphabet for the first time. For his efforts in promoting the use of the Korean alphabet, the king is also regarded as one of the great monarchs of Korea.

Taekwondo, the national sport of Korea, is known worldwide today. And this sport has always been important to the Koreans, even back in the era of the Goguryeo Kingdom, as seen from the pictures on the walls of various ancient temples and tombs, as well as statues in many places. Additionally, the records of Koreans during the Silla Empire show that taekwondo was practiced along with the practice of fencing, archery, swimming, and horseback riding in a systematic military training school called the Hwarang Group. Taekwondo has always been in Korean society even during the colonial days of Japan (1910-1945). Prohibition of this national sport was what led to protests calling for Korean taekwondo athletes to oppose Japanese policies. Later, when the country was liberated from Japan, taekwondo was revived under the leadership of Choi Hong-hee (최홍희), and associations and federations of taekwondo athletes were later formed. Taekwondo was declared the national sport of Korea in 1971, included in the Asian Games in 1974, and finally introduced in the Olympic games in 2000. These successes were made possible by the Korean people's determination to make their national sport better known. Nevertheless, even though Korea is indeed the birthplace of taekwondo, it is unable to win gold medals in all international sports events, and this is clear proof that this sport has become a global sport (Korean Culture and Information Service, 2012 as cited in Chartprasert et al., 2020, p. 182). Due to its worldwide fame, taekwondo has been used to improve the abilities of young people in many areas such as reducing the problem of violent and substance-addicted children. For example, 80 US public schools adopted taekwondo as included in the official physical education curriculum in 2012 (Chimwong, 2020, p. 182). And on account of its immense national and international importance, images of taekwondo were shown in the video of the national song.

Lastly, patriotism has long been one of the values cherished by Koreans. Even though today's values might be affected by the liberal world, loving the country and putting its interests before one's own are still regarded as admirable traits in society. An example of a person with these qualities is General Yi Sun-shin (이순신), a naval commander in the Korean army during the Joseon Dynasty who had protected the country

from the invasion of the Japanese on many occasions and even gave his own life on the battlefield. His bravery and versatility in combat earned him the place of a national hero. In the national video, General Yi Sun-shin's monument is shown to be located in front of King Sejong the Great's, Gwanghwamun Square, Seoul City. Another monument to General Lee Sun-shin was erected in front of Chungmu Square (충무광장) at the National Naval Academy (해군사관학교) in Chang'an Won, South Gyeongsang Province because of his contribution to the country as a capable naval commander.

It is worth noting that national anthem videos of many countries feature images of their country's armed forces, and South Korea is no exception; pictures of both honored military generals in the past and the current South Korean military forces were displayed. The military's mandated mission is to maintain the freedom and independence of the Republic of Korea, defend the country, protect the lives and property of the people, and help maintain international peace. In the author's view, the military symbolizes the country's protection. Therefore, it can be deduced that listening to the national anthem with its lyrics motivates them to protect the country and while seeing the images of the country's powerful military forces, like fighter planes, warships, and highly trained soldiers, people's sense of patriotism will be heightened, allowing the people to become more united and leading to further development in culture, economy, and various fields.

Especially, cultural exports coupled with economic development is the output of South Korea's media sector, which causes the K-contents to have an international influence. The Korean language is one of the Korean cultures that has had a significant impact on K-fans in other countries, as evidenced by the growing number of international students interested in studying Korean. One of the reasons is a preference for K-contents because of the Korean wave's influence. Many universities in South Korea have established courses or language institutes to support international students who want to study Korean in South Korea. Furthermore, the government sector played a significant part in promoting Korean language education to foreigners by establishing language institutes, such as the Sejong Institute, with online and on-site language courses offered worldwide.

5.2 The Country of Mountains and Waters

Because the pictures of South Korea's topography and landscapes outnumber

those of other types of images by far, it is crucial to study them to understand the beautiful natural landscapes of this country. The first images that appeared in the video were the country's location on the world map and the topographical map showing the area's height. Surrounded by seas and oceans, the Republic of Korea is located in the East Asia region on the Korean Peninsula (한반도), bordering the Democratic Republic of Korea in the north, the Yellow Sea (서해, 황해) in the west, the Sea of Japan (동해) in the east, and the Korea-Japan Strait in the south. The Korean Peninsula is the center of Northeast Asia, situated between the People's Republic of China in the west and Japan in the east. Furthermore, 950 km long from north to south and 540 km from east to west and covering an area of 100,364 square kilometers, the Korean Peninsula is surrounded by the seas on three sides, except the north, which is adjacent to the mainland. Though the proportion of plains to mountainous areas is 30 to 70, only 15 percent of the mountains are above 1,000 meters above sea level, and more than 65 percent are lower than 500 meters below sea level, as evident by pictures of many complex mountain ranges as well as the plains between the valleys. Photos of hills covered by autumn leaves and snow-capped mountains in winter show the clear effects that South Korea's topography and location have on its climate and seasonal changes. In addition, the Taebaek Mountains (태백산맥), the metaphorical backbone of the country which stretches from north to south, makes the Korean Peninsula an asymmetrical terrain; the northeast and the west are lower than other regions, and most of the plains are on the western side of the peninsula. The great and small rivers that originate from the high mountains in the east and flow into the west and south coasts created a river basin suitable for crop cultivation. The province that grows the most rice in the country is South Jeolla Province (전라남도).

Mount Paektu (백두대간), the highest mountain in the Korean Peninsula, is also mentioned in the lyrics. The national anthem of the Republic of Korea mentioned Mount Paektu, located in Ryanggang Province in the Democratic People's Republic of Korea, or North Korea, which forms the border between North Korea and Jilin Province, China. Mount Paektu has played an important role in the myths and ancient cultures in Korean society and local religion, especially the volcanic crater called "Heavenly Lake" because it is regarded as the spiritual home of the country and the symbol of the legend of the birth of a country called The Myth of Dan-gun (단군신화), Lastly, Paekdu Mountain Range connects Mount Paekdu (백두산) in North Korea to Mount Jiri (지리산) in South Korea, symbolizing they are one (통일) of Korea.

The landscape of the Yeongwol Korean Peninsula Cliffs (영월한반도지형), also appears in the video of the national song. This beautiful landscape was entirely created by nature, such as meandering rivers which were the result of soil erosion and sedimentation. There is a meander due to river erosion at the source of the Seogang River. It is also the point where the Pyeongchang River and the Jucheon River meet. It is located in Gangwon Province, Yeongwol City, which resembles the shape of the Korean Peninsula. This landscape is one of the natural tourist attractions in Korea.

Not only does the video present pictures of the continental terrain, but it also showcases those of the country's maritime regions. The first one is the Jeju Special Autonomous Province, the largest island in South Korea and a major tourist destination on the southern islands of the Korean Peninsula. It is formed by a volcanic eruption, most of the island's mountains are basalt rocks, a type of volcanic rock, and the landscape there is so unique that it can be called a giant volcanic museum. There are 368 large and small lava caves on the ground and 160 underground scattered throughout the island. Its unusual landscape was what allowed Jeju Island to be listed as a biosphere reserve in 2002 and registered as a natural world heritage site by UNESCO under the name "Jeju Volcanic Island and Lava Tunnel". The island is a popular tourist destination because of its stunning natural elements like the crystal clear emerald sea, the strangely shaped rocks formed by wind and waves, and the Mountain Crater of Halla Mountain (한라산). The prominence of Jeju Island as a tourist attraction can be seen in the many pictures of its landscapes that were featured in the video. An example is the Cheonjiyeon Waterfall (천지연폭포), which means " the pool formed by the union of heaven and earth" in Korean. This waterfall is the most visited place among all the waterfalls on Jeju Island due to its size and spectacular scenery. The waterfall is 22-meter high and 12-meter wide, falling through unique rock formations. It is a dense forest that is evergreen. It has been designated and preserved as a nature reserve. Moreover, the image of a herd of horses running on Jeju Island is another symbol of this island.

All the landscapes and scenery that appear in the national anthem video make it clear that South Korea is "the country of mountains and waters" indeed. This is a special and unique characteristic of the nation. Due to its location and geography, the climate of the country changes in all four seasons. Natural places also change their characteristics according to the seasons. When South Koreans listen to the national anthem and watch

this video, they can perceive the immortal natural beauty of their motherland. This is in line with the lyrics of the national anthem.

In addition, being a country of mountains, it is undeniable that one of the most popular leisure activities among Koreans is mountain climbing. Koreans of all genders and ages can be seen at various mountain parks during the holidays. With a total of 22 natural national parks in South Korea, which are 18 mountain parks and three marine and coastal parks, lots of these picturesque scenic landscapes and scenery are also important in tourism promotion. They can attract Korean and foreign tourists who want to travel to experience the natural beauty of this country as well.

In terms of the K-content industry, a lot of Korean variety shows have been created to produce content related to tourism and exploring South Korea's rural areas. The shows' content was created to the growing demand for a slow lifestyle among urban residents. It also values the Korean countryside, allowing viewers to learn about and widen their perspectives on the image of the Korean countryside with images of lifestyle, clothes, food, and other elements. To attract an audience, it is often necessary to rely on leading Korean celebrities to participate in activities in the countryside or to visit their hometowns to gain ratings from the fan base, which is highly favorable in many programs. Korean television shows provide programming that portrays a rural image, including South Korea's beautiful scenery, for audiences worldwide to experience. This may encourage foreigners to visit the South Korean countryside to learn about Korean rural cultures, such as local dishes and provincial products. Programs that present the Korean countryside such as Amazing Saturday, House on Wheels, I Live Alone, Delicious Rendezvous, and 2 Day 1 Night. These programs boost the value of local wisdom, which local people use to apply and create products from the country's resources, such as food culture, careers, and lifestyles.

5.3 South Korea in the Past

South Korea is a country that has been through hard times from the World War to the Korean War. This can be seen from the pictures in the national anthem video showing the way of life of Koreans during the war in the past, including Korean soldiers going out to fight in the war. Therefore, it is not surprising that Korea has many veterans. These soldiers can be deemed heroes of the country's patriotic spirit. Hence, the government built a national cemetery to commemorate the heroism of the veterans in the past.

Seoul National Cemetery was established on July 15, 1955 to commemorate the patriots, martyrs, and heroes who served in the war against the Japanese invasions, the Korean War, and the Vietnam War. As the cemetery reached its capacity, former president Park Chung-hee (박정희) established a national cemetery in another province, now Daejeon National Cemetery which also appears in the national anthem video. Today, Daejeon National Cemetery is a place built to honor those who sacrificed for the country. It is also a place to learn and feel their patriotism as it offers a public patriotic garden that anyone can visit at any time. This can be considered an activity that aims to instill patriotism in children and youth in remembrance of the country's war heroes.

When the ceasefire treaty was signed, it was later in the 1960s that South Korea was considered an undeveloped country with a very low per capita income which was the aftermath of war. Also, during the war, most of the battlefields were in South Korea. As a result, the situation of the country at that time was quite difficult. But at the same time, from the 1960s to the 1990s, South Korea continued to develop into a rapidly growing country. In the national anthem video, there are old pictures related to the city's development. During the period that may be called the building of the nation, public transport systems such as urban trams were built. Also, there was the construction of the Gyeongbu Expressway (경부고속도로) connecting Seoul and Busan which opened for service in 1970 with a total length of 416.04 kilometers. This expressway represented the development of the country's transportation system at that time. Furthermore, some pictures convey the important economic development of that period, namely heavy industry such as raw materials or semi-finished goods for mass export in the 1960s-1970s. The country's efforts continued. By 1977, South Korea had exported more than $10 billion worth of goods. Thus, that year was celebrated on December 22, 1977 as the $10 Billion Export Celebration Day (100억불 수출의 날) at the Jangchung Gymnasium (장충체육관) in Seoul, with President Park Chung-hee (박정희) as the chairman, as can be seen from the old photos that appear in the national anthem video. In addition, South Korea in the first phase of the economy focused on heavy industries for export. In a later period, the country produced electrical appliances such as televisions. Later, it was an industry that became the foundation of the development of electrical appliances technology.

When a country had been under the ruling military junta since the emergence of the presidency and republic, the military had always played an active role in politics

and the economy through the implementation of state-led economic policies. But as time passed, there was an attempt by the people in the country to become more democratic. This can be seen in the photographs of the Gwangju Uprising (5.18 광주 민주화 운동) in 1980, between May 18 and 27, a historic event for South Koreans caused by public dissatisfaction. Labor workers and students stood up against General Chun Doo-hwan's (전두환) junta government, which cooperated with General Roh Tae-woo (노태우) to carry out violent crackdowns. It was a political tragedy with the highest number of casualties since the Korean War. This anti-authoritarian democratic movement can be regarded as one of the largest events in the democratization process in Korea, leading to social movements in the nation and changes. In the national anthem video, a man can be seen waving the South Korean flag on a bus. At that time, people tried to block the roads with buses or other vehicles to protest, demanding that the government comply with what the people asked for.

South Korea has a past or history like many other countries around the world. The pictures that appear in the old black and white national anthem video show how South Koreans lived and overcame hardships in the past. And most importantly, they reflect the continuous development of South Korea that has changed its image in the past to what it is in the present day. Pictures of protest movements to demand democracy represent a distinctive value or concept. It has been widely recognized globally for its concurrent portrayal of the success of South Korea's economic development and democracy.

5.4 South Koreans' Pride in Sports

During the period of Japanese rule, sports in South Korea were in the dark age. After that time had passed, South Korean presidents in successive governments made efforts to promote policies to improve the nation's sports potential. Since Park Chung-hee's presidency, athletes in the national team had been encouraged to participate in international sports competitions. Policies of using sport as a medium for change had been formulated. Later, President Chun Doo-hwan also proposed the use of sports as a means of preserving national dignity. The establishment of Sports Nation signified sports for nation-building, and the Ministry of Sport was established in 1982. It could be seen that South Korea's sports began to play an increasingly important role on the international

stage. South Korea had previously won two bronze medals at the 14th Olympic Games in London, England, in 1948, just a few years before the Korean War. And Yang Jung-mo (양정모) won a gold medal at the 21st Olympic wrestling event in Montreal, Canada in 1976. It was the first Olympic gold medal in South Korean history. The important thing was that South Korea had been selected as the host of international sports competitions. Since hosting the 10th Asian Games in Seoul in 1986 and the Olympic Games also in the same city in 1988, a significant opportunity had been given to Korea to become an economically advanced country. The event was the 24th Summer Olympic Games with 13,304 athletes from 159 countries participating and "Reconciliation and Progress" as the concept. The organizing committee had set the objectives of the event as follows: unity among all nations, outstanding performances, safety, and cost-efficiency. South Korea is the 16th country and the second country in Asia to host the Summer Olympics. The Olympic Games consisted of 23 events and two demonstration sports. South Korea took fourth place in overall medals, with 12 gold, 10 silver, and 11 bronze medals. The 1988 Summer Olympics in Seoul featured reconciliation between the Western and the Eastern nations after the West boycotted the Olympic Games in Moscow, Russia in 1980 and the East boycotted the Los Angeles Olympics, in the United States in 1984. The Seoul Olympics at that time were above ideological conflicts and racial discrimination under the Olympic Charter.

In addition, because of being chosen as the host, Seoul developed by leaps and bounds in every aspect especially the transportation systems and basic utilities as seen from the constructions of athletes' villages, Olympic Park, and three subway lines that connect the stadium and Gimpo International Airport; the landscape was modified; the Han River scenery was restored, and Koreans were encouraged to learn foreign languages. This was an opportunity for South Korea to introduce the nation's economic development status and traditions including the potential of South Koreans to the world. President Roh Tae-woo's government at that time foresaw a shift in global attitudes towards South Korea so preparations were made to attract more foreigners to travel and invest in the nation. The government placed great importance on broadcasting the stadium atmosphere and sports events of all kinds live around the world. Therefore, it could be deemed as the historic live broadcast of important international sporting events. South Korea later continued to play an active role in international sports when it co-hosted the 17th FIFA

World Cup Korea/Japan with Japan in 2002. It was the first time in history that the World Cup had been hosted by two nations. And it was also the first time the event was held in Asia. The co-hosting was an effort to reduce the conflict between the two countries as well. The World Cup at that time brought a new phenomenon to Korea: the birth of a culture. Many Korean football fans gathered enthusiastically in public places such as the square in front of the Soul City Hall. The Korean national football team in this competition successfully made a record for qualifying for the quarterfinals. Korea's achievements in international soccer could still be seen in the subsequent tournament record, qualifying for the final 16 teams at the 19th World Cup in South Africa in 2010 and receiving a bronze medal at the 30th Olympic Games in London in 2012. After that, Korea had always been the host of international sporting events since the 14th Asian Games in 2002 in Busan, the 13th World Athletics Championships in 2011 in Daegu, and the Asian Games again in 2014, in Incheon. This time, it played an important role in distributing South Korean products such as mobile phones, televisions, and various electrical appliances, as well as promoting the spread of Korean culture continually, such as the K-pop trend. The Korea Creative Content Agency (KOCCA) was established to integrate creative thinking into the business sector to promote the production, investment, and sale of contemporary cultural products which had become the foundation of economic development together with social and cultural development later. South Korea can be said to be one of the most successful countries in the world for sports since the 28th Athens Olympics in 2004. The country has been placed in the top 10 for the number of medals received by athletes four times in a row. In addition, South Korea's role in sports at the international level continued. This could be seen in the national anthem video from pictures of the 23rd Olympic Winter Games in Pyeongchang in 2018. Held on February 9-25, 2018, the competition set a record for the Winter Olympics. There were 2,920 athletes from 92 countries who attended, the highest number in history. The hosting was a success with 1.08 million tickets sold. A new phenomenon was created by adopting the world's first 5G technology. CNN reported that 'the emergence of 5G technology has made the Pyeongchang Winter Olympics the most high-tech Olympics in history.' Above all, the Winter Olympics that year was remembered by people around the world as the Olympics of Peace that embodied the values and spirit of the Olympic Games, especially North Korea's participation by sending 22 athletes to participate in the competition. At the opening ceremony of the Olympic Games, North Korean athletes took to the field with

South Korean athletes. Moreover, South Korean and North Korean athletes were able to compete in the same women's ice hockey team for the first time in Olympic history. The Pyeongchang Winter Olympics also represented the Cultural Olympics by having a program that combines Hallyu (Korean Wave) and traditional culture. For the medal summary, South Korea came in 7th place with 5 gold medals, 8 silver medals, and 4 bronze medals.

The fact that South Korea has hosted five major sporting events in the world which are the Summer Olympics, Winter Olympics, World Cup, World Athletics Championships, World Aquatics Championships including the Asian Games has demonstrated the country's status as a progressive country, not only in sports but also in economic and social aspects. In addition, the improvement of athletes' performance and various international competitions held in Korea attracted, even more, public interest in sports. At the same time, the sports environment has also improved. Popular sports among Koreans are football and baseball. In the national anthem video, pictures of the South Korean national football team are depicted wearing the official team shirt with the traditional design around the collar. As for baseball, its popularity can be seen from the attendance of baseball games at the stadium. The picture of the stadium full of spectators cheering on baseball is also portrayed in the national anthem video. South Korea's national baseball team won a gold medal in baseball for the first time at the 29th Summer Olympics in Beijing, China in 2008. The nation's success in sports competitions of the national team and being one of the few Asian countries that have hosted many international sporting events can be said to be a few of the achievements in sports for South Koreans. We often see them gathering to cheer for sports and waving a large Korean flag to cheer from the sidelines or on the bleachers. These are pictures that show the pride in their representatives and their continuous support of the national teams.

There is an obvious relationship between sports and Korean cultural exports that began when Korean pop culture has begun to influence Asia. The Korean government also promotes the integration of sport into culture and entertainment such as bringing actors, singers, and actors to several sporting events, and opening or closing ceremonies for promotion. This method can attract an attractive trend around the world, especially among foreigners who are interested in Korean pop culture. At the 2010 Asian Games, the famous singer-actress at that time, Rain (Jung Ji-hoon) bare the flag at the closing ceremony of the 2010 Asian Games that was held in Guangzhou, the People's Republic of China to

promote the hosting of South Korea for the next Asian Games 2014 in Incheon, Republic of Korea. Later, when the opening ceremony of the 2014 Asian Games was held, famous K-pop artist EXO also attended the shows. Famous actor, Hyun Bin carried the South Korean flag into the field. Because he was appointed by the South Korean government as an honorary ambassador for the government. Also, Lee Young-ae, who is the main actress in the drama series named Dae Jang Geum, was a torchbearer at the opening ceremony. She was chosen because she was made famous for Korea throughout Asia from the popularity of the drama. During that time, it was undeniable that PSY's song, Gangnam Style, was probably the most famous in the world, so PSY also performed at the show. Later, after hosting sporting events in South Korea, Korean entertainment and culture have become a platform to promote Korean sport. This is a result of the Korean wave that is influencing internationally.

5.5 South Korea – Country of Development

South Korea has achieved unprecedented rapid growth which is called 'The Miracle on the Han River' (한강의 기적) or 'The Miracle of the Han River Economic Growth' despite a situation where the country had little capital and resources, and almost all industrial plants were destroyed due to the war between 1950 and 1953. Since the 1960s, the South Korean government at that time implemented an export-oriented economic development plan. In the beginning, the country exported raw materials, semi-products, or products in the light industry manufactured by small factories such as iron ore, tungsten, raw fiber, and coal (Il Sa-Kong and Koh Young-Sun, 2013 as cited in The Secret Sauce, 2021). But since the year 1970, economic development was promoted through investment in the heavy chemical industry (HCI). Thus, a foundation has been laid for the export of heavy industrial products until the present day. And later, in the 1980s, Korea shifted the focus on the export industry to consumer products such as clothing, shoes, boats, and audio equipment (Il Sa-Kong and Koh Young-Sun, 2013 as cited in The Secret Sauce, 2021). And when South Korea changed its policy in 1993, South Korea's first civilian government under the leadership of President Kim Young-Sam (김영삼), more policies had been implemented to open the country, such as lowering tariffs on foreign goods and promoting foreign direct investment (FDI). South Korea's progress was also reflected in the fact that South Korea held the Taejon Expo '93 (1993년 대전 세계 박람회) in 1993, and in December 1996. The nation became the 29th member of the Organization for Economic Co-operation and Development (OECD), which comprises most of the developed countries and leaders of the world's economy. South Korea can

compete in the global economy in various areas such as mobile phones, semiconductors, automobiles, chemicals, and steel. Currently, the country is the leader in semiconductors. This can be seen from the picture of the Samsung semiconductor in the national anthem video. And of course, Korea is also recognized for its ability to manufacture cars as seen from the statistics in 2019. The nation manufactured 39.51 million vehicles, ranking 7th among the world's automakers. Therefore, it can be considered that South Korea is one of the world's top car exporting countries, as shown in the national anthem video. There is a picture of many finished cars that are ready for domestic sale or export.

In the past, South Korea had a record export of only $32.82 million in 1960, but it surpassed $10 billion in 1997 and subsequently rose sharply to $542.2 billion in 2019. The top 5 exports to foreign countries were semiconductors, automobiles, petroleum products, auto parts, monitors, and sensors (Korea International Trade Association, 2019 as cited in Korean Cultural Center, [n.d.]). In addition, South Korea expanded free trade agreements with countries around the world and promoted investment freedom. Foreign investment was encouraged, and many benefits were offered. Due to its long-term goal of becoming a financial hub and transportation base in Northeast Asia, open market and Free Trade Agreements (FTAs) removed barriers to international trade. And the South Korean authorities promoted a complete market opening under the slogan "a small country with an economic territory of a big country." And the nation also planned to enter into free trade agreements with most countries in the world. In 2017, South Korea entered into free trade agreements with 52 following countries: Chile, European Free Trade Association (EFTA), ASEAN, India, European Union, Peru, the USA, Turkey, Australia, Canada, China, New Zealand, Vietnam, and Colombia, as well as five Latin American countries: Costa Rica, El Salvador, Nicaragua, Honduras, and Panama. The government tried to promote world-class standard products to upgrade and distribute export products and ensure the safety of transportation. It started with 120 products and 140 businesses in 2001 and expanded to 817 products and 917 companies in 2019. The proportion of small and medium-sized enterprises increased from 37% in 2001 to 76% in 2019, which contributed to the enhancement of brand images of many small and medium-sized enterprises and the entry into the global market. The main strength of the South Korean economy is the advancement in Information Technology (IT), which is the IT industry. It is a branch that covers both tangible and intangible technologies such as computers, software, the Internet, multimedia, and communication devices with

well-equipped communication infrastructure. This makes 4G mobile communication network coverage available throughout the country. And in April 2019, the world's first 5G mobile communication service was officially launched. The government has also invested and encouraged the private sector to invest in high-speed internet. Therefore, IT reform was an important part of the country's foundation for development. Exports of Information and Communication Technology (ICT) products in 2019 were worth $176.9 billion. South Korea is therefore very competitive in electronic devices such as mobile phones, semiconductors, computers, and peripherals. These industries create an image of Korea as the world's leading IT country. South Korea is currently making efforts to adapt to the rapidly changing IT environment.

In addition, the country attaches great importance to the development of science and technology by promoting investment in research and development. South Korea has talented people working in the circle of research and development of cutting-edge technology in various fields. Korea's state research institutes, universities, and world-leading corporations also conduct research projects, from basic research to the development of advanced technologies and cutting-edge products. Pictures of a researcher or scientist can also be seen in the national anthem video. Over the past decade, there has been a growing emphasis on research and development in the field of the 4th Industrial Revolution using artificial intelligence (AI), electronic computing, the Internet of Things (IoT), and Big Data. Technological achievements can be seen in the numerous patent applications of Korean researchers. Examples of South Korean research institutes in science and technology are the Korea Institute of Science and Technology (KIST) (한국과학기술연구원) and the Korea Aerospace Research Institute (KARI) (한국항공우주연구원). One of the examples of major technological developments featured in the national anthem video is the successful launch of the KSLV-I "Naro" rocket (나로호) on January 30, 2013.

The continued development of South Korea's economy has placed it among the high-income countries since around 2000. It can also be seen from the images of major cities that reflect economic prosperity. South Korea has several large cities of economic importance. The capital city and largest metropolis, Seoul (서울특별시), is located almost at the center of the Korean Peninsula and is the political, economic, cultural, and transport hub of the Republic of Korea. Since Seoul was established as the capital of Joseon in 1394, the city has served as the political, economic, social, and cultural center in Korea for over

600 years. Its socio-economic transformation has led to the transition from a pre-industrial city to an industrial city. In particular, the rapid population growth along with economic development has developed Seoul into a large city, and continued urbanization has made Seoul a metropolitan area with its surrounding satellite cities growing even more. And the second-largest city in the country is Busan (부산광역시). In the video, the city of Busan can be seen from the perspective of the Gwangan Bridge (광안대교). It is the second-longest suspension bridge in the country stretching for about 7.4 kilometers from Namcheon-dong to the Centum City of Haeundae-gu, which is second only to Incheon Bridge. Of course, images of the two megacities appear in the Korean national anthem video. And it is noticeable that the proportion of agriculture in the agricultural sector has decreased. This is because agricultural land has shifted to urban land use from rapid urban development since the 1960s under the socio-economic process that has transformed rural areas into urban areas (urbanization) and the agricultural labor force has moved to the countryside. In the national anthem video, the images of the two cities are high-density housing and therefore show that both megacities have developed cities of great economic importance. And because Korea is a country with a high rate of export trade of goods and products, the nation's international shipping has also grown. This can be seen from the pictures of major Korean shipping ports such as Pohang, Incheon, Busan, Ulsan, etc.

In addition to urban development, the development of transportation is also important. The development of transportation in South Korea has continued since the first operation of public transportation in Korea on May 17th, 1899, with the first tram line in Seoul, between Seodaemun and Cheongyangni. And later, the tram network expanded to cover the entire city center. An old picture of a tram appears in the national anthem video as well. And on September 18 of the same year, inter-regional trains began to operate, and, more importantly, 'buses' were seen in the city of Daegu for the first time in 1912 and its service was expanded in Seoul. By the 1970s, Seoul's traffic was dense, and buses were the only public transport at the time. As a result, a subway was built. The first Korean subway line is Line 1 (수도권 전철 1호선) which connects Seoul Station and Cheongyangni Station. It opened on August 15, 1974. Then in the 1990s when city traffic became a national problem, subway construction was promoted in major cities such as Incheon, Daegu, Daejeon, Busan, and Gwangju. South Korea's subways are considered to be the most state-of-the-art public transport that major cities need in terms of speed and mass transit capability. Later, in 2004,

a high-speed railway (KTX) was opened in Korea, which can travel across the country at 300 km/h, taking 2 hours and 40 minutes from Seoul to Busan. The successful response was the rapid increase in the number of passengers. And during the 2018 Pyeongchang Winter Olympics, KTX Gangneung Line was able to serve foreigners throughout the competition. Many passengers were transported safely. And South Korea's ability to operate high-speed trains is one of the most widely recognized around the world. From the picture in the national anthem video, the high-speed train is traveling on the rails. Both sides of the road are countryside full of fields and mountains. This shows that Korea's transportation is developing more and more even in rural areas far from large cities to provide connectivity in transportation throughout the country.

In addition to the development of the country's economy and technology, the quality of life of Korean citizens is also taken care of. For example, in the video people are seen biking along the Han River in Seoul, known as Hangang Bike Road (한강자전거길). The bike path runs parallel to the Han River, connecting many parks in the city. The cycling routes are maintained and allocated by the government and not just in Seoul. Many cities in all regions across the country have also been allocated by the local government to maintain cycling routes to serve the people as well. There is also a public bicycle rental service. This may vary from region to region. But for the most part, public bikes are easy and comfortable to use and cost around 1,000 won an hour. Public bicycle rental companies in South Korea have different names in different cities. For example, they are called Ddareungi (따릉이) in Seoul.

South Korea has begun to develop various aspects of the country since the founding of the Republic of Korea. In the beginning, it was a country with poverty and low per capita income due to the post-war situation. In addition, the geographical disadvantage of the location makes the area less agricultural. The nation also faced many crises, but it was able to turn around and achieve rapid growth in a short period, and continually develop the country. It is noted that economic development, urban development, transport development, technological development, and the harmonious improvement of the quality of life of the population may contribute to the gradual reduction of the disparity between urban and rural areas. At the same time, South Korea's efforts are strengthening its global competitiveness. Through this process, the nation is trying to upgrade its economic structure to the global level. Export-oriented economic policies are promoted through large enterprises rather

than small and medium-sized enterprises. There is a problem in the balance between the development of large enterprises and small or medium enterprises (SMEs). To maintain economic growth, the need for mutual growth is becoming an important issue that still needs to be solved.

5.6 South Korea – Country of Cultural Export

South Korea's cultural policies are the result of struggles dating back to the Japanese colonization of the country. When the dictatorship came to power in 1961, the government adopted cultural policies to manage desired citizens for political reasons. After the country became fully democratic and faced an economic crisis in 1997, South Korea's government began to shift from only the manufacturing industry development to the cultural sector industry development. The success of exporting Korean culture is partly attributed to the South Korean government's transition to complete democracy, which change the role from media controller to media supporter, particularly in the entertainment industry (Yang, 2007 as cited in Pushsapavardhana & Wongsomboon, 2020).

Currently, Korean cultural content exports such as K-pop, K-singers, television programs, songs, music, dramas, movies, games, and webtoons are recognized as one of the major businesses that play a role in South Korea's economic development. Korea is now a cultural product exporter. The Korean wave or Hallyu (한류) is steadily gaining popularity. The value of cultural goods exports increased dramatically from 2.3 billion dollars in 2008 to 9.6 billion dollars in 2018. The Korean government emphasized the promotion of Korean popular culture outside of Korea for two reasons: (1) to generate economic benefits from cultural exports and (2) to instill pride in one's own country. The implementation of soft power was concrete during the office of President Lee Myung-bak (이명박) when the Presidential Council on National Branding (국가 브랜드 위원회) was established in 2009 to be responsible for the systematic integration of soft power policies and the promotion of the image of South Korea both in terms of culture and products of Korea into the world's market. This is widely recognized as the government's first serious effort in modern South Korean history to transform the national brand into a global brand (Choi & Kim, 2014 as cited in Pushsapavardhana & Wongsomboon, 2020).

Furthermore, South Korea has a government-run organization known as the Korea Creative Content Agency (한국콘텐츠진흥원 or KOCCA), which was founded in May

2009 by a merger of five related agencies, including the Korean Broadcasting Institute, the Korea Culture & Content Agency, and the Korea Game Agency. KOCCA was founded as a governmental agency that implements concerted policy actions to promote the content industry. The KOCCA promotes all industries related to Korean culture, focusing on creating international distribution strategies for Korean Content. The intriguing part of the Republic of Korea government's role in spreading Korean culture through the establishment of a cultural organization is that they did not construct an organization based on only the current circumstances but also the Korean cultural contents trend in the future (Pushsapavardhana & Wongsomboon, 2020).

As a result, the South Korean government might be considered a factor in the success of the Korean wave (Elaskary, 2018 as cited in Pushsapavardhana & Wongsomboon, 2020) by focusing on and supporting the cultural and entertainment industry, which is one of the country's significant sources of income for making economic growth (Park, 2014 as cited in Pushsapavardhana & Wongsomboon, 2020). Aside from the government's role in establishing an organization to promote and disseminate national culture, the government also encourages the entertainment industry to generate entertainment products that create cultural content as well as national image and branding. Furthermore, the government contributed to the founding of educational institutions specializing in media, communication, and entertainment by emphasizing the importance of teaching arts in accordance with the entertainment industry (Ministry of Education, 2019 as cited in Pushsapavardhana & Wongsomboon, 2020). Famed arts and entertainment universities in South Korea such as the Korea National University of Arts, Dong-Ah Institute of Media and Arts, and Digital Seoul Culture Arts University will produce graduates with knowledge and expertise in working in the entertainment industry and will be part of promoting Korean culture content in the future.

K-Drama

Korean TV dramas have acquired popularity in East Asian countries such as China and Japan since the 1990s. 'What is Love' (사랑이 뭐길래) was the first Korean TV drama aired on CCTV in China in 1997, while 'Winter Sonata' (겨울연가) was aired on NHK in Japan in 2003. In terms of popularity, it was a huge hit. The 'Winter Sonata' was filmed on Nami Island (남이섬) in Chuncheon, Gangwon Province. As a result, it became quite popular as a tourist destination for international tourists as a must-follow drama filming location.

Korean dramas grew in popularity because of the Korean trend, often known as K-Drama, which is related to the expansion of Korean identity. For example, the series 'Dae Jang Geum' (대장금) was aired in 91 countries, bringing Korean food, clothing, and medicine to a broader audience. Since then, South Korea has constantly been exporting K-Drama. K-dramas are prominent in terms of k-television program export. It is a well-known export product that has brought in a lot of revenue for South Korea. Korean dramas brought in 239 million dollars (7,409 million baht) in 2018 (Maybin, 2018 as cited in Pushsapavardhana & Wongsomboon, 2020). Besides providing entertainment and the attractiveness of the actors, K-dramas made the audience get to know more about Korean culture through the drama's content, which also included lifestyle, clothes, family, language, etc. (Pushsapavardhana & Wongsomboon, 2020).

K-Pop

From the mid-2000s to the early-2010s, the Korean wave had a significant impact on the creation of 'idol stars,' such as the Big Bang, Girls' Generation, and Kara. During that time, the Korean wave began to influence broader fans, including Latin America and the Middle East. K-wave has been popular among teenagers, particularly those between the ages of 10 and 20, and has become a significant base for popular culture. The Korean wave has grown in popularity and made global people acquainted with traditional Korean traditions, such as food, literature, and the Korean language. Since 2010, when the charm of Korean culture was getting interesting through online media platforms such as YouTube and SNS, the number of fans fascinated with Korean content has steadily expanded, implying that the K-Pop industry has played a significant role. In the mid-2000s, K-pop began to make inroads into the global market, beginning in Asia regions. In Asian countries, such as China, Japan, Taiwan, and Singapore, Idol groups such as TVXQ, Kara, Big Bang, Girls' Generation, and 2NE1 have exploded in popularity. In 2009, 'Wonder Girls' girl group made their popularity in the United States with the single "Nobody" and became the first Korean group to be on the Billboard Hot 100 chart. In 2012, PSY's "Gangnam Style" song was the second most popular song on the Billboard Hot 100 list for seven weeks in a row, with over 3 billion views on YouTube.

K-pop is now spreading influence beyond Southeast Asia to the European continent, the United States, and South America. In addition, K-pop's popularity has

begun to expand over the globe. According to the survey results, there are a lot of K-pop fans, such as BTS' fandom, Army, and Black Pink's fandom, Blink, etc. In 2019, BTS (방탄소년단) drew even more international attention after rising to the top of the Billboard 200 chart and winning the Billboard Music Awards, Top Social Artist Award, for the fifth consecutive year in 2021. Furthermore, BTS holds the world record for artist charting as well as receiving the highest viewer ratings for live performances in streaming music concerts, held in August 2020, after being the top 1on the Billboard 200 chart with the album 'MAP OF THE SOUL: 7' in February 2020. BTS is also the first Korean group to reach 1st ranking on the US's Hot 100 Billboard Singles Chart. The success of BTS as an influential Asian singers was felt among fans around the world. Their fame can break a record in the international music industry for many years.

Apart from BTS, a lot of K-pop artists have unique qualities that extend beyond their music or song such as excellent performance that blends vocal skills, skilled stage performance, and outstanding dance, which are the the secret of K-pop performers' appeal. It was not only taking a day or two for the idol group's songs and choreography to be perfect. But it is the culmination of several years of preparation and systematic training as trainees. This is also one of the reasons for the high quality of K-pop artists. Another success key for K-pop stars is social media use to engage with their fans all over the world and for keeping their popularity by creating a current of intimacy and connection. Furthermore, the entertainment industry is expanding the value of K-pop by making and selling products such as albums and other items that can bring joy to fans and satisfy their desire to support their favorite singers or artists. As a result, from the late 1990s to today's digital age, the Korean wave has been steadily gaining popularity. The economic implementation and the exporting of Korean cultural content have been successful.

Apart from K-pop artists fascinating their fans, K-pop is also promoting Korean values through the artist's lifestyle in various aspects of Korean cultures, such as the seniority system, which can be seen from the group's older brother/sister and a younger brother/sister determination, the values of dedication and hard work, that can be seen from when they were trainees before becoming artists or after they debuted, and the importance of family ceremonies seen when artists can take a break from work to spend time with their families, etc.

K-Movies

K-Movies have been increasingly popular after filmmaking qualities have been improved and more valuable films have been produced, which can compete with foreign films, such as The Ginkgo Bed (은행나무 침대, 1996), Shiri (쉬리, 1999), Joint Security Area (공동경비구역JSA, 2000), and My Sassy Girl (엽기적인 그녀, 2001). Later, Korean films have become more diverse, including romantic, investigative, science fiction, and warfare films that are technically comparable to Hollywood (Korea Tourism Organization, 2013). As a result, Korean films quickly acquired popularity in many countries (Prasirtsuk, 2018, pp. 127-128). Furthermore, the Korean film's distinctive point is the realistic social reflection movies/films so that the audience may understand the context easily, for example, Parasite (기생충, 2019), which won the Palme d'Or at the 2019 Cannes Film Festival and won leading four awards at the 92nd Academy Awards, becoming the first non-English language film to win the Academy Award for Best Picture and the first South Korean film to receive Academy Award recognition.

e-Sports

The gaming industry in South Korea is being developed, as the gaming industry is related to modern computer technology and generates positive feedback. In 2018, Korea generated over 14 trillion won from the gaming industry and 6.4 billion dollars in exports. Not only in Asia, such as China and Japan but also North America, Korean PC and mobile games are becoming increasingly popular.

Exporting Korean culture can be considered a part of soft power. According to Joseph Nye's conceptual framework, soft power is separated into three components: culture, values, and foreign policy. As previously said, the Korean wave is currently strengthening the South Korean economy. At first, South Korea promoted popular culture to gain market popularity and then promoted traditional culture later. This process has contributed to the fascination of Korean traditional culture becoming more well-known outside of Asia. For example, most foreigners who have been impacted by the Korean wave will recognize Kimchi (김치) as a traditional Korean side dish or will be familiar with the hanbok (한복) as the Korean national dress. It could also attract tourists to visit Korean tourist attractions and buy Korean products such as cosmetics or food, etc.

Apart from Korea's developments in various fields that can be seen in the video footage, such as economic development, urban development, and technology development, there is an image of the historic site, such as a picture of Gyeongbokgung Palace (경복궁), which was built during the Joseon Dynasty and is located at the center of Seoul. It features a distinctive Korean architectural style and is one of Seoul's famous attractions. Every year, many tourists visit there. This is an example of cultural exports' success in tourism. Simultaneously, the success of exporting Korean culture may be seen in the rapidly opening of Korean-style restaurants, the expansion of Korean towns overseas, and the increasing of foreigners who are interested in the Korean language and culture. The South Korean public sector has also promoted Korean language and culture education in many countries around the world through the founding of the Korean Cultural Center, the Korea Education Center, and the King Sejong Institute. Furthermore, the government continues to support many diplomacies to encourage international students to study in Korea, such as providing scholarships at various levels of education and sending qualified personnel to promote Korean language and culture education in other countries.

The Korean wave, or the Korean content popularity trend, is constantly pushed and developed. For example, the South Korean government has promoted the New Southern policy for a cooperative relationship between Korea and ASEAN countries. Two of the seven initiatives, related to cultural exports are (1) sharing the Korean-style education model and supporting the development of human resources and (2) promoting two-way cultural exchanges. Korea has supported the budget to provide cultural exchange activities and human resource development among ASEAN nations. Furthermore, the media industry sector, such as South Korean entertainment companies, has altered the notion of K-pop artists by allowing foreign members for making multi-culture in boy bands and girl groups to attract and grow their fan base more widely. For example, GOT7's foreign members include Hong Kong, Taiwan, and Thailand. The Blackpink girl group also has a Thai member as well.

The benefit of the New Southern policy is that it not only spreads Korean culture but also plays an essential role in building relationships and better understanding, reducing conflicts between nations, and promoting a positive image of cultural diversity, economic development, and long-term stability and culture between Korea and the ASEAN region.

6. Conclusion

The study of Korean values from the images that appear in the national anthem video can cause us comprehend the things that the nation has given importance to. The study has shown that many important elements are combined: topography and symbols representing important identities to portray the foundation of the country from the past; the history of how the nation has gone through past events; Korean military strength and prowess; sports that give Koreans joy, relaxation after work and sport-based policies that can reduce conflicts with North Korea; many pictures of economic and social development, making it clear that South Korea has transformed from a least developed country in the past to a developed country in the present, as seen from the images of urban prosperity, transportation, production of exports generating profits into the country, and economic development along with social and cultural development. These images reflect the important values of South Korea in various areas. In addition, the illustration and the national anthem can be used to create patriotic values for the Korean people to create the nation's unity according to the concept of imagined communities and that can lead to the infinite development values of Koreans which is beneficial to the development of the country in various fields. For example, the creation of the identity with pride of the Koreans has resulted in a raising in cultural exports as well. Insertion of an image of the K-wave content into the national anthem illustration indicates the importance of cultural exports in Korea because economic development along with cultural exports is the main highlight of South Korea's soft power policy today. In addition, the inclusion of the BTS image in the national anthem also resulted in global Korean fans becoming interested in watching the Korean national anthem clips on YouTube. This is only a small part, but it may reveal a lot about the success of cultural exports as using Korean pop culture is an effective way to attract foreigners to be interested more in Korean culture such as learning Korean languages, etc. In addition, in terms of the success of Korean culture exporting, the study found that the government of the Republic of Korea and the media industries sector played a significant role in economic development and cultural export. It is because the government supports the government supports policies to promote Korean content and also supports policies to build good relations between countries through policies to promote intercultural exchange, etc. Meanwhile, the media industry is responsible for generating, distributing, expanding production technology, and maintaining global competitiveness

while efficiently exporting Korean culture.

The advantage of studying Korean identity through national anthem videos is to observe the identities from the perspective of Koreans that can represent Korean values well according to the concept of imagined communities. In addition, it can be said that Korean values and culture represent a vital part of the country's economic development today. The values and images shown in the studied national anthem video are the samples that show an influential correlation to Korean culture exporting which is according to the concept of soft power. Korea's success caused the Korean wave which can be a good case study for studying and learning how to impel soft power policies systematically. From a study of the achievements of the Republic of Korea, the most important things are to promote the values of patriotism and pride in the identity of the nation along with well-cooperation between government and non-state actor roles. This will be one of the important factors leading to the development of the country in all aspects, not only in the field of cultural exports.

References

BalgeunhaeTV 밝은해TV. (2020, May 15). *1977 년 수출100억불달성 수출의날기념식 박정희 대통령 연설... 밝은해TV* [Speech by President Park Chung-hee at the ceremony to commemorate the export day of achieving $10 billion in exports in 1977 by Balgeunhae TV]. [Video]. Youtube. https://youtu.be/31g4L6brojA

Butsaban, K. (2019). How K-Pop Thai Idols Affect Koreans' Public Perception of Thai People and Multicultural Families: The Case of BLACKPINK's Lisa. *Thai Journal of East Asian Studies*, *23*(July-December): 418-438. (in English)

Butsaban, K. (2020). A Study on the Mutual Cultural Development of Korea and Thailand through the New Southern Policy. *Journal of Letters*, *49*(January-June): 126-145. (in English)

Chanthanakun, T. (2019). *เกาหลี เล่มเดียวรู้เรื่อง* [Korean-ness within one book]. Bangkok: Amarin Printing and Publishing. (in Thai)

Charoensook, S. (1989). *เพลงชาติ* [National Anthem]. Bangkok: Rueankaew Printing. (in Thai)

Chartprasert, N. (Ed.), Chaisingkananant, B., Petasen, P., Sinsomboonthong, T., Boonphisudsilp, K., Katawandee, P., Chimwong, L., and Kungwanjerdsuk, W. (2020). *เกาหลีปัจจุบัน: สังคมและวัฒนธรรม* [Korea Today: Society and Culture]. Pathum Thani: Institute of East

Asian Studies, under the patronage of Her Royal Highness Princess Mahachakri Sirindhorn, Thammasat University. (in Thai)

Choe, Yu-jin 최유진. (n.d.). 생활 (대중교통) [Life (public transportation)]. *Ministry of the Interior and Safety National Archives of Korea.* https://theme.archives.go.kr/ next/koreaOfRecord/ publicTransport.do (in Korean)

Daejeon National Cemetery 국립대전현충원. (n.d.). 현충원에서 하는일 [Work at the Cemetery]. https://www.dnc.go.kr/html/child/intr/intr_0103.html (in Korean)

Daejeon National Cemetery 국립대전현충원. (n.d.). 현충원소개 (역사) [Introduction to the Cemetery (history)]. https://www.dnc.go.kr/html/kr/intr/intr_060201.html (in Korean)

Kang Jin-cheol, Kim Yeon-ok, Park Gyeong-ryong, Son In-soo, Lee Jae-gon, & Na Gak-soon 강진철, 김연옥, 박경룡, 손인수, 이재곤, 소재영, 이혜은, & 나각순. (2009). 서울특별시(―特別市) [Seoul Special City]. *Encyclopedia of Korean Culture.* http://encykorea.aks.ac.kr/Contents/Item/E0028073 (in Korean)

Kang, Sin-Hang 강신항. (1995).훈민정음(訓民正音) [Hunminjeongeum]. *Encyclopedia of Korean Culture.* http://encykorea.aks.ac.kr/Contents/Item/E0065805 (in Korean)

Khuhaprema, U. (2013). *การใช้ Public Diplomacy เพื่อส่งเสริมความสัมพันธ์ระหว่างไทยกับเขตคันไซ* [Using Public diplomacy to promote relations between Thailand and the Kansai region]. Individual Study of Foreign Affairs Executive Programme. Devawongse Varopakarn Institute of Foreign Affairs. (in Thai)

Kim, Gi-Hyeok 김기혁. (2009). 부산광역시(釜山廣域市) [Busan Metropolitan City]. *Encyclopedia of Korean Culture.* http://encykorea.aks.ac.kr/Contents/Item/E0024209 (in Korean)

Kim, Hong-un 김홍운. (1995). 천지연폭포(天地淵瀑布) [Cheonjiyeon Waterfall]. *Encyclopedia of Korean Culture.* http://encykorea.aks.ac.kr/Contents/Item/E0056048 (in Korean)

Kim, Man-jeong 김만정. (1995). 설악산(雪嶽山) [Mt. Seolark]. *Encyclopedia of Korean Culture.* http://encykorea.aks.ac.kr/Contents/Item/E0029053 (in Korean)

Korean Cultural Center 한국문화원. (n.d.a). 한국 소개–관광 (자연과 힐링) [About Korea-Tourism (Nature and Healing)]. https://thailand.korean-culture.org/ko/148/korea/50 (in Korean)

Korean Cultural Center 한국문화원. (n.d.b). 한국 소개–관광 (여행 액티비티) [About Korea-Tourism (Travel Activities)]. https://thailand.korean-culture.org/ko/1017/

korea/51 (in Korean)

Korean Cultural Center 한국문화원. (n.d.c). 한국 소개-경제 (브랜드 리더와 코리아 스탠더드) [About Korea-Economy (Brand Leader and Korea Standard)]. https://thailand.korean-culture.org/ko/154/korea/71 (in Korean)

Korean Cultural Center 한국문화원. (n.d.d). 한국 소개-경제 (글로벌 성장의 노력) [About Korea-Economy (Efforts for Global Growth)]. https://thailand.korean-culture.org/ko/ 155/korea/72 (in Korean)

Korean Cultural Center 한국문화원. (n.d.e). 한국 소개-경제 (자본주의 개방 경제) [About Korea-Economy (Capitalist Open Economy)]. https://thailand.korean-culture.org/ko/153/korea/70 (in Korean)

Korean Cultural Center 한국문화원. (n.d.f). 한국 소개-경제 (세계 속의 한국 경제-한 강의기적) [About Korea-Economy (Korea Economy in the World-Miracle of the Han River)]. https://thailand.korean-culture.org/ko/152/korea/69 (in Korean)

Korean Cultural Center 한국문화원. (n.d.g). 한국 소개-문화 (한류) [About Korea-Culture (Korean Wave)]. https://thailand.korean-culture.org/ko/144/korea/46 (in Korean)

Korean Cultural Center 한국문화원. (n.d.h). 한국 소개-생활 (명절, 경축일 등) [About Korea-Life (holidays, holidays, etc.)]. https://thailand.korean-culture.org/ko/135/korea/35 (in Korean)

Korean Cultural Center 한국문화원. (n.d.i). 한국 소개-사회 (교육, 연구, 산업) [About Korea-Society (education, research, industry)]. https://thailand.korean-culture.org/ko/140/korea/41 (in Korean)

Korean Cultural Center 한국문화원. (n.d.j). 한국 소개-사회 (한국 개요) [About Korea-Society (Overview of Korea)]. https://thailand.korean-culture.org/ko/1025/korea/672 (in Korean)

Korean Cultural Center 한국문화원. (n.d.k). 한국 소개-스포츠 (국제대회 개최국으로 위상강화) [About Korea-Sports (reinforced status as a host country for international competitions)]. https://thailand.korean-culture.org/ko/115/korea/57 (in Korean)

Korean Cultural Center 한국문화원. (n.d.l). 한국 소개-스포츠 (한국의 스포츠 역사와 발전) [About Korea-Sports (History and Development of Sports in Korea)]. https://thailand.korean-culture.org/ko/247/korea/54 (in Korean)

Korean Cultural Center 한국문화원. (n.d.m). 한국 소개-스포츠 (프로스포츠, 땀으로 쓴 역사) [About Korea-Sports (Pro Sports, History Written with Sweat)]. https://thailand.korean-culture.org/ko/1018/korea/58 (in Korean)

Leawpiroj, N. (2018). *The Imagined Communities of "Thai Nation" In Social Studies Textbooks During 1957-2017* [Unpublished doctoral dissertation]. Thammasat University. (in Thai)

Lee, Ui-jae 이의재. (n.d.). 서울올림픽대회 (一大會) [Seoul Olympic Games]. *Encyclopedia of Korean Culture*. http://encykorea.aks.ac.kr/Contents/Item/E0028046 (in Korean)

Lee, Wan-beom & Gwag, Byeong-hun 이완범 & 곽병훈. (1999). 5·18광주민주화운동 (五一八光州民主化運動) [May 18 Gwangju Democracy Movement]. *Encyclopedia of Korean Culture*. http://encykorea.aks.ac.kr/Contents/Item/E0038496 (in Korean)

Ministry of the Interior and Safety. (n.d.). *National Administration (National Symbols of the Republic of Korea).* Retrieved from Website https://www.mois.go.kr/eng/sub/a03/nationalSymbol/screen.do (in English)

Ministry of the Interior and Safety 행정안전부. (n.d.). 우리나라 국가상징 (애국가) [National symbol of Korea (national anthem)]. https://www.mois.go.kr/chd/sub/a05/story/screen.do (in Korean)

Ministry of the Interior and Safety 행정안전부. (n.d.). 우리나라 국가상징 (무궁화) [National symbol of Korea (Mugunghwa)]. https://www.mois.go.kr/chd/sub/a05/mugunghwa1/screen.do (in Korean)

Ministry of the Interior and Safety 행정안전부. (n.d.). 우리나라 국가상징 (태극기) [National symbol of Korea (Taegeukgi)]. https://www.mois.go.kr/chd/sub/a05/birth/screen.do (in Korean)

Park, Yang-chun 박양춘. (1995). 경부고속도로(京釜高速道路) [Gyeongbu Expressway]. *Encyclopedia of Korean Culture*. http://encykorea.aks.ac.kr/Contents/Item/E0002460 (in Korean)

Prasirtsuk, K. (2018). South Korea's Soft Power: Strengths and Limitation. *Thai Journal of East Asian Studies*. 22 (January-June): 122-139. (in Thai)

Pushsapavardhana, N. & Wongsomboon, N. (2020). The Success of Korean Wave Distribution: The Roles of Government and Entertainment Sectors. *Suratthani Rajabhat Journal. 7*(July-December): 1-25. (in Thai)

The Academy of Korean Studies 한국학중앙연구원. (n.d.). 영월한반도지형 (寧越韓半島地形) [Yeongwol Korean Peninsula Topography]. *Encyclopedia of Korean Culture*. http://encykorea.aks.ac.kr/Contents/Item/E0070026 (in Korean)

The Republic of Korea Cheong Wa Dae 대한민국 청와대 [TheBlueHouseKR]. (2020, March 1). 제101주년 3·1절 기념식이 서울 배화여고에서 거행됐습니다. 문재인 대통령은 기념식에 참석해 "여러모로 힘든 시기이지만, 1920년 첫 번째 3·1절을 기념하며 '대한독립만세'를 외쳤던 이곳에서 101주년 기념식을 열게 되어 매우 뜻깊다"고 말했습니다. #삼일절 영상보기 https://youtu.be/6h2BUaLrLi8 [Tweet]. Retrieved from https://twitter.com/TheBlueHouseKR/status/1234003168750522369

The Secret Sauce. (2021, December 24). *เกาหลีใต้พัฒนาถึงจุดนี้ได้อย่างไร ตอน 1 เผด็จการ พลิกยากจนสู่แชโบล | The Secret Sauce EP.484* [How South Korea has evolved to this point: Part 1 Dictatorship Turns Poverty into Chaebol | The Secret Sauce EP.484]. [Video file]. https://youtu.be/JYMfB5UjOKA

The Secret Sauce. (2021, December 25). *เกาหลีใต้พัฒนาถึงจุดนี้ได้อย่างไร ตอน 2 ซอฟต์พาวเวอร์สร้างแบรนด์โลก | The Secret Sauce EP.485* [How South Korea has evolved to this point: Part 2 Soft power Builds a Global Brand | The Secret Sauce EP.485]. [Video file]. https://youtu.be/9wCr6jvalN8

Sripanaratanakul, P. & Chansatitporn, P. (2016). Communicative Meaning in the ASEAN National Anthems. *Journal of Communication Arts,* Chulalongkorn University, *34*(September-December): 19-32. (in Thai)

Videomug 비디오머그 – VIDEOMUG. (2019, March 15). 국민이 마음껏 쓸 수 있는 애국가, 비머가 함께 했습니다 / 비디오머그 [The national anthem that the people can freely use]. [Video file]. Youtube. https://youtu.be/_D1SH3FiEDQ

Yeonhab News TV 연합뉴스TV. (2020, March 1). 〔풀영상〕제101주년 3.1절 기념식 / 연합뉴스*TV. (YonhapnewsTV)* [[Full video] 101st anniversary 3.1 commemoration ceremony / Yonhap News TV]. [Video file]. Youtube. https://youtu.be/cIsVXWysKVo

Recommendations for the Submission of Papers
for Publication in NIDA Development Journal

1) NIDA Development Journal publishes two issues per year (January-June, July-December).

2) The papers submitted for publication must be academic works in the field of development administration: Policy, Administration, and Development.

3) The types of contribution include Academic Articles, Research Articles, Journal Articles, Review Articles, Book Reviews, and Article Reviews.

4) Each paper submitted for publication will be rigorously reviewed by the Editorial Team and at least two reviewers, who are knowledgeable in the field. A decision by the Editorial Team is considered final.

5) The submitted papers must be unpublished works and must not be currently under consideration for publication elsewhere.

6) The papers must contain the following:
   - Title both in Thai and in English
   - Names and surnames, contact addresses, and emails of all authors both in Thai and in English
   - Abstract of 150-250 words both in Thai and in English
   - Keywords of 3-5 words both in Thai and in English

7) The text must be printed with single space on one-side of A4 paper, with no longer than 20 pages, and with margins of 2.5 cm. for top and left sides, and 2 cm. for bottom and right sides.

8) Printing of Title both in Thai and in English
   1. **Title** in Thai must be printed in TH SarabunPSK 18 points bold and in English in Time New Roman 14 points, bold.
   2. **Author** in Thai must be printed in TH SarabunPSK 16 points and in English in Time New Roman 12 points on the next line beneath the title.
   3. **Affiliation** in Thai must be printed in TH SarabunPSK 16 points and in English in Time New Roman 12 points on the next line beneath the author both in Thai and in English. In case the affiliation is at the footer, label must be in bold letters with the following wording:

- In Thai, use "**หน่วยงานผู้แต่ง**" such as **หน่วยงานผู้แต่ง:** ภาควิชาการศึกษา คณะศึกษาศาสตร์ มหาวิทยาลัยนเรศวร
- In English, use "**Affiliation**" such as **Affiliation**: Department of Education, Faculty of Education, Naresuan University

4. Abstract in Thai must be printed in TH SarabunPSK 16 points bold, and in English in Time New Roman 12 points bold, with the following wording:
- In Thai, use "**บทคัดย่อ**".
- In English, use "**Abstract**" or "**ABSTRACT**".

5. Keyword in Thai must be printed in TH SarabunPSK 16 points bold, and in English in Time New Roman 12 points bold, with the following wording:
- In Thai, use "**คำสำคัญ**".
- In English, use "**Keywords**" or "**KEYWORDS**".

6. Introduction in Thai must be printed in TH SarabunPSK 16 points bold, and in English in Time New Roman 12 points bold, with the following wording:
- In Thai, use "**บทนำ**".
- In English, use "**Introduction**" or "**INTRODUCTION**".

7. Reference in Thai must be printed in TH SarabunPSK 16 points bold, and in English in Time New Roman 12 points bold, with the following wording:
- In Thai, use "**เอกสารอ้างอิง**" or "**รายการอ้างอิง**" or "**บรรณานุกรม**".
- In English, use "**References**" or "**REFERENCES**" or "**Bibliography**" or "**BIBLIOGRAPHY**".

8. Graphs, tables, illustrations must be both in Thai and in English.

9) The paper (Word file and PDF) plus a submission form should be submitted via ThaiJO system (Thai Journal Online System) at http://www.tci-thaijo.org/index.php/NDJ.

10) References must abide by the APA Style system and must be alphabetically shown. For Thai references, reference list must be added by translating Thai references into English. The details and examples of references are highlighted as follows:

Books

Name of the author. (Year of publication). *Title.* Number of edition. Place of publication: Publisher.

Davis, Keith. (1967). *Human Relation at Work: The Dynamic of Organization Behavior.* New York: McGraw-Hill

Articles in Journals

Name of the author. (Year of publication). Name of article. *Name of journal*. Year (month): Page number.

Egloff, G. & Fitzpatrick, A. (1997). Vocationally Oriented Language Learning. *Learning Teaching Journal. 30* (July): 226: 242.

Websites

Lynch, T. (1996). *DS9 trials and tribble-actions review*. Retrieved October 8, 1997, from Psi Phi: Bradley's Science Fiction Club Web site http://www.bradley.edu/campusorg/psiphi/DS9/ep/503r.html

Mershon, D. H. (1998, November-December). *Star Trek on the brain: Alien minds, human minds*. American Scientist, 86, 585. Retrieved July 29, 1999, from Expanded academic ASAP database.

Other Sources

Agrawal, A. (2008, March 5-6). *The role of local institutions in adaptation to climate change*. Paper presented at the Social Dimensions of Climate Change, Social Development Department, The World Bank, Washington, DC.

Central Statistics Office of Republic of Botswana. (2008). *Gross domestic product per capita 06/01/1994 to 06/01/2008* [Statistics]. Available from CEIC Data database.

Supakorndej, S. (2003). *The process of recycling bank on Ban Thai Samakee community in Ban Pong, Ratchaburi*. Unpublished Master's thesis, Mahidol University.

Wilfley, D. E. (1989). *Interpersonal analysis of bulimia.* Doctoral dissertation, University of Missouri, Columbia.

Examples of References

Prachason, Sajin. (2009). *The Development of Food Security Indicators*. Sustainable Agriculture Foundation (Thailand).

Office of Agricultural Economics (2005). *Level of Thailand's Food Insecurity.* Bangkok: Office of Agricultural Economics.

Agricultural Land Reform Office, Maha Sarakham. (2009). *Annual Report.* Maha Sarakham: Apichart Press.

Babatunde, R. O., & Qaim, M. (2010). Impact of Off-Farm Income on Food Security and Nutrition in Nigeria. *Food Policy, 35*(4), 303-311.

Ebel, R. L., & Frisbie, D. A. (1986). *Essentials of Educational Measurement* (4th ed.). New Jersey: Prentice-Hall.

Nunnally, J. (1978). *Psychometric theory*. New York: MacGraw-Hill.

Radermacher, H., Feldman, S., & Bird, S. (2010). Food security in older Australians from different cultural backgrounds. *Journal of Nutrition, Education and Behavior, 42*(5), 328-336.

Examples of Translated Thai References

Prachason, Sajin. (2009). *The Development of Food Security Indicators*. Sustainable Agriculture Foundation (Thailand).

Agricultural Land Reform Office. (2009). *Annual Report*. Maha Sarakham: Apichart Press.

Ministry of Agriculture and Cooperatives. (2005). *The Results of the Thailand Analysis*. Retrieved October 10, 2008, from Website http://www.asiafivims.net/thailand/fivims/analysis.htm

Research Articles

Introduction elaborates on the importance of problems, scope of research, assumptions (if applicable), document checking may be included.

Objectives are objectives of the research.

Literature Review or Document Checking involves synthesizing the content from related literature and research to present concepts, theories, and information related to the research.

Methods specify methods to compile data, time used to compile data, year of research, methods of data analysis, whether qualitative or quantitative, depending on the type of research.

Research Result represents research result and data acquired from the particular research, possibly with accompanying illustrations, tables, and charts.

Conclusion is the summary of the research result, including discussions on the result, and recommendations based on the research result.

Book Reviews

1. Book reviews must contain the following information:
   - Title of the book in Thai/English
   - Name of the author in Thai/English
   - Year of publication
   - Publisher/printing house
   - Number of pages

2. The submission of book reviews should contain introduction, content, and conclusion, similar to the submission of articles.

3. The review of the content should be separated for each chapter or each article (in case of the book of compiled articles).

Caution in Preparation for Articles

- **Author** Do not specify the author's academic position, rank, military rank, academic degree, or prefix or suffix such as Mr., Mrs., Miss, Asst. Prof. Dr., PhD, Pol. Sub. Lt., Pol. Lt. Col.

- **Author's status** should not be specified such as PhD candidate, thesis advisor, Asst. Prof. Dr., Director…., Dean….., Registered nurse

- **Affiliation** There must be only one affiliation. (If there are more than one affiliation, choose only one). The affiliation should be specified by starting with the unit until the main agency, province, postal code, country such as Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangkok 10140, Thailand.

Contact Details

NIDA Development Journal
Research Center, National Institute of Development Administration
148 Serithai Road, Khlong Chan, Bangkapi, Bangkok 10240
Tel: 0 2727 3312, 0 2727 3314
Fax: 0 2375 8972
e-mail: journal@nida.ac.th
http://www.tci.thaijo.org/index.php/NDJ, http://journal.nida.ac.th

NIDA Development Journal Article Submission Form

Type of Paper Submission ☐ Academic Article ☐ Research Article ☐ Other (Please specify) ....

Article Title

Thai: ....

English: ....

Area of the Article

☐ 1. Public Administration

☐ 2. Development Economics

☐ 3. Business Administration

☐ 4. Social Development

☐ 5. Environmental Development

☐ 6. Applied Statistics

☐ 7. Language and Communication

☐ 8. Human Resource Development

☐ 9. Computer Science

☐ 10. Law

☐ 11. Integrated Tourism Management

☐ 12. Communication Arts and Management Innovation

☐ 13. Sufficiency Economy

☐ 14. Other (Please specify) ....

Author's First and Last Name (in BLOCK Letters)

Thai: ....

English: ....

Affiliation (Organization): ....

....

Education Level: ....

Educational Institution: ....

Academic Position (if applicable): ....

Administrative Position (if applicable): ....**...**

Contact Address

Street Address   ....Soi.........................Street...

Sub-district ....District (Khet)...............................Province..

Zip Code: .... e-mail: ....Line: ....

Tel: ....Mobile: ....Fax: ....

I warrant that the work submitted has not been published before in its current or substantially similar form; and it's not under consideration for another publication, does not contain any unlawful statement; and does not infringe any existing copyright.

I acknowledge and accept that the Editorial Board of NIDA Development Journal has a policy **not to disclose** the names of Editorial Board members or other reviewers who evaluate the articles submitted in any case in order to protect the rights and prevent any negative consequences to the individuals. Furthermore, this is in congruent with international practice standards of academic journals that employ double-blind reviewing process.

No Publication Fee

Reviewers Suggestion

Please suggestion at least three expert **reviewers** in you field.

1. **Name – Surname:** ....
    Affiliation (Organization) ....
    Expertise...
    E-mail: ....Tel: .... Line: ....

2. **Name – Surname:** ....
    Affiliation (Organization) ....
    Expertise...
    E-mail: ....Tel: .... Line: ....

3. **Name – Surname:** ....
    Affiliation (Organization) ....
    Expertise...
    E-mail: ....Tel: .... Line: ....

Author   ....   Co-author   ....
                  (...)   (...)
                  ..../.................../............   ..../.................../............

Co-author   ....   Co-author   ....
                  (...)   (...)
                  ..../.................../............   ..../.................../............