

NIDA Development Journal

วารสารพัฒนบริหารศาสตร์

Volume 61 Number 1 (Januray - June 2021)

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Aims and Scope

The NIDA Development Journal (NDJ) publishes manuscripts that describe or synthesize research of direct relevance to development administration. Its main objective is to publish high quality, double blind peer-review papers using at least three referees that have not previously been published and that reflect the latest research in the area of policy, administration and development. The editors welcome a wide range of academic papers, including research articles, review articles, and book reviews.

Publication Frequency

Issue 1: January-June
Issue 2: July-December

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Bangkapi, Bangkok, 10240 THAILAND
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E-mail: journal@nida.ac.th

Designed and printed by

THANAAROONKARNPIM CO., LTD.
99/2 Dinso Road, Bowonniwet, Phra Nakhon, Bangkok 10200
Tel. 0 2282 6033-4
Fax 0 2280 2187-8

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Message from the Editor

Much like its previous issues, the current one of NIDA Development Journal features research articles that include a wide variety of subjects and themes to suit the interest of a general as well as specialized readership. The titles in this issue cover subjects and themes in the disciplines ranging from demography, through social psychology, to tourism. The issue also contains works that could be regarded as cross-disciplinary in nature, for example, in the study of the role of information technology in local government.

The issue starts with a highly interesting demographic research work titled **“Family Solidarity and Transfers between Elderly Parents and Adult Children in Thailand”**, by Dararatt Anantanasuwong of the Center for Aging Society Research, and Duanpen Theerawanviwat of the School of Applied Statistics, both at the National Institute of Development Administration. The article investigates the manifest family solidarity of older persons in Thailand as related to structural solidarity, associational solidarity, and functional solidarity. The article also analyzes the typology of support between elderly parents and their adult children using the Latent Class Analysis (LCA), which yields the four types of support between elderly parents and adult children in Thailand, namely, “Detached”, “Sociable”, “Tight knit” and “Normative”. The study concludes with a policy recommendation that, given older persons’ ability to relate to many generations of family members, their potential to close the gaps between generations should be recognized.

The next research article involves a social psychological study titled **“Development and Validation of Psycho-Moral Strength (PMS) Scale for University Lecturers”**, by Duchduen Bhanthumnavin of the Graduate School of Social Development and Management Strategy, National Institute of Development Administration. In investigating this issue, the author constructs a psycho-moral strength scale (PMS) consisting of four important psychological characteristics, namely, ๑) need for achievement, ๒) internal locus of control, ๓) future orientation and self-control, and ๔) moral identity. The research results lead to a new approach for future research, intervention, and assessment to enhance desirable behaviors.

This research article is followed by a study in the same line of social psychology by Duangduen Bhanumnavin of the Graduate School of Social Development and Management Strategy, National Institute of Development Administration. Titled “**Antecedent Model of Punctual Behavior of Undergraduate Students**”, the study investigates antecedent factors of punctual behavior of undergraduate students using SEM approach for creating evident-based model, and for comparing two models. Using path analysis using 6,100 students, the study yields a result displaying the psychological trait construct which consisted of three personal characteristics, i.e., moral (dis)engagement, self-regulated learning and core self-evaluation, showing both direct and indirect paths towards punctual behavior of the students.

A study of evidently cross-disciplinary character is the investigation of “**The Role of Pythonic Accounting-Assisted Digital Finance Sentiment in Promoting Environmental Sustainability**” by Dzakiyy Hadiyan Achyar of the School of Management, Mae Fah Luang University. This is a panel data study aiming to examine the relationship between Indonesia’s environmental protection achievement in terms of climate change prevention and its prevailing political economy by explicitly considering the role of pythonic accounting assisted-capital market sentiment from 2000 to 2018. The study shows that speculations or reactions from the media related to digital finance could not do anything about the existing wealth distribution gap's impact on the environmental protection effort in Indonesia in the early 2000s but this started to change after 2008 in Indonesia due to capital market maturity after Asia economic crisis 2008-2009.

The last two research articles being featured in this issue could be regarded as being of cross-disciplinary nature, at least insofar as their employment of new technology is concerned. The first of these is “**Antecedents of Usage Intention of E-hailing Apps in Thailand from Generation-Y & Generation-Z Chinese Independent Tourists’ Perspective, an Integration of TTF and UTAUT**”, by Weidong Lin of the International College, Sri Pathum University. The article examines usage intention of e-hailing apps by integrating TTF and UTAUT model for the case of Gen-Y and Gen-Z Chinese independent tourist through online survey data collected from Chinese respondents who visited Thailand before the outbreak of COVID-19 pandemic or planned to visit Thailand after the end of pandemic (n = 400). The research confirms a positive effect of effort expectancy on performance expectancy

The other article, which is the last one being presented in this issue, is an innovative study titled **“Information use and budget allocation: How information plays a role in spending efficiency and effectiveness among Thailand’s municipalities”** by Pawinee Chuayprakong of the Graduate School of Public Administration, National Institute of Development Administration. The author quantitatively studies a reform endeavor through survey research with a questionnaire inquiring the heads of department about their perceptions of budgetary incrementalism, organizational culture, performance information use and budget outcomes. As a result of her research effort, the author makes a recommendation for future research endeavors to take into consideration the levels of budget allocations and other types of local governments adopting the performance-based budgeting in order to strengthen the internal and external validity of how information use matters in the local budgeting realm.

In view of the variety of their subjects and themes, together with their rigorous modes of inquiry, all six articles will not only be of valuable interest to readers but hopefully provide useful directions for further research efforts.

Patthareeya Lakpetch
Editor

Prapin Nuchpam
Associate Editor

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Family Solidarity and Transfers between Elderly Parents and Adult Children in Thailand

Dararatt Anantanasuwon* and Duanpen Theerawanviwat**

Received: August 23, 2022

Revised: November 15, 2022

Accepted: November 29, 2022

Abstract

The main purpose of the paper was to investigate the manifest family solidarity of older persons in Thailand related to structural solidarity, associational solidarity, and functional solidarity and to analyze the typology of support between elderly parents and their adult children using the Latent Class Analysis (LCA). The investigation and analyses of family solidarity and types of support were disaggregated by age groups comparing the young-old (aged between 60 - 69), the mid-old (aged between 70 - 79), and the oldest-old (aged 80 or over). The data from Wave 2 (2011) of the longitudinal panel household survey on Health, Aging, and Retirement in Thailand (HART) were employed for the cross-section analysis.

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Results: The study findings of the three aspects of solidarity revealed that when parents were advanced in age, the solidarity in each aspect or the interrelationship with adult children would tend to increase, in terms of co-residence with children, frequency in contact with children, or the role of sole “recipients” of resource assistance from children. The solidarity indicators had higher share with the oldest-old parents compared with the young-old and the mid-old parents. It could be interpreted that with parents’ more advanced age, the status of self-reliance would change to reliance on others especially on children in terms of economic, social, and health aspects. With the physical and mental degradation, needs of assistance and care would increase.

The analysis of LCA revealed the four types of support between elderly parents and adult children in Thailand were “Detached” “Sociable” “Tight knit” and “Normative.” Each type had the shares of the elderly parents as follows: ๔๑%, ๖%, ๒๙%, and ๒๔%. In addition, the types of family relationship of elderly parents in each age group were different and could be evidence of a dynamic process of intergenerational interaction in the course of life. Overall, the study results pointed to the social norm that filial gratitude towards parents still existed in the Thai society. But behavior might change from the old pattern of children’s assistance and support both in cash and in kind to parents to at least in regular contact with parents or to parents exchanged assistance in kind. This changing behavior reflected the adaptation to the changing society, while familial support to older persons tended to become long-term care. As the older persons might relate to many generations of family members, to close the gap between generations should be a policy suggestion.

Keywords: Family Solidarity, Intergenerational Transfers, Older Persons, Thailand

ความเข้มแข็งของครอบครัวและการเกื้อกูลกัน ระหว่างบิดามารดาสูงอายุ และบุตรวัยผู้ใหญ่ในประเทศไทย

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บทคัดย่อ

บทความนี้มีวัตถุประสงค์สำคัญในการศึกษา 2 ประการ คือ (๑) เพื่อศึกษาความเป็นปึกแผ่นของครอบครัว ผู้สูงอายุไทยในปัจจุบัน โดยเฉพาะด้านที่ปรากฏให้เห็นเป็น "ปธรรม" ได้แก่ ด้านโครงสร้างของครอบครัว ด้านความเชื่อมโยงสัมพันธ์กัน และด้านการปฏิบัติตามหน้าที่ และ (๒) เพื่อวิเคราะห์จัดประเภท (Ty-pology) ของการเกื้อกูลกันระหว่างผู้สูงอายุไทยกับบุตรวัยผู้ใหญ่ จากมุมมองของผู้สูงอายุ โดยวิธี Latent Class Analysis (LCA) การศึกษาความเป็นปึกแผ่นและการวิเคราะห์ด้วย LCA จะเป็นการศึกษาเปรียบเทียบระหว่างกลุ่มอายุ ได้แก่ ผู้สูงอายุวัยต้น (อายุ ๖๐ - ๖๙ ปี) วัยกลาง (อายุ ๗๐ - ๗๙ ปี) และวัยปลาย (อายุ ๘๐ ปีหรือสูงกว่า) สำหรับข้อมูลในการศึกษาได้นำมาจากการสัมภาษณ์ด้วยตัวอย่างครัวเรือนซ้ำ รอบที่ ๒ (๒๕๖๐) ของโครงการศึกษาสุขภาพ การสูงอายุ และการเกษียณในประเทศไทย เพื่อวิเคราะห์แบบข้อมูลภาคตัดขวาง

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ผลการศึกษา: ผลการศึกษาคือความเป็นกันแน่นของครอบครัวใน ๓ ด้าน พบว่า ความเป็นกันแน่นในแต่ละด้านที่ศึกษา อันได้แก่ ความสัมพันธ์ที่ก่อการมีปฏิสัมพันธ์กับบุตรวัยผู้ใหญ่ ให้น้ำหนัก ๆ ก็มีแนวโน้มที่จะเพิ่มมากขึ้นเรื่อย ไม่ว่าจะเป็นประเด็นของการพักอาศัยอยู่กับบุตร ความถี่ในการติดต่อพูดคุยกับบุตร หรือการมีบทบาทเป็น “ผู้รับ” ทรัพยากรความช่วยเหลือจากบุตรอย่างเดียวย โดยตัวบ่งชี้ความเป็นกันแน่นเหล่านี้มีสัดส่วนที่เพิ่มขึ้นในอัตราตามอายุวัยปลาย เมื่อเปรียบเทียบกับวัยต้น และวัยกลาง ซึ่งอาจจะตีความได้ว่าเมื่อบิดามารดามีอายุมากขึ้น สุ นนะของการพึ่งตนเองได้เปลี่ยน ไปเป็นการพึ่งพาผู้อื่น โดยเฉพาะบุตรในแง่ของเศรษฐกิจ สังคม และสุขภาพ เนื่องจากความทรุดโทรมทางด้าน ร่างกายและจิตใจ จึงต้องการการเอาใจใส่ดูแลช่วยเหลือมากขึ้น

การวิเคราะห์ LAC จากมุมมองของผู้สูงอายุ ได้ผลแยกแยะการสูญเสีย สุ นนะที่ บิดามารดาสูงอายุ และบุตรวัยผู้ใหญ่ ออกเป็น ๔ ประเภท ได้แก่ “ห่างเหินจากลูก” “เห็นที าลัก” “แลกเปลี่ยน วยบริการ” และ “มีลักคตัญญู” โดย ัตส่วนของผู้สูงอายุที่มีการสูญเสีย สุ นนะในแต่ละประเภทตามลำดับ ดังนี้ ๔๑%, ๖%, ๒๙%, and ๒๔% นอกจากนี้ ประเภทการสูญเสีย สุ นนะที่ บิดามารดาและบุตรในแต่ละกลุ่มอายุยังแตกต่างกัน และสามารถแสดงให้เห็น ่วยหลักฐานเชิงประจักษ์ถึงกระบวนการเปลี่ยน แปลงของปฏิสัมพันธ์ ระที่ ่างรุ่น ใน ่วงชีวิตของคน โดยรวม ผลการศึกษา แสดงให้เห็น ึ่งบรรทัดฐานทางสังคมที่เกี่ยวข้องกับความคตัญญู ต่อบุพการียังคงอยู่ใน ังคมไทย แต่พฤติกรรมในการแสดงออกได้มีการเปลี่ยน แปลงจากรูปแบบเดิม ที่การช่วยเหลือและสูญเสีย สุ นนะแก่บิดามารดาทั้งใน ับของเงินและสิ่งที่ไม่ใช่เงิน มาเป็นอย่างน้อย ึ่งการติดต่อพูดคุย บิดามารดาอย่างสุ ่าเสมอ ือบิดามารดาแลกเปลี่ยน วยความช่วยเหลือ ือ าน ึ่งไม่ใช่เงิน ซึ่งเป็น การปรับเปลี่ยนพฤติกรรมให้เหมาะสมกับสภาพของสังคมที่เปลี่ยน ไป และการเกื้อ ุน ึ่งอายุจากครอบครัว มีแนวโน้มที่จะเป็นการดลแลที่มีระยะยาวขึ้น ผู้สูงอายุจึงอาจต้องเกี่ยวพันกับสมาชิกในครอบครัวหลายรุ่นด้วยกัน ดังนั้น ข้อเสนอแนะเชิงนโยบายที่สำคัญ คือ การป้องกันไม่ให้มีปัญหาช่องว่างระหว่างรุ่น ึ่งอยู่ในครอบครัว

คำสำคัญ: ความเป็นกันแน่นของครอบครัว การเกื้อ ุระที่ ่างรุ่น ึ่ง ผู้สูงอายุ ประเทศไทย

Introduction

To sustain or improve the wellbeing of older persons under the rapidly increased number and share of older population globally and in Thailand are a crucial policy challenge in the 21st Century. Related to the ageing population, the Sustainable Development Agenda of the United Nations with the 17 Sustainable Development Goals (SDGs) indicates that the preparing for ageing population is essential to the achievement of the integrated 2030 Agenda since ageing cutting across the goals on poverty eradication, good health, gender equality, economic growth, decent employment, and sustainable cities and communities (United Nations, 2015, 2016). In the implementation of the agenda in order to achieve truly transformative, inclusive, and sustainable development outcomes, it is important to recognize older persons as the active agents of social development beyond treating them as a vulnerable group. (United Nations Development Programme, 2016).

One important recommendation for the recognition of older persons as such by the UN Madrid International Plan of Action on Ageing (MIPAA) for handling the issue of ageing in the 21st Century and for building a society for all ages was a solidarity of people of different generations and ages in all levels, as well as participation in sustainable development, which would form a foundation leading to the society of people of all ages and resulting in social cohesion. The interaction and support between people of different generations must start at the family level. Likewise, the relationship both formal and informal, between older persons and their surrounding people (e.g., family members, neighbors and friends, and services providers) was one major component to ensure healthy ageing and well-being of older persons in order to achieve the UN Decade of Healthy Ageing (2020-2030) as viewed by the World Health Organization (WHO) (World Health Organization, 2015).

The research study on aging population and generational economy in 91 countries by Lee and Mason (2016) identified three supporting sources of capital for older persons (aged over 65 years), namely, public transfers, private transfers (family transfers), and asset-based allocations of the older persons themselves. As for Thailand, the main resource for the support of the older persons is family transfers, followed by asset-based allocations. The public transfers constitute little share.

Based on such reasons, it is of interest to investigate on the family support system of older persons. The strength of this type of support system was based on the foundation of close relationship or solidarity of the members in the same family which constituted intergenerational relationship. Such relationship in particular between elderly parents and adult children was complicated and multi-faceted as there were various theories used to explain the relationship. Superficially, the relationship was such that the older persons received assistance from adult children relevant to behavior of gratefulness still prevalent in the eastern society. However, the in-depth consideration revealed that the older persons were not only “recipients” but also “givers.” It was found that a large number of the older persons supported their adult children. Therefore, the paper consisted of two objectives: (๑) to investigate the solidarity of the older persons’ family in Thailand especially the concrete dimension such as structural solidarity, associational solidarity, and functional solidarity and (๒) to analyze the typology of support between elderly parents and their adult children in Thailand.

To accomplish the objectives, the comparison among the young-old (aged between ๖๐ - ๖๔ years old), the mid-old (aged between ๗๐ - ๗๔ years old), and the oldest-old (aged ๘๐ years old or over) was conducted. The relationship between the children and the older persons born as the Baby Boom generation (born between ๑๙๔๖ to ๑๙๖๓) which covered the birth of the young-old (born between ๑๙๔๗ to ๑๙๕๗) and whether it was different from the older persons born before were studied. This is because recently there were more divorces and remarriages. It might result in weakening the relationship of family members in the generation of Baby Boomers compared to the generation that came before. On the other hand, due to their higher education attained and having fewer children, the parents of the Baby Boom generation should be closer to their children than the parents before them.

Solidarity model of intergenerational family members

The conceptual solidarity model in this study was based on the manifest solidarity reclassified by Silverstein and Bengtson (๑๙๙๗) from the original six dimension of the relationship between intergenerational family members of McChesney and Bengtson (๑๙๘๘). The manifest solidarity was part of the behavior that involved interactions

between intergenerational family members and composed of associational solidarity, functional solidarity, and structural solidarity. **The associational solidarity** involved pattern and frequency of communication between intergenerational family members, while **the functional solidarity** involved assistance of both givers and recipients between intergenerational family members and exchange of the assistance covering cash and in kind, daily activity care, and psychological support, and **the structural solidarity** involved physical closeness or co-residence of intergenerational family members which impact the opportunity of interactions between intergenerational family members. Figure ๑ showed the relationship of the three aspects of solidarity (Rossi and Rossi, ๑๙๙๐). Functional solidarity was related to the other two aspects of solidarity because the structure and types of residence of the elderly had direct and indirect impact on the functional solidarity through the associational solidarity with other family members.

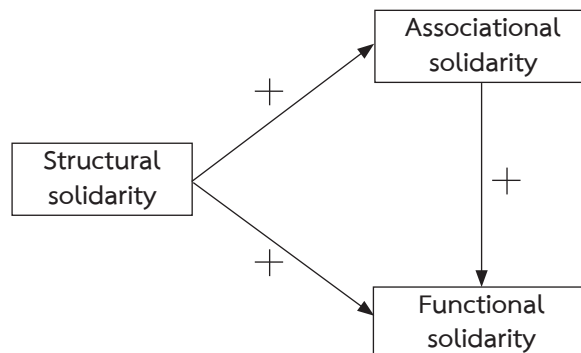


Figure 1: Relationship among the three dimensions of manifest solidarity

Source: Revised from Rossi and Rossi, ๑๙๙๐.

Study methods

The intergenerational relationships in the family solidarity model (Figure ๑) depended on the closeness of relationships in many aspects among members of different generations in the same family. The relationship was linked to the exchange of resources between younger family members and older family members. This study covered adult children aged ๑๘ years old or over and elderly parents aged ๖๐ years old or over. In terms of life-span developmental perspective, the exchange of resources or support between adult-elderly parent dyads could be both recipients and givers. Therefore, the support was bi-directionality and reciprocity.

To investigate the solidarity of the older persons' family in Thailand, five indicators were used to reflect two dimensions of associational solidarity and functional solidarity. Frequency of contact with children whether face-to-face meetings, telephone calls, or other communicative channels was the indicator for associational solidarity. Four indicators for functional solidarity were exchange of resources with children whether "in cash" or "in kind" and elderly parents as both "recipients" and "givers." These indicators were further used to analyze the typology of support between Thai older persons and adult children using the Latent Class Analysis (LCA). The analysis was also conducted on the typology of the support of the young-old, the middle-old, and the oldest-old parents.

Data sources

The study employed the available data from Wave 2 of the longitudinal panel household survey on Health, Aging, and Retirement in Thailand (HART)^a for the cross-section analysis. The HART project involves a bi-annual survey starting with its baseline survey in 2005. The Wave 2 data were collected in 2007 (during January to June 2007). One household member aged from 45 and over from the baseline national representative household samples of 5,616 from 6 regions of Thailand, including Bangkok and vicinity, were interviewed. In Wave 2, the number of the panel households or the total respondents interviewed was 3,708 with the response rate of 66.03% (Anan-tanasuwong, et. al., 2008).

The data for analysis in the study were drawn from Part B of the HART database, "Family and Family Transfers: Wave 2 (2007)" and from the COVERSCREEN. The study focused on the data from the respondents, both males and females, aged from 60 or over and who have at least one adult children (aged from 18 or over). Thus, the data were screened down to 2,738 eligible respondents with 1,078 respondents (39.40%) classified as the young old aged 60 - 69, 887 (32.45%), the mid-old aged 70 - 79, and 773 (28.15%) the oldest old aged from 80 or over.

^a The HART data are kept in a data archive and can be requested from the websites of Center for Aging Society Research (CASR) <http://rc-demo.nida.ac.th/casr/> and NIDA Intelligence and Information Center (NIDA-IIC) http://iic.nida.ac.th/main/?page_id=564

Study Findings

The main personal status including gender, marital status, religion, education, work status and type of work of the sample in this study classified by age groups was shown in Table ๑. From Table ๑, the share of females was higher than males (approximately ๙%) of the three groups in ๒๐๑๗. The proportion of the respondents who were married at that time decreased from ๖๔.๒% of the young-old to ๕๒.๘% and ๓๒.๖% of the mid-old and the oldest-old, respectively. On the contrary, the widowed status increased following the age groups, i.e., ๑๙.๗%, ๓๕.๓%, and ๕๙.๘%, respectively. As for the number of living children, the older persons in the Baby Boom generation had the average of ๒.๒๓ living children, while the mid-old and the oldest-old parents had the average of ๒.๘๕ children and ๓.๕๕ children, respectively. It was noticeable that, in terms of marital status, the shares of single persons, persons living together without marriage, and divorced or separated decreased according to the age groups. Therefore, it could be said that the importance of family institution tended to decrease, as well as the size of family.

In terms of social characteristics, slightly over ๙๐% of the respondents in all age groups were Buddhists, followed by Muslims (i.e., ๘.๗%, ๖.๘%, and ๘.๘% of the young-old, the mid-old, and the oldest-old, respectively). Most of the three age groups received primary education with the following shares: ๗๗% of the young-old, ๘๐.๗% of the mid-old, and ๗๘.๗% of the oldest-old. However, the share of those who received higher education than primary education tended to increase especially when compared with the older persons of the Baby Boom generation and the oldest-old.

For economic characteristics, ๓๑.๖% or approximately one-third of the young-old were still working and the shares of older persons who worked decreased rapidly in the mid-old, and the oldest-old (๑๕.๙% and ๔.๕%, respectively). However, for those still working, the pattern of the types of work were similar for the three age groups, i.e., the ratio of company employees/self-employed: business owners: family business equaled to ๓: ๖: ๑.

Table 1: Number and percentage of the sample distinguished by the main personal status and age groups of parents (n = ๒,๗๓๙)

Personal status	Young-old (60 - 69 years old)		Mid-old (70 - 79 years old)		Oldest-old (80 years old or over)	
	Number	Percentage	Number	Percentage	Number	Percentage
Gender						
Males	๔๘๗	๔๕.๑	๔๒๖	๔๗.๕	๓๓๗	๔๔.๒
Females	๕๕๒	๕๕.๙	๔๗๑	๕๒.๕	๔๒๖	๕๕.๘
Marital status						
Married	๖๙๓	๖๔.๒	๔๗๔	๕๒.๘	๒๔๙	๓๒.๖
Cohabitation without marriage	๔๖	๔.๓	๒๔	๒.๗	๑๖	๒.๑
Divorced, separated	๕๘	๕.๔	๓๘	๔.๒	๑๓	๑.๗
Widowed Single	๒๑๓	๑๙.๗	๓๑๗	๓๔.๓	๔๕๖	๕๙.๘
Number of living children						
๑	๑๘๕	๕๑.๒	๑๑๐	๓๐.๕	๖๖	๑๘.๓
๒	๓๗๒	๕๓.๔	๒๑๓	๓๐.๖	๑๑๒	๑๖.๑
๓	๒๔๑	๔๔.๑	๑๗๙	๓๒.๘	๑๒๖	๒๓.๑
๔	๙๖	๒๗.๓	๑๔๔	๔๐.๙	๑๑๒	๓๑.๘
๕	๔๓	๑๘.๕	๘๒	๓๕.๓	๑๐๗	๔๐.๑
More than ๕	๒๕	๘.๘	๘๓	๒๙.๒	๑๗๖	๖๒.๐
Average number of children	๒.๒๓		๒.๘๕		๓.๕๕	
Religions						
Buddhism	๙๗๕	๙๐.๙	๘๒๗	๙๒.๘	๖๘๔	๙๐.๒
Christianity	๕	๐.๕	๓	๐.๓	๖	๐.๘
Islam	๙๓	๘.๗	๖๑	๖.๘	๖๗	๘.๘
Others	๐	๐.๐	๐	๐.๐	๑	๐.๑
Education						
Did not attend school	๔๑	๓.๘	๖๗	๗.๕	๑๒๐	๑๕.๙
Primary education	๘๒๖	๗๗.๑	๗๑๘	๘๐.๗	๕๙๔	๗๘.๗
Secondary education, vocational certificate, high vocational certificat	๑๗๔	๑๖.๒	๘๐	๙.๐	๒๘	๓.๗
B.A. Degree or higher	๒๙	๒.๗	๒๒	๒.๕	๑๑	๑.๕
Others	๑	๐.๑	๓	๐.๓	๒	๐.๓

Table 1: Number and percentage of the sample distinguished by the main personal status and age groups of parents (n = 2,718) (Continue)

Personal status	Young-old (60 - 69 years old)		Mid-old (70 - 79 years old)		Oldest-old (80 years old or over)	
	Number	Percentage	Number	Percentage	Number	Percentage
Work status						
Unemployed	718	26.4	754	27.9	718	26.4
Employed	2000	73.6	2064	76.1	2000	73.6
Types of work						
Company employees/ self-employed	16	0.6	16	0.6	16	0.6
Business owners	16	0.6	16	0.6	16	0.6
Family business	16	0.6	16	0.6	16	0.6
Others	0	0.0	0	0.0	0	0.0

Structural solidarity

The intergenerational solidarity is defined as physical closeness or co-residence between elderly parents and adult children. Whether the parents resided with their children or not would impact the opportunity of interactions and mutual support between members of the same household. The intergenerational solidarity, therefore, would benefit both elderly parents and their children.

From Table 2, more than half of the older persons co-resided with their children. This was in line with the finding from the Survey of Older Persons conducted by National Statistical Office. The Surveys also provided the trends of the co-residence between 1980 and 2010 decrease on a continuous basis (Knodel, et al., 2010). Compared to other countries in Asia, the share of older persons co-resided with their children would be more serious than that in Thailand. In 1995, 46.5% of the older persons in South Korea co-resided with their children (Park, et. al, 2005). In 2005, 48% of the older persons in Taiwan co-resided with their children (Yi and Lin, 2008). While in 2005, 51.5% of the older persons in China co-resided with their children (Zhao et. al., 2008).

However, as shown in Table ๒, the share of the older persons co-residing with their children increased with advanced age. The shares of ๕๘% of the young-old co-resided with their children whereas ๕๙.๘% and ๖๔.๗% of the mid-old and the oldest-old, respectively, co-resided with their children. Especially, the oldest-old parents who had limitations or health problems in terms of seeing, hearing, and moving, they needed assistance from their children, grandchildren, or caregivers in their daily activities of living. This was in accordance with the type of family of the older persons. From Table ๒, the share of the older persons living in extended family increased according to the age groups whereas the share of living in single family decreased due to the death of their spouses, so they had to co-reside with their children and grandchildren instead. As for the number of household members of the older persons whatever age groups, the average members were appropriately ๓.๕ persons. However, as the percentages of extended family tended to increase according to the older persons' more advanced age, and although the number of household members was stable, the composition or type of household members was different. This was in line with the findings from the Survey of Older Persons in ๒๐๑๔ (Knodel et al., ๒๐๑๕)

Table 2: Percentage of the elderly parents distinguished by types of residence and age groups

Types of residence	Young-old (60 - 69 years old)	Mid-old (70 - 79 years old)	Oldest-old (80 years old or over)
Co-residence with children			
Resided with children	๕๘.๐	๕๙.๘	๖๔.๗
Did not reside with children	๔๒.๐	๔๐.๒	๓๕.๓
Types of family			
Single family	๕๕.๐	๕๐.๕	๔๕.๑
Extended family	๓๙.๙	๔๔.๐	๕๑.๐
No family/relative	๕.๒	๕.๕	๓.๙
Number of household members			
๑	๘.๓	๑๒.๗	๑๓.๒
๒	๒๖.๐	๒๖.๐	๒๔.๐
๓	๒๐.๓	๑๙.๑	๑๙.๓
๔	๑๖.๓	๑๗.๓	๑๗.๔
๕	๑๒.๕	๑๐.๗	๑๒.๗
More than ๕	๑๖.๖	๑๗.๒	๑๓.๓
Average number of household members	๓.๗	๓.๔	๓.๕

Associational solidarity

Associational solidarity between elderly parents and adult children who did not live together was measured through the indicator of frequency in contact and communication, whether visits, telephone calls, letters, email, or others. As shown in Table 3, almost half of the elderly or 46.4%, 42.5%, and 44.4% of the young-old, the mid-old, and the oldest-old parents, respectively, had contact with at least one child who did not live together every day or almost every day. The frequency was determined at the level of “often” meaning contact with the children at least once a week, the level of “moderate” meaning contact with the children at least once a month, and the level of “rarely/never” meaning contact with the children less than once a month or never met. It could be seen that most elderly parents contacted at least one child who did not co-reside with them at high and moderate levels.

Table 3: Percentage of the young-old, the mid-old, and the oldest-old parents with at least one child who did not co-reside with them distinguished by the frequency of contact and locations of residence

Contact	Young-old (60 - 69 years old)	Mid-old (70 - 79 years old)	Oldest-old (80 years old or over)
Number of times of contact with children a year			
Almost every day/every day	46.4	41.5	44.4
2 - 3 times a week	11.2	10.2	14.4
Once a week	12.2	10.1	9.4
1 - 3 times	14.1	11.1	11.5
Once a month	10.1	9.1	14.5
< 12 times	12.2	14.5	12.1
Never met	4.1	11.1	14.1
Locations of children's residence (compared with parents' residence)			
In the same subdistrict	12.1	11.4	12.1
In the same district	14.4	11.2	12.1
In the same province but in different district	14.5	11.2	14.1
In the different province	11.1	14.4	14.4
Others	11.4	14.4	11.1

In terms of the distance from the parents' residence of the children who did not co-reside with them, from Table 3 it was clearly seen that the percentage of the elderly parents with at least one child who resided in the same subdistrict increased with the parents' advanced age, that is 12.1% of the young-old parents, 17.4% of the mid-old parents, and 22.4% of the oldest-old parents.

Functional solidarity

The functional solidarity could broadly mean the level of exchange of services or assistance between intergenerational family members (Robert, Richard and Bengtson, 1989). However, in this study, the functional solidarity would be specifically meant the mutual support between elderly parents and adult children. The mutual support would include both in cash and in kind, daily activity care, and psychological support. Moreover, from the life cycle perspective, the oldest-old parents who should be "recipients" after having performed main duties as "givers" was focused.

Based on Table 4, approximately 20% of elderly parents did not have any support with their adult children. The remaining 43-53% of elderly parents had mutual assistance with the adult children. The share decreased with the parents' advanced age. Similar to the support as sole "givers" of the parents in their old age, the shares were contributed to 4%, 5%, and approximately 4% of the parents aged 60-64 years old, 65-69 years old, and 70 years old and over, respectively. On the contrary, the parents who were sole "recipients" constituted to approximately 18%, 25%, and 30% of the parents aged 60-64 years old, 65-69 years old, and 70 years old and over, respectively. The share of the sole "recipients" would increase with the parents' advanced age.

Table 4: Percentage of the elderly parents distinguished by age groups and directions of support with children

Contact	Young-old (60 - 69 years old)	Mid-old (70 - 79 years old)	Oldest-old (80 years old or over)
One directionality	๒๕.๕	๓๐.๐	๓๔.๒
๑. Parents were sole recipients	๑๗.๕	๒๕.๐	๓๐.๔
๒. Parents were sole givers	๘.๐	๕.๐	๓.๘
Bi-directionality with parents as both recipients and givers	๕๓.๔	๔๙.๐	๔๒.๘
No support between parents and chil-dren	๒๑.๒	๒๐.๙	๒๓.๐
Total	100.0	100.0	100.0

The directions of support between elderly parents and adult children were distinguished by the indicators of the structural solidarity as detailed in Tables ๕-๗ for the young-old, the mid-old, and the oldest-old parents, respectively. The one directionality of the support would consider the perspective of the elderly parents, namely, “sole recipients” meaning the parents were sole recipients from adult children without giving to them. The indicators of structural solidarity consisted of co-residence with children, types of family, as well as the number of living children.

For the young-old parents (Table ๕), the directions of support distinguished by the number of living children revealed that the bi-directionality support between parents and children increased according to the number of the living children or increase from ๕๑% (one child) to approximately ๕๘% (more than five children) with the exception of having four children. As for the case of no support, it revealed that the lowest share was parents with two living children or ๑๖.๖% with the increase to approximately ๒๐% in the case of having three children and increase to approximately ๓๐% of the parents with four living children or more. The pattern of support between young-old parents and children was not vastly different between co-residence with children and without co-residence with children. Finally, with the division of types of family of the elderly residents, it revealed that the share of the residents in extended family (๕๕.๘%) having the bi-directionality support with children was higher than the residents in single family (๔๐.๙%).

Table 5: Percentage of the young-old parents (๖๐- ๖๔ years old) distinguished by the directions of support and structural solidarity

Indicators of structural solidarity	One directionality		Bi-directionality	No support	Total
	Sole recipients	Sole givers			
Number of living children					
๑ child	๑๔.๔	๑๐.๖	๕๑.๐	๒๔.๐	๑๐๐.๐
๒ children	๑๙.๖	๑๐.๑	๕๓.๗	๑๖.๖	๑๐๐.๐
๓ children	๑๗.๒	๖.๔	๕๖.๔	๒๐.๑	๑๐๐.๐
๔ children	๒๑.๐	๓.๗	๔๕.๗	๒๙.๖	๑๐๐.๐
๕ children	๗.๙	๕.๓	๕๕.๓	๓๑.๖	๑๐๐.๐
More than ๕ children	๑๐.๕	๐.๐	๕๗.๙	๓๑.๖	๑๐๐.๐
Co-residence with children					
Co-resided	๑๗.๗	๘.๓	๕๐.๖	๒๓.๔	๑๐๐.๐
Did not co-reside	๑๗.๔	๗.๘	๕๔.๙	๑๙.๙	๑๐๐.๐
Types of family					
Single family	๑๘.๒	๘.๖	๕๐.๙	๒๒.๓	๑๐๐.๐
Extended family	๑๖.๘	๗.๓	๕๕.๘	๒๐.๑	๑๐๐.๐
Total	17.5	8.0	53.4	21.2	100.0

Table ๖ presented the directions of support of the midaged parents. Considering the number of living children, the bidirectionality support between parents and children tended to increase according to the number of living children, similarly to youngold parents, but increased from approximately ๔๒% (one child) to approximately ๕๔% (three children and over five children) except the case of four and five children. As for the sole recipients of the parents of this age group, apart from the overview where the share was higher than the young-old parents, there was also more systematic change in the number of children or approximately ๒๗% and ๓๐% of the mid-old parents with one child and two children, respectively, who were sole recipients and approximately ๒๑ - ๒๕% of the parents with three children or more who were sole recipients. As in the case of no support, it revealed that the pattern was similar to young-old parents. Approximately one-fourth of the elderly in both age groups had no support with children. The lowest share was the parents with two living

children or ๑๗.๒% or the increase to approximately ๒๑% in the case of having three and four children. However, based on the Table, the mid-old parents with one child had the highest share of no support with their child or ๒๖%. As for the co-residence with children, approximately ๒๘% of the mid-old parents co-residing with their children were sole recipients whereas ๒๘% of those who did not co-reside with children were sole recipients. Finally, by the types of family, the share of those residing in extended family (๕๐.๖%) and having bi-directionality support with the children was higher than those residing in single family (๔๗.๗%). On the contrary, the elderly residents in extended family would have lower share of sole recipients than those residing in single family (๒๗.๖% and ๒๖.๖%, respectively).

Table 6: Percentage of the mid-old parents distinguished by the directions of support and structural solidarity

Structural solidarity	One directionality		Bi-directionality	No support	Total
	Sole recipients	Sole givers			
Number of living children					
๑ child	๒๗.๔	๔.๑	๔๒.๕	๒๖.๐	๑๐๐.๐
๒ children	๒๔.๙	๖.๗	๔๖.๖	๑๗.๒	๑๐๐.๐
๓ children	๒๐.๖	๔.๒	๕๓.๙	๒๑.๒	๑๐๐.๐
๔ children	๒๗.๘	๖.๗	๔๘.๔	๒๑.๔	๑๐๐.๐
๕ children	๒๗.๗	๕.๗	๔๗.๔	๒๑.๗	๑๐๐.๐
More than ๕ children	๒๔.๖	๑.๕	๕๓.๘	๒๐.๐	๑๐๐.๐
Co-residence with children					
Co-resided with children	๒๘.๑	๕.๔	๔๗.๗	๑๙.๒	๑๐๐.๐
Did not co-reside with children	๒๗.๕	๔.๘	๔๙.๙	๒๑.๘	๑๐๐.๐
Types of family					
Single family	๒๖.๖	๔.๗	๔๗.๗	๒๑.๗	๑๐๐.๐
Extended family	๒๗.๖	๕.๗	๕๐.๖	๒๐.๖	๑๐๐.๐
Total	25.0	5.0	49.0	20.9	100.0

From Table ๗, considering the directions of support classified by the number of living children of the oldest-old parents, the trend of support of bi-directionality between parents and children decreased according to the number of living children which was contrary to the young-old and the mid-old parents. One important remark was that for ๒๖.๕% of the oldest-old parents with one child, had the bi-directionality support. The share of which was considered extremely low, whether compared with the oldest-old parents with more than one child or compared with the young-old and the mid-old parents with one child (๕๑% and ๔๒.๕%, respectively). Moreover, for those with only one child, the no support from the child would be noticeably clear in the case of the oldest-old parents or approximately ๓๗% of the oldest-old parents compared with ๒๔% of the young-old parents and ๒๖% of the mid-old parents. As for the sole recipients of the oldest-old parents, the trend increased with the number of living children except the case with two children. Finally, the support with children of the oldest-old parents did not depend on the co-residence with their children or the type of family because the share of the oldest-old parents with no support or one directionality support or bi-directionality support was not very different between those who co-resided with their children and those who were in single family and extended family.

Table 7: Percentage of the oldest-old parents (aged ๘๐ years old or over) distinguished by the directions of support and structural solidarity

Indicators of structural solidarity	One directionality		Bi-directionality	No support	Total
	Sole recipients	Sole givers			
Number of living children					
๑ child	๒๘.๖	๘.๒	๒๖.๕	๓๖.๗	๑๐๐.๐
๒ children	๒๑.๘	๓.๑	๕๐.๐	๒๕.๐	๑๐๐.๐
๓ children	๒๘.๖	๔.๕	๔๖.๔	๒๐.๕	๑๐๐.๐
๔ children	๓๘.๐	๔.๐	๔๑.๐	๑๖.๐	๑๐๐.๐
๕ children	๓๓.๐	๔.๓	๔๑.๕	๒๑.๓	๑๐๐.๐
More than ๕ children	๓๐.๓	๒.๑	๔๒.๘	๒๔.๘	๑๐๐.๐

Table 7: Percentage of the oldest-old parents (aged 80 years old or over) distinguished by the directions of support and structural solidarity (Continue)

Indicators of structural solidarity	One directionality		Bi-directionality	No support	Total
	Sole recipients	Sole givers			
Co-residence with children					
Co-resided with chil-dren	๒๗.๖	๔.๙	๔๔.๒	๒๓.๓	๑๐๐.๐
Did not co-reside with children	๗๑.๔	๙.๕	๔๒.๓	๒๒.๙	๑๐๐.๐
Types of family					
Single family	๒๘.๓	๔.๗	๔๓.๗	๒๓.๒	๑๐๐.๐
Extended family	๗๑.๙	๙.๒	๔๒.๑	๒๒.๘	๑๐๐.๐
Total	30.4	3.9	42.8	23.0	100.0

The types of assistance that the elderly parents received from and gave to their adult children as shown in Table ๘ revealed that whether the parents were the young-old parents, the mid-old parents, or the oldest-old parents, almost half or ๔๕.๐%, ๔๕.๑%, and ๔๖.๕%, respectively, received assistance from their adult children both in cash and in kind. The type of assistance received with lower share (๑๔.๒%- ๑๖.๙%) was in kind only, such as house cleaning, cooking, or psychological support. The lowest share (๗.๗%- ๑๐.๕%) was in cash only. Moreover, approximately one-third of the elderly parents did not receive any assistance from their adult children during one year before the survey.

In terms of assistance that the elderly parents provided to their adult children, in the year before the survey, approximately ๔๐% of the young-old parents did not give assistance to their adult children. This share increased to approximately ๔๗% of the mid-old parents and approximately ๕๕% of the oldest-old parents. The parents of the three age groups gave the assistance with similar shares or ๓๕%- ๓๖% to their adult children in kind only, and approximately ๔ - ๖% in cash only. The rest provided the assistance to the children both in cash and in kind with the shares rapidly decreasing with the parents' advanced age or approximately ๒๐% of the young-old parents, ๑๒.๕% of the mid-old parents, and ๕.๔% of the oldest-old parents.

Table 8: Percentage of the elderly parents who were both “givers” and “recipients” distinguished by age groups and types of assistance

Types pf assostamce	60 - 69 years old	70 - 79 years old	80 years old or over
Parents were “recipients” of assistance			
In cash	๑๐.๕	๙.๙	๗.๗
In kind	๑๕.๒	๑๖.๙	๑๖.๔
Both in cash and in kind	๔๕.๐	๔๕.๑	๔๖.๕
Did not receive assistance	๓๐.๓	๒๘.๑	๒๙.๔
Total	๑๐๐.๐	๑๐๐.๐	๑๐๐.๐
Parents were “givers” of assistance			
In cash	๔.๓	๕.๗	๓.๗
In kind	๓๖.๐	๓๕.๑	๓๖.๑
Both in cash and in kind	๑๙.๘	๑๒.๕	๕.๔
Did not give assistance	๓๙.๙	๔๖.๗	๕๕.๙
Total	๑๐๐.๐	๑๐๐.๐	๑๐๐.๐

Types of support between elderly parents and adult children

To classify the types of support between elderly parents and adult children, the five indicators reflecting the two dimensions of solidarity in the elderly's family were further used to analyze the typology of support by the technique of Latent Class Analysis (LCA)^b. The five indicators were measured based on dichotomous method. Therefore, there were in total ๓๒ response patterns. Apart from the study of the overview of the types of support, the analysis was also conducted on the typology of the support of the young-old, the middle-old, and the oldest-old parents.

The LCA results for the overview of the support of the Thai elderly ($n = ๒,๗๓๙$) were classified into ๔ types of support as shown in Table ๙

^b The technical latent classification analysis in details in this part was presented in the Appendix.

Table 9: Results of the analysis of Latent Class Models with four Classes: Overview

Indicators	Types			
	1	2	3	4
	n = 1115 41%	n = 170 6%	n = 792 29%	n = 663 24%
Meetings				
Never/rarely	0.0822	0.0500	0.0881	0.0856
Often	0.678	0.940	0.963	0.965
Parents gave to children: in cash				
Yes	0	0.4444	0.2812	0.0000
No	1	0.541	0.728	0.899
Parents gave to children: in kind				
Yes	0	0.4882	1	0.0856
No	1	0.5118	0	0.814
Parents received from children: in cash				
Yes	0.0222	0.2882	0.784	0.670
No	0.978	0.721	0.2158	0.3300
Parents received from children: in kind				
Yes	0	0	1	0.716
No	1	1	0	0.2834

Note: The Conditional probability which exceeded 0.5 were selected to represent the support of each type

Table 9 presented the Latent class probability and the Conditional probability of the Latent class models that divided the support between elderly parents and adult children into four types. The “**Latent class probability**” was similar to prevalence, meaning the share of the elderly with distribution across types/classes of the support. For example, 24% of the total of 1,115 elderly persons had support in the first type. The “**Conditional probability**” reflected the distribution within each class similarly to the factor loading which showed the relationship between the Manifest indicator and the Latent class which would be given the “**Label.**” The support of each type was based on this Conditional probability, by interpreting only the Conditional probability which exceeded 0.5.

The Conditional probability of the indicator of each type of support as shown in Table ๙ re-lected the four classes or types of the relationship between elderly parents and adult children as summarized in Table ๑๐.

Table 10: Types and definition of support between the elderly parents and adult childre

Types of support	%	Definition of Support (Perspective of elderly parents)
๑. Detached (ห่างเหินจากลูก)	๔๑	Infrequent meetings with children, if at all. No support with children both in cash and in kind (i.e., the elderly parents were neither “givers” nor “recipients”)
๒. Sociable (เห็นหน้าลูก)	๖	Meetings with adult children occur often. The elderly parents are “givers” in the relationship and do not receive either cash or in-kind sup-port from their children.
๓. Tight-knit (แลกเปลี่ยน วยบริการ)	๒๙	Meetings with adult children occur often. The role of the “recipients” of support from chil-dren both in cash and in kind; as for the role of the “givers,” assistance provided in kind only.
๔. Normative (มีลูกกตัญญู)	๒๔	Meetings with adult children occur often. El-derly parents are “recipients” of support from adult children, both in cash and in-kind. They are no longer “givers” to their adult children.

From Table ๙ and ๑๐ the type ๑ “**Detached**”, the highest number of the elderly or ๔๑% was in this type. The characteristic of the parents in this type was that there were not many interactions with their adult children in terms of contact, transfer, or exchange of resources. The type ๒ “**Socia-ble**” represented the lowest share or ๖% of elderly parents. The parents in this type would not re-ceive assistance both in cash and in kind from their adult children. On the contrary, the opportunity to give money to adult children was

higher than the elderly parents in other types. The type $\mathfrak{m}$ “**Tight-knit**” indicated the share of 68% of elderly parents with adult children. The characteristic of the relationship was that the elderly parents received assistance both in cash and in kind from their adult children and that the elderly parents provided their assistance in kind to their adult children. Finally, the type $\mathfrak{a}$ “**Normative**” described the transfer of resources from adult children up-ward to elderly parents with adult children as guarantee in elderly parents’ old age. This type constituted 64%.

The results of the Latent Class Analysis revealed that the model of the four types of support fit the empirical data most. However, the types of support for each age-group of the elderly parents were different as shown in Table 99.

- a) For the young-old parents, the important characteristics of the relationship between the young-old parents and their adult children in the four types were similar as found in the overall situation with the exception of the “**Sociable**” type. The young-old parents that apart from did not receive any assistance from the adult children, they had to give assistance both in cash and in kind to their children even if they were adults. So, this type of support was called “**children who refused to grow up.**”
- b) For the mid-old parents, the characteristics of the three types of support namely the support of “**Detached**” type with 39%, the “**Sociable**” type with 27%, and the “**Tight-knit**” type with 34%. For the first and the last types, there were similarities in the overall aspect and in the young-old parents. As for the “**Sociable**” type in the mid-old parents, the parents would not receive assistance both in cash or in kind from children similarly to the overall situation and the young-old parents. The difference was in the “**givers**” whereby the share of the mid-old parents who did not give assistance in cash or any other assistance to their adult children was higher than in the overall situation.
- c) Finally, for the oldest-old parents, the major characteristics of support revealed that there were only two types, i.e., the “**Sociable**” type (43% of the elderly parents) and the “**Tight knit**” type (56%). The percentage of the last type of support was slightly higher than the first type

Table 11: Percentage of the elderly parents in each age-group distinguished by the types of support with adult children

Elderly groups	Types of support			
	Detached	Sociable/Children who refused to grow up	Tight-knit	Normative
Young-old	๔๖	๕	๒๘	๒๑
Middle-old	๓๑	๒๗	๔๒	
Oldest-old		๔๖	๕๔	
Total (Overview)	๔๑	๖	๒๙	๒๔

The results of the LCA to classify the types of support by age groups in Table ๑๑ indicated that with parents' more advanced age, the types of support would decrease from the four types of the young-old parents to the three types of the mid-old parents. The type that decreased from the young-old was the **"Normative"** type and the two types from the oldest-old parents. The type that decreased from the mid-old parents was the **"Detached"** type. Two issues were noted. Firstly, the support of the **"Normative"** type in which the elderly parents were sole **"recipients"** appeared only in the youngest-old parents or ๒๑% of them received support. Compared with the mid-old and the oldest-old parents, the youngest-old parents should have fewer needs than other ages. Finally, the **"Detached"** type with no mutual support between the elderly parents and adult children existed in the current Thai society, or almost half of the young-old parents and approximately one-third of the mid-old parents. As for the oldest-old parents, although without the **"Detached"** type, the **"So-ciable"** type that the parents were **"givers"** in the relationship without receiving either cash or in-kind support from their children was similar. Only the latter **"Tight-knit"** type constituted more contact with the children.

Conclusion and Discussions

The study used the information from the HART project collected at the end of ๒๐๑๖ to the mid ๒๐๑๗ to analyze the structural solidarity, associational solidarity, and functional solidarity of the Thai older persons' families, as well as analysis of the types of the support

between elderly parents and adult children by using the statistical technique of Latent Class Analysis. This analysis divided the sample into ๒,๗๗๙ parents into three age groups namely ๑,๐๗๕ young-old parents aged between ๖๐-๖๕ years old, ๘๘๗ middle-old parents aged between ๗๐ - ๗๔ years old, and ๗๖๗ oldest-old parents aged ๘๐ years old or over.

The study findings of the three aspects of solidarity as mentioned above revealed that when more parents were advanced in age, the solidarity in each studied aspect would tend to increase as well, including the issue of co-residence with children, frequency in contact with children, or the role of sole “**recipients**” of resource assistance from children. It could be seen that the indicators of these aspects of solidarity had higher share with the oldest-old parents compared with the young-old and the mid-old parents. It could be interpreted that with parents’ more advanced age, the status of self-reliance would change to reliance on others especially on children in terms of economic, social, and health aspects. With the physical and mental degradation, needs of assistance and care would increase.

However, from the studies of demographers, it was found that the fertility rate in Thailand continuously and rapidly declined after the government’s policy of birth control promotion in ๑๙๗๐So, there might be argument that the oldest-old parents were in reproductive age before the period when the fertility level declined. Therefore, the Total Fertility Rate (TFR) meant the number of children that a woman had during her reproductive age (TFR ≥ ๖ persons) would be higher than the young-old (TFR ≤ ๓ persons) and the mid-old (TFR ๔ - ๖ persons) (Pramote and Pattama, ๒๐๐๕). Therefore, it resulted in higher interaction or support with children due to the higher turnover rate of children. But in considering the directions of support between elderly parents and adult children namely one directionality, bi-directionality, and no support and by comparing between the elderly parents of the three age groups with the same number of living adult children (see Table ๑๒), it was found as follows.

- ๑) With the same number of the living children and with the parents’ more advanced age, the parents’ sole status of “**recipients**” tended to increase and the support of the “**Bi-directionality**” tended to decrease.
- ๒) As for the overview of all age groups of elderly parents, the tendency of the parents’ sole status of “**recipients**” did not increase according to the number of living children. The average share of the sole “**recipients**” was between

๒๒- ๒๔% except the case of four living children. Similarly, the trend of the support of the type “**Bi-directionality**” did not increase or decrease according to the number of living children. The average share would narrowly swing between ๔๘ - ๕๒% except the case of one living child (๔๐% which was the lowest share) and four children (๔๕% which was the second lowest share from one living child)

- ๓) As in the case of “**no support**” between elderly parents and adult children, if there was only one living child, the share of the parents with no support with children tended to increase with their advanced age. Moreover, it was also found that for elderly parents with only one living adult child, there was higher risk that there would be no support with the child than elderly parents with more than one living adult child and
- ๔) Finally, it involved the case of “**no support**” similarly to ๓). For the case of elderly parents with more than one living adult child, it was additionally found that the share of elderly parents with “**no support**” with adult children increased following the number of the living children.

Table 12: Percentage of the young-old, the mid-old, and the oldest-old parents distinguished by the directions of support and the number of living children

Number of living chil-dren	One directionality		Bi-directionality	No support	Total
	Sole recipi-ents	Sole givers			
๑. child	๑๔.๔	๑๐.๖	๕๑.๐	๒๔.๐	๑๐๐.๐
	๒๗.๔	๔.๑	๔๒.๕	๒๖.๐	
	๒๘.๖	๘.๒	๒๖.๕	๓๖.๗	
๒. children	๑๙.๖	๑๐.๑	๕๓.๗	๑๖.๖	๑๐๐.๐
	๒๙.๙	๖.๓	๔๖.๖	๑๗.๒	
	๒๑.๙	๓.๑	๕๐.๐	๒๕.๐	
๓. children	๑๗.๒	๖.๔	๕๖.๔	๒๐.๑	๑๐๐.๐
	๒๐.๖	๔.๒	๕๓.๙	๒๑.๒	
	๒๘.๖	๔.๕	๔๖.๔	๒๐.๕	

Table 12: Percentage of the young-old, the mid-old, and the oldest-old parents distinguished by the directions of support and the number of living children (Continue)

Number of living chil-dren	One directionality		Bi-directionality	No support	Total
	Sole recipi-ents	Sole givers			
๔. children	๒๑.๐	๓.๗	๔๕.๗	๒๙.๖	๑๐๐.๐
	๒๓.๘	๖.๓	๔๘.๔	๒๑.๔	
	๓๙.๐	๔.๐	๔๑.๐	๑๖.๐	
๕. children	๗.๙	๕.๓	๕๕.๓	๓๑.๖	๑๐๐.๐
	๒๓.๗	๕.๓	๔๗.๔	๒๓.๗	
	๓๓.๐	๔.๓	๔๑.๕	๒๓.๓	
More than ๕ children	๑๐.๕	๐.๐	๕๗.๙	๓๑.๖	๑๐๐.๐
	๒๔.๖	๑.๕	๕๓.๘	๒๐.๐	
	๓๐.๓	๒.๑	๔๒.๘	๒๔.๘	
Total	๑๗.๕	๘.๐	๕๓.๔	๒๑.๒	๑๐๐.๐
	๒๕.๐	๕.๐	๔๙.๐	๒๐.๙	
	๓๐.๔	๓.๙	๔๒.๘	๒๓.๐	

Note: In each cell, the figures on the first row showed the young-old parents, the following row the mid-old parents, and the last row the oldest-old parents.

Therefore, it could be said that parents had more interactions with adult children with their advanced age. Mostly it derived from the parents' physical necessity and/or economic reasons more than the fact that oldest-old parents had more children than mid-old parents or mid-old par-ents had more children than young-old parents. Moreover, the information from HART project in Wave ๒ pointed out that considering the support that parents were sole “**recipients**” or in the case of both givers and recipients of “**Bi-directionality**” support, the number of two living children or more did not make any difference in the guarantee of security to the parents in their old age. On the contrary, if there was one living child, the security in old age would reduce. There was also higher risk of no support with the child than the parents with more than one child. However, this study covered the familial solidarity only in physical and concrete aspects namely Associational solidarity and Functional solidarity.

As for the results of the analysis of LCA, it revealed that the four types of support between elderly parents and adult children in Thailand ranked from low to high quality of intergenerational relationship between parents and children reflected the quality of children as well namely “De-tached” “Sociable” “Tight knit” and finally “Normative.” Each type had the shares of the elderly parents as follows: ๔๑%, ๖%, ๒๙%, and ๒๔%. When compared with the results of the information of adult children with living fathers and/or mothers in ๔๘ states in US by Silverstein and Bengtson (๑๙๙๗), the indicators were used to show intergenerational solidarity between parents and adult children in five aspects namely Associational solidarity, Functional solidarity (assistance only in kind), Structural solidarity, Affectual solidarity, and Consensual solidarity. It revealed that there were five aspects namely (๑) Tight-knit: Adult children had close relationship with parents in all studied aspects (๒) Sociable: Similar to the first type except performing duties, meaning no giving to parents or receiving assistance from them in kind (๓) Obligatory: Adult children regularly met with their parents but no close emotions or feelings. As for performing duties, approximately one-third of adult children both gave to and received assistance from parents (Parents givers and re-ceivers, only in-kind assistance) (๔) Intimate but distant: Adult children were spiritually close but other relationships were little and (๕) Detached: Contrary to the first type, low level of relationship in all studied aspects. The study of Yi and Lin (๒๐๐๙) conducted in Taiwan showed five types of support similarly to the study of Silverstein and Bengtson. But the indicators used to analyze the LCA of the study in Taiwan were different as follows: Firstly, the indicator of solidary on social norm was added. Secondly, performing duties covered both in cash and in kind. So, the third type was called Normative replacing Obligatory. The other types were similarly called due to their similar characteristics.

There were two differences between this study and the two studies mentioned earlier. First-ly, this study used the less indicators that covered solidarity, but the two aspects covered by this study were particularly important and the behavior could be objectively measured. Secondly, the division of the types of support in this study was conducted in the perspective of the elderly par-ents. But the two studies were conducted in the perspective of the adult children. However, when comparing the types of familial

relationship or support between elderly parents and adult children, similarity could be seen, especially in Taiwan. The comparison could be conducted as follows: Tight-knit (i.e., binding relationship by exchanging services), Sociable (i.e., amicable relationship), Normative (i.e., filial relationship from children), and Detached (i.e., aloof relationship). Although ‘Intimate but distant’ was an important characteristic due to spiritual closeness, this study did not have the indicator in this aspect.

Moreover, this study made additional findings that the types of family relationship of elderly parents in each age group were different. This finding was an important proof that in the course of our life, the intergenerational interaction was a dynamic process, depending on resources of children and needs of parents which were different in each age group of the interactive pair, as well as external limitations. These factors were determinants of the transfer of resources between each other. For example, when parents entered the young-old age, children were still at working age with income while parents did not have much need as they could still rely on themselves. The spouses were also alive so they could depend on each other. Therefore, the types of intergenerational interaction or support were various. But if the parents were the oldest-old and the children started to become the young-old who were mostly retired with no income and must depend on their own children as well, therefore they lacked potential (of resources) to support their own parents whereas the parents had more needs as most entered the phase of complete dependence on others. Due to the conditions in terms of children’s resources and parents’ needs, the intergenerational relationship between the oldest-old parents and children (the young-old) was limited to only two types namely **“Sociable”** and **“Tight-knit.”** What was noticeable was that the support of the oldest-old did not have the type of **“Detached.”** The reason might be because most of the oldest-old were widowed and could not help themselves and so had to live with their children and grandchildren. So heavy burden might rest on the grandchild (child of child) who had to take care of at least two elderly people of two generations, those of parents and grandparents. In the future, the characteristics of the Thai family would increasingly be the Bean pole (Many generations living in the same household and family would extend vertically more than horizontally).

It is forecast that for the Thai population between ๒๐๑๐-๒๐๔๕ the number and share of the oldest-old per the elderly aged ๖๐ years old and over would increase from approximately ๑ million or ๑๓% of the total elderly population in ๒๐๑๐ to almost ๔ million or ๑๙% in ๒๐๔๐ (Office of the National Economic and Social Development Board, ๒๐๑๕). At the same time, the Thais would live longer (individual level) with increased numbers (macro level) of dependency resulting in the need of long-term care. Therefore, the intergenerational relationship or support in family should be considered in a wider perspective, not only between parents and children but also support between grandparents and grandchildren.

Overall, the study results pointed to the social norm that filial gratitude towards parents still existed in the Thai society. But behavior might change from the old pattern of children's assistance and support both in cash and in kind to parents to at least in regular contact with parents or parents exchanged assistance in kind. This constituted the changing behavior appropriate to the changing society and familial support to the elderly tended to become long-term care. As the elderly might relate to many generations of family members, prevention should be made to close the gap between generations.

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Appendix: Goodness-of-fit statistics of the Latent Class Models and LCA

To analyze the typology of support between the Thai elderly and their adult children, the study used the technique of Latent Class Analysis (LCA). The five indicators were measured based on dichotomous method. Therefore, there were in total ๓๒ response patterns. Apart the overview of the types of support, the analysis was also conducted on the typology of the support distinguished by the age-group, the young-old, the mid-old, and the oldest-old parents.

The Goodness-of-fit statistics of the model which distinguished the support into three, four, and five types, respectively, i.e., χ^2 and the Bayesian information criterion (BIC), were tested to identify the best fit model for the typology of the overview of the support of the Thai older persons (all age-groups, $n = ๒,๗๓๙$) and that of each age group (the young-old, $n = ๑,๐๗๙$; the mid-old, $n = ๘๙๗$; and the oldest-old, $n = ๗๖๓$).

In considering both Goodness-of-fit statistics, χ^2 and BIC, of the Latent Class models with various classes for overview in Table a6, it revealed that the model of four types fit the empirical data the most as $\chi^2 = 111.02$, df. = 4, p-value = 0.00, and BIC = 111.02, which was the lowest value.

After the best fit model was identified, the four classes or types of the relationship between elderly parents and adult children were determined by the Latent class probability and the Conditional probability. The “Latent class probability” was similar to prevalence, meaning the share of the elderly with distribution across types/classes of the support. For example, 24% of the total of 1,111 elderly persons had support in the first type. The “Conditional probability” reflected the distribution within each class similarly to the factor loading which showed the relationship between the Manifest indicator and the Latent class which would be given the “Label.” The support of each type was based on this Conditional probability, by interpreting only the Conditional probability which exceeded 0.5.

The Conditional probability of the indicator of each type of support as shown in Table a6 reflected the four classes or types of the relationship between elderly parents and adult children as summarized in Table a6. The type 1 “**Detached**”, the highest number of the elderly was in this type or 46%. The characteristic of the parents in this type was that there were not many interactions with their adult children in terms of contact, transfer, or exchange of resources. The type 2 “**Social**”, 1% of elderly parents with adult children which was the lowest share. The parents in this type would not receive assistance both in cash and in kind from their adult children. On the contrary, the opportunity to give money to adult children was higher than the elderly parents in other types. The type 3 “**Tight-knit**” with the share of 34% of elderly parents with adult children. The characteristic of the relationship was that the elderly parents received assistance both in cash and in kind from their adult children and that the elderly parents provided assistance in kind to their adult children. Finally, the type 4 “**Normative**” with the transfer of resources from children upward to parents with children as guarantee in parents’ old age. The type constituted 19%.

Apart from the overview analysis of the types of support between the elderly parents and adult children as explained above, the same logical method of analysis was also conducted separately on the types of support for the young-old (Tables b6 and b6), the mid-old (Tables c6 and c6), and the oldest-old parents (Tables d6 and d6). The results of the analysis were presented as follows:

Table a1: Goodness-of-fit statistics of the Latent Class Models with various Classes: Overvie

Number of Latent Classes	χ^2	df	p-value	BIC
๑	๔๒๒๔.๘๐	๒๖	๐.๐๐๐	๑๕๖๑๖.๐๑
๒	๑๘๗.๔๗	๒๐	๐.๐๐๐	๑๒๗๖๒.๙๐
๓	๗๑.๖๘	๑๔	๐.๐๐๐	๑๒๗๐๖.๕๕
๔	๑๓.๐๖	๘	๐.๑๑๐	๑๒๖๙๕.๕๔
๕	๘.๖๗	๒	๐.๐๑๓	๑๒๗๓๘.๐๔

Table a2: Results of the analysis of Latent Class Models with four Classes: Overview

Indicators	Types			
	1 n = 1115 41%	2 n = 170 6%	3 n = 792 29%	4 n = 663 24%
Meetings				
Never/rarely	๐.๓๒๒	๐.๐๖๐	๐.๐๓๗	๐.๐๓๖
Often	0.678	0.940	0.963	0.965
Parents gave to children: in cash				
Yes	๐	๐.๔๕๙	๐.๒๗๒	๐.๑๐๑
No	1	๐.๕๔๑	0.728	0.899
Parents gave to children: in kind				
Yes	๐	0.483	1	๐.๑๘๖
No	1	๐.๕๑๗	๐	0.814
Parents received from children: in cash				
Yes	๐.๐๒๒	๐.๒๗๙	0.784	0.670
No	0.978	0.721	๐.๒๑๖	๐.๓๓๐
Parents received from children: in kind				
Yes	๐	๐	1	0.716
No	1	1	๐	๐.๒๘๔

Table a3: Types and definition of support between the elderly parents and adult childre

Types of support	%	Definition of Support (Perspective of elderly parents)
๑. Detached (ห่างเหินจากลูก)	๔๑	Infrequent meetings with children, if at all. No support with children both in cash and in kind (i.e., the elderly parents were neither “givers” nor “recipients”)
๒. Sociable (เห็นหน้าลูก)	๖	Meetings with adult children occur often. The elderly parents are “givers” in the relationship and do not receive either cash or in-kind support from their children.
๓. Tight-knit (แลกเปลี่ยน วยบริการ)	๒๙	Meetings with adult children occur often. The role of the “recipients” of support from children both in cash and in kind; as for the role of the “givers,” assistance provided in kind only.
๔. Normative (มีลูกที่ตัณญ์)	๒๔	Meetings with adult children occur often. Elderly parents are “recipients” of support from adult children, both in cash and in-kind. They are no longer “givers” to their adult children.

Table b1: Goodness-of-fit statistics of Latent Class Models with different Classes: Young-old parents (n = ๑,๐๗๙)

Number of Latent Classes	χ^2	df	p-value	BIC
๑	๑๙๕๙.๘๖	๒๖	๐.๐๐๐	๖๓๒๖.๘๕
๒	๑๒๓.๘๙	๒๐	๐.๐๐๐	๕๐๖๓.๗๓
๓	๔๐.๐๖	๑๔	๐.๐๐๐	๕๐๔๖.๔๔
๔	๑๘.๖๔	๘	๐.๐๑๗	๕๐๖๑.๓๐
๕	๘.๔๒	๒	๐.๐๑๕	๕๐๙๔.๕๘

Table b2: Results of the analysis of the Latent Class Models with four Classes: Young-Old Parents (n = ๑,๐๗๙)

Indicators	Types			
	Detached n = 497 46%	Children who re-fused to grow up n = 55 5%	Tight-knit n = 303 28%	Norma-tive n = 225 21%
Meetings				
Never/rarely	๐.๓๑๒	๐.๐๗๘	๐.๐๔๘	๐.๐๓๘
Often	0.688	0.922	0.952	0.962
Parents gave to children : in cash				
Yes	๐	๐.๗๐๑	๐.๓๕๗	๐.๑๕๐
No	1	0.230	0.643	0.850
Parents gave to children : in kind				
Yes	๐	0.745	1	๐.๓๒๑
No	1	๐.๒๕๕	๐	0.679
Parents received from children : in cash				
Yes	๐.๐๒๖	๐.๑๖๒	0.786	0.691
No	0.974	0.838	๐.๒๑๔	๐.๓๐๙
Parents received from children : in kind				
Yes	๐	๐	1	0.636
No	1	1	๐	๐.๓๖๔

Table c1: Goodness-of-fit statistics of Latent Class Models with various Classes: Mid-old parents (n = ๘๘๗)

Number of Latent Classes	χ^2	df	p-value	BIC
๑	๑๔๕๘.๒๓	๒๖	๐.๐๐๐	๕๑๙๘.๕๖
๒	๖๑.๗๔	๒๐	๐.๐๐๐	๔๒๘๒.๓๐
๓	๒๖.๗๐	๑๔	๐.๐๒๑	๔๒๗๒.๗๙
๔	๑๙.๖๓	๘	๐.๐๑๒	๔๓๐๓.๕๘
๕	๗.๔๐	๒	๐.๐๒๕	๔๓๓๙.๖๖

Table c2: Results of Latent Class Models with three Classes: Mid-old parents (n = ๘๔๗)

Indicators	Types		
	Detached n = 281 31%	Sociable n = 244 27%	Tight-knit n = 372 42%
Contact			
Never/rarely	๐.๔๒๔	๐.๐๒๒	๐.๐๔๐
Often	0.556	0.978	0.960
Parents gave to children : in cash			
Yes	๐.๐๐๖	๐.๑๓๒	๐.๒๔๗
No	0.994	0.868	0.753
Parents gave to children : in kind			
Yes	๐	๐.๑๓๑	0.796
No	1	0.869	๐.๒๐๔
Parents received from children : in cash			
Yes	๐.๐๑๕	๐.๓๓๒	0.794
No	0.985	0.668	๐.๒๐๖
Parents received from children : in kind			
Yes	๐	๐.๒๖๑	0.982
No	1	0.739	๐.๐๑๘

Table d1: Goodness-of-fit statistics of Latent Class Models with the number of various Classes:
oldest-old parents (n = ๗๖๓)

Number of Latent Classes	χ^2	df	p-value	BIC
๑	๔๒๐.๗๓	๒๖	๐.๐๐๐	๔๐๗๒.๖๓
๒	๒๔.๖๑	๒๐	๐.๒๑๗	๓๔๑๑.๖๖
๓	๑๔.๘๔	๑๔	๐.๓๘๖	๓๔๓๗.๒๒
๔	๖.๔๒	๘	๐.๖๐๐	๓๔๖๔.๘๑
๕	๒.๖๔	๒	๐.๒๖๑	๓๔๖๖.๖๗

Table d2: Results of the analysis of Latent Class Models with two Classes: Oldest-old parents
(n = ๗๖๓)

Indicators	Types	
	Sociable n = 351 46%	Tight-knit n = 412 54%
Contact		
Never/rarely	๐.๒๔๒	๐.๐๒๒
Often	0.758	0.978
Parents gave to children: in cash		
Yes	๐.๐๒๖	๐.๑๐๙
No	0.974	0.891
Parents gave to children: in kind		
Yes	๐.๐๑๖	0.605
No	0.984	๐.๓๙๕
Parents received assistance from children: in cash		
Yes	๐.๐๘๘	0.758
No	0.912	๐.๒๔๒
Parents received assistance from children: in kind		
Yes	๐.๐๓๔	0.927
No	0.966	๐.๐๗๓

beyond core self-evaluation (CSE) and psychological capital (PsyCap) with ๒๒.๘๐%. In addition, the magnitude of prediction of the psycho-moral strength scale was significantly higher in the more academically successful lecturers. Furthermore, PMS showed stronger relation with CSE ($r = 0.604, p < .001$) than PsyCap ($r = 0.384, p < .001$). These results lead to a new approach for future research, intervention, and assessment to enhance desirable behaviors.

Keywords: Psychological Scale, Factor Analysis, Academic Behavior

การพัฒนาและประเมินแบบวัดจิตพลังจริยธรรม สำหรับอาจารย์มหาวิทยาลัย*

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บทคัดย่อ

งานวิจัยนี้จัดทำประสงค์เพื่อสร้างแบบวัดใหม่ที่เรียกว่า “จิตพลังจริยธรรม” (Psycho-moral strength scale: PMS) ซึ่งประกอบด้วยจิตลักษณะที่สำคัญ ๔ ประการ ได้แก่ ๑) แรงจูงใจใฝ่สัมฤทธิ์ ๒) ความเชื่ออำนาจในตน ๓) ลักษณะมุ่งอนาคตควบคุมตน และ ๔) เอกลักษณ์ทางจริยธรรม จิตลักษณะทั้ง ๔ ประการนี้มีพื้นฐานมาจากทฤษฎีต้นไม้อจริยธรรมซึ่งได้รับการสนับสนุนจากข้อมูลเชิงประจักษ์จากผลวิจัยจำนวนมาก การวิจัยในขั้นแรกมีจำนวนตัวอย่างเป็นอาจารย์ในมหาวิทยาลัยในประเทศไทยรวม ๗๐๐ คน ผลการวิเคราะห์องค์ประกอบ ซึ่งสำรวจปรากฏทั้ง ๔ องค์ประกอบขึ้นต้น ซึ่งสามารถอธิบายความแปรปรวนของตัวแปร รวมได้ ๕๕.๑๖% โมเดลการวัดนี้มีความกลมกลืนกับข้อมูลเชิงประจักษ์เมื่อนำมาวิเคราะห์องค์ประกอบเชิงยืนยันในขั้นที่สอง พบว่าตรงในเชิงการทำนายเพิ่มขึ้นโดยการวิเคราะห์ถดถอยพหุเชิงซ้อนในกลุ่มตัวอย่างใหม่ที่เป็นอาจารย์มหาวิทยาลัย จำนวน ๑๒๘ คน ปรากฏผลว่าแบบวัดจิตพลังจริยธรรมใหม่สามารถทำนายพฤติกรรมแสวงหาและใช้ความรู้ทางวิชาการได้เพิ่มขึ้นจากการทำนายด้วยแบบวัดการประเมินตนเองแห่งตนและแบบวัดคุณทางจิตวิทยาเชิงบวก ในปริมาณ ๒๒.๘๐% รวมทั้งยังพบว่า

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อาจารย์ที่มีจิตพลังจริยธรรมมากมักเป็นผู้ที่ประทับใจ ความสำเร็จทางวิชาการมากด้วย นอกจากนี้ยังปรากฏว่า จิตพลังจริยธรรมมีค่าสัมพันธทางบวกกับการประเมินแก่นแห่งตน ($r = 0.604, p < .01$) มากกว่ากับ ทุนทางจิตวิทยาเชิงบวก ($r = 0.395, p < .01$) ผลจากงานวิจัยนำไปสู่แนววิ างใหม่ในการศึกษาวิจัย, การพัฒนา และการวัดเพื่อเสริมสร้างพฤติกรรมที่น่าปรารถนา

คำสำคัญ: ค ามเป็นปีกแผ่นของครอบครัว วิ การเกื้อหนุนระหว่างรุ่นวัย ผู้สูงอายุ ประเทศไทย

Introduction

As rapidly approaching normal era after a long battle with COVID-19, scholars and practitioners seem to need comprehensive, accurate, and effective measures in many aspects for practical, precise, less cost, and broader explanation research and development. Another important concern for measurement needs is to construct the scale that is suitable and reliable for local, but powerfully connects with global characteristics. This is a challenging endeavor for researchers, especially psycho-behavioral scientists.

In the previous century, individual psychological characteristics were examined as important antecedents of a person's behavior, e.g., intelligence (Piaget, 1952), self-regulation (Bandura, 1982) and moral reasoning ability (Kohlberg, 1984). Researchers had put great effort on searching for meaning or definition of these important individual constructs. Some groups of researchers had tried to construct these measurements. For example, achievement motive or need for achievement construct was measured by many simple scales in the form of several pictures (Hermans, 1950), such as, Thematic Apperception Test (McClelland, Atkinson, Clark, & Lowell, 1953) and the Iowa Picture Interpretation Test (Johnston, 1957).

Another example of popular single construct that has been widely measured is attitude which is defined as an evaluative knowledge and personal feelings towards an object and abstract concept. Attitude has been getting attention in research studies both in science, such as attitudes towards nuclear powerplant (Bhanthumnavin & Bhanthumnavin, 2014; Fang, Qu, Sun, Wu, & Wei, 2012), attitude towards robots (Gou, Webb, & Prescott, 2010), as well as, in social science, such as attitude towards health prevention (Gibbons, Stein, Springer, Roemhild, Meadows, & Dowling, in press), attitude towards aging (Liu, Duan, & Xu, 2010). Many important theories included attitude as one of the most important predictors of human behaviors (Davis, 1988; Ajzen & Fishbein, 1980).

However, within the last two decades, the concept of multi-construct trait has been and widely researched and used. Due to many recent studies, especially in Thailand (e.g., Kraiprasit, Bhanthumnavin & Bhanthumnavin, 2012) which revealed the confident finding that human behavior is affected by several important psychological characteristics together at the same time, rather than an only single psychological characteristic.

In addition, the field of measurement construction has become more popular to the researchers' interest once again due to the introduction of many new statistical approaches, especially factor analysis approach, as well as more friendly used softwares, e.g., MPLUS, AMOS, LISREL. These softwares give the researchers more power to analyze and to synthesize the dimensions of a construct or many constructs which bring broader and more in-depth understanding of a new higher-order multidimensional construct.

In this paper, a new "psycho-moral strength" (PMS) scale is introduced. It is a higher-order multidimensional construct which was based on more than thirty years of research and conceptualized in theory of work and moral behavior (Bhanthumnavin, ๑๙๘๓). PMS construct is consisted of four important psychological characteristics which have been identified as important predictors in numerous studies both in Thailand and abroad.

Previous examples of higher-order multidimensional construct

In the past, a few high-order constructs had been introduced. For example, Big Five personality can be traced back in ๑๙๔๐-๑๙๖๔ (Cattell, ๑๙๔๓; Norman, ๑๙๖๓). The construct of five psychological characteristics were originally obtained by peer rating (John & Srivastava, ๑๙๘๔). A large pool of traits was associated with this construct. Five-Factor Model (FFM) rooted from the Big Five was investigated by McCrae and Costa (๑๙๘๗). The FFM consisted of five important single constructs, namely neuroticism (emotional instability), extraversion, openness to experience, agreeableness, and conscientiousness. The Big Five scale was translated and validated cross-culture. Many studies validated this construct by using advanced statistical method, especially factor analysis. Several studies revealed that variant of some dimensions relating to cultural or social context (Yang & Bond, ๑๙๙๐). Some dimensions had split into sub dimensions. For example, the variant was found in agreeable dimension in both European (Boies, Lee, Ashton, Pascal, & Nicol, ๒๐๐๑; Di Blas & Forzi, ๑๙๙๘; Szirmak & De Raad, ๑๙๙๔), and Asian (Hahn, Lee, & Ashton, ๑๙๙๙). Furthermore, some studies suggested of dimension combination that reduced into less than five factors (e.g., Goldberg & Somer, ๒๐๐๐; Krueger & Tackett, ๒๐๐๓; Ostendorf, ๑๙๙๐; Saucier, ๑๙๙๗).

Another important higher-order construct is core self-evaluation (CSE) with the aim of as-sessing positive self-concept (Judge, Locke, and Durham, 1984). The original area of study was in organization context as to examine the important antecedent of job satisfaction, which ultimately affects job performance (Judge, Erez, & Bono, 1984). Core self-evaluation construct consists of four single important constructs, namely, self-esteem (e.g., Harter, 1980; Rosenberg, 1965) generalized self-efficacy (e.g., Bandura, 1982; Locke, McClelland, & Knight, 1984), locus of control (Rotter, 1954) and emotional stability (low neuroticism) (e.g., Goldberg, 1968; Watson, 2000) which emphasized three criteria as evaluation-focus, fundamentality, and broader scope (Judge & Bono, 2001). Although, these four single constructs in CSE were formed the research evidence in eight literature themes (e.g., clinical psychology research, child development theory, personality theory, and social psychology), the 12-items CSE scale was carefully constructed, statistically tested, and nomological network validated (Judge, Erez, Bono, & Thoresen, 2003). CSE scale has been validated by factor analysis in many studies, and still held the dimension integrity (e.g., Bhanthumnavin, 2015; Sharma & Misra, 2011).

Psychological capital (PsyCap) construct is one of the well-known higher-order multidimensional constructs introduced by Luthans (2002). Originally from human resource capital concept, PsyCap is consisted of four claimed competitive advantage constructs for performance improvement, called “HERO”, namely, hope, self-efficacy, resilience, and optimism (Luthans & Youssef, 2004) which based on positive psychology approach (Seligman & Csikszentmihalyi, 2000). These four constructs together, as “psychological resource caravan” are malleable, state-like constructs that affect psychological and behavioral outcomes (Luthans, Avolio, Avey, & Norman, 2008). PsyCap scale has been widely used and validated in many languages, e.g., Chinese (Luo, Tsai, Su, Kim, Gao, & Chen, 2012), India (Kumar, Upadhyay, Yadav, & Goyal, 2012), Taiwan (Wu & Nguyen, 2012), and United Kingdom (Barratt & Duran, 2012). Consequently, both CSE scale and PsyCap scale were selected to be statistically compared with the new PMS scale in this study.

Psycho-moral strength: origin and definition

In ๑๙๘๐'s, the indigenous Thai psychological theory, named "Psychological Theory of Moral and Work Behavior" was introduced by Bhanthumnavin (๑๙๘๓;๑๙๘๕). This theory emerged from research evidence during ๑๙๗๔-๑๙๘๓ Thailand that there are eight core psychological dispositions affecting desired behaviors. These eight psychological constructs are divided into two levels, depicted in picture of a healthy growing tree (Figure ๑).

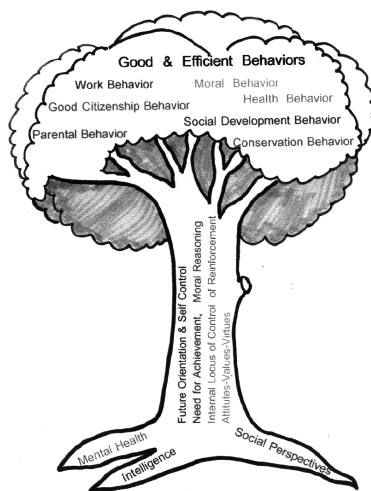


Figure 1: Psychological theory of work and moral behavior (Bhanthumnavin, ๑๙๘๓)

The first level is tree roots. It consists of huge-firm taproots representing three fundamental psychological characteristics, i.e., ๑) mental health ๒) intelligence (based on Piaget's theory, ๑๙๗๑) and ๓) social perspective taking (Coke, Batson, & McDavis, ๑๙๗๘). These are the primary dispositions that should be inculcated from the early stage of life. This similar concept also suggested by the HeadStart Project (Zigler & Valentine, ๑๙๗๘; Zigler & Muenchow, ๑๙๙๒). These three traits at the root can affect another five psychological characteristics on tree trunk. These five psychological characteristics are ๑) attitude (based on Krech, Crutchfield & Ballachey, ๑๙๖๒), value, and virtue, ๒) need for achievement (based on McClelland, ๑๙๖๕), ๓) future orientation and self-control (based on Bandura, ๑๙๘๖; Mischel, ๑๙๗๔; de Volder & Lens, ๑๙๘๒) internal locus of control (based on Rotter, ๑๙๖๖), and ๕) moral reasoning ability (based on Kohlberg, ๑๙๗๔).

This theory suggested that a person is like a tree. These eight psychological characteristics were found to be the important antecedents of fruitful psychological and behavioral outcomes (on the treetop) of wide range of population from primary school students through elder persons in more than ๓๐๐ studies.

In recent decades, empirical evidence in Thailand on psychological antecedents of various types of behavior have indicated four distinguished psychological characteristics (Bhanthumnavin & Bhanthumnavin, ๒๐๒๑) as reflected in the psychological theory of work and moral behavior (Bhanthumnavin, ๒๕๕๙). The first psychological characteristic is moral reasoning/identity-decision making with appropriate rational and reflecting ethical identities of a person's intention to follow rules and regulation for producing good outcomes. Several important theories and concepts can be used in relation with this disposition, e.g., moral reasoning ability (Kohlberg, ๑๙๗๔), moral identity (Aquino & Reed, ๒๐๐๐), moral disengagement (Bandura, ๒๐๐๒). The second psychological characteristic is locus of control, based on Rotter's theory (๑๙๖๖) relates to the belief of a person in his or her ability to predict and control an outcome with different amount of effort. The closely related variables which could be interchanged, e.g., self-efficacy (Bandura, ๑๙๘๖), perceived behavioral control (Ajzen, ๑๙๙๑). The third psychological characteristic is achievement motive. It focuses on forces or energies that drive an individual to plan for increasing facilitators and eliminating inhibitors to accomplish goals. There are many important psychological theories that involve this construct, i.e., McClelland's theory (๑๙๖๕), Maslow's theory (๑๙๕๔), Vroom's theory (๑๙๖๔). The fourth psychological characteristic is future orientation and self-control. This construct is rather psycho-skill in nature. It consists of an ability of an individual to value future rewards as much or more than their immediate, but less favorable outcomes. However, the skill aspect of the construct is a person's ability to divide main goal into sub-goals to achieve that outcome. During the pathway, self-control plays an important role to assist an individual to stay on track from the first sub-goal all the way to achieve the main goal.

All these four psychological characteristics together is so called "Psycho-Moral Strength" (PMS) which considered as "psychological force" that can direct, energize, and drive a person to produce desired psychological and behavioral outcomes. These four psychological characteristics in this measure are considered as "trait-like" because they are not emphasized on a particular context or circumstance.

Phase 1

Research hypotheses

This study was a part of research project funded by ๒๐๑๗ government budget grant under the research program, titled, “Psycho-moral strength in research and training of lecturers for stu-dents’ development” (Bhanthumnavin, ๒๐๒๓). There are two hypotheses in this study.

Hypothesis ๑: By performing exploratory factor analysis, psycho-moral strength scale is composed of at least three factors with at least two items for each factor, with the cumulative per-centage of at least ๖๐%.

Hypothesis ๒: By performing confirmator factor analysis, the underlying latent constructs emerging from the EFA for the psycho-moral strength scale is confirme by another set of data.

Methodology

Participants

In this firs phase, the total of ๗๐๐ university lecturers from Thai public universities in Bangkok and outer provinces were obtained. The data were divided into three steps for data analy-sis as follows: ๑) item quality ๒) exploratory factor analysis (EFA) and ๓) confirmator factor analysis (CFA). The details of participant biosocial characteristics of each step are shown in Table ๑.

Table 1: Biosocial characteristics of participants in three steps of analysis.

Characteristics	Step1- Item quality	Step 2- EFA	Step 3 - CFA
Gender	Males = ๒๖(๒๖.๐๐%) Females = ๓๔(๓๔.๐๐%)	Males = ๔๗(๓๒.๔๐%) Females = ๒๐๒(๗๑.๖๐%)	Males = ๘๗(๒๙.๐๐%) Females = ๒๑๓(๗๑.๐๐%)
Age	Mean = ๔๑.๒๙years Median = ๔๐.๐๐years SD = ๘.๙๙	Mean = ๔๑.๖๑years Median = ๓๙.๐๐years SD = ๘.๘๔	Mean = ๔๑.๕๕years Median = ๔๐.๐๐years SD = ๙.๓๒
Duration after graduation	Mean = ๑๒.๓๙years Median = ๑๐.๐๐years SD = ๑๐.๕๒	Mean = ๑๑.๖๒years Median = ๘.๐๐years SD = ๙.๖๖	Mean = ๑๑.๑๐years Median = ๘.๐๐years SD = ๙.๔๘
N	100	300	300

Measures

Psycho-moral strength (PMS). This construct was derived from the Thai Psychological Theory of Moral and Work Behavior (Bhanthumnavin, ๑๙๙๕). PMS was initially defined as having four components, namely, ๑) moral reasoning and/or identity, ๒) need for achievement, ๓) internal locus of control, and ๔) future orientation and self-control (Bhanthumnavin & Bhanthumnavin, ๒๐๑๑). The researchers constructed pool of items for each component. A group of experts in psycho-behavioral science screened and critiqued for content validity before trying out. The scale was measured by the items with ๖-point Likert scale ranging from “absolutely true” to “not true at all”

Procedure

Data collecting process was administered at the first session of training programs for university lecturers. Before starting the process, the questionnaire was explained. The participants were informed that they had right to leave at any time. It took about ๔๕ minutes to fill out the paper-based questionnaire. The small token for each participant was delivered as an appreciation.

Data analysis

For item quality, item discrimination with t-ratio at least ๒.๐ was computed.

The items passed these criteria were used in exploratory factor analysis. There were four criteria for EFA as follows: ๑) Kaiser-Meyer-Olkin test as a measure of sampling adequacy should be greater than ๐.๖๐, ๒) the Bartlett test of sphericity should be significant, ๓) the emerging measurement model should have at least ๓ components, each with at least ๒ items, and ๔) the total cumulative percentage of all components explaining should be more than ๖๐%.

The emerging measurement model was confirmed by second-order confirmatory factor analysis for construct validity testing. The five most used indices for CFA are non-significant chi-square value (Jöreskog & Sörbom, ๑๙๙๖), a root mean square error of approximation (RMSEA) value of less than ๐.๕๐ (Browne & Cudeck, ๑๙๙๓), a comparative index (CFI) of at least ๐.๙๐ (Bentler, ๑๙๙๐), Tucker-Lewis Index (TLI) of at least ๐.๙๕ (Tucker & Lewis, ๑๙๗๓), a standardized root mean square residual (SRMR) of less than ๐.๘๐ (Hu & Bentler, ๑๙๙๘).

Results - Phase 1

Step 1: Item quality

The initial pool of items of PMS consisted of ๒๔ items. It was divided into ๔ components, namely, ๑) need for achievement ๒) internal locus of control ๓) future orientation and self-control, and ๔) moral identity. The results from item discrimination using data from ๑๐๐ participants re-vealed that ๑ item was excluded.

Step 2: Exploratory factor analysis

The ๒๓ items passing the t-ratio criterion were used in the EFA step and tested with data of another ๓๐๐ participants. The EFA finding showed an adequate fit of Kaiser-Meyer-Olkin test (KMO = ๐.๗๕) with a significant Bartlett test of sphericity ($\chi^2 = ๕๑๘.๐๖, df = ๖๖, p < .๐๐๐$). The four-factor measurement model was emerged which supported the hypothesis ๑ (Table ๒).

Table 2: EFA results of PMS scale

		Items	Components			
			1	2	3	4
๑	pc๒๐	I enjoy situation in which I can have an opportunity to use my ability (ฉันรู้สึกสนุกกับสถานการณ์ที่ทำให้ฉันมีโอกาสได้ใช้ความสามารถของฉัน) (+)	๐.๘๒			
๒	pc๑๙	When I face with problem which is not beyond my ability, I am enthusiastic to cope with it immediately. (เมื่อฉันกำลังเผชิญกับปัญหาที่น่าจะแก้ไขได้ ฉันกระตือรือร้นที่จะลงมือทำทันที) (+)	๐.๘๑			
๓	pc๒๓	I increase my effort every time I work on the tasks which come to me consecutively. (ฉันจะพยายามมากขึ้นในการทำงานขึ้นต่อ ๆ ไป) (+)	๐.๗๓			
๔	pc๒๘	“Perceived as being honest” is more important than “actually being honest” (การที่ “ผู้อื่นคิดว่าเราเป็นคนซื่อสัตย์” สำคัญกว่าการที่ “เราเป็นคนซื่อสัตย์จริง ๆ”) (-)		๐.๗๓		

Table 2: EFA results of PMS scale (Continue)

		Items	Components			
			1	2	3	4
๕	pc๓๐	I usually follow my group decision even though it may not be morally appropriate. (ฉันจ ทำตาม การตัดสินใจของกลุ่มถึงแม้ว่าจะผิด จ्ञองค้ ธรรม) (-)		๐.๖๕		
๖	pc๑	Good work product which is not acceptable by the supervisor is rather worthless. (ผลงานที่ผู้บังคับบัญชา ไม่ยอมรับ แม้จะเป็นผลงานที่ดีแต่ก็ไร้ค่า) (-)		๐.๖๒		
๗	pc๒๙	If someone is aggressive to me, I will return him (or her) with equal treatment. (ถ้าผู้อื่นร้ายมา จ्ञ ก็จึ่ร้ายตอบ) (-)			๐.๗๓	
๘	pc๒	When visiting foreign places, I think we can do what we like, because nobody knows us. (เมื่ออยู่ต่างถิ่น จ्ञ คิด จึ่จะทำอะไรก็ได้ เพราะไม่มีใครรู้จักฉัน) (-)			๐.๕๔	
๙	pc๑๘	What I do in my life, I usually have someone guiding or controlling me. (ชีวิต ของจึ่ มักมีผู้อื่น คอยชี้ทางหรือค้ บคุม) (-)			๐.๕๓	
๑๐	pc๑๕	Most of my success in life happened by chance. (ค้ ามสำเร็จของจึ่ ส่วนใหญ่มาจากค้ ามบังเอิญ) (-)			๐.๔๓	
๑๑	pc๓	I am more careful at work only when someone is observing or watching. (ฉันจะระมัดระวังในการทำงาน เฉพาะเมื่อรู้ว่าผู้อื่นมาคอยสังเกตอยู่) (-)				๐.๗๓
๑๒	pc๑๔	I do not belief in “luck” or “chance” concerning life-outcomes. (ฉัน ไม่เชื่อเรื่องโชคเคราะห์หรือ ค้ ามบังเอิญ) (+)				๐.๗๒
		Eigenvalue	๒.๙๘	๑.๔๗	๑.๑๕	๑.๐๐
		% of Variance	๒๔.๘๙	๑๒.๒๓	๙.๖๒	๘.๓๘
		Cumulative%	๒๔.๘๙	๓๗.๑๖	๔๖.๗๘	๕๕.๑๖

The first factor with the eigenvalue of 2.94 was labelled as “need for achievement”. This factor includes 3 items which account for 24.8% of the variance of the PMS construct. All items were positive direction.

The second factor consisted of 3 items with the eigenvalue of 1.41 which was labelled as “moral identity” which could additionally explain the variance of PMS construct with 12.2%. Thus, it led to the total cumulative variance explanation of 37.1%. All items were negative direction.

The third factor with the eigenvalue of 1.15 consisted of 4 items, which can be labelled as “future orientation and self-control”. All items were negative direction. It could additionally explain the variance of PMS construct with 9.6%, which led to the total cumulative variance explanation of 46.7%.

The last factor with 2 items and the eigenvalue of 1.00 was consisted of two items, labelled as “locus of control”. It could additionally explain the variance of PMS construct with 8.3%, which led to the total cumulative variance explanation of 55.1%. The reliability of the 12-item PMS scale in this EFA step in terms of alpha reliability was 0.67, Omega reliability was 0.63, and GLB reliability was 0.77.

Step 3: Second-order confirmatory factor analysis

The results of a second-order factor analysis from another set of data from 300 participants indicated a model fit with a chi-square value of 62.84 (df = 41, p value = 0.00), RMSEA = 0.027, CFI = 0.97, TLI = 0.96, SMRS = 0.04, which supported hypothesis 2. (Figure 2). The reliability of the 12-item PMS scale in this CFA step in terms of alpha reliability were 0.66, Omega reliability was 0.63, and GLB reliability was 0.75. The relationship between the four facets is presented in Table 3.

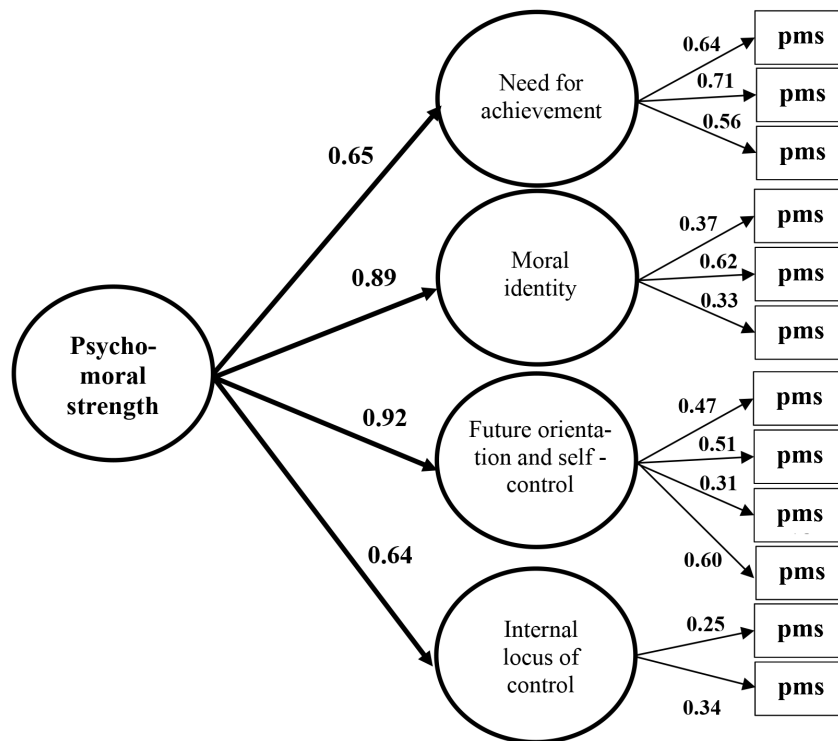


Figure 2: Second-order factor analysis of psycho-moral strength scale in Thai university lecturers

The highest gamma value of 0.82 belonged to the factor “future orientation and self-control”. The highest standardized factor loading in this factor was found in item ๑๕, followed by item ๒, item ๒๔, and item ๑๘.

The second factor with gamma value of 0.๘๔ was the factor “moral identity”. The highest standardized factor loading in this factor was found in item ๓๐, followed by item ๑๘, and item ๑.

The third factor with gamma value of 0.๖๕ was the factor “achievement motive”. The highest standardized factor loading in this factor was found in item ๑๕ followed by item ๒๐, and item ๒๓.

The last factor with gamma value of 0.๖๔ was the factor “internal locus of control”. The highest standardized factor loading in this factor was found in item ๑๕ followed by item ๓.

Table 3: Correlations between the four facets in PMS model

	Variables	1	2	3	4	5
๑	Need for achievement	๑				
๒	Moral identity	.๒๙๔**	๑			
๓	Future orientation and self-control	.๓๘๙**	.๔๑๒**	๑		
๔	Internal locus of control	๐.๐๕๘	.๑๗๒**	.๒๘๔**	๑	
๕	Psycho-Moral Strength	.๕๘๓**	.๗๓๔**	.๘๑๐**	.๕๕๕**	๑

Note: * $p < .05$, ** $p < .01$.

Phase 2

Research hypotheses

In this step, the validation of the new psycho-moral strength scale was assessed. Two hy-potheses were generated.

Hypothesis ๓: The correlation coefficient between PMS and CSE is higher than the correlation coefficient between PMS and PsyCap.

Hypothesis ๔: PMS yields significant higher predictive power beyond CSE and PsyCap in predicting academic behavior.

Methodology

Participants

In this step, the total of ๑๒๘ university lecturers from Thai public universities were obtained. The same data gathering procedure was repeated. There were ๓๖ males (๒๘.๑๐%), ๙๐ females (๗๐.๓๐%), and ๕ not identify gender (๑.๖๐%) with the average age of ๔๐ years ($SD = ๘.๓๐$). Sixty-six lecturers graduated with Master's degree (๕๑.๖๐%), ๕๗ lecturers obtained an Ph.D. (๔๔.๕๐%) and the rest not identify (๓.๙๐%)

Measures

Academic behavior (AB). Based on ambidexterity concept (March, 1996), this construct was defined as searching and using academic knowledge and information for enhancing students' development (Bhanthumnavin, 2018). The total of 12 items, each attached with 5-point Likert scale ranging from "absolutely true" to "not true at all". with the reliability of 0.85.

Core self-evaluation (CSE) was based on Judge, Erez, Bono, and Thoresen. (2003). This construct consisted of four components, namely, 1) generalized self-efficacy 2) self-esteem 3) locus of control and 4) neuroticism. The total of 12 items, each attached with 5-point Likert scale ranging from "absolutely true" to "not true at all", with the reliability of 0.84.

Psychological Capital (PsyCap), based on Luthans and Youssef (2004) The total of 12 items can be summarized into 4 dimensions, namely, self-efficacy optimism, hope, and resilience. Each item was attached with 5-point Likert scale ranging from "absolutely true" to "not true at all", with the reliability of 0.86.

Data analysis

Two statistical approaches were used to test the hypotheses. Pearson's Product Moment Correlation Coefficient was used to examine the magnitude of the relationship between variables. Hierarchical multiple regression analysis was computed to test the incremental validity for the newly constructed measure. Beyond the statistically significant the practical significance of at least 10.00% was set.

Results - Phase 2

Intercorrelation of the variables

Correlation coefficient between PMS and CSE was 0.504, $p < .01$, while between PMS and PsyCap was 0.484, $p < .01$ (Table 4). These results supported hypothesis 3.

Table 4: Intercorrelation coefficient among the variables (N = ๑๒๘)

	Variables	Mean	SD	1	2	3	4
๑	Psycho-moral strength (PMS)	๕๒.๘๔	๗.๘๒	๑			
๒	Core self-evaluation (CSE)	๕๑.๗๗	๗.๕๐	.๖๐๔**	๑		
๓	Psychological capital (Psy Cap)	๕๖.๕๒	๖.๔๔	.๗๙๙**	.๔๙๕**	๑	
๔	Academic behavior (AB)	๕๗.๔๘	๗.๔๘	.๖๕๗**	.๔๐๗**	.๔๕๗**	๑

Note: ** $p < .0๑$.

Hierarchical regression analysis on academic behavior

Two steps hierarchical multiple regression analysis was employed to examine the predictive power of PMS scale on AB (Table ๕). In the first step, it was found that CSE and PsyCap could predict AB with the R square of ๐.๒๔๘. In step ๒, the finding revealed that PMS could significantly predict AB beyond the variables in step ๑ with the R square change of ๐.๒๒๘ which yielded the total R square of ๐.๔๗๕. This result simplified that the PMS variable had predictive power of ๒๒.๘๐% more than those of the two predictors combined.

Table 5: Hierarchical MRA on academic behavior

Step		B	Beta	t	Sig.	Collinearity Statistics			
						Tolerance	VIF	R ²	R ² Change
๑	(Constant)	๒๓.๓๗๓	๐.๒๓๖	๔.๓๔๙	๐.๐๐๐				
	CSE	๐.๒๓๕	๐.๓๓๖	๒.๖๔๓	๐.๐๐๙	๐.๗๕๕	๑.๓๒๕		
	PsyCap	๐.๓๘๘		๓.๗๖๘	๐.๐๐๐	๐.๗๕๕	๑.๓๒๕	๐.๒๔๘	-
๒	(Constant)	๑๔.๘๕๔		๓.๑๙๓	๐.๐๐๒				
	CSE	-๐.๐๙	-๐.๐๙	-๑.๐๓๕	๐.๓๐๓	๐.๕๕๘	๑.๗๙๑		
	PsyCap	๐.๒๙๕	๐.๒๕๖	๓.๓๘๔	๐.๐๐๑	๐.๗๓๙	๑.๓๕๓		
	PMS	๐.๕๗๙	๐.๖๐๖	๗.๓๔๑	๐.๐๐๐	๐.๖๒๒	๑.๖๐๙	๐.๔๗๕	๐.๒๒๘

Conclusion and Discussion

In the past two decades, many higher-order construct consisted of about two to four facets of single important construct have been introduced and validated. Some famous higher-order constructs are, for example, psychological capital (Luthans & Youssef, ๒๐๐๔) and core self-evaluation (Judge, et al., ๒๐๐๓) which originally focused on organizational context. However, numerous studies have revealed that these higher-order construct can be applied in other contexts, e.g., learning, moral, health, environment, and politics. In this study, a new higher-order construct, so called “Psycho-Moral Strength” was constructed. It consists of four facets, namely, ๑) internal locus of control, ๒) achievement motive, ๓) future orientation and self-control, and ๔) moral identity. This trait-like construct is considered as “psychological strength or force” that can direct, energize, and drive an individual to produce desired and sustainable behaviors. The concept and structure of the PMS was validated in the university lecturers and supported by the CFA.

The results in this study revealed three important findings. First, no significant or low significant correlation coefficient among the four facets were found (see Table ๓). These findings indicated less multicollinearity between the facets which is one of important characteristics of higher-order indicators (Jarvis, Mackenzie, Podsakoff, ๒๐๐๓). It means that each facet seems more independent from each other which reflect different construct. But they can be combined into a new and broader construct. Second, the relationship between CSE and PMS was stronger than the relationship between PsyCap and PMS (see Table ๔). It could be explained that the PMS and CSE were measured as trait-like constructs, while the PsyCap was more state-like construct. Furthermore, the CSE and PMS measures both consisted of one of the four factors which were under the concept of internal locus of control. Third, hierarchical regression results revealed that PMS could significantly predict lecturers' academic behavior beyond CSE and PsyCap. Thus, it can be said that CSE and PsyCap could be the primary step constructs as “initiative resources” that passes through PMS which could play as “psychological propulsion” to enhance work behavior of the Thai academicians.

Limitations and Implications

This is a self-report study. Many scholars pointed out about the possible disadvantages of this assessment (e.g., Brutus, Aguinis, & Wassmer, ๒๐๑๒; Luthans, et al., ๒๐๐๗). It can inflate the relationship between variables in the study. Thus, the validation in other samples or in other behaviors to provide further confident evidence to justify this measure is needed. The scholars, researchers, and practitioners all around the world are welcome to modify or further develop this measure by several aspects. For example, the future measure based on the concept of “psychological strength” can be developed using similar stream of constructs as mentioned above. Moreover, to provide more accurate prediction, the future measure should be narrower and more specific to target variables (Ajzen & Fishbein, ๑๙๘๐) which means making the four facets more “state-like”. A recent study of antecedents of COVID-๑๙ preventive behavior (Punpromthada, Bhanthumnavin, Bhanthumnavin, Meekun, Sitsira-at, Pimthong, & Yaemyuen, ๒๐๒๒) followed this strategy and found supportive finding for the PMS.

This measure can shed lights for practical implications in psycho-behavioral science in new normal era. The result revealed that the PMS scale is important and necessary. The use of PMS scale together with other higher-order psychological constructs in future studies which can broaden and increase the understanding of relevant predictors of a wide range of behaviors. Using higher-order constructions in study, intervention, or assessment is more beneficial in terms of measuring many important facets (variables) in short version which is less time consuming, less cost-expense, but provide more data.

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trait construct which consisted of three personal characteristics, i.e., moral (dis) engagement, self-regulated learning and core self-evaluation, showed both direct and indirect paths towards punctual behavior of the students. Strong recommendations for more studies in this area and training modules for students' development programs to enhance successful learning and future career are offered.

Keywords: Psycho-situational Predictors, SEM for Model-comparison

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บทคัดย่อ

สังคมยุคปัจจุบันได้ยกให้ความตรงต่อเวลาเป็นค่านิยมที่สำคัญประการหนึ่ง แต่กลับปรากฏว่า นักศึกษาในมหาวิทยาลัย นิยสย่ีงข้องช้าในการศึกษาเล่าเรียนและมักผัดวันประกันพรุ่งมากขึ้น งานวิจัยนี้ มุ่งดู ระสงค้ีในการศึกษาเกี่ยวกับปัจจัยเชิงสาเหตุ ของพฤติกรรมตรงต่อเวลาในนักศึกษา โด้ ใช้วิธีการ วิเคราะห์เส้นทางอิทธิพลเพื่อสร้างรูปแบบหรือโมเดลเชิงประจักษ์ และทำการเปรียบเทียบสองโมเดลจาก ผลการวิจัยที่ศึกษานักศึกษาจำนวน ๑,๓๑๑คน ทำให้ระบุได้ว่า ในรูป ้องตัวแปรแฝงนั้น จิตลักษณะ ตามสถานการณ์มีค่าสัมประสิทธิ์เส้นทางอิทธิพลที่มากที่สุด รองลงมาคือ จิตลักษณะเดิม และสุดท้ายคือ ปัจจัย านสถานการณ์ของนักศึกษา ผลส่วนสำคัญนั้ บัสนุนกระบ้ นทศึ์ เิงป้ัสมัพันธ์นิยม นอกจากนี้ ในโมเดลที่สอง ซึ่งมีการเพิ่มเส้นทางอิทธิพลจากจิตลักษณะเดิมไปยังสถานการณ์ที่ผู้ตอบประสบบอยู่นั้น ทำให้โมเดลนี้มีความเข้มแข็งมากขึ้น โดยมีอำนาจในการทำนาย พฤติกรรมตรงต่อเวลาได้มากถึงร้อยละ ๗๘.๔๐ ที่ ห้นได้ชัดคือ การที่จิตลักษณะเดิมของผู้ตอบ ซึ่ง มีสามจิตลักษณะย่อยคือ จริย ธรรม (ไม่ห้ ุด) การจัดระเบียบตน ในการเรียน และการประเมินแค้นแห่งตน ทั้งสามประการนี้มีเส้นทางอิทธิพลทั้งทางตรงและทางอ้อม

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ไปู่การทำนาย ฤติกรรมตรงต่อเวลาของนักศึกษา งานวิจัย ได้เสนอแนะการวิจัย ่อไปและการใช้ ผลการวิจัย ในการกำหนด ุติ กอบรมนักศึกษาไทย เพื่อเพิ่มความสำเร็จในการเรียนและที่สำคัญคือ เพื่อประโยชน์ต่องานอาชีพ ในอนาคต

คำสำคัญ: ตวิ ำนาย ำนจิต-สถานการณ์ SEM เพื่อการเปรียบเที โมเดลกระบ นทศี ึ่งงปัสัมพั ันนิยม

Introduction

The world has become much more advanced in science and technology. This leads to a high demand for punctuality in work and life. However, students in schools and universities have been reported to regress into unpunctuality and high procrastination (Butakor & Boatey, ๒๐๑๘). This can become strong habit and can be carried over into their future work-life (Sonnentag, Tian, Cao, & Grushina, ๒๐๒๑). Academic and vocational failures can threaten individuals or, their organizations as well as modern society.

Despite encouragement to change one's research approach to positive models (Seligman & Csikszentmihalyi, ๒๐๐๐), tardiness and procrastination studies are continuously being emphasized. Quantitative research studies on punctuality and punctual behavior have been scarce (White, Valk & Dialmy, ๒๐๑๑), even at present.

The present correlational study aims to examine multiple groups of antecedents of punctual behavior in university students. It offered empirical understanding beyond previous research in three ways. First, this study employed a well-constructed measure of students' punctual behavior, based on a similar type of respondents. Second, both internal (psychological) and external (situational) antecedent types of variables are used. Third, mediating variables are guided by a well-documented interactionism paradigm, as well as, from research literature review. In addition, path analysis with latent variables were carried out to find a more robust model between two competing models. The magnitude of relationship among groups of predictors toward punctual behavior will be a strong basis for future research and development endeavors.

Literature Review

Punctual behavior of university students

Time is available and usually free to all normal individuals. However, time seems to pass by so quickly, especially when we need it. Appropriate time management can lead to goal attainment and achievement in life (Britton & Tesser, ๑๙๙๑; Sultana, Rashid, Mohiuddin, & Mazumder, ๒๐๑๑). Even though punctual behavior can be defined as having various dimensions, but the common element is “being on-time”, or “time keeping” (James & Fleck, ๑๙๘๖).

Evidently, time dimension is only necessary but insufficient to give complete meaning to punctual behavior. Appropriate content needs to be specified, for example, one study used number of hours per week of working at the worksite for each construction worker (Latham & Frayne, ๑๙๘๙). In another study, punctuality was simply defined as the difference between arrival time and the specified appointment time (Spiegelhalter, Regen, Kyle, Endres, Nissen, Feige, & Riemann, ๒๐๑๒). Thus, punctual behavior should cover other dimensions of behavior. Besides time and place, the type of actor, the kind of recipient (if any), helpful or harmful action, social norm, culture, etc., are important dimensions for a person's action to be classified as punctual, nonpunctual or irrelevant (Brislin & Kim ๒๐๐๓; Levine, West & Reis, ๑๙๘๐).

In reviewing research studies, it seemed that researchers used the word “punctuality” at a lesser extent than three other constructs, i.e., procrastination, lateness, and tardiness. Earlier studies put punctual behavior at the opposite end of the same continuum as procrastination (Blatt & Quinlan, ๑๙๖๗). However, other researchers reported the negative relationships among these two constructs from a meta-analytic study (Van Eerde, ๒๐๐๐, ๒๐๐๓). Evidently, procrastination was conceptualized as trait, while punctuality was its reverse performance.

It is surprising that studies of punctual behavior were rare in comparison to the studies of procrastination (Hen & Goroshit, ๒๐๑๘). Maybe after all this shows that “bad is stronger than good” (Baumeister, Bratslavsky, Finkenauer, & Vohs ๒๐๐๑). However, punctuality and procrastination are not necessary at the opposite ends of a continuum. A person can be procrastinated until the last minutes but can still meet the deadline (being punctual). In such cases active procrastination can be used to raise higher anxiety of working efficiently at the last minute (Chu & Choi, ๒๐๐๕; Zohar & Shimore & Hen, ๒๐๑๙). Therefore, one cannot expect that the characteristic of “low procrastination” can be a synonym of “punctuality”

As for punctuality versus lateness, most researchers agreed that the two constructs are the opposite or antonym of each other. Non-punctuality usually means lateness in most measures, such as in the attitudes toward punctuality (Bhanthumnavin, Bhanthumnavin & Sorod, ๒๐๑๘). In addition, lateness was used with working individuals, while tardiness was used with production (or service) units or students (Foust, Elicker & Levy, ๒๐๐๖; Mebarki,

& Shahzad, ๒๐๑๒). While Blau (๒๐๐๒) offered three criteria for taxonomizing lateness behavior, i.e., pattern, frequency, and duration of the incidents. He also revealed that different antecedents accounted for different types of lateness behavior.

In fact, most punctual behaviors, by meaning and positive outcomes are considered prosocial or desirable. Furthermore, punctual behavior can be an important component of health behavior, work or study behavior, or even moral behavior.

On the contrary, nonpunctual behavior can be classified as antisocial or unethical if the consequences turn out to be harmful to others, or to deprive other people's rights to have a free time. Therefore, punctual behavior can be a common core in the definitions of many prosocial and antisocial behaviors. Thus, important antecedents of those behaviors are also expected to be applicable to punctual behavior.

This study attempts to examine a more comprehensive model of the antecedents of punctual behavior of Thai university students. An original measure of punctuality in the life of students was newly constructed for this purpose. Summated rating method with self-report was chosen as most appropriate for measuring punctual behavior of Thai university students. This method has more advantages than disadvantages. For instant, the sum of all the item-scores in the test from each respondent can be assumed as having interval scale, while each single item is more of an ordinal scale. Thus, parametric statistics such as correlation coefficients and SEM standardized coefficients can be used with more confidence (Wu & Leung, ๒๐๑๗). Furthermore, a six-point unit rating scale was used for each item, has been confirmed as most appropriate (Kulas & Stachowski, ๒๐๐๘; Preston & Colman, ๒๐๐๐; Simms, Zelazny, Williams, & Bernstein, ๒๐๑๙). In addition, most of the variables in this study followed this format of measurement to ensure their measurement quality.

The punctual scale covers “being on- time” in the context of studying behavior, and as rule adhering for class attendance and meeting academic deadlines. Furthermore, the scale also covered a context with peers, then punctuality is related to promise keeping, being a responsible person, and avoidance of bad feelings and discomfort among friends. Therefore, the antecedent model selected for this study should cover various groups of possible causes of these behaviors as elaborated below.

Interactionism paradigm and types of antecedents of punctual behavior

Nearly all academic fields examine the causes of human behavior, have emphasized only on situational antecedents, such as the push and pull factors for entering or leaving a place (such as a university). This type of theory usually overlooks the inner or psychological causes of actions. On the contrary, the personality theorists emphasized only the “actor’s” psychological characteristics. For example, Lewin’s theory (๑๙๕๖) states that human behavior is a function of the actor’s ability to do (can) and the actor’s motivation to do it (want). Variation of the amount of behavior off the same person in different situations was considered as measurement error.

Joining of these two approaches resulted from the suggestion of Cronbach. However, in social psychology, Fiedler’s (๑๙๖๗) research and theory on leadership effectiveness has been one of the earlier successful attempts to predict group performance from leader’s psychological characteristics together with group situations (Endler & Magnusson, ๑๙๗๖).

Interactionism is now considered as a paradigm which means a type of theories and predictions which consists of many important theories and supportive research studies from a wide variety of academic disciplines. Interactionism paradigm has four types of determinants of behavior namely, ๑) The actor’s psychological trait(s) or inner causes. ๒) situational characteristics (or present and past locations of the action), and ๓) interactional influence of personal and situational causes when joining together additively or multiplicatively. This interactional influence can be conceptualized as mechanical interaction (from statistics analysis) as well as organismic interaction (as measured from psychological state of an actor) which is also specific to the situation or the context of that actor’s behavior (Endler & Magnusson, ๑๙๗๖).

In this study, only organismic interaction in the form of psychological states were examined. The reason is to keep the hypothetical model simple, and to avoid unnecessary internal redundancy of research results. However, the mechanical interaction effect on punctual behavior can still be computed if needed.

The advantages in using the interactionism paradigm beyond other models are five folds. First, this paradigm is in the form of a conceptual model (see Figure ๑) with three groups of predictors of a group of behaviors. This is consonant with the structural model for performing path analysis. Second, the interactionism model can offer predictions of both direct and indirect

paths from the three groups of antecedents to the targeted behavior. Third, mediating or intervening roles of one or more groups of variables can be clearly examined. Fourth, interactionism model is opened to the research in each study to select the appropriate empirical variables to be grouped as personal or psychological traits, situations, and psychological states. Finally, new development from various fields of psychology and other behavioral science can be incorporated and tested.

Specifications of measured variables as composites of latent variable

Based on the interactionism paradigm, a hypothetical model using three groups of predictors (as latent constructs) and punctual behavior of students can be specified as follows. The three groups of latent predictors mentioned above separately direct the paths towards the target behavior. In addition, the psychological trait latent variable and the situational latent variable also have indirect paths towards the target behavior via the psychological state latent variable. This is only a structural model for hypothesis one. However, hypothesis one has to include several observable variables to form measurement model for each of the three predictive latent constructs.

Psychological traits and punctual behavior

Psychological traits are mental qualities of a person. They can be personality, motivation, ability, belief, reasoning, etc. These psychological traits of certain magnitude are specific to each person. They are rather stable across different situations and time (Bergman, ๒๐๐๑; Tett & Burnett, ๒๐๐๓).

Predictors of punctual behavior in the category of psychological trait proposed here are self-regulated learning, moral (dis)engagement and core self-evaluation. Research evidence on the relationship between each trait and punctual behavior are reviewed and summarized. Finally, measurement model consisting of the three composite psychological traits was proposed.

Self-regulated learning (SR) aimed to capture a predisposition of students in planning and concerning students' duty. They are initiating, effortful managing, striving for each subgoal, such as attending class on time and working on course assignments continuously and preparing for exams as different steps or subgoals, until reaching final academic requirements.

There are hundreds of research studies on procrastination which lead to several reports on research review using meta-analysis. Steel (๒๐๐๗) found ๖๔๑ correlations, among them, there was a high average negative correlation between self-control and procrastination. In other words, the ones who had low self-control usually were high procrastinators. In another study of ๑๖๗ undergraduate students, the ones who were late in various class assignments were low in self-discipline (Steel & Klingsieck, ๒๐๑๖).

Ask for being punctual at work, successful training of self-management (SR) was evident in government employees and salespersons in the US. This six month long training in both projects also helped increasing self-efficacy after training (Frayne & Geringer, ๒๐๐๐; Latham & Frayne, ๑๙๘๙). In Belgium and Indonesia, freshman with low self-control showed high procrastination trait and had more problems in being punctual in their learning (Dewitte & Schouwenberg, ๒๐๐๒; Wijaya & Tori, ๒๐๑๘).

Self-regulation and self-management in relation to time concern and time management have been found to have a rather strong association with procrastination and thus punctuality. Therefore, in the present study, self-regulation was expected to have strong relationship as antecedent of punctual behavior in Thai students.

The widespread occurrence Lateness and non-punctuality in studying as well as in social life is considered as undesirable in most cases even in Thai culture. The non-punctual, rule disadherence, promise unkeeping, etc., may create disturbance in the actor. The ones who live happily with this bad habit and still let it grows, may have mastered some defense or protective techniques. Moral disengagement from Bandura's social cognitive theory is the second proposed antecedent trait. Bandura identified eight cognitive techniques that a person can use to protect self-worth and or to avoid self-condemnation. These moral disengagement thinking is what we called "justification" or "rationalization" (Bandura, ๒๐๐๒; Bandura, Barbaranelli, Caprara, & Pastorelli, ๑๙๙๖).

Among the eight techniques, four of them are, first, displacement of responsibility which means that the cause or influence on such action is not one's own, but one has to comply or obey others. In the case of university students, they can blame senior peers or advisors for the low quality, less quality and or non-punctuality of academic work.

Second tactic that one can use is “advantageous comparison”. This technique is intended to reduce self-condemnation for an unethical behavior by comparing it with graver negative behavior of others. For example, when breaking some rules in college, one decides that it is much less severe than committing an unlawful act. Third technique which is classified as moral disengagement is “dehumanization” or lowering the values of the victim to show that the action is justified for this type of people. For example, when other students got mishaps, one shows no sympathy because one believes that the victim was his or her own misfortune. Another more eclectic of moral disengagement is call “euphemistic labeling”. With intention to persuade a receiver, one uses a more positive wording for negative events such as exchanging of answers for a take-home exam among peers is a demonstration of group solidarity (Bandura, ๒๐๐๒).

Therefore, it can be expected that students with high moral disengagement are the ones with low ethical behavior. Bandura suggested that moral disengagement as a unidimensional concept can have both direction and indirect paths (or influence) on moral behavior. High moral disengagement was found in ๖๗% high school adolescents with aggressive and delinquent behaviors (๓๔% and ๓๑% of variance explained, respectively). Guilt feeling connected and mediated moral disengagement with this behavior (Bandura, ๒๐๐๒). Hardy, Bean, & Olsen (๒๐๑๕) studied ๓๘% high school students with the mean age of ๑๖.๒๘ years, high moral disengagement was found in students with records of rule breaking.

In adult workers, meta-analytic study using ๑๖๖ studies reported that moral disengagement was moderately associated with workplace misconduct, but less so with organizational citizenship behavior. Mediators of the relationship between moral disengagement and workplace misconduct were moral awareness, guilt feeling and self-regulation (Ogunfowora, Nguyen, Steel, & Hwang, ๒๐๒๑).

More recently, ๒๖๖ postgraduate students responded in a questionnaire booklet. Academic procrastination was found to be highest in students with high moral disengagement when they were under the supervision of high moral disengagement supervisors. However, students' moral disengagement showed low positive relationship with their academic procrastination. But their supervisors' moral disengagement was also associated with their students' level of procrastination (Wu & He, ๒๐๒๒).

Evidently, studies on the relationships between punctual behavior of students and their moral disengagement have not been directly identified. However, it can be expected from the above studies that punctuality and moral disengagement are negatively related in college students. In this study, the moral (dis)engagement (MD) was used with high scorers were expected to be more punctual. In addition, punctual behavior of university students can vary according to many other psychological traits. Four other traits combined to form a multi-dimensional higher-level trait was used as follow.

Different people have an equal belief in themselves as a valuable person or having capacity to succeed when putting in more effort to obtain an important goal and having balanced emotion when it is appropriate to do so. These are the four components of “Core self-evaluation” (CSE), i.e., self-esteem, self-efficacy, internal locus of control and stable emotions (Judge & Bono, ๒๐๐๑). This multidimensional trait is a good predictor of a wide variety of other psychological states, such as future concern and attitudes as well as job performance and work success, especially in American students (Judge, ๒๐๐๙). In Thailand, CSE was one of the important psychological characteristics in the elderlies who gave more social support to peers and younger persons (Wichienthano, Bhanthumnavin & Bhanthumnavin, ๒๐๒๑). Social support i.e., giving kind consultation, caring for others) is a type of pro-social or desirable behavior. It is determined by being sensitive to and responding to other people's needs and feelings. Being a punctual person shares this characteristic of empathy. Time keeping and good time management of a punctual individual can be considered pro-social behavior in some circumstance, such as appointment time keeping for letting other the rights to free time. However, CSE has not often been studied as antecedent of punctuality nor even procrastination (Yan & Zhang, ๒๐๒๒). Only one status report that the higher the CSE scores in female students the less they were academically procrastinated (Rajapakshe, ๒๐๑๘). Thus, it is expected that CSE is one of the important antecedents of punctual behavior in Thai students.

CSE was used together with moral disengagement (MD) and self-regulated learning (SRL) to form a latent variable for used in the SEM path analysis. The reasons are three folds. First, each of these traits was usually found to be an isolated predictor of behavior. But this study selected them to be incorporated as one latent variable. Second, their important roles in the latent predictor can be compared using value of factor loading. Third, measurement error of each observed variable is eliminated such that the path analytic result is more reliable than performing a multiple regression analysis. These three reasons were also applicable in forming the two other latent variables as follow.

Situational variables and punctual behavior.

What is a situation? A situation is a changing environment of an individual. This environment can have at least three dimensions, i.e., “cues” (light, color, sound, etc.), “class” (academic situation, social gathering situation, etc.), and “characteristics”, which can be given meaning by a person such as, a public place with rules to follow, appointment keeping or moral event, etc. (Rauthmann & Sherman, ๒๐๒๐) Situation that a student experience can happen in the past or occur in the present. This study focuses on three social situations of undergraduate students. They are family climate (FA), significant university teacher’s moral encouragement (TM), and friends’ academic norm (FR). These three types of social situations with different cues, classes and characteristics were found to have strong social influence on individuals especially on adolescents and students. In a recent meta-analysis report using ๓๐ research studies, parents and closed friends’ habits were found to stimulate initial smoking behavior in youth (East, McNeill, Thrasher, & Hitchman, ๒๐๒๑).

In a famous report on ๑๖๗ sixth grade students, multiple regression analysis revealed that received teacher support was positively related to students’ school interests and responsibility goal pursuit. While family cohesion was positively associated with students’ mastery goal orientation. In addition, perceived peer support was related to prosocial goal pursuit of adolescents (Wentzel, ๑๙๙๘).

Most Thai parents have high value for higher education. They are willing to sacrifice themselves to support their children. Thus, they demonstrate high expectations for academic success and better living for them. Family atmosphere is defined as continuous exchange of social material and emotional support among family members. The family members can interact with reasoning. More importantly, parents have to be good models in prosocial behaviors, community rule adherence. Family atmosphere of multidimensionality can be demonstrated through family coherent, parenting styles as well as parental expectation, etc.

Parental influence is one of the most effective techniques of cultural transmission of belief and practice from generation to generation. One of the more obvious examples is the hand-on of family career such as rice farming or small grocery enterprises. Evidently children can identify with their parents and/or internalize the values and the behavior of

senior family members. Love-oriented and reasoning-oriented child rearing practices have been active research topics in Thailand for more than ๔๕ years (Bhanthumnavin & Prachonpachanook, ๑๙๗๗; Bualar & Bhanthumnavin, ๒๐๒๑).

In the west, parental child rearing with ๒ dimensions of responsiveness and demandingness (Baumrid, ๑๙๙๑; Maccoby & Martin, ๑๙๘๓) has become more popular in research on academic procrastination in many countries. These two dimensions happened to be closely related to love- and reasoning- oriented child rearing practices in Thailand. And also, the authoritative parenting (high responsiveness with high demandingness) in college students with low academic procrastination (Anwar & Qonita, ๒๐๑๙; Wang, ๒๐๒๒). Furthermore, high academic self-regulation could explain the relationship between authoritative parenting and low academic procrastination (Amani & Arbai, ๒๐๒๐).

Thus, it is expected in the present study, parental normative influence as reflected in family atmosphere, is associated with punctual behavior in undergraduate students.

Similar models can be transferred from parenting styles to teaching styles. Effective teachers have to also be both friendly and firm. Thus, teaching can be seen as persuasion or the ways for changing attitudes and behavior of students (Friedrich, ๑๙๙๕). In other words, two processes of attitude change in students are first to identify with their instructors who are friendly and attractive to the students. Second, educators have to be firm in their teaching, knowledge seeking and knowledge using. Students are more easily internalized with credible instructors. Power to reward or punish students to increase their compliance should be used only subtly. The characteristics of persuader, together with the three types of attitudes change in the receivers were conceptualized by Kelman (๑๙๕๘) has gained great acceptance among academicians. Thus, internalization of (accept as better belief or practices) the norms (ways of being concerned with other people and society and upholding their academic roles, such as punctuality and justice) emphasized by the instructors and the university can be a natural process (Guimond, ๑๙๙๙).

Mathematic instructors' role reported by ๒๔๘ students in contributing to their classroom climate consisted of three components, i.e., instructor course organization, instructor expectation and students' attitude towards their mathematics instructor. The direct path from these three

components could account for only ๑๐.๗๐% of the students' academy procrastination. While indirect path via student's self-efficacy accounted for ๒๑% of the procrastination (Corkin, Yu, Wolters, & Wicsner, ๒๐๑๔). Thus, it is expected that instructors' moral encouragement (TM) is associated with students' punctual behavior.

Punctual behavior can be easily developed for young students by their parents and instructors joining forces. However, this desirable events still seem to be resistance to expansion in university students. The third and more powerful source of social influence is their friends who are much more in need by the students in this situation. Friends are more available than family members and instructors while they are studying. Unfortunately, friends usually are more distractors than supporters of punctuality in learning. Nevertheless, academic enthusiasts are still available among friends.

Studying and having fun can be enacted intermittently. Friends can remind friends of responsibility in learning. Friends' academic norm (FR) is defined in this study as having three dimensions, i.e., friends as good model in study, friend's suggestion to engage in studying, and having friends with less avoidance of academic responsibility. In a study of ๑๐๐ ethnic minority students, ๓๙% of variance of college adjustment, and ๓๕% of variance of academic success were both accounted for by less peer dependence, high personal motivation to learn but low school GPA. (Dennis, Phinney, & Chuatec, ๒๐๐๕).

A study of ๑๙๙ Chinese University students using SEM with ๓ latent constructs revealed that the more these students resisted negative peer influence, the less they procrastinated in their study. Furthermore, the high resistance to peer influence was found in the students with high self-esteem (Chen, Shi, & Wang, ๒๐๑๖). It can be interpreted that academic procrastination in these students may be due to using more time socializing with friends to get more acceptance. These results were consonant with the view that social appointment with friends was as important as appointment with the tutors. Thus, the students showed high punctuality to attend on both occasions more than in lecture at experimental event (James & Fleck, ๑๙๘๖). Therefore, friend's social influence seems to be highly meaningful to college students. No matter whether the influence is for or against studying, the students with great need for friendship would comply. Thus, it is expected that having friends with high academic norm (and social norm) is associated with academic prosocial punctuality in students.

Three groups of significant others surrounding a student are family members, instructors, as well as friends in the same institutions. These significant others have been identified as important in two major aspects, i.e., giving social support to the target students and having normative influence on them as well. This subjective norm is an important predictor of behavior in the theory of reasoned action and theory of planned behavior (Ajzen, ๑๙๙๑; Fishbein & Yzer, ๒๐๐๓; White, Smith, Terry, Greenslade, & McKimmie, ๒๐๐๙).

Thus, incorporating the three situational variables with common cores into one latent variable can render the measurement model as more reliable. In addition, it is hypothesized that there is a strong positive association between this situational latent variable and punctual behavior of the Thai students.

Psychological states and punctual behavior

Both psychological traits and situational characteristics are the two major groups of antecedents of human behavior as specified in the Interactionism paradigm. The third groups of antecedents in this paradigm are the interaction effects between the psychological trait and situational influence

When this interaction effect occurs within the acting individual, it is called organismic interaction (Endler & Magnusson, ๑๙๗๖). This interactional antecedent is expected to be closely associated with the target behavior. Since this construct is also a psychological characteristic, but it is also under the influence of the specific situation, experienced by the actor. The antecedent of behavior in the interactionism paradigm, called “psychological state”.

Psychological states are sensitive internal conditions of an individual such as, thinking, reasoning, belief, motivation, personality, attitude, etc., which focus on certain context. The specification of time, place, action, actor and receiver is necessary (Ajzen, ๒๐๐๕). Psychological state is referred to, or measured in more specific context mentioned above, such as rational belief about reading a textbook before exam, or future concern for being nice to other people.

In the present study, three psychological states were employed as antecedents of punctual behavior of undergraduate students in the context of academic time keeping and friendship events. Within these limited contexts, the three psychological states were rational envision (RE), future orientation toward punctual action (FO), and attitude towards punctual behavior (AT).

To identify the more powerful psychological antecedent of punctual Behavior, one has to search beyond the concept of non-procrastination. In other words, non-procrastination personality is necessary but insufficient to drive punctual Behavior. The reason is that there are many more obstacles or barriers along the way to the finish line. Other researchers have been aware of this phenomenon. They called upon the actors' ability to resist temptation or to avoid distraction (Latham & Frayne, ๑๙๘๘).

The present author has a strong place to propose that goal setting and planning for future goal pursuit with dedication, absorption, and vigor from the theory of work engagement (Luthan & Youseff, ๒๐๐๗), as well as initiation with rational and insightful mind (Shi, ๒๐๑๗) as two components of proactive personality are also necessary to be present in normally punctual person.

To behave, the first thing is to make decision or set a goal relevant to punctuality in the target situation. In a study of ๑๘๕ undergraduate students, the one who believe in success by personal effort (a component of CSE), usually made less decision to delay their action and thus avoided choosing to procrastinate (Sagone & Indiana, ๒๐๒๑). In making decision, adults can use many styles of thinking, such as intuitive style or rational style. Intuitive style is by relating the events to reveal a special pattern for guiding their choice. As for rational style, a person searches information for cause-and-effect relationships and choose the act which can bring them the most reward and least punishment (Scott & Brunce, ๑๙๙๕).

Decision making styles and especially rational belief about studying was in at least two study to show moderate associations with academic procrastination. In one of these studies rational belief about studying was also found in the SEM to be a mediator between procrastination and achievement (Balkis, ๒๐๑๗; Sagone & Indiana, ๒๐๒๑) in students.

In the present study, rational envision was analytically defined as searching for cause-effect relationships of study or social problems. Another domain was rational or irrational contexts for future decision.

Thus, based on the review above and similar definition of rational envision with rational thinking style, it is expected that rational envision (RE) is associated with punctual behavior. In addition, rational envision is one of the factors forming psychological state latent variable.

Planning and goal setting for the next coming days is usually a habit of students with high academic achievement (Britton & Tesser, ๑๙๙๑; Lay & Schornwenburg, ๑๙๙๓). Future orientation (FO) in the context of punctuality was defined as having three important components. First was having punctuality as a preferred goal in studying and social living. Second was planning to increase punctuality when necessary. The third component of FO was punctuality concerns to be on time with friends in teamwork and social functions.

Goal-setting theory offered by Locke and Latham since ๑๙๙๐ has been confirmed by hundreds of studies. This theory indicates that setting a future goal can definitely lead to active performance-engagement and accelerates success. Goal setting with strong goal commitment is found to motivate the actor to pay close attention, put more effort, and use appropriate strategy to attain the goal (Latham & Locke, ๑๙๙๑). Based on the reviewed studies and theory, it is expected that the Thai students with high future orientation toward punctuality are the ones with more punctual behavior.

Attitude of a person has been defined in social psychology as having three important components: (๑) beliefs about good and bad qualities of the target of attitude. (๒) feeling like or dislike of the target of attitude and (๓) readiness to behave for positively or negatively toward the target of attitudes (Kretch, Crutchfield, & Ballachey, ๑๙๖๒). If a researcher wants to use attitude to predict the person's behavior, it is recommended that the target of attitude to be measured should be specific behavior such as punctual behavior in this present study.

Ajzen (๒๐๐๕), based on their review of attitude-behavior relations studies, concluded that a measure of attitude should be compatible with the measure of predicted behavior to ensure the highest strength of association. The attitude – behavior compatibility should be in four important aspects. They are action, target, context, and time.

The measure of attitude towards punctual behavior, consisted of (๑) belief in the social advantages of being punctual with friends, (๒) favorable feeling towards having punctual habits, and (๓) showing intention or readiness to be punctual in keeping promise and attending meetings.

It is expected that the attitude toward punctual behavior is positively related to punctual behavior of university students. Furthermore, rational envision, future orientation concerning punctuality, and attitude toward punctual behavior are the three components in the measurement model called “psychological state latent variable”.

Psychological states as mediators

Mediator is used to explain the connection between an antecedent and targeted behavior. Recently attitudes toward some behaviors (AT) were found in several Thai studies to be a strong mediator between moral disengagement (MD) and COVID-19 preventive behaviors of students (e.g., Punpromthada, Bhanthumnavin, Bhanthumnavin, Meekun, Sitsira-at, & Pimthong, 2022) and research working behavior of university lecturers (Bhanthumnavin, 2021).

Beside attitudes (AT) as potential mediator between antecedents and a targeted behavior, future orientation (FO) toward specific issues, such as punctuality is another possible mediator. Future orientation has multiple components such as goal setting, goal pursuit and especially time management. Each of these three components of future orientation were found to mediate between self-regulated learning (SR), and economic engagement behavior in high school students (Froiland, Worrell, Olenchak, & Kowalski, 2022) and degree commitment in university students (Collie, Martin, Papworth, & Ginn, 2022; Sharma & Tomer, 2022).

Rational envision (RE) was reflected in thinking about cause-effect relationship for making decision to attain future goal. As for rational belief about studying, Balkis (2020) found that it mediated between procrastination trait and academic achievement of Turkish undergraduate students.

Mediator can also occur when persons with some psychological traits experience a specific situation. Psychological mediator can occur in the form of compliance to government recommendations to stay and work from home during the pandemic. The magnitude of the psychological compliance was found to relate to the sheltering-in-place behavior of the people. As for planning to be punctual which leads to behavior in class attendance, some students were found to be affected by the teachers and peers' punctuality and interacted with their own sensitivity to such practices. This phenomenon led to change to be more (or less) punctual in some students later (Basu & Weibull, 2022).

Thus, it can be expected that psychological state latent variable (RE, FO, and AT factors) is an important mediator between psychological traits latent variable together with situational latent variable and punctual behavior of the Thai students.

Based on interactionism paradigm and the research reviewed above, an hypothesis is being proposed.

Hypothesis ๑: Three latent variables which are psychological trait, situational influence, and psychological state, have three direct paths toward punctual behavior. In addition, there are two indirect paths, one from psychological trait latent variable to punctual behavior via psychological state latent variable. Another indirect path is from situational latent variable to punctual behavior via the same mediator (psychological state latent variable).

Perceived situational latent variable and model comparison

Situational factors can be real experience measured objectively such as being a university student or not being one. But situational variables in psycho-behavioral research, more often are measured subjectively by self-report from the experiencing persons.

However, in the interactionist paradigm, the psychological traits latent variable and the Nevertheless, most psycho-behavioral research studies situational variables are measured by self-report rating scales. The respondents are assumed to be in situations, such as, family atmosphere or teachers' class moral encouragement or academic modeling from friends as in the present study. But these students still could perceive, evaluate, interpret, and report the same situation differently. Therefore, the outcomes of such situational measurement are affected by the respondents' psychological traits, as well as the actual quality of the situations.

Consequently, model ๒ is proposed in this study by adding one more path from psychological trait latent variable to situational latent variable (Figure ๑). Then, after model ๑ (without this new path added), and model ๒ (with this new path) were compared by applying the technique of structural equation modeling for model comparison (Bentler & Satorra, ๒๐๑๐; Vrieze, ๒๐๑๒).

Hypothesis ๒ states that In comparing model ๒ with model ๑ (as nested model), model ๒ has one more path efficient from the psychological trait latent variable to situational latent variable. Then, model ๒ is better fitted to the data (more robust) than model ๑

Statistical analysis for testing hypothesis ๒ is comparing the model fit indices values of the two models in at least three ways, i.e., goodness of fit indexes, increment percentage of total variance accounted for punctual behavior, and the AIC value differences, (Vrieze, ๒๐๑๒).

Methods

Samples

Regular classroom in four universities in Thailand were used to collect questionnaire booklets from ๑,๓๑๑ undergraduate students. There were ๔๐๕ males (๓๐.๙๐%) and ๙๐๖ females (๖๙.๑๐%) with the average age of ๒๑.๓๓ years, the average GPA of ๒.๙๐ (SD = ๐.๕๓). Most of them were the first generation of the family studying in the university level (n = ๗๑๔, ๕๔.๕๐%).

Measures

There were ๑๐ variables in this study divided into five groups. Each variable was assessed in the form of summated rating with ๖-point scales ranging from “absolutely true” to “absolutely not true”. Each scale accompanied a positively or a negatively worded item. Two statistical approaches, namely, ๑) item discrimination (t-ratio) should be at least ๒.๐๐, and ๒) item -total correlation (r) should be at least ๐.๒๐ were employed to test item quality. Construct validity computed by confirmatory factor analysis, and reliability in terms of alpha coefficient, omega reliability and greater lower bound (GLB) were computed for measurement quality. Most of the variables were constructed in the research project (Bhanthumnavin, ๒๐๑๘) under the research program funded by ๒๐๑๘ government budget grant. The item and measurement qualities of each measurement are shown in Table ๑.

Punctual behavior (PB) defined as on-time or proper-time behaviors relating to three aspects, which were ๑) class and university activities (e.g., submit assignment, arriving at classroom), ๒) appointment with peers (e.g., come early, keep appointment schedule), and ๓) misbehaviors (e.g., friends have to call for, depending on others to stir up)

Psychological state group of variables consisted of three variables, i.e., ๑) rational envision (RE) referred to careful thoughts of causal-effect relations (e.g., finding the causes of various personal problems such as over-spending, maintaining student-identity, and careful risk taking). ๒) future orientation toward punctuality (FO) consisted of three dimensions, namely, planning to facilitate punctual actions and to alleviate non-punctuality, having good feelings when attaining punctuality, and being present-oriented without guilt feeling, and ๓) attitude towards punctual behavior (AT) involved beliefs, emotions, and intention (Eagly & Chaiken, ๒๐๐๗; Kretch, Crutchfield & Ballachey, ๑๙๖๒) toward punctual behavior.

Psychological trait group of variables consisted of two psychological characteristics and one previous behavior, i.e., ๑) core self-evaluation (CSE), based on Judge, Erez, Bono, & Thoresen, ๒๐๐๒) consisted of four important psychological dimensions which are self-esteem, general self-efficacy, locus of control and emotional stability. ๒) moral (dis) engagement (MD), based on Bandura (๒๐๐๒), was defined as justification of an individual to unethical behavior in order to alleviate the negative feelings or consequences. A reversed version of MD was used by giving high total score to the one with less moral disengagement, and ๓) self-regulated learning (SR) referred to an individual ability to appropriately manage and react to his or her emotions and behaviors.

Situational factor group of variables consisted of three variables i.e., ๑) lecturer moral enhancement (TM) referred to the perceptions of students about their lecturer's behaviors of being protective, supportive, good role model, and fair. ๒) family positive atmosphere (FA) was defined as perceived social support, rational and rights, with good role model from family. and ๓) peer academic influence (FR) was defined as academic support and being academically good role model from peers.

Table 1: Item quality and measurement quality of each variable

Variables	items	α (SPSS)	Reliability (α , Ω , GLB) (JASP)	Confirmatory Factory Analysis (CFA)						
				χ^2	df	p-value ($p > 0.05$)	RMSEA (≤ 0.06)	CFI (≥ 0.95)	TLI (≥ 0.95)	SRMR (≤ 0.08)
၁. PB*	၁၆	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၁၀.၆၁၈	၆၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈
၂. RE*	၁၈	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၆၈.၈၈၈	၆၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈
၃. FO*	၁၈	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၆၆.၈၈၈	၆၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈
၄. AT*	၁၆	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၈၀.၈၈၈	၈၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈
၅. SR	၁၈	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၈၈.၈၈၈	၈၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈
၆. MD	၁၈	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၈၈.၈၈၈	၈၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈
၇. CSE	၁၈	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၈၈.၈၈၈	၈၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈
၈. TM*	၁၈	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၈၈.၈၈၈	၈၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈
၉. FA*	၁၆	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၈၈.၈၈၈	၈၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈
၁၀. FR*	၁၆	၀.၈၈	၀.၈၈, ၀.၈၈, ၀.၈၈	၈၈.၈၈၈	၈၈	၀.၀၈၈၈	၀.၀၈၈	၀.၈၈၈	၀.၈၈၈	၀.၀၈၈

Note: * Constructed in this study.

Data Collection

The researcher and team received permission from the four universities, time and place were arranged for data gathering. Before administrating, objectives of study and all rights of participant were informed. The informed consent was obtained from the students who were willing to participate. They filled out the paper-based questionnaires which took about ၆၆ minutes. The small token for each student was delivered as an appreciation.

Data Analysis

Path analysis approach which investigates the direct and indirect relationships among the antecedent latent variables and the dependent latent variable was computed from MPlus. Five indexes were used as criterion for model fit. First, Chi-square should be approach ၀ and not

significant. Otherwise, the mean-square fit, that is chi-square divided by degree of freedom, should be less than ๒.๐๐. Second, the comparative fit index (CFI) should be more than ๐.๙๕ (Hu & Bentler, ๑๙๙๙). Third, standardized root mean squared residual (SRMR) indicates the approximate fit which should be ≤ ๐.๐๘ (Asparouhov Hamaker, & Muthen, ๒๐๑๘). Fourth, Tucker-Lewis Index (TLI) measures a misfit per degree of freedom (Tucker & Lewis, ๑๙๗๗) which should be ≥ ๐.๙๕ (West, Taylor, & Wu, ๒๐๑๒). Fifth, the root mean square error of approximation (RMSEA) is an index indicating a parsimony-adjusted which should be ≤ ๐.๐๖ (Browne & Cudeck, ๑๙๙๓).

Results

Intercorrelation between variables

A range of correlation coefficients between the antecedent variables and the pb was ๐.๑๔๔($p < .๐๑$) to ๐.๖๒๔($p < .๐๑$). As for the correlation coefficients among the psychological and situational antecedent variables was between ๐.๒๔๒($p < .๐๑$) to ๐.๖๓๔($p < .๐๑$). These results indicated less multicollinearity problem (Hair, Black, Babin, & Anderson, ๒๐๑๐).

Table 2: Intercorrelation matrix and descriptive statistics of the variables

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
๑ pb	๖๗.๓๕	๑๑.๐๙	๑								
๒ re	๕๕.๐๒	๖.๗๑	.๓๖๕**	๑							
๓ fo	๕๕.๘๒	๖.๙๘	.๖๒๔**	.๕๕๒**	๑						
๔ at	๗๓.๘๐	๑๐.๑๕	.๕๒๕**	.๕๐๕**	.๖๓๔**	๑					
๕ tm	๗๐.๒๙	๙.๘๒	.๑๔๔**	.๓๔๓**	.๒๗๖**	.๓๐๗**	๑				
๖ fa	๖๘.๓๓	๑๐.๒๒	.๒๑๕**	.๓๐๕**	.๒๔๒**	.๓๒๙**	.๒๙๒**	๑			
๗ fr	๕๗.๐๖	๗.๔๘	.๒๖๑**	.๓๖๕**	.๓๒๖**	.๓๙๗**	.๓๕๕**	.๓๒๖**	๑		
๘ sr	๘๓.๖๕	๑๑.๔๘	.๔๐๕**	.๕๕๗**	.๕๓๕**	.๔๘๐**	.๓๙๓**	.๓๖๓**	.๔๐๓**	๑	
๙ md	๖๔.๓๒	๑๐.๒๑	.๒๘๖**	.๓๙๓**	.๓๖๑**	.๕๒๘**	.๓๘๖**	.๓๕๓**	.๔๕๐**	.๔๖๗**	๑
๑๐ cse	๕๙.๐๐	๖.๙๘	.๒๔๓**	.๓๓๐**	.๒๖๘**	.๒๖๘**	.๒๗๘**	.๓๗๒**	.๒๙๕**	.๔๗๑**	.๓๕๕**

Note. * $p < .๐๕$; ** $p < .๐๑$. N = ๑๓๑ pb = punctual behavior. re = rational envision. fo = future orientation toward punctuality. at = attitude towards punctual behavior. tm = lecturer moral enhancement. fa = family positive atmosphere. fr = peer academic infl ence. sr = self-regulated learning. md = moral (dis) engagement. cse = core self-evaluation.

Path model of the antecedents of punctual behavior

The hypothetical model (H₀) was tested and revealed acceptable model fit (Table 3 and Table 4). The significant chi-square value with large sample size is commonly expected. The chi-square divided by df value was less than 5 is a common benchmark (Schumacker & Lomax, 2000).

The alternative model was tested by adding path direction between psychological trait latent variable and situation factor latent variable. It was found that the results yielded better model fit (Table 3 and Table 4)

Table 3: Model fit indexes and results in model 1 and model 2 (N= 389)

	Fit indexes	Model 1 (H1)	Model 2 (H2)
1	Chi-square, df, p-value	108.127, 12, p<.000	85.888, 12, p<.000
2	chi-square divided by df	9.009	7.157
3	RMSEA	0.088	0.070
4	CFI	0.983	0.987
5	TLI	0.991	0.995
6	SRMR	0.028	0.021

Table 4: Estimated parameter values and statistic values for measurement and structural model of punctual behavior (N = 389)

Latent variables	Model 1				Model 2			
	b	β	SE	t-value	b	β	SE	t-value
A. Measurement model								
1. Punctual behavior 1.1 pb	1.00	0.987	0.021	46.98****	1.00	0.987	0.021	46.98****
2. Psychological state (state)								
2.1 re	1.00	0.800	0.028	28.57****	1.00	0.813	0.028	29.04****
2.2 fo	0.802	0.712	0.028	25.43****	0.802	0.712	0.028	25.43****
2.3 at	0.687	0.683	0.020	34.35****	0.687	0.683	0.020	34.35****

Table 4: Estimated parameter values and statistic values for measurement and structural model of punctual behavior (N = ๓๘๑๑)(Continue)

Latent variables	Model 1				Model 2			
	b	β	SE	t-value	b	β	SE	t-value
๓. Psychological trait (trait)								
๓.๑ sr	๑.๐๐	๐.๗๒๑	๐.๐๑๘	๔๐.๐๒****	๑.๐๐๐	๐.๖๗๘	๐.๐๑๗	๔๐.๗๐****
๓.๒ md	๐.๘๓๔	๐.๖๗๖	๐.๐๒๐	๓๔.๖๓****	๐.๘๑๔	๐.๖๔๓	๐.๐๒๐	๓๔.๘๘****
๓.๓ cse	๐.๔๘๔	๐.๕๗๗	๐.๐๒๓	๒๕.๓๖****	๐.๔๖๑	๐.๕๑๓	๐.๐๒๕	๒๐.๕๘****
๔. Situational factor (situation)								
๔.๑ tm	๑.๐๐	๐.๕๒๘	๐.๐๒๒	๒๓.๘๐****	๑.๐๐๐	๐.๕๓๔	๐.๐๑๙	๒๘.๙๑****
๔.๒ fa	๑.๐๘	๐.๕๔๔	๐.๐๒๔	๒๓.๐๔****	๑.๐๒๐	๐.๕๒๓	๐.๐๒๔	๒๑.๔๒****
๔.๓ fr	๐.๘๘๓	๐.๖๐๗	๐.๐๒๓	๒๖.๗๕****	๐.๘๘๐	๐.๖๒๓	๐.๐๒๒	๒๗.๗๕****
B. Structural model								
trait $\rightarrow$ stat	๐.๓๐๐	๐.๔๕๔	๐.๐๑๕	๒๙.๗๖****	๐.๓๒๐	๐.๔๗๐	๐.๐๑๓	๓๕.๗๓****
trait $\rightarrow$ situation	-				๐.๖๗๐	๐.๙๙๒	๐.๐๒๕	๓๙.๕๒****
trait $\rightarrow$ punctual behavior	๐.๑๖๐	๐.๒๑๘	๐.๐๑๑	๑๙.๔๗****	๐.๓๐๐	๐.๓๗๗	๐.๐๑๗	๒๑.๓๒****
situation $\rightarrow$ state	๐.๓๒๐	๐.๓๐๓	๐.๐๑๓	๒๓.๔๓****	๐.๒๗๐	๐.๒๖๘	๐.๐๐๙	๒๙.๑๗****
situation $\rightarrow$ punctual behavior	๐.๑๔๐	๐.๑๑๙	๐.๐๐๘	๑๕.๔๒****	๐.๒๐๐	๐.๑๖๗	๐.๐๐๙	๑๘.๙๕****
state $\rightarrow$ punctual behavior	๐.๖๖๕	๐.๕๙๗	๐.๐๒๖	๒๖.๖๘****	๐.๔๘๔	๐.๔๑๑	๐.๐๑๗	๒๙.๒๕****
C. R² for latent variables								
๑. situation	-				๐.๙๘๔			
๒. state	๐.๕๖๕				๐.๕๕๓			
๓. punctual behavior	๐.๗๖๘				๐.๗๘๔			

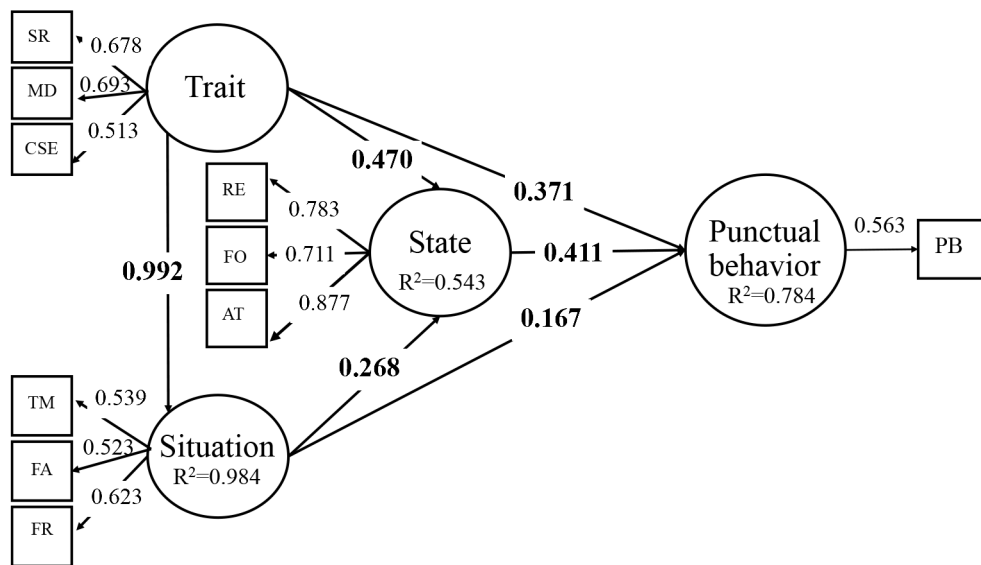


Figure 1: Path model of the antecedents of punctual behavior in undergraduate students.

All coefficients are significant at $p < .0$

For the measurement model of psychological state latent variable (Model 2, Table 4), the highest factor loading of 0.877 was attitude towards punctual behavior (AT), followed by rational envision (RE) (factor loading = 0.783), and future orientation toward punctuality (FO) factor loading = 0.711. For the measurement model of psychological trait latent variable, the highest factor loading of 0.693 was moral (dis)engagement (MD), followed by self-regulated learning (SR) (factor loading = 0.678), and core self-evaluation (CSE) (factor loading = 0.513). For the measurement model of situational factor latent variable, the highest factor loading of 0.623 was peer academic influence (FR), followed by lecturer moral enhancement (TM) (factor loading = 0.539), and family positive atmosphere (FA) (factor loading = 0.523).

For the structural model (Table 4, Figure 1), punctual behavior latent variable was directed affected by psychological state latent variable with the highest path coefficient of 0.411 ($p < .05$), followed by psychological trait latent variable (path coefficient = 0.371, $p < .05$), and situational factor latent variable (path coefficient = 0.167, $p < .05$). The direct and indirect effects of the three antecedent latent variables could explain the punctual behavior latent variable with 0.784.

The psychological state latent variable was directly affected by psychological trait latent variable with the highest path coefficient of 0.474 ($p < 0.05$), followed by situational factor latent variable (path coefficient = 0.268, $p < 0.05$). The direct and indirect effects of these two latent variables could explain the psychological state latent variable with 0.543.

Model comparison

As for model comparison between model 1 (reduced model) and model 2 (full model), the results revealed that the chi-square of both models were still statistically significant. But the model 2 was more robust in terms of chi-square divided by df which was less than 2.00. Moreover, the AIC index in model 2 was much less than in the model. In the additional path from psychological trait latent variable to situational factor latent variable was added in model 2 which yielded better fit indexes and higher percentage of the explanation of punctual behavior latent variable (Table 5). Thus, these results supported hypothesis 2.

Table 5: Nested model comparison

Model	χ^2	p-value	df	2df	AIC: χ^2-2df	χ^2/df
M1 Nested (reduced)	103.267	0.00	26	52	56.267	3.971
M2 Full model	85.844	0.007	28	56	-10.801	3.069

Discussion

Hypothesis 1: Model 1 provides a good fit to the data. All five paths were statistically significant. The results support all sub-hypothesis of five direct and two indirect effects. All the effects together could account for 56.8% of variance in punctual behavior. The results were consonant and gave strong support to the interactionism paradigm (Endler & Magnusson, 1976). Evidently, these results also give new and complex scientific evidence for understanding the origin of puncture behavior in university students.

Hypotheses 2: Model 2 is an extension of a nested model 1. The second model simply has one more direct path from psychological trait to situational variable. The strong direct path pinpoints the appropriate relationship among personal and situational variables. It gives strong support to the conception that the person's characteristics played important roles in their perceiving interpreting and reporting the situational qualities.

Perceived situational variables were found in many antecedent models of important behaviors of Thai respondents from social support giving. In Thai elderlies, to critical buying behavior and especially dedicated-learning behavior in undergraduate students (Wichienthano, et al., 2016; Tangchitprattana, Bhanthumnavin, Bhanthumnavin, & Pimthong, 2018; Bualar, 2018). The present results add more support to this phenomenon.

Hypothesis 2 focused on model comparison. Model 1 is now a reduced model nested in model 2 which had one more direct path, using the same data. The more complex model 2 had all values of fit indices closer to the criterion values than the first model. With one more path, model 2 showed that punctual behavior could be accounted for 0.5% beyond model 1.

AIC statistics (Shipley, 2016) for model comparison in Table 4 shows lower values for model 2 (full model) which signified better fit to the data than model 1. In addition, the mean-square fit value (Chi-square/degree of freedom) of model 2 (full model) is 0.0001 which is consistent with the criterion (less than 0.001). While model 1 (reduced model) has the value of 0.0002. Thus, according to these criteria, the full model 2 has model fit qualities to the data better than model 1. Evidently, hypothesis 2 was supported in many aspects.

The role of the psychological trait latent variable of model 2 (Figure 1) in comparison to model 1, showed stronger association with all the three latent variables. The psychological trait latent variable in the full model 2 had one direct and three indirect paths towards punctual behavior. However, the perceived situational latent variable when having a mediating role (Figure 1), its associations (or standardized path coefficients) with the psychological state latent variable and the punctual behavior, decreased slightly in model 2 which were unexpected. (0.26 in the full model, and 0.20 in the reduced model). Similarly, situation factor to punctual behavior had coefficients of 0.0001 in the full model and 0.0001 in the reduced model. In other words, the perceived situation (in model 2) showed weaker effects.

In the full model 2, situational latent variable was found to be accounted for 0.5% by psychological trait latent variable. Furthermore in the measurement model of the situation latent variable, the factor called friendship academic support (FR) had the highest factor loading (FR = 0.92) than teachers' moral encouragement (TM = 0.00). These results were consonant with the study of perceived social support from these three sources in Chinese college students (Yang, Zhu, & Hu, 2016).

In another study which focused on the three types of social relationships in which academic engagement of 1,111 teenage school students in the US, the UK, and Canada, report of parental relationship showed the weakest association among the three sources (Collie, et al., 2016). While, in this present study, family atmosphere (FA), showed the lowest, but still not far from that of teachers' moral encouragement (TM).

The effect of parent and family can still be detected in college age in Thai and Chinese students, but not in the western countries, was confirmed by a meta-analysis study employed 4 studies (Wang, 2012). In more detail, it was found that the authoritative parenting was reported by the students with low academic procrastination. As noted, the authoritative parenting seems to have similar definition to the family atmosphere (FA) in the present study

SEM full antecedent model of punctual behavior

The results from this study have pinpointed that the psychological traits of the respondents played the most important role among the antecedent of punctual behavior. Psychological traits latent variable which was represented by two of the three components, namely, moral (dis)engagement and self-regulated learning, one direct and three indirect paths towards punctual behavior via perceived situational latent variable and psychological State latent variable (Figure 1).

In addition, inter correlation matrix (Table 2) revealed that future orientation (FO) about punctuality attitudes (AT) toward punctual actions and self-regulated learning (SR) were the three psychological characteristics which showed the highest positive relations in consecutive order with punctual behavior. Furthermore, these three variables were positively related to moral (dis)engagement (MD) and rational envision (RE). The self-regulated learning, moral disengagement and rational envision were all positively related to perceived friendship academy support (FR) (Table 2).

In conclusion, punctual behavior can be explained by all three psychological states (FO, AT, and RE) Together with two psychological traits (SR and MD) and one perceived situation (FR). Thus, the correlation coefficients (Table 2) confirm the SEM results of model 2 (Figure 1)

Strengths and Limitations

As mentioned above punctual behavior has not been popularly investigated (Dishon-Berkovits & Koslowsky, ๒๐๐๒). Even at present punctual behavior was found more often in more advanced statistical studies using work context of employees. However, psychological and personality variables have gained more acceptance among researchers. On the other hand, situational variable was often self-reported as perceived situations (Parker, Williams & Tuners, ๒๐๐๖; Hollet, et al., ๒๐๒๐). Thus, present study can be considered as one of the most comprehensive with rather advanced statistical analysis in students' punctuality. Using non-experimental design (cross-sectional data) is of less obstacle to view the results as cause-effect model due to the convergence of the three methods used. They are first, the antecedent models were strongly based on theoretical paradigm of interactionism. Secondly, all the assessment tools for major dependent and independent variables had been constructed and validated using factor analysis and other advanced statistics. Thirdly, SEM or path analysis with latent variables, together with the intercorrelation matrix among the major variables can ensure more credibility of the concluding results.

Recommendations and conclusion

Theoretical suggestions are three folds. First, the construct of punctuality should be more extensively pursued. Punctual Behavior should not only be “an end” which has limited the more advanced studies in the field. Punctuality also should be examined as “a mean to an end”, as well. For example, punctual behavior can reflect moral identity, professional identity, or social identity.

Secondly, the wider view of punctuality can be linked to many new constructs and theories such as, the psycho-moral strength construct (Bhanthumnavin, in progress) or to the theory of planned behavior (Ajzen, ๑๙๙๑) for creating interesting hypotheses.

Third, for teachers in human development personnel as we last researchers and theorists, training models and evaluation tools and practices should be based on stronger psychosocial enhancement of students. Training models based on the results of the present study should have at least four components: ๑) the model for future orientation and self-control ๒) module for preventing the use of moral disengagement ๓) The model for Academy social support evening to peers, and ๔) the direct training of relevant punctual behaviors of students.

These recommended projects are based on a positive psychological approach. Prevention and promotion of desirable characteristics of students for punctuality in a wide variety of situations can ensure more success and sustainability.

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The Role of Pythonic Accounting-Assisted Digital Finance Sentiment in Promoting Environmental Sustainability

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Received: November 07, 2022

Revised: May 01, 2023

Accepted: May 25, 2023

Abstract

This panel data study aims to examine the relationship between Indonesia's environmental protection achievement in terms of climate change prevention and its prevailing political economy by explicitly considering the role of pythonic accounting assisted-capital market sentiment from 2000 to 2019. This study uses fixed and random-effect models as econometric techniques. Environmental protection is measured by Indonesia Environmental Carbon Index. The political economy is measured by the wealth distribution index among Indonesians or known as the GINI coefficient. This study concludes with two important findings: (1) The Government of Indonesia's politically motivated economic policies resulting in wealth distribution inequalities significantly harm the environmental protection effort mostly in carbon emission control and waste management. Economic inequalities resulting from the politically motivated economic policy indirectly legitimize people's action to exploit nature by any means necessary to survive. Therefore,

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the fifth state principle of Pancasila mandating social justice for every single Indonesian can be the best explanation for this social jealousy phenomenon. In other words, environmental protection without fair political economy policies is an impossible mission; (๒) media sentiment on digital finance shows an insignificant impact only during the first two presidencies ๒๐๐๑- ๒๐๐๘ on the relationship between the wealth distribution gap and environmental protection in Indonesia. Meaning that speculations or reactions from the media related to digital finance could not do anything about the existing wealth distribution gap's impact on the environmental protection effort in Indonesia in the early ๒๐๐๐s but it starts to change after ๒๐๐๕ in Indonesia due to capital market maturity after Asia economic crisis ๑๙๙๘-๑๙๙๙.

Keywords: Python, Pycharm, Sentiment, Polarity, Carbon

บทบาทของตะกอนการเงินดิจิทัลแบบใช้ภาษาบัญชี ไพทอนเพื่อส่งเสริมความยั่งยืนด้านสิ่งแวดล้อม

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บทคัดย่อ

การวิจัยโดยใช้ข้อมูลพาแนล มีวัตถุประสงค์เพื่อศึกษาว่า ภูมิฐานะระหว่าง ความสำเร็จในการป้องกันสิ่งแวดล้อม โดยใช้การป้องกันการเปลี่ยนแปลงสภาพอากาศและระบบเศรษฐกิจการเมืองทั่วไปของประเทศอินโดนีเซีย โดยการพิจารณาบทบาทของตะกอนตลาดลงทุนแบบใช้ภาษา บัญชีไพทอน ในช่วงปี ค.ศ. ๒๐๐๑ ถึง ๒๐๐๘งานวิจัยนี้ใช้วิธีแบบจำลองเชิงสุ่ม ้วยเท่ ิคเศรษฐกิจ โดยที่การป้องกันสิ่งแวดล้อม ัดจากดัชั คาร์บอนสิ่งแวดล้อม องประเทศ ินโดนีเซีย ในขณะที่เศรษฐกิจการเมื่องวัดจากดัชั ส่งมอบค ามู ังคัง ของชาวอินโดนีเซีย หรือประสิทธิภาพ ามไม่เสมอภาค ผลของงานวิจัยมีสองด้านคือ ๑)นโยบายกระตุ้นเศรษฐกิจเชิงการเมืองของรัฐบาลอินโดนีเซีย ส่งผลให้เกิดค ามไม่เสมอภาค องการส่งมอบค ามมั่งคั่ง และเป็นผลเสีย ต่อความพยายามป้องกันสิ่งแวดล้อม โดยเฉพาะอย่างยิ่ง การควบคุมการปล่อยก๊าซคาร์บอนและการจัดการของเสีย ค ามไม่เสมอภาค างเศรษฐกิจ อันเกิดจากนโยบายกระตุ้นเศรษฐกิจเชิงการเมือง เป็นการอนุญาตการกระทำของมู ุษย์ที่เป็นการหาประโยชน์ จากธรรมชาติ ไม่ว่าจะด้วยวิธีการใด ๆ เพื่อก ามอยู่รอด เป็นการกระทำที่ถูกกฎหมาย ดังนั้นหลักการแพนคาซิดาที่ห้าของภาค ัฐ ที่กำหนดค ามู ติธรรม างสังค สำหรับทุกคน ในประเทศ ินโดนีเซีย จึงเป็นคำอธิบายที่ดีที่สุด เมื่อกล่าวังปรากฏการณ์ ามู ิจหาหรือริยาทางสังค

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กล่าวไว้ว่า การป้องกันสิ่งแวดล้อมโดยปราศจากนโยบายเศรษฐศาสตร์การเมือง เป็นพันธกิจที่เป็นไปไม่ได้ (๒) ตะกอนสื่อเรื่องการเงินดิจิทัล แสดงผลกระทบที่สำคัญ เพียงแค่ในช่วงสมัยของประธานาธิบดีระหว่างปี ค.ศ. ๒๐๐๑-๒๐๐๘ ด้วยคำขวัญ "มันจะดีกว่า" ของวอชิงตัน การส่งมอบความมั่งคั่งและการป้องกันสิ่งแวดล้อมในประเทศอินโดนีเซีย ซึ่งหมายความว่า การคาดการณ์หรือปฏิกิริยาจากสื่อ ที่เกี่ยวข้องกับการเงินดิจิทัลไม่สามารถส่งผลใด ๆ ต่อช่องว่างการส่งมอบความมั่งคั่ง จากความพยายามป้องกันสิ่งแวดล้อมของประเทศอินโดนีเซีย ในช่วงต้นทศวรรษที่ ๒๐ แต่ทว่าเริ่มมีการเปลี่ยนแปลงหลังจากปี ๒๐๐๘ อันเป็นผลมาจากการเติบโตของตลาดลงทุนผ่านวิกฤตเศรษฐกิจทวีปเอเชีย ช่วงปี ค.ศ. ๑๙๙๘ - ๑๙๙๙

คำสำคัญ: ไพทอน ไพชาม ตะกอน สภาพแวดล้อม คาร์บอน

Introduction

The Indonesian government has actively pursued the growth of Indonesia's downstream processing and refining industry in the mining sector during the past few years. Particularly, the Indonesian government has passed a number of restrictions that forbid (or heavily tax) the export of raw ores and minerals. In order to promote the development of new processing and refining facilities, it has also been providing tax benefits and other incentives. At least four new smelters, with a total combined value of over \$1.2 billion, are anticipated to start up in Indonesia in 2017, while more smelters and refineries are anticipated to finish up their development in the next several years (World Bank, 2016).

The Indonesian Government has concentrated its efforts on growing the domestic downstream refining industry in the oil and gas sector while upstream business operations have stalled due to the relatively low global oil price, in order to lessen Indonesia's dependence on crude and product imports. The Indonesian government is anticipated to release a request for proposals in 2017 for the construction of up to eight small-scale oil refineries close to the key oil blocks. This is in line with the recent decision of the Indonesian government to prioritize the construction of local infrastructure (including pipelines) and demand the onshore construction of a liquid natural gas plant for the Masela project, which is Indonesia's largest deep-water gas project and is located in the Arafura Sea, Moluccas (Asian Development Bank, 2017).

With over 80% of these projects being led by independent power producers and the remaining projects being run by the Indonesian state-owned power utility, PT PLN, the total capacity of the newly signed power purchase agreements is 11,400 MW. A variety of fuel sources, including many renewable energy projects, will be used in the 11,400 MW new electricity generation project to create about 100 new power plants. 2016 saw the completion of AC Energy's purchase of a sizeable stake in the 115 MW Sidrap wind farm in South Sulawesi, Indonesia, which will become the country's first utility-scale wind company. Early in 2017, this project reached a financial close, and commercial operations are anticipated before the end of the year.

Recent significant foreign divestments have highlighted the need for regulatory reform in the mining sector. With the sale of a ๕๖% stake in PT Newmont Nusa Tenggara to the Indonesian-owned PT Amman Mineral Internasional in ๒๐๑๖, the New York Stock Exchange-listed Newmont Mining Corporation and the Japanese company Sumitomo Mining Corporation completed one of the largest mining transactions in history. This transaction was valued at approximately US\$๒.๖ billion when all associated disposals were taken into account. On the Indonesian island of Sumba-wa, the Batu Hijau copper and gold mine is run by PT Newmont Nusa Tenggara. Additionally, in ๒๐๑๖, BHP Billiton completed the sale of its ๗๕% ownership in seven metallurgical coal contract of work businesses in the Indomet Coal project in Central and Eastern Kalimantan to its current Indonesian-owned joint venture partner Adaro Energy for US\$๑๒๐ million (including the one million tonnes a year Haju mine, which started producing in ๒๐๑๕). Additionally, Freeport McMoran is anticipated to be forced by the Indonesian government to sell a sizable chunk of its stake in the world's largest gold and copper mine, the Grasberg project in East Indonesia, in ๒๐๑๗ (Rodrik & Sabel, ๒๐๑๔).

The "polluter pays" idea, which holds that each person or organization that damages the environment is accountable for the appropriate actions taken, is adopted by the Indonesian Environmental Law. Therefore, generally speaking, every person who is in charge of enterprises or activities that result in environmental pollution or environmental destruction and cause harm to any third party or the environment is required to make restitution or take certain corrective measures such as installing or improving waste treatment units, restoring the original environmental function or eliminating the causes of the environmental pollution or damage (Andaiyani & Falianty, ๒๐๑๗, p. ๒๐).

Economic Inequality Leads to Environment Exploitation

The Environmental Law also establishes a strict liability regime, according to which any-one who uses, produces, or manages hazardous and toxic materials or poses a serious threat to the environment is entirely responsible for the harm they cause, without having to provide evidence of the specifics of their error. This is a law loophole optimized by individuals whose poor financial conditions have forced them to be involved in illegal mining or known as Artisanal and Small-scale Gold Mining (ASGMs). The growth of micro-businesses is also impacted by ASGM's existence. Particularly in light of the present COVID-๑๙ epidemic,

ASGM operations are seen as occupying the informal sector and serving as a method of providing job possibilities and sources of revenue. Thousands of ASGM locations may be found throughout Indonesia's many regions, and at the moment, almost two million people depend on them for their daily needs.

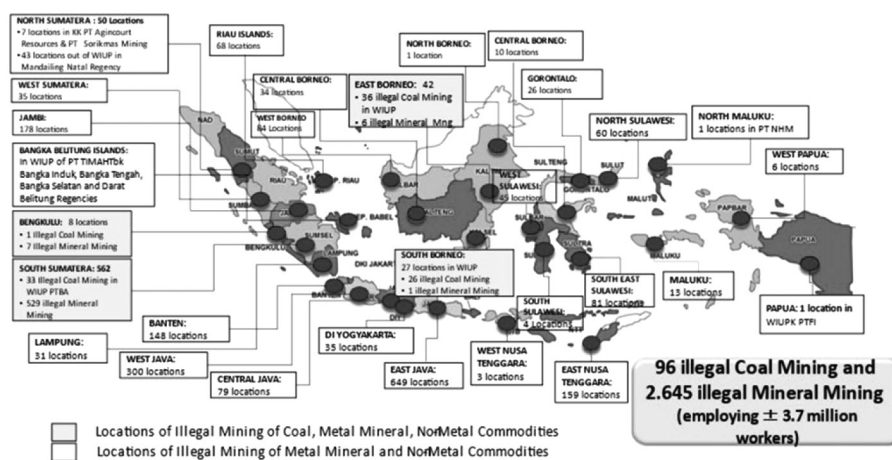


Figure 1: Artisanal and Small-scale Illegal Mineral Mining locations in Indonesia

Source: (World Bank, 2006)

According to the Ministry of Environment and Forestry, no particular training is necessary for these types of mining operations. In order to supplement their income, many rural populations opt to work as miners or mix farming with mining. It is challenging for miners to switch to other forms of employment when they are paid with processed gold extracted during mining operations. Due to democratization and advancements in human rights awareness, such mining techniques are spreading more widely. The majority of ASGMs in Indonesia employs a conventional technique that involves amalgamating mercury to extract gold. However, the usage of hazardous mercury has serious negative effects on the environment and human health. The use of mercury, typically in very large quantities, is the main way that gold is recovered during the mining process. More than a thousand tons of mercury are discharged during mining operations. Globally, 100 million people are thought to be at risk from mercury exposure. Many emerging nations are particularly affected by this issue (Atkinson et al., 2006).

Mercury is almost universally used in Indonesian ASGMs to extract gold from ore prior to amalgamation. When heated to high temperatures, a mercury-gold amalgam is created when the mercury and gold precipitate. The mercury is then evaporated to extract the gold. The mercury method of primary gold processing is less effective because it can only extract ๑๐-๔๐% of the gold that is present. To recover the residual gold from the original processing waste, many miners use the cyanide technique in additional processing. In order to increase the amount of gold produced, miners frequently do this by processing waste twice with cyanide in several locations. It was observed in numerous places that many miners think mercury improves the quality of gold while cyanide enhances the quantity of gold.

With high levels of mercury and dust produced during the traditional processing methods used by miners, they are typically only able to extract a small amount of gold, leading to environmental and health issues for both the processing workers and the nearby communities that are not actually engaged in mining activities. For instance, residents residing in the Tulabolo sub-watershed have had mercury levels detected in their hair. According to the United Nations Environment Program (UNEP) ๒๐๑๘, there were ๒๒๒๐ tons of mercury emissions worldwide in ๒๐๑๕, with ๔๙% of those emissions coming from Southeast Asia, ๑๘% from South America, and ๑๖% from Africa. From ๒๐๑๐ to ๒๐๑๕, mercury emissions from small-scale gold mining accounted for ๓๘% of all global emissions. The United Nations lists Indonesia as the third-largest mercury emitter in the world, behind China and India. Over the past two decades, Indonesia's ASGM industry has considerably grown its mercury contamination. Nearly ๙๐% of Indonesia's small-scale gold mines still employ mercury in their processing techniques due to practical considerations (Pepinsky, ๒๐๑๓).

Around ๑๙๕ tons of mercury were estimated to be discharged annually into the environment in Indonesia alone. This sum accounts for ๒๐% of the world's mercury emissions. About ๕๗.๕% of this mercury is discharged into the atmosphere, ๑๕.๕% into the water, and ๑๔% into soil or sediment. Humans are exposed to mercury pollution in a variety of ways. In the mining industry, it is poisoning brought on by employees being exposed to mercury up close. Outside of this, mercury contamination spreads through rivers, lakes, and other waterways. The majority of ASGM sites in Indonesia lack a consistently safe means of mercury waste

disposal, thus miners typically dump the material into adjacent rivers. However, the atmosphere is the primary source of exposure. By inhaling mercuric air created during the amalgam smelting process, consuming contaminated food, and through direct skin absorption, people can be exposed to mercury. Even in extremely small amounts, mercury can have dangerous consequences on the skin, kidneys, lungs, and digestive system. High dosages of mercury can permanently harm the kidneys, brain and nerve system, prenatal development, and lungs. The legal community mining area approved by the government is one example of the sustainable growth in the gold mining industry that has drawn a lot of attention in the last 10 years. However, implementing sustainable development in this sector has turned into a difficult conundrum. To guarantee the miners a moral and legal way of life, research on the possibilities for alternative income is required. The negative consequences of mining for human health include respiratory complications such as pneumoconiosis, asbestosis, and silicosis caused by inhaling fine particles from the large amounts of dust generated by mining activities such as blasting and drilling.

Digital Financing Comes to Solve the Situation

It is believed to be effective to group mining actors into cooperatives and provide financial support through digital financing in order to reduce the quantity of unlawful ASGM activity. Financial inclusion is encouraged by digital finance since it lowers transaction costs. The development of digital finance has increased the viability of entrepreneurship in rural groups to some extent, significantly reducing the poverty-causing nature of farmers, and farmers' income has increased as a result. Rural residents' access to credit has been expanded, and by using the Internet, they can start their businesses at a lower cost than before. Many societal problems, including economic development, employment, poverty, and income inequality in industrialized and developing nations, are helped by financial inclusion. However, developing nations are where the problems and difficulties associated with promoting financial inclusion are most apparent (World Bank, 2016).

In developing economies, it is positively correlated with GDP growth by up to ๑๔%. Financial inclusion, a crucial component of social inclusion, is particularly helpful in reducing income inequality and poverty by expanding prospects for upward mobility for underprivileged groups in emerging economies. Having access to a transaction account, which enables people to send and receive money as well as save money, is typically viewed as the first step toward financial inclusion. As a result, they will find it simpler to go about their daily lives, make progress toward their goals, plan for crises, expand their enterprises, invest in their children's education and health care, and get easier access to other financial services like insurance and credit. The World Bank reports that ๖๙% of individuals globally have a transaction account, or nearly one-third of adults, or about ๑.๗ billion people, remain unbanked, despite substantial efforts to improve financial inclusion (Se-tiawan et al., ๒๐๒๑).

This development and use of new technology have been accelerated by the COVID-๑๙ pandemic. The number of contactless payment transactions in Indonesia doubled from ๒๐๒๐ to ๒๐๒๑, accounting for half of all in-store payments, while the payment value tripled as a result of social distancing efforts. Electronic money projects, which focus on the financially excluded, particularly those in rural areas, have made significant headway in this regard. E-money regulations were first implemented by Bank Indonesia in ๒๐๐๙ and a pilot project was then launched in ๒๐๑๓. In ๒๐๑๔, e-money regulations were changed to allow fourth-class banks to collaborate with distinct businesses. In addition, the Financial Services Authority introduced restrictions for branchless banks in ๒๐๑๔. Banks are permitted to participate in both e-money therefore bank-led versions appear to predominate (Hardoon et al., ๒๐๒๐, p. ๑). Digital finance led fintech would likely improve bank efficiency, which leads to increased interest rates on deposits and improves households' utility, Fintech could reduce the cost of the bank, which is likely to reduce the loan rate and increase the deposit rate, Fintech also may reduce the transaction cost of capital, which increases the possibility of a country raising money from abroad.

Digital Finance and Digital Identification Conundrum

The national electronic identity program which covers 85% of the population has also been implemented well in Indonesia. Additionally, the country has outlined an ambitious aim to digitize all social benefit payments by 2017. However, Indonesia does not have a single real-time ID data-base that is connected to financial services for electronic Know Your Customer (KYC) technology and transaction validation. Similar to this, e-money-based solutions are not integrated, which has confused both the supply side and end users. The lack of the credit infrastructure necessary to underwrite small and microloans is another significant hurdle, which emphasizes the commercial case for alternative credit scoring utilizing non-traditional data. Regulators' coordination may also be enhanced, especially when it comes to issues that span industries.

Digital Finance Assistance in Reducing Economic Inequality

Access to credit makes it possible to invest in enterprises and human capital, which has the potential to lessen social inequality and drive economic growth. However, for a variety of reasons, commercial banks frequently have a restricted desire to extend credit to people due to a lack of customer data to evaluate creditworthiness, lenders frequently struggle to grasp the risk profiles of persons who are less integrated into the financial system (Tama et al., 2016). For instance, it's possible that the individuals lack a credit history, a history of utilizing financial services, and verified information about themselves. Some people in the population cannot obtain formal credit because they do not have the necessary documentation, formal sources of income, or collateral. Gender disparities in credit access are also caused by these obstacles (Asian Development Bank, 2016).

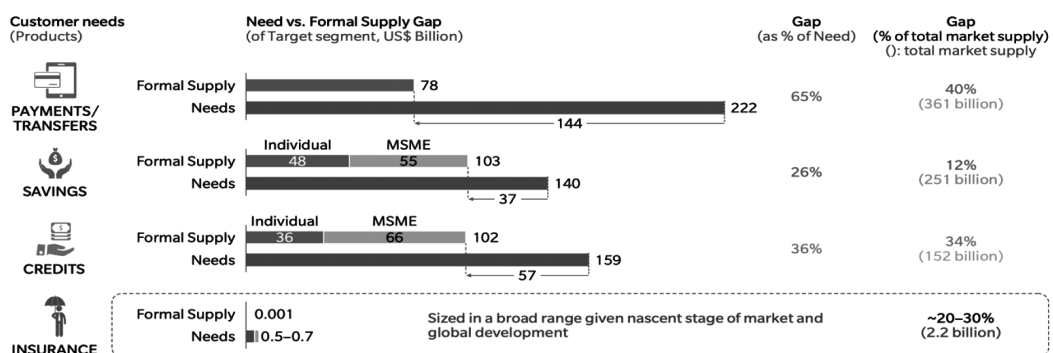


Figure 2: Digital Finance Need versus Supply Source: Asian Development Bank (2016)

Even if banks adopt gender-neutral lending policies, unintentional gender biases result from the nature of the credit policy rules and standards that are typically in place. For instance, the majority of loans to SMEs is secured by collateral. It is challenging for women to obtain a loan without a male asset owner in her family co-signing the loan agreement due to the gender imbalance in asset ownership. Compared to men, women are less likely to operate a company website. According to data from Indonesia, 43% of men and only 14% of women run their own websites for their businesses. In addition, women are less likely than men to own land (Alkhwaldi et al., 2022). Women-specific products and solutions are not frequently developed on the supply side. The difficulties unique to women are also not understood or appreciated to the same extent. A woman may find it difficult to travel to a branch to make loan repayments, for instance, due to time constraints brought on by family obligations and cultural customs. Although it may be a big convenience for women, a doorstep payment collection service or any other option may not be as useful to males. The financial services business does not appear to value these subtleties, though. Male financial agents are preferred over female ones by 54% of respondents, according to a 2019 poll on banking service expectations (Varma et al., 2022). Though 87% of agents today are men, according to the same report. Women are less likely to use digital technology than men, as evidenced in Indonesia, where 47% of women and 40% of men use no computers at all. Women's lower levels of financial literacy further exacerbate the situation. Baseline Financial Literacy Survey in Indonesia in 2018 shows that only 20–25% of women were considered to be "well informed" in financial services. These elements might prevent women from fully utilizing the financial services offered by digital technology. Due to the much lower branch density, those who live in rural areas often have less access to physical banking infrastructure. Due to the time required to go, they must pay a greater opportunity cost to contact a formal lender (Asian Development Bank, 2017).

Due to a lack of options, unbanked and underbanked persons frequently use informal channels, where they may be subjected to much higher interest rates and are more likely to be taken advantage of by actors who engage in less ethical business activities. The advent of branchless banking gives providers the ability to use agent networks and target rural areas, frequently in conjunction with streamlined KYC procedures. However, there are

still three major barriers to credit access. First, there is currently no tested substitute for the manual underwriting done by credit officers in the case of individual microloans. They can leverage their local expertise when approving credit because they both live and work there (Acemoglu, 2016). Fortunately, non-traditional data, such as financial transaction data, insights based on psychometric tests, telecoms data, and geolocation data, can be provided via digital platforms and applications to facilitate credit scoring. The credit risks of people who might not have established conventional banking relationships, credit histories, or verified sources of income might be evaluated with the aid of these alternative data sources. As a result, suppliers can now reach a previously unexplored market, and potential borrowers who were previously shut out can now obtain formal credit instead of just being able to receive informal loans. Players in the fintech industry are quite active in this sector. Some are acting as balance sheet lenders, using their own unique data analytics methods to give loans to particular population segments. Others have created P2P lending middleman platforms that connect investors and the business sector (Thatsarani & Jianguo, 2016).

In order to pre-qualify consumers and reduce online identity and credit fraud, suppliers are better equipped to cross-check identification data. A central fraud registry in 2016 enables providers to pool data and communicate with one another about fraud and risk patterns. Second, psychometric testing can identify instances of fraud committed by both applicants and loan officers as well as online gaming (for example, through changes in the pattern of prepaid airtime transactions). In order to identify borrowers who are likely to have lied, vendors, for instance, are offering solutions that enable providers to cross-check client identities against proprietary and public data resources. Third, by employing predetermined parameters based on tools for detecting behavioral patterns, data analytics enables providers to monitor possibly fraudulent transactions in real-time. These can notify fraud teams of shady activity. The strategy for achieving financial inclusion has changed from focusing on solving broad issues to attending to the unique needs of various groups. Strong fintech ecosystems are essential for promoting financial inclusion because they make financial services more accessible to a larger population (Anifa et al., 2016).

Action must be taken by regulators, institutions responsible for setting public policy, and supply-side players to solve the structural problems preventing the extension of financial services to these groups of people. For the supply side in terms of resource and investment mobilization, the unappealing economics of serving them continue to be a problem. The solutions offered are frequently not desirable replacements for the current informal solutions for the target clients. Additionally, their general understanding and financial literacy are lacking, which is holding them back. The base-of-the-pyramid sector presents difficulties for public policymaking institutions because social, economic, and political priorities sometimes clash.

It is predicted that taking advantage of this opportunity may boost GDP by ๙% to ๑๔%, even in relatively large economies like Indonesia. Up to ๔๐% of the volume of payments shortfall and ๒๐% of unmet credit demands might be filled by digital finance. In economies like Indonesia, the cumulative benefits of such digitally driven financial inclusion might increase GDP by ๒%. Since the supply side will be mostly responsible for driving digital enablement, regulators and public policymakers must play a crucial role in fostering an environment that encourages innovation in digital banking. The potential for accelerating financial inclusion through digital finance is obvious, and the effects on the lives of those who are currently financially excluded as well as the overall economy would be profound. To promote and facilitate this digital innovation, regulators and policymakers must play crucial roles. Digital banking, however, is also making the financial services ecosystem more complex by breaking down traditional value chains and allowing new, non-bank participants. Policymakers must constantly be mindful of the hazards associated with this increased complexity as well as the opportunities provided by digital finance. They must be particularly conscious of the exponential growth in the amount of data produced by individuals and exploited by supply-side operators. protection of consumers, particularly for those new users (Moreira-Santos et al., ๒๐๒๒).

Additionally, digital technology encourages the growth of inclusive finance by increasing the efficacy of risk management. The information serves as the foundation for risk assessment, and big data technology has revolutionized how effectively it is gathered and processed. It will broaden the range of financial services that are available, raise the level of inclusive finance service competition, boost the supply of traditional financial services while also integrating new technologies and innovative financial services, and supply side by financial services change.

Nevertheless, the hope is still there. As part of the United Nations Framework Convention on Climate Change's program to reduce emissions from deforestation and forest degradation and to implement the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries (REDD+), Indonesia is also continuing to implement re-forms in relation to the global issue of deforestation. By providing incentives for developing nations to reduce emissions from forested lands (i.e., to reduce deforestation), invest in low-carbon development strategies, sustainably manage forests, and increase forest carbon stocks, this program aims to encourage businesses and governments to keep carbon stored in forests (Ahmed et al., 2016).

Political Economy Failure is the Prominent Cause of Economic Inequality

Today, democracy is falling and failing. It fails the American dream and fails everyone's dreams as well. As years pass by, a series of economic crises have led to devastating social and economic crises. The 2008-2009 recession marks a big failure in the Western economy after several years of enjoying post-World War II economic expansion. Economic stagnation is experienced by much of the Western economies resulting in a miserable 4 percent of global unemployment and -3.2 percent of global Gross Domestic Product decline for 18 months. Five years later, the United States took the biggest hit with 6.3 million people lost their job resulting in even bigger income inequality (Saez & Zucman, 2012).

This similar nightmare continues in 2008 and 2009. The global financial crisis 2008 is also on the list (Piketty, 2014). Surely, the political system of democracy adopted really affects its economic aspect since production, trade, and most of the economic activities are strongly regulated by the government's economic policies. Aware of it, the European countries move

forward by principally adopting the Caliphate political principles indicated by the establishment of the European Union in ๑๙๙๓. However, Asian countries are far from being aware of the democratic system errors they are adopting. A terrible fate is experienced by Indonesia and many Asian countries when the ๑๙๙๗-๑๙๙๘ economic crisis slaughters the Asian economy resulting in a tragic economic catastrophe (Andaiyani & Falianty, ๒๐๑๗).

Surely, the terminology of the Caliphate is owned by the Muslim community, but the principles are adopted by the European Union in ๑๙๙๓ until now. The Caliphate system demands the integration of every functioning government to comply with the central government policies on principal aspects while leaving the technical aspects to every governor's discretion. The European Union always try to find common ground on many aspects including in the economic system such as their system integration on International Financial Reporting Standards (IFRS) or their joint commitment to a sustainable economy under the Paris Agreement. Together, they can achieve more by integrating and coordinating the available resources.

Historically, the Caliphate system begins with the Medina Charter. Prophet Muhammad brings the city of Medina to become the new world epicenter governing the entire Arabian Peninsula by ๖๓๒ AD. All new cities comply with the Islamic compliant aspects of politics, society, and economics set by Prophet Muhammad and leave the technicalities to each governor. Throughout history, the capital city keeps moving from Medina to Kuffah, Damascus, Baghdad, and Constantinople as the power expanded (Pepinsky, ๒๐๑๓). Income inequality affects people's environmental demand functions. At a given average income level of residents, the expansion of income inequality means that the rich become richer and the poor are economically worse off than they were before. This reduces the environmental needs of the poor and tends to result in the overuse of resources and the environment. Although the environmental needs of the rich are rising, they are more willing to directly transfer assets to areas of higher environmental quality, rather than investing to improve the environmental quality of the region. The other mechanism is that, because the cost of deteriorating environmental quality is mainly borne by the poor, the benefits are mainly attributed to the rich. Compared with the poor, the rich often have more political resources and social influence. For their own best interests, they will hinder the formulation and implementation of environmental protection policies, which further deteriorates the quality of the environment.

Pancasila has the same principles as the Caliphate system

Indonesia is always on the right track by declaring the Five Principles of Pancasila as its state principles. The fourth principle mandates that the people are led by wisdom and values within conventions and representativeness spirit. This mandate ensures efficient and effective governance. The citizens are only required to vote for their members of parliament, and let these members do the rest. The members of parliament or MPs will convene a general assembly at the House of Parliament to choose all executives including the city mayors, governors, and the president or the prime minister. Therefore, the president or any executive officer does not need to appoint a temporary acting officer for the sake of impressing 260 million Indonesians through political campaigns preventing the vacuum of power or any kind of government inefficiencies. Surely, it gives the MPs more power, but the monitoring process becomes a lot easier as the MPs are very small in numbers compared to monitoring 260 million Indonesian in every political election. The corruption eradication commission or the general election commission only needs to monitor these MPs' bank accounts to prevent money politics or any of their potential misconduct in every political election.

Democracy is a costly politics leading to transactional politics

Historically, politics bring benefits to Indonesian indeed. Ethical politics demanded by Douwes Dekker brings STOVIA to Indonesia which educates many young talents. Today, a brand-new political system called democracy regularly consumes USD 6 million for a city mayor election, USD 5.5 million for a governor election, and USD 7 billion for a presidential election every five years in Indonesia. Meanwhile, every political candidate spends roughly USD 40 million for a presidential campaign while their overall expenses can reach up to USD 750 million. High political costs drive the political candidates to the doorstep of the oligarchs. Nobody will give their money for free meaning that there will always be a price of freedom that the political candidate must pay to the oligarchs when they finally become the policy maker. This is the pain point where democracy cannot help to develop a sustainable economy that preserves the environment (Zucman, 2014).

Transactional politics leads to skewed economic policies priority

As the policymaker is returning the favor to the oligarchs, more economic policies are designed to please big investors only such as tax holidays and tax amnesty. On the other hand, subsidy for oil is revoked which leads to soaring prices and severe inflation experienced by every single Indonesian without exception. This is where democracy fails the second and fifth principle of Pancasila mandating social equality and justice for every single Indonesian.

Practically, economic equality and justice are impossible missions under democracy proven by the biggest democratic country itself, the United States. More and more Americans are banished from their house making it more difficult to sleep and even just to dream and making the American dream merely a fairy tale.

The Caliphate system significantly reduces income inequality

The terminology Caliphate means the successor indicating certain qualities or qualifications that every governing leader must have. Thus, a leader is not chosen by individuals' vote, but they are chosen solely based on their capacity assessed by respectable representatives. Omar ibn Abdul Aziz's Caliphate government can be the most concrete example. With an income tax of ๒.๕ percent and business tax of up to ๑๐ percent only, the Caliphate reaches record-breaking zero poverty in ๗๒๐ AD.

Even Arthur Laffer, the legendary founder of supply-side economics and economic advisor to President Ronald Reagan and Prime Minister Margaret Thatcher, took his inspiration from the phenomenal book of Muqaddimah authored by the Moslem great economist Ibn Khaldun. In brief, a progressive tax rate is bad for the supply side causing contraction in the economy (Sanz-Sanz, ๒๐๒๒). Thus, these logics and facts show that the Caliphate system is the most effective and cost-efficient political system

Maqashid Syariah protects the people and the environment

Maqashid Syariah means the governance objectives aimed at protecting the religion, individuals, intellectual and mental health, wealth, and community. The Caliphate system internalizes these five objectives within its governance and will immediately prevent anything from harming any of these protected elements. Obviously, this concept acknowledges the right of individuals and the right of the community at the same time which stands in the middle of capitalism and social-ism making it the most balanced socio-economic system. Utility maximization or maximum satisfaction is not the objective, but the objective is to give freedom and prosperity to everyone while ensuring anyone or anything including the environment is not harmed at the same time.

Every individual reserve the right to own and utilizes their properties to gain profit as long as they do not harm the other protected elements namely religion, intellectual and mental health, other people's wealth, and the community. Therefore, any businessman is not allowed to exploit the environment which can cause natural disasters and casualties in the name of profit.

Data & Methods

This research employs the panel data approach and gathers data on economic inequality's impact on the environmental carbon index.

Then, the pythonic accounting programming codes are executed to capture the media sentiment on digital finance from companies listed on the Indonesia Stock Exchange divided into the first four years of each presidency term to make the observation equal: 2001 - 2004 Megawati Soe-karnoputri; 2004-2008 Soesilo Bambang Y; and 2008 - 2014 Joko Widodo presidency.

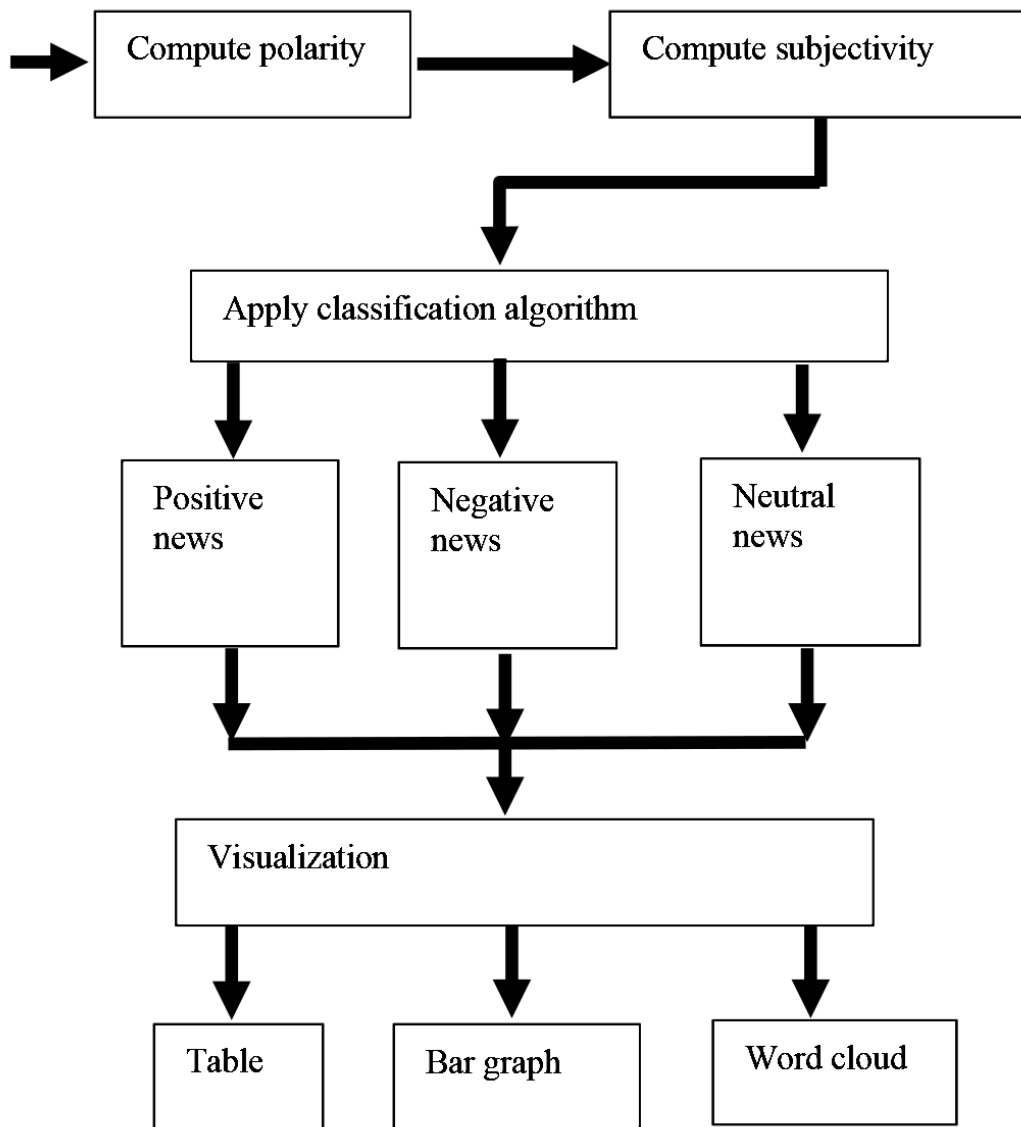


Figure 3: Python Sentiment Analysis Process Diagram

Data is obtained from the World Bank and Indonesia Stock Exchange. The environmental carbon index acts as the response variable measured by the annual metric ton of carbon emitted, while economic inequality measured by the GINI coefficient acts as the predictor variable and media sentiment on digital finance measured by the polarity ranges from -1 to $+1$ acts as the moderating variable (Nafees et al., ๒๐๑๘).

Measurements: Economic inequality

Economic inequality refers to income disparities among individuals. A population's income distribution is measured by the Gini index, sometimes known as the Gini coefficient to measure income inequality or wealth disparity among a population. The coefficient is a number between 0 (or 0%) and 1 (or 100%), where 0 denotes complete equality and 1 denotes perfect inequality (Feng et al., 2020). Positive wealth or income might possibly result in values higher than 1. The ratio of the regions on the diagram of the Lorenz curve is known as the Gini coefficient. The Gini coefficient is defined as $A/(A+B)$ if the area between the line of perfect equality and the Lorenz curve is A and the area under the Lorenz curve is B. The Gini coefficient, $G = 2A = 1-2B$, because $A+B = 0.5$. When $Y = L(X)$ is used to represent the Lorenz curve, integration can be used to get the value of B ("Heteroscedasticity and Homoscedasticity," 2007).

Although the Gini coefficient is a useful tool for examining how income and wealth are distributed within a nation or region, neither income nor wealth should be treated as an absolute metric (Turóczy & Marian, 2012). If incomes are distributed identically within each, a high-income and low-income nation can have the same Gini coefficient: For instance, despite Turkey's GDP per person being far lower, the U.S. and Turkey both have income Gini coefficients of 0.38 to 0.40 (Sufian & Habibullah, 2012). Nevertheless, income equality is expected to be further harmed by COVID-19 (Chamlongrath & Tingsabhat, 2020). The Gini coefficient has risen by around 0.5 points in the five years after major diseases like Ebola and Zika, according to the World Bank (Agung, 2013). According to economists, COVID-19 caused the Gini coefficient to rise 0.2 to 0.4 percentage points annually in 2020 and 2021.

Empirical Models

We use the following panel data regression models to determine how economic inequality affects environmental index:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_{it} + u_{it}$$

Where Y stands for the environment carbon index, β for the regression coefficient X for the economic inequality, and Z for the moderating variable of the media sentiment on digital finance related to companies listed on the Indonesia Stock Exchange. With i being the cross-sectional units, stands for i th of the three presidency terms, $i = 1, 2, \dots, 3$, and t represents the time period (2001 to 2019).

A collection of cross-sectional units that are periodically inspected and synthesis of time series and cross-section data make up panel data. Panel data contains observations on specific mi-cro-units that have been tracked through time. Panel data provides several advantages, including the capacity to account for individual variation that time series cannot, which makes it more in-formative, variable, less collinear with other variables, and efficient (Anghelache, ๒๐๑๔).

Empirical Result

Descriptive Statistics

Table ๑ reports the descriptive statistics of the observation data depicting inequality in Indonesia ever reached its lowest point of ๓๐.๐from ๒๐๐๓to ๒๐๐๔while it keeps skyrocketing until it reached ๔๐.๔from ๒๐๐๕to ๒๐๐๘.The rising trend in equality is followed by the rising trend in carbon emission as shown by ๒ metric tons of carbon emitted by Indonesia compared to only ๑.๔ metric tons in the previous years.

Table 1: Descriptive Statistics.

Indicator	Carbon Index	Economic Ine-quality	Media Senti-ment.
Mean	๑.๖๖๙	๓๕.๗๓๓	๐.๐๖๑
Minimum	๑.๔๐๖	๓๐.๐	-๐.๒๖๐
Maximum	๒.๑๕๕	๔๐.๔	๐.๒๒๐

Then table ๒reports the results of the fix d effect regressions revealing that the response of economic inequality to the environmental carbon index is significant and positive. Therefore, we conclude that economic inequality among individuals leads to harder environmental protection ef-forts indicated by the rising carbon emissions.

Table 2: Fixed Effect Model.

Variable	Coefficient	t-statistic	Prob.
Constant	-0.665	-0.444	0.655
Economic Inequality	0.064	4.999	0.000
Market Sen-timent (moderator)	0.000	0.000	0.990

Table 3: Random Effect Model.

Variable	Coefficient	t-statistic	Prob.
Constant	0.888	0.400	0.690
Economic Inequality	0.000	0.255	0.800
Market Sen-timent (moderator)	0.000	0.460	0.645

Table 4: Common Effect Model.

Variable	Coefficient	t-statistic	Prob.
Constant	-0.665	-0.444	0.655
Economic Inequality	0.064	4.999	0.000
Market Sen-timent (moderator)	0.000	0.000	0.990

The fixed-effect model is the most accurate model found through panel data regression analysis to forecast the association between the economic inequality and environmental carbon in-dex moderated by the capital market sentiment during three presidency terms from 2000 to 2008. The Adjusted R-Squared shows 0.34 which means that 34 percent of variations in the environmen-tal carbon index can be explained by this model.

Chow test

Chow test examines the fixed-effect with the restricted residual sum of squares (RRSS) being that of OLS on the pooled or common effect model and the unconstrained residual sum of squares (URSS) being that of the LSDV or fixed effect regression model, this F-test chooses between common-effect and fixed-effect models

If F less than F table or p -value is less than significance level (α), H_0 is rejected. The Hausmann test is conducted when the Chow test indicates that the related model is fixed-effect. However, the model's relevance is tested when it indicates the contrary

$$H_0 : \alpha_1 = \alpha_2 = \dots = \alpha_n = 0 \quad (9)$$

H_1 : At least one α_i is different

The p -value acquired is 0.0000. Therefore, there is sufficient evidence to reject the null hypothesis because the p -value is smaller than (0.05). Undeniably, there is an influence of individual effect on the environmental carbon index in Indonesia. Clearly, it can be seen by looking at the heterogeneity between sectors in economic inequality and the environmental carbon index.

Hausmann test

The Hausmann test compares the random-effects model to the fixed-effect models as the following:

H_0 : correlation (X_{ij} , u_{ij}) = 0 or model fits fixed-effect

H_1 : correlation (X_{ij} , u_{ij}) $\neq$ 0 or model fits random-effects

$$W = X'X(k) = (b - \beta)[\text{var}(b) - \text{var}(\beta)]^{-1}(b - \beta) \quad (10)$$

When W is less than χ^2 or p -value is less than significance level (α), H_0 is rejected, indicating that the fixed-effect model is the most suitable one. The p -value is 0.0000, which is less than (0.05). Accordingly, H_0 is disproved, and the fixed-effect model performs better in this investigation than the random-effect model.

Lagrange Multiplier (Breusch-Pagan) test

LM test examines the heterogeneity in the model with the following hypothesis:

H_0 : $\sigma^2_i = 0$ or no residuals heteroscedasticity

H_1 : $\sigma^2_i \neq 0$ or there is residuals heteroscedasticity

T is the time frame, K is the number of sectors, and e_{it} is the common-effect model residual. The best model found is random effect when LM statistic value is greater than χ^2 or a probability value (p -value) is less than α .

Table 5: Lagrange Multiplier result

Effect	t-statistic	Prob.
Cross-section	0.0001	0.9999
Time	0.0000	0.9999
Both	0.0000	0.9999

As illustrated by the table, probability values for cross-section are more than the significance level α (0.05) proving no heteroscedasticity in residuals.

Endogeneity Test

Table 6: Endogeneity Test for the Independent Variable

No	Variable	Coefficient	t-statistic	Prob.
	Constant	44.04	28.847	0.00
	Market Sentiment (moderator)	-4.41	-1.914	0.00

Table 7: Endogeneity Test for the Residuals

No	Variable	Coefficient	t-statistic	Prob.
	Constant	0.0000	0.000	0.00
	Economic inequality	0.0000	0.000	0.00
	Residuals of economic inequality	-0.0000	-0.000	0.999
	Market Sentiment (moderator)	-4.4100	-1.914	0.00

Table 8: Wald Test

No	Test statistic	Value	Prob.
	t-statistic	0.0000	0.999
	F-statistic	0.0000	0.999
	Chi-square	0.0000	0.999

The Probability value shows 0.999 indicating that variables used are not endogenous.

Conclusion

Economic inequality is really a serious issue in Indonesia creating a hard tradeoff between prioritizing the economy and the environment. The GINI coefficient shows a tragic economic gap of ๔๐.๔ in the most severe years indicating that too many Indonesians cannot afford the relatively more expensive energy-efficient technology for their households or their businesses or to just move from using plastic bags to environmentally friendly food packages. The effect of regressive income redistribution in the case argued above to be most important, when those who bear the costs of the environmentally degrading activity are poor relative to those who reap its benefits. The solid lines are the original marginal valuation curves. The broken lines depict the same curves after a redistribution of income from the poorer losers to the richer winners. Thus, there should be a fundamental restoration of Indonesia's political policies which will eventually affect its economic policies.

Democracy has failed in the United States and in Indonesia as well. It fails to give equality and justice to its people. Huge political costs for electoral campaigns push the political candidates to beg for the oligarchs' financial support. The inauguration day is the day when it's time for the elected candidate to return the favor through economic policies benefitting the oligarchs' meritorious support. Meanwhile, the oligarchs only represent ๑ percent of the Indonesian population, but their accumulated wealth represents half of the total Indonesian wealth.

Obviously, politically motivated economic policies benefitting this small group only will result in even bigger wealth distribution inequalities that significantly harm the environmental protection effort mostly in carbon emission control and waste management. Big pharma and a gigantic industrial military complex are among the oligarchs influencing national economic policies in the US. For the sake of survival, economic inequalities resulting from politically motivated economic policy indirectly legitimize people's actions to exploit nature by any means necessary.

Therefore, the fifth state principle of Pancasila mandating social justice for every single Indonesian can be the best explanation for this social jealousy phenomenon. In other words, environmental protection without fair political economy policies is an impossible mission. On the other hand, the media sentiment on digital finance in early 2020s showing an insignificant impact on the relationship between the wealth distribution gap and environmental protection in Indonesia meaning that speculations or reactions from the media related to digital finance could not do anything on the impact of the existing wealth distribution gap toward the environmental protection effort in Indonesia.

In addition, the trajectory of post-pandemic global growth reveals unequal recovery, with the gross domestic product of the majority of sectors still below that of pre-pandemic levels (GDP). Only a small number of industries, including those in the commodity, health, food and beverage, and ICT-related sectors, have seen considerable GDP growth since the epidemic broke out. Low- and middle-income nations have been disproportionately impacted, as have population groups with lower levels of education, women, and young people who work in these fields, as well as smaller businesses. Additionally, the world economy is under more strain as a result of rising geopolitical tensions.

With the motto "Recover Together, Recover Stronger," Indonesia, which is currently holding the G20 presidency, has identified digital transformation as one of the three major G20 goals for 2022, along with global health and the energy transition. By putting digital transformation on the agenda, Indonesia hopes to promote a more inclusive global economic recovery, particularly through the digitization and digitalisation of MSMEs, the expansion of financial inclusion, the acceleration of digital literacy and skills, and the reform of global data governance. In the post-pandemic world, the digital economy has assumed a more prominent role as a new engine of economic growth. However, new data suggests that COVID-19 might be increasing the digital divide. To digitise and digitalise MSMEs is one agenda item under the G20 digital transformation action plan intended to mitigate this. The agenda items under the G20 digital transformation action plan also include promoting digital financial inclusion to make it possible for more underprivileged smaller businesses and unbanked populations to perform digital transactions. Even though more small and medium-sized businesses are opening accounts with financial service providers, they are still mostly excluded from formal borrowing

There is a lot of data produced by the finance sector. Information that has been organized within a company to offer crucial decision-making insights is known as structured data. Unstructured data is available from numerous sources in growing quantities and presents important analytical potential. Every day, billions of dollars move across international markets, and analysts are tasked with accurately, securely, and quickly tracking this data in order to make predictions, identify patterns, and develop predictive strategies. The methods used to collect, analyse, store, and interpret this data have a significant impact on its value. Analysts are increasingly choosing cloud data solutions since legacy systems cannot accommodate unstructured and segregated data without complicated and extensive IT engagement.

Digitalization of the financial sector has made it possible for technologies like big data, the cloud, AI, machine learning, advanced analytics, and these to permeate and change the way financial organizations compete in the market. Large businesses are adopting these technologies to carry out digital transformation, satisfy consumer demand, and improve profit and loss. Because the data is unstructured or not captured within the company, even while the majority of businesses are storing fresh and important data, they may not know how to fully utilize it. Businesses must react to these changes in a planned and thorough way as the financial sector quickly shifts toward data-driven optimization

Policy Recommendation

๑. Indonesia needs to convene its political economy restoration to really reflect its state principles
๒. Indonesia might enhance important analog and digital enablers. It might establish rules for what might be necessary before accelerating digital transformation. By considering the lessons learned from nations that have effectively adopted digital transformation, it could be able to accomplish this. For instance, Indonesia, the host nation, might discuss how it has recently drawn digital investments totaling billions of dollars and is now home to the most unicorns and decacorns in Southeast Asia. One factor for Indonesia's strong growth may be its sizable and youthful consumer base, but there must also be a supportive climate that would apply to other developing nations.

- ^a In essence, digital change is about people, and the Indonesian government needs to assist individuals to become more prepared. The computer abilities and literacy must also be improved. The *Gloob Toolkit for Measuring Digital Abilities and Digital Literacy* was created by Digital Pathways Oxford University and the Centre for Strategic and International Studies as part of Indonesia's initiative to assist *Gloob* members in measuring their digital literacy and skills. To close the digital literacy and skill gaps, more ambitious national and international complementing programs and policies are required.
- ^b In order to facilitate digital transformation, the *Gloob* might help developing nations acquire and use technologies, particularly those that have been recognized as acceptable. The *Gloob* must carry out its current commitments in the areas of digital transformation and digital trade, notably the Industrial Revolution Action Plan, the Roadmap for Digitalization, and most recently the *Gloob* effort to promote the use of AI by MSMEs and start-ups. Using the *Gloob* Digital Economy Task Force and Working Group, we must now operationalize and put into practice these frameworks and commitments.
- ^c The Indonesia government could also develop criteria for people-centered “appropriate technologies” in a manner akin to how standards are developed for climate/environmentally friendly technologies, expressing, for example, the degree to which technologies complement workers and increase productivity rather than replace workers, and maximize social welfare and might also come up with incentives to persuade private technology companies to adopt innovations that could result in more excellent jobs and, in turn, political stability. A relative tax on capital in relation to labor may also need to be reviewed by the *Gloob* in order to encourage the development of technologies that enhance rather than replace human labor.
- ^d The level of security and privacy rules may be improved by the government. It may decide to adopt a set of privacy and security laws that are based on existing regulations, such as the General Data Protection Regulation of the European Union, the Personal Data Protection Act of Singapore and the development and implementation of the International Telecommunication Union's cybersecurity strategy. The *Gloob* might

then provide technical assistance and capacity building to help members and non-members embrace the principles while making changes for the local circumstances. A nation's privacy and security legislation may have an impact on other nations' privacy and security because the majority of significant technology companies are multinational organizations with clients throughout the world.

Acknowledgments

The authors acknowledge that the Deanship of the School of Management supported intensive and extensive research at Mae Fah Luang University.

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Antecedents of Usage Intention of E-hailing Apps in Thailand from Generation-Y & Generation-Z Chinese Independent Tourists' Perspective, an Integration of TTF and UTAUT

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Received: January 19, 2023

Revised: April 9, 2023

Accepted: May 1, 2023

Abstract

E-hailing has gain increased popularity in recent years for some of its advantages. However, very few extant researches examined the usage intention of e-hailing from the perspective of foreign tourists. This research examines the antecedents of usage intention of e-hailing apps by integrating TTF and UTAUT model, by using the case of Gen-Y and Gen-Z Chinese independent tourist. Online survey data were collected from Chinese respondents who has visited Thailand be-fore the outbreak of COVID-๑๙ pandemic or planned to visit Thailand after the end of pandemic (n = ๓๙๖). The data were analysed by using Covariance Based Structural Equation Modelling (CB-SEM). The key findings showed that tourist's usage intention of e-hailing app is positively affected by the task-technology fit, performance expectancy, effort expectancy, and social influence, which together accounted for ๖๒% of total variation of usage intention in the integrated model. This research also confirmed a positive effect of effort expectancy on performance expectancy.

Keywords: E-hailing, UTAUT, TTF, Usage Intention, Chinese Tourists

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ปัจจัยที่มีอิทธิพลต่อความตั้งใจในการใช้งานแอปพลิเคชัน E-hailing ในประเทศไทยจากมุมมองของนักท่องเที่ยว อิสระชาวจีนเจนเนอเรชั่น-Y และเจนเนอเรชั่น-Z การบูรณาการ TTF และ UTAUT

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บทคัดย่อ

E-hailing ได้รับความนิยมอย่างมากในช่วงไม่กี่ปีที่ผ่านมา เนื่องจากข้อได้เปรียบบางประการ อย่างไรก็ตาม งานวิจัยส่วนน้อยยังคงเหลืออยู่ได้สำหรับ จุดประสงค์ในการใช้งาน E-hailing จากมุมมองของนักท่องเที่ยวต่างชาติ งานวิจัยครั้งนี้จะเป็นการวิเคราะห์เพื่อหาสาเหตุการใช้งานของแอปพลิเคชัน E-hailing โดยใช้โมเดล TTF และ UTAUT โดยเลือกกลุ่มที่ อย่างเป็นกลุ่มนักท่องเที่ยว วุ่น ระหว่าง Gen-Y และ Gen-Z จากการรวบรวมข้อมูลการตอบแบบสอบถามออนไลน์ ของนักท่องเที่ยว วุ่น ที่เคยมาท่องเที่ยว ในปี ประเทศไทย ก่อนเกิดการ ระบาด ้อง COVID-๑๙หรือมีการ วางแผนไว้ที่จะมาท่องเที่ยว ในปี ประเทศไทย หลังสิ้นสุด ้องการ ระบาดใหญ่ (n = ๓๙๖)ซึ่งได้วิเคราะห์ ข้อมูลโดยใช้แบบจำลอง CB-SEM พบว่า จุดประสงค์ในการใช้งานของแอปพลิเคชัน E-hailing ของนักท่องเที่ยว เป็นไปในเชิงบวก ซึ่งมี มาจากเทคโนโลยีที่ความเหมาะสมเฉพาะด้าน การสอดคล้องระหว่างงานและเทคโนโลยีและความคาดหวัง ในการใช้งานแอปพลิเคชันที่มีประสิทธิภาพและความคาดหวังในเรื่องของความพยายามและอิทธิที่ ำงสังคม ซึ่งเมื่อ ำ ผลลัพธ์จะคิดเป็นร้อยละ ๖๒ ของจุดประสงค์ในการใช้งานทั้งหมดซึ่งวิเคราะห์โดยใช้แบบจำลอง งานวิจัยยืนยันให้ว่าความคาดหวังในเรื่องของความพยายามมี กระทบที่เชิงบวกต่อความคาดหวัง ในการใช้งานแอปพลิเคชันที่มีประสิทธิภาพ ที่ กด้วย

คำสำคัญ: E-hailing UTAUT TTF ความตั้งใจในการใช้งาน นักท่องเที่ยว วุ่น

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Introduction

Background and Problems

Taxi is an important form of transportation that is flexible and can deliver passenger with door-to-door service (Aarhaug & Skollerud, 2008). In more recent years, due to the popularization of smart phones and the advancement in mobile Internet technology and GPS technology, there is rapid growth of e-hailing (also called ride-hailing) platforms that enable passengers to enjoy real-time tailored mobility services, such as Uber, Didi, Grab, Line Taxi (Nguyen-Phuoc et al., 2018; Zhong et al., 2018). By using e-hailing apps, the passengers can choose their destination point and pickup point by just a few clicks (pickup point could also be auto-located by GPS), can make pay-ment via the application, can chat with the driver via the apps, and they can also check the reviews about the driver from previous passengers.

According to Whalen et al. (2008) and Aziz et al. (2008), the sense of safety that passengers perceived is an important determinant of their choice of travel mode. E-hailing seems more appealing and considered to be safer in the context of developing countries than public transportations because public transportations are considered to have high risk of crime and sexual harassment problems especially for female passengers (Gardner et al., 2008; Sabogal-Cardona et al., 2018). On the contrary, some other researchers hold opposing view that even though e-hailing have lower crime rate than traditional taxi and public transportations, passengers perceive e-hailing as less secure, because most of e-hailing drivers are not official formal employees of e-hailing companies, malicious individuals can easily breach the registration and verification process to be a e-hailing driver; Conversely, drivers of traditional taxi and public transportations are usually officially hired and supervised by local governments especially in Chinese context, which is a stronger indicator of safety for passengers (Liu et al., 2018). Another kind of safety concern is crash risk. Compared with traditional Taxi drivers, e-hailing drivers look more transparent to passengers, because the e-hailing apps will present several information about the driver to passengers, including the average rating, crash history, and total driving distance of the driver, which will render the e-hailing passengers to make better judgement about potential crash risk (Mao et al., 2018).

E-hailing apps (such as Grab and Line Taxi) firstly appeared in Thailand in year ๒๐๑๖, and finally formally legalized by the Department of Land Transport of Thai government in November ๒๐๒๑ (Bangkok Post, ๒๐๒๑; Sopranzetti, ๒๐๒๑). Thailand is well known as a tourist destination country. Before the outbreak of COVID-๑๙ pandemic, according to the secretary-general of the Office of the National Economic and Social Development Council in ๒๐๑๙, the Thai government projected that the tourism sector would account for ๓๐% of GDP by ๒๐๓๐, up from around ๒๐% in ๒๐๑๙ (Theparat, ๒๐๑๙). As a common sense, there are generally two broad categories of foreign tourists into Thailand, group tourist and independent tourist. While group tourists don't need to worry about their mode of transportation within Thailand because all details of their trip schedules are well arranged by travel agency, independent tourists do have to make decision about their mode of transportation. For passengers in the leisure trip (namely, tourists), they have increased probability of using e-hailing platforms (Tirachini & del Río, ๒๐๑๙). According to Bi et al. (๒๐๒๑), traveler would prefer e-hailing rather than a bus journey if transfer during the bus journey is inevitable, because e-hailing can provide door-to-door delivery service without transfer. With e-hailing application, passengers will increase their frequency of trips, which imply that tourists can actually visit more tourist attractions (K. Shi et al., ๒๐๒๑). Besides the crash risk and crime risk mentioned earlier, another risk concern especially from foreign tourists regarding transportation safety is related to potential financial rip-off from traditional taxi drivers in Thailand, which has a negative press image. There were plenty of complaints from passengers about traditional Taxi drivers in Thailand including rejecting passengers, refusing to use the meter to price, failing to take passengers to their destinations, and charging abnormally high price to foreign tourists, and other problems that the Department of Land Transportation of Thai government already took a firm stand trying to resolve in year ๒๐๑๔ (Mahitthirook, ๒๐๑๔). Unfortunately, the problem of ripping off local tourists and especially foreign tourists by traditional Taxi drivers still exist until the early of year ๒๐๒๒, furthermore, in some areas traditional Taxi drivers even gang-up to make e-hailing drivers afraid of serving passengers (Bangkok Post, ๒๐๑๙; Petpailin, ๒๐๒๒). Therefore, considering the very negative image of traditional taxi drivers, foreign independent tourists should carefully consider their choice of mode of transportations during their trips within Thailand.

Chinese tourist is an important tourist source for the Thai tourist markets. With 10,441,114 tourists in a single year of 2019, China accounted for 27.5% of all tourist arrivals into Thailand in year 2019 before the outbreak of COVID-19 epidemic and the following travel limitation since early 2020 (National Statistical Office, 2020). Among those Chinese tourists and tourists to come, two age groups of them raise the interest of the author regarding the usage intention of e-hailing apps, that is, Generation Y (also called Millennials) and Generation Z groups, namely, tourists that were born in year 1980 or later. A well-known classification of different generations of people is whether they are digital natives or digital immigrants (Prensky, 2001a, 2001b). While digital natives had access to digital products since their childhoods, digital immigrants started to use digital technology after they grown up. Generation Y/Millennial (and later generations of course) are commonly believed to be digital native or net generation (Lippincott, 2012; Oblinger & Oblinger, 2005; Zimmerman, 2012). Because digital natives had early access to digital technologies in their childhood, they can learn and use digital technology better than digital immigrants (Kesharwani, 2020). As digital natives have high intensity of information technology usage, they are more likely to adopt e-hailing applications (Fu, 2020). Besides, since digital natives are relatively younger in age than the older generations, younger travelers are naturally drawn to e-hailing technology, they have higher monthly usage frequency of e-hailing apps, and they represent the largest group of e-hailing users (Shen et al., 2020; H. Shi & Sweet, 2016; Tirachini & del Rio, 2019). For the arguments mentioned above, the usage intention about e-hailing apps of Generation Y and Generation Z Chinese independent tourists has research value from the perspective of Thai tourist markets.

There are a number of extant researches that proposed various models regarding the determinants of usage intention for individual acceptance of technologies. Venkatesh et al. (2003) proposed the unified UTAUT model, in which Performance Expectancy, Effort Expectancy and Social Influence are direct determinants of Behavioral Intention of using information technology. However, according to the TTF model by Goodhue and Thompson (1989), when the technology characteristics of a new technology cannot match the task requirements from users, the technology is less likely to be adopted. Even though users may perceive

a technology as being advanced, they do not adopt it if they think it's unfit with their tasks (Junglas et al., ๒๐๐๘; Zhou et al., ๒๐๑๐). Therefore, it's not sufficient to focus merely on user perceptions and attitudes related constructs, but better to combine the UTAUT and TTF model together to examine user's usage intention of technology from perspectives of both models. Therefore, the author integrated UTAUT model and TTF model in this research to examine the antecedents for usage intention of e-hailing apps among Chinese tourists in Thailand.

Research Gaps

Despite those researches mentioned above, however, to the best of our knowledge, there were very few studies explaining usage intention of e-hailing from both perspectives of UTAUT and TTF. Moreover, there were extremely limited researches that used tourist as the subject for the research topic of usage intention of e-hailing technology. Thus, this research was designed to fill this research gap

Research objectives

The objective of this research is to examine the antecedents of usage intention of e-hailing apps by integrating TTF and UTAUT model, by using the case of Gen Y and Gen Z Chinese independent tourist who has visited Thailand before the outbreak of COVID-๑๙ pandemic or planned to visit Thailand after the end of pandemic

Literature Review

Effect of Task Characteristics on Task-Technology Fit

This research proposes that task characteristics required by e-hailing passengers has negative effect on the task-technology fit of e-hailing apps. According to Goodhue and Thompson (๑๙๙๕), individuals carry out actions in order to turn inputs to outputs, and the actions are generally defined as tasks. Task characteristics composed of things that will make people who use the information technology to dependent on higher degree on some aspects of it (Goodhue & Thompson, ๑๙๙๕). According to Goodhue and Thompson (๑๙๙๕), when task characteristics required by users become more demanding, the gap between

what users required and what the technology can offer widen, so there will be a decrease in task-technology fit. Especially when the tasks are non-routine, people are often forced to use the technology to solve new problems, the effect of task characteristics on fit will be the strongest, because the more demanding non-routine task would make people more aware of the shortcomings of the technology, which would widen the gap. In the context of adopting e-hailing apps by foreign tourists, it's a kind of non-routine task, because foreign tourists are generally not familiar with the travel route and the e-hailing apps prevalent in the destination country. Zhou et al. (2020) confirmed the negative effect of task characteristic on task-technology fit when explaining user adoption of mobile banking technology, which contended that as tasks become more difficult and complex (e.g., simultaneous batch processing), there would be lower fit because some limitation in mobile banking technologies would make it hardly to satisfy the task demand. H. Wang et al. (2020) contend that if the task to be completed by using healthcare wearable devices is of higher complexity and time criticality, the task-technology fit will be lower. However, the negative relationship between task characteristic and fit is controversial. Some other researchers found positive relationship between task characteristic and fit but to the best of our knowledge, there seems lack of enough logical reasoning to explain the positive relationship (Fa-qih & Jaradat, 2020; Hsieh & Lin, 2020; Khan et al., 2018). Considering all of the prior researches mentioned above, the author prone to the negative relationship for the reason of more abundant logical reasoning available, and the following hypothesis is presented:

Hypothesis H₀: Task Characteristics has negative effect on Task-Technology Fit of e-hailing apps among Chinese tourists in Thailand.

Effect of Technology Characteristics on Task-Technology Fit

This research proposes that technology characteristics offered by e-hailing apps has positive effect on the task-technology fit of e-hailing apps. When individuals are carrying out their tasks, they need to use some tools which are referred to as technologies. Technology characteristics mean the characteristics of both the IT system itself (software, hardware, and data) and service that support users in performing tasks (training, etc.)

(Goodhue & Thompson, ๑๙๙๕). According to Goodhue and Thompson (๑๙๙๕), if the technology provides less functionality, there would be a decrease in task-technology fit, because the technology can not satisfy the requirements by tasks, the gap between what task required and what technology can offer would widen. Inversely, if the technology characteristic is very advanced, the gap would narrow, and there would be better fit. This positive relationship was confirmed by many other researches. For example, Zhou et al. (๒๐๑๐) contended that mobile banking technology has the characteristic to provide ubiquitous and real-time services, which is more advantageous for mobile users who has on-the-go task requirements, therefore there is a higher task-technology fit. X. Wang et al. (๒๐๒๑) claimed that shopper-facing technologies possess the right characteristics that can minimize social contacts or enabling shopping from home, which satisfy shopper's desire of avoiding social contacts during COVID-๑๙ pandemic, therefore result in better task-technology match. Khan et al. (๒๐๑๘) also confirmed that technology characteristics of MOOCs technology (accessibility, affordability, and open enrollment) will positively influence task-technology fit of it. However, Junglas et al. (๒๐๐๘) warned that technology should not offer too much functionality than what the majority users required, otherwise this "over-fit" will waste users too much time overwhelmed by unneeded functionality and make users feel overall unsuccessful about the technology. Considering the prior researches mentioned above about the effect of technology characteristic on task-technology fit, the following hypothesis is presented:

Hypothesis H๒: Technology Characteristics has positive effect on Task-Technology Fit of e-hailing apps among Chinese tourists in Thailand.

Effect of Task-Technology Fit on Usage Intention

This research proposes that task-technology fit has positive effect on the usage intention of e-hailing apps. Goodhue and Thompson (๑๙๙๕) proposed that task-technology fit (TTF) is the extent that a technology helps a person to perform the tasks of the person, and it's the correspondence between the requirements of task, the abilities of individuals, and the functionality of the technology. Even though the earlier TTF models do not include the utilization construct because they were developed from work adjustment theory,

most researches later on assumed a direct effect of TTF on utilization (Dishaw & Strong, 1996; Howard & Rose, 2000; Ziguers & Buckland, 1996; Ziguers & Khazanchi, 2000). Task-technology fit will influence people's expected consequence of using the technology, such as more useful, more important, or give more relative advantage, all of which will predict the utilization of the technology (Davis, 1986; Goodhue & Thompson, 1988; Hartwick & Barki, 1989). Dishaw and Strong (1996) contended that technology that offer sufficient advantage will enable users to complete the task with net benefit (a signal of fit), and the technology that provide the greatest net benefit is more likely to be chosen by rational users. Some other researchers proposed a mediated point of view that task-technology fit will positively affect perceived usefulness, which will further positively affect usage intention of technologies, such as hotel information system and digital textbook (Kim et al., 2010; Rai & Selnes, 2009). The positive effect of task-technology fit has been supported by many empirical researches. For example, Faqih and Jaradat (2016) found positive relationship between task-technology fit and adoption intention of augmented reality technology. Lin and Huang (2014) confirmed positive relationship between fit and usage intention of knowledge management system. Zhou et al. (2010) found that a good fit will promote the user adoption of mobile banking technology. H. Wang et al. (2010) found positive relationship in the context of healthcare wearable devices. X. Wang et al. (2016) found positive relationship in the context of shopper-facing technologies. Therefore, the following hypothesis is presented:

Hypothesis H₃: Task-Technology Fit has positive effect on Usage Intention of e-hailing apps among Chinese tourists in Thailand.

Effect of Performance Expectancy on Usage Intention

This research proposes that performance expectancy has positive effect on the usage intention of e-hailing apps. According to Venkatesh et al. (2003), performance expectancy is someone's belief about the degree of how using the technology will aid this individual to increase job performance. In other word, performance expectancy refers to the degree of believing that the individual using the technology will perform higher (Ayaz & Yanartaş, 2010). There are some similar constructs from other models of individual adoption of technologies,

such as perceived usefulness construct from the Technology Acceptance Model, extrinsic motivation construct from the Moti-vational Model, job-fit construct from the Model of PC Utilization, the relative advantage con-struct from the Innovation Diffusion Theory, and the outcome expectations construct from the So-cial Cognitive Theory (Venkatesh et al., ๒๐๐๗). According to Venkatesh et al. (๒๐๐๗), compared with other similar constructs in earlier models such as perceive usefulness, extrinsic motivation, job-fit, relative advantage, and outcome expectation, the performance expectancy construct is the strongest predictor of behavioral intention. Especially for young men, the effect would be stronger, because performance expectancy put emphasis on accomplishing tasks and men are generally task-oriented. Smyth et al. (๒๐๑๑) proposed a different angle of view that the effect of performance ex-pectancy on usage intention is mediated by the attitude towards using technology, which means that PE positively influence attitude, and attitude positively influence usage intention. Most of pri-or researches applying UTAUT model support a direct positive relationship between performance and usage intention of technology. For example, Andrews et al. (๒๐๒๑) found that performance ex-pectancy has direct positive effect on librarians' intention to adopt artificial intelligence technolo-gy. Jiang et al. (๒๐๑๙) contended positive relationship of performance expectancy (more benefits and utilities) on usage intention of online insurance platform to purchase life insurance. H. Wang et al. (๒๐๒๐) proposed that in the context of healthcare wearable devices, when users believe the technology to increase healthcare effectiveness (higher performance expectation), the technology is more likely to be adopted. For the context of e-hailing, Ooi et al. (๒๐๒๐) found that performance expectancy positively affect user's behavioral intention to adopt mobile taxi. Surya et al. (๒๐๒๑) contended that performance expectancy has positive effect on user's usage intention of certain fea-ture of e-hailing apps. Therefore, the following hypothesis is presented:

Hypothesis H๔: Performance Expectancy has positive effect on Usage Intention of e-hailing apps among Chinese tourists in Thailand.

Effect of Effort Expectancy on Usage Intention

This research proposes that effort expectancy has positive effect on the usage intention of e-hailing apps. The widely accepted definition of effort expectancy was given by Venkatesh et al. (2003) as the degree of ease to use a technology. There are three similar constructs from other earlier models related to individual adoption of technologies, including the perceived ease of use construct from the Technology Acceptance Model, the complexity construct from the Model of PC Utilization, and the ease-of-use construct from the Innovation Diffusion Theory. According to Venkatesh et al. (2003), effort expectancy is one the direct determinant of user's behavioral intention of technology. When users are facing a new technology at the very first stage, the influence of effort-related constructs on intention are believed to be stronger, because users need to overcome some hurdles of using the unfamiliar technology (Davis et al., 1986; Szajna, 1986; Venkatesh et al., 2003). According to Venkatesh and Morris (2000), the behavior intention of female users would be more significantly influenced by effort expectancy than male users because of different gender roles, and older users would be more significantly influenced by effort expectancy than younger users because of the difficulty to handle complexity. When users perceive a technology is easy to use, it's more likely for them to adopt the technology. Most of extant researches support the positive relationship between effort expectancy and usage intention. For example, Smyth et al. (2016) found that effort expectancy positively affect user's attitude towards using driver state monitoring systems for automated vehicles, which is an indicator of usage intention of the technology. Jiang et al. (2018) found that if people perceive online life insurance platform as easy to use, then they are more likely to use online platform to purchase life insurance products. Faqih and Jaradat (2016) found that for advanced technology such as augmented reality technology which is challenging to use, effort expectancy has positive influence on user's usage intention for the technology. However, there are also a few researches that proposing a positive relationship in the beginning while statistical results negate later on (Ooi et al., 2010; Surya et al., 2016). Considering all of the prior researches mentioned above, we decide to follow the majority research findings and propose the following hypothesis:

Hypothesis H₂: Effort Expectancy has positive effect on Usage Intention of e-hailing apps among Chinese tourists in Thailand.

Effect of Effort Expectancy on Performance Expectancy

This research proposes that effort expectancy has positive effect on performance expectancy of e-hailing apps. Several extant researches supported a positive relationship between effort expectancy and performance expectancy. For example, in the context of mobile banking technology, Zhou et al. (๒๐๑๐) contended that when users feel this technology does not require much effort and is easy to use (which indicate higher effort expectancy), users will have higher expectation about attaining their expected performance from using it. In the context of home telehealth services technology, Cimperman et al. (๒๐๑๖) found that user's perceived ease to learn and use (analogous to effort expectancy) of this technology positively influence their perception of usefulness (analogous to performance expectancy) of the home telehealth services technology, which means effort expectancy positively affect performance expectancy. Smyth et al. (๒๐๒๑) found that the effect of effort expectancy on performance expectancy is positive for context of driver state monitoring technology for automated vehicles. H. Wang et al. (๒๐๒๐) also found that effort expectancy positively affects performance expectancy for the context of healthcare wearable devices. As for the context of e-hailing technology, we believe that when users perceive e-hailing apps as easy to use, they would have higher expectation about the functionalities and performance of using the apps. Therefore, the following hypothesis is presented:

Hypothesis H_๖: Effort Expectancy has positive effect on Performance Expectancy of e-hailing apps among Chinese tourists in Thailand.

Effect of Social Influence on Usage Intention

This research proposes that Social Influence has positive effect on Usage Intention of e-hailing apps. According to Venkatesh et al. (๒๐๐๓), social influence is the degree that a person feel about his or her important others' expectation about whether this person should use or reject a technology. It's the social pressure from external surrounding environment (such as the opinions of relatives, friends, and supervisors) and could possibly influence a person's perception and behavior (Tarhini et al., ๒๐๑๖). There are some similar constructs to social

influence from other models re-lated to usage intention of technologies, such as the subjective norm construct from the Theory of Reasoned Action, the social factors construct from the Model of PC Utilization, and the image construct from the Innovation Diffusion Theory, all of which capture user's perception about how others will view them by using the technology. When adopting new technology and innovation, there are certain level of uncertainty facing the users, therefore people would interact with their social network (e.g., friends and relatives) to consult some opinion about usage decision (Jiang et al., 2008; Tarhini et al., 2009). For e-hailing technology, even though many Chinese people are familiar with it because of the popularity of Didi app in China, but Chinese people as foreign tour-ists are generally not familiar with local e-hailing apps prevalent in Thailand, because e-hailing apps in different countries may have different functionalities and user interface design. Thus, when deciding adoption of e-hailing apps in Thailand, Chinese tourists would face certain level of uncer-tainty, which would cause them to consult the opinion of important others. According to Hofstede (2000), Chinese culture has high score in collectivism, people from highly collectivism culture usually have tighter relationships tie with others and may prone to follow opinion of others, which means they would have higher social pressure when making decision. We believe that when con-sidering whether to adopt e-hailing apps in Thailand, Chinese tourists would consult the opinion of their important others. Faqih and Jaradat (2018) also claimed that the effect of social influence on usage intention is particularly stronger for developing countries cultures. Another rationale for the relationship between social influence and usage intention is that people would like to build up their relationships with their important people through following those people's views on certain behav-iors (Hernandez et al., 2008; finedo, 2009). Venkatesh et al. (2008) mentioned that the effect would be more salient for women, more salient in mandatory setting, and would decrease with us-er's experience with the technology. Most extant researches support a positive relationship be-tween Social Influence and Usage Intention. For example, Zhou et al. (2010) found positive effect in the context of mobile banking technology. Surya et al. (2018) found positive effect in the con-text of e-hailing apps for usage purpose of buying food. Therefore, the following hypothesis is pre-sented:

Hypothesis H₃: Social Influence has positive effect on Usage Intention of e-hailing apps among Chinese tourists in Thailand.

Conceptual Framework

The conceptual model is shown in Figure ๑ below.

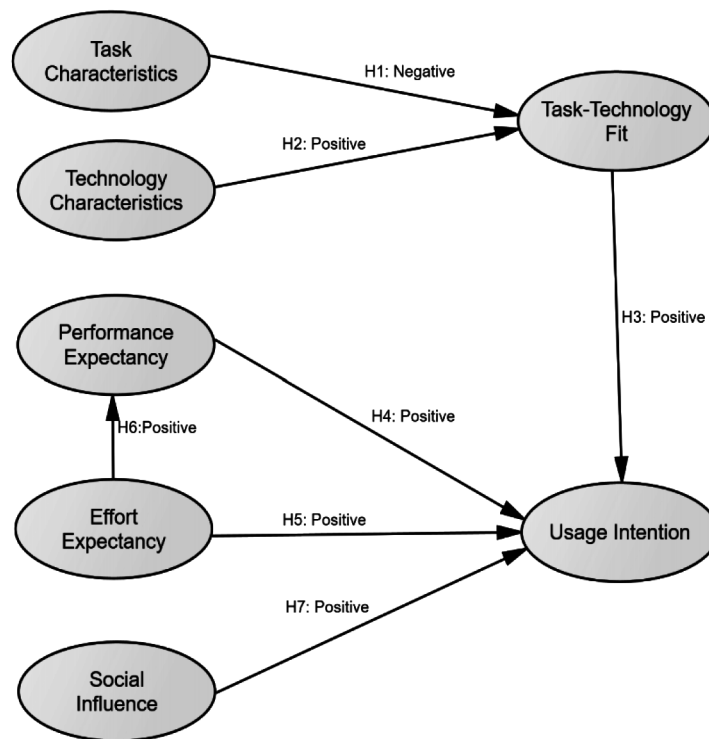


Figure 1: Conceptual model.

Methodology

Sample and data collection process

Participants of this research are Generation-Y and Generation-Z Chinese people who have visited Thailand as independent tourists before the outbreak of Covid-๑๙ pandemic or plan to do so after the end of the pandemic. Survey questionnaires were collected by using the paid sampling services provided by WJX.CN website, which is the largest survey website in China and

claim to use random sampling methods for paid sampling services to collect data from their various data-base of respondents. The survey collection process of the paid sampling service of WJX.CN followed ethical standard, and required respondents to agree on the platform's informed consent before participating in the survey. The author also asked the respondents a question at the very beginning of the questionnaire to verify whether or not the respondents have visited Thailand as independent tourists before the outbreak of Covid-19 pandemic or plan to do so after the end of the pandemic as an initial screening question, to double check to screen out un-targeted respondents by sampling error. In order to facilitate the Chinese respondents to understand the questionnaire, all questions were translated to Chinese language before presenting to respondents, and some screen-shot photos of the user interface of E-hailing apps in Thailand were presented to respondents in the beginning. After the end of the data collection period, there were a total of 1000 usable questionnaires obtained.

As shown in Table 1, among the respondents, 200 respondents are female (20.0%) and 800 respondents are male (80.0%). For age groups, 4 respondents are below 20 years old (0.4%), 42 respondents are 21-30 years old (4.2%), 188 respondents are 31-40 years old (18.8%), 100 respondents are 41-50 years old (10.0%), and 56 respondents are 51-60 years old (5.6%). About marital status, 88 respondents are unmarried (8.8%), 712 respondents are married (71.2%), and 2 respondents claim to be divorced (0.2%). Regarding educational level, 24 respondents are below Bachelor's level (2.4%), 876 respondents are at Bachelor's level (87.6%), 4 respondents are at Master's level (0.4%), and no respondent achieved Doctor's level. For monthly salary level, 24 respondents earn below 4,000 CNY (2.4%), 56 respondents earn between 4,001-6,000 CNY (5.6%), 44 respondents earn between 6,001-8,000 CNY (4.4%), 100 respondents earn between 8,001-10,000 CNY (10.0%), and 84 respondents earn higher than 10,000 CNY (8.4%).

Table 1: Demographic characteristics for the participants (n=๓๙๖).

	Options	Frequency	Percent
Gender	Female	๒๑๐	๕๓.๐%
	Male	๑๘๖	๔๗.๐%
Age Group	Below ๒๐ years old	๔	๑.๐%
	๒๑-๒๕ years old	๘๒	๒๐.๗%
	๒๖-๓๐ years old	๑๓๗	๓๔.๖%
	๓๑-๓๕ years old	๑๐๗	๒๗.๐%
	๓๖-๔๐ years old	๖๖	๑๖.๗%
Marital Status	Unmarried	๙๗	๒๔.๕%
	Married	๒๙๗	๗๕.๐%
	Divorced	๒	๐.๕%
Education Level	Below Bachelor's	๒๔	๖.๑%
	Bachelor's	๓๒๙	๘๓.๑%
	Master's	๔๓	๑๐.๙%
	Doctor's	๐	๐.๐%
Monthly Salary Level	Below ๔,๐๐๐ CNY	๒๕	๖.๓%
	๔,๐๐๑-๖,๐๐๐ CNY	๖๒	๑๕.๗%
	๖,๐๐๑-๘,๐๐๐ CNY	๙๙	๒๕.๐%
	๘,๐๐๑-๑๐,๐๐๐ CNY	๑๑๖	๒๙.๓%
	Over ๑๐,๐๐๐ CNY	๙๔	๒๓.๗%

Data analysis methods

This research used covariance based structural equation modelling approach (CB-SEM), performed with Amos ๒๖ software, for examining our measurement model and the structural model. For measurement model, this research verified the measurement model by examining reliability (internal consistency), convergent validity, and discriminant validity of measurements. Reliability of measurements was examined by using Composite Reliability and Cronbach's Alpha. Convergent validity of measurements was examined by using average variance extracted (AVE). Discriminant validity of measurements was examined by using the square root of AVE values,

which were sup-posed to exceed other inter-construct correlations involving that construct. The assessment of reli-ability (internal consistency), as shown in Table 2, was justifie by Composite Reliability and Cronbach's alpha, all of which exceeded the minimum threshold of 0.7 (Nunnally, 1978).The as-sessment of convergent validity was performed by using average variance extracted (AVE) in Ta-ble 3. Convergent validity was justified because all of the AVE values exceeded the minimum threshold of 0.5 (Hair et al., 2006).Assessment of discriminant validity was performed by compar-ing the square root of AVE values to other inter-construct correlations, the result in Table 3 shows that all the square root of AVE values (in bold) exceeded other inter-construct correlations involv-ing that construct, which justified discriminant validity of measurement model (Fornell & Larcker, 1981)

For the structural model, this research estimated path coefficients and the significance of those path coefficients by using bootstrap resampling method with 5,000subsamples. We also have the R^2 values which represent the amount of total variance explained in usage intention by independent variables in the integrated model.

Table 2: Reliability: CR(Composite Reliability)>0.7, Cronbach's alpha>0.7

	CR	Cronbach's Alpha
Task Technology Fit (TTF)	0.862	0.861
Task Characteristics (TAC)	0.804	0.804
Technology Characteristics (TEC)	0.802	0.802
Performance Expectancy (PE)	0.825	0.822
Effort Expectancy (EE)	0.832	0.825
Social Influence (SI)	0.840	0.837
Usage Intention (UI)	0.840	0.840

Table 3: AVE, square root of AVE, and inter-construct correlation.

	AVE	MSV	TTF	TAC	TEC	PE	EE	SI	UI
TTF	0.608	0.444	0.780						
TAC	0.494	0.300	0.444	0.708					
TEC	0.442	0.300	0.718	0.442	0.718				
PE	0.600	0.444	0.600	0.444	0.444	0.718			
EE	0.444	0.444	0.600	0.444	0.444	0.444	0.718		
SI	0.718	0.444	0.444	0.444	0.444	0.444	0.444	0.718	
UI	0.600	0.444	0.444	0.444	0.600	0.444	0.600	0.600	0.718

AVE for Average Variance Extracted, column ๔-๑๐ show square root of AVE values (in bold) and inter-construct correlations.

Results

Most of the model fit indices shown in Table ๔ indicate that our proposed model appeared to fit well. Except for Adjusted Goodness of Fit Index (AGFI), Goodness of Fit Index (GFI), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) all exceeded the acceptable minimum threshold of 0.5 (Byrne, ๒๐๑๐; Schumacker & Lomax, ๒๐๑๖). Root mean-square error of approximation (RMSEA) also meet the acceptable requirement of less than 0.08 (Browne & Cudeck, ๑๙๙๒).

Table 4: Model fit indice

Fit index	GFI	AGFI	TLI	CFI	RMSEA
Recommended value	>0.50	>0.50	>0.50	>0.50	<0.08
Actual value	0.818	0.843	0.847	0.864	0.044

The path coefficients, the test of their bootstrap significance with 5,000 subsamples, and hypotheses results are presented in Table 5 and Figure 2. Hypothesis 1 proposes a negative effect of task characteristic on task-technology fit. However, the result indicates that task characteristic and task-technology fit are positively associated ($\beta=0.301$; $p<0.001$); the result is also statistically significant. Thus, the results reject Hypothesis 1. Hypothesis 2 proposes a positive effect of technology characteristic on task-technology fit. The result indicates that technology characteristic and task-technology fit are positively associated ($\beta=0.343$; $p<0.001$); the result is also statistically significant. Thus, the result supports Hypothesis 2. Hypothesis 3 proposes a positive effect of task-technology fit on usage intention. The result indicates that task-technology fit and usage intention are positively associated ($\beta=0.289$; $p<0.001$); the result is also statistically significant. Thus, the result supports Hypothesis 3. Hypothesis 4 proposes a positive effect of performance expectancy on usage intention. The result indicates that performance expectancy and usage intention are positively associated ($\beta=0.343$; $p<0.001$); the result is also statistically significant. Thus, the result supports Hypothesis 4. Hypothesis 5 proposes a positive effect of effort expectancy on usage intention. The result indicates that effort expectancy and usage intention are positively associated ($\beta=0.304$; $p<0.001$); the result is also statistically significant. Thus, the result supports Hypothesis 5. Hypothesis 6 proposes a positive effect of effort expectancy on performance expectancy. The result indicates that effort expectancy and performance expectancy are positively associated ($\beta=0.410$; $p<0.001$); the result is also statistically significant. Thus, the result supports Hypothesis 6. Hypothesis 7 proposes a positive effect of social influence on usage intention. The result indicates that social influence and usage intention are positively associated ($\beta=0.400$; $p<0.001$); the result is also statistically significant. Thus, the result supports Hypothesis 7.

Table 5: Standardized path coefficient, bootstrap significance, and hypotheses result

Hypothesis	Path	Standardized Path coefficient	Lower	Upper	P	Supported
H๑	TAC → TTF	.๓๐๒	.๑๖๒	.๔๓๔	.๐๐๑	Not
H๒	TEC → TTF	.๖๔๖	.๕๒๙	.๗๖๓	.๐๐๐	Yes
H๓	TTF → UI	.๒๘๑	.๑๐๙	.๔๕๔	.๐๐๒	Yes
H๔	PE → UI	.๓๘๘	.๒๓๘	.๕๔๐	.๐๐๐	Yes
H๕	EE → UI	.๓๐๙	.๑๕๑	.๔๔๗	.๐๐๑	Yes
H๖	EE → PE	.๕๖๐	.๔๖๒	.๖๕๓	.๐๐๐	Yes
H๗	SI → UI	.๔๐๐	.๒๗๖	.๕๒๔	.๐๐๐	Yes

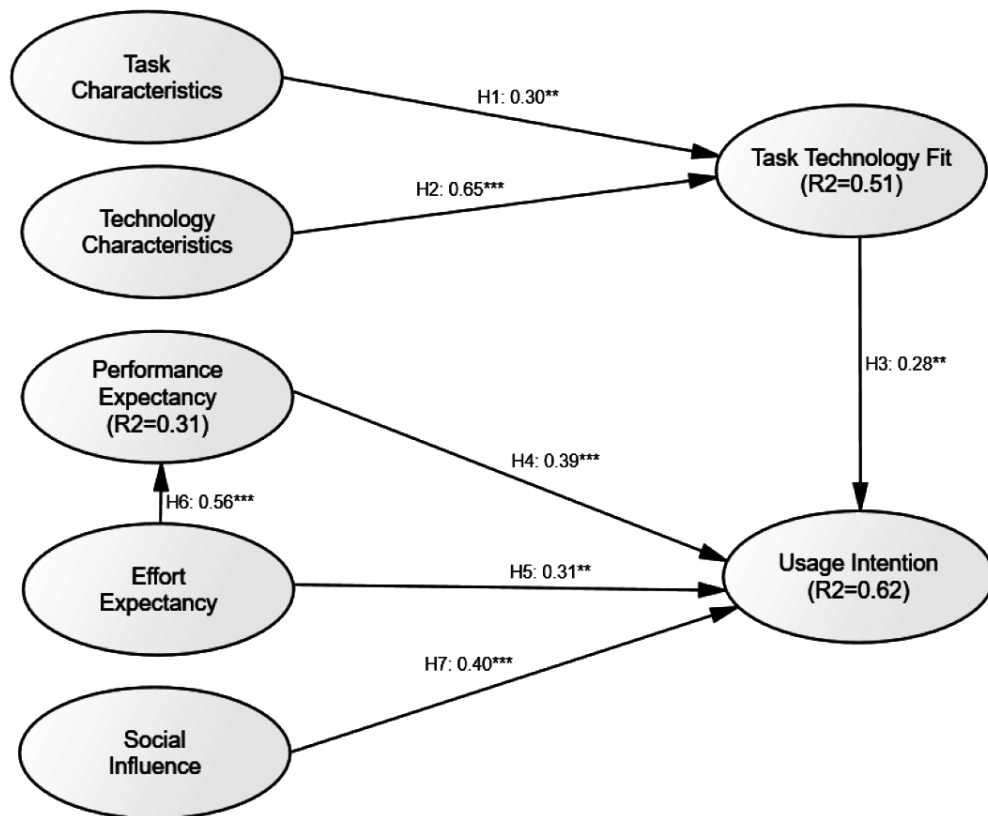


Figure 2: Results from hypothesis testing.

Conclusion and Discussion

Discussion of the results

This research was conducted to examine the antecedents of usage intention of e-hailing apps by integrating TTF and UTAUT model, by using the case of Gen Y and Gen Z Chinese independent tourist who has visited Thailand before the outbreak of COVID-19 pandemic or planned to visit Thailand after the end of pandemic. The integrated model explained 56% of the total variance in usage intention of e-hailing apps, a percentage which should be considered moderate (Hair et al., 2006).

The results show that both task characteristic and technology characteristic have positive effect on task-technology fit. The positive relationship between task characteristic and task-technology fit that we found here contradicts with the results from some prior research on other technologies such as mobile banking technology and healthcare wearable devices technology (H. Wang et al., 2020; Zhou et al., 2020). While there are also some other researches that supports a positive relationship between task characteristic and task-technology fit but there is still lack of enough logical explanation for this positive relationship (Faqih & Jaradat, 2020; Hsieh & Lin, 2020; Khan et al., 2018). Our second hypothesis for the positive relationship between technology characteristics and task-technology fit confirmed with prior researches that the more advanced the technology, the easier for the technology to fit the task requirements (Goodhue & Thompson, 1988; Khan et al., 2018; Zhou et al., 2020). The result for hypothesis 3 also shows that task-technology fit positively affect usage intention of e-hailing apps, if independent tourists perceive better fit between their task requirement for using e-hailing during their trip and the functionalities provided by the app, they are more likely to use the app, and this result confirmed with prior re-researches that task-technology fit will make people to perceive a technology as more useful, more important, provide more relative advantages and net benefits, thus increase people's utilization of the technology (Davis, 1986; Dishaw & Strong, 1986; Goodhue & Thompson, 1988; Hartwick & Barki, 1989).

Performance expectancy was found to have positive effect on usage intention in our result, which means that as independent tourists believe that using e-hailing app will help them to enjoy better tourism experience, they will have higher intention to use it, this finding confirm with prior researches on e-hailing apps (Ooi et al., ๒๐๒๐; Surya et al., ๒๐๒๑). Effort expectancy was found to have positive effect on usage intention, which means that as independent tourists perceive a e-hailing app as easy and effortless to use, they can overcome some unfamiliarity hurdles of using new technology and they are more likely to try it during their trip, which confirm with prior re-search findings on other technology such as driver state monitoring systems, online life insurance platform, and augmented reality technology (Faqih & Jaradat, ๒๐๒๑; Jiang et al., ๒๐๑๙; Smyth et al., ๒๐๒๑). Our research finding of the positive relationship between effort expectancy and performance expectancy confirmed with prior research findings that user's perceived ease to learn and use of a technology will positively influence their perception of usefulness and the performance from using it (Cimperman et al., ๒๐๑๖; Smyth et al., ๒๐๒๑; Zhou et al., ๒๐๑๐). Lastly, for Chinese tourists who are from highly collectivism culture, social influence also has positive effect on usage intention, which means that when Chinese tourists feel stronger social influence from their important others, they are more likely to adopt e-hailing app during their trips, this finding confirmed with prior research that people tend to consult and interact with their social network when they are facing some uncertainty in a unfamiliar environment of adopting a new technology (Jiang et al., ๒๐๑๙; Tarhini et al., ๒๐๑๖).

Theoretical and practical contribution

Theoretical contribution

The results from this research add new knowledge that can contribute to existing literature in the area of examine antecedents of usage intention of a technology. First, to the best of our knowledge, very few extant researches integrated TTF and UTAUT model to examine usage intention of technology. With ๖๒% of explained total variance in usage intention, we confirmed that the integrated model appears to work well (H. Wang et al., ๒๐๒๐; Zhou et al., ๒๐๑๐). Second, for the effect of task characteristic

on task-technology fit, where extant researches did not reach a consensus about whether the relationship should be positive or negative, we found a positive relationship in the context of e-hailing app (Faqih & Jaradat, 2018; Goodhue & Thompson, 1988; Hsieh & Lin, 2020; Khan et al., 2018; Zhou et al., 2020). Third, this research is among the earliest ones that examine the usage intention of e-hailing apps from the perspective of foreign tourists rather than from perspectives of local residents. As foreign tourists come from different cultural backgrounds and the transportation need of tourists may be different from the everyday transportation need of local residents, it's worthwhile to examine the specific group of tourists, especially for Thailand where tourism is of great importance to economy.

Practical contribution

This research may help e-hailing companies in Thailand to improve their apps to better reach the market niche of foreign tourists, and may potentially help the Thailand Ministry of Tourism & Sport to design transportation related promotion policy to better attract Chinese tourists into Thailand after the end of COVID-19 pandemic. For example, since social influence has the highest path coefficient (0.40) as antecedent of usage intention in our results, the e-hailing companies may consider promoting the usage of their apps by cooperating with some key opinion leaders (KOL) in Chinese social media (such as TikTok) to promote the use of the app during trips to Thailand. Alternatively, the e-hailing companies may also team up with the Thailand Ministry of Tourism & Sport or the Immigration Office of Thailand to advertise and promote the usage of e-hailing through official channel.

Limitations and future research directions

There are research limitations that need to be clarified. The first issue is the scope of sample coverage, which is limited to Gen-Y and Gen-Z Chinese independent tourists which have their specific cultural background. Further research may conduct comparison research on foreign tourists from other countries and cultural backgrounds. The second limitation is that we still found no theoretical explanation for the positive effect of task characteristic on task-technology fit in our results. To the best of our knowledge, even though some other researchers also found positive relationship between task characteristic and task-technology fit, there seems lack of enough logical reasoning to explain the positive

relationship (Faqih & Jaradat, ๒๐๒๑; Hsieh & Lin, ๒๐๒๐; Khan et al., ๒๐๑๘). To potentially solve this issue, further researches may consider integrate UTAUT model with other models (other than TTF model) to examine the antecedents of usage intention, to provide more robust theoretical supports. The third limitation is that in the UTAUT part of the integrated model, this research didn't examine the potential moderating effect of gender, age, and usage experience of respondents on adoption intention of technology (Venkatesh et al., ๒๐๐๓). Future researches may consider to examine those moderating effects. The fourth limitation is that user behaviour is constantly changing, therefore the cross-sectional data that we use may not reflect the changes later on

Disclosure Statement

The authors report there are no competing interests to declare.

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Information Use and Budget Allocation: How Information Plays a Role in Spending Efficiency and Effectiveness Among Thailand's Municipalities*

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Received: January 19, 2023

Revised: May 5, 2023

Accepted: June 16, 2023

Abstract

Information is of high value because it can assist in economic, political, and administrative decision makings. Recent public sector reforms concentrating on public finance and budgeting have applied performance information to transform an incremental budget process into a more rational one. It also expects such budget outcomes as spending efficiency and effectiveness. As a result of this reform wave, municipalities in Thailand implemented the performance-based budgeting despite limited financial and administrative resources. This study quantitatively such reform endeavor with the survey research with a questionnaire inquiring the heads of department about their perceptions on budgetary incrementalism, organizational culture, performance information use and budget outcomes. The ordinal logistic regression analyses shows that performance information use is positively associated with enhanced budget outcome high levels

* This study is a part of the author's PhD dissertation titled "The Use of Information and Budget Decision: How Administrative Capacity and Information Play a Role in The Local Budgeting in Thailand", submitted to School of Public Affairs, University of Colorado Denver on August 18, 2022.

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of spending efficiency and effectiveness. Budgetary incrementalism based on the performance-based budgeting is also proved to have the same effect on budget outcome but with lower impact. As policy recommendations to maintain and enhance such desirable budget outcomes, policymakers especially municipal executives should set the quality service and policy objectives at the program level, motivate budget actors to regularly use performance-based information for planning, monitoring, and evaluating programmatic spending, and lessen the conflict between the local government executives and the heads of departments. Meanwhile, as recommendations for future research directions, they should take into consideration levels of budget allocations and other types of local governments adopting the performance-based budgeting in order to strengthen the internal and external validity of how information use matters in the local budgeting realm.

Keywords: Performance Information, Budgetary Incrementalism, Spending Effectiveness and Efficiency, Local Budgeting

การใช้ข้อมูลและการจัดสรรงบประมาณ : บทบาทของข้อมูลที่มีต่อประสิทธิภาพและประสิทธิผล ของรายจ่ายของเทศบาลในประเทศไทย*

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บทคัดย่อ

ข้อมูลเป็นสินทรัพย์ที่มีค่าเนื่องจากสามารถเพิ่มคุณภาพในการตัดสินใจทั้งด้านเศรษฐกิจ การเมือง และการบริหาร การปฏิรูประบบราชการในปัจจุบันจึงใช้ข้อมูลประเภทผลการดำเนินงานเพื่อผลักดันให้กระบวนการงบประมาณมีเหตุมีผลมากขึ้นและเพื่อให้การจัดสรรงบประมาณมีประสิทธิภาพและประสิทธิผลอย่างแท้จริง ด้วยเหตุนี้ เทศบาลในประเทศไทยจึงประยุกต์ใช้งบประมาณแบบมุ่งผลงาน แม้ว่าจะมีข้อกีดด้านทรัพยากรทางการบริหารและการเงิน เพื่อเป็นการประเมิณผล การวิจัยเชิงปริมาณนี้จึงเก็บข้อมูลวัฒนธรรมองค์การ การยึดติดกับงบประมาณแบบค่อยเป็นค่อยไป การใช้มูลผลการดำเนินงาน และประสิทธิภาพและประสิทธิผลของรายจ่ายในเทศบาลต่าง ๆ และผลการวิจัยข้อมูลด้วยเทคนิคสหสัมพันธ์ถดถอยสำหรับตัวแปรลำดับขั้นมาตราชี้ให้เห็นว่าการใช้ข้อมูลผลการดำเนินงานมีความสัมพันธ์ทางบวกกับประสิทธิภาพและประสิทธิผลของรายจ่าย ทั้งนี้ ระบบงบประมาณแบบค่อยเป็นค่อยไปที่ยึดการปฏิรูประบบงบประมาณแบบมุ่งเน้นผลงานก็ส่งผลดีเช่น ดียวิ้น แต่ในระดับที่น้อยกว่าการใช้ข้อมูล สำหรับข้อ สอนแนะทางนโยบาย

* การศึกษานี้เป็นส่วนหนึ่งของวิทยานิพนธ์ระดับปริญญาเอกของผู้เขียนเรื่อง “The Use of Information and Budget Decision: How Administrative Capacity and Information Play a Role in The Local Budgeting in Thailand” เสนอต่อคณะรัฐศาสตร์ มหาวิทยาลัย โคโลราโด เมื่อวันที่ 2 สิงหาคม ๒๕๖๒

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ผู้บริหารเทศบาลควรส่งเสริมและรักษาผลที่พึงประสงค์นี้ด้วยการจูงใจและร่วมกับเจ้าหน้าที่ผลักดันระบบงบประมาณแบบ มุ่งเน้นผลงานผ่านข้อมูลที่สะท้อนค่าของเงินและผลสำเร็จต่าง ๆ ในระดับแผนงาน ทั้งนี้ ในระหว่างการวางแผน การเบิกจ่าย การติดตาม และการประเมินผล และสำหรับข้อ สอนแนะทางการวิจัย การวิเคราะห์ระดับรายจ่ายจริง และการใช้กรณีศึกษานอกจากเทศบาล จะช่วยเพิ่มความ รางภายในและภายนอก ของความ มั่น ันธะหว่างการใช้ข้อมูล กับประสิทธิภาพและประสิทธิผล ข้จ่ายงบประมาณได้มากขึ้น

คำสำคัญ: ข้อมูลผลการดำเนินงาน งบประมาณแบบค่อยเป็นค่อยไป ประสิทธิภาพและประสิทธิผล ของใช้จ่ายงบประมาณ งบประมาณนี้ ้องถิ่น

Introduction

Any kind of quality information is always valuable, economically and administratively. They can assist in and enhance decision making process buffering uncertainty, lowering risk, and suggesting trustworthy ways forward. Either personal or public finances, information is widely utilized or even traded because it provides a competitive advantage. Nonetheless, under the public finance's realm, information does not always change the course of policy decisions due to the prevalence of budgetary incrementalism expenditures of given years are simply equal to those of the previous year narrow range of increase or decreases (Booth, ๑๙๘๘; Davis et al., ๑๙๖๖). Mostly a result of political behaviors and institutions, budgets are almost never actively and holistically reviewed in the sense of weighing at once the costs and benefits of all existing programs as compared to all relevant alternatives (Davis et al., ๑๙๖๖; Downs, ๑๙๕๗).

Nonetheless, occasionally, budget literature under the Western countries' context in particular witnesses the attenuated influence of incrementalism when information is used religiously and appropriately. For example, with coherent policy narrative, performance information (public service's outputs and outcomes) encourages learning and deliberation among different departments, leading to changes in local governments' spending levels in the U.S. and Chile in terms of both efficiency and effectiveness (Ho, ๒๐๑๑; Melkers & Willoughby, ๒๐๐๕; Moynihan, ๒๐๑๕; Zaltsman, ๒๐๐๘). Nevertheless, such research topic has not been adequately explored under the East's developing countries' public expenditures. Consequently, this study fills this research gap by asking: How information use is associated with local spending? It selected Thailand as a typical case study (Gerring, ๒๐๐๗; Miles & Huberman, ๑๙๙๔) because it represents a developing country which, like several other global-south countries, promulgated decentralization policy relatively late and mostly possess limited administrative and financial capacities (R. White & Smoke, ๒๐๐๕).

Through survey methods and quantitative analysis, the answers to this research question aims to promote both internal and external validity (Onwuegbuzie, ๒๐๐๓). For internal validity, it explains the possible linkage between information use and enhanced budget allocation (efficiency and effectiveness). Regarding external validity, it explains how

context bound factors mediate such possible linkage between information use and spending efficiency and effectiveness. Meanwhile, advancing pragmatism of budget theories to present days problems (Gerring, ๒๐๑๒), this study offers at least two contributions to the local budgeting practice. First, it informs the policy makers whether and how information can improve their budget processes and allocations. Second, the study's results identify political and organizational components that potentially obstruct efficient and effective budget allocations given the context of developing countries. Truthfully, both can serve as a springboard for a local budget reform in the foreseeable future in Thailand since it has been more than two decades of its current local budget practices.

Literature Review

To fully understand the possible linkage between information use and spending efficiency and effectiveness, this study thoroughly reviewed the theories of information economics, performance budgeting, budget outcomes, and budgetary incrementalism. Previous studies were also discussed to explain the relationship of interest, to operationalize the concepts of information use, spending outcomes (efficiency and effectiveness), as well as to establish or replicate a statistical model testing the study's hypotheses later.

Information economics in public organizations. Information economics underscores the roles of information in resolving financial as well as fiscal uncertainties and related problems caused by information asymmetry technically termed adverse selection and moral hazard (Akerlof, ๑๙๗๐). According to Principal-Agent Theory, at the organization level, relevant and reliable information is distributed asymmetrically throughout a bureaucracy (Moe, ๑๙๘๔; Ross, ๑๙๗๓). Bureaucrats have and enjoy monopolistic information power over the management because of their technical knowledge and specialization (Frederickson et al., ๒๐๑๒; Niskanen, ๑๙๗๑) and how they can handpick and highlight only information reflect favorably upon themselves as well as repressing other that does not (Downs, ๑๙๖๗; Fullock, ๑๙๖๕).

To avoid such information problems, the management can apply two following strategies information intermediary and performance contract design. Information intermediary is an organizational unit or member gathering information and championing information use (Corburn, ๒๐๐๗) in order to bridge the informational gap between bureaucrats with policy

specialization and management as end users who directly involves in policy design and formulation (Faibisoff & Ely, ๑๙๗๔). Furthermore, since the management cannot closely monitor the bureaucrats' informational behaviors without prohibitive costs, they instead can invest in contract design which centers around performance information (Hölmstrom, ๑๙๗๙; Moe, ๑๙๘๔; Wood, ๒๐๑๐).

Performance information and performance budgeting. As a form of measurement, performance information in public management refers to actionable and quantifiable production process and products or services including outputs (e.g., public goods or services delivered), efficiency (data from cost-benefit analysis), effectiveness (evaluation of missed or achieved policy targets in terms of both quantity, quality, and standards), and policy impacts (economic and social implications) (Ammons & Roenigk, ๒๐๑๕; Talbot, ๒๐๐๗). Performance budgeting is a budgeting practice seeking to directly link the findings based on performance information to budget allocation (Gilmour & Lewis, ๒๐๐๖; Melkers & Willoughby, ๑๙๙๘) in order to help public agencies effectively and efficiently manage their resources, to strengthen organization's transparency and accountability of how such resources are utilized (Zhao & Fan, ๒๐๑๙). Accordingly, it has been part and parcel of the public management reform from the late ๑๙๙๐s until present especially in Asian countries (Srithongrungru, ๒๐๑๘).

Budget outcomes. At the program level and for small and medium size programs, performance budgeting has often brought favorable outcomes to the reforming government agencies. This is because budget actors can think more logically and strategically about how resources can be used and about what outcomes might be accomplished so that they influence policymakers to restructure activity planning and eventually reallocate an organization's financial resources (Gilmour & Lewis, ๒๐๐๖; Joyce, ๒๐๐๘; Melkers & Willoughby, ๒๐๐๕). In terms of performance outcomes, performance budget leads to spending efficiency and effectiveness. Changing appropriation levels, saving costs of public goods and services, eliminating ineffective programs, and reducing duplicative services are the case in point (Melkers & Willoughby, ๒๐๐๕).

Budgetary incrementalism. Given the advantages of performance budget, not all adopting government agencies accomplished such spending efficiency and effectiveness (Ho, ๒๐๑๑). Budgetary incrementalism still exists prevalently and robustly.

According to the theory of incrementalism, additional information will not transform the previous pattern of budget decision makings (Wildavsky, ๑๙๖๔). The reasons explaining how budget actors almost base their budgetary decisions on those of the previous year involve bounded rationality, the politics of budgeting process, and structural inertia. Only under very special circumstances do budget actors and policymakers rely on comprehensive calculations and not on simple consideration and heuristic rules in order to find satisfactory solutions for policy problems they are facing (Davis et al., ๑๙๖๖; True et al., ๒๐๐๗). As a rational agent or a budget maximizer, a given public organization are not willing to abandon their bureaucratic power especially in terms of manpower and financial resources to others (Niskanen, ๑๙๗๑). To avoid conflicts among different organizations, a government almost always adheres to incremental budgets. Finally, inertial pressures from both internal and external environment (for example, sunk costs invested in personnel and equipment, the dynamics of political coalitions, legal and administrative barriers to entry and exit from the budgeting realm, and the loss of institutional support) refrains a government from making radical or proportional adjustments as a response to pressing demands and urgency.

In sum, theoretically speaking, even though performance budget which is based mainly on performance information possibly brings about spending efficiency and effectiveness, budget incrementalism can mediate such association and vice versa.

Previous studies. In order to promote and push forward the budget reform necessary for complementing decentralization policy as stated earlier, the relationship of performance information use and budget allocation is this study's focus. Empirical examinations many in the U.S. and a few in Chile confirmed the existence of this linkage. For overall spending levels, indept evaluation assessment of the national government (information and finding on performance indicator assessment) was statistically associated with Chile's interannual budget changes between ๒๐๐๒- ๒๐๐๕, holding previous-year spending levels constant and type of evaluation (Zaltsman, ๒๐๐๙). Meanwhile, for more specific budget process and output to restructure activity planning and reallocate resources the case study of Indianapolis cities demonstrated that performance measurement influenced budgetary decisions at the program, holding number of performance measures, number of outcome related measures, amount of departmental budget, and percentage of budget

change, and the type of department constant (Ho, ๒๐๑๑). For budget outcomes, there existed the effects of performance measurement information on budgetary decisionmaking of ๓๐๐ U.S. local governments on such budget outcome as change in appropriation levels, cost saving, reduction of ineffective programs and duplicative services, holding community characteristics, organizational culture, and performance measurement characteristics constant (Melkers & Willoughby, ๒๐๐๕).

Conceptual framework. Based on both theoretical foundation and previous empirical studies, it can be said that performance information use is positively associated with budget outcomes, holding constant budget incrementalism, community characteristics, organization culture, and performance measurement characteristics. The interrelationships of interest are summarized in Figure ๑ below.

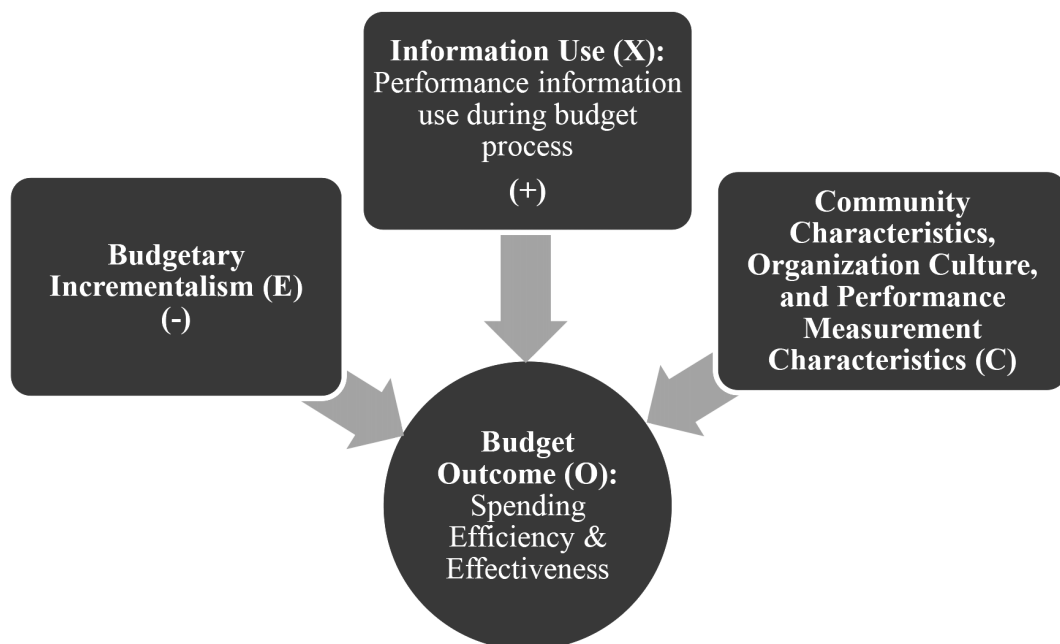


Figure 1: Conceptual Framework of Information Use and Budget Outcome

Note: ๑. X = Independent variable, E= Extraneous variable (Rival Hypothesis), C= Control variable, and Y= Dependent variable

๒. (-) and (+) suggests the negative and positive association with budget outcome, respectively

Hypothesis. Responding to the question of how information use is associated with local spending and subsequently providing results through empirical examination, this study formulated the following hypothesis.

H: Local governments with higher levels of performance information use are more likely to achieve higher levels of budget outcome (spending efficiency and effectiveness) than others with lower levels of performance information use.

Methodology

This study quantitatively examined the possible linkage between performance information use and budget allocation. Survey research was conducted through the questionnaire sent out to management level officials to inquire their information behaviors and perceived budget outcomes. Then, an ordinal regression analysis was applied to analyze these quantitative data to verify whether and how information use is associated with local spending. The following are methodological components of this study.

Background and case justification. This study selected Thailand's municipality as a case study to represent the least likely case (George & Bennet, ๒๐๐๔; Gerring, ๒๐๐๗). This is because the country demonstrated slow process on fiscal decentralization (White & Smoke, ๒๐๐๕) and its local governments usually lacked budget actors with high administrative capacity (Kittipanyasiri, ๒๐๑๕; Nagai et al., ๒๐๐๘). Due to these limitations, an attempt to adopt performance based budget reform by the Department of Local Administration (DOLA) during the early ๒๐๑๐s (Sutheewasinnon et al., ๒๐๑๖) was unlikely to be successful. And the study may not be able to prove and confirm linkage between performance information use and budget outcome (spending efficiency and effectiveness).

Population, unit of analysis, and unit of observation. Local budgeting and spending are a product of local government. As a result, local government is an organization of interest. In other words, organization is a unit of analysis. Local governments in Thailand as this study's research population are categorized into three main types provincial administrative organizations (PAOs), municipalities, and subdistrict (also known as Tambon) administrative organizations (TAOs). However, the first is the upper tier local governments responsible for only interjurisdictional missions such as inter-region highways, regional stadiums,

and provincial tourism policy. Meanwhile, TAOs are considered small ones with limited financial resources and manpower. As a results, they can offer only a few numbers of local public goods and services and largely depend on municipalities for, for instance, sewage management, primary and middle schools, and environmental and cultural conservation. As the type of local government responsible for many indispensable local public goods and services, municipalities are of this study's focus.

In terms of unit of observation, this study concentrates on budget actors who serve as information intermediary and information users who take part in and throughout local budgeting process. Specifically, heads of department involving in information collection, analysis, and utilization throughout the local budgeting process are the data source from whom this study collects data regarding information use and budget outcomes. Note that every municipality has a department of education providing academic services in nursery, primary, or secondary schools. This service aim to make children and students literate (linguistically, mathematically, and scientifically) and eventually able to pass the standardized national examinations. Possibly, using and implementing performance information as key performance indicators can leads to successful education services and, eventually, other desirable outcomes.

In sum, it can be said that the heads of department of education services in Thailand's municipalities represent an intensity case a information rich unit that manifest the phenomenon of interest intensely (the use of performance information potentially bringing about budget outcomes) (Miles & Huberman, ๑๙๙๔).

Sample Size. Given that the unknown percentage of the municipal budget actors in Thailand deliberate and actually utilize relevant and reliable information for their budget proposals and discussion as well as the unknown standard deviation of such information utilization, this study applied the Cochran formula to calculating the sample size. Specifically it set the confidence level at ๙๕% (๑.๙๖ for its Z values) with the level of precision at least at ๕ percent. Additionally, it assumed that half of these budget actors use performance information during the budget process. As a result, after adjusting for the target population of ๒,๔๔๑ municipalities, the calculation suggested that the sample size of ๓๓๓ municipalities be adequate to give the confidence levels the study was required for the data collection. In order to maximize a response rate, a voluntary response sample is applied.

Data Collection. This study conducted a survey with the Likert scale questionnaire inquiring the use of performance information among the heads of departments of education services as well as budgetary incrementalism, organizational cultures, and budget outcomes (spending effectiveness and efficiency). Regarding the last concept as the dependent variable, the Likert type questionnaire asked how effective was the use of performance information on (๑) affecting cost savings, (๒) changing appropriation levels, (๓) reducing duplicative services or programs, (๔) eliminating ineffective services or programs, and (๕) improving service quality (Melkers & Willoughby, ๒๐๐๕). These five items were proved to be statistically consistent and reliable with Cronbach alpha of ๗๓.๔๔%.

Meanwhile, for the independent variable (performance information use), the Likert scale questionnaire asked how frequent the heads of department used performance based budgeting information such as value of money and service quality in order to (๑) influence their budget decisions especially in terms of program prioritization; (๒) combine with other data to reach budget decisions; (๓) prompt further budgetary questions or enquires during budget discussion or debate; (๔) use those information to support a budget decision reached by other means (e.g., professional experience); and (๕) argue that a certain budget choice may not be desirable (Moynihan et al., ๒๐๑๒; Taylor, ๒๐๐๗). These five items were proved to be statistically consistent and reliable with Cronbach alpha of ๗๖.๘๘%.

For control variables, budgetary incrementalism was derived from the Likert scale item asking how the municipality's budget process has dramatically changed over the last four years. Community characteristics were contained from the items asking the community types (merchandising, residential, agricultural, or periurban), population, and whether such community was located in the capital city of the province. Meanwhile, organizational culture including staff's commitment to information based decision making and perceptions on how their responsibilities were of motivational tasks as well as the organization's political factors (conflicts between the executives and the legislatures and that between the executives and the heads of departments). For performance information characteristics, the Likert scale items asked the intensity of the central government's coercive and normative pressure on local governments to adopt information-based decision making.

Data Analysis. This study replicated Melkers and Willoughby (๒๐๐๕)'s model predicting the budget effects based on the use of performance measurements. The following model estimates the perceptions on spending efficiency and effectiveness among department heads.

$$\begin{aligned} \text{Budget Outcome} = & \beta_{\alpha} + \beta_{\beta} \text{Information Use} + \beta_{\gamma} \text{Budgetary Incrementalism} + \\ & \beta_{\delta} \text{Community's Characteristics} + \beta_{\epsilon} \text{Organizational Culture} + \\ & \beta_{\zeta} \text{Performance Information Characteristics} + \text{errors} \end{aligned}$$

Since the dependent variable is an ordinal scale, this study applied the ordinal logistic regression especially probit models as well as their odd ratios to analyze the quantitative data collected from the questionnaires (Gujarati, ๒๐๐๗).

Results

The research results here are several quantitative results including the participating local governments, the sociodemographics of budget actors or the heads of the department of education services, the descriptive statistics of the related variables listed and operationalized in the previous section, the Pearson's correlation, and the results from ordinal regression analysis.

Participating municipalities. The selfadministered questionnaires were sent to every municipality in Thailand asking their heads of the department of education services to provide their community's characteristics and their perceptions on the local governments' cultural and budgetary characteristics. During September ๑st to October ๓๑st, ๒๐๑๘, there were ๒๘๒ budget actors participating in the survey, which is more than the sample size estimated earlier. And the response rate is equal to ๒๗.๔๔%. Based on the responses, most of the participating municipalities are of a subdistrict level and with approximately ๑๒,๐๐๐ residents living in the area of ๒๐ KM^๒. Table ๑ shows the details of community's characteristics of these municipalities.

Table 1: Communities' Characteristics of Municipalities Participating in the Survey

Variable	Characteristic	Frequency		Accumulated	
Municipality type	Metropolitan	๙ (๑.๓๒%)		๙ (๐.๔๔%)	
	City	๔๑ (๖.๑๖%)		๕๐ (๖.๔๘%)	
	Subdistrict	๖๓๕ (๙๒.๕๒%)		๖๘๕ (๑๐๐.๐๐%)	
	Obs.	Mean	Std. Dev.	Min	Max
Area (KM ^๒)	๕๖๓	๖๐.๖๑	๑๖๙.๖๑	๐.๐๖๔	๒,๙๔๓
Population	๕๑๘	๑๒,๐๒๗.๖๕	๒๑,๕๒๔.๓๖	๙๔๓	๓๐๐,๐๐๐

Responders' socio demographics. Considering the survey respondents' socio demographics, budget actors of interest were a diverse group. Most of them were female, ๔๕ years old, holding a master's degree, and had been living in their respective jurisdiction for almost ๑๑ years on average. Table ๒ summarizes the socio demographics of these budget actors or the heads of the department of education services.

Table 2: The Respondents' Socio Demographics

Characteristics	Sub-group	Frequency		Accumulated	
Gender	Female	๔๒๐ (๖๒.๕๕%)		๔๒๐ (๖๒.๕๕%)	
	Male	๒๕๑ (๓๗.๔๕%)		๖๗๑ (๑๐๐.๐๐%)	
Education Profil	Undergrad	๖๖ (๑๑.๓๖%)		๖๖ (๑๑.๓๖%)	
	Postgrad	๕๑๕ (๘๖.๖๔%)		๕๘๑ (๑๐๐%)	
	Obs.	Mean	Std. Dev.	Min	Max
Age (Years)	๖๕๗	๔๕.๑๑	๖.๙๑	๒๖	๖๐
Living in the area (Years)	๖๐๑	๑๐.๘๙	๑๑.๕๓	๐	๕๙

Descriptive statistics. Table ๓ shows the descriptive statistics of all the variables included in the model for ordinal logistic analysis. Note that most of the participating municipality were of agricultural and peri-urban areas outside the provincial capitals. Note that the head of department of education services perceived that there was a relatively high level of budget incrementalism (๒.๖๒) which is slightly higher than the level of performance information use (๒.๔๐). Furthermore, the municipalities appeared to actively institutionalize

the culture of information based decision making because of relatively high levels of staff's commitment and motivation to this practice. Finally, there was a low level of internal conflicts both between the municipal executives and the municipal legislators and between the municipal executives and the heads of department of educational services.

Table 3: The Descriptive Statistics

Characteristics	Sub-group	Frequency	Accumulated		
Community Type	Merchandising	෫෫ (෮.෯%)	෫෫ (෮.෯%)		
	Residential	෩෩ (෫.෩෫%)	෮෮ (෧෫.෨෫%)		
	Agricultural	෧෫෧ (෫෦.෧෧%)	෩෩෯ (෫෫.෮෫%)		
	Peri-urban	෧෩෫ (෫෫.෫෦%)	෧෧෫ (෯෯.෩෫%)		
	Other	෫ (෦.෧෫%)	෧෧෮ (෧෦෦.෦෦%)		
Provincial Capital	Yes	෫෫ (෧.෫෫%)	෫෫ (෧.෫෫%)		
	No	෧෩෮ (෯෩.෫෫%)	෧෩෮ (෧෦෦.෦෦%)		
	Obs.	Mean	Std. Dev.	Min	Max
Budget Outcome	෧෫෧	෧.෧෫	෧.෧෫	෧	෫
Population (෧,෦෦෦)	෫෧෮	෧෧.෦෦	෧෧.෫෦	෦.෯෫	෩෦෦
Staff's Commitment	෧෧෩	෩.෧෫	෦.෮෧	෧	෫
Motivational Tasks	෧෧෧	෧.෯෩	෦.෩෮	෧	෫
Executive/Legislative Conflict	෧෩෧	෧.෧෩	෦.෮෧	෧	෫
Executive/Dept. Head Conflict	෧෩෦	෧.෫෧	෦.෩෧	෧	෫
Normative Pressure	෧෧෫	෩.෧෧	෦.෩෮	෧	෫
Coercive Pressure	෧෧෧	෧.෩෮	෦.෯෧	෧	෫
Budgetary Incrementalism	෧෧෦	෧.෧෧	෦.෮෫	෧	෫
Performance Information Use	෧෫෧	෧.෫෦	෧.෧෧	෧	෫

Pearson's Correlation. Based on Table ๔, the correlation coefficients between variables are lowly and moderately associated, ranging from <๐.๐๑ to ๐.๓๑. The highest is ๐.๓๑ which is the correlation between collectors' budget outcomes and performance information use. However, since all correlation coefficients in Table ๔ do not show the high association between a given pair of variables, it can be said that there is no evidence of substantial multicollinearity (Halcoussis, ๒๐๐๔).

Table 4: Pearson's Correlation

Variable	1	2	3	4	5	6	7	8	9	10
๑ Budget Outcome	๑.๐๐									
๒ Population (๑,๐๐๐)	๐.๐๔	๑.๐๐								
๓ Staff's Commitment	๐.๐๐	-๐.๐๖	๑.๐๐							
๔ Motivational Tasks	๐.๑๖	-๐.๐๔	-๐.๐๒	๑.๐๐						
๕ Executive/Legislative Conflict	-๐.๐๑	-๐.๐๘	-๐.๐๔	-๐.๐๘	๑.๐๐					
๖ Executive/Dept. Head Conflict	-๐.๑๔	๐.๐๒	๐.๐๑	-๐.๐๕	๐.๒๑	๑.๐๐				
๗ Normative Pressure	๐.๐๘	๐.๐๕	๐.๐๐	๐.๑๓	-๐.๐๘	-๐.๑๓	๑.๐๐			
๘ Coercive Pressure	๐.๐๐	๐.๐๔	๐.๐๑	๐.๑๓	-๐.๑๔	-๐.๑๕	๐.๑๓	๑.๐๐		
๙ Budgetary Incrementalism	๐.๑๕	๐.๐๗	-๐.๐๑	๐.๑๔	๐.๐๖	-๐.๐๑	๐.๑๐	-๐.๑๑	๑.๐๐	
๑๐ Performance Information Use	๐.๓๑	๐.๐๘	๐.๐๔	๐.๐๘	-๐.๐๓	-๐.๑๓	๐.๑๕	๐.๐๗	๐.๐๕	๑.๐๐

Table 5: Ordinal Logistic Regression Analyses Predicting Budget Outcome

Budget Outcome	(1) Baseline	(2) Incrementalism	(3) Information Use	(4) Odd Ratio
Residential Community (D)	๐.๐๔๘๘ (๐.๓๑๗)	-๐.๐๒๒๕ (๐.๓๑๘)	-๐.๑๒๒ (๐.๓๒๕)	-๐.๒๑๙ (๐.๕๒๑)
Peri Urban Community (D)	๐.๐๕๖๒ (๐.๒๓๒)	๐.๐๒๔๐ (๐.๒๓๓)	๐.๐๒๒๒ (๐.๒๔๒)	-๐.๐๐๐๙๑๕ (๐.๔๐๐)
Arggricultural Community (D)	-๐.๐๓๖๙ (๐.๒๓๗)	-๐.๐๕๙๗ (๐.๒๓๘)	-๐.๐๘๘๓ (๐.๒๔๖)	-๐.๑๗๒ (๐.๔๐๗)
Other Type of Community (D)	๐.๑๘๗ (๐.๗๖๑)	๐.๓๙๑ (๐.๗๖๗)	๐.๔๕๐ (๐.๗๗๑)	๐.๗๐๕ (๑.๒๑๐)
Provincial Capital (D)	-๐.๒๕๘ (๐.๒๒๗)	-๐.๓๐๙ (๐.๒๓๒)	-๐.๑๙๒ (๐.๒๔๕)	-๐.๓๑๒ (๐.๔๐๒)
Population (๑,๐๐๐)	๐.๐๐๓๓๘ (๐.๐๐๒๘๔)	๐.๐๐๒๕๗ (๐.๐๐๒๘๖)	๐.๐๐๐๗๔๖ (๐.๐๐๓๐๖)	๐.๐๐๑๔๘ (๐.๐๐๔๘๓)
Staff's Commitment	๐.๑๐๓ (๐.๐๖๖๖)	๐.๐๘๒๗ (๐.๐๖๖๙)	๐.๐๓๓๗ (๐.๐๖๗๙)	๐.๐๗๖๔ (๐.๑๑๓)
Motivating Tasks	๐.๒๐๖** (๐.๐๗๒๐)	๐.๑๖๙* (๐.๐๗๓๘)	๐.๑๕๑* (๐.๐๗๔๕)	๐.๒๕๐* (๐.๑๒๗)

Table 5: Ordinal Logistic Regression Analyses Predicting Budget Outcome

Budget Outcome	(1) Baseline	(2) Incrementalism	(3) Information Use	(4) Odd Ratio
Executive/Legislative Conflic	0.0000 (0.0000)	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Executive/Dept. Head Conflic	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000** (0.0000)	-0.0000** (0.0000)
Normative Pressure	0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
Coercive Pressure	-0.0000 (0.0000)	-0.0000 (0.0000)	-0.0000* (0.0000)	-0.0000* (0.0000)
Budgetary Incrementalism		0.0000** (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)
Performance Information Use			0.0000*** (0.0000)	0.0000*** (0.0000)
cut0	-0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
cut1	0.0000 (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)	0.0000* (0.0000)
cut2	0.0000* (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)	0.0000*** (0.0000)
LR χ^2	0.0000**	0.0000***	0.0000***	0.0000***
Pseudo R^2	0.0000	0.0000	0.0000	0.0000
N	0.0000	0.0000	0.0000	0.0000

Note: (0) Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
 (1)(D) = dummy variable

Ordinal Logistic Regression. Overall, the models verifying the association between budget outcomes and information use were statically significant. The pseudo R-squared is equal to 0.0000 meaning that 0.00% of the variability observed in the budget outcomes is explained by the model.

The use of performance information is statistically significant and positively associated with budget outcomes. In other words, answering the research question of how information use is associated with local spending, the ordinal logistic regression's results demonstrated a municipality with one level increase in performance information use is 0.474 time more likely than its counterparts to gain one level increase in budget outcomes (spending efficiency and effectiveness), holding constant community's characteristics, organizational culture, and performance-information characteristics.

For the work environment that promoted spending efficiency and effectiveness, the ordinal logistic regression suggested that making tasks and responsibility motivational among local employees was also the key to enhance budget outcomes. However, note that the use of performance information use became a vain attempt if there existed an evident conflict between the municipal executives and the heads of department of education services as well as the central government's high coercive pressure for municipalities to adopt performance budgeting and management.

Regarding another relationship of interest, unlike theoretically hypothesized, budgetary incrementalism is positively associated with spending efficiency and effectiveness but at a lower level of association compared to the use of performance information. In other words, a municipality with one level increase in budgetary incrementalism is 0.286 time more likely than others to achieve one level increase in spending efficiency and effectiveness, holding other variables constant.

Postestimation Statistics. Overall, the model predicting a degree of spending efficiency and effectiveness was statistically reliable, considering the common problems for regression analyses omitted variable bias, multicollinearity, and heteroskedasticity. Applying the Ramsey RE-SET test, this study found that there were no omitted variables [$F(3, 466) = 2.37$ and $\text{Prob} > F = 0.0644$]. Meanwhile, the average VIF (Variance Inflation Factor) for all coefficients in the models was equal to 1.74 which was far lower than 10, suggesting that there did not exist the problem of multicollinearity for the model estimating the budget outcomes (Wooldridge, 2016). Meanwhile, running the White's general test for unrestricted heteroskedasticity, the study accepted the homoskedasticity hypotheses [$\chi^2(4) = 104.66$ and $\text{Prob} > \chi^2 = 0.0000$] because the distribution of error terms was statistically homogenous (White, 1980).

Discussion and Findings

Based on the results from Table ๕, information use among municipalities in Thailand is positively associated with satisfactory budget outcomes such as spending efficiency and effectiveness. Although with slower pace than information use, incrementalism and the perception that related programs are motivational are also the key factors push forward those budget outcomes. Nonetheless, with high levels of conflicts on a certain program between the municipal executives and the heads of the department of education services and high degrees of the central government's coercive pressure on local government to adopt the performance management, municipalities are less likely to achieve budget outcomes. These results suggest five key findings as follows

Budgeting is multifaceted and a product of complexity. Budget is a product of politics, organizational cultures, and institutional inertia (incrementalism), and as much as a result of public management especially through reform attempts to leverage performance information and performance contract design. Making a budget system political-free is not practical but making it more rational is certainly attainable. It can be said that, if implemented properly with great consideration of political and organizational circumstances, budget reform attempts at the local level are promising because the use of performance information evidently leads to spending efficiency and effectiveness.

The coexistence between budgetary incrementalism and information use. Unlike what is usually hypothesized, budget incrementalism can actually enhance local governments' budget allocation patterns, if such incrementalism based on the performance based budgeting reform focusing on service quality and policy results as the background of Thailand's case stated earlier (Sutheewasinnon et al., ๒๐๑๖). On this ground, budgetary incrementalism is not always negatively associated with spending efficiency and effectiveness.

Internal and external validity of the association between information use and budget outcome. Considering the local context such as community types and organizational cultures, the study witnesses the positive impact of performance information use among Thai municipalities. This empirical finding promotes the internal validity of how information matters in the budgeting process (Onwuegbuzie, ๒๐๐๓). Furthermore, this result based on a developing country confirms the positive impact of the performance based budgeting reform originally and widely adopted in the US local governments (Gilmour & Lewis, ๒๐๐๖; Ho, ๒๐๑๑). On this ground, it can be said that despite different political, administrative, and organizational structures, performance information use, to some extent, can eventually lead local governments to achieve better service quality and policy results.

Recommendations for effective performance-based budgeting reform. Even though there exists clear empirical evidence on the linkage between performance information use and spending efficiency and effectiveness, some operational measures must be in place to accommodate the new budget systems. First, policymakers especially at the top of an organization must motivate budget actors to adopt the new budget system. Budget actors should have chances to collect, analyze, and discuss performance information throughout budgeting process planning, execution, monitoring, and evaluation. Second, the focus should be primarily on the program level. This is because budget actors can think logically and strategically about how resources can be used and saved and about what outcomes might be accomplished. Third, policymakers (local executives) and budget actors (heads of departments) should first find the common ground of residents' urgent problems or service preferences and later formulate program plans, objectives, and results. This can lower the level of conflict and, if possible, increase the degree of collaboration and deliberation

Caveats on applying and generalizing these findings. There are three cautions based on the case selection and the post estimation statistics. Regarding the case selection, this study aims at explaining the program level budget outcomes among municipalities. To avoid overgeneralization, note that these findings above cannot explain the budget outcome of other types of local governments and at policy or organizational level. Meanwhile, the pseudo R^2 reported in Table ๕ was relatively low potentially due to the omitted variable bias based on the result of the Ramsey RESET test. This suggests that,

in order to leverage the performance based budgeting, other measures than the four mechanisms discussed earlier should be taken into consideration. Third, the preliminary models linking information use to spending efficiency and effectiveness in this paper are from budget actors' perception but not from the numerical or financial data such as local economic conditions, unconditional grants from the central government, and spending levels. Interpretation should proceed with caution.

Summary

Through performance information, the public sector reform movement based on performance based budgeting aimed at reducing budget incrementalism and enhancing rational decision making in order to achieve spending efficiency and effectiveness. This study examined this possible association by conducting survey research with a questionnaire collecting a wide range of quantitative data. Like prior empirical research in the US, the results of this study confirm the causal linkage between performance information use and budget outcomes under the context of the education service program among municipalities in Thailand. Note that budget incrementalism from the implementation of performance management reform does not negatively affect budget allocation but actually brings about spending efficiency and effectiveness.

Some policy recommendations for municipalities about to adopt performance based budgeting include to concentrates on the quality service and policy objectives at the program level, to motivate budget actors, and to lessen the conflict between the local government executives and the heads of departments. Meanwhile, there are two suggestions in terms of future research directions. First, for increasing internal validity, researchers should take into account other variables particularly budget capacity and intergovernmental characteristics when verifying the linkage between information use and budget outcome. Second, regarding the external validity, future research should investigate the use of information during a budget process among other types of local governments than municipalities. Third, regarding reliability, budget outcomes in terms of spending levels for each program should be examined and then compared with the perceptual ones pre-sented in this study to assure the robust results of whether and how information use can enhance spending efficiency and effectiveness.

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