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Aims and scope

International Journal of Multidisciplinary in Management and Tourism is an interdisciplinary journal seeking an engagement between scholars working across a range of disciplinary fields, including Management, Tourism, critical theory, and interdisciplinary humanities and social sciences.

Frequency of Issue:

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Peer Review Policy:

At least three experts must review all submitted manuscripts via the double-blinded review system

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Preface

We are pleased to present the fifth volume, the second issue of the 2021 edition of the International Journal of Multidisciplinary in Management and Tourism. This volume consists of six research articles and one article.

Phutawan Ho and Teeris Thepchalerm from the Business Excellence and Logistics Research Centre, Mae Fah Luang Univesity, contribute to the first article. Their studies come at the right time when the world is solidifying its commitment and investments to realize carbon neutrality while at the same time meeting the needs of businesses and livelihoods. If innovatively used, maize stalks, cobs, and peels can offer other downstream industries raw materials, thus alleviating the depletion of forests. Based on questionnaire-based surveys of the maize farmers from two dominant maize farming districts in Chiang Rai, Theong and Chiang Khong, Ho and Thepchalerm study five factors that could influence the green practice adoption for residues disposals, namely the geographical condition, cost of green practice, selling price, farmer's knowledge, and government measures. They point out that policymakers should support the positive factors, reduce the negative factors, and consider the local context for policy implementation.

In the second article, Nuchruedee Rooymai from the Faculty of Management Science, Suan Dusit University Bangkok, studies how foreign tourists perceive and form attitudes about Pattaya city from the news and information they receive. The study concludes a moderate level of impact, and collective efforts of the city administrator, police department, and business stakeholders are essential to change the negative images of the city to positive. The study also recommends marketing channels such as social media, youtube, and travel websites.

The third paper deals with corporate governance on firm efficiency. Using DEA (Data Envelopment Analysis), Keertiman Sharma, Duangjai Ow-jawiyapithak, Piyada Dasri, David Van Brecht, and Danuch Sahakijpicharn from Stamford International University present the efficiency profiles of the banking performance in the context of good corporate governance practices. With few exemptions, they conclude a solid positive relationship between corporate governance practices and firm efficiency (i.e., in the productive use of resources), which is also dependent on the nature of a firm like whether it is government-owned, private, or a foreign enterprise.

The fourth paper is a comprehensive literature review, which compares and analyzes the methods for measuring the sustainability of farmers' livelihoods. The first author is from China and is currently associated with the University of Technology Rattanakosin, Thailand. Xiolan Chen and Nutteera Phakeephirot examine the dimensions of sustainable livelihood measurement, the methods of livelihood sustainability measurement, and with a particular emphasis on the decomposition method, which can rely on the use of neural network simulation AHP, and TOPSIS.

In the fifth article, Professor Shulan Zhao from the International Academic Exchange Center, Yunnan Academy of Social Sciences, China, uses various analytical tools, AHP, TOPSIS, IPA, and statistical analysis, to draw implications to one belt one road (OBOR) initiatives. The multilateralism concept provides China's principal policy direction for her analysis, which sees her skilful use of the 4C model and Michael Porter's national

competitive advantages for OBOR analysis. Professor Shulan advocates that OBOR can consider the needs and states of national competitive advantages of the participating nations, including the general PEST factors, to succeed in OBOR investment and implementation.

Zhimin Li from Shangdong University of Political Science and Law contributes the sixth article. The article employs structural equation modelling (SEM) to validate a framework of the prison-police competency management system. Zhimin Li identifies four essential occupational competence elements for the current needs of the prison police cadres in China: professionalism, business competence, occupational knowledge, and work attitude.

Associate Professor Seri Wongmonta contributes to the seventh article, which presents the current state of the tourism industry, and examines the strategies to suggest post-COVID 19 tourism recovery and resilience.

In closure, we welcome any article contributions of multidisciplinary nature. All papers must be original, have not been published elsewhere, have not been submitted to other publication venues while submitting to us, and should be subjected to plagiarism assessment. The submitted manuscripts will pass through the editorial and double-blind reviews by at least three anonymous independent referees. Apart from research articles, we also accept quality book reviews. Upon appropriate revisions to the required quality and expectations, all accepted articles would be published online on our Journal website and are downloadable free of charge. We recommend that potential authors review our publishing policies, manuscript requirements, and formats before submitting their manuscripts to our Journal.

Dr. Chai Ching Tan

Editor in Chief

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Research Articles

Articles

Factors Affecting Green Practices Adoption in Maize Stalks, Cobs, and Peels Disposal: A Case Study of Chiang Rai Maize Farmers

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Abstract

Although maize cultivation has been considered one of the essential crops of Thailand's agricultural and livestock industry, it should not overlook the negative impact on people's environmental aspects and health caused by traditional maize residues disposal. This research aims to identify the factors affecting green practices adoption in maize stalk, cobs, and peels disposal. The population group of this study is the maize farmers who cultivated in Chiang Rai province. The sample of this research is the maize farmers from Theong and Chiang Khong districts. Using an interviewer-administered questionnaire, the researchers used a convenient sampling method and collected data from 410 maize farmers. The researchers used Binary Logistic Regression to analyze the factors affecting green practices adoption because the value of the dependent variable is dichotomous. With a confidence level of 95 percent, the results reveal that selling price is the most crucial factor followed by farmers' knowledge, geographical condition, and government measures, respectively. Researchers suggest that the government should utilize its policies to generate more efficient and effective outcomes by educating the farmers and facilitating the green practices adoption processes. Lastly, there should be proper and continuous projects and monitoring measures for future improvements.

Keywords: Agricultural Wastes; Open Burning; Haze Pollution; Maize; Green Agriculture

Introduction

Maize is one of the essential crops of Thailand's agricultural and livestock industry. The increase in demand from animal foods consumption in the livestock industry and the need to reduce maize import quantity lead to increasing domestic maize production. According to the Office of Agricultural Economics (2020) data in table 1, maize farming areas increased from 6.78 million rai (1 rai = 1,600 square meters) in 2018 to 7.02 million rai in 2019. The majority of maize farming areas are in the northern region of Thailand, which accounted for

67.24%. Chiang Rai has approximately 0.3 million rai of maize farming area, which is the second largest in the northern region of Thailand.

Table 1 Thailand's maize farming area by region during 2015 – 2019 (in a million rai).

Region	2015	2016	2017	2018	2019
Northern	4.55	4.47	4.52	4.59	4.72
Northeastern	1.32	1.33	1.34	1.47	1.45
Central	0.72	0.69	0.72	0.72	0.86
Total	**6.59**	**6.49**	**6.58**	**6.78**	**7.02**

Increasing maize production may have a higher level of negative impacts not only on the environment but also the health of the people living in nearby communities, for example, over-used of chemical fertilizer, soil degradation, deforestation, and air pollution from open burning of stalks, cobs, and peels (Do Amaral, 2018). The government has introduced many guidelines and policies to mitigate or solve the situation, including temporary open burning restrictions, punishment, and alternative ways of disposal with less environmental impact, e.g., making organic fertilizer and making fuel pellets from maize cobs stalks, and peels. Nevertheless, maize farmers have not widely adopted the practices.

In response to the problems mentioned above, this study aims to identify the factors affecting green practices adoption for maize stalk, cobs, and peels disposal among the maize farmers in Chiang Rai Province. The result of this study can offer government policy suggestions.

Literature Review

Previous research has studied factors affecting green practice adoption in the agricultural industry and found various factors affecting farmers' adoption.

The cost of green practices can affect green practice adoption among farmers. Some farmers are reluctant to adopt green practices because they are afraid that the cost of implementing green practices might be too high, and there is no guarantee that the practices will give favorable results or sufficient financial return (Adnan et al., 2019). The higher cost in farming makes the adoption more difficult. According to Hijbeek et al. (2019), the high investment cost is farmers' primary concern. Although the investment in greener agricultural technology will reduce the cost in the long term, most farmers do not have enough savings to invest in it initially (Bruce and Spinardi, 2018). Moreover, Ragasa et al. (2017) revealed that farming costs, e.g., seed, fertilizer, and equipment, are considerably high even in traditional farming and could be higher if the farmers adopt green practices.

Green practices can improve profitability. The study of Chinese farmers participating in green projects reported that they have got good financial benefits after adopting green practices (Chao et al., 2009). If green practices are appropriately applied, it can increase productivity; hence, the farmers have the potential to increase their revenue (Smith et al., 2017). The farmers will be more willing to adopt green practices if they perceive significant financial returns, such as higher selling prices (Adnan et al., 2019).

Knowledge regarding green practices is another critical factor affecting green practices adoption. (Luo et al., 2016). Jai-Aree (2018) found that the correct understanding of green

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practices can enhance adoption among farmers. The farmers who have less knowledge about environmental health tend to burn agricultural wastes (Adeleke et al., 2017). For example, the farmers who are acknowledged that green practices can help improve soil quality will be more willing to adopt green practices (Abera et al., 2020). On the other hand, some farmers insisted that burning crop wastes can improve soil quality for cropping (Junpen et al., 2018).

The geographical area of cultivation can be the barrier to green agricultural practices adoption. The geographical condition can limit the choices of possible green practices. For instance, farmers who cultivate upland and highlands mostly dispose of the agricultural waste or residue by slashing and burning because it is the easiest and fastest way to dispose of the waste (Phuphisith et al., 2021). It is also impossible for highland farmers to plow the soil with a tractor since the tractor cannot work well on the hill (Tejajai, 2014).

The government's role is also crucial for green practices adoption. Less government effort in providing support is one of the main barriers to green agriculture (Sher et al., 2019). Li et al. (2021) suggested that the government should implement supporting measures to facilitate green practices adoption; on the other hand, the government should discourage the farmers from non-green practices. The government's policies are indeed the vital mechanic of green practices adoption (Waheed et al., 2021).

The above discussions lead to the following hypothesis, which describes the factors affecting green practices adoption in maize stalks, cobs, and peels disposal, consisting of 5 independent variables, namely, geographical condition, cost of green practice, selling price, farmer's knowledge, and government measures.
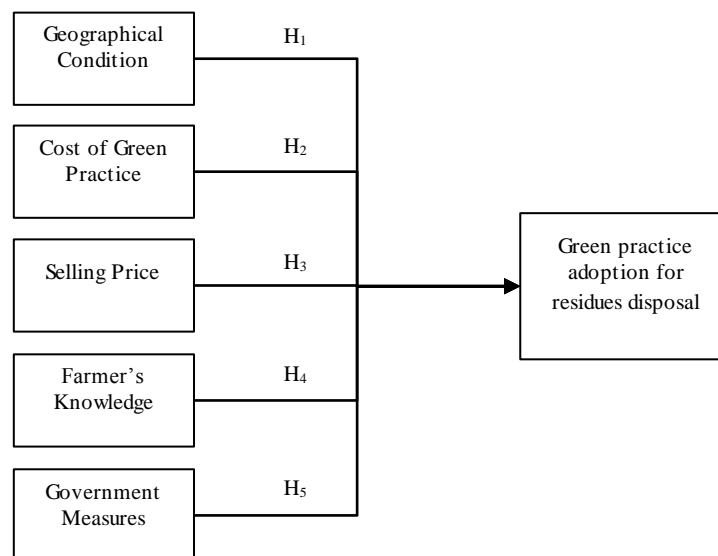
Figure 1: Conceptual framework of factor affecting green practices adoption in maize stalks, cobs, and peels disposal

H_1: The geographical condition significantly impacts green practice adoption for residues disposal.
H_2: The cost of green practice significantly impacts green practice adoption for residues disposal.
H_3: The selling price significantly impacts green practice adoption for residues disposal.
H_4: The farmer's knowledge significantly impacts green practice adoption for residues disposal.
H_5: The government measures significantly impact green practice adoption for residues disposal.

Research Methodology

Population and Sample

The population in this study is the maize farmers in Chiang Rai Province. According to the Office of Agricultural Economics (2019), approximately 32,960 maize farmers in households in Chiang Rai. The study samples the maize farmers from Theong and Chiang Khong districts because maize is widely harvested, and the hotspots are concentrated in these areas (Figure 2). This study used a convenient sampling method, with a confidence level of 95%; the researchers must collect data from at least 395 maize farmers who cultivate in Chiang Khong and Thoeng districts according to the sampling theory of Yamane (1973). The maize farmer population of the whole province was used in sample size calculation because there was a limitation in acquiring the maize farmer population from each district.
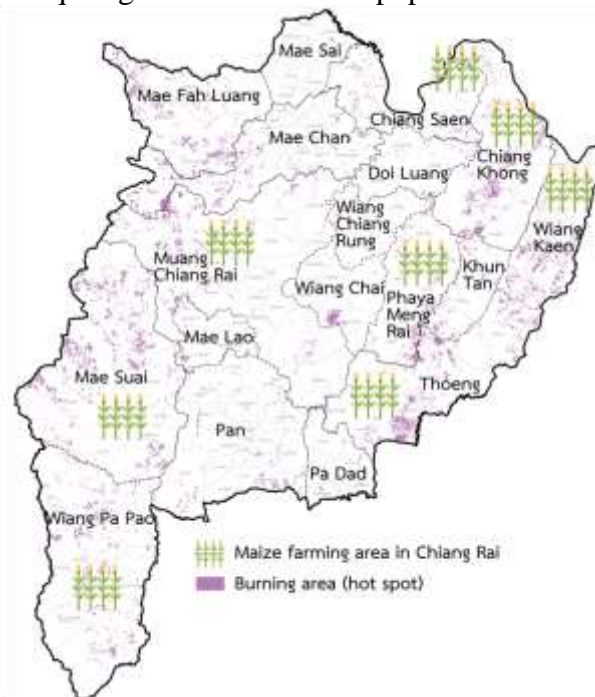
Figure 2: Burning area (hot spot) and maize farming area of Chiang Rai in 2019

Research Instruments

The researchers used a questionnaire to collect the data on factors affecting the green practice adoption in maize stalks, cobs, and peels disposal. The researchers generated the questionnaire by synthesizing information from the related literature review. The questionnaire consists of 2 parts which are:

1. Demographic of the respondent and screening question consists of the geographical condition of the plantation area, districts, and green practice adoption, which are categorical.

2. Factors affecting the green practice adoption in maize stalks, cobs, and peels disposal. The questions regarding factors affecting green practice adoption, developed from the literature and field interview, are presented with a 6-point Likert scale to rate each predictor. The questionnaire survey considers four factors which are 1) Cost of green practice consists of 3 questions, 2) Selling price consists of 4 questions, 3) Farmer's knowledge consists of 4 questions, and 4) Government measure consists of 3 questions.

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A sample group of 30 farmers provides the base for reliability evaluation. The Cronbach's Alpha of the factors ranges between 0.76 to 0.90, which are considered acceptable according to the recommendation from Hair et al. (1998).

Data Collection

The researchers and assistants contact maize farmers and make an appointment to visit them at their places, whether house or plantation. The researchers and assistants interviewed the respondents and then requested the respondents to fill the questionnaires. If maize farmers are local people and cannot communicate effectively in Thai, the assistants who are fluent in the local language will translate them into Thai for accurate information.

Data Analysis

This study used binary logistic regression, which was developed from linear regression analysis and is similar to multiple regression analysis (Piegorsch, 2015). However, the result will be binary or dichotomous, for example, "yes" or "no," "pass" or "fail," and "male" or "female." The goodness of fit test uses chi-square to confirm whether the model and data are significantly in harmony. The independent variables or predictors were tested whether they have a positive or negative impact on the dependent variable (Pallant, 2010).

Results

The questionnaires were distributed manually in paper format by the researchers and research assistants, and there were a total of 422 respondents from both districts. All questionnaires were screened and checked for their completeness. This study has 410 valid responses. As shown in table 2, the demographic data illustrated 209 maize farmers from Chiang Khong and 201 from Theong, which account for 51.00 and 49.00 percent, respectively. The survey has 71.70 percent of the samples cultivated in lowland or plain areas and 28.30 percent in mountainous areas. 56.60 percent of the samples reported that they used the open burning method to dispose of the maize residues, and 43.40 percent reported that they did not.

Table 2 Demographics of respondents

Characteristics of the samples	N	%
Maize farming districts		
.1Chiang Khong	209	51.00
.2Thoeng	201	49.00
Geographical condition		
.1Plain or lowland	294	71.70
.2Mountainous area	116	28.30
Stalks, cobs, and peels disposal methods		
.1Burn	232	56.60
.2Not burn	178	43.40
Total	**410**	**100**

The researchers performed binary logistic regression to examine the samples' opportunity to report that they burned stalks, cobs, and peels and seriously impacted them. The model consisted of 5 independent predictor variables in total, 1 was a nominal scale, and 4 was a rating scale. As illustrated in table 3, the results showed that the model was statistically significant, χ^2 (5, N = 410) = 181.89, p < 0.001: the samples who reported and did not report the adoption of green practice for residues disposal can be categorized by the model consisting of all predictors. The model can explain the variance of maize farmers using environmental-friendly method between 35.80% (Cox and Snell R Square) and 48.10% (Nagelkerke R Square), and 77.10% of the cases were categorized correctly. Table 3 showed that four predictor variables contributed statistically significantly to the model, with a confidence level of 95% (p < 0.05). The logistic coefficients (B) indicated that the geographical condition, farmer's knowledge, and government measures negatively while selling price has a positive relationship with the dependent variable. Therefore, H1, H3, H4, and H5 are accepted while H2 is rejected.

Table 3 The results of binary logistic regression analysis.

Predictor Variables	B	S.E.	Wald	Df	Sig.	OR	Hypothesis
Cost of Green Practice (H$_2$)	-0.062	0.117	0.275	1	0.600	0.94	Reject
Selling Price (H$_3$)	1.136	0.153	55.203	1	**0.000**	3.12	Accept
Farmer's Knowledge (H$_4$)	-0.845	0.166	26.045	1	**0.000**	0.43	Accept
Government Measure (H$_5$)	-0.377	0.162	5.412	1	**0.020**	0.69	Accept
Geographical Condition (H$_1$)	-1.673	0.286	34.296	1	**0.000**	0.19	Accept
Constant	2.338	1.093	4.576	1	0.032	10.36	

* statistically significant (p < 0.05)

Discussion and Policy Implication

The results show that geographical conditions significantly affect green practices adoption among maize farmers; this finding is consistent with the study by Phuphisith et al. (2021). The farmers living in the highland cannot use a tractor for plowing, and they do not have space to fertilize the maize stalk. They might take a slash and burn as it is the most effective and convenient method for agricultural waste disposal. Selling price is another significant factor; the farmers may not be willing to adopt green practices because the financial benefit from adopting such practices is questionable. This finding aligns with the study Ragasa et al. (2017), which proposes that the farmers adopt green practices if they perceive a positive financial benefit. For instance, if the farmers can sell their green products at a higher price compared to traditional products, they might be more willing to adopt green practices. Farmers' knowledge regarding green practices can drive green practices adoption. Knowledge regarding green practices can facilitate the process of adoption (Luo et al., 2016). In addition, the misconception regarding green practices can lead to non-environmental-friendly practices such as slash and burning (Phuphisith et al., 2021). With proper knowledge, the farmers can avoid or reduce failure. They might be more confident in green practices and adopt them. Government measures, both reward and punish, impact green practices adoption

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among farmers. This finding is consistent with the study by Waheed et al. (2021), which suggested that the government should drive green practices adoption via its policies. Logically, the farmers are afraid of being punished; on the other hand, they are satisfied with support and reward from the government.

As policymaker and regulator, the government should enhance the positive factors and reduce negative factors. The government can help in promoting green practices among maize farmers. Firstly, the government should make sure that there is an appropriate market for green maize in which the farmers can access and sell their green products at reasonable prices. Therefore, the farmers can, at least, be sure that they can earn appropriate revenue. Farmers' cooperatives can be the channel to enhance farmers' knowledge regarding green practices and promote environmental-friendly practices (Puangchan, 2020). The government and local authorities should support and work with these cooperatives. They can set up demonstrate or pioneer projects of environmental-friendly agriculture and use the cooperative as a learning center for the farmers. The cooperative can also impose normative pressure – "the collective struggle of members of an occupation to define the conditions and methods of their work" (DiMaggio & Powell, 1983). If most farmers have adopted environmental-friendly practices, the rest of the farmers will be more willing to adopt such practices. The government should strictly implement every measure to support the adoption of the green practice. In addition, it should take local factors into account; for instance, there are numbers of highland farmers in the northern region of Thailand. The government should have policies that are suitable for these highland farmers. Lastly, every policy and measure should be closely monitored to make sure that these policies are continually and effectively implemented

Conclusion and Limitation

In conclusion, this article reveals drivers and barriers of green practices for maize stalks, cobs, and peels disposal among farmers in Chiang Rai province. Many factors affect green practices adoption. Therefore the policymakers should support the positive factors and reduce the negative factors. It is also essential to consider the local context for policies implementation and consistently implement them.

This study certainly has some limitations. Firstly, the scope of this study is limited to only Chiang Rai province. Secondly, this study only focuses on maize farmers' perspectives. Therefore, future research can study similar topics in other areas or more considerable spatial scope. In addition, future research can approach similar research questions from different perspectives, e.g., government authorities, suppliers, or customers' perspectives.

References

Abera, W., Assen, M., & Budds, J. (2020). Determinants of agricultural land management practices among smallholder farmers in the Wanaka watershed, northwestern highlands of Ethiopia. *Land Use Policy, 99*, 1-9.

Adeleke, A., Apidechkul, T., Kanthawee, P., Suma, Y., Wongnuch, P., & Pasukphun, N. (2017). Factors associated with open burning behaviors among Thai and hill tribe farmers in northern Thailand. *Journal of Health Research, 31*(5), 395-402.

Adnan, N., Nordin, S. M., & Anwar, A. (2019). Transition pathways for Malaysian paddy farmers to sustainable agricultural practices: An integrated exhibiting tactics to adopt green fertilizer. *Land Use Policy, 90*, 1-26.

Bruce, A., & Spinardi, G. (2018). On a wing and hot air: Eco-modernisation, epistemic lock-in and the barriers to greening aviation and reminant farming. *Energy Research & Social Science*, *40*, 36-44.

Chao, S., Chen, L., & Yu, X. (2009). Impact of China's Grain for Green Project on the landscape of vulnerable arid and semi-arid agricultural region: A case study in northern Shaanxi province. *Journal of Applied Ecology, 46*(3), 536-543.

DiMaggio, P., & Powell, W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, *48*(2), 147-160.

Do Amaral, S. (2018). *The study report project on sustainable consumption and production of maize supply chain in Thailand* [Research report, Thailand Environment Institute].

Hair, J.F., Anderson, R., Tatham, R., & Black, W. (1998). *Multivariate data analysis* (5th ed.). Prentice-Hall.

Hijbeek, R., Pronk, A., van Ittersum, M., Verhagen, A., Ruysschaert, G., Bijttebier, J., Zavattaro, L., Bechini, L., Schlatter, N. & Ten Berge, H. (2019). Use of organic inputs by arable farmers in six agro-ecological zones across Europe: Drivers and barriers. *Agriculture, Ecosystems & Environment*, *275*, 42-53.

Jai-Aree, A. (2018). Guidelines to promote organic agriculture to food security and safety for community: reflection from the operating sector. *Silpakorn University Journal, 38*(5), 1-17.

Junpei, A., Pamuk. J., Kamnoet, O., Cheewaphongphan, P., & Garivait, S. (2018). Emission of Air Pollutants from Rice Residue Open Burning in Thailand, 2018. *Atmosphere, 9*(11), 449.

Li, Y., Fan, Z., Jiang, G., & Quan, Z. (2021). Addressing the differences in farmers' willingness and behavior regarding developing green agriculture – A case study in Xichuan county, China. *Land*, *10*(3), 316.

Luo, L., Qin, L., Wang, Y., & Wang, Q. (2016). Environmentally-friendly agricultural practices and their acceptance by smallholder farmers in China – A case study in Xinxiang County, Henan province. *Science of the Total Environment*, *571*, 737-743.

Office of Agricultural Economics. (2020). *Maize: Farming area*. Retrieved 13 September 2020, from https://www.oae.go.th/assets/portals/1/fileups/prcaidata/files/maize%20 province%2062.pdf

Pallant, J. (2010). *SPSS Survival Manual* (4th ed.). Open University Press.

Piegorsch, W.W. (2015). *Statistical data analytics: Foundations for data mining, informatics, and knowledge discovery*. John Wiley & Sons.

Phuphisith, S., Gheewala, S.H. & Sampattagul, S. (2021). Assessing environmentally sustainable practices of smallholder highland farmers: A case study of maize production in Northern Thailand. *Clean Technologies and Environmental Policy,* 1-14.

Puangchan, P. (2020). The policy implementation of the organic agriculture development for small farmers in the upper northern of Thailand. *Journal of Interdisciplinary Research: Graduate Studies*, *8*(2), 175-184.

Ragasa, C., Lambrecht, I., & Kufoalor, D.S. (2017). Limitations of contract farming as a pro-poor strategy: The case of maize outgrower schemes in upper west Ghana. *World Development*, *102*, 30-56.

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Sher, A., Mazhar, S., Zulfiqar, F., Wang, D., & Li, X. (2019). Green entrepreneurial farming: A dream or reality. *Journal of Cleaner Production, 220*, 1131-1142.

Smith, E.G., Zentner, R.P., Campbell, C.A., Lemke, R., & Brandt, K. (2017). Long-term crop rotation effects on production, grain quality, profitability, and risk in the northern great plains. *Agronomy Journal, 109*(3), 957–967.

Tejajai, U. (2014). *Guidelines for land development system on highland for sustainable agriculture in northern Thailand*. Land Development Department.

Waheed, A., Bernward Fischer, T., & Khan, M.I. (2021). Climate change policy coherence across policies, planes, and strategies in Pakistan – Implications for the China-Pakistan economic corridor plan. *Environmental Management, 67*, 793-810.

Yamane, T. (1973). *Statistics: An introductory analysis* (3rd ed.). Harper and Row

Development of Presentation Tourist Information to Promote Quality Tourism of Pattaya City

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Abstract

This study aims (1) to find a source of information that influences foreign tourists visiting Pattaya, (2) to examine the impact of news on the behavior of foreign tourists visiting Pattaya, and (3) as implications for policymakers and destination businesses. The sample was 400 inbound tourists to answer questionnaires based on convenience sampling. Descriptive and content analyses are the main analysis methods. The result offers policymakers to design and improve advertising and public relations and create a positive Pattaya image for foreign tourists. This study finds that most tourists are aware of the negative information of Pattaya City at a moderate level. Negative information with the highest mean is plunder news and city of sex show news. Most foreigners trust the negative information of Pattaya City at a moderate level. Negative information with the highest mean is city of sex show news, motorcycle accident news, and car accident news. Most foreigners are afraid of the negative information of Pattaya City at a moderate level.

Keywords: Quality tourism; Presentation; Tourist Information; Pattaya

Introduction

Thailand is one of the significant tourist income countries; It can be seen from the increasing tourism income every year. Most recently, in 2016, total revenue from tourism was as high as 2.51 trillion baht, accounting for 17% of Gross Domestic Product. The expansion of the tourism business has resulted in various businesses and services expansion, such as hotels and guest houses, accommodation, food and beverage, car rental, souvenir business, local products—tourist attractions in Thailand that are popular with foreigners. According to the Google Adword search statistics between June 2016 and June 2017, the top 10 nationalist attractions are Koh Lan (Pattaya), followed by Chiang Mai, Koh Chang, and Khao Yai, respectively Pattaya City is ranked eighth. The tourism situation in 2016 found that more than 13.6 million tourists have stayed in Pattaya, more than 200 billion baht in revenue. After the first quarter of 2017, more than 8 million tourists increased by 5% or approximately 1.1 billion baht. (Office of the Permanent Secretary for Tourism and Sports,2019). News media is a crucial factor influencing tourist behaviors. There are many problems for foreign tourists visiting Pattaya, such as news of controversy and being ill swiped the property, enforce the purchase, fraud, motorcycle accident, boat accident, prostitution of children, being a city of sex. Examining the role of information influencing tourists' perceptions is the main focus of

this study. The finding would help the city planners and tourism stakeholders collectively improve city image and advertise accordingly.

Research Objectives

    1. To find a source of information that influences foreign tourists visiting Pattaya

    2. To study the impact of news on the media exposure behavior of foreign tourists visiting Pattaya

    3. To use the study results to plan advertising and public relations and create a positive image of Pattaya to foreign tourists.

Literature Review

    1. Concept and theories of communication.

Lasswell's communication process,who(sender), say what (message), which message(media), to whom (receiver), with what effect(effect) (Parama, 1996: 28-29)

Fig. 1. Lasswell communication process model

| sender | → | messages | → | media | → | receiver | → | effect |
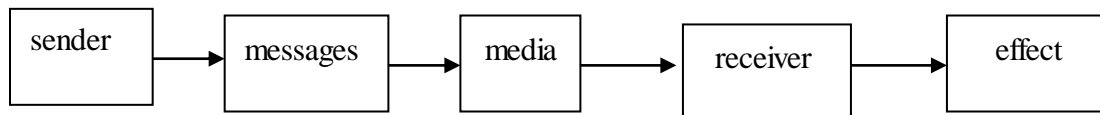
    2. Types and characteristics of media

Mass media can be divided into several types as follows (Parama,1996: 134-135)

    2.1 mass media

        Mass media is a medium that reaches a large number of people promptly

    2.2 personal media

        Personal media is an exchange media by one to one

    2.3 Special media is media produced by a specific group

    3. Concept and theories of media behavior

    In the communication process, the messages must attract the attention of the tourists. News that reaches the audience's attention tends to make communication more effective. (Scharmm,1973: 200).

    3.1 The exposure supports existing attitudes, ideas, and understandings and provides relevant knowledge and guidelines to influence tourists positively.

    3.2 In a research study on audiences based on demographic characteristics theory. The researchers also focused on differences in exposure behavior between females and males. There are some differences between females and males in their exposure to the media.

    3.3 Older adults, age and media exposure behavior, tend to use the mass media to seek heavy information more than entertainment. Older people read to editors, news, politics, editorials. Older people watch news-related television programs.

    3.4 Several studies show that education relates to information exposure behavior; for example, the more educated use social media and print media, while people with low education tend to use radio, television, and film media.

4. Concept and theories of tourism

Tourism Marketing Mix

Destinations have used marketing mix, such as the 4Ps, to influence tourists to make decisions favorable to the destination (Pimonsompong Chalongsri, 2002: 15-17):

4.1. The product domain consists of presentation, service elements, and brandings such as tour guide service itineraries, hotels, plane tickets, buses, and attractions.

4.2 Price consists of objectives, setting prices, pricing policies, and strategies, including products and services, tour guide service, airfare, accommodation, entrance fees to places or shows.

4.3 Place outlines the distribution channels, including travel companies and dealers of hotels, shows, other attractions.

4.4 Promotion consists of advertising, public relations and publicity, and sales promotion, including trade alliances, price reduction, installment payment giveaways, or gifts.

Conceptual Framework

This study is quantitative research. The researcher defines the research
a conceptual framework based on the concept/theory of communication and media behavior, the details are as follows.
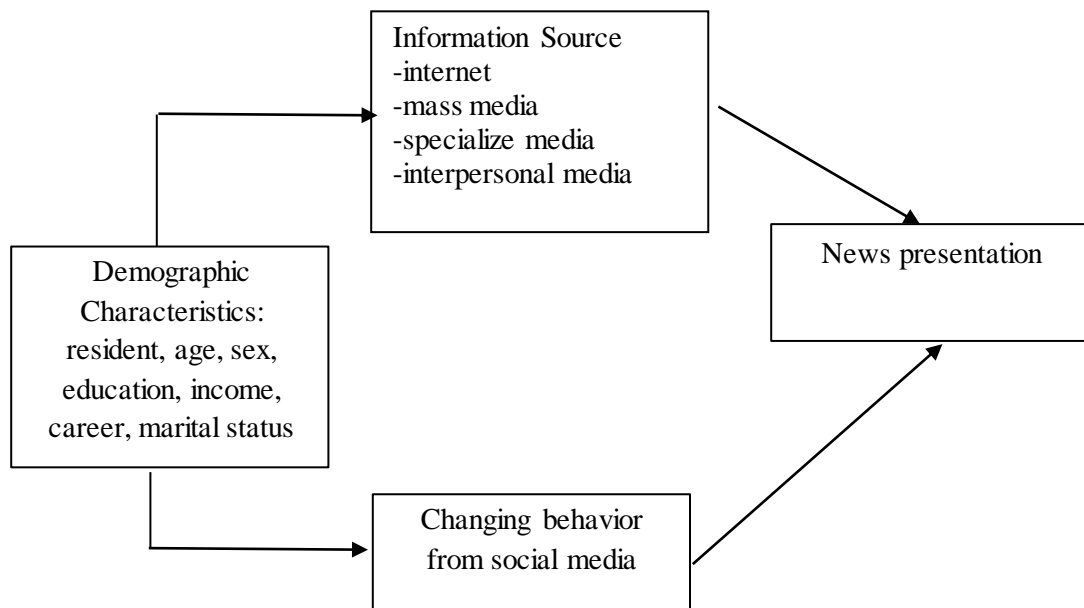

Fig.2. Conceptual Framework

Research Methodology

1. Population and Samples

Population: Foreign tourists traveling to Pattaya from January 2018 to May 2018

Sample: 400 Foreign tourists traveling to Pattaya

2. Research Instrument

Structured Questionnaire

Part 1. Personal characteristics and the nature of travel.
Part 2. Questionnaire items about receiving damaging information about Pattaya, Check Lists, Likert Scale 5 levels.

3. Collection of Data

Convenience-based Sampling from 400 foreign tourists visiting Pattaya.

4. Data Analysis

4.1 Analyze general population data. The statistics used were frequency, percentage, and Average.

4.2 The statistics used were average about measuring the frequency of perceiving negative information about Pattaya, belief in negative information, fear of negative information, and Influencing tourism decisions and planning.

Research Results

The inbound tourists who participated are primarily female, single, under the age of 30 years, the highest level of education is Bachelor, professional employees, earn less than 20,000 US dollars. The inbound tourists mainly came from England, Russia, USA., China and India, respectively. The Average for staying in Thailand is 12 days, travel by themselves, alone, the main reason to come to Thailand is nature and climate.

Table 1. Number and percentage of respondents Classified by address

Country	Number	Percentage
England	47	11.76
Russia	39	9.69
USA	28	6.92
China	27	6.57
India	19	4.84

The table shows that foreign tourists visiting Thailand Most places are in England 11.76%, Followed by Russia 9.69 percent, America 6.92 percent, China 6.57 percent, and India 4.84 percent.

Objective 1. The results showed the source of information that influences foreign tourists visiting Pattaya

Table 2. The mean and standard deviation of the participants' opinions regarding influential media before visiting Thailand**.**

Influential media before deciding to visit Thailand	$\bar{x}$	**S.D.**	level	Ranking
1.YouTube	3.22	1.36	most	3

2. Social Media	3.44	1.35	most	2
3. Tourism organization	3.00	1.31	very	5
4. Travel website	3.13	1.32	most	4
5. Blogs	2.97	1.26	very	6
6. Traveling Guide Book	2.95	1.33	very	7
7. Magazine	2.63	1.26	very	9
8. Movie	2.85	1.26	very	8
9. Friends	3.83	1.16	most	1

The table found that Average about the influential media before deciding to visit Thailand; the number 1 is friend followed by social media, youtube, and website about travel.

Objective 2. The results showed that the impact of news on the news exposure behavior of foreign tourists visiting Pattaya

Table 3. Average of receiving the negative information of Pattaya city for foreign tourist

Perceive the negative news	$\bar{x}$	**S.D.**	level	Ranking
1. Insecurity in life and property news 1.1 Plunder news	2.80	1.16	moderate	1
1.2 Brawl, Assault news	2.73	1.16	moderate	2
1.3 Prescription and plunder news	2.57	1.16	moderate	7
1.4 Disease epidemic news	2.64	1.17	moderate	4
2. Tourist fraud news 2.1 Food price fraud news	2.69	1.13	moderate	3
2.2 Equipment rental price fraud news	2.61	1.13	moderate	6
2.3 Fare fraud news	2.54	1.15	moderate	9
2.4 Other Services price fraud news	2.54	1.17	moderate	9
3. Accident news 3.1 Boat accident news	2.55	1.16	moderate	8
3.2 Car Accident news	2.57	1.15	moderate	7
3.3 Player Accident news (scooter, jetski)	2.52	1.11	moderate	
3.4 Motorbike Accident news	2.63	1.16	moderate	5
4. News of the city of sex 4.1 city of sex show news	2.80	1.19	moderate	1
4.2 Child prostitution news	2.52	1.16	moderate	10

4.3 Gay bar, Boy prostitution news	2.57	1.14	moderate	7
4.4 Imprisonment news	2.47	1.14	moderate	11

The table shows that most of the respondents perceived the negative information of Pattaya city at a moderate level. By perceiving the negative information with the highest Average, news about being a sex show city and plunder news followed by the brawl, assault news, and food price fraud news.

Objective 2. The results showed that the impact of news on the media exposure behavior of foreign tourists visiting Pattaya

Table 4. Average of the trust about negative information of Pattaya

The trust in negative information	$\bar{x}$	**S.D.**	level	Ranking
1. Insecurity in life and property news 1.1 Plunder news	2.60	1.14	moderate	7
1.2 Brawl, Assault news	2.65	1.12	moderate	4
1.3 Prescription and plunder news	2.49	1.04	moderate	
1.4 Disease epidemic news	2.57	1.11	moderate	10
2. Tourist fraud news 2.1 Food price fraud news	2.58	1.14	moderate	9
2.2 Equipment rental price fraud news	2.55	1.09	moderate	12
2.3 Fare fraud news	2.59	1.13	moderate	8
2.4 Other Services price fraud news	2.54	1.13	moderate	13
3. Accident news 3.1 Boat accident news	2.62	1.17	moderate	5
3.2 Car Accident news	2.67	1.20	moderate	3
3.3 Player Accident news (scooter, jetski)	2.65	1.19	moderate	4
3.4 Motorbike Accident news	2.70	1.19	moderate	2
4. News of the city of sex 4.1 city of sex show news	2.78	1.21	moderate	1
4.2 Child prostitution news	2.61	1.10	moderate	6
4.3 Gay bar, Boy prostitution news	2.56	1.12	moderate	11
4.4 Imprisonment news	2.51	1.13	moderate	14

The table shows that most of the respondents trust the negative information of Pattaya city at a moderate level: with the highest Average being news about being a sex show city, followed by motorbike accident news, car accident news, and player accident news (scooter, jetski).

Objective 2. The results showed that the impact of news on the behavior of foreign tourists visiting Pattaya

Table 5. Average anxiety from negative information in Pattaya

Anxiety from negative information	$\bar{x}$	**S.D.**	level	Ranking
1. Insecurity in life and property news 1.1 Plunder news	2.62	1.15	moderate	3
1.2 Brawl, Assault news	2.54	1.11	moderate	6
1.3 Prescription and plunder news	2.50	1.14	moderate	8
1.4 Disease epidemic news	2.52	1.17	moderate	7
2. Tourist fraud news 2.1 Food price fraud news	2.48	1.13	moderate	9
2.2 Equipment rental price fraud news	2.44	1.16	moderate	11
2.3 Fare fraud news	2.44	1.16	moderate	11
2.4 Other Services price fraud news	2.38	1.10	moderate	12
3. Accident news 3.1 Boat accident news	2.55	1.14	moderate	5
3.2 Car Accident news	2.55	1.16	moderate	5
3.3 Player Accident news (scooter, jetski)	2.55	1.16	moderate	5
3.4 Motorbike Accident news	2.67	1.22	moderate	2
4. News of the city of sex 4.1 city of sex show news	2.70	1.20	moderate	1
4.2 Child prostitution news	2.61	1.15	moderate	4
4.3 Gay bar, Boy prostitution news	2.52	1.15	moderate	7
4.4 Imprisonment news	2.47	1.16	moderate	10

The table shows that most of the respondents were anxious about the negative information of Pattaya city at a moderate level: with the highest Average being news about being a sex show city, then motorbike accident news, plunder news, and child prostitution news.

Discussion

Data from the research found that Most tourists come alone and travel alone, indicating that foreign tourists must be very confident in the safety of their trips to Thailand. Therefore, the Tourist Police must ensure that foreign tourists feel safe when traveling to Thailand. When tourists are impressed, they will tell their friends. Research on media usage among foreign tourists confirms this, and the information that foreign tourists trust the most about Thailand before traveling is friends. In addition, tourism public relations agencies must emphasize the importance of Internet media because it is the media that tourists use the most, especially www. booking.com, followed by www.tripadvisor.com and www.viator.com, to plan for practical and cost-effective use of public relations media.

A message is a plan to counter negative news on the issues tourists are most aware of, a sex-show city robbery news. The news tourists trust the most is a sex show city, motorcycle accident news, and car accidents. The news that worries the tourists the most is a sex show city followed by motorcycle accidents and news robbery news. The news that most affects the decision is a sex show city, robbery news, and car accident news.

Conclusion

The messenger is the person who is directly responsible for the tourism of Pattaya, such as tourism in Pattaya Tourism Authority of Thailand.

This study shows that friends, social media, youtube, and travel websites are the most notable ones, in important ranking, to influence foreign tourists to visit Thailand. The most critical negative information the surveyed tourists receive is insecurity in life and property news, brawl and assault news, news of the city of sex, tourist fraud news, and

food price, in ranking order. When asked which area the tourists trust the most in the negative news, the notable ones are the news of city sex, motorbike accident news, car accidents, brawls, and assault news. The tourists worry most about the negative image of Pattaya as a sex city, followed by motorbike accidents and insecurity in life and child prostitution news.

Realizing the most influential channels are friends, social media, youtube, and travel websites, this study suggests that policymakers and strategists should use these channels to alter potential tourists' perceptions. In addition, the government administration and residents, and the police teams, should work together to improve the images of Pattaya. Changing the image of a city is a collective and systematic effort.

Knowledge from research

Fig. 3 depicts the communication process which this study suggests to improve the positive images of Pattaya city.

Sender
- Tourism in Pattaya
-Tourism Authority of Thailand

Message
-Tourism activities and various tourist attractions of Pattaya
- Confidence in property safety
- Strict traffic rules, use of cars, use of roads, motorcycles wearing helmet

Media
- The word of mouth of tourists
-social media such as booking.com tripadvisor.com viator.com

Receiver
The main foreign tourists visiting Pattaya
-England
-Russia
-USA
-China
-India

The effect of communication
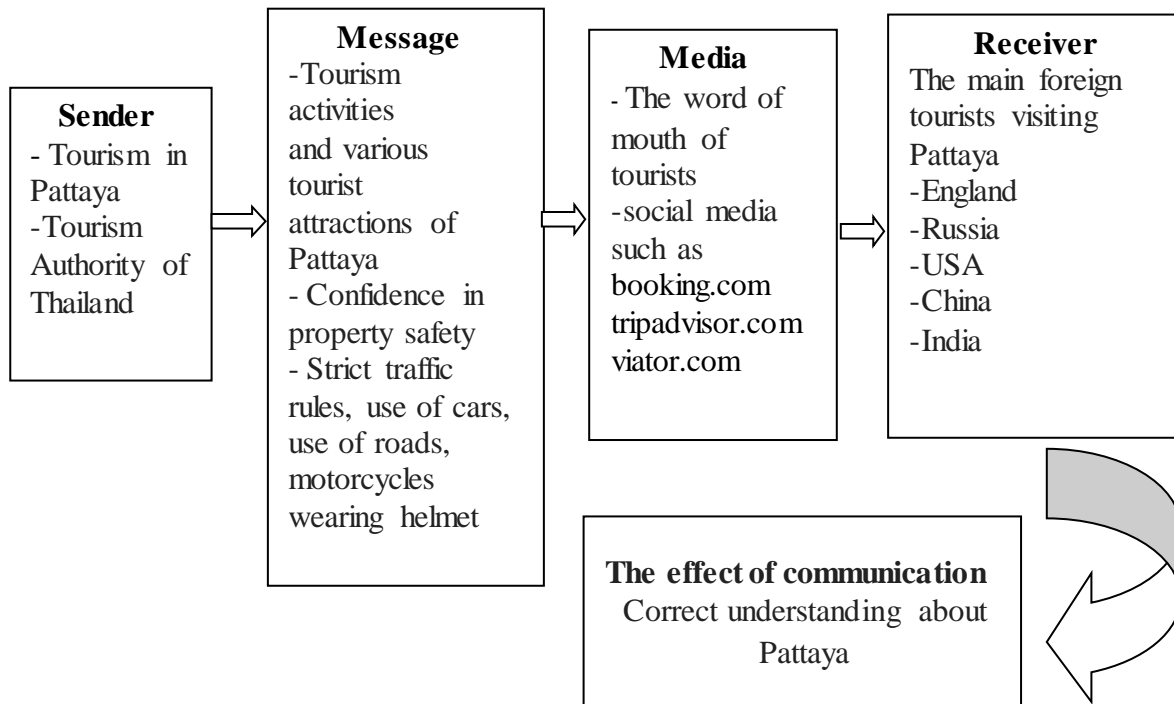Correct understanding about Pattaya

Fig. 3. Communications Framework

References

DeFleur, M. (1970). *Theories of Mass Communication*. David Mckay.

Chalongsri, P. (2002). *Planning and development tourist market*. Kasetsart University.

Lasswell, H. D. (1966). *The Structure and Function of Communication in Society*. Free Press.

Office of the Permanent Secretary for Tourism and Sports. (2019). *Survey of Attitude and Foreigner Tourist Satisfaction in Thailand*. Office of the Permanent Secretary for Tourism and Sports.

Parama, S. (1996). *Principle and Communication Theory*. Chulalongkorn University.

Scharmm, W. (1973). *Men, messages, and media*. Harper & row.

Whyte, P.R. (2004). *The beach is a liminal space. A companion to tourism*. Blackwell.

Impact of Corporate Governance on Firm Efficiency: A Study of Thai Banking Companies

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Abstract

Corporate governance refers to the system by which organizations are directed and controlled. The need for and the relative importance of corporate governance arose in the 1980s due to poor corporate governance, which led to a loss in the value of firms, a downturn in economies, trust deficit in businesses, and corporate responsibility scandals. Good corporate governance will help in reassuring the stakeholders that an organization's Board of directors (BOD) and top management are acting as worthy agents of their principal (the shareholders). Firm efficiency is the effective utilization of a firm's resources to generate more revenues. The present paper addresses whether a positive relationship exists between corporate governance and firm efficiency in Thai Banking companies. It analyzes whether good corporate governance leads to better firm efficiency and helps users' decision-making. For this purpose, the corporate governance scores (CG scores) of eleven (11) Thai banking companies (Public Companies Limited) have been compared and evaluated with their firm efficiency for each of the five years from 2015 to 2019. Data Envelopment Analysis (DEA) has been performed on essential financial items to determine firm efficiency. These financial items relate to the ones used in DuPont analysis. They have been obtained from the banks' financial statements. The findings report the change in CG scores and DEA firm efficiency of Thai banking companies and the impact of corporate governance on the efficiency of these firms. There is a clear and positive relationship between corporate governance and firm efficiency for most Thai banking companies but not for all of them.

Keywords: Corporate governance; firm efficiency; DEA; CG scores; Thai banking companies

Introduction

Corporate governance refers to how an organization is directed and controlled by its Board of directors (BOD) and senior management. The Stock Exchange of Thailand (SET) defines corporate governance as a relationship between the Board of directors, its management team, shareholders, and other stakeholders in controlling its direction and monitoring its operations and administration. Claessens and Yurtoglu (2006) suggest that corporate governance considers matters like how the Board of directors operates, the roles of shareholders and stakeholders, executive compensation in determining the performance of a firm, and the relationship between labor policies and firm performance.

Mekong Capital (2003) mentioned the benefits of good governance, which are as follows:

- Higher valuation: The study indicated a high correlation between corporate governance and a company's performance.
- Capital efficiency: Companies with good governance are more likely to make better decisions and generate higher returns on their spending towards growing the revenue.
- Higher returns for shareholders: Good governance offers higher returns to the shareholders
- Mitigation of risks: Good governance, including transparency, transparent procedures, and responsibility for important decisions, could empower the company's Board to have better control and sound risk management that aids in mitigating the risks.
- Improved vision: Corporate governance helps improve an organization's vision through effective leadership by its Board and top managers.
- Transparency and social accountability: It enhances transparency and accountability in an organization, bolsters public confidence.

One of the causes of the financial crisis in Thailand in 1997 was poor corporate governance. Poor governance was responsible for frivolous lending by financial institutions, overusing short-term foreign currency-denominated loans to finance long-term investments, expropriation of company funds by managers and owners, risky business deals, and poor audits. The main factors contributing to weak corporate governance in Thailand were: ineffectiveness of regulatory framework, lack of transparency and adequate disclosure, and family-based corporate ownership structure (Limpaphayom, 2001). Weak corporate governance may cause various risk factors to stakeholders of the company such as loans to related parties, loans from related parties, asset sales to shareholders, asset purchases from shareholders, contracts with related parties, share sales to shareholders, share purchases from shareholders, fraudulent asset transfers, poor transparency, and unclear procedures. Each of these risk factors would harm shareholders and stakeholders. It may lead to poor transparency, and the investors would not make sound decisions (Mekong Capital, 2003).

Firm efficiency refers to how well the company utilizes its resources to generate revenues. Although the scope of firm efficiency can differ, depending on the type of research conducted and the economic situation in which a firm operates, its underlying import lies in the effective utilization of scarce resources that an organization has. Koh and Nawalkha (2020) define firm efficiency as an organization or a manager's ability to use its resources to maximize output based on a selection of input variables. Processes used in production, manufacturing, and service industries have become more efficient due to the increasing use of technology. Examples include data analytics, robotics, and enhanced processing power.

For this research, corporate governance (CG) scores are used to determine the quality of corporate governance in Thai banking companies. CG scores were obtained from the Thai Institute of Directors (IOD) website for the sample of banking companies. These scores will assist in knowing how well the corporate governance performance for the sample of these companies has been. Data envelopment analysis (DEA) is effective in measuring firm efficiency comparison. It is a non-parametric linear programming technique that converts input and output variables to an aggregate score relative to the best-in-class observations. Sherman and Zhu (2013) mentioned that DEA helps companies benchmark and identify best practices that are not easy to achieve using management techniques. DEA can be used to determine service organizations' efficiency and performance evaluation.

Lin et al. (2009) suggested that the corporate governance indicators like the proportion of outside directors and number of board meetings are positively associated with the firm efficiency in Chinese manufacturing firms. They provide credible signals to minority

investors of firms with an insider-dominated or small board. The authors also mentioned that firm efficiency was positively related to public and employee share ownership while negatively related to state ownership. In a sample of manufacturing firms from sixteen countries, Nanka-Bruce (2011) mentioned that corporate governance could contribute towards better technical efficiency of firms by increasing the large external shareholders. The author also suggested that a firm should increase the size of non-executive directors when the firm has widely dispersed directors or the executive directors are underperforming.

Nguyen and Vo (2020) examined the impact of corporate governance on the efficiency of ASEAN banks. They suggested that government-owned banks were more cost-efficient, but private and foreign banks were more efficient. They also mentioned that CEO duality, board independence, and foreign ownership showed no significant effect on bank efficiency levels. Another paper by Hsu and Petchsakulwong (2010) also studied the effect of corporate governance on efficiency, but it was done for Thai non-life insurance industry. There is still a lack of studies about the impact of corporate governance on the efficiency of Thai banking companies. There has also been a lack of studies on determining the efficiency of the firms by using the DEA technique on the Thai banks. Thus, more study and evidence are required to expand knowledge in this area and assist the managers, investors, and other users in better decision-making.

As an attempt to fill this research gap, the objective of this study is to address whether corporate governance in an organization is positively related to its efficiency or not. The point here is to analyze if good corporate governance will lead to better firm efficiency for a sample of Thai Banking companies and therefore help users' decision-making by analyzing the relationship between CG and firm efficiency. Results from this study will provide a further contribution to existing literature that still needs more evidence regarding the effect of corporate governance on firm efficiency in Thai banks. In addition, the results will also provide implications to the stakeholders like managers about which companies demonstrate a positive relationship between good corporate governance and efficiency and which ones do not. This may help the managers of banks, for instance, identify and analyze the causes or factors responsible for lower firm efficiency despite having good corporate governance.

Literature Review

History of Corporate Governance

Corporate governance has been referred to as creating an environment that stimulates trust within an organization. In the capital markets, the word trust has been associated as an essential factor for buying shares. It is so because without trust, investors will not buy shares, and without access to adequate funding sources, companies cannot prosper quickly. Corporate governance has also been a significant consideration among foreign investors looking at Thai capital markets. However, corporate governance was not deliberated upon in the professional or academic literature before 1980.

Corporate governance was primarily brought to focus in 1987 by the Treadway Commission in the United States, which issued a report on fraudulent financial reporting and asserted the role and status of audit committees. Afterward, in May 1991 in the UK, the Cadbury Committee was set up by Financial Reporting Council (FRC), the London Stock Exchange, and the accountancy profession to look into the low level of confidence of stakeholders in financial reporting and inadequacy in the work of auditors who audit the financial reports. In addition, the responsibilities of the Committee were to report on the financial aspects of corporate governance, consider the responsibilities of executive and non-

executive directors, the case for the audit committee, the principal responsibilities of auditors, the extent and value of the audit, and the links between shareholders, boards, and auditors. This Committee recommended three principles of the Code of Best Practice to be the guidelines for the companies, which are:
- Openness: subject to corporate confidentiality
- Integrity: honest, balanced, and complete financial reporting
- Accountability: requirement for directors to provide quality information and for shareholders to exercise their powers as owners' responsibility

Significance of corporate governance in modern times

Jo and Harjato (2011) suggested that corporate governance manages the interest of shareholders and non-investing stakeholders and helps resolve the conflict between the two. Accelerated corporate governance in the last decade has also led to the growth of Corporate Social Responsibility (CSR), ensuring the firm's sustainability through transparency and accountability (Jo and Harjato, 2011). In other words, CSR is an extension of an organization's efforts to provide better corporate governance and enhance its sustainability.
Good corporate governance promotes investor confidence. Therefore, it is crucial to raise capital from potential investors. The companies should focus on a holistic and informative explanation of their corporate governance framework to their stakeholders.

The role of the Board of Directors (or Board) is crucial to good corporate governance. Denis and McConnell (2003) mentioned that the Board exists mainly to recruit, disengage a senior employee from service, monitor and compensate management with the significant objective of maximizing the shareholders' value. In theory, it is an effective mechanism but may not be so in practice. In the US, the Board of Directors includes some of the very insiders to be monitored (Denis & McConnell, 2003). There is also a possibility that the Chief Executive Officer (CEO) is the chairperson of the Board. In other words, it raises some questions on whether good corporate governance is possible in such situations or not.

Corporate Governance in Thailand

Initial interest and concern concerning corporate governance in Thailand started in the 1980s by Siam Cement Plc., Thailand's most significant conglomerate in building and construction materials. This company adopted a code of best practice by following the governance model of IBM. Despite this, there was generally a lack of development and interest towards corporate governance until the financial crisis in 1997. At that time, The Stock Exchange of Thailand (SET) realized the significance of corporate governance in developing the capital markets after the banks and many other financial institutions collapsed. Since then, corporate governance practices have been studied and taken seriously.

The SET has continuously supported listed firms to establish their CG systems. In 2002, the SET supported listed firms' good CG by proposing the 15 Principles of Good Corporate Governance as preliminary guidelines to implement. In 2006, the principles were revised to be comprehensive and comparable to the Principles of Corporate Governance of the Organization for Economic Co-operation and Development (OECD). Also, it includes recommendations made by the World Bank in its Report on the Observance of Standards and Codes related to Thai CG (CG-ROSC).

The Stock Exchange of Thailand (SET) and the Securities and Exchange Commission (SEC), Thailand have cited four factors to promote good corporate governance. These factors are:

- Fairness: To treat shareholders and creditors fairly and protect them against fraud and misconduct
- Transparency: To disclose accurate and timely information of both financial and non-financial aspects of a company
- Accountability: To set up a structure of accountability for the Board of directors and executives and make them accountable towards the interest of shareholders and creditors
- Responsibility: Management should take responsibility regarding the interests of the organizations' shareholders and stakeholders.

Prommin et al. (2014) studied the effect of corporate governance on stock liquidity in Thailand. The authors suggested that effective corporate governance provided better operational and financial transparency in firms and that this led to a significant improvement in the stock liquidity. They have claimed that a rise in governance quality by one standard deviation improves the stock liquidity ratio by 26.19%.

Hoontrakul and Karnchanasai (2010) suggested that the majority of the privately owned banks in Thailand are efficient and have better corporate governance. The authors mentioned that the Bank of Thailand (BoT) has continuously updated its bank functioning and corporate governance regulations. The Thai banks can do better with a clear strategic direction.

According to the Institute of Directors (IOD) in Thailand, the Thai banking sector has consistently been the best performing in corporate governance over the years compared to other sectors. The Thai SEC requires Thai companies to disclose their CG practices in the 56-1 business report and the annual Report. For instance, Thai banks scored highest on the IOD 2019 and 2018 CG ratings. All the banks scored an excellent or very good CG rating in both years. In general, the companies with high market capitalization from different sectors have exhibited a better corporate governance performance in Thailand.

Corporate Governance parameters

Iftikhar et al. (2017) studied the relationship between corporate governance and Pakistani listed commercial banks' technical efficiency from 2005 to 2014. The study found a statistically significant positive relationship between a corporate governance index and the technical efficiency observed in the banks. The corporate governance index used in the study was subdivided into the following five areas: Board of directors, audit committee, disclosure and transparency, remuneration committee, and shareholder's rights.

Like the CG scores in Thailand, corporate governance benchmarking benefits the shareholders, creditors, management, employees, directors, policymakers, academics, analysts, customers, and regulators. CG score for a firm may help in investment screening, pricing the new capital issues, and guiding regulation and policy. It helps the various stakeholders evaluate a firm's corporate governance practice and compare the firms. It also supports comparing corporate governance practices from one country to another.

The Thai Institute of Directors (Thai IOD) compiles annual corporate governance scores for nearly all listed Thai companies. The IOD evaluates corporate governance using five categories, namely: Rights of Shareholders (15%), Equitable Treatment of Shareholders (10%), Role of Stakeholders (20%), Disclosure, and Transparency (20%), Board Responsibilities (35%). Each category's weightings to the firm's corporate governance score have been included in parentheses. The Thai IOD calculates a weighted average score by checking a list of criteria related to each corporate governance category. The individual scores of each company are not made publicly available, but the Thai IOD reports company performance by categorizing performance; the following categories are used: Excellent

(*****) for CG scores greater than 90, Very Good (****) for scores between 80 and 89, Good (***) for scores between 70 and 79. If a listed firm is not included in one of the above categories, it can be assumed to achieve a score of lower than 70.

Firm Efficiency

Different scholars have also used different techniques to determine firm efficiency. One such technique is known as the modified form of the technique for order preference by similarity to ideal solution (TOPSIS). Deng et al. (2000) pioneered the new method to analyze and rank the firms based on their overall performance on multiple financial ratios. It can also be considered as a multiple-criteria analysis for inter-firm comparison using financial ratios. Scholars have also used Tobin's Q ratio to measure firm performance.

Another technique that industry practitioners and research scholars use to value a firm is the Data Envelopment Analysis (DEA). Sharma (2018) has defined DEA as a usual non-parametric method that uses linear programming to measure the relative performance of similar units of a firm or between the firms. This technique uses multiple input and output variables to generate an overall score. Anadol et al. (2014) mentioned that DEA could play an important role in firm valuation as it is a relatively advanced technique. Anadol et al. (2014) used this method to determine the efficient and inefficient American companies.

DEA has not been used in financial analysis, although its use has grown since 2000 and onwards. One of the significant advantages of using this technique is that multiple input and output factors can be used to generate the relative efficiency of the firms. The use of DEA contrasts to ratio analysis which typically compares one financial item with another to derive information. For instance, the Return on Assets ratio expresses the relationship between net profit and the average total assets of a firm to throw light on the asset efficiency. Since DEA can use multiple inputs and outputs simultaneously, it provides a holistic view and a pragmatic relative efficiency and performance of a firm. Another advantage of using DEA is that it provides a relative measure of a firm's efficiency vis-a-vis other firms. However, it does not indicate an average efficiency or median efficiency. So, it becomes easier and straightforward to analyze and compare the firms and helps investors in their decision-making process.

Zhu et al. (2021) conducted an efficiency and productivity analysis of Pakistan's banking industry using the DEA approach. They used interest and non-interest expense as input variables and interest income and non-interest income as the output variables. They selected these variables based on past studies done by Zhu and Shah (2019) and Avkiran (1999). Rodríguez-Pérez et al. (2011) researched 85 Spanish insurance companies and considered total expenses, financial investments in associated and group companies, other financial investments, land and buildings, and other assets as input variables while considering total revenues as output variable. These variables were used to determine firm efficiency by using DEA analysis. They considered these input variables because they form a significant chunk of a financial (insurance) company and will therefore affect the generation of revenue (the output variable). They also considered the changes in the historical cost basis to fair value basis. They advocated that some of these input variables will show significant differences between the two valuation bases and, therefore, help determine and compare the firm efficiency by using each valuation basis. Different authors and scholars have used different variables based on the nature and scope of their studies and the variables used in the past studies for related research.

Research Hypothesis

H1: High corporate governance score leads to the high efficiency of the Thai banking companies.

H2: Ranking of Thai banking companies based on their corporate governance scores will concur with the ranking based on their efficiency.

Research Methodology

Sample and data collection

The annual reports of a sample of eleven (11) Thai banking public companies limited (PCL) were obtained. All the financial information related to the variables chosen, like total expenses, available for sale securities, annual revenue, etc., were obtained from the financial statements or notes to the financial statements. This was done in order to test the hypothesis and analyze the findings. The present research is based on secondary data, which is the annual reports/financial statements of the Thai banking PCL. The main reason for selecting banking companies is that they are critical to developing the Thai economy and contribute a substantial portion to Thailand's Gross Domestic Product (GDP). Finance (including banking) and the insurance industry contributed Thai Baht 1.27 trillion towards the country's GDP in 2019.

The annual reports and related financial information were obtained from these companies' websites, the settrade.com website, and the Stock Exchange of Thailand (SET) website. The information on available-for-sale securities, securities-held-to-maturity and land & buildings was collected from the balance sheet of the sample of companies. The information for revenues and expenses was taken from the income statement of these companies. Expenses, available-for-sale securities, securities-held-to-maturity, and land & buildings have been taken as input variables. In contrast, the revenue is considered as an output variable for this research.

The first word in capital letters of these banking companies mentioned below refer to their stock symbol or ticker, and these symbols will be used more often in this research. The list of these companies is as follows:

KBANK – Kasikorn Bank Public Company Limited; TTB - TMBThanachart Bank Public Company Limited; BBL - Bangkok Bank Public Company Limited; KTB - Krung Thai Bank Public Company Limited; BAY - Bank of Ayudhya Public Company Limited; KKP - Kiatnakin Phatra Bank Public Company Limited; CIMBT - CIMB Thai Bank Public Company Limited; SCB - The Siam Commercial Bank Public Company Limited; TCAP - Thanachart Capital Public Company Limited; TISCO - Tisco Financial Group Public Company Limited; LHFG - LH Financial Group Public Company Limited

The information regarding the corporate governance scores (CG score) of the sample of companies has been taken from the Thai Institute of Directors (IOD) website. The Institute of Directors is a leading organization for improving corporate governance and director professionalism in Thailand. The organization's guidelines on corporate governance are considered reliable and effective, nationally and globally.

The assessment of the corporate governance practices of Thai listed companies is done by the IOD in collaboration with the Stock Exchange of Thailand (SET). The assessment criteria are developed based on the Thai Corporate Governance Code for Listed Companies and the Organization for Economic Cooperation and Development (OECD). It is then

published in a comprehensive report, "Corporate Governance Report of Thai Listed Companies (GCR)".

Measures

a. Focus was placed on the financial items likely to affect banking companies' efficiency. They included the annual revenues as the output and expenses, available-for-sale securities, securities-held-to-maturity, and land & buildings as the inputs. In other words, these variables relate to the ones used in DuPont analysis.

b. Standard deviation was used to study all the variables under consideration, like companies' expenses for different years. This was done to know the dispersion of the variables from the mean.

c. The CG scores of Thai banking companies were compared with their efficiency scores for each of the five years from 2015 to 2019 to test hypothesis H1.

Table 1. CG scores description categorized by the Institute of Directors

Score	90-100	80-89	70-79	60-69	50-59	<50
Description	Excellent	Very Good	Good	Satisfactory	Pass	N/A

The significant categories of assessment of corporate governance by IOD and SET include the role of stakeholders (20%), disclosure and transparency (20%), board responsibilities (35%), rights of shareholders (15%), and equitable treatment of shareholders (10%). A steering committee comprising industry leaders reviews and comments on the CG score evaluation process.

d. Relative efficiency for each year of Thai banking companies was determined using DEA analysis and evaluated with the ranking of these companies based on their corporate governance scores. This was done to test hypothesis H2. DEA analysis is a proven method to determine firm efficiency and is especially relevant when the data is not normally distributed as it is a non-parametric method. A non-parametric method does not make any assumption about the characteristics of the sample or its parameters and usually means that the data does not have a normal distribution.

One sample Kolmogorov- Smirnov (K-S) test is also used to determine if a variable is normally distributed or not. e. The skewness & kurtosis and one-sample Kolmogorov-Smirnov (K-S) test were performed to determine if the data is normally distributed or not. Skewness can be quantified as representing the degree to which a given distribution varies from a normal distribution, while kurtosis measures whether the data are lightly tailed or heavily tailed relative to the spread or normal distribution.

The use of CG scores and DEA efficiency methods will help to achieve the objective of this study which is to address whether corporate governance in a bank is positively related to its efficiency or not. CG scores are provided by IOD, which is a reliable organization in Thailand. These scores are derived for companies through the use of scientific assessment methods. DEA is an effective and reliable non-parametric method used to determine an organization's efficiency.

DEA and statistical analysis

DEA software DEAP and SPSS software were used to perform this research. DEAP software was used to determine companies' efficiency scores, while SPSS software was used to determine Standard deviation, mean and perform Kolmogorov-Smirnov (K-S) test.

DEA can effectively determine an overall score for the efficiency of a firm based on the input and output variables. It is a powerful tool in analyzing the efficiency of a firm. In financial statement analysis, input and output variables are the primary financial items or accounts that can significantly affect firms' efficiency. In the DEA model used in this study, total expenses, Available-for- sales-securities, Securities-held-to-maturity, Land & Buildings have been taken as input variables. At the same time, annual revenue is considered an output variable. These input variables are a firm's significant resources that help it generate its total revenues. Therefore, these variables have been taken as the inputs which affect the output, i.e., total revenues. Contrasting outputs to inputs helps to determine the efficiency of a firm.

Table 2. Input and Output Variables used in DEA model

Input variables	Output variable
Total expenses	
Available-for- sales-securities	Total revenues
Securities-held- to-maturity	
Land & Buildings	

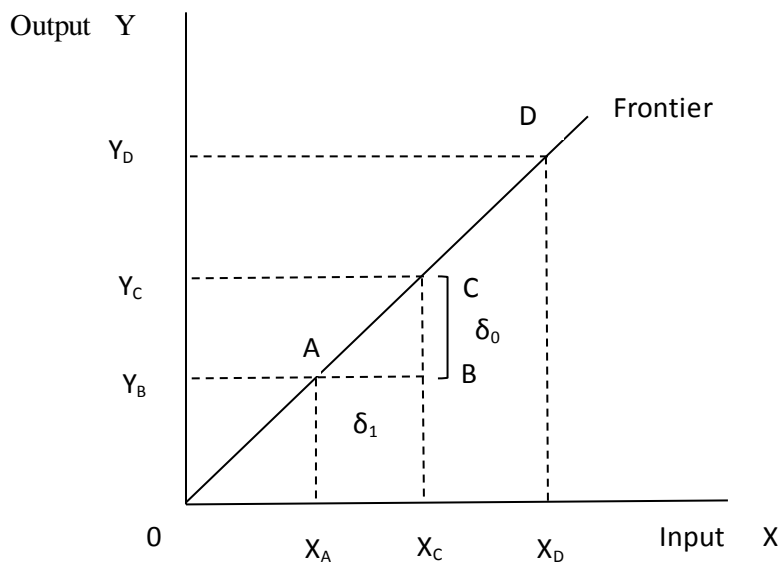A simple DEA model of one input variable and one output variable is explained below:

Fig. 1. Simple DEA model - one input variable and one output variable

The decision-making units (DMUs) or firms A, C, and D are considered the most efficient as they are on the efficiency frontier among a set of observations. The curve from 0 and passing through A, C, and F is the efficiency frontier because it shows the best input and

output variables combinations. Firm B is inefficient as it is not on the efficiency frontier. To be efficient, it can do one of two things; one way is to reduce its input from X_C to X_A while keeping the output Y the same. Labeled YB. Another method is increasing its output variable from Y_B to Y_C while keeping the same (X_C) input. It can be expressed as follows:

1. Firm B should increase its output by δ_0

$$\gamma = \frac{Y_C/X_C}{Y_B/X_C} > 1$$

Here γ represents the factor by which Firm B's output should be improved to become fully efficient. This approach is called the output-oriented approach as it focuses on improving the output variable.

2. Firm B should decrease its input by δ_1

$$\theta = \frac{Y_D/X_G}{Y_D/X_E} > 1$$

Here θ represents the factor by which Firm B's input should be decreased to become fully efficient. This approach is called the input-oriented approach because it aims at decreasing the input and maximizing efficiency.

For this research, an output-oriented approach and constant returns-to-scale have been assumed. Technical efficiency of 1 is considered the best and means that the decision-making unit (DMU) is the most efficient, whereas a score of 0 means the DMU is least efficient among its peers. In other words, the technical efficiency of DMUs can have a score between 0 and 1, with 0 representing the least efficient firm, while the more the score, the better is the efficiency of a firm with the maximum at 1. DMUs refer to the firms under consideration for their firm efficiency.

Results

Financial year (FY) 2015

The following information has been taken from the financial statements and annual reports from 2015-2019. This data pertains to the input and output variables chosen for DEA analysis of eleven (11) banking companies (Public Company Limited) in Thailand. PCL means Public Company Limited. **All units are in Thai Baht (THB) million.**

Table 3. Financial information of Thai banking companies for FY 2015

Bank Name	Annual revenue	Total expenses	Available-for-sales-securities	Securities-held-to-maturity	Land & Buildings	Corporate governance Score
KBANK	147,515	66,656	215,365	248,272	45,284	excellent (5 stars)
TTB	33,450	16,467	40,814	39,557	10,292	excellent (5 stars)
BBL	102,728	45,045	441,497	16,213	46,108	very good (4 stars)
KTB	116,607	50,920	93,740	124,706	26,355	excellent (5 stars)
BAY	82,773	38,947	107,756	1,006	20,993	very good (4 stars)
KKP	15,057	7,822	12,940	1,005	1,892	excellent (5 stars)
CIMBT	12,234	7,127	26,518	22,399	2,770	very good (4 stars)
SCB	137,258	48,797	382,200	133,064	39,988	excellent (5 stars)
TCAP	39,895	20,009	160,527	11,053	8,047	very good (4 stars)
TISCO	16,489	5,527	7,886	191	2,633	excellent (5 stars)
LHFG	5,543	2,400	2,353	44,824	499	excellent (5 stars)

Financial year 2016

Table 4. Financial information of Thai banking companies for FY 2016

Bank Name	Annual revenue	Total expenses	Available-for-sales-securities	Securities-held- to-maturity	Land & Buildings	Corporate governance Score
KBANK	153,403	63,854	336,234	298,065	49,728	excellent (5 stars)
TTB	35,223	16,589	24,355	25,309	12,383	excellent (5 stars)
BBL	105,858	50,505	462,742	18,121	45,231	very good (4 stars)
KTB	124,668	50,631	106,241	103,088	27,313	excellent (5 stars)
BAY	91,487	43,080	114,497	16,700	25,221	excellent (5 stars)
KKP	16,156	7,352	12,914	1,093,949	2,092	excellent (5 stars)
CIMBT	12,928	7,424	30,433	17,511	3,671	very good (4 stars)
SCB	133,334	51,644	438,473	122,166	40,888	excellent (5 stars)
TCAP	40,747	21,073	165,736	2,917	9,605	excellent (5 stars)
TISCO	16,757	6,541	6,753	16	2,653	excellent (5 stars)
LHFG	6,967	2,602	6,859	45,803	404	excellent (5 stars)

Financial year 2017

Table 5. Financial information of Thai banking companies for FY 2017

Bank Name	Annual revenue	Total expenses	Available-for-sales-securities	Securities-held- to-maturity	Land & Buildings	Corporate governance Score
KBANK	156,856	66,372	171,397	338,003	50,137	excellent (5 stars)
TTB	37,439	17,792	36,865	23,851	12,071	excellent (5 stars)
BBL	112,468	48,948	533,651	11,233	30,763	very good (4 stars)
KTB	123,224	49,483	158,497	41,837	26,019	excellent (5 stars)
BAY	100,480	48,210	66,797	16,438	26,401	excellent (5 stars)
KKP	16,298	8,578	16,737	1,218	2,744	excellent (5 stars)
CIMBT	13,155	7,613	20,811	13,600	3,588	very good (4 stars)
SCB	182,579	57,650	432,064	120,671	44,164	excellent (5 stars)
TCAP	47,323	20,836	155,454	2,024	8,678	excellent (5 stars)
TISCO	18,394	7,671	7,127	0	2,653	excellent (5 stars)
LHFG	6,493	2,721	1,246	47,146	343	excellent (5 stars)

Financial year 2018
Table 6. Financial information of Thai banking companies for FY 2018

Bank Name	Annual revenue	Total expenses	Available-for-sales-securities	Securities-held-to-maturity	Land & Buildings	Corporate governance Score
KBANK	155,483	68,348	266,798	371,025	48,525	excellent (5 stars)
TTB	48,042	17,475	40,830	31,143	11,876	excellent (5 stars)
BBL	121,400	55,165	497,838	19,849	31,168	very good (4 stars)
KTB	117,221	53,088	196,800	2,392	26,501	excellent (5 stars)
BAY	109,579	51,741	117,098	16,297	26,239	excellent (5 stars)
KKP	18,103	9,470	18,715	1,227	2,773	excellent (5 stars)
CIMBT	13,537	8,346	48,874	20,105	3,536	very good (4 stars)
SCB	188,135	64,639	432,663	120,645	43,206	excellent (5 stars)
TCAP	49,168	20,979	147,676	2,231	8,043	excellent (5 stars)
TISCO	20,033	8,753	8,793	0	2,992	excellent (5 stars)
LHFG	7,060	2,768	2,408	43,241	292	excellent (5 stars)

Financial year 2019
Table 7. Financial information of Thai banking companies for FY 2019

Bank Name	Annual revenue	Total expenses	Available-for-sales-securities	Securities-held-to-maturity	Land & Buildings	Corporate governance Score
KBANK	160,491	72,729	336,707	416,369	52,698	excellent (5 stars)
TTB	39,821	20,674	55,377	0	23,642	excellent (5 stars)
BBL	133,746	54,963	574,720	23,257	40,754	very good (4 stars)
KTB	125,658	62,474	344,198	1,737	24,201	excellent (5 stars)
BAY	121,608	52,169	102,724	13,437	29,029	excellent (5 stars)
KKP	19,168	10,194	20,701	1,221	3,038	excellent (5 stars)
CIMBT	14,155	9,640	34,446	19,555	3,429	very good (4 stars)
SCB	201,445	70,538	270,740	8,717	40,777	excellent (5 stars)
TCAP	14,177	3,153	33,197	3,046	301	excellent (5 stars)
TISCO	19,436	9,271	9,146	0	2,984	excellent (5 stars)
LHFG	7,904	3,005	1,648	42,075	280	excellent (5 stars)

Statistics

The standard deviation for all variables like annual revenue, total expenses, etc. is high, which means that dispersion or variation from the mean is high. The skewness coefficient is an indicator for measuring the extent of the latent variables' asymmetrical distribution compared to the normal distribution (Ho & Yu, 2015). When the value of the skewness coefficient is zero, it indicates normality; otherwise the data is not normally distributed. Ho and Yu (2015) suggested that the kurtosis coefficient is an indicator for estimating the extent of pointedness of the latent variables' distribution compared to the normal distribution. When the value of the Kurtosis coefficient is zero, it indicates normal distribution. The skewness and kurtosis of all the descriptive statistics like annual revenue, total expenses, available-for-sale securities etc., for years 2015 to 2019 are not near zero, so the data is not normally distributed. Some variables such as securities-held-to-maturity, the

skewness, and kurtosis in all the years are greater than 1, clearly indicating that the data is not normally distributed.

Kolmogorov-Smirnov (K-S) test is used to measure if the data is drawn from a specific distribution or not (Lall, 2015). Lall (2015) mentions that the K-S test is significant as it is non-parametric, which means that it does not assume that the data comes from some fixed type of distribution. For all variables overall years, the one-sample Kolmogorov-Smirnov (K-S) test is significantly less than one and at times close to zero. It implies that the data are not normally distributed.

DEA is a non-parametric technique that produces an efficient frontier from the data provided (Visbal-Cadavid, 2017). The author also mentioned that DEA enables a single efficient index for each unit evaluated and generates a reference set of efficient units as a benchmark. It can handle multiple input and output variables at the same time. Therefore, using a non-parametric technique like the DEA for further analysis based on these variables is justifiable.

Table 8. Descriptive Statistics for variables of Thai banking companies for FY 2015

Statistics					
	Annual Revenue	**Total expenses**	**Available-for-sale-securities**	**Securities-held-to-maturity**	**Land & Buildings**
Mean	64,504.586	28,156.108	135,599.670	58389.983	18623.701
Median	39,894.660	20,008.940	93,740.480	22399.000	10291.850
Std. Deviation	54,057.8771	22,499.6418	152,934.7093	78648.5979	18123.908
Skewness	.415	.378	1.217	1.694	.605
Kurtosis	-1.649	-1.424	.367	2.511	-1.414
Minimum	5,543.42	2,399.65	2,352.96	191.00	499.00
Maximum	147,515.13	66,656.15	441,497.00	248272.00	46108.06
Kolmogorov-Smirnov (Sig.)	.139	.200	.197	.008	.134

Table 9. Descriptive Statistics for variables of Thai banking companies for FY 2016

	Annual Revenue	**Total expenses**	**Available-for-sale-securities**	**Securities-held-to-maturity**	**Land & Buildings**
Mean	67,047.853	29,208.652	155,021.519	158513.211	19926.094
Median	40,746.700	21,073.140	106,240.860	25309.000	12383.370
Std. Deviation	55,350.6415	22,821.135	175,709.280	322240.420	18643.129
Skewness	.371	.218	.994	2.926	.535
Kurtosis	-1.729	-1.871	-.625	8.908	-1.411
Minimum	6,967.07	2,601.53	6,752.76	16.00	403.90
Maximum	153,402.68	63,854.38	462,742.00	1093949.00	49727.87
Kolmogorov- Smirnov (Sig.)	.114	.200	.116	.000	.200

Table 10. Descriptive Statistics for variables of Thai banking companies for FY 2017

Statistics					
	Annual Revenue	**Total expenses**	**Available-for-sale-securities**	**Securities-held-to-maturity**	**Land & Buildings**
Mean	74,064.400	30,534.011	145,513.293	56001.906	18869.306
Median	47,322.860	20,835.920	66,797.000	16438.000	12070.720
Std. Deviation	63,235.807	23,643.945	179,943.860	99718.630	17653.872
Skewness	.518	.235	1.479	2.704	.655
Kurtosis	-1.280	-1.851	1.242	7.662	-.933
Minimum	6,493.43	2,720.64	1,246.31	.00	343.22
Maximum	182,578.75	66,371.95	533,651.00	338003.00	50136.65
Kolmogorov- Smirnov (Sig.)	.194	.118	.035	.000	.200

Table 11. Descriptive Statistics for variables of Thai banking companies for FY 2018

Statistics					
	Annual Revenue	**Total expenses**	**Available-for-sale-securities**	**Securities-held-to-maturity**	**Land & Buildings**
Mean	77,069.149	32,797.406	161,681.221	57104.972	18650.057
Median	49,167.740	20,979.370	117,098.000	19849.000	11876.260
Std. Deviation	63,566.805	25,582.984	172,456.313	109662.965	17299.0415
Skewness	.477	.219	1.079	2.809	.599
Kurtosis	-1.226	-2.006	.035	8.222	-1.104
Minimum	7,060.02	2,768.13	2,408.04	.00	291.71
Maximum	188,134.64	68,347.67	497,838.00	371025.00	48525.13
Kolmogorov-Smirnov (Sig.)	.165	.125	.200	.000	.200

Table 12. Descriptive Statistics for variables of Thai banking companies for FY 2019

Statistics					
	Annual Revenue	**Total expenses**	**Available-for-sale-securities**	**Securities-held-to-maturity**	**Land & Buildings**
Mean	77,964.324	33,528.143	162,145.801	48128.530	20103.004
Median	39,821.260	20,674.370	55,377.000	8717.000	23642.380
Std. Deviation	71,228.943	28,765.075	190,437.814	122819.841	19164.078
Skewness	.503	.269	1.180	3.251	.398
Kurtosis	-1.457	-2.028	.494	10.672	-1.372
Minimum	7,903.86	3,005.24	1,647.80	.00	280.19
Maximum	201,444.74	72,729.25	574,720.00	416369.00	52697.53
Kolmogorov- Smirnov (Sig.)	.055	.062	.038	.000	.033

DEA analysis

The eleven (11) banking companies are called Decision-making units (DMUs) in DEA analysis. On undertaking the DEA analysis using DEAP software, with revenue as the output and expenses, available-for-sale investments, securities held to maturity, and land

and buildings as inputs, the DEA efficiency of firms for the years under consideration was as follows:

Table 13. DEA efficiency scores of Thai Banking companies for Years 2015 to 2019

	2015	**2016**	**2017**	**2018**	**2019**
K BANK	1.000	1.000	1.000	0.971	0.770
TMB	0.827	1.000	0.876	1.000	0.748
BBL	1.000	0.842	0.742	0.946	0.788
KTB	1.000	1.000	1.000	1.000	1.000
BAY	0.872	1.000	1.000	1.000	1.000
KKP	1.000	0.976	0.777	0.724	0.809
CIMBT	0.690	0.648	0.718	0.545	0.543
SCB	1.000	1.000	1.000	1.000	1.000
TOP	1.000	0.870	0.736	0.818	1.000
TESCO	1.000	1.000	1.000	1.000	1.000
LFG	1.000	1.000	1.000	1.000	1.000
Mean	0.944	0.940	0.895	0.909	0.851

Discussion

Comparison of efficiency scores with the CG scores

Praptiningsih (2009) performed a study to measure corporate governance and performance in the banking sector. The author's banking sectors considered were Thailand, Indonesia, Malaysia, and the Philippines. The author found that only CEO duality, the board size, and board independence among all the internal control monitoring mechanisms like CEO duality showed a positive relationship with corporate performance. The study also suggested that the disclosure monitoring mechanism through the big four auditing firms was significantly related to corporate performance. According to Nguyen and Vo (2020), foreign ownership, board independence, and CEO duality showed no significant effect on the bank efficiency levels. Board size had a positive effect on banking efficiency. The authors had conducted this study to evaluate the effect of corporate governance on the efficiency of ASEAN banks from 2007 to 2014. Hsu and Petchsakulwong (2010) conducted research on the impact of corporate governance on the efficiency performance of the Thai non-life insurance industry. They used the DEA method to determine the efficiency of firms. His findings suggest that audit committee size & diligence, board tenure, board ownership, and separation between voting rights and cash flow rights negatively affected firm efficiency. However, firm size and board independence & diligence had a favorable effect on efficiency performance. This discussion highlights that corporate governance is related to the firm's efficiency but not always. It also suggests that some of the mechanisms or categories of corporate governance may be positively related to the firm efficiency but not all of them. There has been a lack of research in Thailand on the overall impact of corporate governance on firm efficiency, particularly for the banking industry. This study contributes to filling this research gap.

Efficiency scores obtained by using DEA are compared with the CG scores of these firms under consideration for each year which is one of the principal objectives of this study. CG score is like a cumulative score of a firm's governance based on significant categories of

corporate governance assessment like stakeholders' role, disclosure and transparency, board responsibilities, rights of shareholders, and equitable treatment of shareholders. As mentioned in the research methodology, the assessment of CG practices is done by IOD in collaboration with SET and is then published in GCR.

Table 14. Comparison of CG scores and DEA efficiency scores - FY 2015

Firm symbol/ticker	CG score	Efficiency score
K BANK	excellent (5 stars)	1.000
TMB	excellent (5 stars)	0.827
KTB	excellent (5 stars)	1.000
KKP	excellent (5 stars)	1.000
SCB	excellent (5 stars)	1.000
TESCO	excellent (5 stars)	1.000
LFG	excellent (5 stars)	1.000
BBL	very good (4 stars)	1.000
BAY	very good (4 stars)	0.872
COMBAT	very good (4 stars)	0.690
TOP	very good (4 stars)	1.000

From the above comparison, the CG scores have a positive relationship to their firm efficiency for most companies. Hypothesis 1, H1 was that 'High corporate governance score leads to the higher efficiency of the Thai banking companies.' It holds for all the companies in 2015 except for CIMB Thai Bank (CIMBT) whose technical efficiency is relatively low at 0.690.

Hypothesis 2, H2 was that the 'Ranking of Thai banking companies based on their corporate governance scores will concur with the ranking based on their efficiency.' In the case of TMBThanachart Bank (TMB), the CG score was 'excellent', but its efficiency was relatively lower at 0.827. Furthermore, in the case of Bangkok Bank (BBL) and Thanachart Capital (TCAP), the CG score was comparatively lower. However, the efficiency was still maximum, i.e., 1. Therefore hypothesis 2 does not hold for all banking companies in 2015, but it is validated for most of them.

Table 15. Comparison of CG scores and DEA efficiency scores - FY 2016

Firm symbol/ticker	CG Score	Efficiency score
K BANK	excellent (5 stars)	1.000
TMB	excellent (5 stars)	1.000
KTB	excellent (5 stars)	1.000
BAY	excellent (5 stars)	1.000
KKP	excellent (5 stars)	0.976
SCB	excellent (5 stars)	1.000
TOP	excellent (5 stars)	0.870
TESCO	excellent (5 stars)	1.000
LFG	excellent (5 stars)	1.000
BBL	very good (4 stars)	0.842
COMBAT	very good (4 stars)	0.648

CIMB Thai Bank (CIMBT) has a 'very good' CG score but its efficiency is quite low at 0.648. Hypothesis H1 holds for all companies other than CIMB Thai Bank (CIMBT).

Hypothesis 2, H2 is not satisfied because Kiatnakin Phatra Bank (KKP) and Thanachart Capital (TCAP) have relatively lower efficiencies at 0.976 and 0.870, respectively, although they have 'excellent' CG scores. Therefore, the ranking of a few companies based on their CG scores is not in line with their efficiencies.

Table 16. Comparison of CG scores and DEA efficiency scores - FY 2017

Firm symbol/ticker	CG Score	Efficiency score
K BANK	excellent (5 stars)	1.000
TMB	excellent (5 stars)	0.876
KTB	excellent (5 stars)	1.000
BAY	excellent (5 stars)	1.000
KKP	excellent (5 stars)	0.777
SCB	excellent (5 stars)	1.000
TOP	excellent (5 stars)	0.736
TESCO	excellent (5 stars)	1.000
LFG	excellent (5 stars)	1.000
BBL	very good (4 stars)	0.742
COMBAT	very good (4 stars)	0.718

Hypothesis H1 is not validated as Kiatnakin Phatra Bank (KKP) and Thanachart Capital (TCAP) CG scores are 'excellent', but their efficiency is relatively lower. For all other companies, though, the CG scores reflect a positive relationship with their corresponding efficiency.

Hypothesis H2 is also not validated as the ranking of banking companies based on their CG scores does not concur with the ranking based on their efficiency for two companies, Kiatnakin Phatra Bank (KKP) and Thanachart Capital (TCAP).

Table 17. Comparison of CG scores and DEA efficiency scores - FY 2018

Firm symbol/ticker	CG Score	Efficiency score
K BANK	excellent (5 stars)	0.971
TMB	excellent (5 stars)	1.000
KTB	excellent (5 stars)	1.000
BAY	excellent (5 stars)	1.000
KKP	excellent (5 stars)	0.724
SCB	excellent (5 stars)	1.000
TOP	excellent (5 stars)	0.818
TESCO	excellent (5 stars)	1.000
LFG	excellent (5 stars)	1.000
BBL	very good (4 stars)	0.946
COMBAT	very good (4 stars)	0.545

Like in 2017, in 2018 hypothesis 1, H1 does not hold as Kiatnakin Phatra Bank (KKP) and Thanachart Capital (TCAP) CG scores are 'excellent', but their efficiency is lower. Also, hypothesis H2 is not validated because both Kiatnakin Phatra Bank (KKP) and Thanachart Capital (TCAP) scores highest on CG scores but not on the efficiency criteria. Therefore, the relative CG scores of a few banking companies do not concur with that of their efficiencies.

Table 18. Comparison of CG scores and DEA efficiency scores - FY 2019

Firm symbol/ticker	CG Score	Efficiency score
K BANK	excellent (5 stars)	0.770
TMB	excellent (5 stars)	0.748
KTB	excellent (5 stars)	0.703
BAY	excellent (5 stars)	1.000
KKP	excellent (5 stars)	0.809
SCB	excellent (5 stars)	1.000
TOP	excellent (5 stars)	1.000
TESCO	excellent (5 stars)	1.000
LFG	excellent (5 stars)	1.000
BBL	very good (4 stars)	0.788
COMBAT	very good (4 stars)	0.543

The efficiency scores of banks like Kasikorn Bank (KBANK), TMB Thanachart Bank (TMB), and Krung Thai Bank are lower while their CG scores are highest, which is 'excellent. Hypothesis 1, H1 does not hold.

Ranking of efficiencies also does not concur with the efficiencies of several companies like CIMB Thai Bank (CIMBT), Kiatnakin Phatra Bank (KKP), Kasikorn Bank (KBANK), TMBThanachart Bank (TMB), and Krung Thai Bank. For CIMB Thai Bank (CIMBT), its relative efficiency is not as high as Bangkok bank's (BBL) efficiency, although its CG score is the same as the latter.

Conclusions and Recommendations

For all the years from 2015 to 2019, The Siam Commercial Bank (SCB), LH Financial Group (LFG), and TISCO Financial Group (TISCO) have been the best performing both in terms of corporate governance and firm efficiency. These companies secured an 'excellent' CG score and an efficiency of 1 for all five years. Their CG scores and efficiency are positively related. Although CIMB Thai Bank (CIMBT) secured a 'very good' rating for its CG scores for all years, its efficiency varied more from year to year. Overall, its efficiency was relatively lower than its corresponding CG scores, and it was relatively the least efficient and had the lowest CG scores overall.

In all the years from 2015 to 2019, most banking companies with a high CG score also had a high firm efficiency. The notable ones where this was not the case were Kiatnakin Phatra Bank (KKP) and Thanachart Capital (TCAP). Notably, in 2016, 2017, and 2018, a high CG score of these two companies did not lead to high efficiency. Further, in no year from 2015 to 2019 did the ranking of the banking companies concur with the ranking based on their efficiency.

Studies were done by Salim et al. (2016), Ongore and Owoko (2011), and Lin et al. (2009) suggest that some CG assessment parameters or criteria have a positive relationship to the firm efficiency but not all of them. The effect of corporate governance on the firm efficiency is also dependent on the nature of a firm like whether it is government-owned, private or a foreign enterprise. The results in this research paper reflect that although there is a clear and positive relationship between corporate governance and the firm efficiency of most Thai Banking companies, this positive relationship cannot be said for all of them. This finding adds to the debate for managers and academia whether sound corporate governance will always lead to higher firm efficiency. This finding implies that sound corporate governance helps achieve effective utilization of resources and enhances the efficiency of most firms. However, other factors are involved, which may lead to higher firm efficiency for

Thai Banking companies. Some of these factors could be employee morale, use of latest technology, etc., for which more study will need to be done. When skilled employees are retained and their morale is stable, it leads to decreased costs and better organizational efficiency (Pampurini & Quaranta, 2018). When employees are recognized for their performance and productivity, it increases their morale and job satisfaction, translating into better firm efficiency (Afsar et al., 2017). Gumbau-Albert and Maudos (2002) mentioned that using the latest technology like new machines improved the efficiency of firms in the Spanish industry. These studies confirm that other factors may also affect firm efficiency.

The present study will be helpful to the stakeholders like investors, managers, and the government to know more about the corporate governance and firm efficiency of banking firms and how far they are related in the different Thai Banking firms. The managers and analysts of the companies like Kiatnakin Phatra Bank (KKP) and Thanachart Capital (TCAP) can identify and analyze the reasons and factors responsible for lower firm efficiency based on all the years despite the 'excellent' CG scores that they have. The managers of Kasikorn Bank (KBANK), TMBThanachart Bank (TMB) and Krung Thai Bank can also analyze the reasons for lower efficiency in 2019 despite excellent CG score. Further study is needed to identify other factors that, along with corporate governance, can be used to analyze their effect on the firm efficiency in Thai Banking companies. Future research can also look at how some categories of assessment of corporate governance, like disclosure and transparency, affect the firm's efficiency.

Limitations

As noted above, corporate governance and other factors can be identified and studied to analyze their effect on the firm efficiency of Thai banking companies. This research includes the study of banking companies only. Future research can also include other sectors in the financial industry like insurance companies and other financial companies in Thailand. Further studies of different sectors will help determine if similarities exist with the Thai banking sector. This research considers the CG scores, an aggregate derived from different categories of assessment of corporate governance. Some of these categories, like the role of stakeholders or disclosure and transparency, should be considered individually to analyze their impact on firm efficiency.

References

Afsar, B., Badir, Y. F., Saeed, B. B., & Hafeez, S. (2017). Transformational and transactional leadership and employee's entrepreneurial behavior in knowledge-intensive industries. *The International Journal of Human Resource Management*, *28*(2), 307-332.

Anadol, B., Joseph, P. C., Simak, P., & Yang, X. (2014). Valuing private companies: A DEA approach. *International Journal of Business and Management*, *9*(12), 16.

Avkiran, N. K. (1999). The evidence on efficiency gains: The role of mergers and the benefits to the public. *Journal of Banking & Finance, 23*(7), 991–1013.

Claessens, S. & Yurtoglu, B. (2006). Corporate governance and development. *The World Bank Research Observer*, *21*(1), 91-122.

Deng, H., Yeh, C. H., & Willis, R. J. (2000). Inter-company comparison using modified TOPSIS with objective weights. *Computers & Operations Research*, *27*(10), 963-973.

Denis, D. K., & McConnell, J. J. (2003). International corporate governance. *Journal of Financial and Quantitative Analysis*, *38*(1), 1-36.

Gumbau-Albert, M., & Maudos, J. (2002). The determinants of efficiency: the case of the Spanish industry. *Applied Economics*, *34*(15), 1941-1948.

Ho, A. D., & Yu, C. C. (2015). Descriptive statistics for modern test score distributions: Skewness, kurtosis, discreteness, and ceiling effects. *Educational and Psychological Measurement, 75*(3), 365-388.

Hoontrakul, P., & Karnchanasai, C. C. (2010). The evolution of corporate governance in the banking industry of Thailand from the 1997 Asian crisis to the 2008 global credit crisis. *SSRN Electronic Journal.*

Hsu, W. Y., & Petchsakulwong, P. (2010). The impact of corporate governance on the efficiency performance of the Thai non-life insurance industry. *The Geneva Papers on Risk and Insurance-Issues and Practice*, *35*(1), S28-S49.

Iftikhar, U., Asghar, M. J. E. K. A., Khan, H., & Mirza, H. H. (2019). The corporate governance and efficiency of commercial banks in Pakistan: application of the non-parametric approach. *Argumenta Oeconomica, 2*(43), 169–189.

Jo, H., & Harjoto, M. A. (2011). Corporate governance and firm value: The impact of corporate social responsibility. *Journal of business ethics*, *103*(3), 351-383.

Koh, K. (R., & Nawalkha, S. K. (2020). Firm efficiency and the investment anomalies. *Managerial Finance*, *46*(12), 1589–1603.

Lall, A. (2015, October). Data streaming algorithms for the Kolmogorov-Smirnov test. In *2015 IEEE International Conference on Big Data (Big Data)* (pp. 95-104). IEEE.

Limpaphayom, P. (2001). *Corporate Governance and Finance in East Asia− A Study of Indonesia, Republic of Korea, Malaysia, the Philippines and Thailand, Vol. 2.* Asian Development Bank.

Lin, C., Ma, Y., & Su, D. (2009). Corporate governance and firm efficiency: evidence from China's publicly listed firms. *Managerial and Decision Economics*, *30*(3), 193-209.

Mekong Capital (2003). *Recommendations on Good Corporate Governance Practice in Vietnam*. Mekong Capital. https://www.mekongcapital.com

Nanka-Bruce, D. (2011). Corporate governance mechanisms and firm efficiency. *International Journal of Business and Management, 6*(5), 28.

Nguyen, T. L. A., & Vo, X. V. (2020). Does corporate governance really matter for bank efficiency? Evidence from ASEAN countries. *Eurasian Economic Review*, *10*(4), 681-706.

Ongore, V. O., & Owoko, P. (2011). Effects of selected corporate governance characteristics on firm performance: Empirical evidence from Kenya. *International Journal of Economics and Financial Issues*, *1*(3), 99.

Pampurini, F., & Quaranta, A. G. (2018). Sustainability and efficiency of the European banking market after the global crisis: The impact of some strategic choices. *Sustainability*, *10*(7), 2237.

Praptiningsih, M. (2009). Corporate governance and performance of banking firms: evidence from Indonesia, Thailand, Philippines, and Malaysia. *Jurnal Manajemen dan Kewirausahaan*, *11*(1), 94-108.

Prommin, P., Jumreornvong, S., & Jiraporn, P. (2014). The effect of corporate governance on stock liquidity: The case of Thailand. *International Review of Economics & Finance*, *32*, 132-142.

Rodríguez-Pérez, G., Slof, J., Solà, M., Torrent, M., & Vilardell, I. (2011). Assessing the Impact of Fair-Value Accounting on Financial Statement Analysis: A Data Envelopment Analysis Approach. *Abacus*, *47*(1), 61-84.

Salim, R., Arjomandi, A., & Seufert, J. H. (2016). Does corporate governance affect Australian banks' performance?. *Journal of International Financial Markets, Institutions and Money*, *43*, 113-125.

Sharma, K. (2018). Fair-Value Accounting and Financial Statement Analysis in Thai Insurance Companies. *AJMI-ASEAN Journal of Management and Innovation*, *5*(2), 176-188.

Sherman, H. D., & Zhu, J. (2013). Analyzing performance in service organizations. *MIT Sloan Management Review*, *54* (4), 37.

Thai Institute of Directors. (2018). *Corporate Governance Report of Thai Listed Companies 2018*. Thai Institute of Directors Association. http://www.thai_iod.com/imgUpload/CGR%20Report%202018.pdf

Visbal-Cadavid, D., Martínez-Gómez, M., & Guijarro, F. (2017). Assessing the efficiency of public universities through DEA. A case study. *Sustainability*, *9*(8), 1416.

Zhu, N. & Shah, W. U. H. (2019). A Cross-Country Comparison of Operational Efficiency between Chinese and Pakistani Commercial Banking Industries. *International Journal of Operational Research, 8*(1), 1–11.

Zhu, N., Shah, W. U. H., Kamal, M. A., & Yasmeen, R. (2021). Efficiency and productivity analysis of Pakistan's banking industry: A DEA approach. *International Journal of Finance & Economics*, *26*(4), 6362-6374.

Comparison and Analysis of the Methods for Measuring the Sustainability of Farmers' Livelihoods

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Abstract

The sustainability of farmers' livelihood is essential for studying farmers' welfare. This article defines the connotation of farmers' livelihood sustainability and sorts out the latest research trends on farmers' livelihood sustainability. On this basis, this paper further analyzes the theoretical framework of farmers' sustainable livelihoods, including three aspects: the dimensions of farmers' sustainable livelihoods measurement, the index system, and the types of measurement results. At the same time, this article discusses the measurement methods of rural households' sustainable livelihoods from two perspectives: descriptive measurement and inferential measurement. Finally, this article analyzes the sustainable decomposition methods of farmers' livelihoods from a subjective and objective perspective. The finding indicates that we can measure the sustainability of rural households' livelihoods more comprehensively and systematically. This study adopts a combination of descriptive and inferential measurement methods, which has the flexibility of the two methods with the advantages of easy quantification.

Keywords: Sustainable livelihood; Farmer's livelihood; Livelihood measurement

Introduction

Livelihood is "a means (method) of life". This interpretation far exceeds the concept of income because livelihood shifts the focus to the means needed to achieve life, not just the income or the attainable net output measured by consumption (Su et al., 2016). Scholars who study poverty and rural development believe that the concept of livelihood has rich meanings. The term livelihood has a richer connotation and a greater extension than "work", "income," and "occupation" and can more completely describe the survival of the poor. The complexity of the state is more conducive to understanding the strategies adopted by the poor for survival and safety (Su et al., 2009). In scientific research, the concept of livelihood has undergone continuous development and enrichment. The inconsistency of research interests and goals has led to different scholars' understanding of the concept of livelihood, and the definitions given are not wholly the same.

There are numerous livelihood definitions: Livelihoods as "livelihoods include assets (natural, material, human, financial, and social capital), actions, and access to these assets (adjusted by institutions and social relations), all of which determine this has helped individuals or farmers to obtain the resources needed for survival" (Ellis, 2000). research on

the sustainability of livelihoods defines livelihoods as "livelihoods are composed of the abilities, assets (including material resources and social resources) and actions needed for life" (Su et al., 2009). A generally accepted concept of livelihood is: a livelihood "includes abilities, assets, and activities required for a way of life." This definition directly focuses on the connection between the assets that people have and their choices in pursuing the income level that people need to increase their survival (Tan, 2021).

The concept of sustainable livelihoods was first seen in the "Our Common Future" report published by the World Commission on Environment and Development in 1987. It was conceptualized for the first time in the Human Development Report issued by the United Nations Development Program in 1990 (Tang, 2015). Since then, the issue of sustainable livelihoods has gradually attracted the scientific community's attention. Scholars have conducted much research on the impact of environmental fragility and unsustainable development on humanity. In the early 1990s, some institutions recognized the importance of sustainable livelihoods theory and incorporated the Sustainable Livelihood Approach (SLA) into their guidelines for action. At this stage, the research and development of the Sustainable Livelihood Approach （SLA） framework achieved Great progress. In 1994, the international organization CARE introduced "household livelihoods security" as the basic principle of its development work. In 1995, the Institute for Development (IDS) proposed an analysis framework for sustainable rural livelihoods. In 1999, the Department for International Development (DFID) established the SLA. Since the beginning of the 21st century, this theory has been widely used in a series of empirical studies, and the focus of attention has also changed and deepened.

The research on sustainable livelihoods is divided into theoretical Research and empirical Research. There are few theoretical studies on sustainable livelihoods, and more studies are being conducted for empirical analysis. Most of the research hotspots on sustainable livelihoods of farmers focus on land-lost farmers and sustainable livelihoods, returning farmland to forests and sustainable livelihoods for farmers, ex-situ poverty alleviation and relocation and sustainable livelihoods, urbanization and sustainable livelihoods, rural tourism and sustainable livelihoods for farmers, Targeted poverty alleviation and sustainable livelihoods (Songsraboon et al., 2021). The future research hotspots of sustainable livelihoods include rural revitalization and sustainable livelihoods and research on the sustainable livelihoods of a large number of semi-urbanized farmers in the process of urbanization.

The issue of sustainable livelihoods for land-lost farmers is a hot issue that has been studied. Cheng (2008) reflected on the concept and policy of China's urban village reconstruction and analyzed the important role played by urban villages in promoting the accumulation of land-lost farmers' livelihood assets and promoting the process of rural urbanization and pointed out that the urban village reconstruction must adhere to a scientific approach. The concept of urban development cannot destroy the village's original economic and social operating mechanism
in the city.

Effectiveness. The study of sustainable livelihoods from returning farmland to forests and rural tourism has also become the focus of academic circles. Liu et al. (2007) and others investigated the formulation and implementation of social insurance measures for land-expropriated farmers in Chengdu, and studied the advantages and advantages of the social security system for land-lost farmers in substituting land and solving basic survival and security issues. Ning (2017) studied the relationship between the sustainable livelihood capital of farmers and targeted poverty alleviation by constructing a sustainable livelihood

capital evaluation system for farmers and proposed corresponding poverty alleviation measures. Li et al. (2019) and others took Xia fu Village in Dan Xiaoshan, Guangdong as an example, through combing and summarizing the village's tourism poverty alleviation and the rural households' livelihood structure, and proposed a model that conforms to the sustainable livelihoods of local farmers from the perspective of tourism poverty alleviation. Kong (2018) discussed the impact of the implementation of the policy of returning farmland to forests on the sustainable livelihoods of farmers, understood the main impacts caused by the implementation of the policy, and made relevant recommendations based on this.

Research Objective

In order to lay a good groundwork for livelihood mechanisms in rural revitalization, this study undertakes an in-depth literature review, which aims to (1) examine the dimensions of sustainable livelihood measurement, (2) comparison and analysis of methods of livelihood sustainability measurement, and (3) decomposition method of livelihood sustainability.

Research Method

The literature review serves as a good knowledge groundwork for further empirical Research (Tan, 2016; 2019). This study reviews the existing literature from both China and outside. The literature review is only limited to dimensions of sustainable livelihood measurement, index system for sustainable livelihood measurement, and types of sustainable livelihood measurement, supporting configuring theoretical frameworks for sustainable livelihoods. As noted in Tan (2018) and Tan and Julian (2022), a good set of measurements should facilitate organizations and rural communities to engage in learning that can benefit process reengineering, quality management, and customer value innovation. In addition, literature review efforts are made relating to comparative methods used to measure livelihood sustainability.

The theoretical framework for sustainable livelihoods
Dimensions of sustainable livelihood measurement

The research idea of sustainable livelihoods originated from Chambers' research work in the mid-1980s. In addition to the research on income poverty also gave dialectical considerations to the deep-seated causes of poverty, such as the limiting factors of livelihood development. The poverty of development capabilities and opportunities, etc. With the deepening of Research, Chambers & Conway (1992) clearly stated the idea of sustainable livelihoods, namely: livelihood is a way of earning a livelihood, which is based on capacity, assets (including reserves, resources, claims, and enjoyment rights). Moreover, based on activities. Only when a kind of livelihood can cope with and recover under pressure and shock; can it maintain and even strengthen its capabilities and assets at present and in the future, without damaging the natural resource base, can this kind of livelihood be sustainable. Chambers and Conway divided the sustainability of livelihoods into social and environmental measures, which emphasized the external impact of livelihoods on global natural resources to achieve environmental sustainability and emphasized the internal capacity of livelihoods to maintain sustainability and enhancement of the carrying capacity. Social sustainability. (Nash & Jonathan, 2000) believe that when people make choices and use opportunities and resources without hindering others' current or future livelihood opportunities, stable livelihoods are obtained. They divided the sustainability of livelihoods into two measures on the time scale of present and future generations, and on the social scale into two measures of self and others, and emphasized that both themselves and others, both present and future generations have the opportunity to make a living, and livelihoods are available.

Sustainability can be achieved. Ashley & Carney (1999) also believe that when people can respond to coercion and shocks, and recover, maintain and increase assets, maintain and improve capabilities, and provide opportunities for the survival of the next generation; in the long and short term, locally and globally, the livelihood of others brings a net benefit, so the livelihood is sustainable (Damnoen et al., 2021). Ashley and Carney's measurement of the sustainability of livelihoods, in addition to themselves and others, the present and the future, also added a new measurement range that should include local and global.

Since the beginning of the 21st century, new progress has made good understanding in sustainable livelihoods. Harriet (2009) proposed from the perspective of social policy choices that policy formulation must consider the livelihoods of current and next generations and rationally allocate needs and expectations between generations. Carmen & Frederick (2009) proposed the significance of farmers' economic cooperation organizations for sustainable livelihoods from global cooperation. It further enriches the time and space dimensions of sustainable livelihood measurement.

Index system for sustainable livelihood measurement

At present, sustainable livelihoods provide a new perspective for observing and studying rural development and its relationship with resources and the environment. In practical application research, the main way to express one's thoughts is to make it operable by establishing a sustainable livelihood analysis framework. The SLA framework established by DFID is the most widely used sustainable livelihood analysis framework.

The sustainability analysis framework consists of five parts: vulnerability background, livelihood capital, structural and institutional changes, livelihood strategy, and livelihood output. The vulnerable environment includes shocks caused by natural disasters, economic depression trends, trends, seasonal and cyclical price changes, production, and employment fluctuations in resources, politics, and economy. According to the rural vulnerability analysis method commonly used by the World Food Program, there are generally three categories of vulnerability analysis indicators, and each category contains several specific indicators. The three categories of indicators are:

(1) Risk factors, especially the food security risks faced, the risk of insufficient food faced by the region or population; the higher the risk, the higher the vulnerability of the region or population.

(2) The ability to resist risks is the ability of the region or the population to cope with risks. The stronger the ability to resist risks, the lower the area's vulnerability or population.

(3) The social service system reflects a specific area's overall social development level. The higher the level of development, the more conducive the area or the population is to resist various risks. Combining the above three factors can more comprehensively reflect the degree of vulnerability of a region or group of people to objectively obtain the most vulnerable groups, find out the direct causes of vulnerability, and take corresponding measures.

The livelihood capital indicator system of the sustainable livelihood analysis framework is generally composed of five indicator systems: natural capital indicators, financial capital indicators, physical capital indicators, human capital indicators, and social capital indicators. Researchers can choose appropriate indicators to construct an indicator system to study the livelihood status of farmers according to the actual situation of the research object. For example, Ma et al. (2021) found that satisfaction has been widely used as an essential parameter for subjective evaluation of the quality of life, so they improved the SLA framework based on relevant literature and listed satisfaction as equal to the original

five types of livelihood capital. The sixth type of capital is to construct a livelihood evaluation index system to analyze the livelihood status of relocated rural households for poverty alleviation. The sustainable livelihood approach is driven by policies, technology, and investment, emphasizing the impact of the external environment and interventions on sustainable livelihoods. The sustainable livelihood approach has also established a set of indicator systems as follows:

(1) Resources invested in sustainable livelihood policies and planning;

(2) The output of physical products and services from sustainable livelihood policies and planning;

(3) The extent to which the output as mentioned above is enjoyed;

(4) The extent to which people's lives have been improved;

(5) Use inputs to obtain the output as mentioned above, achievement and influence path. To monitor the sustainability and safety of livelihoods.

Types of sustainable livelihood measurements

The sustainable livelihood analysis framework enumerates six possible livelihood outcomes: income increase, welfare improvement, food safety improvement, living standard improvement, vulnerability reduction, ecological environment improvement, and sustainable use of natural resources. Livelihood outcomes fully reflect the ultimate goal of sustainable livelihood development.

The measurement objects are different, and the results obtained are also different. The current livelihood sustainability measurement is mainly for the livelihood capital of the farmers, the livelihood strategy, and the relationship between the two. Yang et al. (2009) conducted an empirical analysis on the current status of livelihood capital of farmers in the reservoir area of the South-to-North Water Transfer Project (Middle Route) based on the framework of sustainable livelihood analysis. The results show that the overall livelihood capital of farmers in the reservoir area is fragile, and the degree of social integration of livelihood capital is low. Li et al. (2009) and others use the framework of sustainable livelihood analysis to study the livelihood status of rural households in poverty-stricken mountainous areas in western China and analyze whether they fall into poverty and the environmental impact of livelihood strategies to examine the livelihood consequences. Li et al. (2012) analyzed the poor population in Tibet's farming and pastoral areas.

Zhou et al. (2020), based on the survey data of relocated farmers in Hunan, used a Logistic regression model to analyze the impact of livelihood capital on the choice of livelihood strategy. The study found that the overall livelihood capital of the poor population in agricultural and pastoral areas is fragile, and the livelihood capital is mutually causal, showing a non-linear relationship. Due to the limitation of livelihood capital, the livelihood strategies that farmers and herders can choose are limited, leading to an aggravation of poverty and ecological environment problems. The findings indicate that natural capital, financial capital, human capital, and social capital significantly affect the choice of labor-oriented, agricultural-oriented, and non-agricultural-oriented livelihood strategies. They have transformed livelihood strategies for relocated farmers from agriculture-oriented to labor-oriented. Have a significant impact.

Comparison and Analysis of Methods of Livelihood Sustainability Measurement

Since the natural environment is relatively inevitable and immutable, and the policy environment is challenging to change quickly, the measurement of livelihood sustainability mainly focuses on three aspects of livelihood capital, livelihood strategies, and livelihood

results. The measurement methods for these three aspects are mainly described. There are two types of measurement methods: descriptive and speculative measurement methods.

Descriptive measures of livelihood sustainability

Descriptive livelihood sustainability measurement methods mostly use participatory rural appraisal (PRA), including direct observation, random interviews, household surveys, community meetings, questionnaire surveys, semi-structured interviews, and other methods.

Direct observation method refers to a method in which investigators visit the site to count, measure, measure, and register the survey items of the investigating unit in order to obtain first-hand information. For example, to know the output of crops in time, the investigators personally went to the field to perform actual cutting, threshing, drying, weighing, etc. In another example, investigators went to the workshop to observe, count, and measure Wait for work to understand the year-end product balance of industrial enterprises. The direct observation method can guarantee the accuracy of the survey data collected. However, it requires a lot of workforces, material resources, financial resources, and time. Some social and economic phenomena cannot be measured by direct observation methods, such as the survey of historical data and the family of workers.

Semi-structured interviews mean specific topics and assumptions in advance, but the actual questions are not specific. Its advantages and disadvantages are between structured and unstructured interviews. However, its low degree of quantification makes it challenging to quantify the results, so it is often used as an auxiliary survey method. For example, in Meng (2013)'S Study on the Relationship between Sustainable Livelihood Assets and Livelihood Strategies of Farmers and Herdsmen-Taking Wushen Banner, Ordos City, a combination of questionnaire surveys and semi-structured interviews was used.

A questionnaire survey questionnaire refers to a form used for statistics and surveys to express questions in asking questions. The questionnaire method is a method for researchers to use this controlled measurement to measure the researched problem to collect reliable information. Most of the questionnaires are sent by mail, individual distribution, or collective distribution in the questionnaire method. The investigator fills in the answers according to the form asked. Generally speaking, the questionnaire is more detailed, complete and more accessible to control than the interview form. The main advantages of the questionnaire method are standardization and low cost. Because the questionnaire method uses a well-designed questionnaire tool to conduct surveys, the design of the questionnaire requires standardization and measurement. For the measurement and survey of livelihood capital and livelihood results, most studies use questionnaire survey methods, such as Li & Liang (2010)'s Research on the impact of returning farmland to forests on farmers' livelihoods-sustainable livelihood analysis on the perspective of family structure. The livelihood capital used a questionnaire survey.

Community meetings refer to understanding villagers' cognitive level, output level, and irrigation conditions through community meetings. For example, in Zhang (2005)'s survey of livelihoods and cultivated land use patterns in mountain farming and pastoral areas in the eastern part of the Qinghai-Tibet Plateau, community meetings were used to investigate and record land-use types, planting systems, topography, irrigation conditions, chemical fertilizers, farm manure (dry manure, Manure removal, plant ash, etc.) and input of pesticides, seeds, film and other elements, yield level, etc.

Measures of inferential livelihood sustainability

Inferential statistics is a statistical method that studies how to use sample data to infer overall characteristics. For example, to understand the demographic characteristics of a region, it is impossible to measure the characteristics of each person one by one. The quality of products is often destructive, and it is impossible to measure each product. This requires extracting some individuals or samples for measurement and then inferring the overall characteristics of the Research-based on the obtained sample data. This is the problem to be solved by inference statistics. In the measurement of the sustainability of livelihoods, the inferential methods used include regression analysis, such as Liang (2010)'s study on the impact of the policy of returning farmland to forests on farmers' livelihoods-in the analysis of sustainable livelihoods based on the perspective of family structure,) The regression of farmers' incomes further explores the impact of family structure and the policy of returning farmland to forests on farmers' incomes and uses Uchida's method to establish an estimation model.

Comparative analysis of sustainable livelihood measurement methods

For the descriptive measurement method of sustainable livelihood measurement, statistical values are mainly used to describe the relationship between the relevant characteristics of the sample or the variables. For example, it can answer questions such as: What is the average age of the sample? What is the degree of difference in age between units in the sample? What is the correlation between age and income in the sample? In measuring livelihood capital, livelihood strategies, and livelihood results, many studies have adopted descriptive measurement methods. Most of these methods are easy to obtain, direct, and flexible, but at the same time, they are insufficient in terms of quantification.

The inferential measurement method of sustainable livelihood measurement is mainly based on the principle of mathematical statistics, using sample statistical values to infer the overall statistical value or to infer the significance of the relationship between variables. The questions it answers are different from descriptive analysis, such as: According to the average age of the sample, what is the average age of the population? According to the correlation between age and income in the sample, how likely is the population's correlation between age and income? Two experiments were carried out before and after, and two different results were obtained. Is the difference between the two results meaningful? Using theoretical methods to measure livelihood sustainability indicators has the characteristics of easy quantification and further analysis.

Although descriptive and inferential are closely related, they each have their own suitable tools. There is no better method. They need to be selected according to the content of the research and objective conditions. In order to measure the sustainability of rural households' livelihoods more comprehensively and systematically, it is advisable to adopt a combination of descriptive and inferential measurement methods, combining the flexibility of the two measurement methods with the advantages of easy quantification.

Decomposition method of livelihood sustainability

The methods for determining the weight of the index system are divided into two categories: subjective assignment and objective assignment. The subjective assignment method is to determine the weight of evaluation indicators based on the experience of the evaluator. It is suitable for evaluation and analysis when the number of indicators is small. If the number of indicators is large, it is difficult to grasp many indicators fully. Relying on the subjective judgment will increase or decrease some indicators. The degree of importance makes it difficult for the empirical results to reflect the objective reality. This method has solid explanatory nature and can effectively avoid the contradiction between attribute weight

and practical meaning, and has been widely used. The objective methods can make use of TOPSIS (Tan, 2020), neural networks (Tan and Julian, 2022), and structural equation modeling (Tan et al., 2022).

Commonly used subjective assignment methods include the analytic hierarchy process (AHP method), Delphi method, etc. The Delphi method, also known as the expert scoring method, uses communication to send the problems to be solved to each expert separately, solicit opinions, and then collect and summarize the opinions of all experts and sort out comprehensive opinions. Each expert revised his original opinions based on the comprehensive opinions and then summarized them. Subsequently, the comprehensive opinions and forecast questions were returned to the experts, and opinions were solicited again. Such multiple iterations will gradually obtain a more consistent decision-making method for predicting results. Helmer and Gordon pioneered the Delphi method in the 1940s. In 1946, the American RAND Corporation used this method for the first time in order to avoid the defects of succumbing to authority or blindly obeying the majority in collective discussions. This method was used to make qualitative predictions, and later this method was quickly and widely adopted. As a subjective and qualitative method, the Delphi method can be used in the field of forecasting and can be widely used in the establishment of various evaluation index systems and the process of determining specific indexes.

In the Research of Cui (2018), the Delphi method was mainly used to select evaluation indicators, combined with the goals, status quo, and characteristics of rural tourism development in the Qinba mountainous area, and finally, 20 secondary indicators and 44tertiary indicators of the indicator layer were determined. Su et al. (2009) used the SLA sustainability analysis framework to establish a sustainable livelihood indicator system. The livelihood status of farmers in the Ganzhou District of Zhangye City is analyzed. Use stationery survey face-to-face bookmakers to determine the weights of measurement indicators, apply AHP theory to data processing, and finally get the relative influence weight value. After scoring the assets, the binomial logistic regression model analyzes the relationship between livelihood strategies and livelihood capital. Ma et al. (2021), based on the improved sustainable livelihood framework, comparative analysis of the livelihood status of rural households before and after relocation, using the AHP-entropy weight assignment method to calculate the index weights, and using the more subjective AHP method to neutralize the more objective entropy Weight assignment method to obtain objective index weight values.

The objective assignment method is to determine the index weight according to the degree of variation of each index or the interrelationship between the indexes. In most cases, the objective weight assignment method can reduce the arbitrariness of the assignment, and the accuracy of the determined weights is high. However, the determined attribute weights are often contrary to the actual situation, the interpretability is poor, and it is difficult to define the results obtained clearly. Explain. Commonly used objective weighting methods include the principal component analysis method, entropy method, dispersion method, etc. The entropy method refers to a mathematical method used to judge the degree of dispersion of an index. In information theory, entropy is a measure of uncertainty. The greater the amount of information, the smaller the uncertainty, and the smaller the entropy; the smaller the amount of information, the greater the uncertainty, and the greater the entropy.

According to entropy characteristics, we can judge the degree of dispersion of an index by calculating the entropy value. The greater the degree of dispersion of the index, the greater the influence on the comprehensive evaluation. According to the degree of variation of various indicators, the tool of information entropy can be used to calculate the weight of each indicator to provide a basis for comprehensive evaluation of multiple indicators. (Wang,

2021) studied the sustainability of livelihoods of relocated households in Tibet for poverty alleviation, using the entropy method to determine the index weights. The quantitative evaluation of livelihood capital in the research of (He et al., 2014), referring to the quantitative study of livelihood capital carried out by scholars and the analysis method of farmers' vulnerability, adjusted the indicator system based on the particularity of the livelihoods of farmers in the northern foot of the Qinling Mountains, and adopted entropy. The value method determines the index weight. Principal component analysis, also known as principal component analysis, uses the idea of dimensionality reduction to convert multiple indicators into a few comprehensive indicators (ie, principal components), where each principal component can reflect most of the information of the original variable and contains information Do not repeat each other. This method simplifies the complex factors, and at the same time, obtains more scientific and practical data information. For evaluation and analysis with many indicators, the use of principal component analysi.e. can more conveniently and effectively construct an indicator evaluation system. Yuan (2018) studied the impact of ecological compensation and livelihood capital on the sustainable livelihoods of residents. They used principal component analysis to measure fundamental indicators' weights and divided the first principal component coefficient by corresponding characteristic roots. The unit feature vector obtained afterward is used as the weight of each dimension index, and finally, the sub-indices are synthesized.

Discussion

Research on the sustainability of livelihoods has two types, empirical Research and theoretical Research. However, from the perspective of current research, most scholars have conducted substantive research, adjusted and modified the developed SLA framework, and applied it to research on sustainable measurement and analysis of farmers' livelihoods. The current methods for sustainable livelihoods include sampling surveys, participatory rural evaluation, and transect research. Measurement methods include descriptive analysis and theoretical methods. However, current research cannot fully reflect the concept and concept of sustainable livelihoods. The connotation and subjectivity of the research results are strong, and the guidance for regional sustainable development is not enough. Most research methods and technical means are based on the evaluation of phenomena and the analysis of results. The lack of in-depth research on the mechanism and process limits the theoretical development of sustainable livelihoods.

In order to determine the weight of the index system, the existing research literature mainly adopts the relative index method, analytic hierarchy process, entropy method, factor analysis method and principal component analysis method, etc. These methods are also often used to quantify the quality of economic growth. The relative index method is a statistical method that transforms a series of indicators into a comparable index form and then performs simple or weighted summation to evaluate, ignoring the high correlation between the sub-indices; level analysis. The method carries out weight assignment based on the researcher's subjective understanding of the importance of each index, and its assignment is highly subjective and lacks objectivity. Although the entropy method belongs to the objective weighting method, it cannot reflect the relationship between the relevant indicators. The factor analysis and principal component analysis methods are both objective weighting methods. Among them, factor analysis focuses on the comprehensive evaluation of the clarity of the causes in its application. It cannot accurately describe the specific changes of each dimension and can only get the dynamics of the public factors. At the same time, the principal component analysis focuses on the comprehensive evaluation of the influence of information contribution. The quantification of the quality status of economic growth in the

existing relevant research literature is generally achieved through a comprehensive evaluation index system, which mainly adopts the relative index method, analytic hierarchy process, entropy method, and factor analysis method.

The issue of sustainable livelihoods for land-lost farmers is a hot issue that has been studied. Current research hotspots on sustainable livelihoods of farmers mostly focus on land-lost farmers and sustainable livelihoods, returning farmland to forests and sustainable livelihoods for farmers, ex-situ poverty alleviation and relocation and sustainable livelihoods, urbanization and sustainable livelihoods, rural tourism and sustainable livelihoods for farmers, and targeted poverty alleviation and sustainable livelihoods. The future research hotspots of sustainable livelihoods include rural revitalization and sustainable livelihoods and research on the sustainable livelihoods of many semi-urbanized farmers in the process of urbanization.

Conclusion

As an essential perspective for studying the welfare of farmers, the research on the sustainability of farmers' livelihoods is of great significance to solving the problem of rural poverty. After the concept of sustainable livelihoods of farmers was put forward, the research on sustainable livelihoods began to develop continuously, and the understanding of it was also deepened in practice and exploration. Entering the 21st century, researchers have put forward suggestions from a new perspective. In the early 1990s, some organizations began exploring and putting forward the Sustainable Livelihood Approach (SLA). Subsequently, the measurement of the sustainability of livelihoods was mainly realized by the sustainable analysis framework, among which the most The classic and commonly used method is the sustainable livelihood framework established by the Department for International Development (DFID), which enumerates income increase, welfare improvement, food safety improvement, living standards improvement, vulnerability reduction and ecological environmental improvement and the sustainable use of natural resources have six possible livelihood outcomes.

The sustainable measurement methods of farmers' livelihoods mainly include descriptive and speculative measurement methods. Descriptive livelihood sustainability measurement methods include direct observation, random interviews, household surveys, community meetings, questionnaire surveys, semi-structured interviews, and other methods. Inferential statistics is a statistical method that studies how to use sample data to infer overall characteristics. Descriptive and inferential analysis have their own suitable tools, and there is no better method. They need to be selected according to the content of the research and the objective conditions. In order to measure the sustainability of rural households' livelihoods more comprehensively and systematically, it is advisable to adopt a combination of descriptive and inferential measurement methods, combining the flexibility of the two measurement methods with the advantages of easy quantification. In the study of sustainable livelihoods of farmers, the methods for determining the weight of the index system are divided into two categories: subjective assignment and objective assignment. Commonly used subjective assignment methods include analytic hierarchy process (AHP method), Delphi method (Delphi method), etc. Commonly used objective weighting methods include principal component analysis, entropy, dispersion, etc.

References

Ashley, C. & Carney. (1999). *Sustainable livelihoods: Lessons from early experience*. Department for International Development.

Carmen, D. D. & Frederick, S. R. (2009). *Rural social movements in Latin America: organizing for sustainable livelihoods.* U Press of Florida.

Chambers, R. and Conway, G. (1992). *Sustainable rural livelihoods: practical concepts for the 21st century.* Institute of Development Studies.

Cheng, D. L. (2008). Rethinking the development of villages in cities in China based on the perspective of sustainable livelihoods of land-lost farmers. *Urban Development Research*, *3*, 68-79.

Cui, X. M. (2018). *Research on the coordinated development of tourism and communities in Qinba Mountains based on the framework of sustainable livelihoods.* Northwest University.

Damnoen, P. S., Phumphongkhochasorn, P., Punwasuponchat, N., & Srichan, P. W. (2021). The Development of Learning Management Design Models in Compulsory Subjects of the Master of Education Program in Educational Administration Innovation in Order to Enhance the Characteristics of Learners According to the Needs of the Professional Education Institution Administrators. *Turkish Journal of Physiotherapy and Rehabilitation, 32*(3), 20459 – 20466.

Ellis, F. (2000). *Rural livelihoods and diversity in development countries.* Oxford University Press.

Harriet, D. (2009). *Ten lectures on social policy.* Shanghai People's Publishing House.

He, A. L., Yang, X. J., Chen, J., & Wang Z. Q. (2014). The impact of rural tourism development on farmers' livelihoods: Taking rural tourism destinations in the northern foot of the Qinling Mountains as an example. *Economic Geography*, *34*(12), 174-181.

Kong M. X. (2018). The impact of returning farmland to forests on farmers' sustainable livelihoods. *Henan Agriculture*, *35*, 50-52.

Li, J. G. & Mao, Y. H. (2012). Analysis of the livelihood status of the poor in Tibet's farming and pastoral areas under the framework of sustainable livelihood analysis. *Northwest Population, 33*, (1), 79-84.

Li, J., Li, Y. L., Tai, X. J., & Li, C. (2009). Analysis of the livelihood status of rural households in the poverty-stricken mountainous areas in western China under the framework of sustainable livelihood analysis. *China Rural Observation*, 5, 29-38.

Li, S. z., & Liang, Y. C., (2010). Marcus W. Feldman, Gretchen C. Daily. Research on the impact of the policy of returning farmland to forests on farmers' livelihoods: An analysis of sustainable livelihoods based on the perspective of family structure. *Journal of Public Management, 7*(2), 1-10.

Li, Y. T., Xu, S. H., & Li, Y. S. (2019). Research on sustainable livelihoods of rural households from the perspective of tourism poverty alleviation: Taking Xiafu Village, Danxia, Guangdong as an example. *Rural Economy and Technology*, *30*(17), 120-122.

Liu, J. Q., Luo, R., & Shi, J. C. (2007). Research on the social security system of land-lost farmers from the perspective of sustainable livelihoods based on the survey and thinking of Chengdu city. *Population Research*, *4*, 27-34.

Ma, G. X., Zhou, Z. F., Zhu, C. L., Chen, Q. & Yin L. J. (2021) Comparative analysis of rural households' livelihoods before and after relocation for poverty alleviation under the framework of improving sustainable livelihoods: Taking the resettlement site of Zhejiang Town, Zhenfeng County, Guizhou Province as an example. *China Agricultural Resources And Regionalization*, *4*, 1-13.

Meng, J. J., Aimurula, Liu, Y., & Xiang, Y. Y. (2013). Research on the relationship between sustainable livelihood assets and livelihood strategies of farmers and herdsmen taking

wushen banner, Ordos city as an example. *Journal of Peking University (Natural Science Edition), 49*(2), 321-328.

Nash, S., & Jonathan, G. (2000) Make livelihoods sustainable. *International Journal of Social Sciences (Chinese Edition), 17*(4), 124.

Ning, Z. K. (2017). Sustainable Livelihood Capital of Farmers and Targeted Poverty Alleviation. *Journal of South China Agricultural University (Social Science Edition), 16*(01), 86-94.

Songsraboon, R., Thongtao, J, Damnoen, P. S., & and Huanjit, P. S. (2021). Course management based on outcome-based education (OBE) of learning by working in real conditions. *Turkish Journal of Physiotherapy and Rehabilitation, 32*(3), 20491 – 20499.

Su, F., Xu, Z. M., & Shang, H. Y. (2009). Summary of sustainable livelihood analysis research. *Advances in Earth Science, 24*(01), 61-69.

Su, F., Ying, R. R., & Zeng, J. M. (2016). Visual analysis of research hotspots and frontiers of sustainable livelihoods. *Acta Ecologica Sinica*, 36(07), 2091-2101.

Tan, C. C. (2019). *A business research guidebook for postgraduate studies*. IMRF Publishing.

Tan, C. C., Damnoen, P. S., Toprayoon, Y., Dabjan, N., & Damkam, K. (2022). *An exploratory study of the spirituality-oriented experiences of tourists.* In P. Srivastava, S.S. Thakur, G.I. Oros, A.A. AlJarrah, & V. Laohakosol (Eds.). Mathematica, Computational Intelligence and Engineering Approaches for Tourism, Agriculture and Healthcare. *Lecture Notes in Networks and Systems, 214*, 307-314.

Tan, C.C. (2016). *Towards a phenomenological theory of corporate social responsibility and its spirited services*. IMRF Publication House.

Tan, C.C. (2018). Stimulate changes of views, and measure to learn to transform organizational performance: an action research case. *Advanced Science Letters, 24*(7), 5080-5085.

Tan, C.C. (2020). TOPSIS method in search for competitive advantage and firm performance. *International Journal of Mechanical and Production Engineering Research and Development, 10*(3), 13917-13926.

Tan, C.C. (2021). Civil participation-driven social capitalization-enabled resilience cycle for community-based tourism. *Psychology and Education, 58*(2), 5568-5578.

Tan, C.C., & Julian, M. (2022). *Two-stage neural network-structural equation modeling approach to studying drivers for hotel objectives: with implications*. In P. Srivastava, S.S. Thakur, G.I. Oros, A.A. AlJarrah, & V. Laohakosol (Eds.). Mathematica, Computational Intelligence and Engineering Approaches for Tourism, Agriculture and Healthcare. *Lecture Notes in Networks and Systems*, 214, 39-58.

Tang, Q. (2015). Research status and future key trends of sustainable livelihoods. *Advances in Earth Science, 30*(07), 823-833.

Wang, H. f. (2021). *Study on the sustainability of livelihoods of poverty alleviation and relocation households in Tibet*. Tibet Agriculture and Animal Husbandry College.

Yang, Y., Zhao, F., & Liao K. (2009). Investigation and analysis of farmers' livelihood capital under the framework of sustainable livelihood analysis: Taking the reservoir area of the South to North Water transfer (middle route) project as an example. *Agricultural Economic Issues, 35*(3), 58-65.

Yuan, L. (2018). *Research on the impact of ecological compensation policies and livelihood capital on sustainable livelihoods*. Northwest Agriculture and Forestry Science and Technology.

Zhang, F. F. & Zhao, X. Y. (2015). A review of the ecological effects of rural households'
livelihood transformation in my country. *Acta Ecologica Sinica*, *35*(10), 3157-3164.

Zhang, L. P., Zhang, Y. L., Yan J. Z., & Wu, Y. Y. (2008). Livelihoods and cultivated land
use patterns in the mountain farming and pastoral areas of the eastern Qinghai-Tibet
Plateau. *Acta Geographica Sinica, 63*(4), 377-385.

Zhou, Q., Huang, Z., & Zhang, W. (2020) Study on the follow-up livelihood of poverty
alleviation and relocation farmers in Guizhou Ethnic Areas under the background of
rural revitalization. *Guizhou Ethnic Research*, *41*(7), 21-27.

Combined AHP-TOPSIS-IPA and Statistical Analyses for Implications to One Belt One Road Initiatives

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Abstract

Based on a concerted multilateralism principle of one-belt-one-road (OBOR) initiatives, this study proposes and demonstrates that OBOR initiative should aim to support the PEST (political, economic, social and technology) environments and the competitive-advantage goals of OBOR's participating countries. In doing so, favorable perceptions of the participating countries can be established. Besides, the competitive-advantage goals that OBOR investments can support are generally the ultimate incentives for the participating countries. The data provides the evidential supports. In addition, this study employs AHP, TOPSIS, and IPA (Importance-Performance Analysis) to understand the nature and level of perceived success in ASEAN's one-belt-one-road (OBOR) initiatives. The PEST environments are particularly examined. Overall, the study contributes using a risk management model to link microeconomic to macroeconomic environments, which, leads to the 4C model for OBOR initiatives and implementation. AHP and TOPSIS provide the priority of importance, and importance-performance analysis (IPA) captures the performance gaps to draw implications for the policy makers for OBOR's (one belt one road) participating countries.

Keywords: One belt one road initiatives; TOPSIS; AHP; IPA analysis; PEST analysis, China; ASEAN

Introduction

The Belt and Road Initiative (BRI), or One Belt One Road (OBOR) Initiative, can be described as "China's grand connectivity project" (Chung, 2017), propelled partly by China's impressive economics performances globally (Zhai, 2017). Due to the global scale, OBOR initiative can be seen to influence towards transforming regional political and economic landscapes (Yang, Jiang, and Ng, 2018). It is the latter issues that warrant the concerns and critiques of the developed countries in particular. If the BRI or OBOR is argued from the structural realist points of view, one can rationalize that China's objective is to use OBOR as means to and end, and ultimately, for its survival and power balancing in the world (cf. Mearsheimer, 2013), and many researchers, thus, argue that the OBOR initiative is a means for China to act within the region (Wang, 2016), which sees the United States towards more defensive reactions (Fint and Zhu, 2019). To defend against the similar variants of defensive arguments, President Xi was quoted saying at the gathering of 37 world leaders:

"The Belt and Road is not an exclusive club", arguing further that China has rejected accusations that Belt and Road is a "debt trap" and a geopolitical tool for Beijing's ambitions of becoming a global superpower" (Bangkok Post, 2019).

Clearly, different nature of philosophical arguments, such as structural realism (Mearsheimer, 2013), or critical theory (Roach, 2013), or constructivism (Fierke, 2013), could lead to a large variation of interpretations into the intention and objectives of OBOR, both for China and the participating countries. For instance, Flint and Zhu (2019) adopt a political economy approach to geopolitics, highlighting the "single logic" of competition in the capitalist world-economy, that "firms and states are connected as the former seeks to maximize profits while states (i) seek to capture that economic activity within their borders, (ii) make global connections that maximize the benefits of global economic flows for their domestic economy, and (iii) intertwine economic agendas with geopolitical goals" (pp. 95-96). Putting ideologies and theoretical philosophies of international relations aside, it is clear that what matters on the economics will also matter on non-economic issues such as politics, societies and technologies, which is the study of a PEST framework. At a global scale, OBOR would certainly create a new rhetoric of concerns and international relations languages that could lead to new forms of territorial arrangements (Glassman, 2011) and strategic shifts.

In view of the PEST induced challenges, this research attempts only to voice out and point out some of the important concerns of OBOR subject experts and delineates a structural pattern of nation's competitiveness drivers from the available data at global level, so as to bring to the attention of the researchers and relating stakeholders to some practical concerns and structural issues. To some extent, this research underpins on a realist approach, which is presupposed in a philosophical stance that "power is the currency of international politics" (Mearsheimer, 2013, p. 51), in particular it deals with a possible power shifting due to some planned structural changes to the nation's competitiveness systems, as configured in Porter's (1990) Diamond model and studied in Zhao et al, (2019). As argued in Hanafi, Wibisono, Mankusubroto, Siallagan and Badriyah (2017), "In a world of increasing global competition, the nation has become more important as the basis of competition, which is influenced by globalization in responding to global market competition of its superior products and services to fulfil world needs" (p. 335). Nevertheless, to juxtapose the variances of challenges and criticism, Vines (2016) argue for a "concerted unilateralism" approach to Chinese leadership that is more cooperative in manner, such as by means of "creating an international forum, or for a. In such a for a information can be exchanged, preference articulated, discussions can take place, compromises can be reached, and collective action agreed upon. At best, once agreement has been reached within the fora, each individual country will be able to act of his or her own free will, rather than being coerced. This is a form of leadership which helps countries to pursue their own self-interest, i.e. to do what they have already wanted to do, but have been unable to do, acting on their own" (pp. 5-6). Based on cooperative spirit, Liu and Dunford (2016) identify five cooperation priorities in the OBOR Initiative: (1) Policy coordination – co-development of large-scale projects, (2) Facilitative connectivity – infrastructure projects and removal of institutional and logistical bottlenecks, (3) trade facilitation, (4) financial cooperation – to offer good quality financial services, and (5) people-to-people bonds – cultural and academic exchanges (Flint and Zhu, 2019, p. 97). Further on, Huang (2016) stresses on the win-win cooperative position of OBOR initiative,

and through inter-country connectivity, OBOR can be an effective structural stimulation to sustain global economic growth.

Research Objective

One belt one road initiative is an important globalization initiative of China, which provides the logistical and infrastructure connectivity between China and other countries. Due to lack of subjective views of the participating countries, subject experts in one belt one road initiatives are asked for their opinions in PEST domains. To provide meaningful PEST (political, economic, social and technological) analyses of the one belt one road initiatives, mathematical decision-making methods, TOPSIS and AHP are used.

Literature Review

The Belt and Road Summit 2019 in Hong Kong brought a diversity of participants, of them approximately 5000 government officials and business leaders, approximately 520 one-to-one business matching meetings, 80+ prominent international speakers, 100 exhibitors, 100 Mainland China and overseas delegation, and 230+ investment projects (Belt and Road Summit Hong Kong). The testimonials from both the public and private sectors attendants indicate the role of the induced benefits OBOR (One Belt One Road) initiatives can bring to the individuals, businesses, and nations. The interests are, to an obvious observable extent, linked to the nature of environment stimulated through OBOR initiatives. Few of the following testimonials from the summit present the argument supporting the roles of environment that is the integrative functions of political functions, economics progresses, societal development and technological investments:

> "Last year we signed a MoU with a new start-up in Hong Kong, Over the year, our company has already developed a business of about a few million US Dollars, so I think the Belt and Road Summit is a very fruitful event. We always recommend our partners in Thailand to join the Summit" – A senior vice president, Loxley Public Company (Thailand)."

What sums up above is the PEST macroeconomic environment, but the ultimate function this environment serves is to stimulate the development of the markets and the industries in the countries which they have a stake or interest in the OBOR initiatives. Nevertheless, fears must be overcome, and views that block the active participations of the participating countries must not be ignored and should be creatively, theoretically and holistically challenged and resolved. Risk management, so far, has been neglected in the OBOR literature. To lay a groundwork, this research acknowledges that risk management has to be pragmatic, which means it has to consider the business environment that is consisted of both the macroenvironment (such as represented by the "PEST" (Political, Economic, Societal, and Technological) model) and industry's competitiveness. Oliva (2016) argues that the macroeconomic, which includes the environmental forces, such as the PEST forces, should be considered holistically as it can significantly influence the destination of businesses. On similar stance, Zhao, Tan and Jiang (2018) advocate that, to succeed in the implementation of OBOR initiatives, it is important connectivity-related objectives, whether it is people connectivity, governmental connectivity, or/and economy connectivity, should consider the industry's competitiveness of the participating countries, because ultimately, each nation intends to bring about some scopes and levels of industry competitiveness, in order to serve as the stimulus for other domains of development in sustainable manner. The risk model that interlinks the micro- business model level and the PEST macroeconomic

environment level is shown in Fig. 1. In a recent OBOR Summit in Beijing, KiniTV interviewed the Prime Minister Dr. Mahathir Mohammad, and he stated:

> "Now that I understand better the intention behind this idea of the Belt and Road Initiative. In the first place is the problems we have with the ECRL and the Bandar Malaysia, is not about Malaysia and China; it is about money; if it is too expensive for us, we have to reduce the cost, even if the project is with any other countries, we would have to adopt the same strategy to reduce the borrowing from other countries. So, it is not linked to the BRI. China and Chinese companies have been investing a lot in Malaysia. I met them just now and I find that they have put in a lot of money into Malaysia, and they seem to be quite happy with it, and we welcome their investments in Malaysia, as much as we welcome all foreign direct investments." (KiniTV, 2019).

Clearly, the interviews with Dr. Mahathir reflects a need to sensitize over the macro- and micro-economic environment of OBOR's participating countries, especially they are involved in large-scale infrastructure projects that concern not simply connectivity between nations, but also relating to the funding, and how the investments can help further stimulate the businesses in the nation.
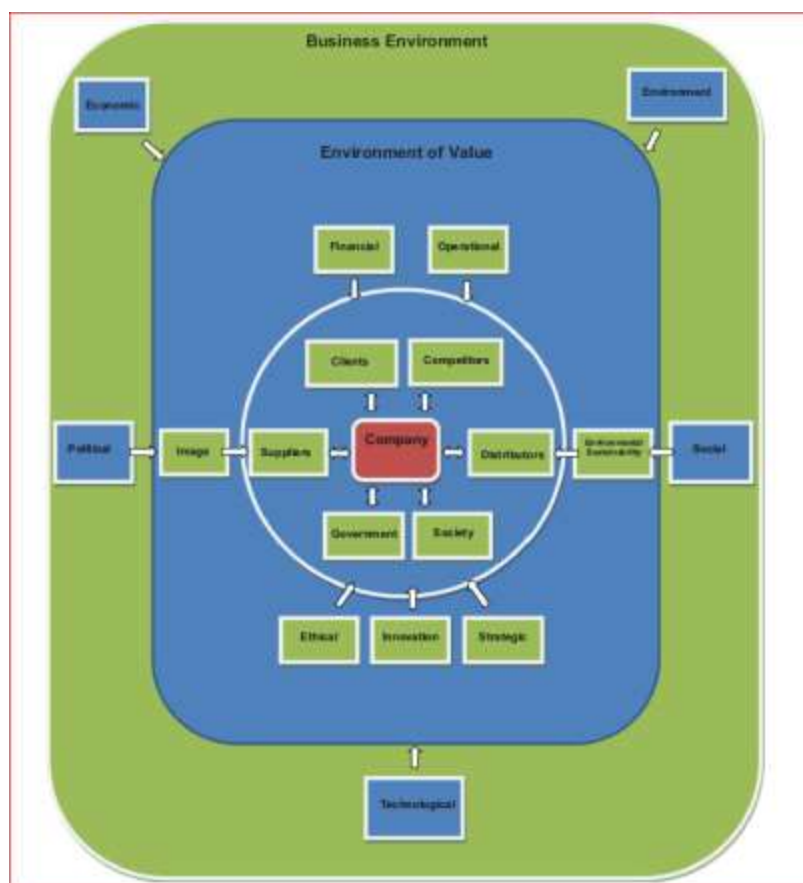
Fig. 1. A Risk Management Model linking Microeconomic to Macroeconomic Environment

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For national strategies to systematically and holistically impact on the entire nation's industry and societal developments, Kotler, Kartjahaya and Huan (2014), Kotler, Kartajaya and Setaiwan (2017) advocate that it is important to proactively stimulate changes of the four macroeconomic forces, namely PEST, as shown in Fig. 2. The concept in Fig. 2 is motivated by Zhao, Tan and Jiang (2018). A careful observation of Fig. 2 indicates that the model of 4C (Changes involving PEST, Company, Customer and Competitors) can be further adapted to suit the applications of OBOR initiatives and their implementation. Instead of considering competitors in Kotler et al. (2014; 2017), OBOR model should consider the views, the needs and the actual macro- and micro-economic environmental conditions of the participating countries, along the concept of ecosystems coopetitors, shown in Fig. 2. As such, three important objectives are conceptualized based on the 4C model, namely:

1. Enhance rules and good governance to develop political-security community.
2. Enhance integration and competitiveness of partners and the economy ecosystems.
3. Enhance well-being and livelihood of people.
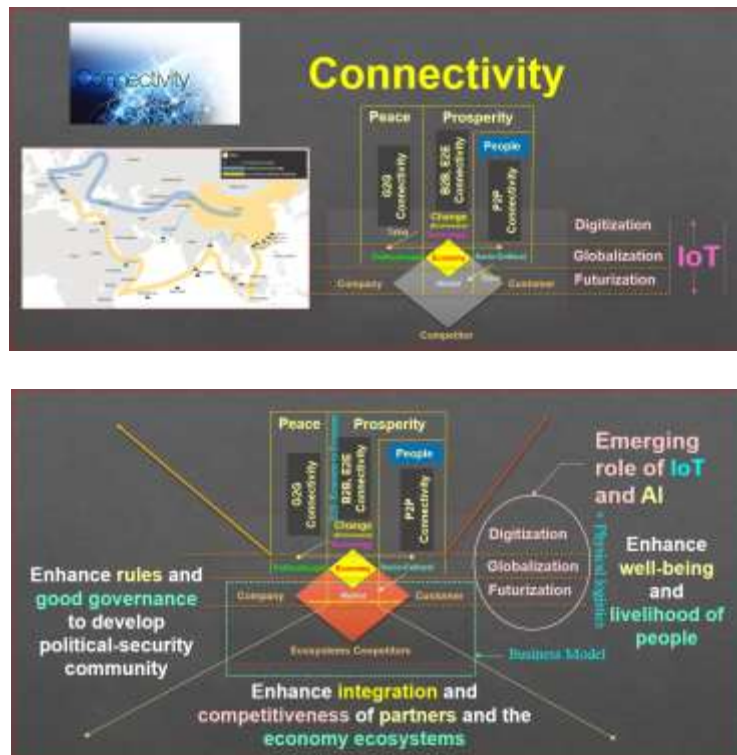
Fig. 2. The Four C Model Suggested for OBOR Initiatives and their Implementations

The first objective highlighted above through the 4Cs is also explained in Brewster (2018), "Although the OBOR initiative is principally economic, Chinese officials acknowledge that it has a political and security component vis-à-vis neighboring states." (p. 69). The second objective reflects the shared inclusivity approach of the Chinese policies through OBORs, as President Xi said:

"The old mindset of zero-sum game should give way to a new approach of win-win and all-win cooperation. The interests of others must be accommodated while pursuing one's own interests, and common development must be promoted while seeking for one's own development.

The vision of win-win cooperation not only applies to the economic field, but also the political, security, cultural and many other fields. It not only applies to countries within the region, but also to cooperation with countries from outside the region. We should enhance cooperation of macroeconomic policies to prevent negative spill-over effects that may arise from economic policy changes in individual economies. We should actively promote reform of global economic governance, uphold an open world economy, and jointly respond to risks and challenges in the world economy" (Xi, 2015).

In addition, the advocacy for means to enhance national competitiveness through national cooperation should shift away from a competition perspective (Lundberg, 2010) to cooperative (Cho, Moon and Yin, 2016), PEST connectivity as change targets for a nation (Kotler et al., 2014; 2017) and business ecosystems through OBOR connectivity (Zhao, Tan and Jiang, 2018), shown in Fig. 3. By focusing on such advocacy rather than being reactive, a nation recognizes the latent and manifest politics of approaches to intervention (Wilkins, 2014) can work towards creating the potential value of social change.
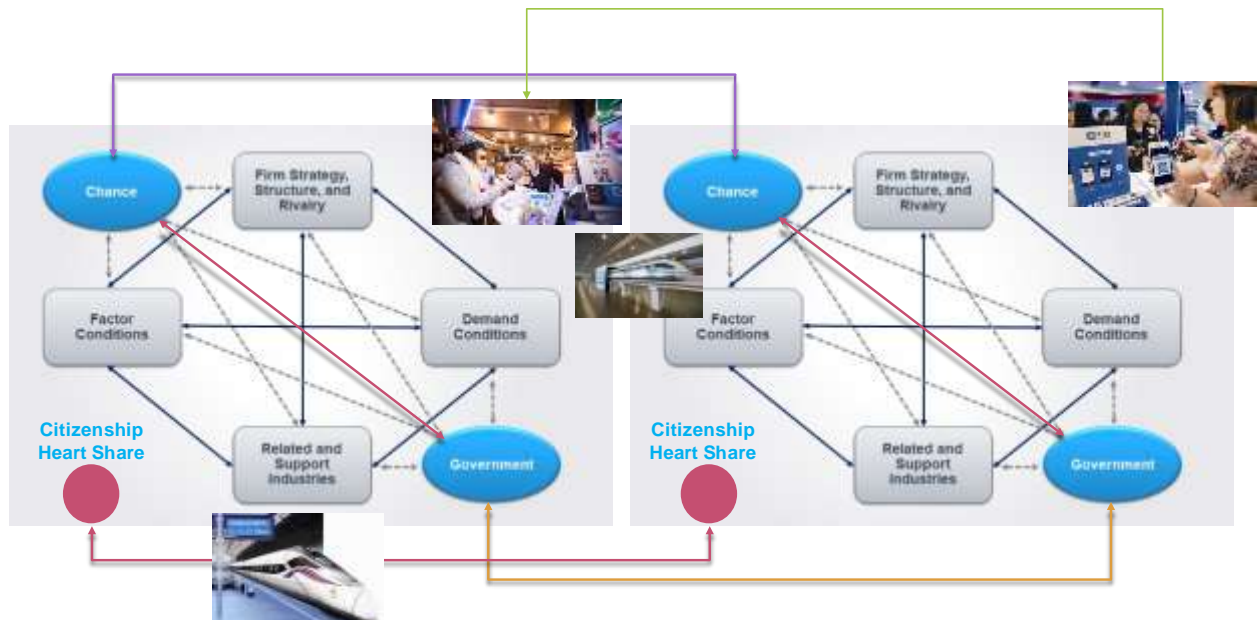
Fig. 3. The Connectivity to Enable Industry's Competitiveness of Participating Countries

The interrelationship structure of PEST is subtle and beyond the scopes of this research, and could involve various deep-rooted theoretical and historical developments (Tan, 2018). For instance, in view of the dominant influence of various different political economic ideologies as methods for promoting development, the United States employed an agenda of modernization through free trade, with a laissez-faire, democratic leadership, whereas, the Soviet Union favored modernization through a planned and centralized economy, with an authoritarian leadership (Pamment, 2014). Fig. 3 is meant for pushing forward on OBOR-enabled and connectivity that benefits a nation's economy, which avoids discussing the international relations theories such as the possibility of seeing a new form of a structural realist in national policy being formed, which may also consider its tactical variants such as defensive realists (i.e. it is unwise for states to try to maximize their share of world power, because the system will punish them if they attempt to gain too much power) or offensive

realist approach that maintains that "it makes good strategic sense for states to gain as much power as possible, and, if the circumstances are right, to pursue hegemony. The argument is not that conquest or domination is good in itself, but instead that having overwhelming power is the best way to ensure one's own survival" (Mearsheimer, 2013, p. 52).

In note passing, if international relations theories are to be discussed, Fig. 3 could be presented and discussed from the view of classical realists (that power is an end in itself), or from the view of structural realists in that power is a means to an end and the ultimate end is survival (ibid, p. 52). Alternatively, through a proactive 4Cs stimulation, it is possible to succeed, OBOR countries, including the concept originating country China, can undertake on a "Social Construction" theory of international relations. From this theoretical lens, once constructed (such as through an ideology or philosophy supporting OBOR, or norms, rules and language used), then, according to Fierke (2013), each of the constructed objects "has a particular meaning and use within a context. They are social constructs insofar as their shape and form is imbued with social values, norms, and assumptions rather than being the product of purely individual thought or meaning" (p. 163). In short, through a constructed "world of our making" (Onuf, 1989), a new rationality and reality is formed.

Method

This research adapts three methods – namely, SPSS (hierarchical multiple regression analysis), TOPSIS (with AHP in the weightage evaluations) and IPA (Importance-Performance Analysis) – to study the current and expected PEST conditions for implications to OBOR (One Belt One Road) initiatives. The skillful uses of TOPSIS-AHP-Neural Network and Structural equation modeling (SEM) based analyses are given in Tan and Julian (2022), Tan et al. (2022), and Tan (2020). The multiple regression is used to analyze the world data by use of existing world competitiveness index in areas of logistics performance index (LPI 2018), T&TCI 2017 (Travel & Tourism Competitiveness Index, 2017), GII 2018 (Global Innovation Index, Dutta, Lanvin, and Wunsch-Vincent, 2019; and corruptions perceptions index (CPI, 2018), which justifies the macro-competitiveness decisions of OBOR initiatives. The TOPSIS and IPA use the data based on OBOR's subject experts to study the current and expected PEST conditions for implications to OBOR initiatives in ASEAN countries.

TOPSIS

TOPSIS is a multicriteria decision-making technique (Tan, 2020). TOPSIS stands for Technique for Order Preference by Similarity to Ideal Solution, which was first introduced by Hwang and Yoon (1981), but soon became a classic multiple attribute decision making (MADM) method with more than 4,500 citations (Yoon and Kim, 2017). TOPSIS has been used in various strategic and operations management studies. For instance, Subramaniya, Guru Dev and SenthilKumar (2017) uses TOPSIS to identify the critical success factors (CSFs) which could contribute to increase the agility level of the Textile industry in India. Ajmera (2017) uses TOPSIS to rank the strategies for Indian medical tourism sector through the integration of SWOT analysis and TOPSIS method. That is, based on SWOT analysis, organizations can then use TOPSIS to find the best alternative among the available strategic alternatives that is important for firm to sustain in today's competitive marketplace (Ajmera, 2017). By treating the numbers of the respondents as describer of compatibility to fuzzy concept (Zadeh, 2009), TOPSIS can be turned into a fuzzy TOPSIS version (Shakerian, Dehnavi, and Ghanad, 2016).

TOPSIS assumes that if we have m alternatives (options) and n attributes / criteria and we have the score of each option with respect to each criterion:

Let x_{ij} score of option i with respect to criterion j; a matrix A = (x_{ij}) of mXn matrix; Let J be the set of benefit attributes or criteria, and let J' be the set of negative attributes or criteria.

Step 1: Construct normalized decision matrix – this step transforms various attribute dimensions into non-dimensional attributes, which allows comparisons across criteria, and normalize scores or data as follows:

$$r_{ij} = \frac{x_{ij}}{\sum x_{ij}^2} \text{ for } i = 1, ..., m; j = 1, ..., n.$$

Step 2: Construct the weighted normalized decision matrix, by assuming we have a set of weights for each criteria w_j for j = 1,…, n. Then, we multiple each column of the normalized decision matrix by its associated weight, and thus the element become:

$$v_{ij} = w_j r_{ij}$$

Step 3: Determine the ideal and negative ideal solutions:
Positive Ideal solution:
$A^+ = \{v_1^+, ..., v_n^+\}$
Where:
$v_j^+ = \{\max(v_{ij}) \text{ if } j \in J; \min(v_{ij}) \text{ if } j \ni J'\}$

Negative Ideal solution:
$A^- = \{v_1^-, ..., v_n^-\}$
Where:
$v_j^- = \{\min(v_{ij}) \text{ if } j \in J; \max(v_{ij}) \text{ if } j \ni J'\}$

Step 4: Calculate the separation measures for each alternative
The separation from the positive ideal alternative is:

$$S_i^+ = [\sum(v_j^+ - v_{ij})^2]^{1/2} ; i = 1, ..., m$$

Similarly, the separation from the negative ideal alternative is:

$$S_i^- = [\sum(v_j^- - v_{ij})^2]^{1/2} ; i = 1, ..., m$$

Step 5: Calculate the relative closeness of alternative to the ideal solution P_i^*, which is a value function (Yoon and Kim, 2017)

$$C_i^* = \frac{S_i^-}{S_i^+}, 0 < C_i^* < 1$$

Choose the alternative in which C_i^* is closer to 1, or perform the ranking from among the alternatives, so that prioritization of the strategies can be identified, or benchmarking of the best performed from the alternatives can be revealed.

It is noted in Yoon and Kim (2017) that the value function can be rewritten by $S_i^- = V S_i^+$, which is a straight line that has a slope of V and V-axis intercept of zero where the value increased, the line becomes steeper. Then, as shown in Yoon and Kim (2017), the most preferred alternative is one that meets the indifference curve with the steepest slope. Fig. 4 shows A_1 is the most preferred alternative and A_3 is the least preferred.
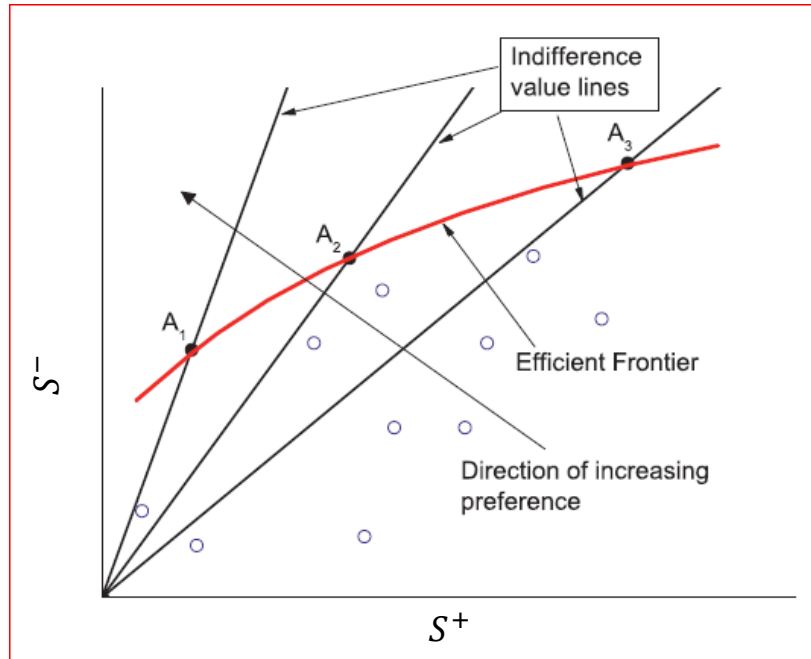
Fig. 4. Preference Order by Original TOPSIS

Correspondingly, A_j is preferred to A_k if the slope, V of A_j is more than V of A_k:

$$\frac{S_j^-}{S_j^+} > \frac{S_k^-}{S_k^+}$$

Which is mathematically equivalent to the following equation,

$$\frac{S_j^-}{S_j^+ + S_j^-} > \frac{S_k^-}{S_k^+ + S_k^-}$$

That is, the relative closeness of alternative A_i to the ideal solution is defined as:

$$C_i^+ = \frac{S_i^-}{S_i^- + S_i^+}; i = 1,\ldots,n;\quad \text{where} \quad 0 \le C_i^+ \le 1, \quad \text{and} \quad C_i^+ = 0 \text{ when } A_i = A^-, \quad \text{and}$$

$C_i^+ = 1$ when $A_i = A^+$. TOPSIS picks an alternative that has the maximum C^+, or rank them accordingly.

Importance-Performance Analysis

Since the original seminal conception owed to Martilla and James (1977), IPA (Importance-Performance Analysis) technique has gained widespread usages and popularity in the field of strategic management discipline as well as hospitality and tourism industry (Azzopardi and Nash, 2013; Matzler, Sauerwein and Heischmidt, 2003), partly owed to its simplicity to quickly point out the areas of significance and actual performances. Two important questions are raised in a typical IPA, namely (1) "How important is a certain construct or variable important to the decision maker?" and (2) "How satisfied performance has been achieved in relation to the construct or variable of concern?". Thus, IPA is a broad-based approach to help researchers, practitioners and policy makers identify constructs or variables to target, and the resources and investments needed for performance realization.

Specifically, IPA provides a mapping scenario to illuminate where and what efforts are to continue, such as by addressing resource allocation and policy decision making. Too much exertion on low-important areas would identify areas of potential overkill, and thus the decision makers could re-allocate resources for alternative purposes that can better bring values to the decision makers. In short, IPA technique is a "basic diagnostic decision tool that facilitates the identification of improvement prioritization, the mobilization and deployment of scarce resources to where they are needed most, and the harmonization of strategic planning efforts to enhance relative competitiveness" (Azzorpadi and Nash, 2013, p. 223).

Results and Discussion

Vines (2016) suggests a concept of concerted unilateralism and international leadership that China could pursue in macroeconomic policymaking in a multipolar world. By "concerted", Vines (2016) explains that it involves nations and their leaders are brought together through common shared synergies and thus "are prepared to do the necessary work, and if necessary, invest the necessary resources, and to bring about the necessary agreement, of a kind which enables self-interested action to take place in a mutually supportive manner" (p. 7). Underpinned on the similar logic and based on shared prosperity, peace and connectivity mission, as advocated in OBOR initiative principle, it is necessary for China to proactively sense and incorporate the opportunities abroad. Towards this end, we suggest PEST framework as a valid and useful mechanism that could provide some fundamental bases of monitoring to guide China in adjusting strategies to improve OBOR initiative implementation. Particularly, rather than focusing on PEST monitoring and decision-making reactively, the literature review section has articulated and suggested that the PEST can be approached with change-oriented mindset, driven by integrating the four domains of PEST through strategic conceptions. Thus, PEST framework is a valid and useful mechanism as it considers the fundamental macro-level context for laying out the groundworks for competitiveness-oriented approach.

The PEST framework fits the three mixtures of goals and strategies of the Belt Road Initiatives (BRIs): 1) Economic integration, 2) Regional influence (i.e., social and technological), and 3) global geopolitical competition (Flint and Zhu, 2018). As it is argued in Zhao, Tan and Jiang (2018), and Vines (2016), when the economic development plan of OBOR can consider and integrate the other nation's competitiveness requirements and potentials, it can project favorable cooperative spirit (Cho, Moon, and Yin, 2016), the geopolitical goals and implications can be effectively met (Glassman, 2011) and can also better re-shape the political, economic, societal and technological competitiveness at international level (Huang, 2015). Cross national cooperation and integration, as many

researchers have presented in the context of OBOR, involves a need to "create a multitier inter-governmental mechanism for macro-policy dialogues, deepen shared interests, reach new consensus and promote political trust", and through infrastructure connectivity, unimpeded trade, financial support, and people-to-people exchange (Huang, 2016). The data presented in this section, and discussed in the following, provides an exploratory attempt to lay out the groundworks on PEST-induced OBOR's strategy adjustments.

In the PEST context, goal of infrastructure connectivity is probably the most prominent as its functions pervade the influences across the entire PEST domains. Given the low level of infrastructure development in most BRI countries (Zhai, 2018, p.2), as also indicated in Fig. 5, BRI can serve to help the OBOR-participating countries remove infrastructure bottlenecks, and in doing so, it can foster further regional economic integration and development.
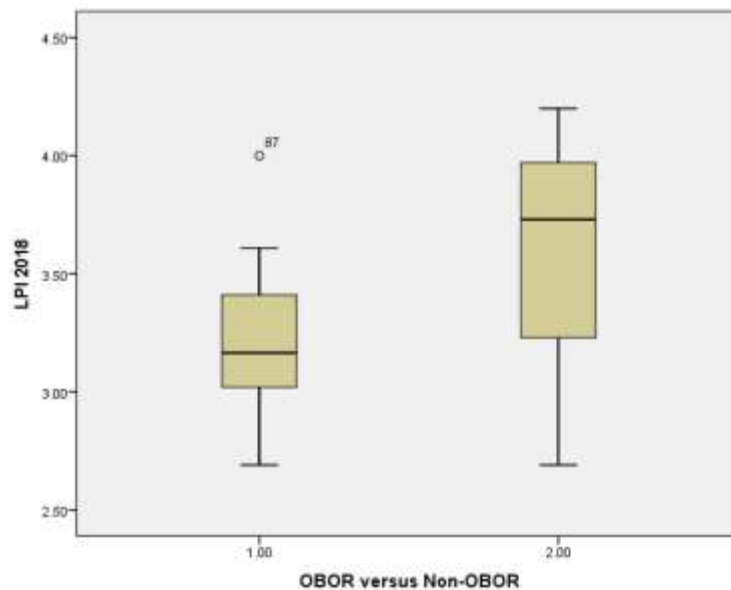
Fig. 5. Logistics Performance Index 2018 in Comparison between the OBOR [1] and Non-OBOR Participating Countries [2] (Source: Zhao, Tan and Jiang, 2019)

To study the nature of competitiveness capable to explain the national logistics performance index 2018, we collected globally monitored indexes such as LPI (Logistics Performance Index), T&TC (Tourism & Travel Competitiveness), CPI (Corruptions Perceptions Index), and GII (Global Innovation Index). A careful observation of the innovation input sub-index in the GII 2018 report reveals that its component-wise structure shares the concept advocated in Porter's Diamond Model (1990). Porter's Diamond model is generally acknowledged as a useful framework to help a nation building its competitive advantages. The framework is long-term (10 years or more) in basis, and is suitable for public policy development and national attractiveness, and point towards the areas to help firms in a nation build competitiveness and innovativeness (Solvell, 2015). As argued in Cho, Moon and Yin (2016), "Unlike the resource-based view of a firm, the diamond model deals with not only the firm activities but also other factors related to industries and rivals… In addition, Porter's new theory on competitiveness has an advantage of being comprehensive by capturing the most important variables or concepts stressed by related existing theories" (p. 484).

There are significant differences across the different regions of OBOR-participating countries listed below, shown in Figs. 6-8:

- South Asia – Pakistan, Bagladesh, Sri Lanka, Afghan, Nepal, Maldives, Bhutan
- Southeast Asia – Indonesia, Thailand, Malaysia, Vietnam, Singapore, Philippines, Myanmar, Cambodia, Laos, Brunei, East Timor.
- West Asia and North Africa – Saudi Arabia, UAE, Oman, Iran, Turkey, Israel, Egypt, Kuwait, Iraq, Katar, Jordan, Lebanon, Bahrain, Yemen, Syria, and Palestine.
- Central Asia countries – Kazakhsta, Uzbekistan, Turmenistan, Kyrghyzstan, and Tajikista.
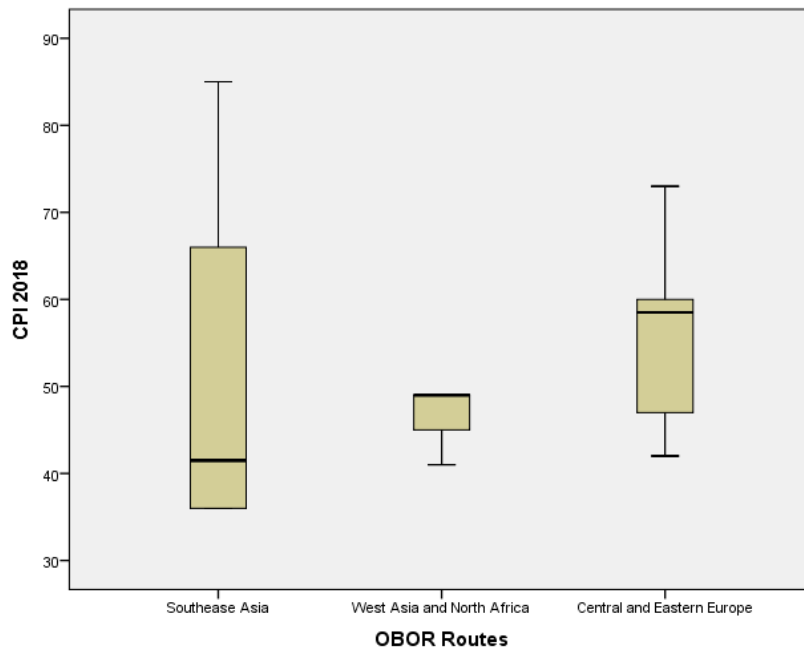
Fig. 6. CPI 2018 Comparisons
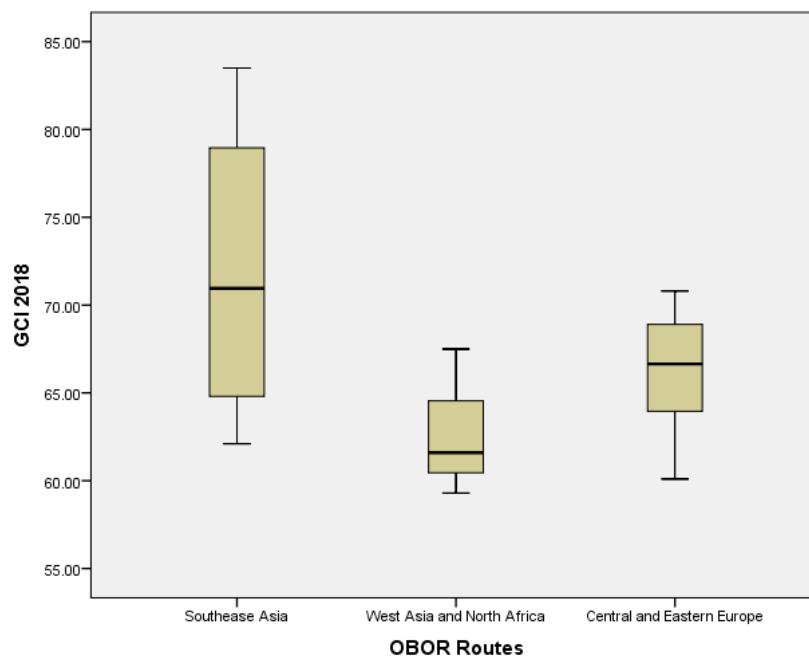
Fig. 7. GCI 2018
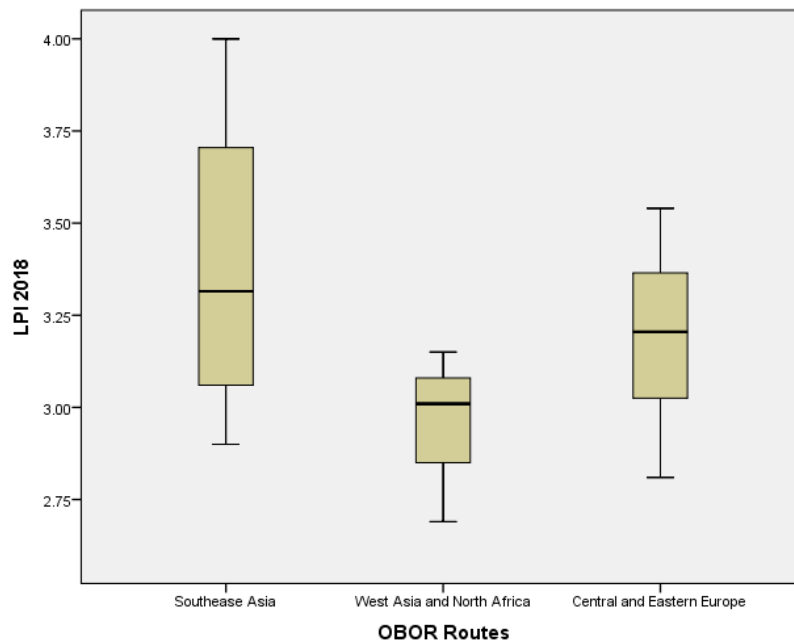
Fig. 8. LPI 2018 Comparisons

In view of the above data analysis results, we conclude that:

"OBOR-initiative design and executions should need to sensitize and actively help strengthen the competitiveness drivers of OBOR-participating nations, and in particular, three aspects are to be stressed: (1) travel and tourism competitiveness, (2) global innovation competitiveness, and (3) the governance strength of the public administration.

Technological investments especially on infrastructure are the dominant ones prioritized by the China government, which includes the "building of railway and highway networks, port facilities, pipelines, airports and energy and communication infrastructure" (Zhao, 2018), and also requires "massive funding and long-term commitments, and often entails political risks and diplomatic sensitivies" (ibid, p. 2). Nevertheless, a TOPSIS analysis of the perceptions of the OBOR experts associated with the Institute of Southeast Asian Studies, Yunnan Academy of Social Sciences, shows three perceptual differences which may be of potential implications, as being reflected in Fig. 9. The ultimate purpose of Fig. 9 is to help researchers and policy makers identity the gaps between the importance and actual perceptions that reflect the reality. A TOPSIS ranking by technological factors show three distinctive perceptual groups of experts: The "A" zone shows gaps of political, economic, societal factors (PES), in different performance direction, whereas expert group "B" shares positively correlated synergies among the PEST factors, and group "C" is an expert group involves a mixture of opinions but are non-technological favor in nature.
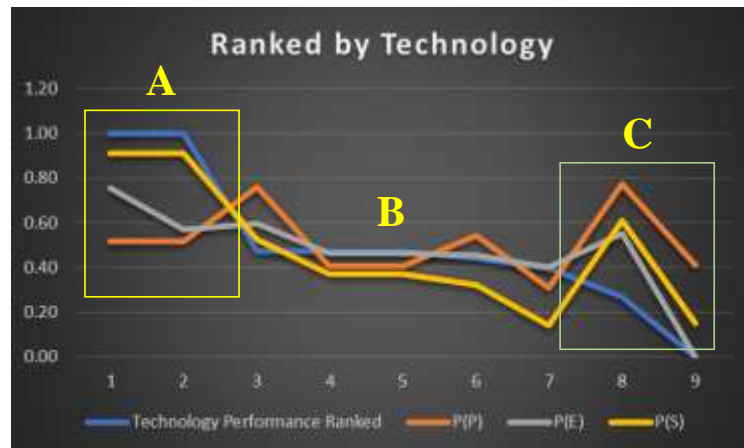
Fig. 9. TOPSIS-yielded PEST Analysis, Ranked by Technology

Through TOPSIS, this research attempts to provide the visibility at an important level that can prompt for strategic and operational thinking and efforts.

It is aimed that through this research, with the use of TOPSIS and AHP methods, it can provide some useful insights to help the strategists and policy makers of OBOR participating countries, including Chain, to see the various interrelated perspectives and concerns.

Based on the AHP method, the importance weightages assigned collectively by the OBOR subject experts are: 36% to intellectual property rights protection, 18% to the comprehensive standard of science and technology development, 16% to both technology transfer and R&D share of GDP, and 14% to the recent patent applications number, in ASEAN regions. The collective AHP calculations and importance weightage plots are given in Fig. 10.
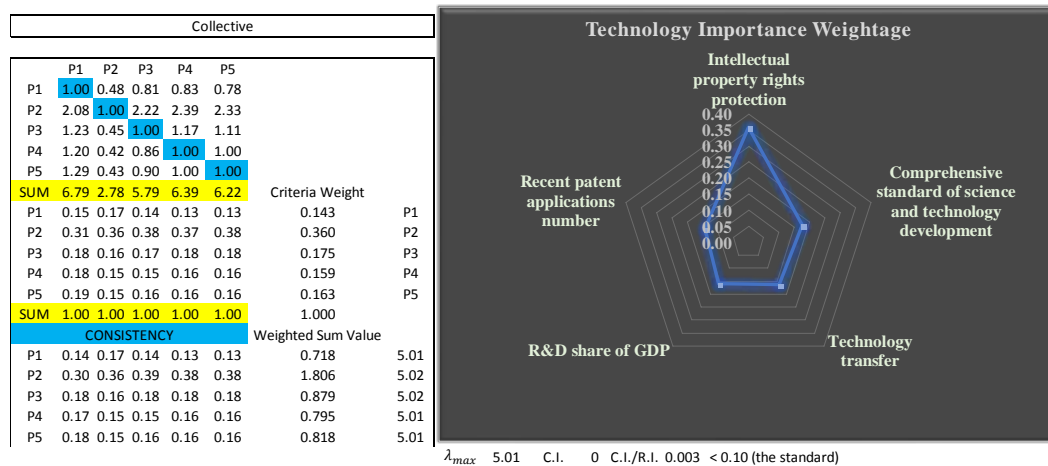

Fig. 10. Technological Importance Weightage Obtained from AHP Method (Source: This research)

Majority of the OBOR subject experts have the perceptions of importance fall on the level between 2-3 (somewhat important to comparatively important), with level 4 at very important level. The perceived actual performance level is shown relative to the perceived

importance level for the 9 subject experts in OBOR, which shows that majority of the perceived performance in between 2-3 levels (namely, there is some degree of influence to OBOR and meeting the satisfaction, respectively). Nevertheless, there are obvious two variances among the subject experts, with one group having actual perceived performance at below the important level while the other is opposite in nature.
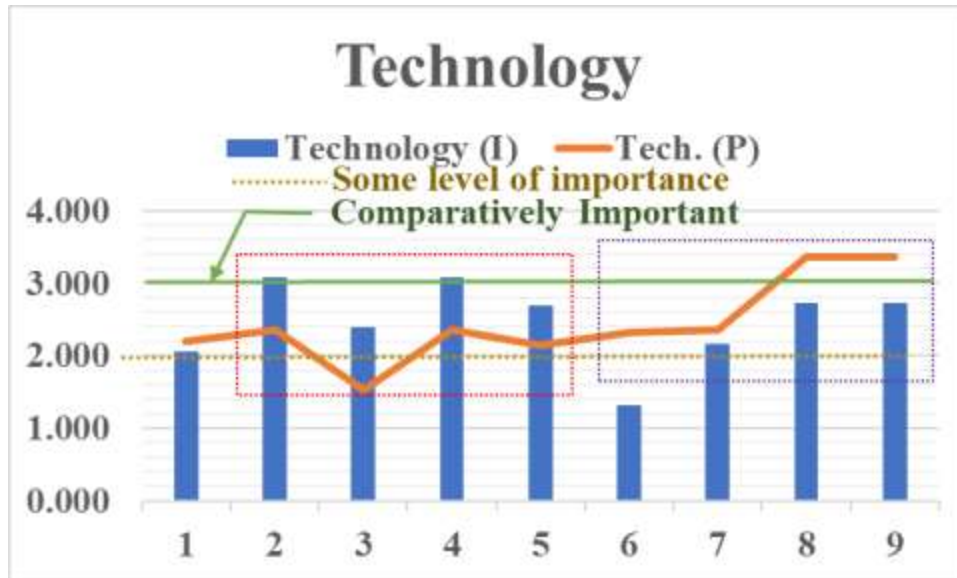
Fig, 11. Expert Perceptions on IPA

Importance-Performance Analysis (IPA) was first developed by Martilla and James in 1977. Since then, according to Sulaiman, Jahwari, Sirakaya-Turk and Altintas (2016), IPA method has been widely used in different disciplines due to its simplicity and efficacy in showing the position of assorted attributes in a visually appealing format. In this research, we resolve to only the Radar Chart for the visual expression to facilitate the explanation. Shown in Fig. 12 is the Radar Chart plot for the IPA of politics (OBOR), which indicates four wider gaps needed to be addressed in helping to move OBOR initiatives forward in favorable manner, namely: (1) P1 = the political stability (政局稳定性), (2) P2 = issues with nationalism (民族主义问题), (3) the separatism issue of people in a nation (民族分离主义问题), and (4) P7 = the policy stability of the nation (政策稳定性).
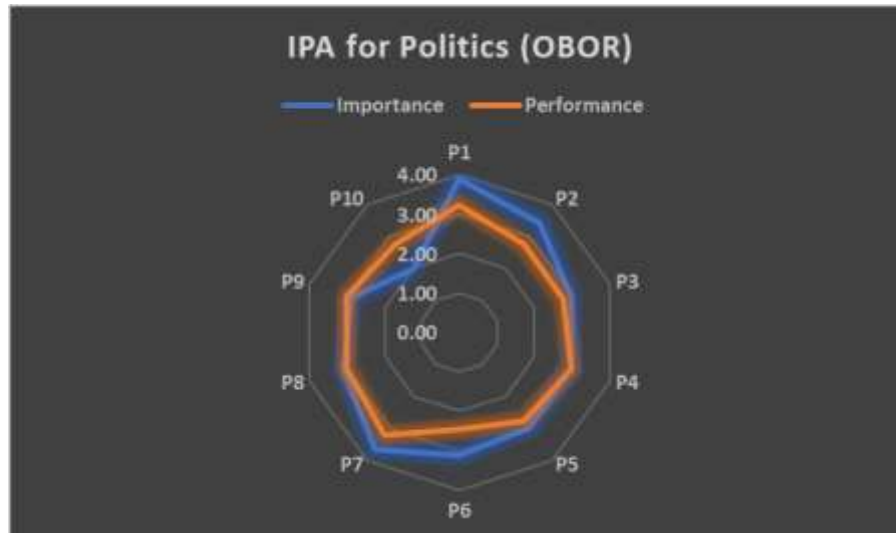
Fig. 12. IPA for Politics (OBOR)

In view of the social domain, two wider gaps that are consider capable to influence OBOR progresses in favorable manner are P1 (demographic ration, 人口结构比) and P8 (the people's sensitivity to product quality, 国家民众对商品质量的敏感度).
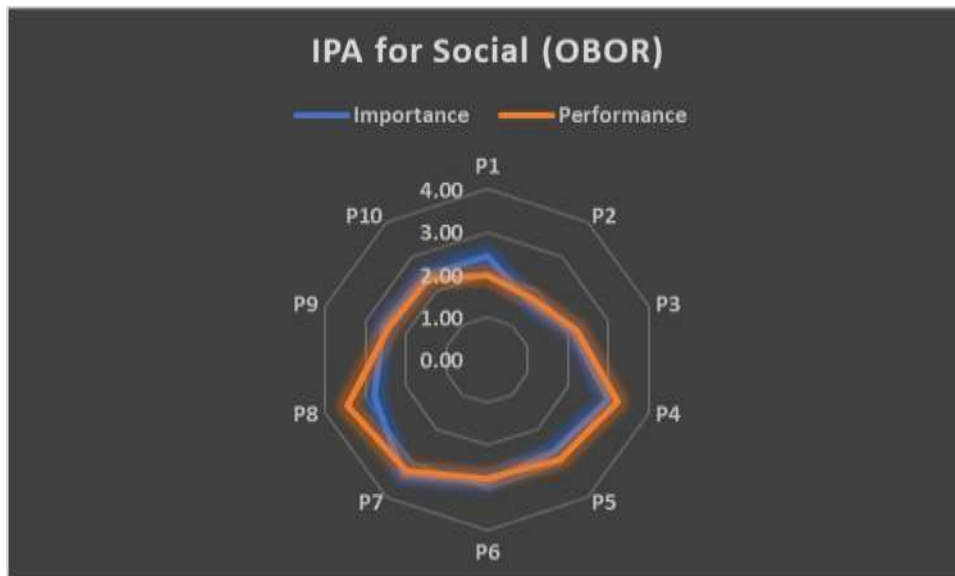

Fig. 13. IPA for Social (OBOR)

Lastly in the domain of technology, the wider gap exists for P2, which is patent protection law (专利保护法).
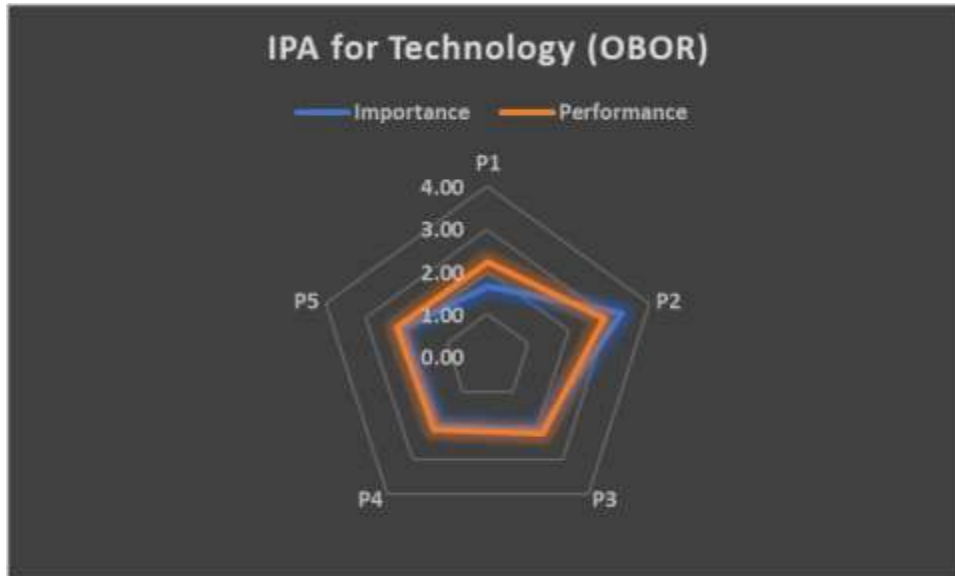
Fig. 14. IPA for Technology (OBOR)

Quoted in Han and Guo (2019), "A comprehensive IP protection system has come into shape in China since the 40 years' of reform and opening up, making outstanding achievements to the great undertakings," said Director General of the World Intellectual Property Organization (WIPO), Mr. Francis Gurry, who attended 2018 High-Level Conference on IP for Countries along the Belt and Road and the 9th China Patent Annual Conference recently. Since then, China's innovation achievement has been very impressive, being ranked 17 in the world for Global Innovation Index 2018, which is above Canada (Ranked 18), Australia (Ranked 20), and Thailand (Ranked 38). Thus, as shown in Fig. 15 in the GII 2018 report, China is currently an innovation leader in the world.
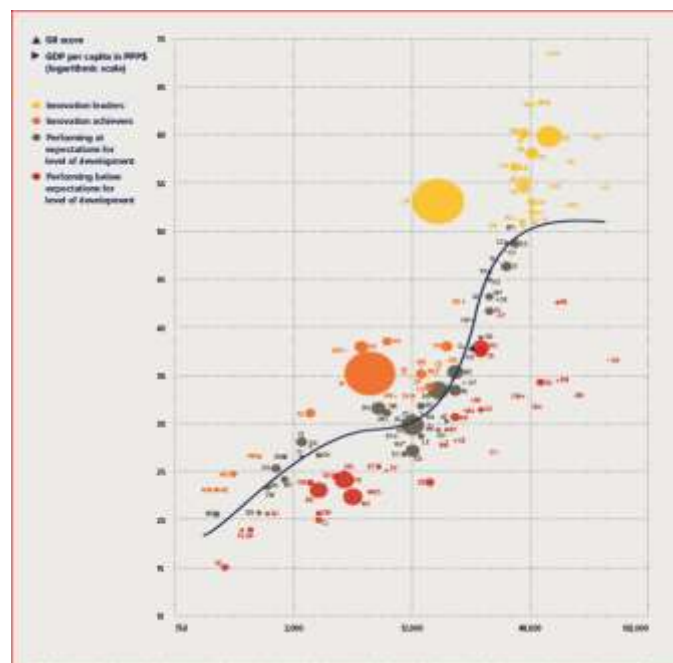

Fig. 15. GII Scores and GDP Per Capital in PPP$ (Bubbles Sized by Population) (Source: Dutta et al. 2019, p. xxxvi)

The OBOR subject experts' perceptions and worries about the gaps on patent protection is reflected in another way through GII 2018, which sees a comparatively significant difference between OBOR and non-OBOR countries. Lerner (2002) reported a significant positive impact of the patent system on innovation by examining shifts in the strength of patent protection across sixty countries and a 150-year period. The concern of the OBOR subject experts has many empirical supports, for instance, in Hall and Helmers (2010), they show that the stronger patent protection encourages FDI and technology transfer to mid-level developing countries.

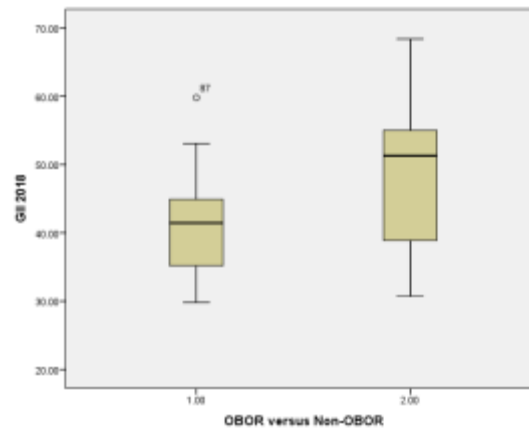**Fig. 16.** GII 2018 Scores between OBOR Countries and Non-OBOR Countries (Zhao, Tan and Jiang, 2019)
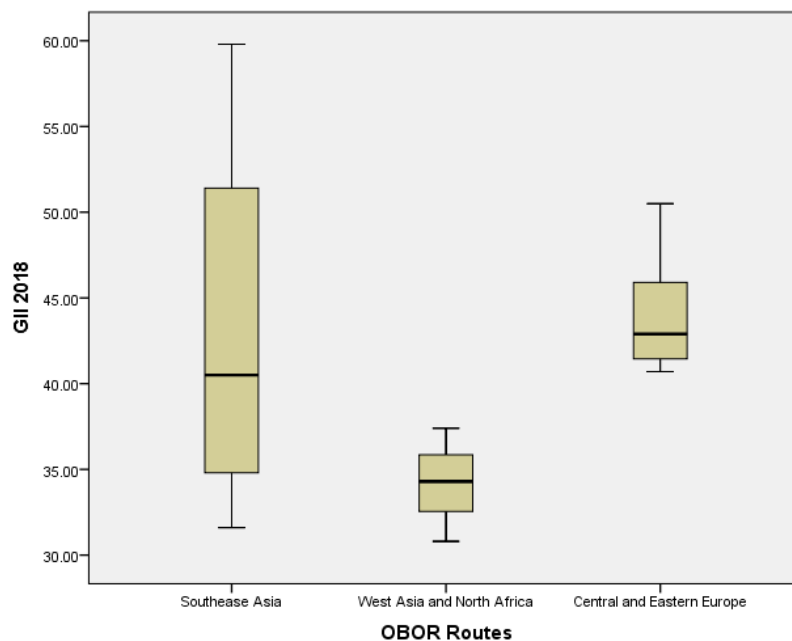

Fig. 17. GII 2018 Scores for the Different OBOR Route-Regions (Source: Zhao, Tan and Jiang, 2019)

As to the economics domain, two wider gaps exist in P4 (stability of macroeconomics, 宏观经济形势的稳定性) and P10 (import and export factors, 进出口因素). As Helpman and Grossman (1989) pointed out, "not only technology affects trade, but also

trade affects the evolution of technology". The OBOR initiatives have seen an accelerated exports of China's infrastructural technologies to OBOR countries, but many are in the forms of fund-lending (i.e. some $8 trillion lending for infrastructure development in 68 countries), which is part of the importing and exporting determinants that can serve as a risk of financing from the borrowing countries.
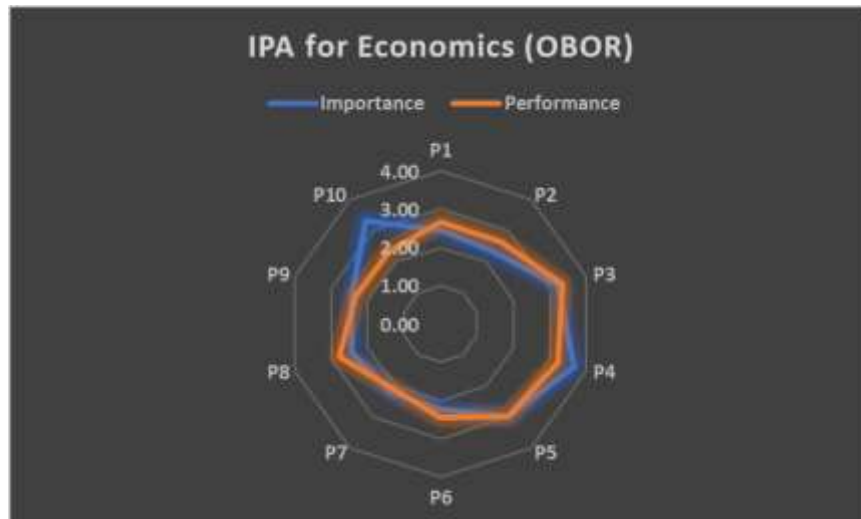

Fig. 18. IPA for Economics (OBOR)

Conclusion

This study draws the attention of the policy-makers of one-belt one-road (OBOR) initiatives towards a need to consider both macro-environments, noted as PEST environments of the participating countries, and the competitive-advantage goals of them. Competitive advantage is an ultimate, pragmatic goal of any nation, and a proactive consideration in this aspect provides a strong base for implementing concerted multilateralism principles of China in OBOR.

Specifically, using TOPSIS (Tan, 2020), this study provides the comparative visibility of where PEST performance domains best perform in China's one-belt one-road (OBOR) initiatives in ASEAN countries. The study also concludes that one-belt one-road initiatives can assist OBOR countries to improve their global innovation competitiveness, but first, they need to help improve stability of macroeconomics and imports and exports of OBOR countries. Beside considering the role of logistical infrastructure for nation-to-nation connectivity, this study also demonstrates that OBOR can benefit to improve the competitive advantages of the participating nations.

In addition, TOPSIS, AHP, and IPA analyses highlight numerous concerns of performance gaps as perceived from the OBOR subject experts in China. It is assumed, as inferred from this research, that addressing these performance gaps would benefit both China and the participating countries of OBOR.

References

Azzopardi, E., & Nash, R. (2013). A critical evaluation of importance-performance analysis. *Tourism Management, 35*, 222-233. https://doi.org/10.1016/j.tourman.2012.07.007

Bangkok Post. (April 26, 2019). China's Xi defends belt and road, says 'not exclusive club'. Retrieved from https://www.bangkokpost.com/news/world/1667508/chinas-xi-defends-belt-and-road-says-not-exclusive-club

Belt and Road Summit Hong Kong. (April 29, 2019). *Testimonials*. Retrieved from http://www.beltandroadsummit.hk/en/information_centre/testimonials.html.

Brewster, D. (2018). The MSRI and the evolving naval balance in the Indian Ocean. (J.M.F. Blanchard Ed.). China's maritime silk road initiative and south Asia: a political economic analysis of its purposes, perils, and promise. Palgrave Macmillan.

Cho, D.S., Moon, H.C., & Yin, W.Y. (2016). Enhancing national competitiveness through national cooperation: The case of South Korea and Dubai. *Competitiveness Review*, *26*(5), 482-499.

Chung, C. P. (2017). What are the strategic and economic implications for South Asia of China's maritime silk road initiative?. *The Pacific Review, 31*(3), 1-18. https://doi.org/10.1080/09512748.2017.1375000

CPI. (2018). *Corruptions performance index 2018*. Retrieved December 1, 2019. https://www.transparency.org/cpi2018.

Dutta, S., Lanvin, B., & Wunsch-Vincent, S. (2019). Global Innovation Index 2018 (GII 2018). Cornell SC Johnson College of Business, INSEAD The Business School for the World, WIPO World Intellectual Property Organizaiton, CII Confederation of Indian Industry, Strategy& Part of the PwC Network, SEBRAE, and CNI National Confederation of Industry Brazil.

Fierke, K.M. (2013). Constructivism. In T. Dunne, M. Kurki, and S. Smith (Eds.), *International Relations Theories: Discipline and Diversity* (pp. 161-178). Oxford University Press.

Flint, C., & Zhu, C. (2019). The Geopolitics of Connectivity, Cooperation, and Hegemonic Competition: The Belt and Road Initiative. *Geoforum, 99*, 95-101.

Glassman, J. (2011). The Geo-Political Economy of Global Production Networks. Geography Compass, 4, pp. 154-164.

Hall, B. H., & Helmers, C. (2010). The Role of Patent Protection in (Clean/Green) Technology Transfer. *Santa Clara Computer and High Technology Law Journal, 26*(4), 487-532.

Han, W.W., & Guo, X.J. (April 10, 2019). *China: IP protection China: New policies and change. Mondaq: Connecting knowledge & people*. http://www.mondaq.com/china/x/775646/Patent/IP+Protection+In+China+New+Policies+And+Changes.

Hanafi, M., Wibisono, D., Mangkusubroto, K., Siallagan, M., & Badriyah, J. K. (2017). Modeling competitive advantage of nation: A literature review. *Competitive Review, 27*(4), 335-365.

Helpman, E., & Grossman, G. (1989). Product development and international trade. *Journal of Political Economics, 97*(6), 1261–1283. https://doi.org/10.1086/261653

Huang, R. (2015). *The belt and road initiative" is the experimental field for the new concept of international order*. Retrieved June 6, 2018. http://world.people.com.cn/n/2015/0705/c1002-27255803.htm.

Huang, Y. (2016). Understanding China's belt & road initiative: motivation, framework and assessment. *China Economic Review, 40*, 314-321. https://doi.org/10.1016/j.chieco.2016. 07.007

KiniTV (2019). *In China, Dr Mahathir learns the true intention behind the belt and road initiative*. Retrieved from https://www.kinitv.com/video/c4fc4ae5-2c4c-4f6e-9f36-05fad15f9cf0?fbclid=IwAR2G1rEt-jz9LZ22j97J3jRFVTIcnnCuYaOuBuTxKwj1kwO94Clz9NkpA-Q, on 29 April, 2019.

Kotler, P., Kartajaya, H., & Huan, H.D. (2014). *Think Asean! Rethinking marketing towards Asean economic community* (2nd ed.). McGraw-Hill.

Kotler, P., Kartajaya, H., & Hooi, P.H. (2017). *Marketing for competitiveness: Asia to the World: In the age of digital consumers*. World Scientific Press.

Lerner, J. (2002). 150 years of patent protection. *American Economic Review, 92*(2), 221-225.

Liu, W., & Dumford, M. (2016). Inclusive globalization: Unpacking China's belt and road initiative. *Area Development Policy, 1*, 323-340.

Lundberg, H. (2010). Strategic networks for increased regional competitiveness: Two Swedish cases. *Competitiveness Review: An International Business Journal, 20*(2), 152-165. https://doi.org/10.1108/10595421011029866

Martila, J.A., & James, J.C. (1977). Importance-performance analysis. *Journal of Marketing, 41*(1), 77-79. https://doi.org/10.2307/1250495

Matzler, K., Sauerwein, E., & Heischmidt, K. (2003), Importance-performance analysis revisited: The role of the factor structure of customer satisfaction. *The Service Industries Journal, 23*(2), 112-129. https://doi.org/10.1080/02642060412331300912

Mearsheimer, J. J. (2013). *Structural Realism(T. Dunne, M. Kurki, and S. Smith, Eds), International Relations Theories: Discipline and Diversity*. Oxford University Press.

Oliva, F.L. (2016). A maturity model for enterprise risk management. *International Journal of Production Economics, 173*, 66-79.

Onuf, N. (1989). *World of our making: rules and rule in social theory and international relations*. University of South China Press.

Pammet, J. (2014). *Political economy of development (K.G. Wilkins, T. Tufte, and R. Obregon, Eds.). The handbook of development communication and social change*. John Wiley & Sons.

Porter, M.E. (1990). *The competitive advantage of nations*. Free Press.

Roach, S.C. (2013). *Critical theory(T. Dunne, M. Kurki, and S. Smith, Eds.). International relations theories: Discipline and diversity*. Oxford University Press.

Silk Capital. (April 10, 2019). *One belt one road*. Retrieved from. https://www.silkcapital.net/global-frontier-markets/one-belt-one-road/

Solvell, O. (2015). The competitive advantage of nations 25 years – opening up new perspectives on competitiveness. *Competitiveness Review, 25*(5), 471-481.

Sulaiman, D., Jahwari, A., Sirakaya-Turk, E., & Altintas, V. (2016). Evaluating communication competency of tour guides using a modified importance-performance analysis (MIPA). *International Journal of Contemporary Hospitality Management, 28*(1), 195-218.

Tan, C.C. (2018). Giving strategic management an epistemological structure: a case of community-based tourism. *National Academy of Managerial Staff of Culture and Arts Herald, 1*, 723-733.

Tan, C.C. (2020). TOPSIS method in search for competitive advantage and firm-performance. *International Journal of Mechanical and Production Engineering Research and Development, 10*(3), 13917-13926.

Tan, C.C., & Julian, M. (2022). Two-stage neural network-structural equation modeling approach to studying drivers for hotel objectives: with implications(P. Srivastava, S.S. Thakur, G.I. Oros, A.A. AlJarrah, & V. Laohakosol, Eds.). Mathematica, Computational Intelligence and Engineering Approaches for Tourism, Agriculture and Healthcare. *Lecture Notes in Networks and Systems*, *214*, 39-58.

Tan, C.C., Damnoen, P.S., Toprayoon, Y., Dabjan, N., & Damkam, K. (2022). An exploratory study of the spirituality-oriented experiences of tourists. (P. Srivastava, S.S. Thakur, G.I. Oros, A.A. AlJarrah, & V. Laohakosol, Eds.). Mathematica, Computational Intelligence and Engineering Approaches for Tourism, Agriculture and Healthcare. *Lecture Notes in Networks and Systems*, *214*, 307-314.

T & TCI. (2017). *The travel & tourism competitiveness report 2017: Paving the way for a more sustainable and inclusive future*. World Economic Forum.

Vines, D. (2016). Chinese leadership of macroeconomic policymaking in a multipolar World. *China Economic Review, 40*, 286-296. https://doi.org//10.1016/j.chieco.2016.07.010.

Wang, J. (2016). *Great power strategy: Research and reflection on the international strategy*. CITIC Publishing Group.

Wilkins, K.G. (2014). *Advocacy communication (K.G. Wilkins, T. Tufte, and R. Obregon, Eds.). The handbook of development communication and social change*. John Wiley & Sons.

Xi, J.P. (2015). Towards a Community of Common Destiny and a New Future for Asia. Keynote Speech delivered at the 2015 Boao forum for Asia Annual Conference, 2015, http://www.en84.com/nonfiction/remarks/201503/00016043.html.

Yang, D., Jiang, L., & Ng, A.K.Y. (2018). One belt one road, but several routes: a case study of new emerging trade corridors connecting the Far East to Europe. *Transportation Research Part A, 117*, 190-204.

Zhai, F. (2018). China's belt and road initiative: A preliminary quantitative assessment. *Journal of Asian Economics, 55*, 84-92. https://doi.org/10.1016/j.asieco.2017.12.006

Zhao, S., Tan, C.C., & Jiang, C. (2018). A Cross-Disciplinary View on Japanese ODA to Thailand and its Implications to One Belt One Road Initiative in Southeast Asia. A Keynote Speech Presented to First India Great Mekong Subregion (IGMSIG) 2018 International Conference, at Fr. Agnel College, Goa, India.

Zhao, S., Tan, C.C., & Jiang, C.C. (2019). *A cross-national competitiveness and hofstede culture studies as implications for catalyzing one-belt-one-road (OBOR) initiatives*[Research Progress Report, Institute of Southeast Asian Studies, Yunnan Academy of Social Sciences, and School of Management, Mae Fah Luang University].

An SEM-based Analysis in Constructing Occupational Competency Profile for the Prison Police in China in the Information Age

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Abstract

Prison police are those engaged in prison management with the responsibility of the execution of sentences and the correction of offenders, which are also a vital force to maintain social stability. In the age of information, China's prison management system is constantly innovating and changing, thus placing higher demands on the professionalism of prison police officers. Prison police competency describes the potential ability of prison officers to perform well in prison management, which becomes an urgent requirement to improve the professionalism of the police cadre. This study validates a competency model with high dimensional matching for prison police officers using AMOS. The model offers job performance level prediction and a valuable reference for selecting prison police officers, thus guiding practical human resource management. The ultimate founding shows that the stronger the business ability, the stronger the competency of prison police.

Keywords: Information age; Competency model; Prison police officer

Introduction

The "informationization" of prison offender management in China has received widespread attention in recent years. Many economically developed provinces have initially implemented "informationization" of prison offender management, with various new information technologies being actively applied (Feng, Sun, & Huang, 2011). Nevertheless, due to the influence of the prison system, financial security, policies, staff quality, and management philosophy, the significance of enhancing information technology and competence of prison management is also self-explanatory for prison police. The modernization of comprehensive prison offender management is, in a sense, the informationization of prisons (Feng, 2014). Moreover, as information technology is substituting more rapidly, the technical requirements for its innovation are higher and more urgent. Consequently, accelerating the construction of information technology under the prison offender comprehensive management competency is an essential element of prison innovation.

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From the present situation of complete prison offender management's information construction in China, prison information technology is comparatively large compared to other government departments, especially public security and other political and legal departments. It is still challenging to realize the sharing of information resources. The construction of the prison offender's integrated management system has a late and thin start, with a poor foundation. The prison police have a limited level of information technology, especially in rehabilitating offenders. The information technology status is even lower (Huang, 2006). Namely, it is rare to use significant information technology data in conjunction with other relevant prison management capabilities to provide targeted and individualized rehabilitation to offenders. According to the evolution of police management, competency models have been studied and constructed by scholars in numerous ways. They are industry-specific, yet competency models have changed with societal changes and cultural differences. In the age of information technology, the competency of prison police officers still needs to enhance continuously.

On the one hand, prison informational management should take the integrated prison offender management system. It refers to the requirements of the National Prison Information Construction Plan, advanced concepts based on hierarchical, modular, and component-based, standardized police management, full consideration of the needs and characteristics of prison offender management, the use of advanced information technology in the prison work process, the completion of the standardization and optimization of offender management processes, the establishment of an integrated management system as the basis of information technology System (Peng, 2011). The construction and use of the competency models can enable the prison management to scientifically allocate and manage the prison officers rationally, allowing the prison officers to perform their proper values and promote the continuous development of the prison officers in proper positions.

On the other hand, the innovation and development of other prison tasks need to rely on information technology before the depth and breadth of development can be vigorously supported through this modern technology to enhance the overall standard of prisons. Taking the prison system of Shandong Province as an example, this paper tries to study the current situation and characteristics of prison management in Shandong Province utilizing questionnaire method and literature synthesis method. The policy management system enables collecting and storing information for a host of capabilities: prison management, prison investigation management. The system contains basic information of offenders, life and health, education and reformation, release from prison, and resolve the incomplete, inaccurate, and insufficient information of traditional prison offender management, and provide more comprehensive and accurate information for integrated prison offender management.

Objective Research

The purpose of this research is to identify the prison's occupational competence profile by starting the factors that shape the ability of prison officers in prison management and to make relevant training recommendations for the Chinese prison police in improving the overall performance of prison officers.

Literature Review

At this stage, China's prison system remains the traditional human management method. With the continuous development of the information age, various statistical methods have emerged. Structural equation modeling is popular in the social science field to effectively validate construction models. The paper introduces the competency model into the human resources management of the prison system based on the structural equation modeling, thereby realizing the excellent establishment of the prison police force and improving the efficiency of its administration of the rules of law.

Occupational competence lies in performing the assigned work with a certain level of professional ethics and professionalism. The nobler the professionalism, the more operational competence and mastery of professional knowledge one possesses, the more positive the work attitude and the more professional competence one has (Liang, 2020). The Australian National Training Council's Occupational Competence considers: The capacity to work within the scope of the occupation or the ability to reach the standard required by the employer and that such standard, in terms of work outcomes, is the degree to which any individual is required to achieve in the role they play in the particular occupation; Occupational competence includes workers' working ability, career transition ability, and creative ability, among which intelligence level, professional knowledge, vocational skills, and psychological quality are the main factors that constitute occupational competence (Shu & Mo, 2008). Occupational knowledge is necessary for those who practice a profession; Extensive occupational knowledge is an asset to developing occupational competence. Occupational knowledge and skills are the manifestations of the internal audit occupational competence framework and are the most easily cultivated and realized competencies (Zhang, 2013). Training a work attitude compatible with the company's core values also maximizes the mobilization of competencies (Shi, 2017).

Regarding the purpose and method of empirical research, domestic and foreign scholars have theoretical bases or hypotheses for research on competency, and this paper follows the four hypotheses based on prior research. As a corollary to this assumption, the hypothesis is that professionalism, work competence, occupational knowledge, and work attitude influence occupational competence. The study constructs a competency model for prison officers based on existing literature, relevant models, and theories, which is a practical guide for cultivating prison officers, selecting, promoting, and evaluating officers, and promoting the continuous growth of prison officers.

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Analysis of related concepts

(i) *Structural equation modeling*

Structural equation modeling as a statistical method, abbreviated as SEM, was developed in 1970 by statistician Joerekog (Joerekog, 1993). Structural equation modeling is also known as structural analysis of covariance. It allows the covariance matrix of variables to deal with the relationship between multiple independent and dependent variables and has become an invaluable tool for multivariate data analysis. Researchers have often used structural equation modeling to study phenomena in economics, management, and sociology. It can serve for hypothesis model validation and has the advantages of dealing with multiple dependent variables, allowing variables to contain measurement errors, and dealing with measurement and analysis problems simultaneously.

(ii) *Competency model*

The competency model presents the sum of the competency characteristics of a person who can perform exceptionally well in a position. The competency model uses a scientific approach. The model is helpful for different positions. The application of the competency model allows for effective prediction of the performance of staff in post, screening out those with excellent potential performance and helping to efficiently select staff for entry-level positions.
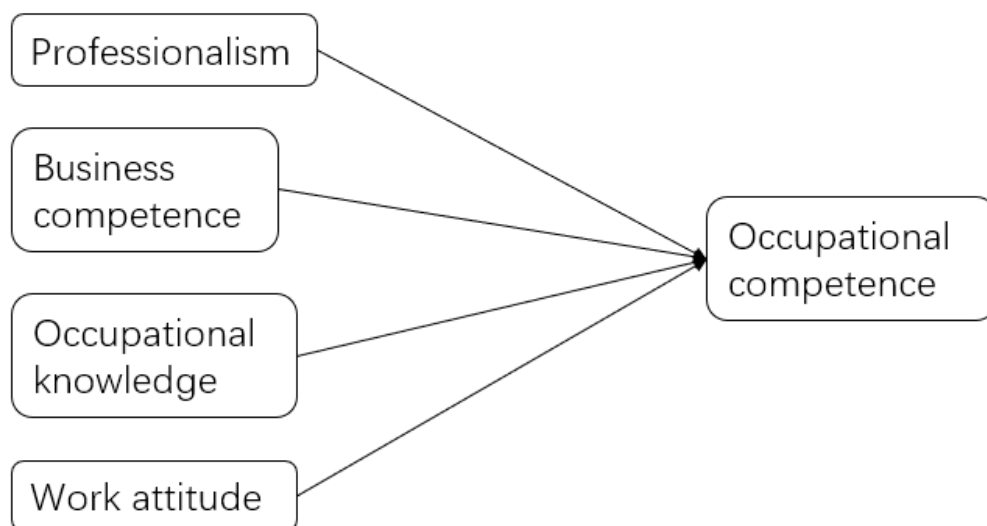
(iii) *Conceptual framework*

Fig. 1. Conceptual model

Fig. 1 illustrates the conceptual framework diagram derived from the literature review. The author found that professionalism, business competence, occupational knowledge, and work attitude influence occupational competence.

Methodology

Structural equation modeling usually entails questionnaires to obtain information and consequently requires questionnaire design. The questionnaire on prison police competency adapts the given literature, combined with the prison police competency questionnaire by Deng Shuai, Yin Zhanjun (Deng & Xing, 2015), and Gao Yang (Gao, 2015), and finally formed the present questionnaire, i.e., the Prison Policemen Competency Questionnaire. The question item consists of two parts. The first part includes basic personal information, including age, gender, education, years of work, position. The second part of the questionnaire is the competency profile, which mainly covers four dimensions related to professionalism, business competence, occupational knowledge, and work attitude, with 21 questions. The questionnaire applies the 5-level Likert scale: 1 represents "very unconformity," 2 "basic unconformity," 3 "uncertainty," 4 "basic conformity," and 5 "very conformity." The questions are of single-choice format. Non-conformity represents an encounter that is inconsistent with the problem. Some of the sample questions are, "I know all the laws and regulations related to prison management." or, "When I encounter a prisoner who resists discipline, I will investigate his family background, social experience and other aspects of the situation."

Structural equation modeling, professionalism, business competence, knowledge law, and work attitude are exogenous latent variables, and occupational competence is an endogenous latent variable. Professionalism involves four observed variables, business competence involves six observed variables, occupational knowledge involves three observed variables, and work attitude involves four observed variables. The conceptual model, Fig. 1., integrates the four competencies to describe occupational competence.

The questionnaire was distributed to X prison police in Shandong Province using Questionnaire Star. We distributed a total of 300 questionnaires; 285 were successfully collected, with a recovery rate of 95%, 12 invalid questionnaires excluded, and the questionnaire efficiency was 95.7%.

The study began with a reliability analysis using SPSS with AMOS, followed by a validation factor analysis using AMOS 24.0 software to test the structural equation model by the simulation to validate the research model and research hypotheses.

Results

Reliability and validity

We subject all constructs to validity

 and reliability evaluations before inferential and descriptive statistical analysis.

The specific data are as follows. First, $\alpha = (k/k-1) * (1 - (\sum S_i^2)/S_T^2)$ provides the reliability index, where k refers to the number of items in the questionnaire designed for the competency of prison officers. A value around 0.7~0.8 is acceptable. When the value is 0.8 or above, the reliability of the questionnaire is outstanding. All the constructs conform to the above 0.8 value.

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Table 1: Cronbach's alpha coefficient

Professionalism	Business competence	Occupational knowledge	Work attitude	Overall model
0.823	0.908	0.815	0.804	0.871

In the aspect of validity assessments, this study ensures uniform dimensions of each construct, with a factor loading of each item above 0.50, and the total variance explained also exceeds 0.50. Correspondingly, we ensure convergent and divergent validity. The value of KMO over 0.6 is suitable for exploratory factor analysis. Regarding Bartlett's spherical significance, when P<.05, there is a strong correlation between variables. Bartlett's spherical significance of this questionnaire is .000, so it is suitable for factor analysis, and its validity is adequate.

The analysis of the construct of prison police competence model based on structural equation modeling

Prison police competence modeling

Fig. 2 depicts the initial conceptual model, which describes four competency domains: professionalism, business competence, occupational knowledge, and work attitude for prison-police management.
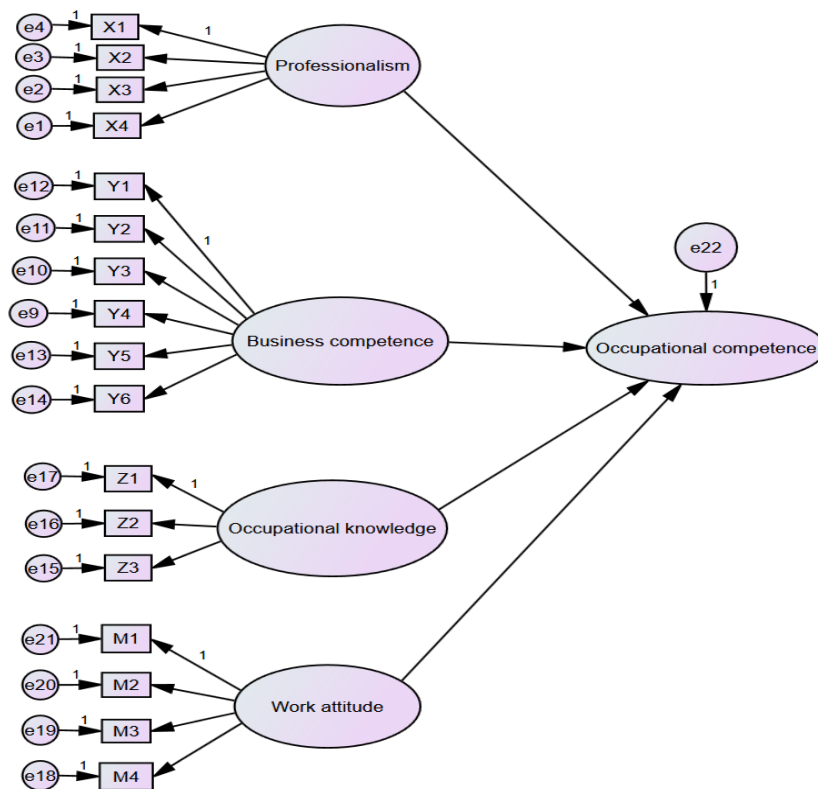

Fig. 2. Initial model

The model is modified following the inspection of the initial model for the correction indices and various fit indices. The original path of the structural equations is shown in Fig. 2 according to the modified model after the revision indices.
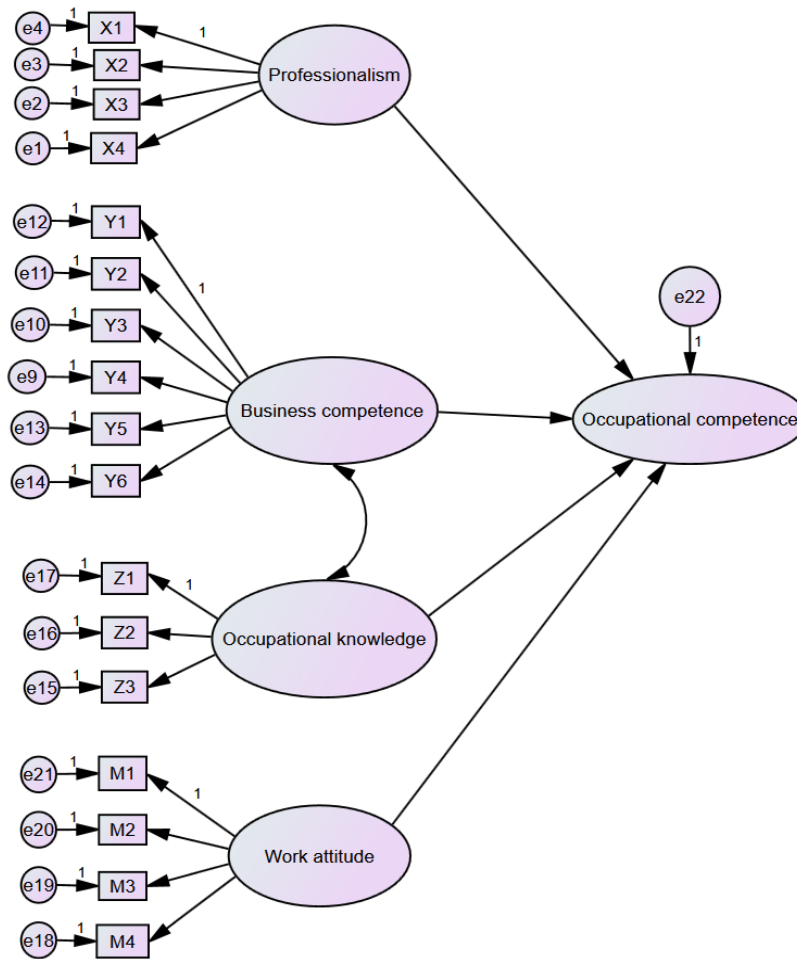
Fig. 3. Modified model

In the original path diagram of the prison-police competency structure, occupational competence is an endogenous latent variable. Furthermore, professionalism, business competence, occupational knowledge, and work attitude are exogenous latent variables, which influence each other—specifically, X_1, X_2, X_3, X_4 as the observed variables for characterizing professionalism. Y_1, Y_2, Y_3, Y_4, Y_5, Y_6 are the observed variables of business competence, Z_1, Z_2, Z_3 as observed variables of occupational knowledge, M_1, M_2, M_3, M_4 as observed variables of a work attitude. Notation "ei" represents the error residuals. The indicator titles corresponding to each observed variable in the original path diagram are shown in Table 2.

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Table 2: Table of variables of the prison police competency model

Latent variable		Observed variables	
		Symbols	**Tittles**
Endogenous latent variable	**Occupational competence**		
Exogenous latent variables	**Professionalism**	X_1	Self-confidence
		X_2	Hardworking
		X_3	Attentive
		X_4	Positive Optimism
	Business competence	Y_1	Organizational coordination ability
		Y_2	Emergency flexibility
		Y_3	Innovation ability
		Y_4	Environmental Adaptability
		Y_5	Logical reasoning ability
		Y_6	Law enforcement and compliance capabilities
	Occupational knowledge	Z_1	Information Technology Knowledge
		Z_2	Prison Correctional Knowledge
		Z_3	Knowledge of the law
	Work attitude	M_1	Planning
		M_2	Targeting
		M_3	Mental resilience
		M_4	Execution

Goodness-of-fit test for prison police competency model

AMOS 20.0 contains a variety of model fit indexes, in this paper, the absolute fit index CMIN, RMR, and GFI, the value-added fit index CFI, IFI, and NFI (Wu, 2009). The composite fit index AIC was selected to assess the fit merit of the structural equation model modeling of police competency. The calculated goodness-of-fit indicators for the police competency structural equation model in this study are shown in Table 3.

Table 3: Calculated results of the goodness-of-fit of the prison police competency model

Goodness-of-fit index	Absolute fit index			Value-added fit index			Integrated fit index
Adaptation index	CMIN	RMR	GFI	CFI	IF	NFI	AIC
Default model	114.684	0.129	0.917	0.958	0.943	0.913	178.197
Saturated model	0.000	0.000	1.000	1.000	1.000	1.000	146.000
Independent model	1842.209	0.385	0.481	0.000	0.000	0.000	1873.243

The following states the goodness-of-fit reference criterion for the structural equation model of police competency: the smaller the absolute fit index CMIN, the better; Absolute fit index GFI, value-added fit index CFI, IFI, NFI are over 0.9, the larger, the better; The absolute fit index RMR is less than 0.05, the smaller, the better; the closer the integrated fit index AIC is to the saturated model, the better. As a result, this paper's fitted goodness-of-fit indexes of the prison police competency model correspond to the reference standard. The fitted values of the fit indexes all conform to the references. The prison police competency model fits well and has high construct validity.

Estimation of parameters of the prison police competency model

AMOS provides a variety of model estimation methods, implemented through Estimated in the Analysis Project in the View menu. The parameter estimation method usually used is maximum likelihood estimation (MLE). T

able 4, Estimated parameters of the prison police competency model.

Causality			Standardized regression coefficients	Standard error	T-test value	P-value
Occupational competence	←	Professionalism	0.145	0.032	2.741	0.021
Occupational competence	←	Business competence	0.701	0.102	2.407	0.051

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Occupational competence	←	Occupational knowledge	0.421	0.021	2.512	0.036
Occupational competence	←	Work attitude	0.131	0.041	2.613	0.019
Professionalism	→	Self-confidence	0.252			
Professionalism	→	Hardworking and enduring hardships	0.438	0.035	2.602	0.003
Professionalism	→	Careful and attentive	0.307	0.101	2.731	***
Professionalism	→	Positive Optimism	0.321	0.086	2.541	***
Business competence	→	Organizational coordination ability	0.791			
Business competence	→	Emergency flexibility	0.847	0.153	7.291	***
Business competence	→	Innovation ability	0.456	0.087	7.136	***
Business competence	→	Environmental Adaptability	0.412	0.103	7.325	***
Business competence	→	Logical reasoning ability	0.812	0.137	7.106	***
Business competence	→	Law enforcement and compliance capabilities	0.825	0.126	7.116	***
Occupational knowledge	→	Information Technology Knowledge	0.703			
Occupational knowledge	→	Prison Correctional Knowledge	0.821	0.194	2.981	0.002
Occupational knowledge	→	Knowledge of the law	0.807	0.182	2.784	***
Work attitude	→	Planning	0.402			
Work attitude	→	Targeting	0.382	0.163	2.654	0.04
Work attitude	→	Mental resilience	0.458	0.124	2.765	0.02
Work attitude	→	Execution	0.524	0.108	2.821	***

Occupational knowledge	→	Business competence	0.342	0.021	2.581	0.039
	←					

The blank section with no arithmetic results serves as the reference variable regarding parameter estimation results. The unstandardized coefficient is 1. *** indicates that the p-value is less than 0.001. The p-values are less than 0.05 for the t-test, so the prison police competency model's parameter estimates have the desired significance level.

Analysis of the results of the prison police competency model

1. Occupational competence analysis

In Table 4, prison police officers' professionalism, business competence, occupational knowledge, and work attitude all have significant and direct positive effects on prison police officers' occupational competence, where the coefficients of effects are 0.145, 0.701, 0.421, and 0.131, respectively. The result indicates that the higher the professionalism, the more business competence, and occupational knowledge possessed, the better the work attitude, and the stronger the occupational competence. The four factors that impact occupational competency are the most influential business competence and the least influential in respect to work attitude.

2. Analysis of professionalism factors

Among the observed variables of the latent variable professionalism, the coefficient of influence of the factor "self-confidence" is 0.252. The coefficient of influence of the "self-confidence" factor on occupational competence is 0.252 x 0.145, with an influence coefficient of 0.037. The influence coefficient of the "hardworking" factor is 0.438, and the influence coefficient of the "hardworking" factor on occupational competence is 0.438 x 0.145, with an influence coefficient of 0.064. The coefficient of influence of the "attentive" factor is 0.307, and the coefficient of influence of the "attentive" factor on professional competence is 0.307 x 0.145, with an influence coefficient of 0.045. The coefficient of influence of the "positive optimism" factor is 0.321, and the coefficient of influence of the "positive optimism" factor on professional competence is 0.321 x 0.145, with an influence coefficient of 0.047. As a result, hard work is the most crucial factor affecting the professionalism of prison police, followed by the positive, optimistic factor.

3. Business competence factor analysis

The following states the coefficients of the observed variables of the latent variable business competencies: "organizational coordination ability" is 0.791, "emergency flexibility" is 0.847, "innovation ability " factor is 0.456, "environmental adaptability" factor is 0.412, "logical reasoning ability" factor is 0.812, and "law enforcement and compliance capability" is 0.825. The coefficients of these factors on occupational competence are 0.791×0.701, 0.847×0.701, 0.456×0.701, 0.412×0.701, 0.812×0.701, 0.825×0.701, and 0.825×0.701. 0.825

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× 0.701, the obtained indirect impact coefficients were 0.554, 0.593, 0.320, 0.289, 0.569, 0.578, respectively. Hence, "emergency flexibility" has the most influence on the business competence of prison police, and "environmental adaptability" has the least effect on the business competence of prison police.

4. Occupational knowledge factor analysis

The coefficient of the observed variables of the latent variable occupational knowledge is 0.703 for the factor " information technology knowledge," 0.821 for the factor "prison correctional knowledge," and 0.807 for the factor "knowledge of the law." "The coefficient of the influence of these factors on occupational competence is 0.703×0.421, 0.821×0.421, 0.807×0.421, and the indirect influence coefficients are 0.296, 0.346, and 0.340, respectively. From this, it is evident that "prison correctional knowledge" has the most significant influence on the occupational knowledge of prison officers, which is in line with the professional characteristics of prison officers (Zhang, 2016)

5. Analysis of work attitude factors

Among the observed variables of the latent variable work attitude, the coefficient of the "planning" factor is 0.402, the coefficient of the " targeting" factor is 0.382, the coefficient of the "mental resilience" factor is 0.458, and the coefficient of the "execution" factor is 0.524. The coefficients of these factors on professional competency are 0.402×0.131, 0.382×0.131, 0.458×0.131, 0.524×0.131, and 0.524×0.131. 0.524 × 0.131, and the indirect influence coefficients obtained were 0.053, 0.050, 0.060, and 0.069, in that order. Therefore, "execution" has the greatest influence on the work attitude of prison officers.

As for the relationship between business competence and occupational knowledge, according to Table 5, there is a mutual positive influence between them, and the standardized regression coefficient is 0.342, which shows that the business competence and occupational knowledge of prison police officers are influenced by each other. If one of the factors changes, it must impact the other one, and the two reinforce each other.

Discussion and Conclusion

This study contributes significantly to the extant literature. Establishing the prison-police competency model can offer many implications: academy training, prison police performance management, prison police entry selection, prison police training, and providing a scientific basis for enhancing the efficiency of human resources management and prison information construction. Consistent with Tao (2021), facilitating the standard of prison police management through the information technology dimension and enhancing the efficiency of the prison police in all aspects.

Occupational competence is a combination of different competency elements associated with the high performance required for a specific job in an organization. Its utility improves by matching people's competency to their positions. Meanwhile, professional competency can also be specifically differentiated to apply to the new situation's higher work requirements effectively and improve the individual competency of prison officers effectively. Hence, the

study of occupational competence can provide a different sound working mechanism for constructing prison policy, which is more conducive to establishing a prison police team that meets the requirements of the times and possesses comprehensive quality.

Relevant applications based on the competency model

   (i) Establish a training system based on the competency model

As noted in this study, business competency has the most significant influence on occupational competency. Thus, it is necessary to focus not only on explaining vocational knowledge but also on long-term training planning based on the current situation of prison management and the requirements of police tasks, focusing on improving competence. The implementation of specific training can be carried out through course lectures, case studies to quickly improve the business competence of prison police officers and thus enhance the overall competency. In addition, "emergency flexibility" and "law enforcement and compliance capabilities" have a significant impact on the business competence of prison police. Consequently, the training needs to focus on developing these two competencies. As an example, the training content focuses on cultivating the ability of prison police to investigate cases in detail and conduct precise analysis, in addition to the need to pay attention to developing the ability of prison police to respond to crisis events and law enforcement and compliance with the law. For example, in the face of sudden brawls in prison, corrections officers need to abide by the law, not violence to violence. Prison management needs to handle flexibly, timely pacification of both sides, not simply a severe punishment for the brawlers, to prevent the reduction of the enthusiasm of the prisoner to cooperate with the rehabilitation.

   (ii) Establish a selection mechanism based on a competency model

In the prison police competency model, "prison correctional knowledge" and "knowledge of the law" have a considerable impact on the occupational knowledge of prison policy, which is why it is necessary to examine the legal knowledge in the selection of prison police. At the current stage, the prison police in China recruits using an interview and physical fitness test and a written test (Li, 2015). The current investigation examines the interviewer's comprehensive analytical ability, emergency flexibility, logical reasoning ability, and other cognitive abilities during the interview section. In contrast, the interviewer's spiritual qualities, human attitude, and other personality traits lack a certain degree of investigation. The competence model reveals that professionalism, business competence, occupational knowledge, and work attitude jointly influence occupational competence; therefore, in the structured interview, the interviewer's personality, mental qualities, and work attitude are required to be examined to some extent. Regarding the concrete implementation, competency content such as mental qualities and work attitude can be assessed using psychological tests and psychological indicators.

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(iii) Establishing a performance management mechanism based on the competency model

Traditional performance appraisal relies mainly on the subjective impressions of the rater, and the appraisal aspect is inadequate in terms of quantification and places too much emphasis on results, thus failing to meet the motivational effect (Wang, 2016). The application of the competency model to performance management, on the other hand, can combine police officers' personal goals with career development and help break through the previous limitations of pure superior-to-subordinate appraisal (Yao & He, 2013). Besides, when it comes to a specific implementation, the indicators in the competency model can be transformed to form measurable indicators, thereby targeting the assessment and realizing the quantification of the assessment method. For example, in the evaluation basis, the " execution" of the work attitude can be taken as the evaluation criterion, and the number of rehabilitation of the prisoner as the evaluation basis. Another example is that the competency indicators of "Hardworking," "Attentive," and "Positive optimism" could be assessed in the form of a rating scale and scored according to the corresponding performance. Then all the scores would be added up to arrive at the final evaluation score, a combination of qualitative and quantitative indicators to avoid the disadvantages of subjective factors and achieve the performance management of the personnel in the position.

References

Deng, S., & Xing, Z. (2015). *Construction of competency model of prison police.* Collection of Political Science and Law.

Feng, J. (2014). On the prison security management platform. *China Public Security*, *10*, 147-149.

Feng, Q., Sun, P., & Huang, G. (2011). Research on the status quo and countermeasures of prison information construction. *Chinese Journal of Prisons*.

Gao, Y. (2015). *Research on the construction and application of prison police competency model.* Liaoning Normal University.

Huang, Y. (2006). Informatization and prison management innovation-construction of criminal account management system. *China Management Information Technology*, *9*, 10-12.

Joerekog, K. (1993). *Testing structural equation models.* Contemporary sociology.

Li, P. (2015). Analysis on the status quo of physical fitness test in police recruitment. *Sports Science and Technology Literature Bulletin, 23*(12), 118-119.

Liang, S. (2020). Research on the professional competence and competency improvement of college counselors in the new era. *Theoretical Research and Practice of Innovation and Entrepreneurship, 3*(17), 166-167.

Peng, D. (2011). Research on the standard system of prison informatization construction. *Science & Technology Information*, *16*, 7-17.

Shi, Z. (2017). *Design of performance appraisal system for sales staff of Tianqi Shengye Company.* Liaoning Technical University.

Shu, Y., & Mo, L. (2008). Research on the evaluation index system of professional competence psychological quality. *Psychological Science*, *5*, 1039-1044.

Tao, X. (2012). Classification on how to strengthen the management of prison police. *Rule of Law and Society*, *34*, 197-198.

Wang, Y. (2016). *Talking about the shortcomings and new ideas of traditional enterprise performance appraisal*. China Petroleum & Petrochemical.

Wu, M. (2009). *Structural equation model -AMOS operation and application.* Chongqing University Press.

Yao, S., & He, R. (2013). *Performance management based on competency model.* Chongqing and the World: Academic Edition.

Zhang, K.. (2016.). *Analysis of job burnout of prison police form the perspective of psychology.* Tianjin University.

Zhang, Q. (2013). Research on the design of general competency framework for the internal auditing profession in Chinese enterprises - Based on the analysis of questionnaire survey. *Journal of Accounting Research*, *51*(1), 84-91.

Post-COVID 19 Tourism Recovery and Resilience: Thailand Context

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Abstract

COVID 19 is a pandemic that has significant impacts on tourism businesses. All countries rely on vaccination to create herd immunity to open their doors to welcome international tourists. Building confidence in health and hygiene is essential to create tourism demands after COVID 19. The use of social media is another necessary strategy to communicate stories of attractions and tourism resources of a destination. Other than marketing strategies to operate tourism businesses, the "new normality" strategies on safety protocols and sanitary measures are also essential factors that every business in the tourism industry must consider mandatory. The government must implement and communicate adequate health and safety protocols at all points of the travel journey. To fully reopen doors to international arrivals and travelers without fears of contracting COVID 19, worldwide immunization programs must reach herd immunity. Other measures include health safety and security measures, observing the principles of community-based tourism, and sustainable tourism. Travel recovery and resilience must enhance livelihoods and economies with responsibility and a sense of solidarity. The government must provide economic packages to entrepreneurs for tourism recovery and resilience.

Keywords: Post-COVID 19; Pandemic Crisis; Tourism; Recovery and Resilience; Health Safety Protocols; Economic Packages

Introduction

COVID 19 is a pandemic that significantly impacts many businesses globally, including tourism. Stacy (2019) says that the tourism industry has been at a standstill due to lockdown. For almost two years, people have witnessed temporary and permanent closes of tourism businesses, and many employees lost their jobs. After a lengthy lockdown, international tourism has declined since the pandemic outbreak. Now that lockdowns are gradually ending worldwide, many countries have started to ease border restrictions and reopen international tourism (Aref, 2020). Although many governments are still advising their citizens against "nonessential" international travels, hosts of many popular destinations have eased their COVID-19 border restrictions and readily welcome tourists back. To ensure that their countries will not encounter a new wave of COVID 19, the government and other constituents must take precautions before easing travel restrictions for tourism recovery and resilience.

For Thailand, Phuket Sandbox is a pilot model aimed to recover the tourism industry and gradually revive the country's economy. If Phuket Sandbox proves successful, many destinations will follow suit in a short period to open their doors to foreign visitors again.

Thailand hopes to open its doors to welcome tourists by the end of 2021. While tourism is slowly returning in some destinations, most UNWTO Panel of Tourism Experts members expect international tourism to recover only by the second half of 2021, followed by those who expect a rebound in the first part of next year. However, there are still concerns over the lack of reliable information and the deteriorating economic environment (Pankham et al., 2021). These are factors weighing on consumer confidence. The concerns over the "new wave" of COVID 19 brought on by returning vacationers are wreaking havoc on the world's tourism industry.

Retrospective Scenario

The number of international tourist arrivals has grown remarkably in the last decade and still sustained growth throughout the last years. Since the outbreak of the COVID-19 pandemic, international tourism has gone down tremendously. At the start of the COVID-19 pandemic, governments worldwide moved swiftly to impose national lockdowns and curtail international travel (Lunkam, 2021), which led to an unprecedented drop in international tourist arrivals. Today, the global situation remains critical in many countries, including Thailand. The country has been experiencing new infections, and the number of cases in each wave continues to rise. The pandemic will continue to impact many communities and the overall economy severely. According to the UNWTO's March forecast and its September update, the recovery for the industry might be in 2021, and domestic demand expects to recover faster than international. In May 2020, the majority of the UNWTO tourism experts expected to see signs of recovery by the final quarter of 2020 but mostly in 2021 (Aref, 2020). For Thailand, international tourism recovery has begun with the Phuket Sandbox model, allowing international tourists who have received two vaccine doses to enter Phuket and stay in Phuket for 14 days without quarantine. After 14 days and three tests of COVID 19 during their stay show, they are free to travel to any destination in Thailand.

Vaccination Is Shredding lights on Tourism Recovery and Resilience.

All countries rely on vaccination to create herd immunity to open their doors to welcome tourists. However, uncertainty over the efficacy of vaccines and issues with manufacturing and distribution on a global scale deter tourism recovery and resilience. Although vaccination programs are underway in many countries, the WHO projects herd immunity will require 65-70% of the population to be vaccinated, which is not easy to achieve. Therefore, it is challenging to create confidence among tourists and employees in tourism businesses. Not only do tourists lack confidence in their safety, but they also consider tourism a luxury. Losing jobs and earning less triggered by the pandemic severely reduce travel demands.
Nonetheless, vaccination coverage to create herd immunity must be a key measure for tourism recovery, coupled with health and hygiene issues. Destinations must pay attention to the primacy of health and hygiene so speedy and safe tourism recovery and resilience. With new usual ways of life, health and hygiene will be much more critical within the tourism industry. While making an effort to stimulate tourism demands, all destinations must focus on raising health and hygiene standards to build confidence for tourists and employees in tourism businesses.

Creating Demands for Recovery and Resilience

It is essential to build confidence in health and hygiene to create tourism demands after COVID 19. Some measures to create demands are: 1) adjusting services to reduce the risk of

physical contact 2) working with the local community to produce a plan for the recovery of local tourism, 3) revisiting and leveraging tourism resources of a destination, 4) developing a plan for community-based tourism, and 5) developing 'creative tourism' by providing opportunities for tourists to participate in creative activities to verify their creative potential. (Richards, 2004) For a decade, creative tourism has been an expansion of cultural tourism. It is a shift from "passive seeing and learning" to "active experiencing" Tourists want to have experiences of doing creative things of authentic community culture. Creative activities include handicraft arts, performing arts, games and sports, language learning, and participating in the everydayness of community residents. The tourism resources should be re-audited to look for new attractions and offerings to persuade tourists to revisit the destinations. Each community should leverage its tourism resources to make it a tourism destination by applying the resource-based view (RBV) strategic management proposed by Barney (1991). Tourism resources that are valuable, rare, unique, and inimitable must create tourism demand with unique differentiation.

Post-COVID 19 Tourism Strategies

The Covid-19 pandemic has substantially impacted millions of businesses worldwide and has severely hit the tourism industry. It is one of the most affected and probably one of the latest to recover. Ramírez (2020) states that crisis moments give all people around the world the opportunity to experience feelings of uncertainty and anxiety, which leads to the incident of "thinking out of the box" to renovate ways of living and create new strategies to get out of the comfort zone and overcome the crisis. People's mentality and habits have changed, including traveling after Covid-19. Now that tourists' have changed their ways of travel, new tourism strategies are needed to innovate.

As international tourism has been declining tremendously, all businesses in the tourism sector must start thinking more locally and focus their resources on attracting domestic tourism than international. Short-term planning to reactivate tourism businesses and the national economy is formulating strategies to attract domestic tourists. In order to come up with effective strategies, entrepreneurs in the tourism industry must realize that with the COVID 19 pandemic, tourists' habits are changing; thus, they need to keep analyzing their tourists' persona, interests, and new travel habits(UNWTO, 2020). Having insights into tourists' new travel habits will help entrepreneurs in the tourism industry define and implement new strategies that will stimulate tourism after the COVID 19 pandemic.

The use of social media is another necessary strategy to communicate stories of attractions and tourism resources of a destination. New stories of underused tourism resources are essential to inspire tourists to visit a destination they have never considered visiting. The private business sector and other sectors involved in developing and promoting tourism of any destination must re-audit tourism resources in the destination and rethink how to leverage specific tourism resources to be selling points to attract tourists in the incident of tourism recovery and resilience (Pinyocheepet al., 2021). All social media platforms should post exciting content to engage tourists to stimulate demands. People in a destination management organization (DMO) should use social media for rebranding a destination to make an "unsought destination" become a "do not miss destination." Unheard stories are needed for unsought and unseen attractions and activities to inspire tourists to reconsider visiting the destination. It is worth investing time to devise social media strategies to communicate destination stories effectively.

Other than marketing strategies to operate tourism businesses, the "new normality" strategies on safety protocols and sanitary measures are also essential factors that every

business in the tourism industry must consider mandatory. Health and safety measures will influence tourists' decisions to visit a particular destination. For fear of health hazards, tourists will be reluctant to travel again. Paying attention to health and hygiene is essential to build tourists' confidence and ensure tourists' and employees' safety. If another pandemic wave recurs, tourism recovery and resilience will halt and be difficult to resume. The economy will slowly reactivate; thus, the recovery and resilience will not happen as fast as the government and entrepreneurs want (Tan et al., 2022).

The government of Thailand has come up with the following strategies: 1) stimulating domestic demands by subsidizing 40% of accommodation and food expenses for Thais who travel out of their residence cities, 2) launching a half and half program that subsidizes 50% of daily 300 baht expenses at micro, small, and medium enterprises, 3) subsidizing 1,000 baht for domestic airfares, and 4) promoting unseen places in 55 secondary provinces. These strategies help but are not sufficient. Therefore, The government has gradually opened doors to receive international arrivals. The Phuket Sandbox has been designed as a pilot project to receive international tourists who have had two doses of vaccine, and 70% of residents in the destination also have had two doses of vaccine to create herd immunity.

Bubble Tourism: A Balance of Health and Economy

When the COVID 19 pandemic crisis subsides, many countries want to reopen borders to international arrivals to recover the economy. However, there would still be fears of contracting COVID-19, and local communities would still worry about the arrival of outsiders (Lunkam, 2021). Therefore, while trying to recover a country's economy, health safety precautions must also be taken. These two issues must be well balanced. Bubble tourism' with bilateral agreements to allow free travel to and from participating nations would be an appropriate strategy. The requirements are 1) at least 70% of the residents in a destination must have been vaccinated to create herd immunity, 2) vaccinated tourists; two doses for more than 14 days, 3) cautionary arrangement of entry protocols to ensure health safety, so that quarantine will not be needed, 4) clear instructions of a "do and do not list" for tourists while staying in a destination, and 5) new normality should be encouraged among tourists and residents of a destination. Thailand should open its borders to visitors from low-risk countries and countries that were once Thailand's primary source of inbound tourism. The government must build confidence in public health and hygiene standards to attract tourists to visit Thailand. Tourists must believe that Thailand has managed to contain the COVID-19 pandemic crisis well enough to be a safe destination. Though Thailand adopts the Bubble Tourism strategy, it will not open doors to welcome international arrivals in all country destinations. It will gradually select pilot provinces as models to find the best way to restart the inbound tourism industry. The Phuket Sandbox is the first pilot project to welcome international tourists with two-dose vaccination, as it is an area with revenue being heavily dependent on foreign tourism. It is an island, which makes it easy to control the spread of COVID 19. Other provinces with islands and revenue dependent on tourism will be benchmarking the Phuket SandBox.

Tourism Industry Recovery Strategies for Enhanced Economic Impacts

Barbados (2017) suggests that if a destination wants to reform its tourism for economic impacts, it should revisit and redefine its unique value proposition and create a diversity of its tourism offerings to expand its tourist bases with more types of tourism. At the same time, organizations should train their staff to provide world-class services. People involved in developing promoting tourism must increase regional collaboration. For a decade, medical and

education tourism has been on the rise. The strategic concepts cited by Barbados can be applied to the post-COVID recovery of tourism, especially an attempt to promote medical tourism as tourists and people in tourism businesses face health risks. At the same time, more recreational activities, such as sporting, cultural events, eating in excellent restaurants, and fun nightlife, must be provided. These recreational activities help increase the diversity of tourism products and experiences.

The government must issue a public policy, appropriate regulations, and incentives to prioritize tourism as a tool for economic development. Countries with attractive tourism resources should leverage the resources as tourism products to grow other sectors related to tourism. The government must treat the tourism industry as a cohesive and formal part of the economy. Tourism strategies to create economic impacts must create links to the local economy, meaning that the development must comply with the principles of community-based tourism. Community residents must benefit from the development through equitable distribution of wealth. Tourism is a tool to alleviate poverty. The government has to issue programs to help entrepreneurs access capital quickly.

Barbados (2017) recommends tourism reform strategies as follows: 1) improving transportation links, 2) standardizing immigration and customs procedures across the region, optimizing the impact of arrivals, and 4) creating value for community people, value chains, economic linkages, personnel training, and local investment by local enterprises. All sectors should involve in the recovery and resilience programs. A task force to plan tourism recovery and resilience must consist of public officers, private entrepreneurs, community leaders, and academicians in a destination. They have to work together in an integration fashion without friction synergistically.

Tourism Sector Guiding Principles for Recovery

Mahumapelo (2020) lists the following issues for post-COVID tourism recovery and resilience: 1) the health of employees and tourists, 2) the law enforcement aspects, 3) economic activities to preserve the sector, and 4) equitable benefits for all. United Nations (2020) has announced a roadmap to transform post COVID tourism by addressing five priority areas: 1) managing the crisis and mitigating the socio-economic impact on livelihood, 2) boosting competitiveness and building resilience, 3) advancing innovation and the digitalization of the tourism ecosystem, 4) fostering sustainability and inclusive green growth, and 5) coordination and partnerships to transform tourism and achieve sustainable development goals. In order to achieve tourism recovery and resilience, health and safety protocols in all tourism operations are essential for confidence building. The government must implement and communicate adequate health and safety protocols at all points of the travel journey. All regulations and requirements must be issued to rebuild confidence while ensuring travelers, workers, and the host's safety and security. Collaborating and cooperation between countries will be essential in this regard. To prevent a new wave of COVID outbreaks, general guidelines for tourism activities and specific guidelines for certain destinations must be in place and strictly enforced. The regulating agencies must guide and regulate the necessary preconditions undertaken by tourism entrepreneurs towards restarting their tourism businesses. All people involved in the recovery must ensure that all measures taken protect employees and tourists.

The Organization for Economic Co-operation and Development (OECD, 2020) recommends that the return of tourism revenues and safety be well balanced by listing the following: 1) vaccination and new normal behaviors are the keys, 2) health officials develop a plan to classify accepted countries based on how the country is performing in controlling the coronavirus, 3) reopen program announcement contains essential information allowing a safe

re-launch of free movement and tourism in specific destinations, and 4) the platform must provide real-time information on borders, available means of transport, travel restrictions, public health, and safety. Full coordination with health authorities and international cooperation on consumer protection policies and travel restrictions are essential to promote safe travel, build confidence and accelerate recovery as tourism restarts. The lifting or imposing of travel restrictions should be fully coordinated among countries to ensure the safe restart of tourism (United Nations, 2020). Effective reopening and recovery plans and policies will require more dynamic and agile structures and better coordination among all stakeholders, including different ministries and public authorities, to advance safety and security. For Thailand, there must be integrated collaboration among the Ministry of Interior, Public Health, and Tourism and Sports. These ministries should form a tourism recovery action council for the protocols and best practices for safe tourism, an essential strategy for post-COVID economic recovery.

Safe Tourism: A New Normality of Tourism

Mohamed (2020) cites that the World Travel & Tourism Council (WTTC) has recommended that enhancing tourism requires measures ensuring that people are and feel safe towards traveling. WTTC awards global safety and hygiene stamps to countries that demonstrate their commitment to reopening their tourism sector as they recover from the coronavirus outbreak. WTTC, a council representing private-sector travel and tourism, created the Safe Travels Stamp to allow tourists to recognize governments and companies worldwide. Given the health and hygiene global standardized protocols, tourists can experience "Safe Travels" Eligible entities such as hotels, restaurants, airlines, cruise lines, tour operators, attractions, short-term rentals, car rentals, outdoor shopping, transportation, and airports. These facilities can use the stamp of the health and hygiene protocols outlined by WTTC. As of September 2020, the "Safe Travels" List included 100 destinations to adopt the stamp.

Measures Supporting the Recovery

OECD (2020) suggests the following measures for countries that want to recover their tourism and build resilience: 1) reduces red tapes regarding immigration, 2) addresses the VAT issues, 3) provide additional funds for tourism marketing, 4) implement private-public partnership (PPP) for marketing promotion, 5) there must be air liberalization, and 6) the government must provide investment incentives. Tourism Business Council of South Africa (UNCTAD, 2020) points out that there must be government financial relief programs for tourism entrepreneurs to keep their businesses going and increase relief program funds. Also, to devise special incentives for both the supply and demand sides. Peter (2019) gives recommendations concerning communities as follows: 1) there must be a financial injection into tourism communities, 2) entrepreneurs should hire community residents, 3) people involved in the recovery must re-audit tourism resources of the community, and 4) tourism recovery programs must include modifying and strategically leveraging tourism resources according to the principles of RBV management. The United Nations designates a post COVID tourism recovery and resilience process including the following: 1) employee training, screening, social distancing, 2) sanitization of the premises with deep cleaning at the interval, and 3) increasing precaution of food handling systems and processes (International Labor Organization, 2020). These strategies and measures need government support in issuing guidelines, regulations, protocols, and economic packages to build resilience for tourism

businesses. Government subsidies are remedial programs for both the supply and demand sides, essential for tourism recovery and resilience.

How to Boost Competitiveness and Build Resilience

United Nations' guidelines state that all stakeholders must rethink the structure of tourism economies to improve competitiveness and build resilience. They have to adopt new policy frameworks, more conducive to a sound and resilient business environment. The government must support the development of tourism infrastructure and quality services that enable the development of other related sectors and facilitate investment for local micro, small, and medium enterprises (MSMEs) in the tourism industry. The government should provide alternative income sources for tourism-dependent communities to build crisis resilience. An inclusive model that designates linkages between the tourism sector and the rest of the economy should be established, especially the transport and trade sectors. The marketing plan should diversify markets and products (Pankham et al., 2021). At the same time, it should address seasonality to promote all-year-round demands.

l destinations should improve visitor experiences through new offerings, including cultural heritage and creative industries, to raise competitive potential. Entrepreneurs must repurpose skills and competencies to diversify beyond tourism and establish a "smart sector mix" in places where tourism has become the sole economic activity. To achieve safe tourism, all destinations should create a system of early warning tourism based on destinations' risk assessments. In this case, there must be data intelligence systems, science-based approaches, and assessment mechanisms based on clear indicators and targets to detect any warning. When developing new offerings, principles of sustainable tourism must be well observed by preserving all three dimensions of tourism sustainability, namely economy, socio-culture, and quality of environments (Sungmala et al., 2021). In the recovery and resilience programs, community residents should be heard. Their inputs are essential in the decision-making process.

Content marketing on social media platforms is an important strategy to create competitiveness for a destination. Thus, it is necessary to strengthen digital and other emerging technologies and tools for integrated marketing communication. Contents, communication strategies, and technology are three essential components of integrated marketing communication to inspire tourists to visit a destination. Contents on social media platforms must be sharable buzzes to enhance viral marketing. Content provided should correspond with the 5 A's (Awareness, Appeal, Ask, Act, and Advocacy) of the customer journey in decision making. (Kotler et al., 2020). Details of 5 A's are as follows: 1) awareness means creating awareness with accurate information about a destination, 2) appeal means giving details of tourist attraction in a destination that will attract tourists., ask means provoking conversation to get engagement, 4) act means being able to persuade tourists to decide to visit a destination, and 5) advocate means tourists who have visited a destination help promote the destination on social media platforms.

Not only are social media platforms communication channels, but they are also sources of big data. People involved in developing and promoting post-COVID tourism should use social listening to understand better and monitor travelers' needs and trends. Enormous data analytics competency is needed for entrepreneurs to develop new offerings to create innovative experiences for tourists. In short, entrepreneurs must use digital platforms to enhance the competitiveness and agility to reach customers.

Boosting competitive advantages requires a nation to leverage more tourism resources to offer more tourism products and attractions to persuade tourists to visit a destination (Songsraboon et al., 2021). With more leveraged resources, one can develop more types of

tourism for a particular destination. Each resource might be modified, enhanced, supplemented, and complemented according to its condition to make it ready to welcome post-COVID tourists. Economic packages are needed to stimulate entrepreneurs to invest in tourism recovery and resilience programs to develop the tourism resources.

Economic Recovery and Resilience Packages

United Nations (2020) recommends that all countries develop economic packages for tourism recovery and resilience incorporation with multilateral development banks and financial institutions. It is also important that financial support packages for COVID-19 encourage a green recovery economy. The packages should support jobs and livelihoods in local communities. The packages should be designed to support transformative actions for leveraging local tourism resources in tourism development projects (Stacey, 2019). Financial and bailout support from governments must be available for the accommodation and transportation industries. Public-private partnerships should be deployed at all levels to integrate vertical coordination between national and local authorities. The packages should be designed to enhance coordination across sectors supporting tourism such as air, land, and maritime transport, trade, environment, culture, employment, and strong public-private partnerships (United Nations Educational, Scientific and Cultural Organization, 2020). The transformative projects must place the well-being of host communities at the center of tourism policies and management.

Measures to support Enterprises and Jobs

United Nations lists measures to support tourism enterprises and create jobs for residents in a host community as follows: 1) postponing the due payment on tourism and hotel establishments, 2) assisting businesses (hospitality, travel agencies and tour operators, restaurants and fast food establishments among others) by covering the insurance payments owed by the employers, 3) approving the suspension of tax payments, social security, and welfare contributions for the tourism sector and extending the measure to cultural businesses, 4) providing direct payments to enterprises that have been forced to close due to the pandemic, 5) announcing funding from multilateral partners and international institutions to be made available for small and medium tourism enterprises for COVID-19 response and recovery, 6) setting special conditions for loans with low-interest funds, particularly for paying employee salaries, and 7) providing wage subsidy for hardest-hit sectors to aid businesses in retaining jobs in tourism, hospitality, travel, and aviation industries.
Each country should consider what economic packages it could offer to tourism entrepreneurs, especially micro, small, and medium enterprises (MSME) because they experience a brutal hit of the pandemic impacts.

Without economic packages provided by the government to help entrepreneurs recover their businesses, it will be challenging to build tourism resilience. Special funds for this mission must be secured.

Thailand's Post COVID 19 Tourism Recovery and Resilience

Thailand declared a state of emergency on March 25, 2020, and temporarily closed Thai borders to inbound tourists. Since then, there have been zero foreign arrivals in Thailand. The measures taken were successful In controlling the spreading of COVID 19. Seeing that the situation improved slightly, the Thai government introduced the Special Tourist Visa (STV), allowing foreign tourists to enter the country, subject to strict conditions. Visitors must have

proof of valid health insurance. They must stay in an alternative state quarantine (ASQ) for 14 days. Upon arrival, tourists test for COVID-19 and two more tests on the fifth and the fourteenth days. This program brought in a certain number of upper-class tourists who could afford the expenses of ASQ, which was relatively high.

Thailand is now facing the third pandemic wave, which is complicated. The number of infected people is high, and the number of deaths. Nonetheless, the Thai government cannot wait until the pandemic subsides to recover tourism and build resilience. It has adopted a Phuket Sandbox pilot project to open doors to welcome international tourists. The procedures are: 1) 70% of the residents vaccinated with two doses in order to create herd immunity, 2) the destination will open doors to welcome international and domestic tourists who have received two doses of vaccine for more than 14 days, 3) entry protocol designed to ensure health safety for tourists, employees in tourism businesses, and residents, 4) tourists will be tested for COVID upon arrival, on the fifth day, and on the twelfth day before they can travel in areas other than Phuket, and 5) there are health safety criteria to assess whether the project is viable so that it will be a model for other destinations to benchmark.

Pinchuck (2020) points out that travelers will re-venture cautiously with the concept of social distancing in mind. As the tourist sector comprises a significant part of the Thai economy, Thailand needs to recover and build resilience for tourism before the end of 2021. Thailand should leverage the fact that it has been hailed by the World Health Organization as a success story in its handling of the outbreak to project an image of a safe tourism destination. However, plans to reopen borders to foreign tourists have been postponed due to the incidents of the third wave of COVID 19, which is very severe. The success of Phuket Sandbox will encourage other famous destinations of Thailand to replicate the model. The tourism sector will continue to deteriorate if Thailand cannot reopen its borders before the end of 2021.

Things that will help recover the tourism industry in Thailand are: 1) lower prices of air tickets and room rates, 2) lower total travel costs that make traveling more affordable, 3) assurance of health safety measures, new tourism destinations with a diversity of tourism offerings, 4) low contact experiences with new normality, such as social distancing and online services, and 5) enforcement of rules and regulations that control business operation, residents' behaviors, and tourists' behaviors while staying in a destination. Any destination that tries to reopen doors to welcome international tourists must ensure a safe destination with all due measures to protect tourists. It must be positioned as a safe destination.

Conclusion and Discussion

To fully reopen doors to international arrivals and offer travelers less fear of contracting COVID-19, worldwide immunization programs must reach herd immunity. Thailand is one of the top 10 destinations for tourists of most countries; therefore, it has strong potential for the inbound tourism sector when the COVID-19 crisis has been contained. New tourism offerings generated by revisiting and leveraging the tourism resources of a destination will create competitive advantages by offering more types of tourism to tourists. Easy accesses, more attractions, health safety measures, and pricing will be success factors to attract tourists.

Once Phuket Sandbox has proved successful, other destinations in Thailand will follow. Pattaya, Hua Hin, Chiang Mai; Krabi, and Samui are just a few to mention. These destinations have high appeal to international tourists. As foreign tourists are increasingly looking for new travel destinations, Thailand has issued a policy to promote tourism in 55 secondary tourism destinations. Thus, Thailand will respond to tourists' needs to visit new destinations by developing and promoting more country destinations. As tourists' post-COVID behaviors will radically change, people involved in the development and the promotion of post-COVID tourism recovery must pay attention to data analytics through social listening to understand

tourists' persona. Having insight into tourists' persona will help increase entrepreneurs' abilities to respond to tourists' needs, tastes, and expectations. Information derived from data analytics will help entrepreneurs redesign their business strategies amid a changing landscape in the tourism sector.

The mandates to recover and build resilience for the tourism industry are as follows: 1) government officers, entrepreneurs, employees, and residents of a destination must develop disease control measures and enforce health safety standards, 2) there must be government measures to stimulate domestic demands as long as borders remain closed to foreign tourists, 3) public-private partnerships enhance frictionless integrated collaboration, 4) harmonize and coordinates immigration and customs protocols and procedures, 5) uses digital technologies for communication and transaction, and 6) community residents perceive equitable economic benefits. Tourism recovery and resilience are a means to recover the economy and create jobs. It has to be carried out along with confidence recovery through health safety and security measures. To complete the mission, one must observe community-based tourism and sustainable tourism principles. In order to recover the economy, destinations should set an objective to recover the tourism industry before the end of 2021.

It should be noted that the recovery and resilience of tourism can be materialized with government economy revival projects to support the supply-side survival to enable recovery and resilience. Easing restrictions for various businesses in the industry and the safety of tourists, employees, and community residents must be well balanced. All stakeholders must realize that tourism, one of the most dynamic and job-intensive sectors of our times, has been one of the hardest hit by the COVID 19 pandemic. Millions of livelihoods worldwide are at stake and need to be supported. Countries attempt to lift travel restrictions with health safety priority gradually to open up opportunities for recovery. A well-coordinated health protocol management protects employees, community residents, and tourists while supporting businesses and employees must be firmly in place.

Multilateral collaboration is needed to build tourism resilience; therefore, international cooperation needs to be stepped up, especially around travel restrictions and border management, to enhance livelihoods and economies with responsibility and a sense of solidarity. Collective action and international cooperation are essential to recover and reform tourism to ensure an economic contribution. The COVID 19 pandemic crisis is also an opportunity to rethink the tourism sector and its contribution to sustainable growth. It is time for all stakeholders to harness innovation and digitalization. It is also time to embrace local values and create job opportunities. The resilience project must leave no one behind.

Recommendations
Once we contain the COVID 19 pandemic crisis, strategies to recover and build resilience for tourism must take place. The following
states a few crucial recommendations:

1. Vaccination program executed to reach herd immunity
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2. Strictly enforce health safety protocols.

3. Residents, employees, and tourists behave in line with new normality to ensure safety for residents, employees, and tourists.

4. International cooperation is essential to ease border restrictions while raising guards against a recurrence of a new wave of the pandemic.

5. All measures taken must be well considered to balance tourism recovery and health safety.

6. Revisiting, redefining, and leveraging the tourism resources of a destination are needed to come up with new tourism offerings to attract tourists.

7. The recovery program must expand target bases by developing new destinations in a country with new tourism offerings, including products, services, attractions, and new types of tourism following tourism resources available in a destination.

8. Digital technologies should be leveraged for communication, transaction, and operation for low physical contact services.

9. Government policies that set tourism recovery and resilience as national priority agendas must ensure that the economic packages to support tourism recovery and resilience are available.

These measures for post-COVID 19 tourism recovery should commence as soon as the pandemic ends. To wait until the country is COVID-free will be too late to recover economies and livelihoods worldwide. Thus, we recommend the following strategies: 1) health safety protocols that align with the guidelines of the World Health Organization (WHO) and the Department of Health (DOH) of each country, and 2) train employees to comply with health safety protocols and new normality in the tourism industry.

References

Aref, M. (2020). *How COVID-19 impacted the travel & tourism industry globally.* https://infomineo.com/covid-19-impacted-travel-tourism-industry/

Barbados, M. (2017). *Tourism industry reform strategies for enhanced economic impact Caribbean development bank.* https://www.caribank.org/publications-and-resources/resource-library/thematic-papers/tourism-industry-reform-strategies-enhanced-economic-impact.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management, 17*, 99-120. http://dx.doi.org/10.1177/014920639101700108

International Labor Organization. (April, 24 2020). *COVID-19 and employment in the tourism sector: impact and response in Asia and the Pacific.* https://www.ilo.org/wcmsp5/groups/public/---Asia/---euro-Bangkok/documents/briefing note/wcms_742664.pdf

Lunkam, P. (2021). Tourism & Hotel industry in the post-COVID world. https://www.krungsri.com/en/research/research-intelligence/ri-future-of-tourism-21

Mahumapelo, S. (2020). Tourism business council SA response to COVID-19 risk-adjusted strategy. tourism June 09, 2020, chairperson. https://pmg.org.za/committee-meeting/30418/

Pankham, S., & Plaibou, N. (2021). The Influence of Causal Factors Positive Electronic Word of Mouth on Facebook Fanpage about Cultural Attractions of Thai Tourists. *Journal of Multidisciplinary in Humanities and Social Sciences, 4*(3), 842-856.

Pankham, S., & Yutthananiyom, S. (2021). The Influence of Causal Factors of Revisit Intention On Travel Facebook Page of Thai Travelers. *Journal of Arts Management, 5*(1), 232-246.

Peter, V. (2019). Measuring economic wellbeing and sustainability: a practical agenda for the present and the future. https://ec.europa.eu/eurostat/cros/system/files/euronaissue 1-2019-article 1_0.pdf

Philip, K., Kartajaya, H., & Setiawan, I. (2020). *Marketing 5.0: Technology for humanity: Technology for humanity.* https://www.amazon.com/Marketing-5-0-Philip-Kotler/dp/1119668514

Pinchuck, J. (2020). *IT is unclear what the tourism industry would look like after COVID-19*: Published 12 months ago on July 11, 2020 https://www.thailand-business-news.com/tourism/79048-how-covid-19-will-change-the-thailand-tourism-sector.html.

Pinyocheep, P., Kumboon, B., Sajjanand, S., & Kositkanin, C. (2021). Models of integrating supply chains on quality service and results in operations of the hotel business in Thailand. *Journal of Arts Management, 5*(1), 218-231.

Richards, G., & Wikson, J. (2004). Developing creativity in tourist experiences: A solution to the serial reproduction of culture?. *Tourism Management, 27*(6), 1209-1223. https://doi.org/10.1016/j.tourman.2005.06.002

Songsraboon, R., Thongtao, J, Damnoen, P. S., & and Huanjit, P. S. (2021). Course management based on outcome-based education (OBE) of learning by working in real conditions. *Turkish Journal of Physiotherapy and Rehabilitation, 32*(3), 20491 – 20499.

Stacey, J. (2019). Rebuilding tourism for the future: COVID-19 policy responses and recovery. https://www.oecd.org/coronavirus/policy-responses/rebuilding-tourism-for-the-future-covid-19-policy-responses-and-recovery-bced9859/.

Sungmala, N., & Verawat , A. (2021). The Impact of Socio-Demographic Factors on Employee Engagement at Multinational Companies in Thailand. *Journal of Multidisciplinary in Humanities and Social Sciences, 4*(2), 694-711.

Tan, C. C., Damnoen, P. S., Toprayoon, Y., Dabjan, N., & Damkam, K. (2022). *An exploratory study of the spirituality-oriented experiences of tourists.* In P. Srivastava, S.S. Thakur, G.I. Oros, A.A. AlJarrah, & V. Laohakosol (Eds.). Mathematica, Computational Intelligence and Engineering Approaches for Tourism, Agriculture and Healthcare. *Lecture Notes in Networks and Systems*, *214*, 307-314.

UNCTAD. (2020). *Impact of the Coronavirus outbreak on global FDI*. https://unctad.org/en/PublicationsLibrary/diaeinf2020d2_en.pdf?user=1653.

United Nations Educational, Scientific and Cultural Organization. (2020). *Museums around the world in the face of COVID-19*. https://unesdoc.unesco.org/ark:/48223/pf0000373530

United Nations. (2020). *Policy brief: COVID-19 and transforming tourism*. https://unsdg.un.org/resources/policy-brief-covid-19-and-transforming-tourism.

UNWTO. (2020). COVID-19 brings international tourism to a standstill in April. *World Tourism Barometer*, *18*(3), 1-32. https://doi.org/10.18111/wtobarometereng