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## **Foreword**

The authors in this issue bring our attention to a variety of current topics such as: ESG (Environmental, Social, and Governance), digital logistics, live broadcast on TikTok, creative tourism, economic downturn in Laos, and KOL (key opinion leader).

Intouch Junpong and Veerisa Chotiyaputta examine ESG and financial performance of 1,528 SET companies over the year 2020 to 2022, and test with the regression model if there is a positive significant relationship between their environmental, social & governance performance and ROE, ROA & Net Profit Margin.

Saran Phinijphara and Kritsana Lakkhongkha explore the role of digital logistics in the Eastern Economic Corridor (EEC) of Thailand, with the technologies such as cloud computing, Internet of Things (IoT), and artificial intelligence (AI), and suggest several initiatives Thailand needs to undertake.

Ying Chen and Patamaporn Pongpaibool collect data from 402 Chinese TikTok users and apply the Stimulus-Organism-Response (S-O-R) model to understand the factors affecting consumer purchase intention. The study uses professionalism, interactivity, popularity, and product involvement as independent variables, and perceived trust and playfulness as mediators, in the PLS-SEM analysis.

Thianrat Chatphattaraphona, Techita Phattharasorn, Sariya Prasertsut, and Pimmada Wichasina design creative tourism routes in Suphanburi province of Thailand, together with a platform which integrates information on tourist need, tourist attractions and community products available. The results are obtained from content analysis on the interviews with government agencies, private organizations, local communities, and Thai tourists.

Worrawoot Jumlongnark reviews the economic data in Laos from 2010-2022. The current economic downturn since 2020 is identified as the decline in GDP growth, surge in unemployment, inflation, external debt, and depreciation of Lao kip. Content analysis of 62 research articles in the period from 2001 to 2023 reveals the most prevalent sub-topics related to policy matters, followed by China's role in foreign direct investment.

Chenicha Praphruetmona and Nata Tubtimcharoonb claim "The More Familiar You Are, the Less You Will Buy" as the moderating effect of relationship strength on the continuity of viewer engagement with the KOL. The research is based on questionnaire survey of 251 respondents. SEM (structural equation modeling) reveals relationship between the suitability of KOLs, levels of relationship, viewers' sustained engagement and purchase intentions.

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# ESG Synergy and Financial Performance: An Investigation into SET Companies (2020-2022)

Intouch Junpong<sup>1\*</sup> and Veerisa Chotiyaputta<sup>2</sup>

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## Abstract

It has been a growing awareness of the importance of ESG practices in business enterprises. Sustainable operations and ethical business practices are critical as companies navigate a world characterized by tightening international rules and regulations. Thus, this study aims to explore the relationship between ESG and financial performance across various industries on SET companies. The data from this research obtained from the SETSMART database, SET's Thailand Sustainability Investment reports (THSI), and SET's financial performance for 1,528 SET companies over the year 2020 to 2022. The research employed multivariable empirical regression, correlation analysis, and descriptive approaches. Three regression models were used to find the relationship between ESG performance and ROA, ROE, and the Net Profit Margin, respectively. The results revealed a significant increase in environmental, social, and governance performance, which differs across sectors. The multivariable regression results demonstrated a positive significant relationship between environmental performance and the ROE and ROA. In addition, the study showed a positive significant relationship between the Net Profit Margin and government performance. However, there is no significant relationship between social performance and other financial performance.

**Keywords:** Environmental, Social, Governance, ESG, SET, ROA, ROE, Net Profit Margin

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## **Introduction**

It is an accepted fact that ESG (Environmental, Social, and Governance) has integrated its principle into every corporate practice for many years. According to the SET sustainable forum (n.d.) has a viewpoint in ESG practice that ESG now represents a crucial business priority. Investors who are more familiar with the concept have a competitive edge in forecasting upcoming changes in the very near future. Large to medium institutional investors worldwide, such as pension funds, insurance companies, and asset management firms, are now considering ESG factors when analyzing and strategizing their investments. This trend is also present in personal asset management, and these investors are influencing corporate behavior by exercising their voting rights during shareholder meetings. Consequently, to satisfy investors and shareholders, companies now must prioritize addressing ESG problems that have happened for many years. ESG-related strategies and risk management techniques are crucial for reducing the effects on business, promoting long-term growth, and maintaining competitiveness. A growing number of investors, particularly those from younger generations, are embracing the trend of investing in ESG because they view it as a tool for risk management and long-term return generation.

At the global level and in Thailand, businesses must transparently disclose ESG information. Businesses and registered companies are required to publicly disclose their ESG performance by securities markets and regulatory bodies around the world, including Thailand. In order to provide investors with enough information to make informed decisions, the European Union (EU) established the Sustainable Financial Disclosure Regulation (SFDR), which requires financial advisors and participants to disclose ESG information (Gannon, Holland, & Nelson, 2021). Numerous nations, including Australia, New Zealand, Singapore, Hong Kong, Taiwan, and Thailand, are beginning to implement similar laws. Thus, in order to assess the transparency of SET companies' ESG reporting, this study will make use of ESG data.

During the forum in SET Sustainability, the companies that have strong ESG conventions (as indicated by higher MSCI ESG Scores) tend to accomplish better financially than those that have lower ESG Scores or more fragile ESG practices (SET, n.d.). Moreover, firms that fully incorporate all three dimensions of ESG (Environmental, Social, and Governance) into their processes tend to have higher returns compared to firms that only focus on one of these dimensions. From the insights from MSCI (n.d.) during the SET Sustainability forum, it is very impressive to see how ESG is associated with monetary performance. As a result, this study also aims to study the relationship between SET companies from the viewpoint of financial performance and the environmental, social, and governance performance in Thailand.

## **Research Objectives**

The purpose of this research is to analyze the association between the Environmental, Social, and Governance Commission and the financial performance of SET companies for the past three years. The study attempts to study the Thailand sustainability investment (THSI) reports, employee participation in providence fund, board composition, and others. As a result, there is an ambitious aim of discovering potential correlations and insights that contribute to understanding the influence of demand dynamics and enterprises on ESG practices. Therefore, this paper would be helpful for current and future businesses in Thailand to concentrate more on ESG performance besides financial performance for investors. Hence, we can summarize our research objectives below:

1. To evaluate the extent to which Environmental, Social, and Governance (ESG) practices have been integrated into businesses listed on the Stock Exchange of Thailand (SET) between 2020 and 2022.
2. To examine the SET companies' financial performance over the same period, paying particular attention to important metrics like profitability.
3. To investigate the relationship between financial indicators and ESG performance metrics in SET-listed businesses.
4. To investigate and determine the nature of any synergies that may exist between SET companies' financial performance metrics and ESG practices.

## **Literature Review**

### **The Relationship Between Environmental and Financial Performance**

Looking at a similar study in Korea, Han, Kim, and Yu (2016) also studied the relationship between CSR and financial performance in Korea between 2008 and 2014. The authors used the Return on Equity (ROE), Market-to-Book Ratio (MBR), and Stock Return for the FP as the financial ratios. The study shows that the performance score for environmental responsibility and FP have a negative (U-shaped) relationship. In another study, Chen, Kuo, and Chen (2022) studied the impacts of climate change-related risks, looking specifically at climate change and financial performance by using ROA among 100 manufacturing companies worldwide from 2005 to 2020. The study using the multilevel quadratic growth model shows that the firm's financial performance, especially that of private firms, showed a positively significant improvement when climate change-related risks and opportunities were disclosed.

### **The Relationship Between Social and Financial Performance**

Sittipun et al., (2021) investigated corporate social responsibility performance (CSR) through CSR spending, number of awards, and CSR activities among SET companies from 2015 to 2019. According to the authors, an organization that wants to run ethically and with effective management must practice corporate social responsibility (CSR). The data were obtained from 293 annual reports among 71 SET companies and 9 MAI companies over five years, and the data was analyzed using the unbalanced panel data analysis method. The study shows that companies that have higher CSR awards and CSR activities tend to have higher financial performance (ROA). However, it is also noted that companies with higher CSR spending also tend to have lower ROA performance. Sudcharean (2021) explored the impact of financial performance and the risk of investment with ESG performance among SET companies from 2018 to 2020. The 1,203 samples were used to study through the Structural Equation Model (SEM) method. Based on the study, the ROA, ROE, and enterprise value performance in SET companies from 2018 to 2018 had a positive impact on the social performance of the companies. Moreover, social performance has a negative impact on the social performance. Additionally, social performance indicators and private firms had a moderating effect on financial performance that was both positive and negative, indicating that private enterprises that invested in and used social performance indicators saw an increase in positive financial outcomes (Chen, Kuo, and Chen, 2022). In the other studies, Shin, Moon, and Kang (2023) studied the role of culture in influencing the relationship between ESG and financial performance. From 4,978 firms in 48 different countries, the results show that stakeholders explicitly value and appreciate a firm's ESG performance in cultures with high levels of individualism or masculinity, strengthening

the positive relationship between ESG efforts and financial performance. In contrast, the study indicates that a firm's ESG initiatives are less likely to be directly linked to financial success within cultures that are characterized by high power distance or uncertainty avoidance. However, another study in Korea from 2008 to 2014 showed that there was no relationship between the social responsibility score and the Stock Return for the FP (Han et al., 2016).

### **The Relationship Between Governance and Financial Performance**

Velte (2019) studied whether CEO power modifies the relationship between financial performance and environmental, social, and governance (ESG) performance, focusing on the German two-tier tier system between 2010 and 2018. The accumulated 775 firms were analyzed through regression analysis with the ROA performance to find the result. Although there is a favorable correlation between ESG performance and financial performance, the research shows that the CEO power magnifies this effect. Other studies by the same author Examine the effects of women serving on management boards on the environmental, social, and governance (ESG) performance of two European two-tier nations, Austria and Germany, from 2010 to 2014. Multiple regression analysis of the 1,019 sets of data reveals that the presence of female members on the management board positively affects ESG performance Velte (2016). Another study also shows that governance performance also has a positive impact on the financial risk through the study among SET companies from 2018 to 2020 (Sudchareon, 2021). On the other hand, Han et al., (2016) also studied the relationship between CSR and financial performance in Korea, showing the relationship between the governance performance score and the financial performance.

### **The Relationship Between ESG and Financial Performance**

It is important to note that in ESG and financial performance studies, many researchers don't separate the independent variables into Environmental, Social, and Governance perspectives. As a result, the author believes that it is necessary to also include other related studies related to ESG and financial performance. From the author's experience obtained from this study, the reason why many studies don't separate might be its limitation in defining ESG in separate perspectives. Additionally, many researchers might face difficulty obtaining data in 1 out of 3 ESG performances that might be unavailable in some regions. Therefore, it is easier for many studies to use only one ESG performance, which can be easily found in many external rating agencies. However, the author believes that one of the limitations in ESG studies is that if using only 1 ESG rating, it would be difficult to see the performance from each perspective. For instance, one firm might be outstanding in only one ESG perspective which can drive the overall ESG rating to be higher. Vete (2017) investigated the relationship between ESG performance and financial performance (ROA and Tobin's Q) among listed German companies (MDAX, DAX30, and TecDAX). The 412 firms were used to study from 2010 to 2014 through regression and correlation analysis. The author found that ESG performance has a positive impact on the only to the Return on Asset (ROA). However, the study found no significant relationship to Tobin's Q. Similar study was conducted in Chinese companies in 2014. Zhou, Liu et al., (2022) studied the relationship between the ESG performance and the market value of the listed Chinese companies from 2014 to 2019. The result also showed that more commitment to ESG performance can improve the market value of the organization. One study took place in the United Kingdom from 2002 to 2018, studying the impact of ESG on the FTSE350 companies' financial performance (market value and earnings per share). The overall ESG performance data show that ESG significantly and favorably affects the financial performance of the company.

All things considered, the findings support the idea that companies with high ESG standards outperform those with low ESG standards financially. Additionally, the relationship between ESG performance and firm financial performance is mediated by firm size (Ahmad et al., 2021).

**Hypothesis for this study**

H<sub>1a</sub>: The environmental performance in SET companies does have a positive impact on ROE.

H<sub>1b</sub>: The environmental performance in SET companies does have a positive impact on ROA.

H<sub>1c</sub>: The environmental performance in SET companies does have an impact on the Net Profit Margin.

H<sub>2a</sub>: The social performance in SET companies does have a positive impact on ROE.

H<sub>2b</sub>: The social performance in SET companies does have a positive impact on ROA.

H<sub>2c</sub>: The social performance in SET companies does have a positive impact on Net Profit Margin.

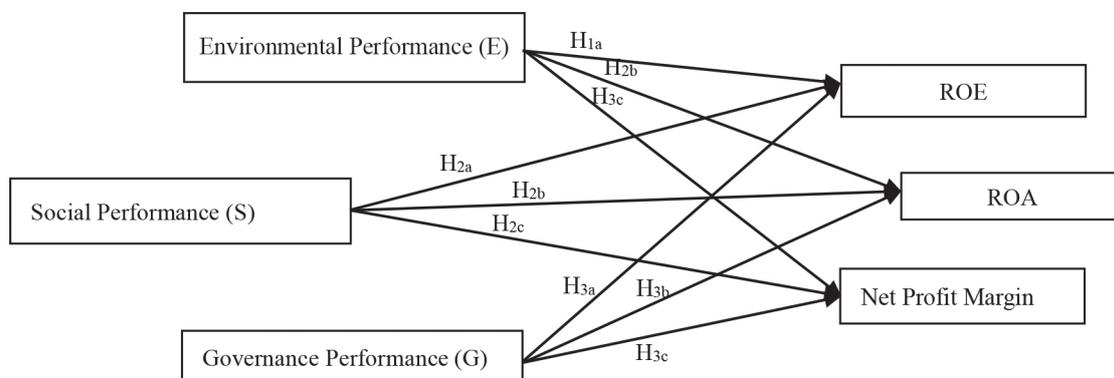
H<sub>3a</sub>: The corporate governance performance in SET companies does have a positive impact on ROE.

H<sub>3b</sub>: The corporate governance performance in SET companies does have a positive impact on ROA.

H<sub>3c</sub>: The corporate governance performance in SET companies does have a positive impact on Net Profit Margin.

**Conceptual Framework and Constructs**

In this study, the author establishes the conceptual framework for this research that aims to find insights into all ESG dimensions and very well-known financial matrixes obtained from other literature reviews, as mentioned. As a result, the author constructs the Thailand Sustainability Investment or THSI (Environmental), the percentage of total number of employees joining the employee provident fund to total number of employees (%) (Social), Corporate Governance Report (CGR) (Governance) as an independent variable. On the other hand, the three financial matrixes, such as the Return on Equity, Return on Asset, and Net Profit Margin, will be constructed as the dependent variable.



**Figure 1** Conceptual Research Framework

## Methodology

The author measures the environmental (E) performance of all listed companies in SET by using the data from SET's Thailand Sustainably Investment Awards (THSI). The THSI is a good indicator for investors to see the commitment to the environmental impact of each SET company. As a result, the author rated "1" for having a commitment to the environment and "0" for not having a clear commitment to the environmental impact. Looking at the social (S) side, the social performance can be evaluated through the percentage of the total number of employees joining the employee provident fund to the total number of employees. Lastly, regarding the corporate governance side, the author evaluates the governance by using the cooperate governance report (CGR) by the Thai Institute of Directors. The rating of the organization is "5 logo given", means excellent corporate governance performance; "4 logo given", means very good corporate governance performance; "3 logo given", means good corporate governance performance; "2 logo given", means satisfactory cooperate governance performance, "1 logo given" means pass level cooperate governance performance, and lastly "0 logo given" means not available cooperate governance performance. However, with the limitation of data provided by the organization, the author only has access through 5 logos to 3 logos. As a result, the rating will be only from a "5" rating according to the Thai Institute of Directors as excellent cooperate governance performance, "4" rating as very good cooperate governance performance, "3" rating as good cooperate governance performance, to "0" rating as moderate to low governance performance. Looking at the financial side and companies' demographics, as this research has aimed mainly at SET companies, the financial data and other information such as ROE, ROA, Net Profit Margin, and industries landscape can be easily accessed through the SET's database.

The author uses all financial and industrial data from SETSMART and SET databases to collect and precisely analyze the data. On the other hand, the SET's Thailand Sustainably Investment Awards (THSI) can be accessed through SET's ESG annual announcement. The social performance can be retrieved through SETSMART's ESG database, and all data for each year can also be extracted through the Excel sheet. Lastly, the Corporate Governance Report (CGR) for the governance performance can be accessed through the Thai Institute of Directors' website.

After the data is collected from many reliable sources and methods, all data will then be categorized in one database for the data to be run successfully. However, some sets of data might be unavailable, which is very normal in the SET SMART database, especially the data in the percentage of the total number of employees joining the employee provident fund to the total number of employees (Social) that many companies didn't report their ESG or social performance to the public. As a result, all unavailable data will be deleted by the listwise deletion method, which left the set of companies to run the regression from 2020 to 2022 in this study to 1,528 companies from 1,818 companies in total.

After all data sets are obtained and cleaned, the data can be used to run the regression analysis to answer our research question, as mentioned earlier. The regression model can be seen in the models below:

$$\begin{aligned} ROE &= \beta_0 + \beta_1 E + \beta_2 S + \beta_3 G + \varepsilon \\ ROA &= \beta_0 + \beta_1 E + \beta_2 S + \beta_3 G + \varepsilon \\ PM &= \beta_0 + \beta_1 E + \beta_2 S + \beta_3 G + \varepsilon \end{aligned}$$

Where:

- ROE, ROA, and PM are the dependent variable
- E for Environment (Thailand Sustainably Investment (THIS))
- S for Social (% of employee to providence fund to total employee)
- G for Governance (Corporate Governance Report) = independent variable
- $\beta_i$  for parameter
- $\varepsilon$  for error terms

## Research Results

### Industries Overview

The 1,528 companies in our study can be categorized into many industries, as mentioned in the research’s methodologies. By looking at 2022 specifically, there are 509 SET companies in 2022, which could be explored in the table and chart as shown (given table and figure numbers).

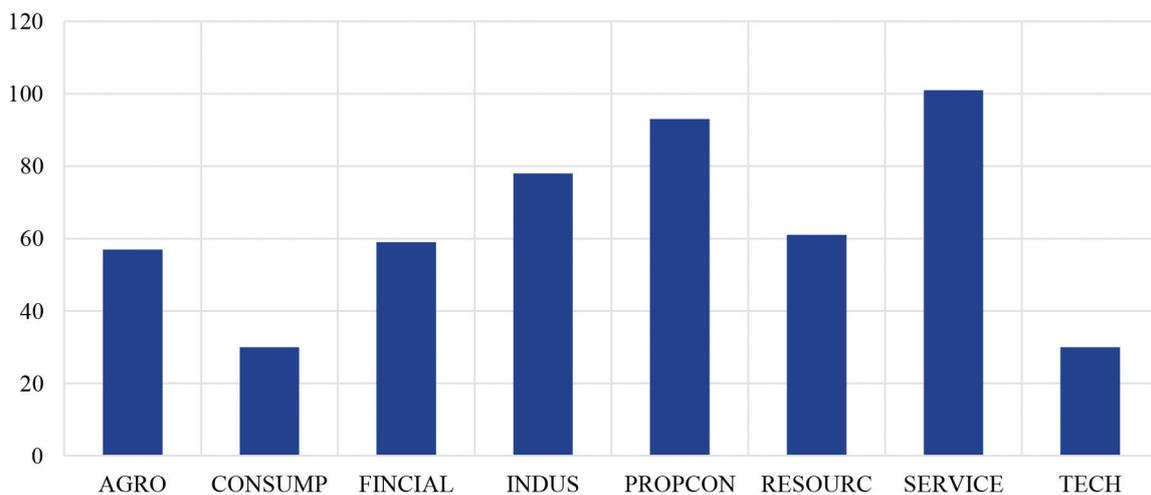


Figure 2 SET’s Industry Overview in 2022

Generally, the companies’ demographic in SET (Figure 2) consists of 8 main industries. The service industry has the most companies in SET, consisting of 101 companies (around 20%) in 2022 (Figure 3). Property construction has the second largest number of companies in Thailand, consisting of 93 companies (around 18%). The industrial sector has 78 companies (around 15%). The resources sector has 61 companies (around 12%). The financial sector has 59 companies (around 12%). The agriculture sector has 57 companies (around 11%). Lastly, the technology and consumption sectors have the least number of companies in 2022, comprising only 30 companies each (around 6%). Additionally, it is important to note that the number of companies in this study is already reduced through the listwise method.

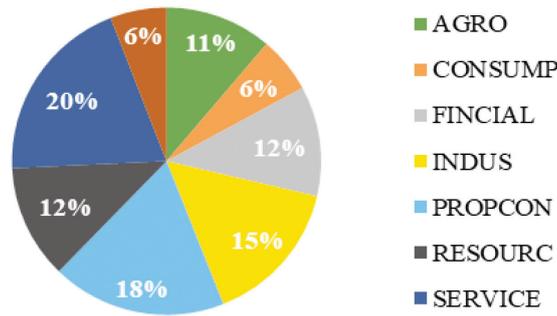


Figure 3 Industry Overview 2022 (%)

**Correlation Result**

From Table 1, some variables show a positive relationship with each other. The environmental variable, or the nomination of Thailand Sustainable Investment or THSI awards by SET Sustainable, has a statistical relationship with the ROE and ROA at the 5% level, showing a weak correlation between each variable at 0.065 and 0.055, respectively. On the other hand, the social variable or the Percentage of the total number of employees joining the employee provident fund to the total number of employees shows a moderate correlation 5% level with the environmental variable (THSI) and the Net Profit Margin at 0.057 and 0.053 respectively. The governance also has a moderate correlation at a 5% level as well, with the Return on Equity at 0.052. This study also shows the high correlation between each variable, which is all from the corporate governance performance among SET companies. The governance performance has a high correlation at a 1% level with the social performance, environmental, and Net Profit Margin performance at 0.179, 0.367, and 0.073, respectively.

Table 1 Correlation Matrix

Correlation Matrix						
	ROE	ROA	Net Profit Margin	Environmental	Social	Governance
ROE	1	-	-	-	-	-
ROA	.464**	1	-	-	-	-
Net Profit Margin	0.014	0.043	1	-	-	-
Environmental	.065**	.055**	0.029	1	-	-
Social	0.009	0.027	.053**	.057**	1	-
Governance	.052**	0.037	.073***	.367***	.179***	1

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

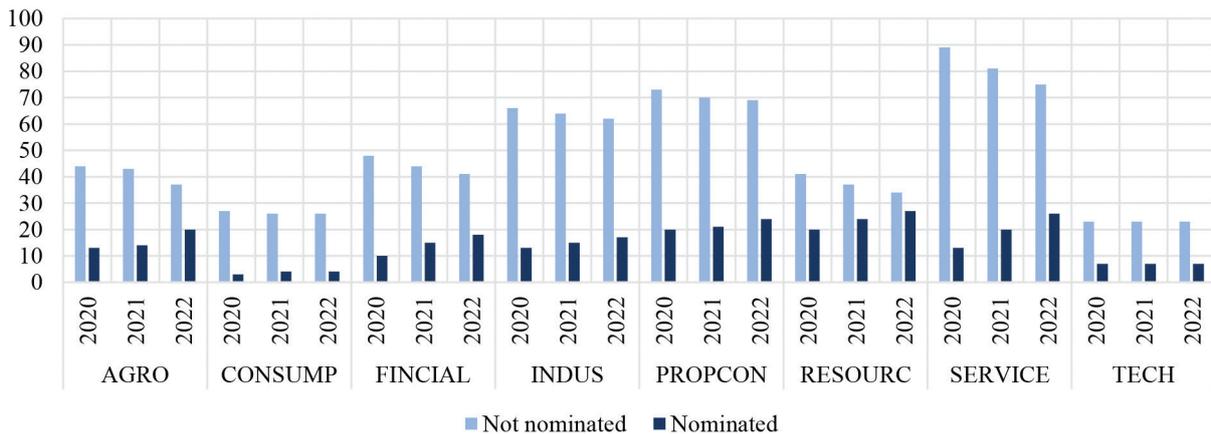
Environmental = Thailand Sustainability Investment (THSI)

Social = Percentage of total number of employees joining employee provident fund to total number of employees (%)

Governance = Corporate Governance Report (CGR)

**Environmental (E)**

Overall, all sectors except the technology sector have improved their commitment to the environment, as there has been a greater number of companies nominated by SET’s sustainable awards for the past three years. By looking specifically at each sector for environmental performance in 2022, the resources sector had the highest percentage of companies that were nominated to have SET’s Thailand Sustainable Awards or the THSI. On the other hand, the industry has 10.5% growth rate for the past three years. The agricultural sector also ranked 2nd in the percentage shares, at 35.1% of all agricultural companies in SET are nominated in the SET’s Thailand Sustainable Awards. The growth rate of the agricultural sector’s nomination is 15.4%. The financial sector has a percentage share of 30.5%, with a growth rate of 10.9%. On the service sector side, the industry has the highest growth rate at 26%, while the percentage shares within the industry in 2022 is 25.7%. The property construction sector performs similarly to the financial sector, with the percentage shares in 2022 at 25.8% and a growth rate of 6.3%. On the industrial side, the industrial sector has a percentage share of 21.5%, with a growth rate of 21.6%. The consumption sector has the lowest percentage of shares that were nominated to have SET’s Thailand Sustainable Awards, with only 13.3% shares and a 10.1% growth rate. Lastly, the technology sector has no percentage growth rate, and the percentage share was 23.3% in 2022.



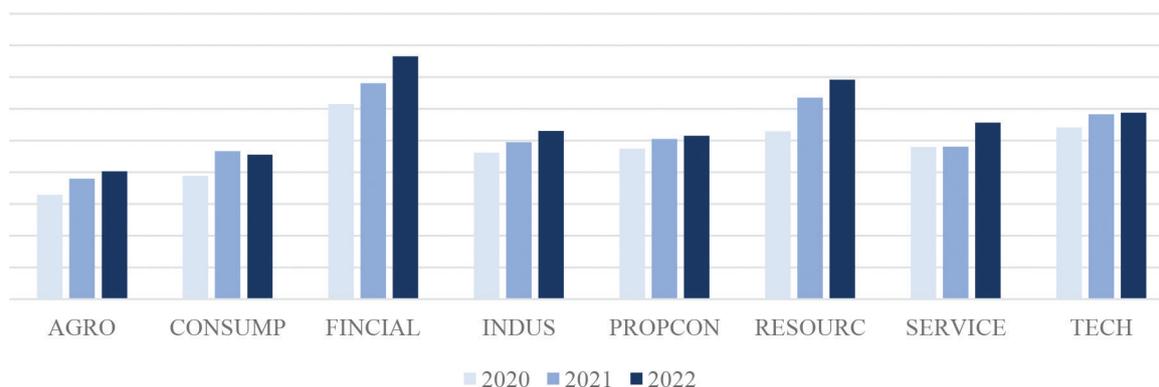
**Figure 4** THSI (Thailand Sustainability Investment) Nomination

**Table 2** CAGR Growth Rate and % Share (Environmental Performance)

<b>CAGR Growth Rate and % Share</b>		
<b>Industries</b>	<b>THSI Growth Rate CAGR from 2020 to 2022 (%)</b>	<b>Companies with THSI in 2022 (%)</b>
AGRO	15.4%	35.1%
CONSUMP	10.1%	13.3%
FINCIAL	10.9%	30.5%
INDUS	21.6%	21.5%
PROPCON	6.3%	25.8%
RESOURC	10.5%	44.3%
SERVICE	26.0%	25.7%
TECH	0.0%	23.3%
<b>TOTAL</b>	<b>13.0%</b>	<b>28.0%</b>

**Social (S)**

On the social performance side, we can evaluate the performance through the actual data of the total number of employees joining the provident funds to all employees in the companies. Overall, the industry has improved its social performance by encouraging employees to join the provident funds over the past three years. Looking specifically at the financial sector, we see that it has had the highest percentage of employees joining the provident fund since 2020, showing the high financial literacy within the industry. The financial sector also has had the highest percentage of employees joining the provident fund every year, reflecting high social performance in the financial sector. More interestingly, the industry also has the 2nd highest growth rate of social performance. On the growth performance, the resources sector has the highest growth rate at 9.3%, which growth led the industry to have the 2nd highest percentage of employees joining the providence fund. On the other hand, the technology and property construction sectors have shown the slowest growth rate, which has only been 2.8% since 2020. Looking at other sectors, the agriculture, consumption, services, and industrial sectors have a growth rate from 2020 to 2022 of 6.9%, 5.4%, 5.1% and 4.7%, respectively. Despite the 6.9% growth rate the agriculture sector has had the lowest percentage of employees joining the provident fund every year. This reflected the lowest social performance and also could explain the financial literacy within the industry.



**Figure 5** Percentage of the total number of employees joining the employee provident fund to total number of employees (%)

**Table 3** CAGR Growth Rate (Social Performance)

Industries	CAGR Growth Rate (%)
AGRO	6.9%
CONSUMP	5.4%
FINCIAL	7.5%
INDUS	4.7%
PROPCON	2.8%
RESOURC	9.3%
SERVICE	5.1%
TECH	2.8%
<b>TOTAL</b>	<b>6.9%</b>

**Governance (G)**

The corporate governance report has shown an increase in all industry’s corporate governance performance for the past three years. Looking at the overall industry performance, all industries have had an increase in the number of 5-star badge nominations since 2020, showing more companies are committing and developing their corporate performance in SET at their excellence level, according to Thailand’s board of directors. Looking more specifically at each sector, the resources industry has the highest shares of 5-star performance, or 52.5% of companies in the industry have excellent corporate governance performance. On the other hand, the growth of achieving excellence within the resources sector was 4.6% for the past three years. The financial sector also shows a significant percentage share of excellent corporate governance performance at 50.8% of all companies in the sector. On the other hand, the growth rate of the financial sector since 2022 was twice the growth rate of resources at 10.9% growth. Looking at the growth side, the agricultural sector has had the highest excellence performance growth rate at 13.7% for the past three years, showing more companies in the industry are putting more effort towards the governance performance in the company. On the other hand, the technology sector has the slowest growth rate of their excellent corporate governance performance at only 2.3% for the past three years. However, half of the companies in the sector, or 50.0%, achieved

five stars or excellent corporate governance performance in 2022. Another notable lowlight in corporate governance performance is the consumption sector; only 26.7% of all companies in the sector have an excellent corporate governance performance in 2022, while the growth rate has been moderate since 2020. Looking at 2022 in the consumption sector specifically, around 40% of all companies have four stars in CGR performance, implying that most companies in the consumption sector have very good performance in 2022. On the other hand, 23.3% of the companies have 0 to 2 stars in CGR performance, implying 23.3% of the companies in the consumption sector have only satisfactory levels at their best performance in 2022.

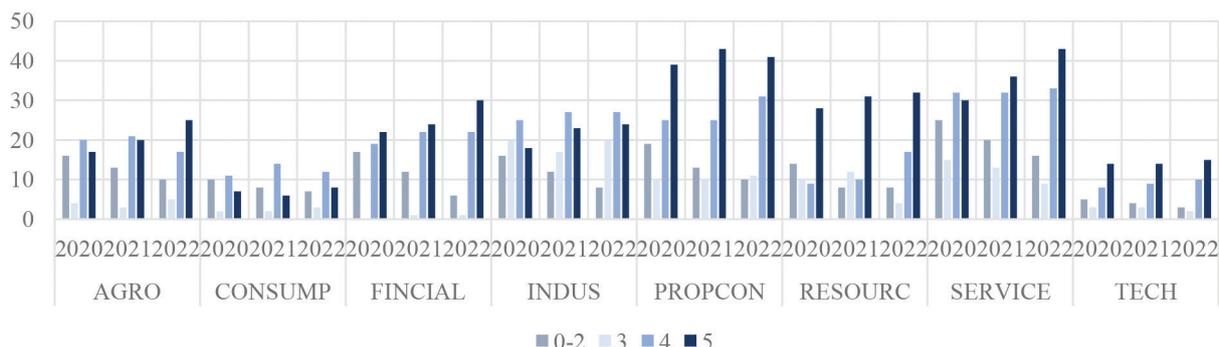


Figure 6 Corporate Governance Report in Each Sector (2020-2022)

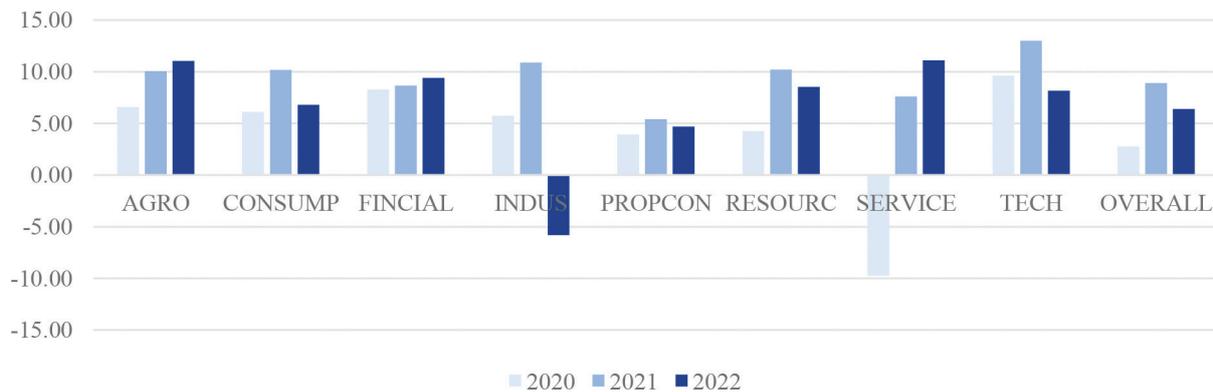
Table 4 CAGR Growth Rate and % Share (Governance Performance)

CAGR Growth Rate and % share			
Industries	5 Stars Companies' Growth Rate	The Companies Have 5 Stars in 2022 (%)	
AGRO	13.7%	43.9%	
CONSUMP	4.6%	26.7%	
FINCIAL	10.9%	50.8%	
INDUS	10.1%	30.4%	
PROP CON	1.7%	44.1%	
RESOURC	4.6%	52.5%	
SERVICE	12.7%	42.6%	
TECH	2.3%	50.0%	

### ROE Performance

The overall industry growth rate was 32.2% between 2020 to 2022. Looking at each industry's performance, the ROE performance varied based on each industry's performance. Moreover, it is noticeable to see that each industry also has an outlier in the descriptive regression. As can be seen in the graph, the industrial sector's ROE performance in 2022 was heavily affected by the decline in ROE from STARK Corporation PCL. As a result, the ROE growth rate of the industry has been heavily affected at negative 200.4%. STARK PCL became infamous following a significant accounting scandal. As of December 31, 2022, the company had approximately 39 billion baht in liabilities, mostly consisting of bonds, loans, and trade credit. Furthermore,

it reported negative shareholder equity of 4.4 billion baht, indicating a situation where total liabilities exceeded assets. By June 2023, STARK had become a major financial concern in Southeast Asia’s second-largest economy. The accounting scandal plagued the company, causing it to suffer a staggering 99% loss in market capitalization, eventually leading to a default on its financial obligations (A 99% Stock Crash and Shock Default Raise Alarm, 2023). On the other hand, the service sector was affected by the decline in ROE from the Bangkok Posts, (2020), with the average ROE performance in the service sector reaching an almost negative ratio of 10. Not the COVID-19 virus’s spread, but rather the print media sector’s overall downturn was the reason for the financial loss. This is demonstrated by declining sales, fewer readers, and much lower advertising revenue (Junthra, 2021). Despite the negative growth rate of the service industry in 2020, the industry has improved significantly from both outliers and the recovery from the COVID-19 pandemic, which resulted in a 204.4% growth rate for the past three years. Besides looking at the growth performance, the technology sector has had the highest average ROE from 2020 to 2021, at a ratio of 9.63 and 12.69, respectively. Lastly, the average ROE tends to be highest in 2022 in many industries, at a ratio of 11.10 and 11.03 in the service and the agricultural sectors, respectively.



\*The decline in ROE for industrial industry was affected by STARK In 2022 (outlier)  
\*The decline in ROE for service industry was affected by POST In 2021 (outlier)

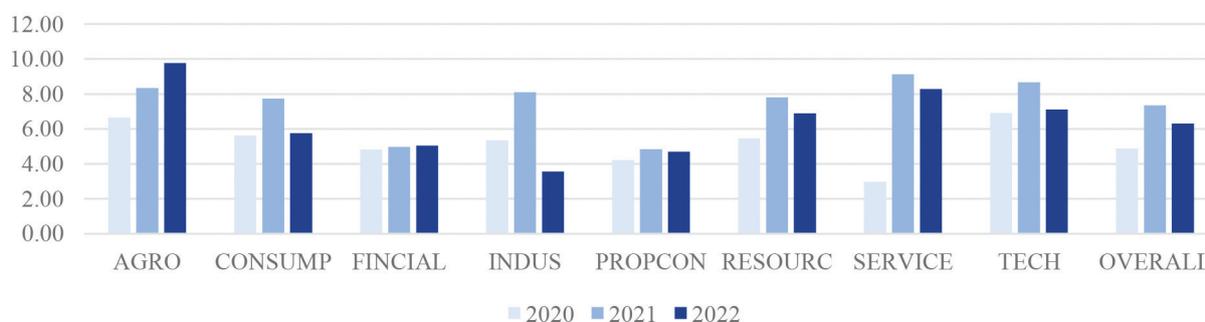
**Figure 7** Average ROE Performance

**Table 5** CAGR Growth Rate and % Share (ROE Performance)

CAGR Growth Rate and % Share	
Industries	ROE Growth Rate (%)
AGRO	18.7%
CONSUMP	3.5%
FINCIAL	4.3%
INDUS	-200.4%
PROPCON	6.2%
RESOURC	26.2%
SERVICE	204.4%
TECH	-5.4%
OVERALL	32.2%

**ROA Performance**

Most industries in SET have had a growth rate in ROA performance in the past three years, except the ROA growth performance in an industrial sector, where the growth rate is -12.7%. It is also notable that the decline in ROA growth rate for the industrial sector might be affected by other outliers in the same scenario of the decline in ROE performance affected by STARK corporation in 2022. Moreover, the overall graph shares similar movement compared to the ROE performance. This also correlates with the correlation matrix in Table 1, which shows that ROE and ROA have a moderate positive correlation with each other. As a result, the ROA performance will likely also have outliers if we compare it with the ROE performance. Figure 8 shows that the technology sector has the highest ROA performance in 2021 at an average ratio of 6.92. In 2022, the technology industry ranked the 2nd ROA performance at an average ratio of 8.66, lower than the service industry at 9.12. In 2022, the highest ROA performer for the year was the agricultural industry at a ratio of 9.76. The growth rate in each sector shows that each sector has a different growth pattern, but all are similar to the ROE performance in Figure 7. According to Table 6 and looking at the pattern in Figure 6, the agriculture sector has overperformed all other sectors' growth rates at 13.6% for the past three years. As a result, the sector ranked 2nd in the growth rate of the ROA performance. On the other hand, the service sector ranked with the highest ROA growth rate at 40.7%.



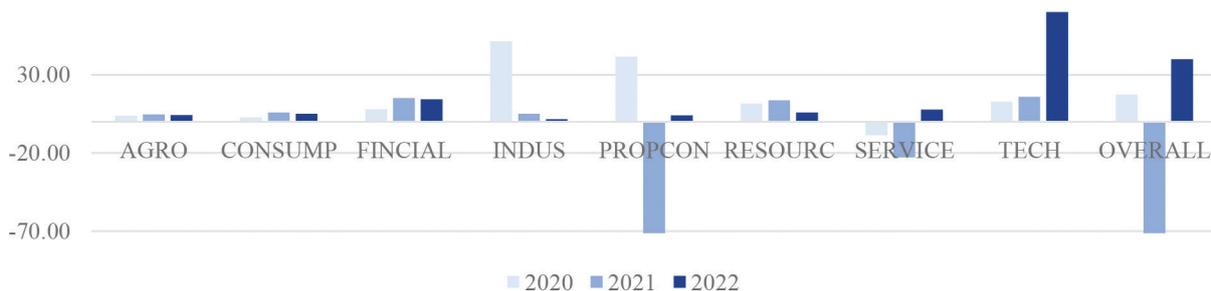
**Figure 8** ROA Performance

**Table 6** CAGR Growth Rate and % Share (ROA Performance)

CAGR Growth Rate and % Share	
Industries	ROE Growth Rate (%)
AGRO	13.6%
CONSUMP	0.7%
FINCIAL	1.4%
INDUS	-12.7%
PROPCON	3.6%
RESOURC	8.1%
SERVICE	40.7%
TECH	0.9%
OVERALL	8.9%

**Net Profit Margin Performance**

The Net Profit Margin performance between 2020 and 2022 shares the difference in the growth rate in each industry. Overall, no trend can describe the overall industry. Moreover, if we compared the industry performance with ROA (Table 6) and ROE (Table 5), there is no similarity in the trend between each variable correlated with Table 1 in the correlation matrix. Moreover, it is important to note that there are also outliers found during this study, which resulted in the fluctuation of the Net Profit Margin performance over the past three years. It can be clearly seen in Figure 9 that there was an outlier in the service and technology sectors. Looking at the technology sector, which has a Net Profit Margin performance at the ratio of 581.33 in 2022, the industry also has a growth rate of 256%, which is the highest among other sectors. The sharp increase in the technology sector in 2022 came from an exponential Net Profit Margin by Intouch Holding PCL or INTUCH. The company reported an increase in performance mainly contributed by an additional factor, such as the private sector’s rebound in consumption and tourism after COVID-19 restrictions and international travel restrictions were loosened (Thunhoon Com., 2023).



\*\*\* The biggest winner in the Technology Industry is INTUCH (outlier)  
 \*\* The biggest loser in the Property construction Industry is POLAR (outlier)  
 \*The biggest loser in the Service Industry is PRTR (outlier)

**Figure 9** Net Profit Margin Performance

**Table 7** CAGR Growth Rate and % Share (Net Profit Margin Performance)

<b>CAGR Growth Rate and % Share</b>	
<b>Industries</b>	<b>Net Profit Margin Growth Rate (%)</b>
AGRO	1.9%
CONSUMP	20.8%
FINCIAL	21.2%
INDUS	-67.8%
PROPCON	-53.5%
RESOURC	-20.0%
SERVICE	196.7%
TECH	256.0%
OVERALL	31.6%

### **The Multivariable Regression Results**

Significant insights into the connection between environmental (E) elements and financial performance metrics are provided by the environmental (E). With a significance level of 0.05, the coefficient of return on equity (ROE), which shows a significant positive impact, is 4.846. This strongly correlates with higher ROE and improved environmental performance, indicating a possible relationship between ROE profitability and environmentally conscious company practices. Comparably, Return on Assets (ROA) displays a positive correlation but one that is somewhat weaker. A coefficient of 0.995 at a significance level of 0.10 suggests a less strong but still beneficial relationship. Unfortunately, as shown by its coefficient of 18.066 without statistical significance, the Net Profit Margin does not show a significant impact, suggesting that the commitment towards environmental performance may not have a significant influence on this financial metric in SET companies during this analysis.

Financial performance metrics and social performance indicators are not significantly correlated when looking at social aspects (S). Statistically significant coefficients are not demonstrated by Return on Equity (ROE) or the percentage of total providence fund. The coefficient of 0.000 for ROE and the coefficient of 0.006 for the percentage of total providence fund both show statistically insignificant values at 0.030 and 0.007, respectively. Based on the analysis, it can be concluded that social performance during the examined period is not significantly impacted by ROE or the percentage of total compensation measured.

Regarding governance (G) aspects, the findings demonstrate a unique correlation between governance performance and financial performance metrics found in the Net Profit Margin. There appears to be no significant influence on governance performance, as evidenced by the lack of statistically significant coefficients for Return on Equity (ROE) and Return on Assets (ROA). In contrast, the Corporate Governance Rating (CGR) shows a strong positive correlation with a high significance level of 0.05 and a significant coefficient of 82.918. This result suggests a significant relationship between corporate governance practices and financial performance, as stronger corporate governance, as measured by CGR, moderately aligns with the Net Profit Margin performance in the SET companies over the studied period.

**Table 8** Regression Results from ROE, ROA, Net Profit Margin to ESG Performance from 2020 to 2022

<b>Regression Results from ROE, ROA, and Net Profit Margin to ESG Performance from 2020 to 2022</b>			
<b>Variables</b>	<b>ROE</b>	<b>ROA</b>	<b>Net Profit Margin</b>
E: THSI Index	4.846** (2.465)	0.995* (0.595)	18.066 (149.054)
S: % of Total Providence Fund	0.000	0.006	2.871
G: CGR	(0.030) 0.675 (0.593)	(0.007) 0.081 (0.143)	(1.796) 82.918** (35.842)
Constant	2.428 (2.471)	5.294*** (0.596)	-509.211*** (149.422)
Observations	1,528	1,528	1,528
R-squared	0.005	0.004	0.007

Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

## Conclusions

The author studied the relationship between ESG and financial performance among SET companies from 2020 to 2022. The author uses the THSI (Thailand Sustainability Investment) Nomination as an environmental variable, the percentage of total number of employees joining the employee provident fund to the total number of employees (%) as the social variable, and lastly, the corporate governance stars (0 to 5) as a corporate governance variable. All those variables are the independent variables, while other financials, such as ROA, ROE, and the Net Profit Margin, are the dependent variables in this study. Most of the financial variables come from previous studies to ensure that there will be a comparison in the profitability performance. As a result, the author has three regression models and nine hypotheses in this study. The study uses data from reliable sources from the SET SMART, SET database, Thailand Board of Director reports, SET Sustainability, and others in order to ensure the reliability of the study. Moreover, most ESG and financial performance are obtained directly from SET's API service in order to ensure no human error. The author used the multivariable regression, correlation, and descriptive methods for the 1,528 data sets that were the final dataset after eliminating the unavailable through the listwise deletion method.

The correlation result in this study shows a statistical relationship between ROE and ROA to the environmental variable or the nomination of Thailand Sustainable Investment or THIS at a 5% level, showing a moderate correlation between each variable at 0.065 and 0.055, respectively. On the other hand, the social variable or the percentage of the total number of employees joining the employee provident fund to the total number of employees shows a moderate correlation at a 5% level with the environmental variable (THSI) and the Net Profit Margin at 0.057 and 0.053 respectively. The governance also has a moderate correlation at a

5% level as well, with the Return on Equity at 0.052. Additionally, governance performance has a high correlation at a 1% level with social performance, environmental performance, and net profit margin performance at 0.179, 0.367, and 0.073, respectively.

The descriptive result shows mixed results based on each financial performance and each industry’s demographics. From this study, it is notable that an outlier affects the overall financial performance in ROA, ROE, and the Net profit Margin for the past three years. It also shows that there is a correlation between ROA and ROE in the financial performance and trends in each industry. Starting with the environmental performance, the service industry has the highest Environmental commitment growth at 26.0% CAGR from 2020 to 2022. On the other hand, the resources have the most shares of companies getting nominated in SET’s sustainability investment in 2022 at 44.3%. The social performance, obtained directly from the company’s ESG performance report, has an outstanding result. The resources industry has had the highest growth rate at 9.3% for the past three years, while the financial sector showed the highest % shares in 2022 at 76.6% of average employees joining the provident fund. The high percentage number in the financial sector might also show higher financial literacy within the industry. The governance performance showed a positive excellent performance (5 CGR stars) result for the agriculture sector, which has the highest growth rate at 13.7%. Moreover, the industry with the highest % shares of companies reported having excellent performance is the resources industry.

**Table 9** Summary of Hypotheses and Results

Hypothesis	Path	Beta	Std. Error	t-value	p-value	Result
H <sub>1a</sub>	E → ROE	4.846**	2.465	1.97	0.050	Supported
H <sub>1b</sub>	E → ROA	0.995*	0.595	-1.67	0.094	Supported
H <sub>1c</sub>	E → NPM	18.066	149.054	0.12	0.904	Not Supported
H <sub>2a</sub>	S → ROE	0.000	0.030	-0.01	0.992	Not Supported
H <sub>2b</sub>	S → ROA	0.006	0.007	0.84	0.401	Not Supported
H <sub>2c</sub>	S → NPM	2.871	1.796	1.60	0.110	Not Supported
H <sub>3a</sub>	G → ROE	0.675	0.593	1.14	0.255	Not Supported
H <sub>3b</sub>	G → ROA	0.081	0.143	0.57	0.571	Not Supported
H <sub>3c</sub>	G → NPM	35.842	82.918**	2.31	0.021	Supported

\*\*\*p<0.01, \*\*p<0.05, \*p<0.1

E (Environmental) = Thailand Sustainability Investment (THSI)

S (Social) = Percentage of total number of employees joining employee provident fund to total number of employees (%)

G (Governance) = Corporate Governance Report (CGR)

ROE = Return on Equity

ROA = Return on Asset

NPM = Net Profit Margin

## **Discussion**

The result of the study shows a significance level and the coefficient of return on equity (ROE), which shows a significant positive impact. This result is inconsistent with other studies from Han, Kim, and Yu (2016) that also explored the relationship between CSR and financial performance (ROE, Market-to-Book Ratio (MBR), and Stock Return) for FP Korea between 2008 and 2014. The result showed that the performance score for environmental responsibility and financial performance has a negative (U-shaped) relationship. On the other hand, the Return on Assets (ROA) displays a positive correlation but one that is somewhat weaker. This result is consistent with Chen, Kuo, and Chen (2022), who studied the impacts of climate change-related risks, looking specifically at climate change and financial performance by using ROA among 100 manufacturing companies from all around the world in the period 2005 to 2020. The result from Chen, Kuo, and Chen (2022) shows a significantly positive improvement when climate change-related risks and opportunities were disclosed to the ROA performance. On the Net Profit Margin, there is no statistical relationship between Environmental and Social variables used in this study. Lastly, the Corporate Governance Rating (CGR) shows a strong positive correlation with a significance level and a significant coefficient of to the Net Profit Margin. The effect of governance performance shares similarities to other studies. Velte (2019) studied whether CEO power modifies the relationship between financial performance and Environmental, Social, and Governance (ESG) performance among 755 German firms. The result shows that the CEO power magnifies this effect of ESG performance on the ROA performance of the company. Similarly, in Thailand's case, the increase in governance performance also has a positive impact on financial risk, as seen through the study among SET companies (Sudchareon, 2021). Moreover, another study by Velte (2016) shows that the presence of female members on the management board positively affects ESG performance. Lastly, the relationship between governance performance and financial performance in this study also shares similarities with Han, Kim, and Yu (2016), who found that the governance performance score has a positive relationship with financial performance. For all as mentioned, the theoretical contributions of the study proceed beyond simply identifying correlations between ESG factors and financial metrics. It explores the particulars of these relationships, demonstrating the differing factors of influence across various dimensions. Enterprise sustainability practices can be better-understood thanks to the method of utilizing company-reported ESG data. In examining the relationship between ESG and financial performance, this methodological decision highlights how crucial it is to take firm-specific contexts into account.

## **Limitation and Future Research**

Despite the outcome of this research, there are also crucial limitations of this study in ESG and financial performance. Firstly, the variables of ESG vary among researchers, as mentioned in the literature reviews, and most of the variables are from external awards or rating reports. As a result, it is difficult to compare each country's ESG and financial performance from the same point of view. In this Thailand case, the author uses the THSI nomination awards by SET Sustainability for the environmental variable and the Corporate Governance Report for the governance variable, which is also variable from well-known and reliable external parties. Moreover, the definition of ESG that can be used in each study is very different and vast, which led to each research having a different definition of Environmental, Social, and Governance

performance. Therefore, each variable in each research might be different in context; hence, it is difficult to define or conclude that each company has more commitment to ESG as there are many perspectives on ESG.

Secondly, the limitation of the ESG data in SET companies has prevented the study from reaching its full potential. The lack of transparency among SET companies has caused many researchers in Thailand to use other reliable data through other external sources. Nevertheless, the author uses the internal social performance on the percentage of employees to total employees, which is the one and only ESG performance data that comes from the SET company itself.

Thirdly, many listed companies have not reported their ESG performance correctly. During the research process, the author experienced incorrect data reporting in ESG data. For instance, the wrong input of data in other variables resulted in outliers of regression analysis. As a result, the author deleted all those variables and replaced them with other reliable variables.

Lastly, the outliers of some companies have impacted the overall industry performance, as can be seen in ROE's and ROA's financial performance for the past three years. Some SET companies had declined sufficiently in their financial performance. As a result, an enormous decline in their performance has impacted the overall industry performance. As a result, it is challenging for the researcher to see the actual performance of the industry.

Despite many obstacles in the research, the author sees an exciting path of ESG and financial performance studies ahead. SET has promoted ESG practices and developed the ESG rating among the listed companies while promoting the ESG framework and transparency for all listed companies to comply. As a result, there is expected to be more collaboration in the private sector to commit more to the ESG practice. In the ESG studies, SET has done an incredible job in making a database and platform more accessible to investors. More importantly, their transparency and ESG rating framework have incentivized the companies to drive their organization toward sustainable growth. The SET SMART ESG data is a starting point for corporates to report their internal ESG data from many perspectives, while SET can give a clear ESG rating based on the reported data. As a result, with more collaboration from the private sector and an improved SET ESG rating. The study of ESG rating and the financial performance among SET and perhaps MAI companies in Thailand will give us more understanding of how important ESG can impact financial performance.

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# Revolutionizing Regional Trade: Digital Logistics in Thailand's Eastern Economic Corridor (EEC)

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## Abstract

The Eastern Economic Corridor (EEC) in Thailand is poised to revolutionize regional trade focusing on digital logistics. This paper delves into how the EEC, leveraging its prime location in Southeast Asia and integrating advanced technologies, transforms Thailand into a key logistics hub. The strategic importance of the EEC's location in the economic heart of Southeast Asia offers unmatched global connectivity. The paper explores the integration of emerging digital technologies such as cloud computing, the Internet of Things (IoT), and Artificial Intelligence (AI) in logistics. These technologies enhance operational efficiency, resource optimization, and decision-making, leading to a more efficient and resilient logistics system.

However, the challenges in maximizing the benefits of digital logistics are also addressed. Key among these is the need for robust infrastructure, including high-speed internet and data centers, essential for smooth data exchange and advanced logistics operations. The importance of public-private partnerships in driving infrastructure development and fostering innovation is highlighted. Addressing the talent gap through workforce development programs is crucial to ensure a skilled workforce capable of managing advanced logistics technologies. Modernizing regulations to support digital logistics businesses, attract foreign investment, and create a thriving ecosystem is also emphasized.

The paper concludes by underscoring the transformative impact of digital logistics on regional trade and economic growth in Southeast Asia, highlighting Thailand's potential to become a leader in the ASEAN economic landscape through the effective implementation of digital logistics strategies.

**Keywords:** Eastern Economic Corridor (EEC), Digital Logistics, Economic Development

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## Introduction

The development of logistics systems in Thailand has been a critical focus for enhancing the efficiency and competitiveness of the country's economy. The logistics system encompasses a broad range of activities, including transportation, warehousing, inventory management, order processing, and distribution management, all of which play a vital role in the smooth operation of both domestic and international trade (Thai Logistics Association, 2021).

One of the key strategies for logistics development in Thailand has been the government's investment in infrastructure. The construction of new highways, expansion of ports, and upgrades to rail and air transport networks are aimed at reducing transportation costs and improving connectivity within the country and with its neighbors. This infrastructure development is supported by the Thailand 4.0 policy, which seeks to transform the country into a value-based economy with a strong focus on technology, innovation, and sustainability (Office of the National Economic and Social Development Council, 2020).

Moreover, Thailand is strategically positioned as a logistics hub in the ASEAN region, offering opportunities for the country to enhance its logistics and supply chain management systems further. The adoption of digital technology in logistics, such as the use of blockchain for tracking and tracing goods, artificial intelligence for inventory management, and the Internet of Things (IoT) for enhancing the efficiency of logistics operations, is increasingly becoming a priority (Department of International Trade Promotion, 2021).

The Thai government has also initiated several policies to support the logistics sector, including incentives for logistics service providers, the establishment of Special Economic Zones (SEZs) for logistics activities, and the promotion of Public-Private Partnerships (PPPs) in logistics infrastructure projects (Ministry of Commerce, 2021).

In conclusion, the development of the logistics system in Thailand is crucial for the country's economic growth and competitiveness. The continuous investment in infrastructure, adoption of digital technology, strategic geographic location, and supportive government policies are key factors driving the advancement of Thailand's logistics sector.

The logistics sector in Thailand in 2022 has demonstrated significant economic contributions and evolving cost dynamics, reflective of broader economic trends and global supply chain shifts. The value-added by the logistics business is estimated at approximately 517.5 billion baht in 2022, marking an increase of about 4.6%. This growth is in alignment with the expansion of the Gross Domestic Product (GDP) and the overall logistics cost implications. The logistics costs for the same year are projected to reach around 2,382.2 billion baht, accounting for 13.7% of the GDP. This represents a 5.8% increase from the previous year, largely influenced by sustained high transportation prices due to global supply chain adjustments.

For the year 2023, the logistics cost to GDP ratio is anticipated to slightly improve, ranging between 13.3% to 13.8%. This forecast is supported by the recovery of the service sector and tourism, alongside increased consumption and private sector investments. The breakdown of logistics costs reveals distinct components (Logistics Strategy Development Division, 2022):

- Transportation costs: Account for 6.6% of the GDP with a value of 1,152.4 billion baht, a 5.3% increase from 2021.

- Warehousing costs: Represent 6.1% of the GDP at 1,052.6 billion baht, rising by 6.39% from 2021.

- Management costs: Constitute 1.0% of the GDP, totaling 177.2 billion baht, up by 5.8% from 2021.

These figures underscore the logistical sector's critical role in Thailand's economy, highlighting the need for strategic planning and investment to optimize efficiency and support sustainable growth.

The Eastern Economic Corridor (EEC) serves as a pivotal component of the "Thailand 4.0" strategy, a development plan focusing on the eastern region of Thailand to significantly bolster economic and social advancements. The EEC extends the success of prior economic development plans in the Eastern region, setting objectives to foster economic growth through the development of five key industries: 1) modern automotive, 2) intelligent electronics, 3) health-oriented tourism, 4) aviation and logistics, and 5) digital industries.

In particular, the logistics business plays a vital role in efficiently linking and transporting goods and services from production sites to consumers. This sector not only helps in reducing costs and enhancing the competitiveness of Thai businesses and products in the global market but also significantly improves the efficiency of management and operations through the development of digital technologies. In an era of globalization and expanding free trade, having a modern and efficient logistics system becomes a critical factor in supporting the long-term growth of the Thai economy. Furthermore, the EEC's evolution into a significant economic nexus for the region and the world is substantially aided by these developments in the logistics sector.

The digital logistics business in the Eastern Economic Corridor (EEC) plays a crucial role in driving the economy within this region. This includes the transportation of goods and raw materials for various target industries, as well as cross-border transportation services within ASEAN countries. The adoption of digital technologies, such as the internet, artificial intelligence (AI), and blockchain, has greatly enhanced efficiency and reduced costs in logistics operations. Examples of digital technology applications in logistics include real-time tracking and monitoring of goods, warehouse management, and transportation management systems. These advancements significantly boost the competitiveness of target industries in the EEC by reducing costs, increasing efficiency, and rapidly responding to customer needs. Moreover, digital logistics businesses play a role in attracting foreign investments to the EEC. Having a modern and efficient logistics system is a key factor in driving the economy of special economic zones globally. Therefore, digital logistics is a primary strategy in promoting the economic development of Thailand through the EEC, forming a crucial part of the country's current development plan.

The competition of the digital logistics business in Thailand's EEC, especially when compared to other special economic zones in the ASEAN group, such as Malaysia's Iskandar and Vietnam's Quang Yen Special Economic Zone, is of great importance. Both of these zones have also been significantly promoted by their governments and have attracted substantial foreign investments. If Thailand cannot sufficiently strengthen its digital logistics business, it risks falling behind in the competition with other special economic zones in the region. This could lead to inefficiencies in attracting foreign investments to the EEC and may hinder the ability of the Thai economy to achieve its set goals.

When considering various factors affecting special economic zones (SEZs) in the ASEAN region, such as Thailand's Eastern Economic Corridor (EEC), Malaysia's Iskandar Special Economic Zone, and the Quang Yen Special Economic Zone, several key aspects should be taken into account.

In the following table, we provide a comprehensive comparison of three major special economic zones in the ASEAN region: Thailand's Eastern Economic Corridor (EEC), Malaysia's Iskandar Special Economic Zone, and Vietnam's Quang Yen Special Economic Zone. This

comparative analysis focuses on various critical aspects such as geographic advantages, infrastructure development, labor and technological readiness, and investment policies. The aim is to elucidate the unique strengths and potential challenges of each zone, offering a clear perspective on their roles in regional economic development and competitiveness (Eastern Economic Corridor (EEC), 2023; Socialist Republic of Vietnam, 2023; Kritsadathan, 2022; Kaewmanee, 2016).

**Table 1** Comparative Analysis of Special Economic Zones in ASEAN: Thailand’s EEC, Malaysia’s Iskandar, and Vietnam’s Quang Yen

Factor	EEC	Iskandar Special Economic Zone	Quang Yen Special Economic Zone
Geographic Location Factor	Located in three provinces, namely Chonburi, Rayong, and Chachoengsao, covering an area of 36,000 square kilometers, the Eastern Economic Corridor (EEC) is situated along the eastern coastline of Thailand, adjacent to the Gulf of Thailand. It is approximately 600 kilometers away from China and about 2,000 kilometers from Malaysia.	Located in the southern part of Johor state, Malaysia, the Iskandar Special Economic Zone covers an area of 2,217 square kilometers. It is situated along the western coastline of Malaysia, adjacent to the Strait of Malacca. The zone is approximately 30 kilometers away from Singapore and about 800 kilometers from Indonesia.	Located in the northern province of Quang Ninh, Vietnam, the area spans 2,060 square kilometers. It is approximately 150 kilometers northeast of Hanoi and 20 kilometers west of the coastal city of Hai Phong. It is situated along the eastern coastline of Vietnam, adjacent to the Gulf of Thailand. The zone is approximately 1,400 kilometers away from China and about 2,000 kilometers from South Korea.

**Table 1** Comparative Analysis of Special Economic Zones in ASEAN: Thailand’s EEC, Malaysia’s Iskandar, and Vietnam’s Quang Yen (Con.)

<b>Factor</b>	<b>EEC</b>	<b>Iskandar Special Economic Zone</b>	<b>Quang Yen Special Economic Zone</b>
Market Expansion Opportunities	The EEC possesses a high potential for market expansion in trade and investment due to its proximity to China, a large market with significant potential. Furthermore, The opportunities for market expansion and investment in the EEC include the manufacturing, service, and tourism industries.	The Iskandar Special Economic Zone (ISEZ) has significant potential for market expansion in trade and investment due to its proximity to Singapore, which is a key financial and logistics hub in the region. Additionally, ISEZ is located near Indonesia, a large market with high potential. The opportunities for market expansion and investment in the ISEZ include the manufacturing industry, service industry, and tourism industry.	The QYSZ has the potential to expand its market to countries in Southeast Asia, China, Japan, and South Korea. These markets are large and growing rapidly. The QYSZ can leverage its favorable geographic location to access these markets.

**Table 1** Comparative Analysis of Special Economic Zones in ASEAN: Thailand's EEC, Malaysia's Iskandar, and Vietnam's Quang Yen (Con.)

<b>Factor</b>	<b>EEC</b>	<b>Iskandar Special Economic Zone</b>	<b>Quang Yen Special Economic Zone</b>
Infrastructure Factor in Transportation	The EEC possesses a well-developed transportation infrastructure, including Laem Chabang Port, Map Ta Phut Port, U-Tapao International Airport, Suvarnabhumi International Airport, and motorway networks. Additionally, plans include the development of a high-speed rail system that will connect three airports.	The Iskandar Special Economic Zone features a well-rounded transportation infrastructure, including the Tanjung Pelepas Port, Senai International Airport, and motorway networks. Future developments include a high-speed rail link between Singapore and Malaysia.	<p>The QYSZ has a comprehensive and modern transportation infrastructure, including a deep-sea port, highways, and railways. The Dam Nha Mac deep-sea port is under construction and is expected to be operational in 2027. This port will be the second deep-sea port in Vietnam and will be a major trade gateway for the region.</p> <p>The highways and railways connecting to the QYSZ allow for the efficient and convenient transportation of goods and people. The QYSZ is approximately 150 kilometers from Noi Bai International Airport, which provides connectivity to cities around the world.</p>

**Table 1** Comparative Analysis of Special Economic Zones in ASEAN: Thailand's EEC, Malaysia's Iskandar, and Vietnam's Quang Yen (Con.)

<b>Factor</b>	<b>EEC</b>	<b>Iskandar Special Economic Zone</b>	<b>Quang Yen Special Economic Zone</b>
Labor and Technology Readiness Factor	The EEC exhibits moderate readiness in terms of labor and technology, with approximately 2.5 million highly skilled workers and ongoing development of new technologies.	The Iskandar Special Economic Zone demonstrates high readiness in labor and technology, with approximately 1.5 million highly skilled workers and substantial foreign investment in technology and innovation industries.	Vietnam has a skilled and affordable labor force. The QYSZ is located near the city of Hai Phong, which is a major city with many leading educational institutions. These institutions produce skilled workers with knowledge of modern technologies. The QYSZ can therefore attract skilled and technologically advanced workers to work in the special economic zone.
Government Policy Factor	The Thai government has policies in place to promote investment in the Eastern Economic Corridor (EEC) Special Economic Zone, offering benefits and incentives to investors, such as tax exemptions, fee reductions, and facilitation of import-export procedures.	The Malaysian government has policies to encourage investment in the Iskandar Special Economic Zone, providing benefits and incentives to investors, including tax exemptions, fee concessions, and facilitation of import-export activities.	The Vietnamese government has issued many policies to promote investment in the QYSZ. These policies include tax incentives, reduced import and export fees, and financial assistance.
Regulatory and Standards Factor	The Eastern Economic Corridor (EEC) adheres to relatively stringent regulations and standards that are in line with international norms.	The Iskandar Special Economic Zone maintains relatively stringent regulations and standards, aligning with international benchmarks.	The Quang Yen Special Economic Zone has relatively relaxed regulations and standards, which are not yet in full alignment with international norms.

**Table 1** Comparative Analysis of Special Economic Zones in ASEAN: Thailand’s EEC, Malaysia’s Iskandar, and Vietnam’s Quang Yen (Con.)

Factor	EEC	Iskandar Special Economic Zone	Quang Yen Special Economic Zone
Digital infrastructure readiness	Moderately prepared, with high-speed internet coverage across the entire area and investment promotion in technology and innovation industries such as Artificial Intelligence (AI) and the Internet of Things (IoT)	Highly prepared, with high-speed internet coverage across the entire area and investment promotion in technology and innovation industries such as AI and IoT	Underprepared, with high-speed internet coverage in only part of the area and no serious investment promotion in technology and innovation industries

Based on the above information, it can be concluded that special economic zones such as Thailand’s EEC, the Iskandar Special Economic Zone, and the Quang Yen Special Economic Zone have significant potential in Southeast Asia. Each has distinct characteristics:

- Thailand’s EEC is strategically located adjacent to the Gulf of Thailand, featuring comprehensive transportation infrastructure and policies promoting foreign investment. However, it faces challenges in high-skilled labor shortages, environmental issues, and corruption.
- The Iskandar Special Economic Zone has high potential in labor and technology readiness but may have limitations in some aspects of its transportation infrastructure.
- The Quang Yen Special Economic Zone is favorably situated geographically but may encounter challenges in labor and technology readiness.

Each zone has its unique strengths and challenges, with varying degrees of readiness in infrastructure, labor, technology, and regulatory environments, catering to different investment and business opportunities. The development of each special economic zone must consider and address specific challenges according to the needs and potential of each area to achieve the goal of becoming a leading economic zone in the region. Consequently, Thailand must accelerate the development of its digital logistics sector to compete with other SEZs in ASEAN. Potential strategies include developing digital infrastructure, supporting technological and innovative advancements, revising regulations and standards to favor business operations, and fostering public-private partnerships. These actions will enhance the competitiveness of Thailand’s digital logistics business, attracting investments to effectively stimulate economic growth in the region. The development of the digital logistics business in Thailand is essential to effectively compete with other Special Economic Zones in the ASEAN countries. The advancement of digital infrastructure, such as high-speed internet networks, cloud computing systems, and various sensor systems, will enhance the operational efficiency of digital logistics businesses.

Supporting the development of technology and innovation, like real-time product tracking systems, automated warehouse management, and intelligent transportation management systems, will elevate the competitiveness of digital logistics enterprises. Improving regulations and standards, including safety, environmental, and product standards, will create a conducive environment for digital logistics operations.

Moreover, fostering collaboration between the public and private sectors, such as in developing digital logistics business plans, promoting investment, and research and development in technology and innovation, will further strengthen the potential of digital logistics businesses. These measures will enable Thailand to compete effectively with other ASEAN Special Economic Zones and drive the Thai economy towards its set goals. The development of a digital logistics business is thus a key strategy for maintaining Thailand's competitiveness in the ASEAN region and preserving its leadership in economic and innovative fields.

### **The Role of Digital Logistics in the Eastern Economic Corridor (EEC)**

Digital logistics plays a vital role in driving the economy of Thailand's Eastern Economic Corridor (EEC). It is responsible for the transportation of goods and raw materials for various industries within the EEC, as well as offering cross-border transportation services to other ASEAN countries. The integration of digital technologies in logistics, such as the internet, Artificial Intelligence (AI), and blockchain, enhances efficiency and reduces operational costs. (Guerra, 2023) Examples of such technology applications include real-time tracking and monitoring of goods, warehouse management systems, and transportation management systems.

#### **The Role of Digital Logistics in Thailand's Eastern Economic Corridor (EEC)**

1. **Driving Target Industries:** Digital logistics in the EEC plays a crucial role in supporting and propelling various industries within the zone, particularly those with high transportation and goods management demands.

2. **Enhancing Efficiency and Reducing Costs:** The application of digital technologies in logistics operations, such as real-time tracking, warehouse management, and transport management, leads to more efficient processes and overall cost reduction.

3. **Boosting Competitiveness:** Digital logistics enhances the competitiveness of EEC's target industries by reducing transportation and handling times, increasing flexibility, and improving customer service.

4. **Attracting Foreign Investment:** A modern and efficient digital logistics system in the EEC attracts foreign investors, making it an appealing destination for investment in diverse industries.

5. **Supporting Economic Growth:** Digital logistics is a key driver of economic growth in the EEC, linking various industries and fostering cross-border trade.

Overall, digital logistics in the EEC plays a significant role in supporting and promoting regional economic growth and is a primary mechanism for enhancing Thailand's global competitiveness. The development of digital logistics in the EEC not only increases the competitiveness of its targeted industries but also attracts foreign investment, a critical factor in driving the economy of global special economic zones. Therefore, the development of digital logistics is a crucial strategy with a significant role in advancing Thailand's economy and global competitiveness in this sector.

### **Business Opportunities for Digital Logistics in the Eastern Economic Corridor (EEC)**

Digital logistics in Thailand's Eastern Economic Corridor (EEC) shows high growth potential, as the EEC serves as a hub for various target industries including modern automotive, intelligent electronics, health-oriented tourism, aviation and logistics, and digital industries. All these sectors require a modern and efficient logistics system to support expansion and compete in the global market (Eastern Economic Corridor (EEC), 2023).

Strategically located in a key position in Southeast Asia, the EEC has the potential to become a global hub for the production and consumption of goods. This represents a golden opportunity for digital logistics businesses looking to expand their market reach in this region and globally. The business opportunities for digital logistics in Thailand's Eastern Economic Corridor (EEC) are multifaceted, reflecting the needs and growth of various industries in this region:

1. **Supporting Target Industries in the EEC:** Digital logistics can provide efficient transportation and goods management services for key industries in the EEC, such as automotive, electronics, health-oriented tourism, aviation and logistics, and the digital industry.

2. **Expanding Markets to ASEAN Countries:** Given the strategic location of the EEC in Southeast Asia, digital logistics has excellent opportunities to expand cross-border services to other ASEAN countries, enhancing international trade.

3. **E-commerce Services:** With the growth of e-commerce, digital logistics has opportunities to offer efficient, fast, and timely transportation and delivery services, meeting the rapidly expanding needs of the online market.

4. **Innovative Technology Utilization:** Opportunities exist to integrate digital technologies like AI, blockchain, and the Internet of Things (IoT) to improve and develop logistics processes, increasing precision and efficiency in goods and warehouse management.

5. **Customized Solutions Creation:** There is potential to develop customized logistics solutions to meet specific industry or customer needs, offering value-added services and creating market differentiation.

6. **Promoting Sustainability:** Opportunities to develop and provide sustainable logistics solutions, both in terms of reducing emissions and efficient resource utilization, are emerging.

7. **Therefore, digital logistics businesses in the Eastern Economic Corridor (EEC) have significant potential to expand their market and strengthen their business through the use of digital technologies and innovations, as well as by creating solutions that accurately meet customer and market needs. Business opportunities for digital logistics in the EEC include:**

- **Transportation Services for Modern Automotive Manufacturers:** Meeting the increasing demands of the automotive industry.

- **Electronic Goods Transportation Services for Smart Electronics Manufacturers:** Supporting the production and distribution of advanced electronic devices.

- **Tourism Goods Transportation Services for Health-Oriented Tourism Operators:** Transporting equipment and materials necessary for this industry.

- **Air and Sea Freight Services for Aviation and Logistics Operators:** Supporting the transportation of goods by air and sea.

- **Express Delivery Services for E-commerce Operators:** Catering to the need for rapid delivery of goods in the digital era.

- **Digital logistics businesses looking to invest in the EEC should conduct detailed market research and analysis to develop strategies that address customer needs and remain competitive in a growing and highly competitive logistics market.**

### **Technologies in Digital Logistics: An In-depth Examination within the EEC Context**

The digital transformation in the logistics sector marks a pivotal development for the burgeoning landscape of online commerce, particularly within the Eastern Economic Corridor

(EEC). This evolution has catalyzed a significant influx of logistics entities, all endeavoring to satisfy the escalated consumer demands for timely, precise, and high-quality delivery services. Yet, the Thai logistics industry faces persistent challenges concerning labor quality and availability, compelling the adoption of cutting-edge technologies to enhance operational efficiency and reduce costs (Gesing & Peterson, 2018).

### **1. Artificial and Augmented Intelligence: Transforming Logistics**

Within the logistics domain, Artificial Intelligence (AI) and augmented intelligence are playing a crucial role in transforming industry standards by automating complex processes and refining decision-making accuracy. Technologies such as image analysis, for example, have been deployed to conduct detailed inspections of packages and barcodes, tasks that traditionally required human expertise and experience (Gesing & Peterson, 2018). Additionally, AI-driven algorithms for optimizing delivery routes and scheduling have proven essential in saving time and resources (Allen, 2019). These implementations highlight AI's capability to overcome labor and quality challenges in logistics, providing scalable and efficient solutions.

### **2. Robotics in Warehousing: Leading the Charge in the EEC**

In the context of the EEC, the integration of robotics in warehousing is setting new standards for automated storage and retrieval systems, mirroring global trends set by leading logistics innovators. These robotic systems significantly reduce the need for manual labor in locating, preparing, and inspecting goods for dispatch. The resulting decrease in operational expenses and human errors emphasizes the transformative role of warehouse robotics in enhancing the efficiency of warehousing operations and the supply chain at large (Allen, 2019).

### **3. The Strategic Role of Consolidation Warehouses**

The strategy of employing consolidation warehouses stands out as a logistical innovation within the EEC, amalgamating goods from multiple sources for collective transportation. This approach maximizes the use of larger transport vehicles, extending delivery capabilities while substantially lowering the costs related to smaller-scale shipments (Manjeet & Ehsan, 2022). Such centralization underscores the significant economic and logistical advantages achievable through this methodology.

### **4. Advancing Supply Chain Visibility for Real-Time Insights**

The evolution of Supply Chain Visibility (SCV) technology from a novel concept to an essential component of modern logistics underscores its importance in the EEC's logistics operations. Real-time access to data on the location, quantity, and movement of products allows companies to reduce operational losses and quickly adapt to customer demands. The capacity for immediate information access is vital for logistics firms aiming to stay competitive and meet increasing expectations for swift and dependable service delivery (Simchi-Levi & Timmermans, 2021).

### **5. Autonomous Vehicles: Pioneering Future Transportation Solutions**

The advent of Autonomous Vehicles (AVs), such as self-driving cars, represents a significant technological leap with considerable implications for the EEC's logistics sector. Despite seeming futuristic, the rapid development of AV technology signals a new era of improved functionality and safety. Autonomous vehicles are set to address labor shortages and streamline logistics operations, challenging traditional transportation norms (Rahman & Thill, 2023).

**In Conclusion:** The amalgamation of advanced technologies such as AI, warehouse robotics, consolidation warehouses, SCV, and autonomous vehicles provides a transformative

outlook for the logistics industry within the EEC. These innovations not only address existing challenges but also propel the sector toward enhanced levels of efficiency, accuracy, and cost-effectiveness. As the digital logistics landscape continues to evolve, particularly within the Eastern Economic Corridor and beyond, adopting these technologies is crucial for businesses aiming to maintain a competitive edge in the dynamic global market.

### **Challenges of Digital Logistics Business in the Eastern Economic Corridor (EEC)**

The digital logistics business in Thailand's Eastern Economic Corridor (EEC) faces several significant challenges, including:

1. **Intense Competition:** The digital logistics sector is highly competitive due to the entry of new players, both domestic and international. This heightened competition necessitates continuous development by businesses to maintain their market leadership.

2. **Operational Costs:** Digital logistics businesses require substantial investment in technology and innovation to enhance efficiency and reduce costs. High investment often leads to increased operational expenses.

3. **Regulations and Standards:** The changing landscape of regulations and standards related to digital logistics can be unclear or frequently altered, leading to uncertainty in business operations.

4. **Skilled Labor:** There is a demand for labor skilled in technology and digital fields, but the current labor market may not have enough skilled workers to meet this demand.

To address these challenges, digital logistics businesses looking to invest in the Eastern Economic Corridor (EEC) should consider the following approaches:

- **Developing Innovation and Technology:** Investing in developing new technologies that can enhance efficiency and reduce operational costs.

- **Collaboration with Partners:** Seeking business partners to share resources and knowledge, which can help achieve goals and mitigate risks.

- **Keeping Up with Regulatory and Standard Changes:** Staying updated and adapting to potential changes in regulations and standards.

- **Workforce Skill Development:** Investing in training and skill development of employees to align with market demands.

- If digital logistics businesses can effectively tackle these challenges, they have the potential to grow and succeed in the EEC.

### **Approaches to Develop Digital Logistics in the Eastern Economic Corridor (EEC)**

To enable Thailand to compete effectively with other Special Economic Zones in the ASEAN group and support the growth of digital logistics in the Eastern Economic Corridor (EEC) (Jongwanich, 2022), Thailand needs to undertake several initiatives:

1. **Advanced Digital Infrastructure Development:** Spearheaded by enhancing the efficiency of high-speed internet networks, developing cloud computing systems, and installing sensors and other technologies like IoT. This modern and efficient infrastructure will bolster the operational capabilities of digital logistics businesses.

2. **Support for Technology and Innovation Development:** Focusing on developing technologies for real-time tracking and monitoring of goods, automated warehouse management systems, and intelligent transportation management systems to increase efficiency and competitiveness.

3. Facilitating Regulatory and Standard Improvements: Updating regulations related to safety, environment, and product standards to create a business environment conducive to operations and investment.

4. Public-Private Sector Collaboration: Driving joint projects in development planning, investment promotion, and research and development of technology and innovation, to enhance the potential of businesses.

Furthermore, Thailand should prioritize the development of technology and digital skills in the workforce to meet the demands of the digital logistics business requiring such skilled labor. Efficiently implementing these strategies will enable Thailand to robustly compete in the ASEAN group and attract foreign investment to the EEC effectively.

## **Discussion**

The digital transformation within the logistics sector, especially in the EEC, is pivotal for enhancing operational efficiencies and reducing costs amid growing online commerce. This transformation is underpinned by the integration of advanced technologies such as AI, IoT, and autonomous vehicles, which address significant challenges including labor shortages and the need for operational cost reduction (Gesing & Peterson, 2018).

### **Challenges in Southeast Asia's Logistics Sector:**

The logistics sector in Southeast Asia, including the EEC, faces several challenges. Space and freight rates present major issues due to high demand for warehousing near ports and infrastructure, reflecting the region's booming e-commerce market (GLG Insights, 2021). This growth has led to a shift towards purchasing a wider range of items online, including larger and heavier goods, straining last-mile logistics networks. Despite these challenges, there have been significant advances in last-mile delivery, highlighting the need for the mid-mile space to enhance its operations (GLG Insights, 2021).

Moreover, the logistics sector is witnessing a transformation driven by changing market demand, with a growing emphasis on last-mile delivery solutions. This change is fueled by factors such as urbanization, rising consumer incomes, and government investments in infrastructure (Truong, 2023). However, the logistics startups in Southeast Asia face challenges but have opportunities for growth during the pandemic, especially in B2C logistics and same-day deliveries (Khamila, 2020).

### **Opportunities and Strategic Approaches:**

To capitalize on the opportunities within the EEC's logistics sector, there's a need for substantial investment in digital infrastructure, including high-speed internet, cloud computing, and IoT technologies. This would support the development of real-time tracking, automated warehouse management, and intelligent transportation systems, enhancing the efficiency and competitiveness of the logistics sector (Tenka, 2023).

Furthermore, addressing the challenges of digital logistics in the EEC requires a multifaceted approach. Strategies should include collaboration with business partners to share resources and knowledge, staying updated on regulatory changes, investing in workforce skill development, and focusing on innovation and technology development. By tackling these challenges effectively, digital logistics businesses can achieve growth and success in the EEC and beyond.

## Conclusions

The conclusion of digital logistics in Thailand's Eastern Economic Corridor (EEC) emphasizes the need for Thailand to strengthen its digital logistics sector to compete effectively in the ASEAN region. Digital logistics is a key component of international trade today, with companies using digital technologies to improve supply chain efficiency, reduce costs, and enhance customer experience. Thailand is well-positioned for investment in digital logistics, with its convenient location in ASEAN and strong transportation infrastructure. However, Thailand must invest in digital infrastructure and develop skilled talent in digital logistics. The document proposes several strategies to achieve these goals, including:

- **Developing digital infrastructure:** This involves investing in high-speed internet, cloud computing, and secure electronic payment systems.
- **Supporting technological innovation:** This involves funding digital logistics startups and promoting research and development of new technologies in this sector.
- **Amending regulations to promote business operations:** This involves streamlining legal processes and facilitating the movement of goods and information.
- **Fostering public-private partnerships:** This involves attracting private companies to invest in digital logistics projects and share risks and benefits.
- **These measures are aimed at enhancing Thailand's competitive advantage in digital logistics, which is essential for attracting foreign investment and promoting long-term economic growth in the EEC and the broader ASEAN region. By addressing these challenges, Thailand can become a leader in digital logistics in ASEAN and promote economic growth in the future.**

### **Additional Insights:**

- **The importance of digital logistics:** Digital logistics is a critical component of international trade today. Companies are increasingly using digital technologies to improve the efficiency of their supply chains, reduce costs, and enhance customer experience. This is leading to a growing demand for digital logistics services, and companies that can provide these services effectively will be well-positioned to compete in the global market.
  - **Opportunities for Thailand:** Thailand is well-positioned for investment in digital logistics. The country has a convenient location in ASEAN, with access to a large and growing market. Thailand also has a strong transportation infrastructure, which is essential for efficiently moving goods and information.
  - **Challenges for Thailand:** Thailand faces some challenges in developing its digital logistics sector. The country needs to invest in digital infrastructure, such as high-speed internet and cloud computing. Thailand also needs to develop skilled talent in digital logistics. In addition, Thailand needs to amend regulations to promote business operations in the digital logistics sector.
- By addressing the challenges it faces, Thailand can become a leader in digital logistics in ASEAN. This would be a significant achievement for the country, as it would help to attract foreign investment and promote economic growth.

## Suggestions

Advancing Digital Logistics in Thailand's Eastern Economic Corridor: A Stakeholder Analysis

The Eastern Economic Corridor (EEC) of Thailand is poised for significant economic development and regional integration. Recognizing the transformative potential of digitalization,

stakeholders in the EEC are increasingly focusing on optimizing its logistics infrastructure through advanced technologies. This paper delves into the current state of digital logistics in the EEC, highlighting key challenges and formulating strategic recommendations for stakeholders.

### **Current Landscape and Challenges:**

While the EEC boasts a robust physical infrastructure with modern ports, highways, and rail networks, its digital infrastructure requires further development to unlock its full potential. Limited investment in digital technologies and inadequate regulatory frameworks hinder the adoption of innovative solutions like smart logistics platforms and data-driven decision-making. Additionally, the absence of a skilled workforce equipped with the necessary digital literacy poses a significant challenge to the effective implementation and utilization of these technologies.

Strategic Recommendations:

#### **For Businesses and Investors:**

- Prioritize investments in cutting-edge digital technologies like cloud computing, IoT, and AI to optimize logistics operations.
- Develop intelligent warehousing systems, implement real-time tracking and tracing solutions, and facilitate seamless data exchange.

#### **For Government Entities:**

- Foster public-private partnerships (PPP) to accelerate digital infrastructure development, including high-speed internet connectivity and data centers.
- Revise regulations to create a conducive environment for digital logistics businesses.
- Streamline regulations, encourage open data sharing, and incentivize innovation through tax breaks and subsidies to attract foreign investment.

#### **For Educational Institutions and Industry Experts:**

- Prioritize workforce development programs to address the existing skill gap.
- Offer upskilling and reskilling initiatives to equip the workforce with the necessary digital literacy and technical expertise for advanced logistics technologies.

#### **Long-Term Implications and Competitive Advantages:**

By implementing these recommendations, stakeholders can strengthen Thailand's digital logistics capabilities within the EEC. This will lead to enhanced operational efficiency, increased competitiveness, foster the growth of related industries, and attract foreign investment. Moreover, a robust digital logistics ecosystem will contribute to Thailand's long-term economic progress by facilitating seamless trade and integration within the ASEAN region and beyond.

The digital transformation of logistics in the EEC presents an opportunity for Thailand to emerge as a regional leader in smart and sustainable logistics. By addressing existing challenges and proactively implementing strategic recommendations, stakeholders can unlock the full potential of digital technologies and contribute to Thailand's long-term economic success.

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# The Influence of Anchor Characteristics on Consumers' Purchase Intention by TikTok E-commerce Live Broadcast in China

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## Abstract

The Stimulus-Organism-Response(S-O-R) theoretical model was developed to understand the factors affecting consumer purchase intention by TikTok E-commerce live broadcast in China. This study examines professionalism, interactivity, popularity, and product involvement as independent variables, and perceived trust and playfulness serving as mediators. Data collected from 402 Chinese TikTok users were analyzed using PLS-SEM. The empirical results revealed that all independent variables have significant positive impacts on both consumer-perceived trust and perceived playfulness. Both perceived trust and perceived playfulness are positively associated with purchase intention. These results contribute valuable knowledge on the antecedences of purchase in online marketing literature. They also to use of the Stimulus-Organism-Response(S-O-R) theoretical model in a particular context of live E-commerce, taking TikTok application as a study case. In addition, the provides additional evidence on the mediating roles of perceived trust and perceived playfulness as a mechanism to drive purchase intention. E-commerce live businesses can apply the findings as useful guidelines in their marketing strategy development.

**Keywords:** E-commerce Live Broadcast, Anchor Characteristic, Purchase Intention, TikTok, S-O-R Model

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## **Introduction**

Traditional E-commerce is a one-way output model with text, pictures or videos, and E-commerce live is the promotion of online product sales through real-time social interaction (Cai & Wohn, 2019), anchors present details and demonstrations of products to consumers and offering special discounts to consumers during the live broadcast. Consumers can interact with the anchor and other viewers while watching, express their opinions on the products or ask the anchor to recommend suitable products according to their needs and click directly on the links displayed on the live stream to make a purchase (Sun et al., 2019). Most of the E-commerce platforms that use this model use weblebrities and celebrities to promote products whose prices are acceptable to most consumers, thus achieving the purpose of promotion within a short period. This E-commerce live model is easily accepted by most people, who subconsciously accept the products and generate the idea of buying them while watching the live broadcast.

The E-commerce live broadcast industry is growing rapidly. According to the “49th Statistical Report on the Development of the Internet in China” provided by China Internet Network Information Center, as of December 2021, the size of China’s Internet users was 1.032 billion, the Internet penetration rate reached 73%, the number of online shopping consumers in China reached 842 million, up 59.68 million from December 2020, accounting for 81.6% of Internet users as a whole, or 78.6% of Internet users with online shopping experience (CNNIC, 2022).

TikTok - a leader in the short video industry in China - is a social networking software based on the idea of music and the ability to shoot short videos, which was successfully launched in September 2016 and has grown rapidly since its inception and is well-liked by its users. According to the Online Survey Report on Consumer Satisfaction in Live E-commerce Shopping released by the China Consumers Association, the data shows that the percentage of consumers using Taobao Live is 68.5%, which is in the absolute lead, second is TikTok Live with 57.8% of consumers and third is Kwai Live with 41% of consumers (China Consumers’ Association, 2020). The difference with Taobao is that TikTok Live is a platform mainly for entertainment with live streaming of goods, while Taobao is a live platform mainly for shopping, the nature of the two platforms are different, and this article takes TikTok as the object of study to make it better adapted to the development of live e-commerce and to provide a case study for other live platforms.

Since the rapid development of E-commerce live broadcast, countless scholars at home and abroad have conducted studies. Although similar studies have been conducted to do the behavioral intention of E-commerce live purchases, few have explored the comprehensive model in the context of TikTok Live in China. In addition, Research on the willingness of consumers to e-commerce live-stream is still in its infancy, and studies on E-commerce live-streaming mainly analyses its impact on consumers’ purchase intentions and behaviour from the perspectives of product information, discount promotions, and online interaction. Through collation, it is found that there is a relative lack of research on anchor characteristics, especially research on perceived trust, and perceived playfulness as mediating variables.

So this paper takes the S-O-R theoretical model as the basis, takes TikTok as the research object, according to the current development of E-commerce live broadcast, takes professionalism, interactivity, popularity, and product involvement degree as the measurement dimensions of multicast characteristics, integrates anchor characteristics, perceived trust, perceived playfulness,

and consumer purchase intention, proposes the influence of anchor characteristics on consumer purchase intention of E-commerce live, and provides some directions and suggestions for the future development of E-commerce live.

## **Research Objectives**

This study investigates the influence of anchor characteristics on consumers' purchase intention in E-commerce in China. There are two key objectives of this study:

- 1) To determine how anchor characteristics affect perceived playfulness and perceived trust in the TikTok E-commerce live broadcast in China.
- 2) To investigate the relationship between perceived playfulness, perceived trust, and consumer purchase intention in the TikTok E-commerce live broadcast in China.

## **Literature Review**

Mehrabian and Russell (1974) proposed the model of Stimulus-Organism-Response (SOR) in 1974. It has been widely used in the field of marketing behaviour and has become an effective theoretical basis for supporting consumer buying behavior (Mehrabian & Russell, 1974).

S-O-R (Stimulus-Organism-Response) refers to the cognitive-emotional response of an individual to an external stimulus that ultimately influences consumer behavior where the stimulus is the external environment (both positive and negative), the organism is the cognition and emotion, and the response is the behaviour of convergence or avoidance. This study applies this extension to Chinese consumers' purchase intention in the TikTok E-commerce live broadcast.

### **Anchor Professionalism**

The anchor has the relevant knowledge, expertise, and practical experience and can provide professional answers to consumers (Yan, 2021). During the live broadcast, the anchor will use professional knowledge and rich experience to explain the products professionally evaluate them effectively, and make buying suggestions for consumers, increasing the consumers' interest in the products and generating a sense of playfulness (Li et al., 2021). When the anchor has a high level of expertise, consumers tend to perceive the information as having a high level of credibility and are therefore willing to listen to the anchor (Fang, 2014). People are more likely to trust the opinions of experts than those of non-experts and to adjust their behaviour and attitudes (Park & Lin, 2020).

### **Anchor Interactivity**

A direct form of communication between anchors and consumers that relies on the visual and real-time nature of live streaming (Zhao & Wang, 2021). During the live broadcast, consumers can ask the anchor for information about the product by sending a pop-up or link, and the anchor can reply in time so that consumers can fully understand the product and feel valued at the same time (Li & Li, 2022). The more often the anchor interacts with the consumer, the more the consumer trusts the anchor, consumers enjoyed the interaction with the anchors and could not help but have their mouths turned up while watching the live stream. Tong found through his research that the interactive nature of webcasting has a positive effect on consumer trust (Tong, 2017).

### **Anchor Popularity**

It means fame status of anchors, and influence (Lin, 2021). In general, people are more likely to trust celebrities and have a strong sense of trust and admiration for celebrities with a good public image. In E-commerce live streaming, consumers' trust in information disseminated by people with high visibility gradually strengthens, because when the anchor is well known, it helps to reduce the time and cost of collecting information for consumers, increase their certainty and reassurance about the product, and delight their mood (Liu, 2017).

### **Product Involvement Degree**

It refers to the extent to which the anchor knows the product and the extent to which the anchor is able to trigger the consumer's desire to buy (Chen et al., 2020). A good anchor spends more time and effort trying out and digging up products before each broadcast, being well prepared, and striving to offer the best value for money to consumers.

### **Perceived Trust**

Perceived trust is the level of honesty and trustworthiness of the anchor, the anchor does not take advantage of the consumer (Wongkitrungrueng & Assarut, 2020). In TikTok Live, the anchor does not take advantage of the consumer, but actively serves the consumer to the best of their ability and to make them satisfied. The more trust consumers have in the anchor, the more likely they are to be willing to buy when watching a live broadcast. Liu et al. found that based on perceived trust, consumers tend to make purchase decisions in a relatively short period of time (Liu & Shi, 2020). Xu Xia found that trust plays a crucial role in consumers' willingness to buy in a live e-commerce context (Xu, 2021).

### **Perceived Playfulness**

Perceived playfulness refers to the degree of mental playfulness that consumers derive from the shopping (Moon & Kim, 2001). In E-commerce live streaming, a pleasant live-streaming atmosphere will create a sense of playfulness among consumers. This sense of playfulness includes the feeling that consumers are happy in the live streaming room and that consumers enjoy the interaction with the anchor or other consumers, thus guiding their shopping behaviour and increasing their willingness to buy. Wright and Bower noted that consumers are more likely to make purchases when they are in a happy state while shopping online (Adaval, 2003). Shi Mengnan's research found that playfulness has a significant positive effect on purchase intention in live e-commerce (Shi, 2021).

### **Purchase Intention**

The subjective likelihood that consumers will make a purchase while watching a live E-commerce broadcast (Yan, 2021). Wang et al. (2022) found that trust significantly influences consumer attitudes and further influences consumers' willingness to buy. Chen (2022) also found that perceived playfulness positively influences consumers' willingness to buy on E-commerce live platforms. It can be found that the playfulness generated by the consumer will, to a certain extent, contribute to the consumer's willingness to buy.

### **Hypotheses in this Study**

H1a: In TikTok live broadcast, Anchor professionalism has a positive impact on perceived trust.

H1b: In TikTok live broadcast, Anchor professionalism has a positive impact on perceived playfulness.

H2a: In TikTok live broadcast, anchor interactivity has a positive impact on perceived trust.

H2b: In TikTok live broadcast, anchor interactivity has a positive impact on perceived playfulness.

H3a: In TikTok live broadcast, anchor popularity has a positive impact on perceived trust.

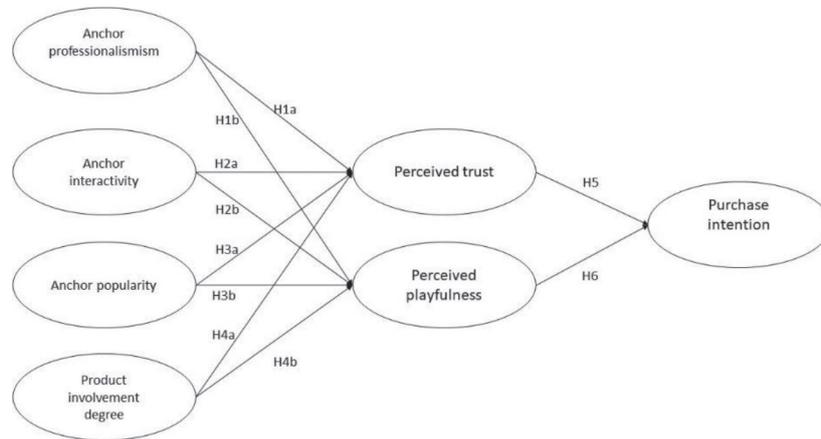
H3b: In TikTok live broadcast, anchor popularity has a positive impact on perceived playfulness.

H4a: In TikTok live broadcast, product involvement degree has a positive impact on perceived trust.

H4b: In TikTok live broadcast, product involvement degree has a positive impact on perceived playfulness.

H5: In TikTok live broadcast, perceived trust has a positive impact on purchase intention.

H6: In TikTok live broadcast, perceived playfulness has a positive impact on purchase intention.



**Figure 1** Proposed Conceptual Framework

Source: Adapted from Guo, 2021

## Methodology

In this section, the study covers the population and samples, research instrument, data collection and analysis, and pilot testing.

### Population and Sample Size

The primary object of this research is to explore the impact of anchor characteristics on consumer purchase intentions in TikTok live broadcast. Therefore, the target population for this study is the males and females in China. The sample of the population is TikTok Live streaming users in China. According to the TikTok Data Report 2021, the average daily active volume of TikTok Live is roughly 600 million (The TikTok Data Report 2021, 2021).

The term sample in research terms is a group of people, objects, or items that are taken from a larger population for measurement. The sample ought to be the representation of the population in order to specify the characteristics of a population (The Hillingdon Hospital, 2020). The proposed research model was initiated based on a quantitative study conducted

among TikTok Live streaming users in China. As such, an online survey was distributed to the participant population through a shared link and convenience sampling. In order to minimize the error probability and maximize the accuracy, the sample of this research will be collected by using a web survey according to Tara Yamane in 1967,

$$n = N / [1 + N * (e)^2]$$

Where n is the sample size.

N is the whole population that is under study.

e is the acceptable sampling error which is usually 0.10, 0.05, or 0.01.

For this research, with population,

$$n = 600,000,000 / (1 + 600,000,000 * 0.05 * 0.05)$$

$$n = 399.99$$

As a result, the research will be collecting 402 respondents to develop this survey.

## Research Instrument

The measurement instrument in this research is a self-conduct questionnaire that had been prepared for online distribution. The existing scale used in the questionnaire is based on the constructs of the study. To get a precise and accurate result, a pilot study will be conducted on a small group of respondents then the results were being interpreted.

The author divided the surveys into two sections to assess the influence of anchor characteristics on consumers' purchase intention in E-commerce live in China. In the first section, the authors seeked to learn more about general information pertaining to respondents' demographics. In the second section, authors frequently asked questions about anchor professionalism, anchor interactivity, anchor popularity, product involvement degree, perceived trust, perceived playfulness, and purchase intention.

### Data Collection and Analysis

In this study, the data was obtained through an online questionnaire sent to TikTok Live streaming users in China. This pre-requirement is met by using a set of screening questions in the questionnaire. The distribution of the questionnaire is done through personal and group online chat then ask them if they are willing to spread the questionnaire to their acquaintances.

### Validity and Reliability Test

The term pilot test is a pre-test or a rehearsal of the research study with a small number of respondents before conducting the main research study (Wright, 2020). Before the main data collection phase, a pilot test with 30 respondents evaluated the measurement tool's content validity and reliability. Based on the outcomes of the pilot test, adjustments were made to improve content validity, taking into account participant concerns and offering clarification as necessary. The reliability study entailed gathering information from 30 respondents who had purchase experience. By measuring the internal consistency and reliability of survey items assessing the same underlying construct, Cronbach's Alpha coefficient was used to determine the reliability of each variable in this study.

According to the attached table, Cronbach's Alpha values for the seven variables ranged from 0.709 to 0.894 demonstrating the outcome of outstanding data that were approved as a result of (*Cronbach's Alpha: A Tool for Assessing the Reliability of Scales*)

## Research Results

Table 1 shows that in terms of gender, more than 50% of the sample was “female”. The proportion of the male sample was 41.29%. 41.54% of the sample was “18-25”. The proportion of the 26-30 sample was 31.09%. In terms of average monthly disposable income, there were relatively more “1001-4000” in the sample, with 40.55%. In terms of how much time you spend watching live online shopping each week, the majority of the sample (61.44%) spend “0-5 hours”. Another 35.32% of the sample spent between 6-10 hours.

**Table 1** Descriptive Analysis of Respondent Demographic

Factors	Characteristics	Frequency(f)	Percentage (%)	Cumulative Percentage (%)
Gender	Male	166	41.29	41.29
	Female	236	58.71	100.00
Age	<18	14	3.48	3.48
	18-25	167	41.54	45.02
	26-30	125	31.09	76.12
	31-40	74	18.41	94.53
	>41	22	5.47	100.00
Income per month	<=1000	71	17.66	17.66
	1001-4000	163	40.55	58.21
	4001-7000	144	35.82	94.03
	7001-10000	13	3.23	97.26
	>10001	11	2.74	100.00
How much time do you spend each week watching live online shopping	0-5h	247	61.44	61.44
	6-10h	142	35.32	96.77
	11-15h	11	2.74	99.50
	>15h	2	0.50	100.00
<b>Total</b>		<b>402</b>	<b>100.00</b>	<b>100.00</b>

### Measurement Instrument Assessment

In this section, the reliability and validity of the constructs shown in the Table were being analyzed, justified, and discussed.

In order to measure the reliability of an instrument, there are three tests that had to be done such as Cronbach’s Alpha Coefficient, Composite Reliability (CR), and Average Value Extracted (AVE). Not only the reliability but also the validity of an instrument had to be measured by Convergent Validity (Factor Loading) and Discriminant Validity.

Cronbach’s Alpha Coefficient is an instrument used to measure the reliability of all the variables in this study. The value of Cronbach’s Alpha Coefficient has to be 0.70 or higher is considered as reliable. The values of each variable exceed 0.70 as they range from 0.756 to 0.872, which means they are reliable and acceptable. The values are presented in the Table below.

When the Cronbach's Alpha value of the scale is higher than 0.7, it means that the internal consistency of the constructs is good for the scale. Firstly, for the "CITC values", the CITC values of the analyzed items are all greater than 0.4, indicating a good correlation between the analyzed items and a good level of reliability. Secondly, the Cronbach's Alpha results for each dimension, the Cronbach's Alpha values for the seven dimensions designed in this paper are 0.792, 0.762, 0.834, 0.872, 0.816, 0.802, 0.78, and 0.756 respectively, which are all greater than 0.7, indicating that the internal consistency of each dimension of the questionnaire is good, so the reliability of this survey is excellent. The reliability of the results of this survey is excellent.

**Table 2** The Measurement Model (n = 402)

Variables	Itwma	Unstandardized Coefficients	z (CR)	p	Standardized Coefficients	AVE	CR
Anchor Professionalisms	AP1	1	-	-	0.795	0.566	0.796
	AP2	0.838	13.369	0	0.727		
	AP3	0.819	13.457	0	0.733		
Anchor Interactivity	AI1	1	-	-	0.721	0.514	0.76
	AI2	0.934	12.188	0	0.737		
	AI3	0.864	11.68	0	0.692		
Anchor Popularity	APY1	1	-	-	0.787	0.559	0.835
	APY2	0.839	14.596	0	0.741		
	APY3	0.795	14.151	0	0.719		
	APY4	0.819	14.64	0	0.743		
Product Involvement Degree	PD1	1	-	-	0.752	0.532	0.872
	PD2	0.864	14.265	0	0.730		
	PD3	0.886	14.404	0	0.736		
	PD4	0.866	14.062	0	0.720		
	PD5	0.833	13.471	0	0.691		
	PD6	0.881	14.626	0	0.747		
Perceived Trust	PT1	1	-	-	0.815	0.6	0.818
	PT2	0.854	15.444	0	0.767		
	PT3	0.813	14.898	0	0.741		
Perceived Playfulness	PP1	1	-	-	0.751	0.544	0.781
	PP2	0.834	12.472	0	0.702		
	PP3	0.891	13.191	0	0.757		
Purchase Intention	PI1	1	-	-	0.726	0.509	0.757
	PI2	0.895	12.197	0	0.708		
	PI3	0.884	12.172	0	0.706		

**Summary of the Measurement Model**

Construct reliability were also examined by Composite Reliability. According to Hair (1998), the threshold of the CR is 0.70 or higher is considered as reliable. And according to Fornell and Larcker (1981), the Composite Reliability has to be above 0.7 to be considered as acceptable (Shodhganga, 2020). In this study, the values of each variable obtained are higher than 0.7 as they range from 0.757 to 0.872. The values are presented in the Table above.

Average Value Extracted (AVE) has a minimum threshold of 0.5 which indicates that the construct is described as greater than half of the variance of its variables according to Gotz, Liehr-Gobbers, and Krafft (Shodhganga, 2020). In this study, the values of each variable obtained are higher than 0.5 as they range from 0.509 to 0.600. The values are presented in Table 3. So it means that the data of this analysis has good convergent (convergent) validity.

**Table 3** Fornell-Larcker Criterion: Correlation Constructs and the Square Root of AVE

Construct	Anchor Professionalism	Anchor Interactivity	Ancho Popularity	Product Involvement Degree	Perceived Trust	Perceived Playfulness	Purchase Intention
Anchor Professionalism	<b>0.752</b>	-	-	-	-	-	-
Anchor Interactivity	0.399	<b>0.717</b>	-	-	-	-	-
Anchor Popularity	0.440	0.466	<b>0.748</b>	-	-	-	-
Product Involvement Degree	0.350	0.415	0.396	<b>0.730</b>	-	-	-
Perceived Trust	0.472	0.488	0.522	0.480	<b>0.775</b>	-	-
Perceived Playfulness	0.444	0.427	0.432	0.428	0.493	<b>0.737</b>	-
Purchase Intention	0.469	0.469	0.489	0.454	0.520	0.485	<b>0.713</b>

Source: Diagonal figures are AVE square root values

**Summary of Fornell-Larcker Criterion**

In terms of discriminant validity, the AVE square root value of 0.752 for anchor expertise is greater than the absolute value of the inter-factor correlation coefficient of 0.472, meaning that it has good discriminant validity. For anchor interactivity, the AVE square root value of 0.717 is greater than the absolute value of the inter-factor correlation coefficient of 0.488, meaning that it has good discriminant validity. For anchor awareness, the AVE square root value of 0.748 is greater than the maximum value of the absolute inter-factor correlation coefficient of 0.522, which means it has good discriminant validity. For product involvement, the AVE square root value of 0.730 is greater than the absolute value of the inter-factor correlation coefficient of 0.480, implying that it has good discriminant validity. For perceived trust, the AVE square root value of 0.775 is greater than the maximum value of the absolute inter-factor correlation coefficient of 0.522, which means that it has good discriminant validity. For perceived playfulness, the AVE square root value of 0.737 is greater than the maximum value of the absolute inter-factor correlation coefficient of 0.493, which means that it has good discriminant validity. For purchase

intention, the AVE square root value of 0.713 is greater than the absolute value of the inter-factor correlation coefficient of 0.520, which means that it has good discriminant validity.

### Structural Model

The study investigated a variety of hypotheses addressing the connections between different factors and purchase intentions.

**Table 4** The Summary Results of the Structural Model

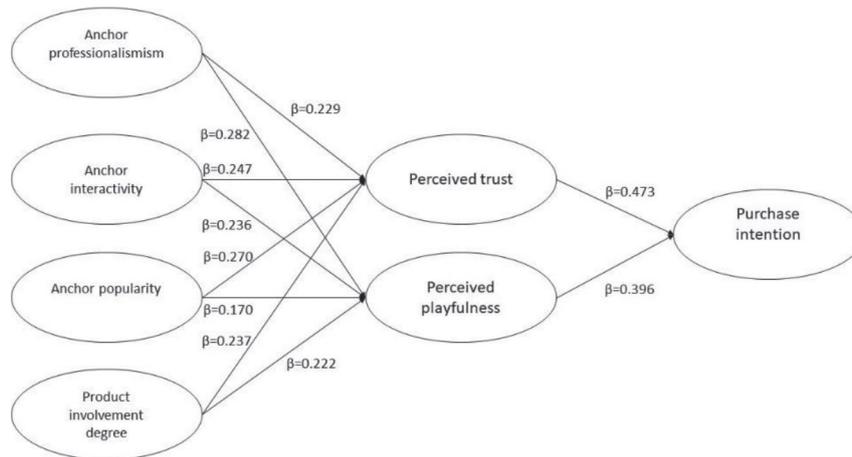
Hypothesis	Beta	Non-normalized Path Coefficients	S.E.	T-Value	P
Anchor professionalism→Perceived trust	0.229	0.279	0.076	3.689	***
Anchor interactivity→Perceived trust	0.247	0.336	0.098	3.414	***
Anchor popularity→Perceived trust	0.270	0.338	0.084	4.043	***
Product involvement degree→Perceived trust	0.237	0.297	0.072	4.147	***
Anchor professionalism→perceived playfulness	0.282	0.288	0.071	4.066	***
Anchor interactivity→perceived playfulness	0.236	0.269	0.091	2.970	0.003
Anchor popularity→perceived playfulness	0.170	0.178	0.076	2.338	0.019
Product involvement degree→perceived playfulness	0.222	0.233	0.066	3.539	***
Perceived trust→Purchase intention	0.473	0.390	0.059	6.589	***
Perceived playfulness→Purchase intention	0.396	0.390	0.071	5.472	***

Based on the results of the analysis of the path coefficients between the variables shown in the table 4, it is possible to determine the relationships between the potential variables that lie at the heart of this paper.

Anchor expertise had a significant positive effect on perceived trust ( $\beta=0.229$ ,  $p<0.05$ ); Anchor interactivity had a significant positive effect on perceived trust ( $\beta=0.247$ ,  $p<0.05$ ); Anchor popularity had a significant positive effect on perceived trust ( $\beta=0.27$ ,  $p<0.05$ ); product involvement had a significant positive effect on perceived trust ( $\beta=0.237$  ( $\beta=0.236$ ,  $p<0.05$ ); Anchor professionalism had a significant positive effect on perceived playfulness ( $\beta=0.282$ ,  $p<0.05$ ); anchor interactivity had a significant positive effect on perceived playfulness ( $\beta=0.236$ ,  $p<0.05$ ); anchor popularity had a significant positive effect on perceived playfulness ( $\beta=0.17$ ,  $p<0.05$ ); product involvement degree had a significant positive effect on perceived playfulness ( $\beta=0.222$ ,  $p<0.05$ ); perceived trust had a significant positive effect on purchase intention ( $\beta=0.473$ ,  $p<0.05$ ); and perceived playfulness had a significant positive effect on purchase intention ( $\beta=0.396$ ,  $p<0.05$ ).

**Hypothesized Paths Results**

Table 4 illustrates the structural model that could explain perceived trust and perceived playfulness to purchase intention. There are 6 hypotheses testing was done namely on Anchor professionalism, Anchor interactivity, Anchor popularity, Product involvement degree, perceived trust, perceived playfulness, and purchase intention. Overall, the hypothesized path result reveals that H1, H2, H3, H4, H5, and H6 were supported, which is shown as below.



**Figure 2** The Structural Model Result, Smartpls Calculation

**Discussion**

The proposed structural model aims to study how anchor characteristics influence consumers’ purchase intention in E-commerce live broadcasts in China with the sample of TikTok live streaming shopping users, who were asked to complete a questionnaire based on the relevant previous research and theories.

This study explores the influencing factors of consumers’ purchase intention of TikTok E-commerce live streaming by means of a questionnaire survey in China, extracts the four major influencing factors of the anchor’s professionalism, interactivity, popularity, and product involvement degree by means of factor analysis, and constructs a research model. According to the results, the anchor’s professionalism, interactivity, popularity, and product involvement degree all have a significant positive effect on consumer purchase intention, and all have a positive effect on the mediating variable.

Perceived trust plays a mediating role between anchor characteristics and consumers’ purchase intention, and the enhancement of the anchor’s professionalism, interactivity, popularity, and product involvement degree contributes to the enhancement of perceived trust, which increases consumers’ purchase intention. Meng (2012) points out that opinion leader expertise, product involvement and interactivity can play a direct role in consumers’ purchase intentions and can also be mediated by trust. For example, the live broadcast in the live band goods to show the goods, and introduce the characteristics of the goods, consumers better understand the goods, and the higher the professionalism of the anchor, the richer the information about the product that the consumer thinks the anchor has, the lower the perceived risk of the product, the more it can produce perceived trust, which positively affects the consumer’s willingness to buy; the anchor carries out frequent exchanges and interactions with

the consumer, enhances the familiarity with the consumer. In addition to the frequent exchanges and interactions between the anchor and the consumers, which enhance the familiarity with the consumers and bring them closer to each other, the stronger the interactivity of the anchor and the richer the form of interaction, the more it can enhance the consumer's experience of spiritual exchanges, which makes the consumers willing to buy the products recommended by the anchor; in addition to this, it is easier to get the trust of the consumers for the high-profile anchors; in general, the higher the visibility of the anchors, the bigger the fan base, and the more the sense of responsibility and ability of the anchors, the more the consumers follow the status influence and other influences, the stronger the trust in the anchor and the product, inspire consumers to make a decision to buy, stimulate the consumer's willingness to buy.

Perceived playfulness plays a mediating role. For example, frequent interaction between anchors and consumers during live broadcasts can give consumers a virtual interpersonal interactive experience, stimulate consumers' pleasant emotions, transiently forget the reality of their troubles, and immerse themselves in live broadcasting activities, which will increase their willingness to buy, and interesting anchors will recommend live broadcasting products to consumers in a funny way, which is more likely to give consumers a sense of pleasure and make it easier for them to buy products during live broadcasts. behaviour becomes simpler and easier.

### **Theoretical Contributions**

This study's outcomes support the Stimulus-Organism-Response model (SOR) that leads to the consumers' purchase intention in TikTok. The results of the study have empirically validated the SOR models in the adoption literature.

First, this paper analyses and investigates consumers' states and reactions when watching E-commerce live streams on TikTok in terms of the anchor's professionalism, interactivity, popularity, and product involvement. Although similar studies have been conducted to do the behavioral intention of live E-commerce purchases, few have explored the comprehensive model in the context of TikTok in China, which provides a different perspective to further understand and study the impact of the anchor characteristics of E-commerce anchors on consumers' purchasing behaviors.

Second, most of the existing research on E-commerce live broadcasting focuses on the development process of E-commerce live broadcasting, the mechanism of online interaction and sense of presence on consumers' purchase intention, etc., and there are fewer studies on the influence of E-commerce anchors' characteristics on consumers' purchase intention. As a key figure connecting enterprises, live platforms, and consumers, anchors play a crucial role in corporate profitability and consumer purchase decisions. Therefore, this paper analyses the influence mechanism of anchor characteristics on consumers' purchase intention and extends the research on anchor characteristics in E-commerce live broadcasting.

Third, based on perceived trust and perceived playfulness on consumer purchase intention in E-commerce live broadcasting in China, it was found that perceived trust and perceived pleasure had a significant positive effect on consumer purchase intention, revealing the mediating utility of perceived trust and perceived playfulness between anchor characteristics and consumer purchase intention.

### **Research Limitation**

First, the content of the relevant questionnaire was filled out by the questionnaire participants based on their recent live broadcast viewing experience, not immediately after watching the live

broadcast video, thus, there is a deviation from the selection in real scenarios.

The proposed study conducted the convenience sampling method by distributing it to groups of participants through shared link and only trusted that results. In this manner, by conducting different data collection such as personal interviews, focus groups, etc. might enhance the understanding into the intentions and perceptions of Tiktok live streaming shopping users.

Second, the proposed study focused on only TikTok and the China region and would not research on other platforms.

### **Recommendation for Future Research**

Future research can try to use the scenario experiment method to conduct the questionnaire survey, such as providing the test subjects with a description of the live broadcast scenario or a live broadcast replay video to help them retrieve their real feelings when watching E-commerce live videos before filling out the questionnaire, better predict the feelings of the consumers when watching live broadcasts as well as the purchasing decisions they make.

Future research should expand comparative studies of consumer purchase intentions, for example, between Tiktok and all other platforms in China, and, if possible, between China and other countries. Exploring new areas may help researchers gain a more thorough understanding of consumer behaviour. Last but not least, it is important for academics to keep up with technological developments, especially in the area of social media and digital marketing, as these developments can be useful tools for informing and improving marketing strategies.

### **Conclusions**

The structural model presented in the study was designed to predict the behavioral intentions of these factors influencing TikTok consumers' purchases in E-commerce live in China. The overall results measured by the model were acceptable in terms of reliability and validity. Based on the results, which support the six hypotheses, the analyses show that anchor characteristics play a positive role in influencing consumers' purchase intention in E-commerce live broadcasts on TikTok in China; therefore, if anchors want consumers to purchase willingly, anchors need to strengthen their training in all aspects, collect product information extensively, experience the products in person, familiarize themselves with product-related content, especially master high-level presentation skills, and cultivate, through continuous attention and learning, a Professionalism in the field, so that the quality and quantity can be guaranteed, so that the consumers watching the live broadcast are impressed and thus make a purchase decision.

According to the study, Anchor professionalism, interactivity and popularity affect consumers' purchase intention through perceived trust and perceived playfulness, which shows that perceived trust and perceived playfulness will prompt consumers' purchase intention under different external environmental stimuli. Anchors can focus on E-commerce live according to their own conditions and product involvement, if the anchor's professional ability is insufficient and visibility is not high, it can be used to improve consumer pleasure through interaction, so that they can purchase products. At the same time, the anchor can also improve their own internal to improve the professional ability and visibility, to obtain the consumer's perceived trust and perceived pleasure, so as to bring the sales of E-commerce live with goods!

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# The Platform Development for Creative Tourism Route Design to Tourists in Suphan Buri Province

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## Abstract

The research aims to achieve 3 objectives: 1) to explore, collect, and synthesize tourism data of Suphan Buri Province; 2) to analyze and design a model creative tourism route of Suphan Buri Province; and 3) to analyze, design, and develop a platform that helps design creative tourism routes for tourists in Suphan Buri. The framework for implementation begins with the collection of data from a review of existing concepts, data, and knowledge. This is coupled with in-depth interviews with the target audience and data collection from surveys with tourist questionnaires to bring the data into analysis to design a prototype creative travel itinerary combined with the analysis, design, and development of a platform to assist in creative travel route design.

The implementation of this research project will acquire the knowledge of the analysis to design creative tourism routes along with the model of creative tourism routes in Suphanburi province, including a platform to help design creative tourism routes as a model to support tourism management in the future.

**Keywords:** Platform, Creative Tourism, Tourism Route Design

## Introduction

The situation and trends of tourism in Thailand which are likely to increase due to the opening of the country create-circulating income worth to hundred billion baht having a positive impact on the national economy. Such situations and trends also lead to essential consequences in other aspects, and change tourist behavior nowadays, such as traveling in small groups, and traveling more on their own which results in quality-of-life development. Tourism both drives the economy at the community level and is the alternative for local communities to generate additional income from tourism. To prepare for the new normal of tourism, including the emphasis on creative tourism, which is travel directed towards an engaged and authentic experience, with participative learning in the arts, heritage, or special character of a place providing a connection with those residing in the place and create the living culture causing further expansion and adding value through innovation, which leads to “Creative Business”, “Creative City”, “Creative

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District” and “Creative Tourism” (Office of the Permanent Secretary, Ministry of Tourism and Sports, 2020), which is creating unique creative products indicating the brand’s identity, enabling consumers remember the brand every time they see, reflecting the product’s personality and unique characteristics. Therefore, it is important to help promote interest to the local community. Especially, Suphanburi Province is outstanding in agriculture, creating creative products with identity in the form of safe agricultural since decent quality and toxic-free agricultural products are safe. This is consistent with the strategy map under the 20-year national strategy on agriculture (2018-2037), which has designated local identity agriculture as one of the sub-plans of the strategy map to raise the competitiveness of the country by utilizing local identity’s strengths and wisdom in the production and agricultural product distribution, creating value to agricultural products covering agricultural goods and products that are exceptional to the area (Khammungskun, 2022). In addition, the government has supported tourism development to promote tourism and outstanding identity in accordance with the Suphanburi Province Development Plan 2023-2027. As a result, in the future Suphanburi Province will increase opportunities to develop the quality of tourist attractions, manufacturers and sellers of products and services, and tourism entrepreneurs by utilizing information technology and communication to communicate agricultural information, including creating an online market and promoting tourism development to be “Tourism for All” and “New-next Normal” (Suphanburi Provincial Office, 2023). Suphanburi Province’s potential and development position consists of area potential beneficial to a variety of agriculture leading to the development of “From farm to table”, ethnic diversity, culture and tradition differences which are distinctive characteristics of the province passed down since ancient times. The Suphanburi Province consists of 11 ethnic group’s enables local people to accept cultural variety. Because of different wisdom, there is a promotion of medicinal plant cultivation, which is considered the origin of production, procession for unitizing medicine, and cosmeceutical, expanding operations throughout the province. (Suphanburi Provincial Administrative Office as of July 2021)

Therefore, it is considered that creative tourism is a new direction of tourism of which the purpose is conversation, and cultural knowledge exchange, and helps promote tourism as a tool for understanding the value of cultural diversity, which reinforces the awareness of one’s community values and promote creativity potential development for tourists to apply experiences gained from tourism to their life. (Suphanburi Provincial Office, 2023).

This research focuses on surveying and compiling data on tourism patterns. Tourist attractions and needs related to tourism in Suphanburi Province lead to the analysis and design of tourism routes within Suphanburi Province. Including designing and developing a platform to help design creative travel routes for tourists in Suphanburi Province to support tourism in Suphanburi Province to be more efficient.

## **Research Objectives**

1. To survey, collect, and synthesize tourism information in Suphanburi Province.
2. To analyze and design prototype creative tourism routes in Suphanburi Province.
3. To analyze, design, and develop a platform that helps design creative tourism routes for tourists in Suphanburi Province.

## Literature Review

### Tourism

The United Nations World Tourism Organization (UNWTO) has defined tourism as a social, cultural, and economic phenomenon that entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors which may be either tourists or excursionists. (The United Nations World Tourism Organization (UNWTO), n.d.).

At the 22nd General Assembly in Chengdu, China, UNWTO members (The United Nations World Tourism Organization, 2019) identified forms of tourist attractions. Three main tourism forms have been defined: 1) Natural based tourism, 2) Cultural based tourism, and 3) Special Interest tourism

Natural-based tourism consists of 14 types, as follows: 1) Cultural tourism, 2) Ecotourism, 3) Rural tourism, 4) Adventure tourism, 5) Health tourism, 6) Wellness tourism, 7) Medical tourism, 8) Business tourism, 9) Gastronomy tourism, 10) Coastal, maritime and inland water Tourism, 11) Urban/city Tourism, 12) Mountain tourism, 13) Educational tourism, and 14) Sports tourism

Chanmuen (n.d.) divides tourist attractions into 5 elements (5As) important for considering and designing strategies for tourist attractions. This will help create a strong image and effectively attract tourists which consist of

1. Attraction: Tourist attractions should be outstanding, interesting identity to attract Tourists. Whether they are natural or man-made.
2. Accessibility: Convenient travel and easy access from several transportation will help promote more travel to tourist attractions.
3. Amenities: Facilities and amenities are another option to help tourists decide on travel. The tourist attractions should provide facilities and amenities in terms of public utilities, tourist service points, and souvenir shops to satisfy tourists.
4. Accommodation: Tourist attractions or the nearby areas providing sufficient accommodation for the number of tourists enable tourists to make decisions. Tourists also select accommodations for safety and security.
5. Activities: Various activities to enhance recreational opportunities and satisfaction in tourist destinations attract tourists to participate.

The most important element for tourists' decision-making is attraction. Therefore, tourist attractions should be given priority to create a strategy for tourists. In addition to the 5 important components of tourist attractions above (Sirikudta, 2014), the elements of tourist attractions/ destinations are divided into 2 types:

1. Attraction/ Destination consists of various forms of tourist attractions including concrete tourism activities to attract tourists.
2. Other elements of tourism include accessibility, convenience of travel, accommodation, facilities, as well as fundamental services for tourists.

### Creative Tourism

The Ministry of Tourism and Sports (2020) defines creative tourism using the concepts presented by Crispin Raymond and Greg Richards as tourism that gives opportunities to tourists to be able to develop their potential and creativity through the process of community participation, which is learning to enhance experience. As Kyrgyzstan (2022) said creative tourism was first

introduced in 2000 by Greg Richards and Crispin Raymond, emphasizing the significance of creativity in planning cultural tourism, which was the first tourism presentation that had never happened before. Later, in 2006, the United Nations Educational, Scientific and Cultural Organization (UNESCO) defined creative tourism as “travel directed towards an engaged and authentic experience, with participative learning in the arts, heritage, or special character of a place and it provides a connection with those who reside in the place”. It was also defined creative tourism as tourism emphasizing immersing oneself in culture or history, participatory tourism, and true experience. Creative tourism is tourism focused on educational, emotional, and social interaction, participation with places lively culture and people in the place, together with the awareness of the city’s creativity and available resources. Similar to the Designated Areas for Sustainable Tourism Administration-DASTA (Public (Organization), 2018) definition, creative tourism is tourism focusing on tourism value creation sustainably based on the local community’s background, way of life, wisdom, arts, culture, and history from the area’s resources. Creative tourism is tourism that does not harm and decrease such resources, is not the activity emphasis on revenue but value, meanwhile, conserves resources sustainably. In 2008 (Department of Tourism, 2017), Thailand clearly announced a policy to drive the creative economy, which was the beginning of the tourism concept and creative economic policy promotion leading to the integration of local wisdom and tourism since creative tourism is significant to the tourism development in international competitive conditions.

### **Tourist Behavior**

Jittangwattana (2014) stated that tourist behavior refers to various exchange behaviors that occur regularly among tourists under the effects of environmental conditions, tourists’ feelings, knowledge, and understanding to meet their needs and satisfaction. There are 7 important elements of tourist behavior: 1) Goals, 2) Readiness, 3) Situations, 4) Interpretations, 5) Responses, 6) Consequences, and 7) Reactions to disappointment

In addition to tourist behavior determining the expression in designing and selecting a tourist destination, there are 4 other main factors affecting tourists’ decisions, which consist of 1) Perception refers to the process used to interpret the surrounding environment to choose and make decisions. 2) Motivation refers to an internal and external driving force that creates enthusiasm for oneself. 3) Attitude is a feeling, opinion, or expression towards something. 4) Personality refers to someone’s characteristics reflecting the responses towards situations and the surrounding environment, and 5) Learning means changing behavior from experiences or perceived news. This may result in changes in human behavior.

Prasakul (2016) interpreted the meaning of Cooper et al. regarding the decision-making process for purchasing tourism products from the first step where the person (Tourists) are aware of the need until they finally decide to purchase tourism products. The decision-making process for purchasing tourism products is as follows:

1) Stage of demand simulation, 2) Stage of need recognition, 3) Stage of tourist attraction searching time level, 4) Stage of tourist attraction distinction Level: Countries that pop up in the mind of the person making the decision, such as a list of previously known countries also known as the evoked set, at this stage the factors that help considering the destination includes people such as friends or relatives, travel agency salespersons, products or tour packages, brochures, announcements, or advertisements, 5) Stage of evaluating options: At this stage, buyers will consider choosing destinations by comparing tourist attractions’ identities in

accordance with their criteria, 6) The stage of decision making, 7) The stage of purchasing: It is the stage at which individuals travel, and 8) The stage of post-purchase behavior or behavior after traveling: It is the feeling happening to tourists towards their thorough decision making on travelling or purchasing tourism products, which tourists may feel satisfied or dissatisfied with experiences.

Prasasakul classifies tourists of which there are many types. Each tourist or group of tourists has his/their objectives and different expectations. Therefore, tourist characteristics have been classified into 3 types according to the number, behavior, and factors attracting one another, and their activities. The types of tourists are as follows:

1. Based on the criteria of tourist numbers, including
  - 1.1 Package tourist
  - 1.2 Independent tourists
2. Based on the criteria of tourist numbers and their adaptation in the area, including
  - 2.1 Explorer
  - 2.2 Elite tourists
  - 2.3 Off-beat tourists
  - 2.4 Unusual tourists
  - 2.5 Incipient mass tourists
  - 2.6 Mass tourists
  - 2.7 Charter tourists
3. Tourists who want to seek both novelty and familiarity, including
  - 3.1 Organized mass tourist
  - 3.2 individual mass tourists
  - 3.3 Explorer
  - 3.4 Drifter

### **Technology in Platform Development**

Udomthanateera (2019) presents the System Development Life Cycle (SDLC). New technology development processes or the improvement from the system development is divided into 7 steps as follows:

1. Problem Recognition which is an important first step because desired goals must be clearly defined, priority and important group classification for selecting the appropriation for further development.
2. Feasibility Study which is studying the appropriateness of changes or adjustments with the least cost and time for the most satisfying outcomes.
3. Analysis which is the process of collecting problems and bringing the information to develop systems needs to study and collect information from users and write the plan to develop systems and information direction.
4. Design which is turning the analysis result into a problem-solving concept with no specific details and characteristics but focuses on an outline delivered to system designers. This phase identifies working system characteristics, such as tool and technology details database types for designing, suitable networks, data import characteristics, report formats, and possible outcomes, etc.
5. Development and Test which is the process of program writing to develop specified systems and system testing to check the system validity.

6. Implementation which is installing and implementing a fully developed system together with the system supporting procedure, training, documentation, and service support plans.

7. System Maintenance which is the process of continuously maintaining the system after operation, follow-up and evaluation, and collecting complaints to improve the system.

Bindusa and Aowsakul (2018) present a network analysis that has been applied to transportation routes to choose the best or shortest route which depends on the consideration of factors and goals needed, such as the shortest distance, the least time, and the most saving cost, etc.

### Platform Development Process

The development of a tourist attraction spatial database is to support the development of the platform because the platform needs to retrieve data from the database to process specified conditions to obtain travel itineraries for tourists that define the parameters for processing. The operation considers using the geographic information system database as the basis for the database development because the database in the system supports storing and managing spatial data efficiently.

Spatial data has specific properties because it can present elements of location (Location), data describing characteristics (Attribute), time (Time), and spatial relationships (Spatial Relationship). Therefore, while developing a geographic information system database, it is necessary to consider such a unique fundamental structure so that the developed database will be applied effectively.

The structure of tourist destination data is considered from the need of data usage for processing to select creative tourism routes and the data from tourist destination surveys to determine the data structure aligning with the data usage and properties so that the data retrieving will be efficient.

### Research Conceptual Framework

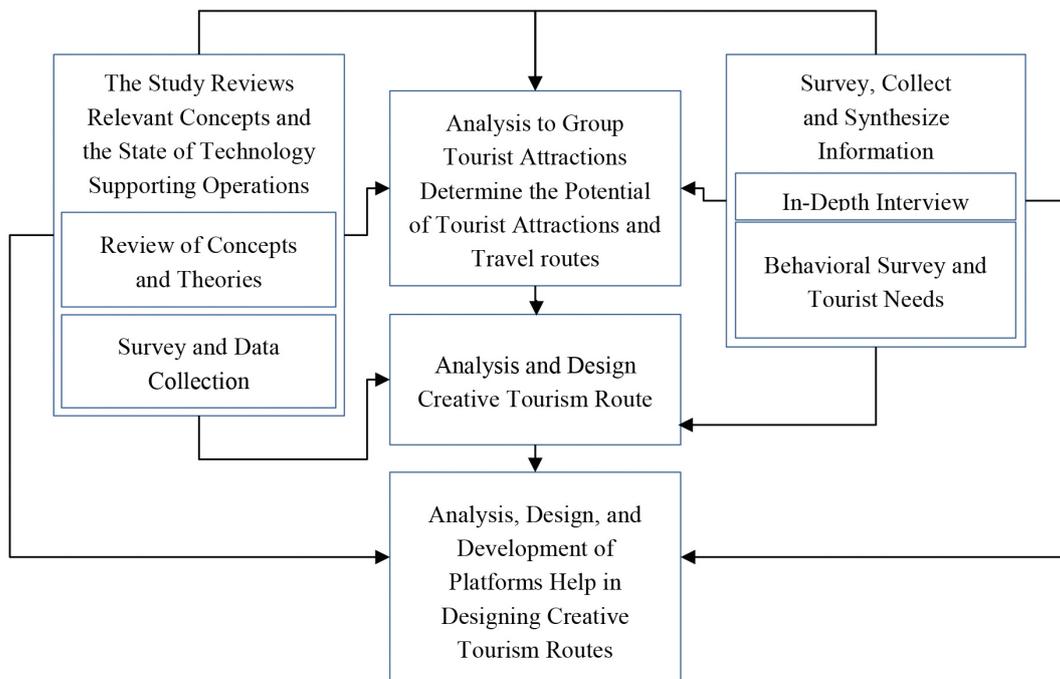


Figure 1 Research Conceptual Framework

## Methodology

### Population and Sample

1. This research is an in-depth survey using interviews to determine 3 main groups for data survey in Suphanburi Province, namely 1) A group of government agencies whose missions are related to tourism management and community development in Suphanburi Province 2) Groups of private organizations with roles and responsibilities related to tourism in Suphanburi Province, and 3) Community groups that are entrepreneurs of creative tourism destinations in Suphanburi Province and 4) Groups of Thai tourists who are both escort tours and independent tourists visiting tourist attractions in Suphanburi Province.

### 2. The Creation and Development of Tool Quality

Qualitative research, a preliminary study from a review of knowledge related to tourism in Suphanburi Province. Questions for the interview questionnaire were designed to lead to interviews with the sample group and quantitative research from the questionnaire development. Considering the content that will be related to factors and conditions that must be present for platform development. The focus is on gathering information related to basic factors that will be related to tourists' travel behavior and tourist needs there are plans to travel to tourist attractions in Suphanburi Province by random sampling method and calculating the number of samples using Taro Yamane's calculation method, setting a confidence value of 95 percent, which determines a sample size of 400, and testing the reliability of the questionnaire using the IOC (Index of Item-Objective Congruence) formula by having experts consider the questions. Each item of the questionnaire and consider whether each question is consistent with the objectives that will be used for further operations.

### 3. Data Collection

In Qualitative research in this study, the researcher used interviews to collect in-depth information. The researcher has brought relevant objectives, frameworks, and assumptions studied various documents and information, theories, concepts, principles, and various related research as guidelines for determining the scope and content in creating the interview form. The data was collected by means of in-depth interviews, where the researcher, conducted the interviews himself. Then the data is processed, interpreted, categorized, analyzed and synthesized according to the specified issues.

### 4. Data Analysis

Qualitative data were analyzed by using content analysis. The survey of general information on creative tourist attractions in Suphanburi Province aims to collect basic information on tourist attractions and use them for the development of a spatial database of creative tourist attractions in Suphanburi Province to align with the research objectives. The data was verified through data collection methods and document verification.

## Research Results

After following the steps and details presented above, the result from each process and the platform helped design tourist routes for creative tourist attractions in Suphanburi Province. The details according to the research objectives are as follows:

### **1. To survey, collect, and synthesize tourism information in Suphanburi Province.**

The aim for surveying creative tourist attractions in Suphanburi Province is to review the evaluation of tourist attractions including an additional survey issue determined according to the research objectives to applied for the tourist attraction database development, platform development support in terms of creative tourism situation, policy, and operation plans to drive creative tourism in Suphanburi Province, including opinions towards to the platform development issues, such as the platform operation or groups of platform users.

#### **Policy situation and creative tourism plans of Suphanburi Province**

Suphanburi Province has established a policy to develop the tourism industry according to the provincial development plan. The goal is to develop tourism and sports, promote Suphanburi Province's identity, increase the number of tourists and income, and promote and develop the sports industry and sports for tourism, including the standards of the province's sports services. It also promotes Suphanburi Province as a creative tourism city emphasizing the genuine participation of tourists from other areas by people who own the resources in the community. In addition, good transportation routes enable tourists to travel conveniently and take less time, Suphanburi Province is one of the popular provinces chosen for relaxation, traveling, and getting away from it all. There are a variety of nature in Suphanburi Province rich in culture and history, including interesting activities for relaxation and learning on holiday. Tourists can experience nature in a short time traveling, participate in experience-enhancing activities of different types, and learn the objectives of tourist attractions around the province.

#### **Analysis of results from a survey of tourist behavior**

An in-depth interview survey found that after the COVID-19 outbreak situation, more tourists are coming to travel in Suphanburi province. Many tourist attractions have begun to be renovated to support tourism. The tourism market is starting to return to normal. Suphanburi Province has set a plan to promote tourism in Suphanburi Province continuously. There is coordination and cooperation between government agencies, organizations related to tourism, and tourism operators. The strategy has been established to support tourism in Suphanburi Province, including considering new tourist attractions to enhance tourism in Suphanburi province. The summary results of the survey of the behavior and needs of tourists for creative tourism in Suphanburi Province are as follows:

1. Most respondents have never experienced tourism in the form of creative tourism in Suphanburi and other provinces. Some of them have had experiences in creative tourism in other provinces, which came from personal interest and information from internet sources. However, the reason they have not visited creative tourist attractions in Suphanburi Province is there is little information about them.

2. Factors such as age and occupation are the main factors that affect travel decisions, which cause different travel behaviors.

3. Age and occupational factors affect tourism groups. Choosing to travel alone, traveling with family traveling with a group of friends, or traveling in groups affects the number of travel groups.

4. Age and occupation factors affect the number of days of travel planning. This will continue to affect the selection of travel times.

5. Age and occupational factors affect interest in activities in creative tourism destinations. This will affect the selection of creative tourism destinations in Suphanburi Province.

## 2. To Analyze and Design Prototype Creative Tourism Routes in Suphanburi Province.

Results of Analyzing and Designing Prototype Creative Tourism Routes in Suphanburi Province.

The results of the survey of the behavior and needs of tourists lead to determining the factors and conditions for designing a prototype of creative tourism routes used as a model to determine the designing processes for developing the platform. The factors and conditions to determine the creative tourism route are defined as follows:

**Table 1** Factors and Conditions to Determine Creative Tourism Routes

<b>Factors</b>	<b>Conditions</b>
Starting point of the journey	Determine the starting point of the trip by the tourist.
Travel time	The duration for the trip to the selected creative tourism attractions plus the time spent at each creative tourism attraction must not exceed 8 hours per day.
Time spent in creative tourism attractions	There must be an appropriate amount of time for all creative tourist attractions which must not exceed 8 hours per day.
The potential of creative tourism destinations	The potential assessment of the selected creative tourism attractions along the route must be ranked at a good or very good level to impress the tourist.
Types of Creative Tourism Attractions	The selected creative tourist attractions along the creative tourism route must be interested by tourists.
Characteristics of activities in tourist attractions	The selected creative tourist attractions along the creative tourism route must provide interesting activities suitable for the tourist's ages.
Tourism Carrying Capacity	The selected creative tourist attractions along the creative tourism route must have the capacity to accommodate the number of tourists as specified by the tourists.

Five samples of creative tourism routes developed from the specified factors and conditions are as follows:

**Table 2** Creative Tourism Travel Routes

Route	Creative Tourism	Travel Duration (Days)	Total Expenses at Tourist Attractions (Baht)
1	Ban Laem Tourism Community Enterprise Community	1	799
2	7 Senses Amazing BaanChan Fulfillment at Wang Yang	1	600
3	Thai Buffalo Conservation Village – Sam Chuk Market	1	700
4	Hia Chai Rice Breeding Learning Center – Center for reviving the ancient Tai Dam culture	1	1,500
5	Ban Laem Tourism Community Enterprise Community Ruean Thai Bang Mae Mai Homestay Community Enterprise	2	1,299

After information processing and receiving tourist routes focusing on selecting only creative tourist attractions, tourism routes were designed. The routes also included other tourist attractions located along the routes as additional options for more complete routes. The lists of designed creative tourism routes are as follows:

**Table 3** List of Creative Tourism Routes

List	Details	Travel Duration (Days)
1	Pay homage to Luang Pho To, a famous sacred object of the province. Learn the farmers' way of life and experience the spirit of Thai farmers at the Hia Chai Rice Learning Center. Taste, shop, and experience the way of life of villagers, Thai houses made from openwork wood, Sam Chuk, a 100-year-old market. Stop by to have delicious, sweet, juicy tomatoes at the touching-horizon farm. Watch the Intelligent Buffalo show and Buffalo Swim.1	1 Day
2	Experience life with the water at Ban Laem community. Admire the bird's-eye view and beautiful gardens. Taste, shop, and experience the way of life of villagers, Thai houses made from openwork wood, Sam Chuk, a 100-year-old market. Stop by to have delicious, sweet, juicy tomatoes at the touching-horizon farm.	1 Day

**Table 3** List of Creative Tourism Routes (Con.)

List	Details	Travel Duration (Days)
3	Learn the farmers' way of life and experience the spirit of Thai farmers at the Hia Chai Rice Learning Center. Stay at Ban Thung Homestay experiencing the scent of nature near the city. Pay homage to Luang Pho To, Pa Lelai Temple. Learn Chin's rich history at the large Dragon Building. Admire the bird's-eye view and beautiful gardens. Travel back in time to Kao Hong market, a 100-year-old riverside market.	2 Days 1 Night
4	Stay at Thai Phai Ta Phut Homestay. Take a boat trip to see the Thai way of life on the Ban Laem Community River. Visit the Dong Yen Agroforestry Community Enterprise to learn how to grow organic vegetables. Stop by to see the beautiful garden with several types of plants. Experience the spirit of Thai farmers at the Hia Chai Rice Learning Center. Pay homage to Luang Pho To, the image of the city of Suphan. Stop by to have fresh tomatoes at Ta Khob farm. Shop for souvenirs at Sam Chuk Old Market	2 Days 1 Night

### **3. To Analyze, Design, and Develop a Platform that Helps Design Creative Tourism Routes for Tourists in Suphanburi Province.**

The Results of Analyzing, Designing, and Developing a Platform that Helps Design Creative Tourism Routes for Tourists in Suphanburi Province.

From the thinking process of designing samples of creative tourism routes to the design of physical specifications related to the platform development, the overview of the working concept and platform is as follows:

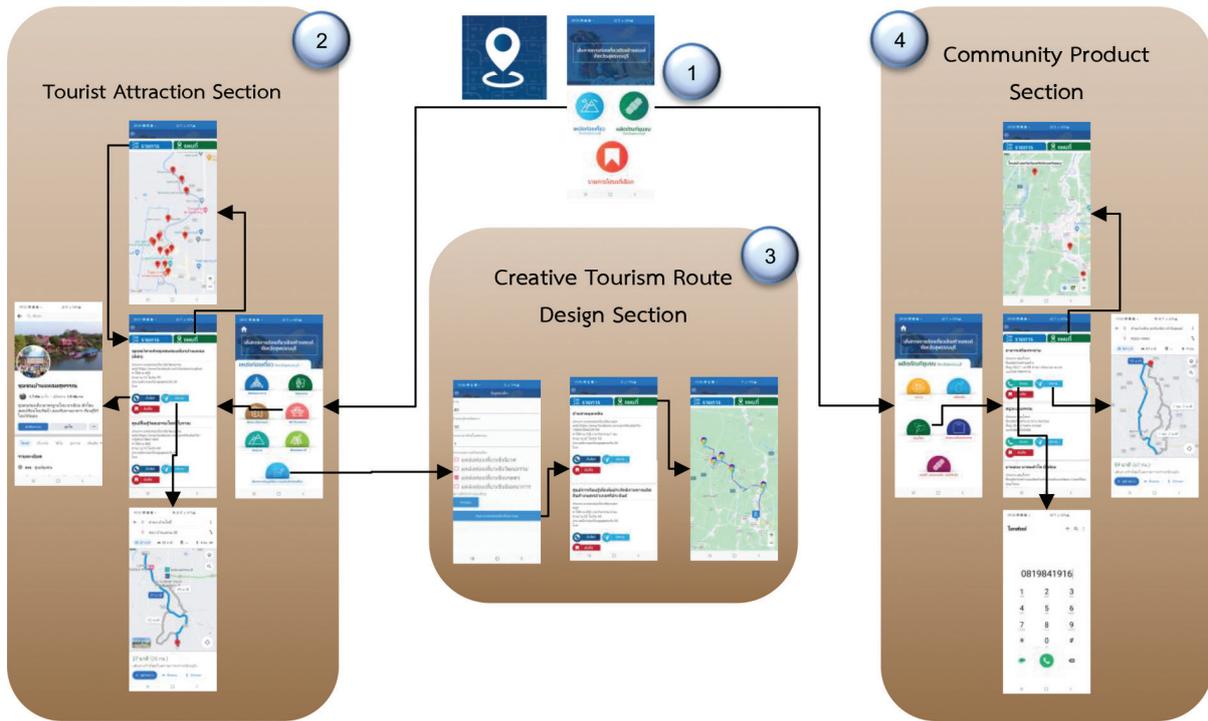


Figure 2 The Overview of Creative Tourism Route Design Platform

The completely developed platform will be published for tourists via the Google Play Store.

### The Platform Operation Overview

The platform was developed according to the basic requirements obtained from the study. It is divided into 4 main parts as follows:

1. The main part of the platform: When entering the platform, users will see the operation main page providing main options leading to functions related to retrieving tourist attraction information, community products, creative tourism route searching, including recorded tourist attractions and products.

2. The operational part related to tourist attractions: This part allows tourists to select details of tourist attractions in Suphanburi Province according to the types of tourist attractions tourists need by displaying a list of tourist attractions. Tourists can view details of tourist attractions. The system connects the details of tourist attractions nearby, displays the tourist attraction location on the map, and provides routes and guides to the tourist attractions. Moreover, tourists are enabled to record tourist attraction information for later usage.

3. The creative tourism route designing part: This part focuses on finding creative tourist attractions that meet the conditions required by tourists along with travel route selection for tourists. The selected attraction displays a list of attractions as the operational part related to tourist attractions does. However, the display on the map will process and organize the traveling sequences and routes.

4. The community product part: This part focuses on searching and displaying details of community products according to the types of products that tourists are interested in. In addition, this part enables sellers and tourists to connect via contact channels for trading. The system displays marketplace locations on the map and provides routes and guides to the marketplaces. Moreover, tourists are enabled to record marketplace information for later usage.

## **Discussion**

Operations in this research project aim to develop a platform that helps design creative tourism routes for tourists in Suphanburi Province to support and raise the level of creative tourism in Suphanburi Province. The platform developed from operations will be a tool to support the design and selection of creative tourist attraction travel routes in Suphanburi Province to meet the needs and conditions of tourists. As a result, tourism management in Suphanburi Province can answer tourist's needs more efficiently.

The efficient platform development operating framework begins with in-depth interviews with agencies responsible for setting tourism policies and plans for Suphanburi Province, tourism entrepreneurs, and tourist behavior surveys. Then, the results will be identified as the factors and conditions for designing a creative tourism route model leading to the platform design and development.

The Results from in-depth interviews with agencies responsible for setting tourism policies and plans for Suphanburi Province clarify the tourism management situation, obstacles, and opportunities in Suphanburi Province. The creative tourism operation linkage in Suphanburi Province must include:

- Government agencies whose mission is personally responsible for tourism within Suphanburi Province are the managers in charge of tourism management policy to drive tourism in Suphanburi Province at present to help and promote awareness of either seasonal festivals or regular tourism activities and destinations to tourists and enhance tourism management to be functioned according to the province and the country's policy.

- Private sector organizations having experience in tourism help promote public relations, solve problems between tourism entrepreneurs, as well as drive the tourism business in Suphanburi Province, and enhance tourism according to the province's policy. It is the main sector responsible for gathering travel business networks to make it convenient to take care of, help, and solve problems, including promoting tourist attractions in the network to be widely known.

- Creative tourism entrepreneurs managing creative tourism attractions develop creative tourism activities and interact with tourists the most.

These three components must work cooperatively to effectively manage creative tourism activities in Suphanburi Province. Processing information from interviews with representatives from all groups found that the demands for a platform to help design creative tourism routes were accordant in the same direction, which was driving creative tourism. The demand led to the summary of the platform operation's basic requirements used to determine the framework for the platform development.

The results of the tourist behavior and needs survey found that several factors affecting most tourist decision-making related and influenced to traveling and choosing a destination were the age range, travel time, occupation, number of traveling participants, main goals, satisfaction, interest in tourist attractions, income, travel expenses, and accommodation in tourist areas. The relationship between the mentioned factors is as follows:

1. Age and occupation are the main factors that affect travel decisions causing different travel behaviors.

2. Age and occupational factors affect tourism groups. Choosing to travel alone, travel with family, travel with friends, or travel in groups affects the number of traveling groups.

3. Age and occupational factors affect the number of days of the travel plan which continuously affects traveling duration.

4. Age and occupational factors affect the activity interests in creative tourism destinations which affects tourism destination choices in Suphanburi Province.

The results from the analysis indicated the tourist behavior towards creative tourism in Suphanburi Province was used to determine factors and conditions for the thinking process for selecting creative tourist attractions and designing creative tourist routes in Suphanburi Province leading to the design of the platform development thinking process. As a result, the platform worked as needed.

The Conceptual framework from the interview results and the tourist behavior survey was used to design the tourism route model. However, to obtain more complete tourism routes, the tourism route model design included other tourist attractions located along the routes did not belong to the creative tourist attraction category so that there were more interesting tourist attractions on the designed routes. As a result, creative tourist attractions in Suphanburi province were able to respond to tourists' wants variously and had the potential capacity to accommodate tourists. Moreover, the travel duration in Suphanburi Province could be more than a day the organizations responsible for driving and developing tourism in Suphanburi Province changed the old belief that traveling in Suphanburi Province took only one day.

From the operation to the platform development and design choose the development as a communication device application since tourists could reach the most. Such platform development operated from the framework, the factor and condition determination, and all mentioned processes and thinking processes. The developed application passed the testing process and was published so that tourists could use the application via the application service system. The result from the application testing was the application could work according to the design framework, and be able to provide creative tourism attraction information and other tourist attractions complemented for more complete routes. After publishing the application to the Suphanburi Province targets, namely public organizations, government organizations, and creative tourism entrepreneurs, it was considered a positive response since the application was agreed to help promote creative tourism by providing more information about tourists needing creative tourism and the design of creative routes for creative tourists which help promote more creative tourists to travel in creative tourist attractions in Suphanburi Province.

## **Suggestions**

From the study, analysis, and development the platform that helps design creative tourism routes in Suphanburi Province was developed to promote creative tourism activities according to the project's goals as mentioned above. Some issues should be considered continuously so that the platform works sustainably as follows:

1. Consider agencies or organizations either existing ones or developing new work groups to oversee the operation of the platform. There are reasons as follows:

1.1 The operation of the platform will require regular expenses incurred from the service system rental fees including other rental fees which require an annual support budget. In addition, such expenses could increase in the case of platform publishing and several users.

1.2 A process to ensure the platform always provides an accurate and up-to-date database so that tourists using the platform acquire the correct information for the trip

1.3 Platform improvement to keep up to date with changing technologies, such as an operating system, service system technology, and security system technology.

1.4 Developing the platform covering operating systems on currently available communication devices since the operating system within this project was developed on Android operating systems. Therefore, developing the platform operated on an iOS operating system needs to support more comprehensive usage thoroughly affecting the number of platform users and finally creative tourism in Suphanburi Province.

2. Considering the standardization of the process form of the creative tourist attractions potential assessment in Suphanburi Province to gain acceptance internationally. Since the potential level of creative tourism attractions will be considered as tourist attractions according to specified criteria, the determination of the tourist attraction potential standard and acceptance will affect tourist confidence leading to tourism management in Suphanburi Province.

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# Unraveling the Current Economic Downturn in Laos: A Study of Factors and Implications

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## Abstract

Laos was previously a country that enjoyed relatively high economic growth. However, at present, Laos is facing economic challenges. The objectives of this study are twofold: 1) to analyze the current state of Laos' economy from 2010-2022, and 2) to identify the factors contributing to the current economic downturn in Laos spanning from 2001 to 2023. These objectives are achieved through qualitative study methods, including literature survey and content analysis of statistical documents on economic indicators, as well as analyzing academic articles from the Scopus database and Web of Science. A total of 62 documents were considered. This article has examined the economic aspects of Laos during and post the COVID-19 period. The findings of the study reveal two key aspects. Firstly, several economic indicators of Laos today indicate that the country is undergoing an economic crunch. Secondly, scholars have primarily focused on the influence of Lao government policies in shaping the country's economy. Considering these findings, this article suggests that the Lao government should consider revising its current economic policies to address the ongoing economic crisis in the country. The economic downturn in Laos is primarily due to a lack of domestic industrial development policies and an overreliance on investment from a single country, namely China. To address this issue, Laos should implement policies aimed at achieving self-reliance in developing its own industries rather than depending on imports. Additionally, Laos should diversify its foreign investment strategies to avoid dependence on any one country. This approach would provide Laos with greater flexibility to adapt to economic changes.

**Keywords:** Lao Economy, Economic Growth, Economic Factors, Economic Crisis, Economic Policy

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## **Introduction**

Laos has witnessed remarkable economic growth over the past few decades. However, the current state of the Lao economy seems to be struggling (Rehbein, 2022). With a population of approximately 7 million people (Great Mekong Subregion, 2023) and a land area of 236,800 km<sup>2</sup> (Worlddata, 2023), Laos is 333 times larger than Singapore. The country is blessed with abundant natural resources, including vast forests and mountain ranges. However, since 2019, Laos has encountered challenges in restoring its economy from the COVID-19 pandemic.

As of 2021, Laos' GDP stands at approximately 2.5%, with foreign exchange reserves of only USD 1.2 billion, which are sufficient for reserving essential goods for merely three months (Asiatimes, 2022; International Banker, 2022). The country is grappling with a high inflation rate of 40 percent, while its exchange rate and currency have experienced significant depreciation (Radio Free Asia, 2023). Despite the efforts of Laos' leaders to reform the economic structure and attract foreign investors in 2023, aiming to transform the country into a newly industrialized nation and leverage its abundant natural resources (Radio Free Asia, 2023), the current situation remains challenging.

Laos has positioned itself as Asia's battery, utilizing its geographical advantage of numerous mountains and rivers to attract foreign investors for dam construction and electricity generation (Douglas, 2023). The country envisions exporting energy by supplying electricity to neighboring countries such as Thailand, Cambodia, China, and Vietnam. Furthermore, Laos has established special economic zones to attract foreign investors, such as in Bo Kaeo province, where China's Ngiu Kham business group operates hotels and casinos adjacent to Thailand's territory. Other areas serve as special economic zones leased by Chinese capitalists for agricultural purposes, including banana and rubber tree plantations, as well as gold mining concessions in Sepon, Savannakhet, and border regions with China (Asiatimes, 2022). Chinese capital groups have also taken over logistics for importing and exporting goods to China. Chinese investors are the largest contributors to the Laotian economy, followed by Thai and Vietnamese investors, respectively (Vientiane Times, 2022). The Lao government expects these special economic zones to drive economic growth and attract foreign investment.

Major investments, predominantly from China, have been made in key infrastructure projects, including the construction of a high-speed rail linking Vientiane to China's Kunming. Funding for these projects comes from construction and loans provided by China (Sims, 2023). Another project, the construction of a highway from Vientiane to Vang Vieng, has been completed and is set to be extended to Luang Prabang and eventually to Bo Ten, near China's border. The Lao government believes that investing in high-speed rail infrastructure and road connectivity with China will transform Laos from a landlocked country to a land-link nation. This initiative aligns with China's Belt and Road Policy and aims to connect ASEAN countries with China, the region's largest economy (Jiang, 2023).

However, despite the efforts of the Laos government to address its economic downturn, the current economic situation in Laos has not improved as anticipated. Academic writings raise questions about the country's failure to achieve desired economic growth and the major factors contributing to the current economic downturn. In light of these concerns, this article aims to address the following study objectives.

## **Research Objectives**

1. To examine the present condition of the Lao economy by analyzing key economic indicators, including GDP growth, unemployment rate, inflation, public debt, and international exchange rates.
2. To investigate the factors that influence the current state of the Lao economy.

## **Literature Review**

Previous studies have conducted various analyses of Lao economic development. This issue has been addressed in recent works by Langbein et al. (2021), who examined the impact of trade liberalization. Laos heavily relies on the viability of the existing coalition of political and economic leaders in its exporting industries. Cohen (2009) also pursued similar research, exploring alternative Western and Chinese development models, as well as the post-opium future and rubber industry in northern Laos. The rubber boom in northern Laos represents a clash between Western drug-oriented alternative development and China's opium-replacement policy, resulting in socioeconomic and environmental effects that pose a threat to the principles and goals of alternative development. This paper draws upon ethnographic and agro-economic research, as well as reports from international development organizations operating in Laos. Li and Wang (2021) conducted more recent research, examining the efficiency and changes in land use within Laos' special economic zones (SEZs). Due to their ability to attract foreign investment, promote industrialization, and drive economic globalization, SEZs play a significant role in Laos. This study focused on land-use intensity, structural changes, and land-use efficiency within Laos' SEZs. While the land dedicated to infrastructure declined, the area used for production systems experienced the highest increase. The Golden Triangle SEZ and Dongphosy SEZ were found to be relatively more successful. The effective use of land in Laos' SEZs was closely linked to the fundamental elements of industrial space and factors reflecting international collaboration.

Phimmavong et al. (2020b) examined the impact of forest plantation development in Laos using a dynamic general equilibrium analysis. Their paper assessed the economic effects of forest plantation development through a recursive dynamic computable general equilibrium model. Simulation results indicated that this policy is likely to have a positive impact on the Lao economy by increasing the production of forestry and forestry-related industries, stimulating exports and household income, and generating higher government tax revenue. Phimmavong and Keenan (2020a) conducted a study on forest plantation development, poverty, and inequality in Laos using a dynamic CGE microsimulation analysis. They employed a macro-micro economic modeling framework to assess the effects of plantation development policies on poverty and inequality in Laos. The study revealed that while welfare and inequality increases, poverty incidence would decrease. Zheng, Xiao, You, and Feng (2022) studied the evaluation of resources and environmental carrying capacity in Laos, utilizing a three-dimensional tetrahedron model. Laos' human settlement environment is primarily characterized as moderately suitable, with over 90% of the area in good condition, but with a low level of social and economic development.

Wang et al. (2019) investigated the impacts of economic globalization on the ecological environment of inland developing countries, focusing on Laos as a case study from the perspective of land use/cover change. The study found that economic globalization has significantly influenced the ecological environment of inland developing countries like Laos. Land use/cover change data, as well as exports and imports data, indicated a substantial conversion of natural forest to

plantation forest in Laos between 2000 and 2017, along with a degradation of 5.94% of natural forest to shrubland and grassland. Topographic analysis revealed that natural forest degradation primarily occurred in high-altitude and large-slope areas, increasing the potential for natural hazards.

Sims (2022) analyzed the Belt and Road Initiative (BRI) as a cognitive empire, focusing on epistemic violence, ethnonationalism, and alternative imaginaries in the Zomian highlands. This article critically examines BRI discourse, arguing that it risks perpetuating new forms of epistemic violence against marginalized populations. It specifically explores China-Laos relations and the epistemic positioning of highland ethnic minority groups in northern Laos, providing a valuable case study for understanding BRI discourse. Kyophilavong et al. (2019) researched the expansionary effects of currency devaluation in Laos, examining whether devaluations are expansionary for the country. The study found that currency devaluation has an expansionary impact on Laos, with cointegration and VECM Granger causality analysis supporting the link between currency devaluation and economic growth. For the study on the rise of impervious surfaces in the China-Laos border area, Li and Xiao (2022) utilized the Mohan-Boten Economic Cooperation Zone as a case study. They found that geo-economic cooperation among neighboring nations has led to landscape modifications across borders, such as the growth of impermeable surfaces or the conversion of agricultural fields to forests. Sentinel-2 A/B 10 m images and the Continuous Change Detection and Classification algorithm were employed to identify, correct, and reconstruct monthly time series of impervious surface area (ISA). The results indicated that ISA in the ECZ nearly doubled in five years, with ISA on the Boten side expanding faster than on the Mohan side in the first half of the study period. The study recognized three expansion patterns within the ECZ. Sims (2017) explored the development of casino enclaves, and their role in poverty alleviation in Laos. The study investigated how casino development in Laos is informed by the logic of expulsion and the establishment of new predatory formations. It relied on fieldwork visits, desk-based research, and interviews with local residents, casino staff, and members of the Government of Laos. Kyophilavong et al. (2017) examined the nexus between electricity consumption and economic growth in Lao PDR. They employed the ARDL bounds testing approach and confirmed a long-term relationship between electricity consumption and economic growth in Laos.

Kyophilavong et al. (2018) investigated the relationship between trade balance and exchange rate in Laos' trade with Thailand. The study analyzed how Laos' trade balance and its actual exchange rate with Thailand are related. The findings showed a combination between the trade balance and the actual exchange rate, using a combined co-integration technique. The study revealed that Lao Kip devaluation improves the trade balance, although the J-curve phenomenon is not present. Laos' trade balance worsens as a result of its economic expansion, while the trade balance improves with the increase in Thai wealth. The study provides new perspectives for decision-makers aiming to maintain commerce with Thailand through the formulation of a comprehensive trade policy. Barney and Souksakoun (2021) stated that the Lao PDR has pursued massive infrastructure-led economic growth by relying on a high level of financial leverage and increased government debt obligations. Currently, the government faces the risk of a sovereign default.

Overall, these studies contribute to our understanding of various aspects of Lao economic development, including trade liberalization, special economic zones, forest plantation development, the impact of economic globalization, epistemic violence the Belt and Road Initiative, currency

devaluation, land use/cover change, the rise of impervious surfaces, casino enclaves, electricity-growth nexus, trade balance, and exchange rate relationships, and the challenges associated with infrastructure-led growth.

## **Methodology**

The process of this study involves qualitative research through literature reviews and content analysis.

1. A literature review is a form of research that gathers and analyzes academic work such as research papers and articles. Academic papers and textbooks relevant to the research topic provide an overview of the current knowledge and concepts. Research methodology addresses the research question before conducting a study and, in some cases, may undergo further review once the study is completed.

2. Content analysis is a research technique that focuses on the substance of a message, aiming to derive conclusions and interpretations about its characteristics, the sender, and the recipient. By examining communication contexts, it reveals the social behaviors manifested in the content and helps to test various hypotheses mentioned in the theory.

### **Data Collection**

The timing for studying changes in the Lao economy is crucial. It opted to focus on the period during the global spread of COVID-19, which marked a significant turning point for the Lao economy. Objective 1 involves analyzing economic data from 2010 to 2022 to understand the evolving trends in Laos. Objective 2 entails examining a broader timeframe, spanning from 2001 to 2023, to gain insights into issues impacting the Lao economy. The data collection period specifically falls on March 28-29, 2023. The data sources are categorized into two groups:

1. Scopus: 18 documents
2. Web of Science: 44 documents

There are a total of 62 documents as data sources.

Despite the reviewed works, a significant gap remains in studies, particularly in the analysis of economic factors in Laos during and post the COVID-19 era. This study delves into crucial aspects of the Lao economy, including economics, electricity, hydropower, political policy, and land management.

### **Data Analysis**

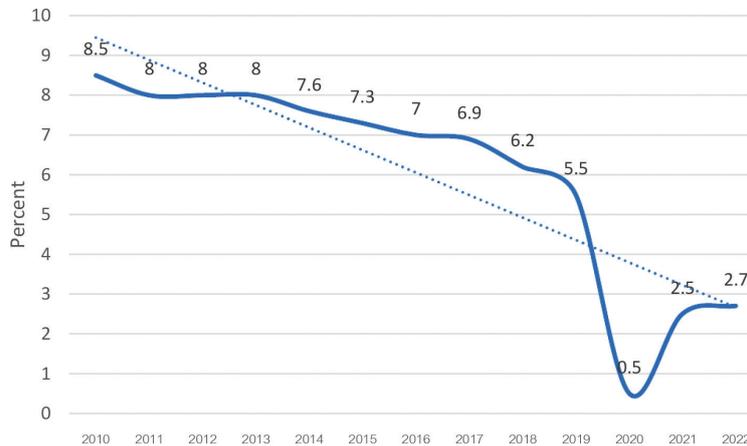
Once the information from various sources has been gathered, the authors utilized Viva Coding to categorize them based on the given topic. Viva Coding was employed to explore the factors contributing to the economic recession in Laos. Following viva coding, the analysis results will be categorized into the most studied themes and arranged accordingly, highlighting the key issues that academics are most interested in. These findings will then be linked to identify relationships with the economic indicators of Laos during that period. The presentation focuses on economic indicators such as GDP growth, unemployment rate, inflation, public debt, and international exchange rates. Subsequently, a content analysis was conducted to identify the primary causes of the economic recession and to determine their relative significance compared to other factors.

## Research Results

### 1. Current situation of the Lao Economy

The analysis of Laos' economic status index encompasses the following factors: GDP growth, unemployment rate, inflation, public debt, and international exchange rates.

#### 1) GDP Growth

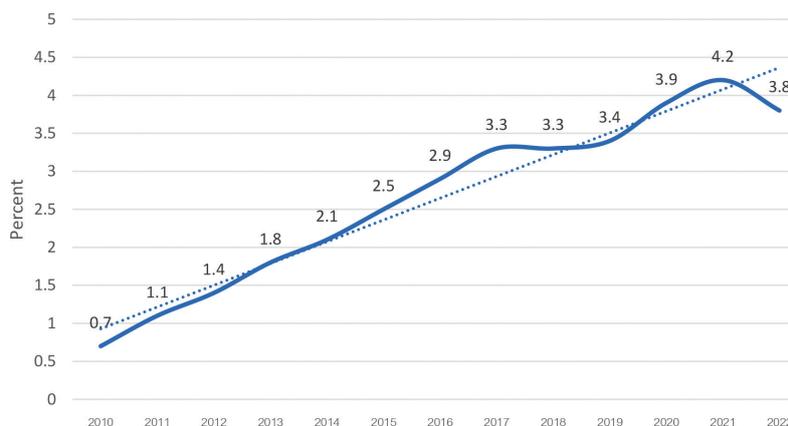


**Figure 1** GDP Growth from 2010 to 2021 (Annual %)

Source: Adapted from The World Bank (2023a)

Figure 1 depicts Laos's GDP growth rate spanning from 2010 to 2022. It's evident that since 2010, Laos's GDP growth has consistently declined. In 2010, growth peaked at 8.5 percent, whereas by 2022, it had dwindled to a mere 2.7 percent, marking a significant downturn in the country's economic expansion. Notably, the period encompassing 2019-2020, coinciding with the COVID-19 pandemic, witnessed the lowest economic growth rate. Specifically, in 2020, GDP only saw a 0.5 percent increase, underscoring the profound impact of COVID-19 on Laos's economic trajectory.

#### 2) Unemployment Rate

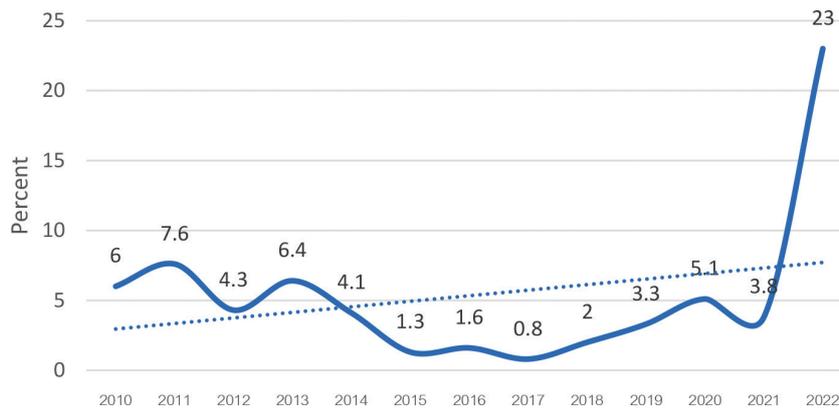


**Figure 2** Unemployment, Total (% of the total labor force) from 2010-2022 (Modeled ILO Estimate)

Source: Adapted from The World Bank (2023d)

Figure 2 illustrates the unemployment rate of Laos’s overall population spanning from 2010 to 2021. Notably, since 2010, Laos has witnessed a consistent rise in unemployment. In 2010, the unemployment rate stood at a mere 0.7 percent, but by 2022, it soared to 3.8 percent among citizens, marking a significant increase of 5.4 times compared to 2010. This underscores the critical importance of monitoring Laos’s population unemployment rate. Remarkably, the period from 2010 to 2020, coinciding with the COVID-19 pandemic, recorded the highest unemployment rate among the population. In 2021, this rate peaked at 4.2 percent, highlighting the profound impact of the COVID-19 outbreak on Laos’s population unemployment rate.

3) Inflation

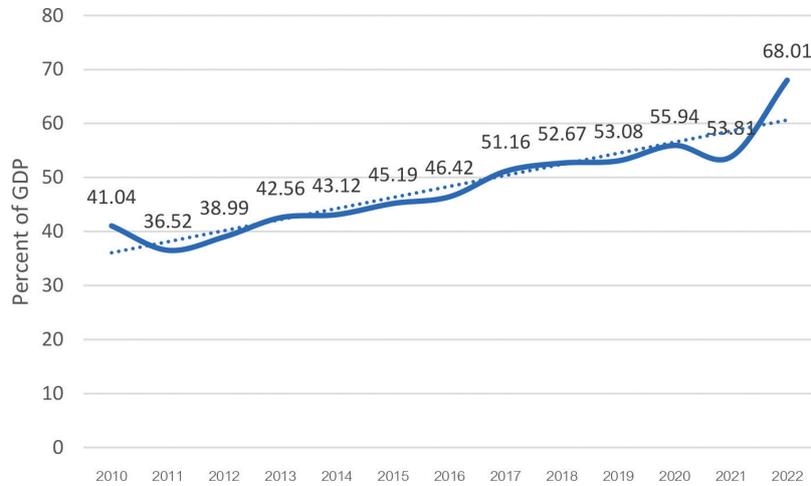


**Figure 3** Laos Inflation from 2010-2021 (Annual %)

Source: Adapted from The World Bank (2023b)

Figure 3 displays Laos’s inflation rate from 2010 to 2022. Notably, from 2010 to 2020, Laos experienced stable inflation with minimal fluctuations. However, a significant shift occurred in 2021-2022, with the country’s inflation rate skyrocketing from an unusually high 3.8 percent in 2021 to 23 percent in just a single year, marking a more than 6.1-fold increase and highlighting a crucial turning point in Laos’s inflationary trends. Interestingly, this surge coincides with the period following the COVID-19 outbreak, underscoring the substantial impact of the epidemic on Laos’s inflation rate.

#### 4) Public Debt

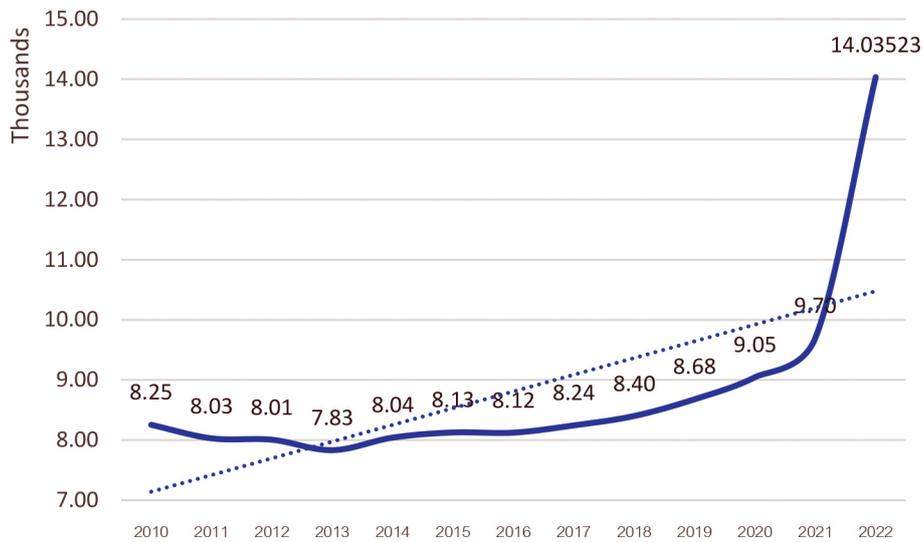


**Figure 4** Laos' External Debt (% of GDP)

Source: Adapted from CEIC Data (2023)

Figure 4 illustrates Laos's public debt from 2010 to 2022. Throughout this period, Laos's public debt has consistently risen, indicating a high reliance on foreign capital. In 2010, the public debt stood at 41.01 percent of GDP. However, by 2022, it had surged to 68.01 percent of GDP, marking an increase of over 50 percent and highlighting a significant turning point in Laos's public debt trajectory. Remarkably, this escalation aligns with the period following the COVID-19 outbreak, emphasizing the substantial impact of the epidemic on Laos's public debt level.

#### 5) International Exchange Rates



**Figure 5** Laos Official Exchange Rate (LCU per US\$, Period Average)

Source: Adapted from The World Bank (2023c)

Figure 5 presents Laos’s foreign exchange rate against the US dollar spanning from 2010 to 2022. This economic indicator is significant as it reflects the weakening economic structure of Laos. From 2013 to 2021, the Lao foreign exchange rate gradually depreciated relative to the US dollar. However, in 2022, the depreciation of the Lao kip experienced a sharp drop, plummeting from 9,700 kip per one US dollar to 14,035 kip per one US dollar. This underscores structural economic weaknesses within Laos. Notably, this significant depreciation aligns with the period following the COVID-19 outbreak, highlighting the substantial impact of the epidemic on the depreciation of the Lao kip.

In summary, the analysis of Figures 1-5 sheds light on Laos’ economic indicators. The country has witnessed a decline in GDP growth rates, alongside a recent uptick in unemployment rates and sharp inflationary pressures. Moreover, the escalating external debt necessitates prudent management. Furthermore, the significant depreciation of the Lao kip against the US dollar has adversely impacted trade and investment. This analysis underscores the challenges stemming from the ongoing economic crisis in Laos, exacerbated by the adverse effects of the COVID-19 pandemic on all economic fronts. Despite being a global issue, Laos has faced particularly severe consequences, with no immediate signs of economic recovery. The absence of effective government measures or policies to spur economic revitalization further complicates the situation, highlighting the need for initiatives like restructuring production, infrastructure investments, promoting private consumption, and enhancing export-import activities.

**2. Analysis of the Causes of Laos’ Economic Recession**

From an analysis of data extracted from 62 research articles sourced from the Scopus database and Web of Science, spanning the search period of March 28-29, 2023, the gathered information yields several intriguing insights.

1) The focus of the content in the article

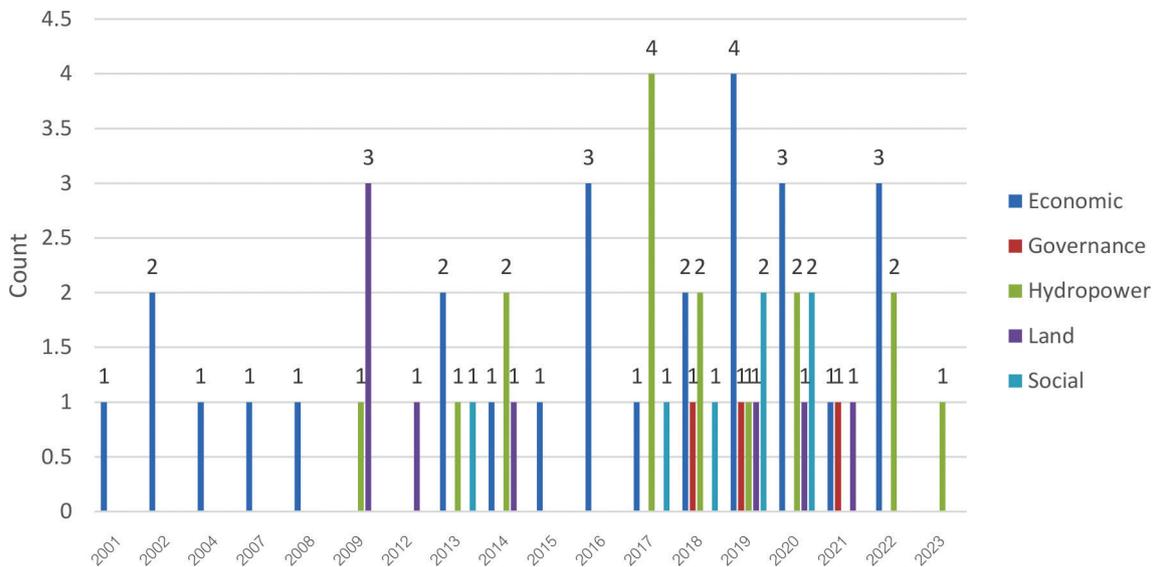


Figure 6 Count of Focus (2001-20023)

Based on the data, the analysis reveals that scholars have shown significant interest in studying various aspects of Laos between the years 2001 and 2023. The top five topics of interest, as identified in academic journals, include economics, politics, hydroelectric power plants, governance, and social aspects.

The Figure below illustrates the number of issues studied during the period of 2001-2023.

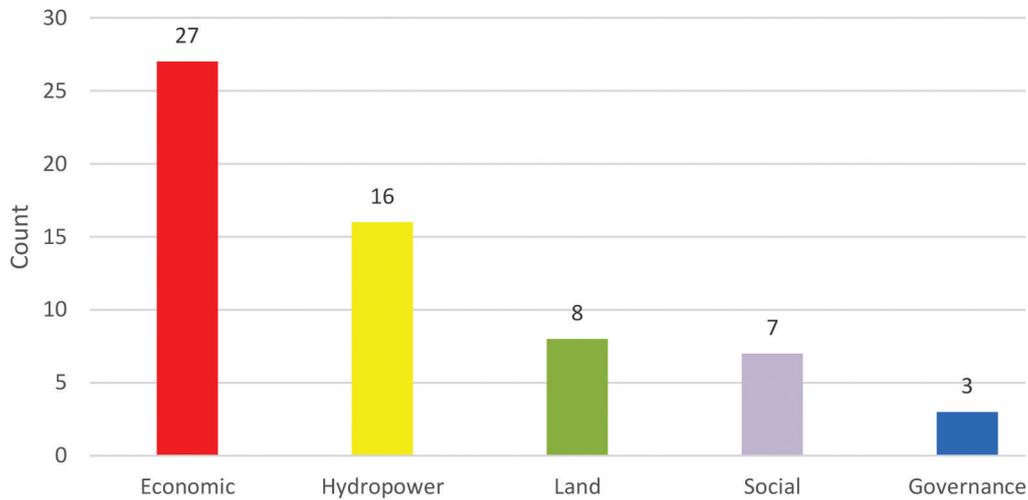


Figure 7 Count of Focus (2001-2023)

From Figure 7, a closer examination of studies conducted in the field of economics reveals the distribution of research conducted over a span of several years, as depicted below.

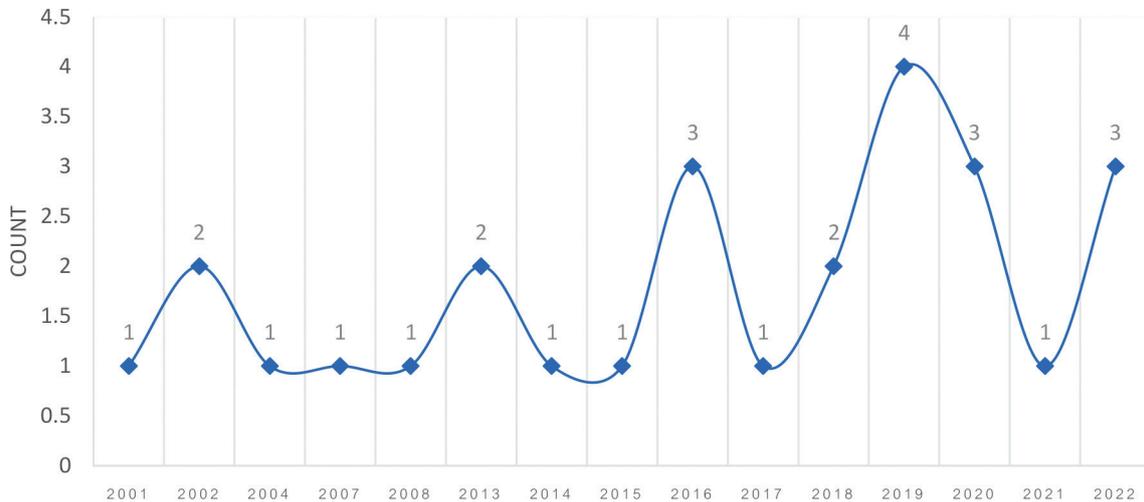


Figure 8 Focus on economic (2001-2023)

In 2019, there was a notable surge in the number of scholars conducting studies on economic issues in Laos. Furthermore, from 2001 to 2021, there has been a consistent focus on examining economic subjects every year, indicating the significance of economic issues as a central area of study related to Laos, particularly in recent years.

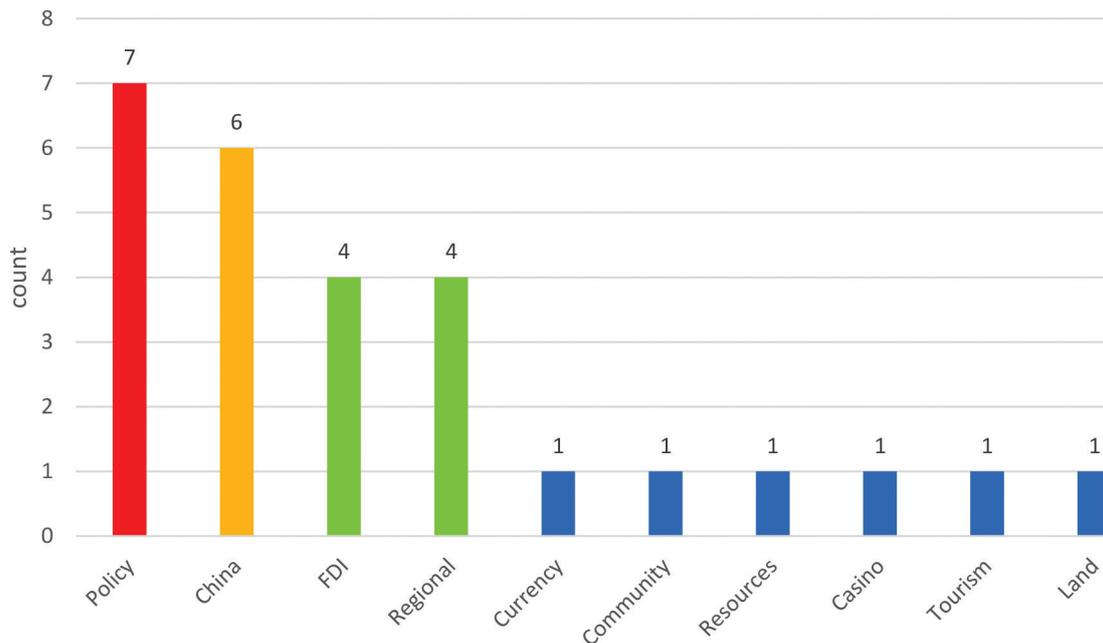


Figure 9 Count of Sub-Theme

Upon reviewing Figure 9, it becomes apparent that the most prevalent sub-topics of academic research between 2001 and 2023 were related to policy matters, followed by China’s role in direct investment. Additionally, other notable sub-topics included region, exchange rate, community, resources, casino, tourism, and land, respectively.

In summary, the analysis of scholarly interest in Laos from 2001 to 2023 reveals a consistent focus on various aspects, with economics, politics, hydroelectric power plants, governance, and social factors emerging as the top five topics of study. Notably, there was a significant increase in economic research in 2019, indicating heightened attention to economic issues during that period. Throughout the years, there has been a steady examination of economic subjects, underscoring their importance in academic discourse concerning Laos. Subsequently, the predominant sub-topics of research during this period were related to policy matters, with a notable emphasis on China’s role in direct investment. Other significant sub-topics included regions, exchange rates, communities, resources, casinos, tourism, and land.

## Discussion

When examining the economic issues of Laos in the contemporary era, two key points can be considered:

1) The current state of the Lao economy can be assessed by examining economic indicators such as GDP growth, unemployment rate, inflation, public debt, and international exchange rates from 2010-2022. Specifically, the onset of the COVID-19 crisis has had a profound impact on the Lao economy. Analyzing these factors and the overall economic landscape reveals a distinct difference compared to the past. This is an intriguing aspect warranting further investigation. A study utilizing inferential statistics could examine the extent to which the factors of the COVID-19 crisis have influenced Laos’ economic indicators, providing valuable insights. The Lao economy has faced challenges, as evident from lower GDP growth, high unemployment

rate, inflationary pressures, and unfavorable foreign exchange rates. Hence, the proposal of this study is for the Lao government to promptly implement measures to rejuvenate the economy post the COVID-19 crisis. For instance, following the example of Thailand, efforts to boost tourism to attract foreign currency and promote foreign investment should be considered. However, the strategy should not solely rely on China. Moreover, adjustments to the country's production structure should be made to prioritize exports to diverse countries and regions. Moreover, there is a limited amount of research focusing on the relationship between the Lao economies and neighboring countries, like Thailand, especially during Thailand's Asian financial crisis, where Laos experienced a similar economic slowdown. Kyophilavong et al. (2018) also highlight the significance of trade with neighboring countries, such as Thailand, in driving Lao economic growth. It is intriguing to observe the potential impact of heavily linking Laos' economy to Thailand. Laos heavily depends on importing various products, including energy resources like refined oil, from Thailand. Moreover, a significant number of Lao workers migrate to Thailand for employment due to the comparatively higher wages offered there. These Lao workers are then remunerated and return to Laos. Consequently, any economic downturn experienced by Thailand can have repercussions on the economic growth and development of Laos.

2) Various factors influence the current state of the Lao economy. Analysis of research interest in Laos over the past 23 years (2001-2023) reveals that economic issues have been the primary topic of interest among scholars, underscoring the importance of economic changes in Laos since 2000. Digging deeper into economic sub-issues, it becomes evident that government policies play a crucial role in shaping the direction of the Lao economy. Policy-making factors driven by political and governmental entities have significantly influenced the trajectory of the Lao economy in recent years. Laos is facing difficulties in addressing its poor economic conditions, partially influenced by the global economic downturn. In 2022, Phankham Viphavanh resigned as Prime Minister, passing on the responsibility to Sonexay Siphandone, the current Prime Minister. The burden of revitalizing Laos' economy falls significantly on his shoulders. The primary cause of the economic crisis in Laos is the substantial amount of public debt, particularly from borrowing from China. However, considering Sonexay Siphandone's previous role as a minister in the former government, it remains uncertain whether there will be a deviation in the policy adjustments that rely on China. This aligns with the findings of Barney and Souksakoun (2021), which suggested that heavy reliance on Chinese investment could lead to an increase in national debt and have long-term adverse consequences for the country's economy. Hence, the Lao government's economic policy adjustment stands as one of the pivotal factors that will enable Laos to break free from the cycle of overwhelming debt and ensure the sustained stability of its economic growth.

## **Conclusions**

The examination of Laos' economic issues in the contemporary era highlights two key points. Firstly, assessing the current state of the Lao economy through indicators such as GDP growth, unemployment rate, inflation, public debt, and exchange rates reveals notable differences compared to the past. The Lao economy has encountered challenges, including lower GDP growth, high unemployment, inflationary pressures, and unfavorable exchange rates. Limited research exists on the relationship between the Lao economy and neighboring countries like Thailand, particularly during times of economic downturn such as Thailand's Asian financial

crisis. Secondly, various factors shape the current state of the Lao economy. Analysis of research interest demonstrates that economic issues have been the primary focus of scholars, underscoring the importance of economic transformations in Laos since 2000. Within economic sub-issues, it becomes evident that government policies wield a crucial role in shaping the direction of the Lao economy. Political and governmental entities heavily influence policy-making factors, significantly impacting the trajectory of the Lao economy in recent years. The recommendation for this study is that the Lao government should revise its policies to better address the economic aftermath of the COVID-19 crisis and minimize reliance on foreign borrowing. Instead, the emphasis should be placed on increasing revenue through exports and tourism. The expansion of diverse foreign investment and opportunities within the country's private sector has enabled it to engage in business activities more freely, serving as a catalyst for stimulating the economy. Therefore, the government should implement measures to foster domestic capital growth. Excessive control over private operations within the nation could detrimentally impact long-term economic development in Laos.

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# The More Familiar You Are, the Less You Will Buy: The Moderating Effect of Relationship Strength

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## Abstract

With the rapid expansion of internet technology, the user base of live broadcast platforms has been steadily increasing. This surge in online activity has led to a growing trend of consumers turning to live broadcasts for product information before making purchasing decisions. Key Opinion Leaders (KOLs) who livestream have become central figures in this virtual landscape, prompting extensive research into the dynamics of relationship strength within these platforms. In light of this, our study centers on KOL live broadcasts and explores the moderating effect of relationship strength on the continuity of viewer engagement and its impact on audience purchase intention.

We collected data from 251 respondents and employed questionnaire surveys along with structural equation modeling for analysis. Our findings reveal a positive correlation between the suitability of KOLs and live broadcast products and viewers' sustained engagement. Additionally, continuity of viewership positively influences purchase intentions. Furthermore, varying levels of relationship positively strengthen and significantly moderate the impact of sustained viewership, with audiences potentially being swayed by different relationship dynamics in the information presented during live broadcasts.

**Keywords:** Suitability, Key Opinion Leader, Continuance of Watching, Relationship Strength, Purchase Intent

## Introduction

Since the emergence of the COVID-19 pandemic, live commerce has evolved into a distinct consumption trend in Thailand, attracting significant attention from international media. Key Opinion Leaders (KOLs), celebrities, influencers, and businesses are desperate to attract customers through persuasive product presentations on camera. The emergence of the live commerce model has not only showcased the dynamism of the Thai market but is also expediting the transformation of traditional brick-and-mortar businesses into the digital realm.

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In an era where online shopping is synonymous with convenience and speed, the proliferation of social media has revolutionized modern lifestyles. The accessibility of Internet Technology has transcended the confines of scheduled television programming, enabling viewers to watch content anytime and anywhere using the Internet or mobile devices.

This wave of live broadcasts has initiated a media revolution, compelling brands to reconfigure their marketing strategies. The phrase “No live streaming, no marketing” succinctly captures the essence of this transformation (Wongkitrungrueng et al., 2020). The live-streaming phenomenon, unrestricted by temporal or spatial constraints, is characterized by immediacy, authenticity, focus, and interactivity. Unlike traditional TV programming, it allows targeted audiences without interference from preset schedules. Platforms such as Facebook, YouTube, Instagram, TikTok, and others have heralded the era of live broadcasting, fostering the growth of numerous live-streaming platforms. Combined with the rise of the KOL economy, e-commerce live streaming has ushered in a new era of live streaming economy (Yang, 2021).

The live streaming economy has achieved unprecedented scale due to the pervasive use of smartphones and seamless connectivity. This study aims to examine how live streaming platforms leverage the strength of relationships to navigate intense market competition. It also delves into the factors influencing sustained viewership of live streams featuring KOLs and whether this impacts purchasing intent.

The contemporary landscape features a multitude of live-streaming platforms, each contributing to the rise of KOLs who owe their fame to live broadcasting. Manufacturers have also joined the trend, collaborating with renowned KOLs to showcase their products through live streams. This movement has given rise to a burgeoning economic trend. This study aims to investigate whether the compatibility between KOLs and products influences sustained viewership and purchasing intent.

## **Research Objectives**

1. Building on the aforementioned motivations, this study seeks to achieve the following objectives:

a. Examining the moderating effect of strong and weak social bonds and their influence on continued viewership and purchasing intent among live-stream audiences.

b. Investigate the impact of social relationships on viewers’ purchasing intent.

2. Examine the influence of strong and weak social ties on users’ purchasing intent: Building on prior research, which highlights the significance of recommendations from friends and family. This study employs the concepts of strong and weak social ties to explore their impact on purchasing intent. The moderator variable aims to uncover whether familiarity in relationships between viewers and anchors influences purchasing behavior or if an excessively intimate connection negates purchasing intent.

3. Explore the positive correlation between KOL-product compatibility and sustained live stream viewing. This aspect of the study aims to ascertain whether the suitability of the KOL anchor and the endorsed product fosters continued viewership. Furthermore, it investigates whether viewers’ interest extends to purchasing the products recommended by the KOL anchor.

**Literature Review****Social Tie**

A Social tie denotes the close connection between a Key Opinion Leader (KOL) and their audience. This connection encompasses the audience's familiarity with the KOL, indicating that the audience perceives the KOL as someone with whom they have a social connection. Additionally, it involves interpersonal relationships within the social network, encompassing factors like duration, frequency of contact, relationship type, social significance, and other related elements. The degree of closeness in the audience-KOL relationship categorizes these ties into Strong Ties and Weak Ties. For instance, a strong tie represents a close relationship between friends or family members. In contrast, a weak tie signifies a more distant association, such as with strangers, KOLs, and netizens (Y. Li & Peng, 2021).

Researchers have identified four dimensions-intimacy, familiarity, support, and partnership as pivotal indicators of relationship strength. Scholars argue that these dimensions must be collectively assessed to provide an accurate gauge of relationship strength (Yang, 2021). Of these dimensions, intimacy is widely regarded as the most crucial measure of relationship strength, given its positive correlation with factors like relationship reciprocity, actions, interaction time, and emotional intensity (Yao et al., 2021). Consequently, the strength of the bond between live broadcast audiences and hosts influences their attitudes and behaviors toward continuing viewership, subsequently affecting information sharing (Horng & Wu, 2020; Wongkitrungrueng et al., 2020; Yuan & Lou, 2020).

In this study, we define a social tie as the close association between a KOL and its audience, encompassing the audience's perception of familiarity with the KOL. For instance, individuals tend to recommend or share live broadcasts from acquaintances they are very familiar with; however, this may not necessarily translate into prolonged viewership or proactive consumption. As such, we explore how the source of moderator influence-continuance of watching-affects the purchase intent within the context of social relationships.

**KOL**

KOL (Key Opinion Leader) occupies a position between mass media and the general public. Information from mass media, such as newspapers, advertisements, or broadcasts, first reaches KOLs for assimilation and organization before being relayed to the public. This intermediary role shapes public attitudes and behaviors (Jiménez-Castillo & Sánchez-Fernández, 2019). Some scholars propose that KOLs are instrumental in changing attitudes and behaviors in the two-step communication theory. Additionally, those who receive messages last in the dissemination process are known as Key Opinion Followers (Chen & Chang, 2021).

With advancements in technologies like networking, big data, and cloud computing, the landscape of media has transcended the confines of traditional single-format media. Social networks have become channels through which to maintain interpersonal relationships and express individuality. Correspondingly, research on KOLs has shifted from the physical realm to the online sphere (Winter & Neubaum, 2016). The definition of KOL varies among scholars. Scholars point out that KOL can inadvertently influence the attitudes of others in the way and frequency expected by others to some extent so that their behavior becomes what KOL wants (Hu, 2022).

Essentially, KOLs are individuals deeply engrossed in a specific subject with specialized knowledge, often at the center of social networks, making them relatable figures. These KOL roles are contingent upon factors such as background, theme, field, culture, and social environment (Chen & Chang, 2021). KOLs, often experts in their respective fields, leverage their charisma and expertise to foster heightened trust among followers (Jiménez-Castillo & Sánchez-Fernández, 2019). They use their proficiency to provide product insights, personal recommendations, and feedback, thereby assisting companies in product promotion (Jain & Katarya, 2019). Notably, the suitability of a KOL to live broadcast products extends beyond expertise to encompass critical thinking and unique perspectives formed through research and experimentation, effectively establishing them as influential figures on social media platforms (Hu, 2022).

This study elucidates the identification of KOLs through the lens of the compatibility between KOLs and live broadcast products. Specifically, KOLs are experts in specific fields with rich life experiences, industry influence, and a network. These characteristics position them as trusted advisors sought out by opinion followers. Their influence leads to the emergence of social hotspots and trends, filtering information and elevating trust levels among their followers. Essentially, KOLs exert significant influence on the opinions, attitudes, values, motivations, and decision-making behavior of others, including such figures as sports stars, entertainment figures, industry luminaries, bloggers, entrepreneurs, authors, pundits, beauty experts, and more.

### **Continuance Watching**

Continuance describes consumers' intention to persistently engage with a product or service (Li et al., 2021). While previous research predominantly focused on consumers' purchasing behavior, our study examines the extent to which viewers are inclined to continue watching online live broadcasts following interaction with live hosts.

Given the rapid evolution of information technology, marketers are increasingly concerned with how information systems can be used and applied to the marketing field. Some scholars propose that users maintain relationships with live broadcast platforms when satisfied with the quality of service (Singh et al., 2021). Others have suggested, however, that an increase in the use of social media platforms will affect the transmission of information and opinion sharing (Winter & Neubaum, 2016). Some scholars hold that the long-term survival and success of an information system depend on continued viewership. This behavior is influenced by user experience, and the intent to continue watching stands as a key determinant of system success (Gupta et al., 2020). Notably, the integration of the Expectation Confirmation Theory (ECT) and Information Systems (IS) during the adaptation phase has led to the development of the IS (Continuance Model).

Building upon the aforementioned concepts, this study adopts scholars' definitions of continuous viewing. We explore the audience's sustained engagement with online live broadcast platforms, defining continuance watching as the audience's intent to consistently engage with live broadcast platforms in the future.

### **Purchase Intention**

The audience's support for the live broadcast host is particularly interesting within the context of live broadcasts. This support extends beyond forms of engagement, such as watching and chatting, to financial contributions, including payments, subscriptions, and sponsorships, which represent a source of income for the live broadcast hosts.

Preceding actual purchases, individuals exhibit behaviors characterized by preferences towards specific venues, products, and services, denoting a certain predisposition. Such behavioral inclinations can be interpreted as an intention to purchase (Brand et al., 2020). Therefore, the concept of purchase intention refers to an intention to consume during the purchasing decision-making process. It encompasses consumer behavior aimed at fulfilling personal needs (Prapruetmon, 2022). Similarly, some scholars have proposed that purchase intention is defined as various behaviors consumers show when they search, evaluate, purchase, and use a product or service.

Furthermore, scholars have asserted that consumers' favorable attitudes and cognitive appraisals towards products or services subsequently form an intention to purchase (Liu et al., 2019). Consumers make purchasing decisions based on their trust in products or services (Bansal & Voyer, 2000). Alternately, some academics believe that purchase intention refers to the behavioral intention of consumers to purchase a particular product or service, including repurchase intention and the willingness to advocate the product or service to others (Wang et al., 2019). The overall assessment of consumer satisfaction with a product or service influences will trigger emotional responses that generate purchase intentions (Elmashhara & Soares, 2020). In line with the above, this study defines purchase intention in the context of live broadcasts as viewers' willingness to take actions such as payments, sponsorships, and subscriptions to support their favored live broadcast hosts while concurrently engaging with the live broadcast platform.

## **Research Hypothesis**

In line with the structural framework of the literature review and the hypotheses to be examined, this research formulates three hypotheses, delineated as follows.

### **1. Impact Of Suitability on the Continuation of Watching**

Live Key Opinion Leaders (KOLs) have effectively penetrated public discourse through social media platforms, creating a perception of virtual face-to-face communication with their audience. They are easily influenced by KOLs' suggestions and behaviors (Jain & Katarya, 2019). According to trust theory, situational factors emphasize the contextual characteristics intrinsic to trust relationships, while relationship attributes refer to the state and degree of the relationship (Luo et al, 2019; Sun et al., 2020).

KOLs function as pivotal intermediaries between brands and consumers. The effectiveness of KOL-driven live commerce hinges on three key factors: individual attributes, situational factors, and relationship dynamics (Jiménez-Castillo & Sánchez-Fernández, 2019).

Social media marketing theory places drainage and conversion at the center of marketing communication. The latter is achieved through the alignment of word-of-mouth communicators with products. In this context, Suitability signifies the degree of correspondence in interests, hobbies, lifestyles, or group affiliations between individuals. Some scholars hold that a KOL's image should match the brand's identity (Jain & Katarya, 2019; Tang & Lai, 2020). Suitability will affect interpersonal trust and positively influence the evaluation of Internet Word-of-Mouth (IWOM) value (Winter & Neubaum, 2016). Users are more receptive to recommendations from friends who share common interests (Wongkitrungrueng et al., 2020). When there's a high degree of correspondence between word-of-mouth senders and receivers, users are inclined to continue engaging with content created or recommended by the sender (Xiao & Mou, 2019).

In light of this, the suitability of KOL live commerce can be assessed using three criteria: the alignment of KOL personal characteristics with fan group attributes, the congruence between KOL identity and brand image, and the suitability of the KOL live broadcast content with the platform characteristics. As a situational factor, the suitability of KOL-driven live commerce can impact the continuation of viewer engagement.

H1: The suitability of KOL live commerce has a positive influence on the persistence of consumer viewing.

## **2. The Relationship Between Continuance of Watching and Purchase Intention**

Numerous studies have established that KOLs wield more significant influence over consumers' purchasing decisions than traditional celebrities. This phenomenon can be attributed to consumers' perception of KOLs as more relatable figures, thus facilitating trust-building (Jiménez-Castillo & Sánchez-Fernández, 2019). Concurrently, research reveals that higher consumer perceptions of service quality and satisfaction correlate with heightened purchase intentions (Kim & Heo, 2021). Consequently, online live broadcast platforms enhance user satisfaction with the information and services they provide, leading users to recommend the platform to others or increase purchase intentions (Zhang, et al., 2022).

Moreover, behaviors that provide users with tangible benefits or valuable assistance tend to persist and are unaffected by temporal variations (Zhang et al., 2022). Some scholars argue that the user interface of an online store significantly shapes consumers' experiences with goods or services. An intuitive and efficient user interface leads consumers to perceive online shopping as enjoyable and satisfying, thereby boosting purchase intentions (Kim & Heo, 2021).

Reference Group Theory: The Reference Group Theory is a foundational concept in social psychology and explores how individuals' attitudes and behaviors are shaped by the influence of the groups to which they belong or aspire to join (Li et al., 2021). When individuals share numerous commonalities in terms of personal characteristics and social experiences with others, their consumption patterns and brand preferences tend to converge. Consequently, consumers who share common interests or exhibit higher suitability are more likely to influence each other's purchase intentions (Jain & Katarya, 2019; Tang & Lai, 2020). This line of thought provides the basis for the hypothesis that follows.

H2: The Continued Viewership of Live Broadcasts Positively Impacts Purchase Intentions.

## **3. The Moderating Effect of Relationship Strength**

Relationship strength refers to the degree of closeness between individuals in a social network (Kim et al. 2018). The reliability of information sources can affect consumers' beliefs and attitudes. In online communication, people are often more willing to trust information delivered by familiar and close contacts, who are generally perceived as more reliable (Zhang et al., 2022). Strong relationships are conducive to the development of sustained consumer attitudes. Some scholars argue that consumers must consider relationship strength and social cues when evaluating word-of-mouth information on social media (Fu, et al. 2022).

According to the Relationship Strength Theory, interpersonal relationships can be categorized into strong and weak ties. Strong ties typically exist within socially homogeneous personal networks, such as friendships and family bonds. In contrast, weak ties span socially heterogeneous personal networks and may include interactions with online acquaintances or strangers engaging in temporary online communications and comments (Li & Peng, 2021).

Researchers have analyzed relationship strength based on two main approaches: one draws on the three-dimensional model of social capital, treating relationship strength as the structural dimension of social capital, while the other delves into the two dimensions of strong and weak ties within ego-centric networks to examine the factors influencing relationship strength (Yao et al., 2021).

This study focuses on analyzing the latter dimension, exploring the impact of strong and weak ties. The research findings regarding the effect of relationship strength have so far been inconclusive. For instance, some scholars argue that individuals with weak ties are more likely to acquire shared knowledge than those with strong ties (Horng & Wu, 2020). Other scholars contend that strong ties are more conducive to accepting new and individualized information, while weak ties facilitate connecting users to new groups, fostering creativity, and stimulating fresh insights (Korzynski et al. 2019). Additionally, weak ties can facilitate acquiring new external information more effectively than strong ties (Islami, Wahyuni, & Tiara, 2020).

As a result, information shared within strong relationships typically exhibits a higher degree of similarity (Yuan & Lou, 2020). However, weak ties can serve as information bridges for consumers and promote the sharing of factual knowledge because they span a wider array of relationships (Horng & Wu, 2020). Specifically, live broadcast e-commerce has further enhanced the breadth of relationships between networks and gradually extended real interpersonal communication into the online world. Individuals have weaker ties, making the role of weak ties in the transfer and expansion of explicit knowledge more prominent. The advantage of the weak ties over strong ties lies in the often less repetitive information they provide, and the cost of maintaining weak ties is lower than that of strong ties. For instance, if people know each other too well, there may be a lack of freshness or excitement akin to the happy but ambiguous phases of a romantic relationship.

While scholars have studied the influence of relationship strength on individual behavior, in the context of social networks, the mechanism of relationship strength's influence on individual behavior requires further exploration. Previous studies have affirmed that the level of relationship strength can, to a certain extent, affect the credibility of information, thereby influencing consumers' purchase intentions (Islami et al., 2020). In strong relationships, since the information sender comprehensively understands consumers' personal preferences and needs, this relationship tends to reduce the impact of consumer involvement on word-of-mouth communication (Li & Peng, 2021). Moreover, scholars have found that, under equal levels of involvement, weak ties can yield a more substantial word-of-mouth influence (Bansal & Voyer, 2000; Horng & Wu, 2020). This study posits that recommenders comprehend consumers' preferences and needs in a strong relationship, thereby diminishing consumer involvement to some extent. Building on the aforementioned analysis, this paper presents the following hypotheses:

Based on the above, this paper contends that the strength of the relationship in KOL live commerce may influence consumer satisfaction among those who continue to view content. Therefore, the following assumptions are formulated:

H3: The strength of the relationship between the anchor and the audience moderates the relationship between the continued viewing and purchase intention.

Based on the relationship strength theory, this research delves into the design of e-commerce live streaming’s viewership continuity and proposes a research architecture diagram. Measured by the aspects of KOL live commerce, audience personality, continuance watching, and purchase intention, explore the influence among variables, summarize the above research hypotheses, and organize them as shown in Figure 1.

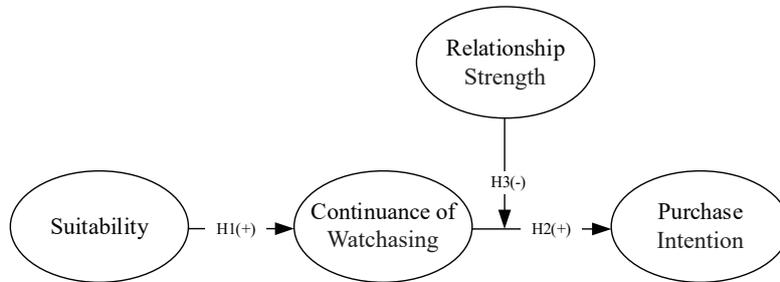


Figure 1 The Theoretical Framework of the Research

## Methodology

### Questionnaire and Measures

In order to test the research hypothesis mentioned above, this study operationalizes the conceptual framework and constructs related questions. Within the research framework, this research primarily discusses the following items: suitability, continuance watching, and purchase intent, and describes the operational definition and measurement tools of each construct. According to Yang (2021), the scale of suitability is modified according to the research purpose of this paper, and the four items of suitability are, respectively; the continuance watching is based on the viewpoint of Gupta et al. (2020), and the scale is modified according to the research purpose of this paper, with a total of 4 items to measure; purchase intention is based on the viewpoint of Pornsrimate and Khamwon (2020), and the scale is modified to match the research purpose of this paper, with a total of 3 items to measure; relationship strength is based on the viewpoint of Yang (2021), in line with the research of this paper. Objective to revise the scale and measure the items with a total of 4 items. All items are measured with a five-point Likert scale, ranging from “1 strongly disagree” to “5 strongly agree”.

### Materials and Methods

An overview of Key Opinion Leader (KOL) groups in Thailand’s social network landscape categorizes them into three distinct segments:

- **Celebrity:** Renowned individuals such as A-list singers and actors boasting substantial fan base and considerable societal influence. For example, Superstar Online by Yui Chinranan.
- **Influencers:** These figures wield influence across diverse domains on social media. Not limited to entrepreneurs, they span singers, bloggers, comedians, and any online user capable of exerting influence. For instance, Pimrypie Sell everything.
- **Micro-Influencers:** Exerting influence within niche customer groups, micro-influencers actively share content from celebrities and influencers to promote brands. For instance, Makeeshop, Fashion clothes by Polyyclothes.

## Research Results

After collecting questionnaires in this study, invalid questionnaires were removed after reviewing the responses. Data analysis was conducted using AMOS, and the research hypotheses were validated through empirical data analysis.

### Samples and Sampling

This study utilized data from questionnaire surveys conducted in Thailand. The research sample included respondents who had previously watched live webcasts. The questionnaires were distributed through an Internet-based Google Form using convenience sampling, with respondents who hadn't watched webcasts excluded. A total of 38 respondents were included, resulting in 251 valid questionnaires.

This study will examine and discuss the primary data of the returned samples. In order to understand the structure of the sample of respondents, frequency distribution and percentage frequency distribution are used to analyze gender, age, and income, as well as to watch a live video recently, play in the broadcast, or have a live broadcast. The results of the platform that you often follow are shown in Table 1.

In this survey, there were 42 males, comprising 16.7% of the respondents, and 209 females, accounting for 83.3%. The majority of respondents were female. Regarding age, the largest group, 222 respondents, fell within the 20-30-year-old category, representing 88.4%. The age group over 40 constituted the smallest segment, with 16 respondents, or 6.4%. In terms of monthly income, 195 respondents earned between 30,001-50,000 yuan, constituting 77.7% of the sample, while 42 respondents earned less than 15,000 yuan, representing 16.7%. The category with incomes ranging between 15,001 and 30,000 yuan had the lowest representation, at 5.6%. There was minimal variation in the regency of live video viewing, with the highest number of respondents, 85, having watched approximately three days ago, accounting for 33.9%. The second-largest group, 56 respondents, had watched about a year ago, representing 22.3%.

**Table 1** Demographic Characteristics of Respondents (N=251)

Demographic Profile	Number	Percentage (%)
Gender		
Male	209	83.3
Female	42	16.7
Age		
<20	16	6.4
20-30	222	88.4
31-40	8	3.2
41>	5	2
Incomes(B)		
<15,000	42	16.7
15,001-30,000	14	5.6
30,001-50,000	195	77.7

**Table 1** Demographic Characteristics of Respondents (N=251) (Con.)

Demographic Profile	Number	Percentage (%)
When did you watch the live video recently?		
About 1 week ago	24	9.6
About 1 year ago	56	22.3
About 3 days ago	85	33.9
About half a month ago	48	19.1
About half a year ago	38	15.1
What role do you play in the broadcast?		
Audience	162	64.5
Consumers	91	35.5
Do you have a live broadcast platform that you often follow?		
Yes	103	41
Non	148	59

### Measurement Model

Validity refers to the correctness and accuracy of the measurement results obtained from the questionnaire. A validity analysis helps us determine whether the scale can accurately measure the characteristic attributes of the object being measured. Higher validity indicates that the measurement results more accurately represent the fundamental nature of the object being studied.

For this study, the content of each aspect of the questionnaire was derived from relevant papers and literature, and a prediction-independent sample T identification was conducted. The questionnaire used in this study was translated from English to Thai. After language modification and discussions with five professors, the questionnaire's wording was refined to enhance clarity and specificity. It was then further modified based on suggestions from English experts and scholars to create the final formal questionnaire. As a result, the questionnaire is valid in terms of both content and form.

The reliability and validity of the 45 valid questionnaires collected during the pre-test were assessed using factor analysis. As shown in Table 2, each item has a factor loading above 0.5, and the explained variation is reasonably distributed. Additionally, the Cronbach's  $\alpha$  value for each aspect is above the 0.7 standard. This indicates that the questionnaire, consisting of 58 items covering the demand for tourist information, word-of-mouth communication, image information, and behavioral intent, meets the required reliability levels. Questions PT1 and PT3 were removed, ensuring consistency and stability in each aspect (refer to Table 2). This questionnaire can be employed as the official survey instrument in subsequent research.

**Table2** Item Analysis and Scale Reliability

Independent Variables	RS	ST	CW	PT
Number of Item(s)	4	4	4	3
Cronbach's Alpha if item deleted	.787	.892	.855	.878
Number of Item(s)	4	4	4	3
Cronbach's Alpha	.787	.892	.855	.878

Source: RS=Relationship; ST=Suitability; CW=Continuance of purchasing; PT=Purchase intention.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

The measurement model was estimated by calculating individual loadings, composite reliability scores, Cronbach's alpha, and average variance extracted (Luo et al., 2019) (as summarized in Table 1). Individual item loadings were assessed against the recommended threshold of 0.7 to evaluate the reliability of each item. Following this assessment, three items were excluded from the analysis. Table 3 displays the individual item loadings for the final set of measurement items, all of which exceed 0.7, indicating satisfactory internal reliability (Chin, 1998).

Cronbach's  $\alpha$  reliability coefficient was utilized in this study to test the questionnaire's reliability. Table 7 demonstrates that Cronbach's  $\alpha$  reliability coefficient for KOL and live product suitability, continuity of watching, and purchase intention dimensions surpass 0.7, indicating strong reliability for these three constructs. The face-to-face reliability is deemed acceptable, confirming that this study's questionnaire exhibits sufficient reliability and strong internal consistency (Bagozzi & Yi, 1988).

Factor analysis was performed on the suitability, continuity of watching, and purchase intention regarding KOL and live broadcast products. Before conducting further analysis, it is crucial to confirm a certain level of correlation between the variables. The results indicate a good cohesive effect among the factor facets, making them representative of the constructs.

All constructs underwent a reliability analysis using Cronbach's alpha to assess the consistency of items within each construct. According to Ledesma et al. (2002), higher values of Cronbach's alpha indicate greater internal consistency and reliability. As per Khalid et al. (2012) reliabilities in the range of 0.70 are acceptable, while values over 0.80 are considered good. The analysis involved 5 independent variables (ST, RS, PT) and 2 dependent variables (CW and PT).

Reliability tests using Cronbach's Alpha for all seven variables were conducted in SPSS. For the variable RS, the reliability coefficient was found to be 0.787, indicating reliability. ST showed a coefficient of 0.892, signifying very high reliability. The subsequent variable, CW, demonstrated a coefficient of 0.855, representing a high level of reliability, and PT exhibited a coefficient of 0.878, indicating good reliability as well. Overall, the reliability assessment for all seven variables was valid and holds promise for subsequent statistical tests.

The Average Variance Extracted (AVE) was computed to evaluate convergent validity. AVE values for all factors exceeded 0.6, indicating that more than 60% of the variance in the indicators could be attributed to the latent variables. This level of validity is considered acceptable, aligning with the recommended AVE threshold of greater than 0.5 (Fornell & Larcker, 1981).

AVE was also employed to assess discriminant validity, testing whether each construct is distinct from others. According to Fornell and Larcker (1981) criteria, for satisfactory discriminant validity, each construct should have higher correlations within its own construct than others. The results (as shown in Table 3) reveal that the diagonal elements (representing the square root of AVE extracted between constructs and their measures) are greater than the off-diagonal elements (correlations among constructs), indicating a reasonable level of discriminant validity.

### **Structural Model and Hypothesis Testing**

The purpose of confirmatory factor analysis (CFA) is to assess the correlations among research variables within the theoretical framework and the applicability and validity of the factor structure, and to examine the reliability and convergence of measurement items within each dimension: test validity and discriminant validity. For each hypothesis in this study, we employed CFA to examine the factor loadings of each variable and assess the hypothesized correlations among variables.

Structural equation modeling (SEM), also known as linear structural relationship modeling or covariate structural analysis, is a statistical technique designed to analyze patterns of causal relationships. SEM's primary goal is to test relationships between latent and observed variables and the causal links between multiple latent variables, taking error variables into account. SEM integrates latent and observed variables, measurement and structural models, factor analysis, and path analysis. The measurement model's primary aim is to establish the relationship between latent and observed variables.

We primarily assessed the measurement model's validity through CFA. The structural model, on the other hand, examines causal pathways among latent variables and conducts path analysis to evaluate the suitability of the structural model (as depicted in Figure 2). This study performed factor analysis as part of the verification process to test discriminant validity among factors, testing four-factor models (as displayed in Table 4). The results indicate that the first model among the assumed four-factor models provides the best fit to the data (i.e.,  $\chi^2 = 162.92$ ,  $\chi^2/df = 1.94$ , CFI = 0.96, AGFI = 0.88, RMSEA = 0.06, SRMR = 0.06).

Furthermore, SEM can simultaneously analyze a series of interconnected dependencies and is a statistical model that presents relationships between analytical variables in multiple linear models. In this study, SEM was used for data analysis to explore causal relationships between variables and to test the validity of our hypotheses. Using AMOS for analysis, the conceptual model was assessed via SEM, resulting in two models (as illustrated in Figure 3).

All two comparative indices (CFI and AGFI) in the SEM model exhibited values exceeding 0.90, indicating a good fit for the model (Fan & Sivo, 2007). RMSEA and SRMR displayed values greater than 0.08 and less than 0.08, respectively, reflecting a superior fit compared to the conceptual model. Consequently, considering each index's assessment, model 1 demonstrated a superior overall fit (i.e.,  $\chi^2 = 93.96$ ,  $\chi^2/df = 2.24$ , CFI = 0.97, AGFI = 0.90, RMSEA = 0.07, SRMR = 0.05). The model's overall fit, as indicated by these indexes, was considered satisfactory, providing a solid foundation for evaluating individual hypotheses (as shown in Table 5).

### **Moderating Effect**

Jones and Reynolds (2006) employed hierarchical moderating regression analysis to assess the moderating impact of relationship strength on the link between the continuation of watching and purchase intention.

As presented in Table 6, this study initially estimated a regression equation, Model 1, incorporating gender and age as control variables. In Model 3, purchase intent served as the dependent variable, and continuance of watching was the independent variable. Additionally, the control variable encompassed relationship strength. In Model 3, an assumed interaction was introduced: the continuance of watching × relationship strength interaction yielded a positive and statistically significant result ( $\beta = -0.928, t = -2.287, p = 0.023$ ). These findings suggest that the influence of relationship strength on the continuance of watching intensifies with an increase in relationship strength. These results provide partial support for H3.

As is evident from Table 7, in H1, the suitability of KOL live broadcast products is indicated by a  $\beta$  value of 0.676 in relation to continuance watching, indicating a significant positive impact. This suggests that the suitability of KOLs and products in live broadcasts positively affects continuance watching.

Regarding H2, the  $\beta$  value for audience continuance watching of live broadcasts in relation to continuance watching is 0.628, displaying a significant positive effect (as seen in Figure 4).

**Table 3** Discriminant Validity and the Factor Loading Cronbach’s  $\alpha$ , CR, and AVE for Convergent Validity (CFA Model)

Constructs / Indicators	Mean	Std.	1	2	3	4	$\alpha$	CR	AVE
Relationship (RS)	3.79	.66	.86				.74	.90	.74
Suitability (ST)	2.79	1.00	.32**	.77			.85	.86	.60
Continuance of purchasing (CW)	3.22	.90	.40**	.59**	.75		.84	.84	.57
Purchase intent	3.39	1.03	.35**	.37**	.57**	.88	.91	.91	.77

Source: \* is significant at the 0.05 level (2-tailed).  
 \*\* is significant at the 0.01 level (2-tailed).  
 \*\*\* is significant at the 0.001 level (2-tailed).

**Table 4** Confirmatory Factor Analysis Results of Discriminant Validity of Each Variable (Hu & Bentler, 1999)

Goodness of Fit Index	$\chi^2$	df	$\Delta\chi^2$	$\Delta df$	$\chi^2/df$	CFI	AGFI	RMSEA	SRMR
Level of acceptable fit	< 3					> .90	> .90	< .08	< .08
Model 1 Four factors	162.92	84			1.94	.96	.88	.06	.06
Model 2 Three factors	314.88	87	151.96***	3	3.62	.88	.77	.10	.07
Model 3 Two factors	628.53	89	465.61***	5	7.06	.71	.60	.16	.10
Model 4 One factors	766.89	90	603.97***	6	8.52	.63	.54	.17	.12

Source: \* is significant at the 0.05 level (2-tailed).  
 \*\* is significant at the 0.01 level (2-tailed).  
 \*\*\* is significant at the 0.001 level (2-tailed).

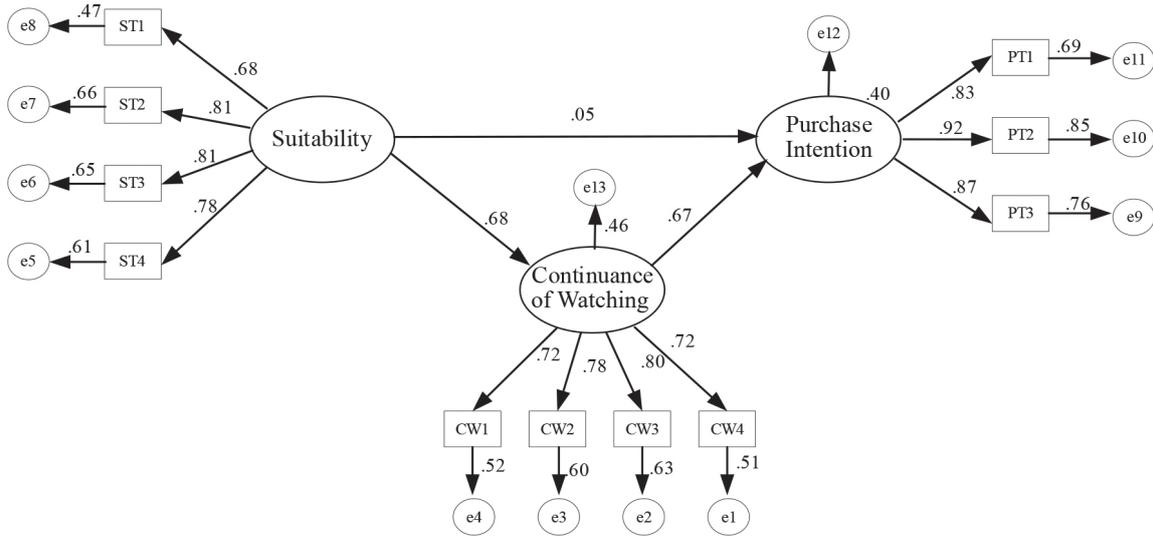


Figure 2 Structural Equation Model Analysis

Table 5 Structural Equation Model Analysis Results of Each Variable Distinguishing Fit (Hu & Bentler, 1999)

Goodness of Fit Index	$\chi^2$	<i>df</i>	$\Delta\chi^2$	$\Delta df$	$\chi^2/df$	CFI	AGFI	RMSEA	SRMR
Level of acceptable fit	< 3					> .90	> .90	< .08	< .08
Model1	93.96	42			2.24	.97	.90	.07	.05
Model2	93.72	41	.24	1	2.29	.97	.89	.07	.05

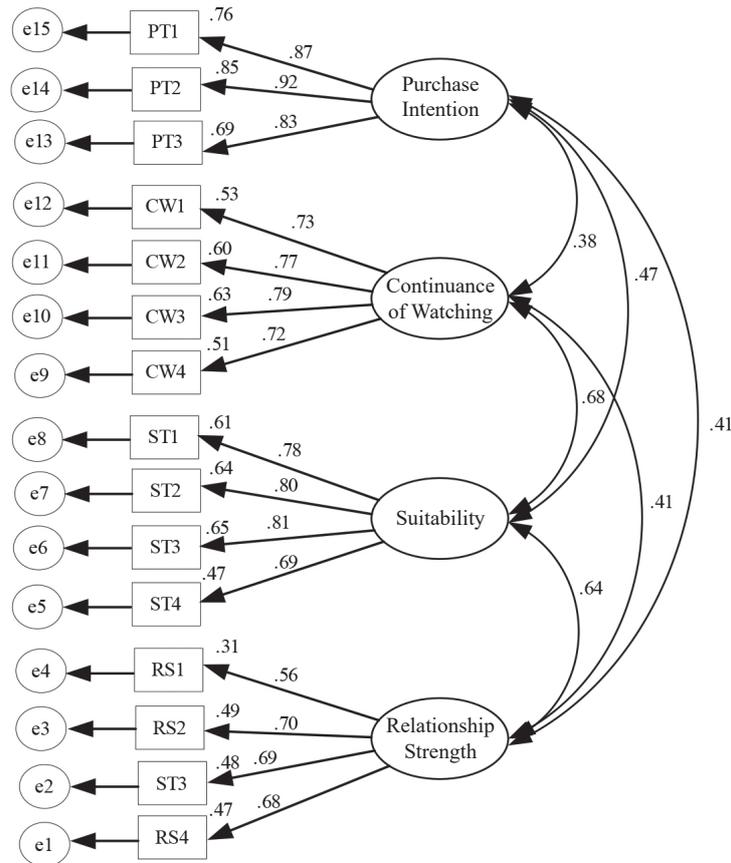


Figure 3 Confirmatory Factor Analysis (CFA) Framework

In the context of H3, which examines how relationship strength affects purchase intent when audiences continue watching KCOL live broadcasts, the regression analysis yields a  $\beta$  value of -0.928 for audience purchase intent and continuance watching  $\times$  relationship strength. This outcome signifies a significant positive impact, indicating that relationship strength moderates the influence of continuance watching on purchase intention (as depicted in Figure 5).

### Conclusions

This study formulated hypotheses to investigate the influence of KOL live broadcasts on viewer suitability, continuance watching, and purchase intent. The findings are as follows:

Hypothesis 1 (H1): KOL live broadcast suitability has a positive and significant impact on continuance watching. This confirms the existence of an influential relationship.

Hypothesis 2 (H2): Continuance watching positively influences purchase intent, with a significant impact, indicating an influential relationship.

Hypothesis 3 (H3): Relationship strength exerts a strengthening effect on the connection between continuance watching and purchase intent, with a significant impact. Thus, a significant impact relationship exists for Hypothesis 3.

Online live broadcasting is experiencing tremendous growth, with the rising prominence of KOLs, who have made their mark through live broadcasts. Even manufacturers are seeking partnerships with well-known KOLs to leverage live broadcasting as a means to reach a wider

audience for their products. This trend is gaining traction in emerging economies. Consequently, this study aims to explore the suitability of KOL live broadcasts on live streaming platforms and its impact on continuance watching and purchase intent. Additionally, it delves into whether the strength of the relationship between KOLs and their audience affects continuance watching and purchase intent during live broadcasts. The results of this study reveal the following:

**Positive Impact of KOL Live Broadcast Suitability on Continuance Watching:** When KOLs are deemed suitable for the products they promote, consumers develop confidence in the information, products, and purchasing decisions. As the suitability factor strengthens, viewers are more inclined to continue watching. When consumers perceive a high degree of suitability in KOL live broadcasts, they often discover products they like, leading to continued viewing. Higher suitability between KOLs and products correlates with increased continuance watching. For instance, consider the case of an anchor known for makeup expertise and a sophisticated appearance who primarily sells second-hand luxury accessories. The audience tends to trust her vision and product recommendations. Similarly, a fashion clothing review anchor, known for her beauty, engaging communication style, and humorous and friendly demeanor, predominantly sells daily wear clothing.

**Positive Impact of Continuance Watching on Purchase Intent:** The research results demonstrate a positive correlation between continuance watching and purchase intent. In other words, higher continuance watching scores are associated with greater purchase intent. As viewers continue watching live broadcasts, this further drives payments, sponsorships, and subscriptions as viewers seek to support their favorite KOLs.

These findings highlight that KOLs are an effective means to retain viewers and increase purchase intent, especially when the suitability of KOLs and products aligns with viewers' preferences. The more suitable and engaging the live broadcast, the more likely viewers are to stay engaged and invest in their favorite KOLs on the current live streaming platform.

#### **Affected by Relationship Strength Adjustment**

The results indicate that varying levels of relationship strength influence the source credibility of the moderator on purchase intention, demonstrating significant distinctions. These findings align with previous research (Yang, 2021; Yao et al., 2021), which found that source credibility, whether in a strong or weak relationship, significantly affects purchase intention. Notably, the impact of a strong relationship is more pronounced than that of a weak one, corroborating earlier studies (Korzynski et al., 2019).

Regarding information usefulness, it's observed that different relationship strengths do not yield significant moderator differences. Nevertheless, information usefulness in strong relationships exerts a significant impact. This result diverges from previous literature (Fu et al., 2022).

**Table 6** Results for Mediated Regression Analysis

<b>The Moderating Effect of Relationship Strength Between Continuance of Purchasing and Purchase Intent</b>			
<b>Item</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
Age	-1.232	-.061	-.078
Gender	-.768	-.058	-.062
Continuance of purchasing		.506***	1.196***
Relationship strength		.151**	.545**
Continuance of purchasing x Relationship strength			-.928*
$R^2$	-1.089	.589	.601
$\Delta R^2$	-1.008***	.347	.361
$F$ -value	1.001	32.676***	27.637***

Source: \* is significant at the 0.05 level (2-tailed)

\*\* is significant at the 0.01 level (2-tailed)

\*\*\* is significant at the 0.001 level (2-tailed)

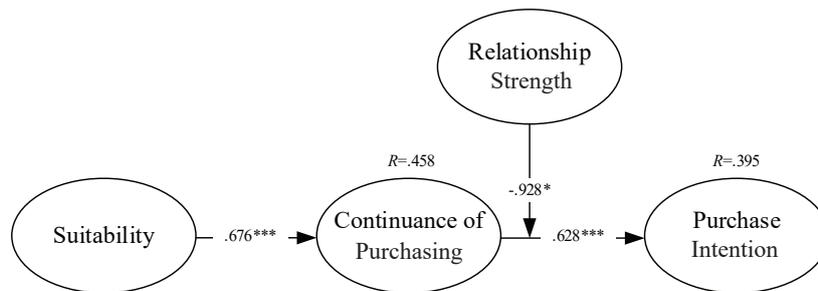
**Table 7** Hypothesis Testing

<b>Hypothesis</b>	<b>Relationship</b>	<b>Estimate</b>	<b>t</b>	<b>P-Value</b>	<b>Results</b>
H1	Continuance of watching ← Suability	.676	8.391	***	Supported
H2	Purchase intention ← Continuance of watching	.628	8.030	***	Supported

Source: \* is significant at the 0.05 level (2-tailed).

\*\* is significant at the 0.01 level (2-tailed).

\*\*\* is significant at the 0.001 level (2-tailed).

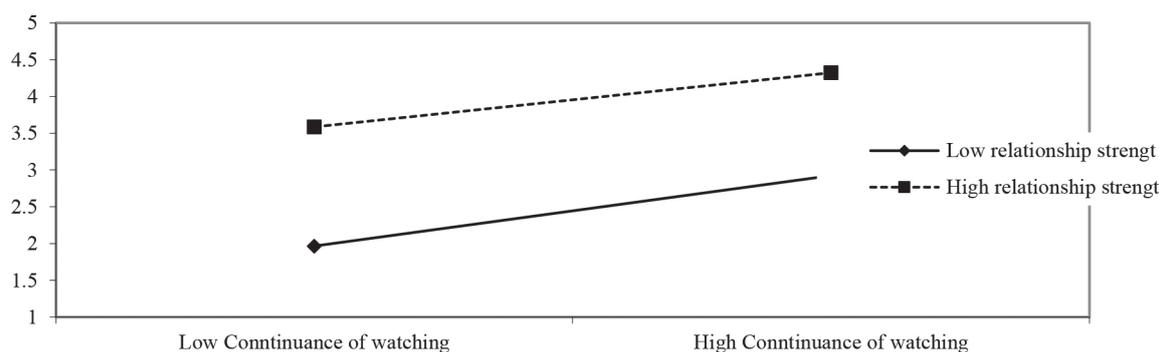


**Figure 4** Analysis Results

Source: \* is significant at the 0.05 level (2-tailed)

\*\* is significant at the 0.01 level (2-tailed)

\*\*\* is significant at the 0.001 level (2-tailed)



**Figure 5** Interactive Effects of Continuance Watching and Relationship Strength on Employee Purchase Intent

It is posited that information recipients often find value in the information offered by strangers but may not be swayed towards consumption or abstention.

The results concerning attitudes toward comments also reveal significant moderator differences related to different relationship strengths. Notably, weak social relations significantly influence outcomes, whereas strong social relations lack a significant effect. This study suggests that source credibility is the primary factor influencing purchase intent, rendering it less impactful concerning attitudes toward reviews.

The research findings herein validate the theory of weak ties, which posits that compared to strong ties, weak ties exhibit extremely rapid, potentially cost-effective, and highly efficient propagation efficiency (Granovetter, 1973).

As per the research results, the strength of the relationship between the anchor and the audience exerts a strengthening effect on purchase intention. This implies that regardless of whether the anchor and the audience share a strong or weak relationship, their support, such as watching, active buying, and reposting during live broadcasts, may not waver. Familiarity with the host of the live broadcast strengthens this bond.

### Theoretical Implications

This study integrates factors influencing purchase intention with the continuity of watching within the comprehensive framework of KOL live broadcasting influence. While past research has emphasized the significant impact of continuity of watching on purchase intention, our findings introduce a moderating factor in the form of relationship strength. This relationship strength moderator, however, may have adverse effects. Beyond the factors discussed, other influences may affect audience decision-making, thereby highlighting the need for further exploration.

In line with previous studies, we conclude that the relationship strength moderator indeed influences the continuity of watching. Importantly, we find that under the weak social relationship moderator, unfamiliar KOLs may exert a more significant impact on live broadcast recommendation purchases than familiar KOLs, including friends and family.

### Practical Implications

Based on the study's comprehensive results, it is evident that audiences with "weak" relationship strength exert a more substantial influence on continuity of watching compared to audiences with "strong" relationship strength. In the realm of live marketing, solid social relations among audiences enhance the effectiveness of live broadcasts. This suggests that leveraging

social media for live marketing, capitalizing on interpersonal connections, not only augments influence but also reduces costs. This strategy can attract users who share common interests and seek familiarity but are yet to discover the information, drawing them to watch live broadcasts.

### **Managerial Implications**

Merchants are advised to bolster consumer relationship marketing efforts, leveraging strong relationship recommendations to alleviate consumer risk perception and increase willingness to purchase. Third-party online shopping platforms should provide specific foundational platforms and guarantees, such as creating relationship-based shopping channels, to enhance their marketing strategies. Merchants could offer exclusive discounts when viewers with strong relationships shop through KOL live broadcast recommendation channels. This approach reduces the time costs associated with online searches, mitigates choice anxiety, and ultimately results in increased orders and additional profits. Merchants should enhance their website construction and product information descriptions for more efficient consumer engagement. Furthermore, tailored marketing activities for different products to boost purchase intentions are recommended. For the suitability of KOL live broadcasting:

- The host should possess unique characteristics. In a fiercely competitive live broadcast market, standing out necessitates enthusiasm during broadcasts and active audience interaction. By creating an immersive experience for viewers, the host can differentiate themselves, make a lasting impression, and pique audience interest to prolong viewership.

- Creating a sense of presence for viewers is crucial. Live broadcasts thrive on their proximity to the audience, which involves expressing concern and empathy. Establishing trust and satisfaction through audience engagement enhances the live broadcast experience. As viewers participate and support their favorite live broadcasters, they are more likely to engage in various forms of support, such as payments, sponsorships, and subscriptions.

### **Limitations and Further Study**

Due to practical limitations, this study may only partially align with the assumptions of statistical analysis. Limitations include:

1. Age Limitation of Research Subjects: The research was designed for consumers who have watched live broadcasts, with the majority of subjects falling within the 21 to 30 age range. Consequently, the study only covers specific age groups.

2. Research Tool Limitations: This study employed online questionnaires for data collection, offering advantages such as flexibility in timing and location. However, it also has limitations, as the online platform user pool is confined to a specific demographic, rendering random sampling inadequate for reflecting all consumers' opinions.

3. Questionnaire Vulnerability: The respondents' questionnaire responses may be influenced by various external factors, including environmental conditions and personal emotions, leading to discrepancies between test results and real-world situations, thus introducing errors.

4. Singular Data Collection Method: The reliance on a single data collection method and the sample size constraints suggest that future research should employ multiple data collection approaches.

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## Introductions for Manuscript Preparation

### Manuscript Printing

The submitted manuscript must have the following specifications:

- 1) It must be 10 – 15 pages in length, printed on one side of A4 paper, with the margins (top, bottom, left, and right) of 1 inch (2.54 cm.). Set to single columns.
- 2) Manuscript should be as concise and precise as possible.
- 3) Abstract printed in 1 column.
- 4) All contents and references are printed in 1 column with 1 cm of indentation.
- 5) The simplified font is Times New Roman, with details as specified below:

<b>Format Requirements for Each Component of the Manuscript</b>	<b>Font Size</b>	<b>Labeling</b>
Title	18 (CT)	bold
Author's Name (Name/Surname)	12 (CT)	bold
Author's Affiliation / E-mail	9 (LJ)	First-page footer
Abstract Title	14 (LJ)	bold
Abstract Content (Single column)	12 (LJ)	regular
Keywords Title	14 (LJ)	bold
Keywords	12 (LJ)	regular
Topics	14 (LJ)	bold
Content	12 (LJ)	regular
References Head	14 (LJ)	bold
References (Alphabetically (A – Z))	12 (LJ)	regular
Table Title (On top of the table)	12 (LJ)	bold
Table Content (On top of the table)	12 (LJ)	regular
Figure Title; Chart Title (Under the figure or chart)	12 (CT)	bold
Figure Content; Chart Content (Under the figure or chart,)	12 (CT)	regular
Source Head (Under the table/ the figure/ chart )	9 (LJ)	bold
Source Content (Under the table/ the figure/ chart)	9 (LJ)	regular

## Components of the Article

1. Manuscript title
2. Name of every Author, with identification of affiliation office or university and country
3. Corresponding Author E-mail, identify only the e-mail of main author or the manuscript coordinator
4. Abstract must have the length of not more than 300 words, and must have Keywords of 3-5 words or phrases.
5. Content of manuscript
  - 5.1 Research article comprises: Introduction, Research Objective (s), Literature Review, Methodology, Results, Discussion, Conclusions, and Recommendations (If any)
  - 5.2 Academic article comprises: Introduction, Content, Conclusions, and Recommendations (If any)
6. References, using the format of APA (7th edition)
7. Figures, Charts, Tables, or other illustrations must be numbered, with correct reference of their sources. They must be clear, and distinctive, and not violate the copyright of the others.

## The Examples of Presentation of Tables, Figures, and Charts

**Table 1** Title of Table ...

“Table 1” printed in Times New 12 point font face, bold letters, left alignment

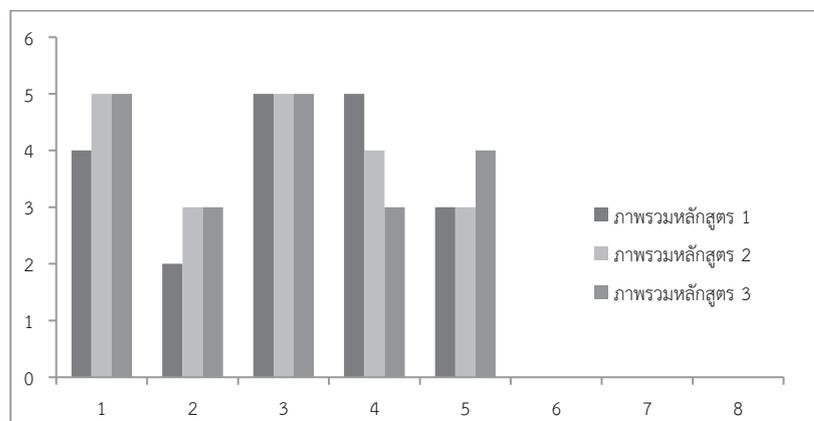
“Title of Table...” printed in Times New 12 point font face, normal letters

<b>List</b>	<b>Number</b>	<b>Percentage</b>
(Each topic printed in Times New 12 point font face, bold letters, in the center of the table and in the center of each line)		
Content (Times New 12 point font face, normal letters, in the center of the table and in the center of each line)	1	70
Content (Times New 12 point font face, normal letters, in the center of the table and in the center of each line)	2	30
<b>Total</b>	<b>4</b>	<b>100</b>

Sources or Remarks: Details.....

“Sources or Remarks:” printed in Times New 9 point font face, bold letters, left alignment

“Details...” printed in Times New 9 point, normal letters



**Figure 1** Name of Figure, Chart...

Sources or Remarks: Details.....

“Figure 1” printed in Times New 12 point font face, bold letters, center of the page  
 “Name of Figure, Chart...” printed in Times New 12 point font face, normal letters  
 “Sources or Remarks:” printed in Times New 9 point font face, bold letters, left alignment  
 “Details...” printed in Times New 9 point, normal letters

As such, Tables, Figures, Charts, and Equations can be printed in one column, depending on the size, clarity, and appropriateness.

## Quotations

Printed in Times New 12 point font face.

### 1. Quotations in the Contents

Format	Quotation (In front of the sentence)	Quotation (At the end of the sentence)
One author	Coghlan (1993)	(Coghlan, 1993)
Two authors	Mohsen and Mohammad (2011)	(Mohsen & Mohammad, 2011)
Three or more authors	Burkart et al. (1997)	(Burkart et al., 1997)
Organization	Ministry of Education (2020)	(Ministry of Education, 2020)
Organization using abbreviation	First quotation: National Institute of Development Administration (NIDA, 2018) Next quotation: NIDA (2018)	First quotation: (National Institute of Development Administration [NIDA], 2018) Next quotation: (NIDA, 2018)
Quotation from the document (Specify page number)	Shaw (2017, p. 172) or Shaw (2017, pp. 172-180)	(Shaw, 2017, p. 172) or (Shaw, 2017, pp. 172-180)
Quotation from interviews	J. M. Sun (Personal communication, August 18, 2021)	(Sun, J. M., Personal communication, August 18, 2021)

### 2. References at the End of the Article

All documents that have been quoted must be listed in the References at the end of the article. The list must be alphabetically ordered based on the reference sources and surname of the author. The reference format should follow that of APA (7th edition).

#### 2.1 Format of Reference Based on Number of Authors

Authors	Reference at the End of Article
One author	Surname,/ First alphabet of name being a capital letter.
Two authors	Surname,/First alphabet of name being a capital letter./&/Surname of second author,/First alphabet of name being a capital letter.
3-20 Authors	Surname,/First alphabet of name being a capital letter./Surname,/First alphabet of name being a capital letter./Surname,/First alphabet of name being a capital letter./ (Number 1-19 authors),/&/Surname,/First alphabet of name being a capital letter. (Number 20 author)
21 Authors or more	Surname,/First alphabet of name being a capital letter./ (Number 1-19 authors),/././Surname,/First alphabet of name being a capital letter. (The last author)

## 2.2 Format of Reference Based on Documents

### 2.2.1 Journals

#### 1) Journal (Printed)

Surname,/First alphabet of name being a capital letter./(A.D. year)./Article title./*Journal title*,/  
/////Volume(No.),/first page-last page of article in the journal.

Kraikunasai, J., Chongcharoen, K., Ngudgratoke, S., & Pukchanka, P. (2017). A causal model of administrative factors affecting educational quality in vocational school. *Panyapiwat Journal*, 9(2), 171-184.

#### 2) Journal (Electronic)

Surname,/First alphabet of name being a capital letter./(A.D. year)./Article title./*Journal title*,/  
/////Volume(No.),/first page-last page of article in the journal./http://doi.org/xxxx or URL

Waehayee, N. (2014). Relationship between strategic performance based budgeting system and law on the budgetary procedures. *Jurisprudence Journal Naresuan University*, 7(2), 152-178. <http://doi.org/10.14456/nulj.2014.9>

Sittichai, O., & Silcharu, T. (2021). Guidelines for creating competitive advantage for processed food industry cluster. *Panyapiwat Journal*, 13(2), 12-26. <https://so05.tcithaijo.org/index.php/pimjournal/article/view/240994>

### 2.2.2 Books

#### 1) Book (Printed)

Surname,/First alphabet of name being a capital letter./(A.D. year)./Book title/(Edition)./Publisher.

\* In case of no publication date, put n.d.

\* In case of first edition, do not specify the edition.

\* In case of no specification of publisher, put n.p.

Ritcharoon, P. (2016). *Principles of measurement and evaluation*. House of Kermyst.

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.

#### 2) Book (Electronic without DOI)

Surname,/First alphabet of name being a capital letter./(A.D. year)./Book title/(Edition)./URL

\* In case of no publication date, put n.d.

\* In case of first edition, do not specify the edition.

\* In case of no specification of publisher, put n.p.

Department of Primary Industries and Mines. (2017). *Benchmarking industrial logistics performance index supply chain performance index logistics scorecard*. <https://dol.dip.go.th/files/article/attachments/dol/3e30ca4fc9f964feeb57fce3fc602c04.pdf>

#### 3) Chapter in a Book

Surname,/First alphabet of name being a capital letter./(A.D. year)./Title of chapter or article./  
/////In/First alphabet of editor's name being a capital letter/Surname/(Ed. or Eds.),/Book  
/////title/(pp./page numbers)./Publisher.

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. In G. A. Marcoulides (Ed.), *Modern methods for business research* (pp. 295-336). Lawrence Erlbaum Associates.

### 2.2.3 Thesis

#### 1) Thesis (Printed)

Surname./First alphabet of name being a capital letter./(A.D. year)./Title of thesis/[Master's thesis  
/////or Doctoral dissertation]./Name of educational institution.

Seangsri, W. (2009). *An analysis and development of school network administration model in northeastern rural area* [Doctoral dissertation]. Chulalongkorn University.

#### 2) Thesis (Electronic)

##### First Format

Surname./First alphabet of name being a capital letter./(A.D. year)./Title of thesis/[Master's thesis  
/////or Doctoral dissertation]./Name of website./URL

Lin, Q. (2020). *the influence of music teachers' competence on job performance-moderator role of interactive behavior* [Doctoral dissertation]. Panyapiwat Institute of Management Library. <http://elibrary.pim.ac.th/Record/833578>

##### Second Format

Surname./First alphabet of name being a capital letter./(A.D. year)./Title of thesis/(UMI number or  
/////other numbers)/[Doctoral dissertation or Master's thesis, /Name of university]./Name of  
/////database.

Lope, M. D. (2014). *Perceptions of global mindedness in the international baccalaureate middle years programme: The relationship to student academic performance and teacher characteristics* (Order No. 3682837) [Doctoral dissertation, University of Maryland]. ProQuest Dissertations and Theses Global.

### 2.2.4 Research Report

Surname./First alphabet of name being a capital letter./(A.D. year)./Title/(Report No. if given)./  
/////Publisher./http://doi.org/xxxx or URL

National Cancer Institute. (2019). *Taking time: Support for people with cancer* (NIH Publication No. 18-2059). U.S. Department of Health and Human Services, National Institutes of Health. <https://www.cancer.gov/publications/patient-education/takingtime.pdf>

### 2.2.5 Electronic Media

Surname./First alphabet of name being a capital letter./(A.D. year./month/date)./Article title./  
/////Name of website./URL

\* In case of no publication date, put n.d.

\* In case of only A.D. year appears, put only A.D. year

\* In case of the author's name and the website name being the same, cut the website name

Minister of Tourism and Sport. (2020, January 9). *Bangkok flea markets: Adventurous shopping experience*. Tourism Thailand. <https://www.tourismthailand.org/Articles/bangkok-flea-markets-adventurous-shopping-experience>

Millburn, J. F. (2021). *How to start a successful blog in 2021*. The minimalists. <https://www.the.minimalists.com/blog/>

### 2.2.6 Articles/documents presented in academic conference (Proceedings)

Surname,/First alphabet of name being a capital letter./(A.D. year)./Title of article./In/First  
/////alphabet of the editor's name being a capital letter./Surname/(Ed. or Eds.),/Name of  
/////conference topic./Name of conference/(pp./page numbers)./Name of database./  
/////https://doi.org/xxxx or URL

Phinitchai, S., Nawaratana, N., & Tanthanuch, J. (2021). Distributional-based analysis for health care insurance claim data. In *Globalization revisited: Building organization resilience with digital transformation. The 4<sup>th</sup> PIM International Conference* (pp. 715-725). Panyapiwat Institute of Management. <https://conference.pim.ac.th/zh/wp-content/uploads/2021/03/I-Social-Sciences-and-Humanities-Part-1.pdf>

### 2.2.7 Documents for the Conference

Surname,/First alphabet of name being a capital letter./(A.D. year,/month/date)./Topic of  
/////conference./In/First alphabet of the Chair Person's name being a capital letter./Surname/  
/////Chair)/Name of conference/[Symposium]./Name of conference organizer,/Place of  
/////conference.

Wasi, N., Poonpolkul, P., & Thephasdin na Ayudhya, C. (2021, September 30). Policy design for coping with aging society. In N. Wasi (Chair), *Future world money: Developing Thai digital currency* [Symposium]. BOT Symposium 2021: Building a Resilient Thailand. Bank of Thailand. <https://www.pier.or.th/conferences/2021/symposium/>

### 2.2.8 Interview Documents

Surname,/First alphabet of name being a capital letter./(A.D. year,/month/date of the interview).  
/////Interviewed by/First alphabet of the interviewer's name being a capital letter./Surname  
///// [Tape recording]./Position of interviewee (If any)./Place of interview.

Chearavanont, S. (2021, September 30). Interviewed by N. Wanakijpaiboon [Tape recording]. Executive Chairman of Charoen Pokphand Group, Bangkok.

### 2.2.9 Newspapers

#### 1) Newspaper (Printed)

Surname,/First alphabet of the author's name being a capital letter./(A.D. year,/month/date)./  
/////Topic or article title./Name of newspaper,/first page-last page.

Sriwattanachai, R. (2014, October 24). The prefabricated generation of seasoning sauce market. *POST TODAY*, B3-B4.

**2) Newspaper (Electronic)**

Surname,/First alphabet of the author's name being a capital letter./(A.D. year,/month/date)./  
/////Topic or article title./Name of newspaper./URL

Bangkok post and reuters. (2021, October 8). UK eases travel rules for countries including Thailand. *Bangkok Post*. <https://www.bangkokpost.com/thailand/general/2194651/uk-eases-travel-rules-for-countries-including-thailand>



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