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The Impact of COVID-19 on Thailand International Arrivals and Tourism Sector

Introduction

Thailand is one of the world's leading tourist destinations for both business and leisure travellers. Historically, Thailand's increase in tourism was because of the stable political environment and the development of the intersections of the international air movements. International travelling has become more widespread as living standards have risen around the world and technology of air transport has advanced. Additionally, the country is famous for its variety of cultural uniqueness: from food to scenery, and cultural heritage. It also provides tourism with affordable prices of goods and services, particularly food, hotels, and transportations.

Thailand can be divided into four primary regions: Northern, Central, Southern, and Northeastern. In accordance with Figure 1 in Appendix A, Bangkok is excluded from Central Thailand and is considered as another region of Thailand for a precise analysis since it is a capital city with a huge tourist inflow. The bar graph illustrates that the numbers of Thai tourists among regions, except Central Thailand, do not differ by a large degree, between 14 per cent to 18 per cent. Since the population is concentrated and the ease of transportation is greater around Central Thailand, this caused the region to attract the largest percentage of Thai tourists, nearly 35 per cent. Moving onto foreign tourists, apparently, Bangkok has the highest percentage of tourists accounting for about 32 per cent. Meanwhile, the Northeastern region has the lowest share of foreign tourists of about 1 per cent.

As reported by the Ministry of Public Health, the first COVID-19 patient outside Wuhan, China, was detected on January 12 2019 in Thailand, who was an international passenger from Wuhan. The number of COVID-19 cases increased gradually until March when there were a few clusters in Thailand and the number of patients tested positive for COVID-19 skyrocketed. Data from the Bank of Thailand (BOT) shows that the number of international tourist visitors to Thailand in March 2019 went down by more than half in February of the same year. In the following months, April to September 2019, the regulations completely halted international arrivals to Thailand. Nevertheless, the number of COVID-19

infected cases in Thailand fluctuated until a rapid increase in May 2021. The rise continued at a faster rate until the middle of August in the same year.

According to Figure 2 in Appendix A, it is evident that Thailand experienced a sharp decline in the number of international tourist arrivals in 2020 by 83.2 per cent, leaving Thailand with 6.7 million visitors compared to 39.8 million visitors in 2019. This contrasts with the gradual increase in the number of tourist arrivals since 2015 ("Number of international tourist arrivals in Thailand from 2015 to 2020", 2020). Moreover, in 2021, it is predicted that the number of travellers will continue to decrease complying with the nation's policies and restrictions on border transportation during the COVID-19 outbreak (Bank of Thailand, 2020). In addition, Table 1 in Appendix A indicates that Thailand is ranked eighth in the World Tourism Rankings in 2018 and 2019. However, this statistical data represents situations before the COVID-19 pandemic reached Thailand.

The tourism industry is one of the major sectors that contribute to the nation's growth. As reported by the BOT, the share of tourism contribution to Gross Domestic Product (GDP) value drastically dropped from 21.9 per cent to 6.78 per cent in 2019 and 2020 respectively, despite a slight fall in GDP from approximately 544.3 billion dollars in 2019 to 501.8 billion dollars in 2020.

Literature review

Since this paper emphasises the impact of COVID-19 on tourism in Thailand, there are three categories of literature review as followers:

1. Literature related to research methods

    1.1. The differences between the number of trips using different types of transportation, such as by private car, by ships, or by aeroplanes, in January to July 2019 and 2020 was analysed and compared by employing a paired t-test (Ruksakulpiwat et al., 2021).

    1.2. In the case of collecting large data, filtering them was used to organise the data. After that, separating filtered data into new tables and categories for data summarization as updated data were being added to the dataset on a daily basis for up-to-date results (Nimpattanavong et al., 2020).

1.3. The Radius of gyration was applied to examine the movement in time intervals and movement during the lockdown period in Thailand. To analyse shifts in travel patterns among major regional locations of activities and cross-border movement, a human mobility network was employed (Haddawy et al., 2021).

1.4. The estimation of the forecasted number of international arrivals to Australia under no COVID-19 preventive regulations was calculated based on the data from January 2015 to December 2019, the period in which the spread of COVID-19 was not yet become a global concern. The next stage was applying Box Cox transformation to each individual time series for normal shape data. (Liebig et al., 2021)

1.5. While the topological connectivity between the Association of Southeast Asian Nations (ASEAN) is available, the magnitude of flights between the countries has substantially decreased because of the COVID-19 outbreak. How international trade in regional economic integration was affected by changes in air connectivity among the ASEAN countries was discovered by applying econometric regressions (Zhang et al., 2021).

2. Literature related to datasets

2.1. Mobility flows of smartphone users who permit their current and past locations tracking was gathered from the Google COVID-19 Aggregated Mobility Research Dataset. This is used by Google Maps to show congestion levels in some places. Additionally, the seasonal autoregressive integrated moving average (SARIMA) model was employed since it is appropriate for predicting time-series with seasonal variations (Lai et al., 2021).

2.2. FlightRadar 24 was used to derive data of all flights at some specific airports around the world. In addition, AeroDataBox also provided the list of flights for each airport during the selected period. After the collection, flight data was merged with FlightRadar24 in order to estimate certain missing parameters allowing for the use of a complete dataset. Furthermore, Python scripted was performed to process on an hourly basis and request FlightRadar24 for obtaining data on daily flight traffic. The data was later stored in the database for ease of use (Nimpattanavong et al., 2020).

2.3. The data of the airline transportation including daily origin-destination traffic flows were collected from the International Air Transport Association (IATA) and Official Aviation Guide (OAG). For ground mobility flows, the data is available from statistics offices from the chosen countries. In the case of mainland China, the mobility variations were acquired from Baidu location-based services (LSB) (Chinazzi et al., 2021).

2.4. The research focusing on travelling and the COVID-19 outbreak contained the data gathered from two main sources. The first dataset was obtained from the Ministry of Public Health, Thailand, which was the monthly COVID-19 in Thailand from January to July 2020. Besides, Open Government Data of Thailand provides data on travelling in Thailand during the course of the pandemic and for the same period in 2019 (Ruksakulpiwat et al., 2021).

2.5. Data regarding mobility can be derived from a smartphone application with an Android system. It was developed to document and accumulate locations every hour. Moreover, Global Positioning System (GPS), present cellular data, and the WiFi connection were employed for the geographic precision in the study (Haddawy et al., 2021).

3. Literature related to the COVID-19 situation in Thailand affecting the tourism sector

3.1. As Thailand is considered a popular travel destination among visitors around the world, its economy relied heavily on the tourism sector, especially prior to the outbreak of COVID-19. The economy, therefore, is vulnerable to changes in travel patterns and tourism regulations. The pandemic imposed a slowdown in the country's economic growth. Specifically, it became more severe after March 2019 when the number of COVID-19 infected cases in Thailand started to rise more significantly. This resulted in more strict regulations being enforced to prevent and mitigate the spread of COVID-19 (Tantrakarnapa & Bhopdhornangkul, 2020).

3.2. The Thai government announced policies to restrict both non-essential domestic and international travel. This included international flights arriving at the airports and borders connecting Thailand to the neighbouring countries (Song et al., 2021).

3.3. Most of the countries around the globe had imposed lockdowns as well as other policies to minimise air and intercity, resulting in approximately 70 to 90 per cent decline from 2019. Thus, Thailand was exposed to the vulnerability in demand shortage in the tourism industry (Dunford & Qi, 2020).

3.4. The impact of COVID-19 covers almost all of the businesses in the tourism sector. Adaptations are necessary to determine whether those businesses can survive or fail. For instance, both domestic and international airlines, such as Thai Airways, Bangkok Airways, or Thai Airasia, were one of the first industries to face financial difficulties as a consequence of the pandemic. Not only those enterprises in the tourism sector who were largely affected, but other enterprises outside of the tourism sector who were involved in doing business with those within the sector have also experienced various challenges. For example, restaurants in the food industry which plays an important role in supporting tourists had to adjust themselves, including business models and strategies, during the period with a very small number of tourists (Maneenop & Kotcharin, 2020).

3.5. Thailand made efforts to recover the tourism sector in early 2021 since the new infected COVID-19 cases were consistently low. The government lessen restrictions on travelling both domestically and internationally to promote the tourism sector. It also reduced and deregulated some of the previously imposed regulations. Unfortunately, the new wave of COVID-19 eventually hit Thailand around the mid-year period (Chancharat & Meeprom, 2021).

3.6. Many of the countries responded to the COVID-19 outbreak by scaling down the number of passengers per flight and reducing the number of flights too late. As the pandemic continues spreading across the globe, most countries have limited the number of flight connections substantially, particularly international routes (Zhang et al., 2021).

Research gap

This research aims to discover the impact of the COVID-19 outbreak on the tourism sector in Thailand. However, there is no available data on the purpose of travel from international visitors to Thailand. This also applies to domestic travellers between provinces.

Therefore, there is no confirmation on the portion of the travellers whether they are on holidays, business trips, or other purposes of visiting.

Additionally, data acquired from the Ministry of Tourism and Sports (MOTS) is missing in July 2019. Although the absent data was estimated, it currently cannot be rectified for a perfect outcome. Therefore, the result may slightly deviate from the actual result.

Data & research Methods

Data collection

This study seeks to discover the relationships between conventional and alternative indicators under the topic of 'the impact of COVID-19 on Thailand tourism sector'. The alternative indicator is the number of international tourist arrivals in Thailand derived from the BOT from January 1 2016 to October 31 2021. The data is presented on a monthly basis (in a total of 70 months) to determine the correlation with preventive COVID-19 policies frequently updated by the government in accordance with the number of new patients tested positive for COVID-19. Another conventional source of data used in this research is provided by the MOTS from August 1 2018 to March 31 2021 (in a total of 31 months). This includes the number of visitors to Thailand by region and country.

For the alternative indicator, the data was collected from Google Trends. This is to determine how frequently ten search terms were searched Google's search engine relative to the site's total search volume in Thailand during the same period as the data derived from the BOT, January 1 2016 to October 31 2021.

Research methods

Part I

For Google Trends, there are two sections since the data on maximum words searched is limited at 5 per time. Also, this allows for the separation of searched keywords into two groups of Thai and English. Five of the keywords are in Thai (เที่ยวทะเล การท่องเที่ยว ที่เที่ยว กรุงเทพ เที่ยวไทย รีวิวที่เที่ยว). This is to observe how local people's searching behaviours are correlated with the number of tourist arrivals and restrictions on international arrivals. Another five terms are in English (beach, travel, Chiang Mai, Bangkok, and Phuket) to study assumed non-Thais' searching behaviours in Thailand.

After data collection from the BOT and Google Trends, the data were normalised using Excel to organise the data between records of the number of international travellers to Thailand. Subsequently, the normalised data were used to generate graphs, including scatter plot diagrams and line graphs. In addition, ANOVA F-test and Autoregression model was generated, with a summary output table, applying the same dataset from the BOT that had been normalised for ease of calculation and comparison. For the Autoregression model, the data were used to compute using three Lags.

Part II

Moving onto another online tool to transform the acquired from the MOTS into dashboards containing informative and visualised diagrams. The initial stage was to perform data cleansing in order to detect and correct defective records from the database on the number of visitors to Thailand by region and country. Unfortunately, the data collected from the MOTS is missing in July 2019. Hence, the unobtainable data is estimated by using the average value using the data from adjacent months to sort out this issue, which is June and August 2019.

After that, the gathered data were computed on Google Data Studio. This facilitates the comparison between regions as well as countries. The data were interpreted on line graphs, a per cent stacked bar chart, pie charts, and a map chart. For the line graph of Figure 13 in Appendix C, there are some details of the graph that vanished since they are relatively immensely low. Thus, Figure 14 in Appendix C was generated by zooming into the area for better visualisation.

Result analysis and discussion

Part I

Figure 5 in Appendix B indicates the normalised data for easier comparisons between the five computed terms, with ‘Bangkok’ being the most frequently searched keyword among them. The most distinct feature of this line graph is the plummet in the search volume of all keywords from January to April in 2020. This corresponds with the number of COVID-19 infected cases in Figure 20 in Appendix D. Meanwhile the infected cases continued to increase, the number of searched terms on Google has remained constantly low thenceforth.

The sub-region of those five terms searched is demonstrated in Figure 6 in Appendix B. It is notable that ‘Bangkok’ was searched the most in the majority of Thailand. ‘Chiang Mai’, covers a few nearby provinces in the North whereas ‘beach’ and ‘Phuket’ were searched most in Southern Thailand.

Integrating the data on a number of international arrivals and keywords search volume, the comparisons of the trends are illustrated as a scatter plot diagram and a line graph in Figure 7 and Figure 8 in Appendix B respectively. Figure 7 depicts a clear correlation of all the variables before the number of international tourists arrivals reaches zero, as complied with the tourist restrictions. For the trendline, the number of international tourists arrivals has the steepest. This can be interpreted that the COVID-19 imposed a larger impact on the actual number of arrivals rather than keywords searched relating to tourists.

In Figure 8, there is a similar pattern among the variables, especially before a sudden drop in the number of international tourists arrivals and the searched terms during the two months period from January to March 2020. Before the pandemic, all the variables reached peaks during the new year courses and slight increases during mid-year months.

Moving onto the results from another five terms searched in Thai, Figure 9 in Appendix B displays the comparison of the frequencies for the search. In general, it fluctuates throughout the selected period. Nonetheless, it can be observed that all the word searches fell around February to April 2021 and began to recover and fluctuate again in the following months. Considering Figure 5 and Figure 9 in Appendix B, it implies that the English terms began to drop approximately a month earlier than Thai keywords.

The searched terms based on each sub-region in Thailand is illustrated in Figure 10 in Appendix B. It is apparent that the frequency of ‘การท่องเที่ยว’ (tourism) being searched is dispersed across all regions. Meanwhile, ‘ที่เที่ยวกรุงเทพ’ (tourist attractions in Bangkok) appeared in an adjacent province of Bangkok and ‘เที่ยวทะเล’ in a few seaside provinces.

According to Figure 11 in Appendix B, the scatter plot displays the normalised data of the number of international tourists arrivals and the five Thai words searched. The trend is quite steady over the course. However, the frequency of ‘รีวิวที่เที่ยว’ being searched is more dispersed relative to other terms and the volume is larger relative to other terms. It is also the only word among the selected keywords to represent a positive correlation trendline. Furthermore, the R-squared value derived from the data is considerably low.

The trends from the same dataset can be more easily identified in Figure 12 in Appendix B. The sharp fall at the beginning of 2020 is conspicuous as well as highly correlated lines of the six variables since January 2021, except for the number of international tourist arrivals which dropped to zero and became extremely low.

In accordance with the Autoregression model in Table 2 in Appendix B, the value of R-square derived from the number of international tourist arrivals is reasonably high, approximately 0.948. Besides, the standard error is low, 0.112. Those values imply a high level of correlation. The table also shows the significance levels of the F-test from ANOVA and p-value. The result determines that the regression model fits the data with more accuracy than the model with no independent variables since the significance level, 2.095, is higher than the p-value, except for Lag 1, with the p-value of 8.535 while the value for intercept, Lag 2, and Lag 3 are 0.832, 1.104, and 0.004 respectively.

Part II

In Figure 13 in Appendix C, the numbers of visitors by region are represented in different lines, with travellers from East Asia ranked first. This is followed by those from Europe, South Asia, and America. Meanwhile, tourist arrivals from Oceania, the Middle East, and Africa accounted for a small portion. In early 2020, the number of visitors from all regions around the globe massively declined from the COVID-19 outbreak and tourist restrictions. Since the tourist volume is extremely low, even after the pandemic situation is relieved, a separate line graph, Figure 14 in Appendix C, depicts a closer review from April 2020 to February 2021. After Thailand was reopened to welcome international arrivals, the overall number of tourists from all the regions was increasing. Moreover, in November 2021, travellers from Europe exceeded those from East Asia, followed by those from America.

In order to see the comparison of the number of travellers to Thailand by region since August 2018, the data gathered was computed into a per cent stacked bar chart as in Figure 15 in Appendix C. It can be easily observed that there were no international visitors from April to September 2020. Also, before the restriction of international arrivals and two months after reopening the country, travellers from East Asia contributed to the majority of the regions. Nonetheless, during the latest month (as data available on the MOTS), Europe was the major source of tourists. For the overall trend, the percentage of travellers by region fluctuated until the latest three months.

The data can be concluded with details into two main pie charts in Figure 16 in Appendix C. The pie chart on the right indicates the ratio of international tourist arrivals or the overall whereas the pie chart on the right demonstrates those after the second wave. It is conspicuous that East Asian visitors dominated by 67 per cent while those from Europe ranked second with 18.5 per cent. The other regions contributed to merely 15.5 per cent. Nevertheless, European arrivals accounted for 46 per cent after the second wave of the pandemic. The following region was East Asia, America, 11.9 per cent, and the rest of the world, 11.4 per cent.

Moving onto the ratios regarding the major countries of visiting in Figure 18 in Appendix C. Over the chosen period, Chinese visitors accounted for more than a quarter, 25.5 per cent and ranked first. The other eight countries participating in the portion of visiting tourists were Malaysia, India, Laos, Korea, Japan, Russia, America, and Singapore. The rest of the world, therefore, accounted for 34.6 per cent of the arrivals in Thailand. However, after the second wave of the COVID-19 outbreak, the top countries with the largest number of tourists visiting Thailand were more equally distributed as displayed in Figure 18 in Appendix C. The percentage of international arrivals from China decreased significantly to 12.5 per cent. This is followed by Germany, America, the UK, Japan, Korea, France, Cambodia, and Russia. The remaining countries around the world accounted for approximately the same portion, 39.3 per cent.

In addition, Figure 19 in Appendix C illustrates the countries and regions (as separated by the radius colours) of departure among visitors to Thailand. The most outstanding country is unsurprisingly China. It can be recognised that East Asia was the most crowded region and it spread to different countries throughout the entire region. This also applied to Europe, South Asia, and the Middle East. Nonetheless, America and South Africa were substantially less congested.

Conclusion and policy recommendations

Conclusion

The tourism sector in Thailand plays an important role in contributing to the country's GDP and economic growth has been severely affected by the COVID-19 outbreak as it involves international travelling and transfers, the overall economy of Thailand has been

growing at a slower rate relative to the period prior to the pandemic. This research collected data regarding tourists via three main sources: the BOT, the MOTS, and Google Trend. Other related useful and supportive information was also acquired from various online sources. Academic literature reviews are separated into three sections, including research methods related literature, datasets related literature, and the topic related literature. Besides, using Google Trends and Excel to analyse the data indicates that the terms searched on Google are moderately correlated with the number of visitors to Thailand. Furthermore, the Autoregression model was computed to predict future international arrivals trends based on the past. In addition, Google Data Studio allows for insights into changes in travelling patterns from different tourists' countries of origin.

Policy recommendations

According to Figure 20 in Appendix D, the number of new COVID-19 infected cases in Thailand has steadily declined since mid-August 2021. On November 1 2021 after the Foreign Ministry announced to admit visitors from another 17 countries without requiring quarantine after the arrival if they have been fully vaccinated and be able to provide evidence showing a pre-flight negative COVID-19 test, the first group of international passengers entered the country (Bangkok Post, 2021). Taking the reduced tourist restrictions, the number of new detected COVID-19 cases continues to decrease, even after the maximum 14 days of the incubation period. This signifies that Thailand opening to travellers from more countries does not impose a huge negative impact on local people. Thus, it can be beneficial if Thailand continues welcoming foreign tourists under strict preventive COVID-19 measures to minimise the possibility of new waves.

Additionally, Thailand should promote tourism and the related industries to attract international visitors during the upcoming new year holiday. As represented in Figure 4 in Appendix C, it is remarkable that the number of tourists usually reaches the peak at the end and beginning of each year since 2016. The reason behind this is that it is a long holiday. Moreover, European travellers usually visit Thailand during winter, particularly senior tourists, with the intention to occasionally escape extreme low temperatures in their countries (Esichaikul, 2012). The graph depicts that the number of foreign tourists was high around the mid-year months before the COVID-19 outbreak in Thailand. Hence, maintaining the regulations to rebuild and gain the international visitors’ confidence in the public health conditions before the pinnacle time of the year.

As the COVID-19 pandemic is currently an ongoing issue around the globe, many Thais experience the challenge of visiting other countries due to the strict restrictions. Furthermore, Figure 21 in Appendix D demonstrates that the increase in average monthly income in Thailand has been growing gradually since 2015 and the line became flattered and more deviated from the average trend line. This can be implied that more Thais may face financial struggles and, therefore, travelling to foreign abroad is less likely. Accordingly, the government should encourage domestic tourism as it is a more cost-saving option relative to international tourism.

Further suggestions

1. Since the data on the number of international tourist arrivals to Thailand provided by BOT is available until October 2021 as the latest data, the effect of Thailand reopening the country to 17 more countries in November, with quarantine-free under specific conditions, cannot be analysed currently. Thus, if further studies can include the data after November 2021, the result will be more useful for policy suggestions.

2. If the number of COVID-19 infected cases can be introduced in Figure 7, Figure 8, Figure 11, and Figure 12 in Appendix B as well as Figure 13 and Figure 14 in Appendix C, it will simplify the comparisons between factors.

3. As the keywords searched on Google Trends in this research are based on searches in Thailand, foreign travellers who search the words while they are outside of Thailand are not accounted for in the search volume. Hence, analysing the results using data from other countries can strengthen the outcome of further studies.

4. This study does not differentiate the consumption value in the tourism sector from domestic and international tourists. Thus, comprehending this factor will allow for a better understanding and a more accurate result of changes in the travelling patterns of Thais and foreigners during the pandemic period.

5. More insightful research can be executed by including changes in certain measurement indicators of businesses within the tourism industry. For instance, the decline in hotel rooms occupancy rate, domestic and international flights passengers, or revenues of tourist attractions businesses. If that is accomplished, the effective policies can be enhanced from the interpretations of the outcome, both from the private and public sides.

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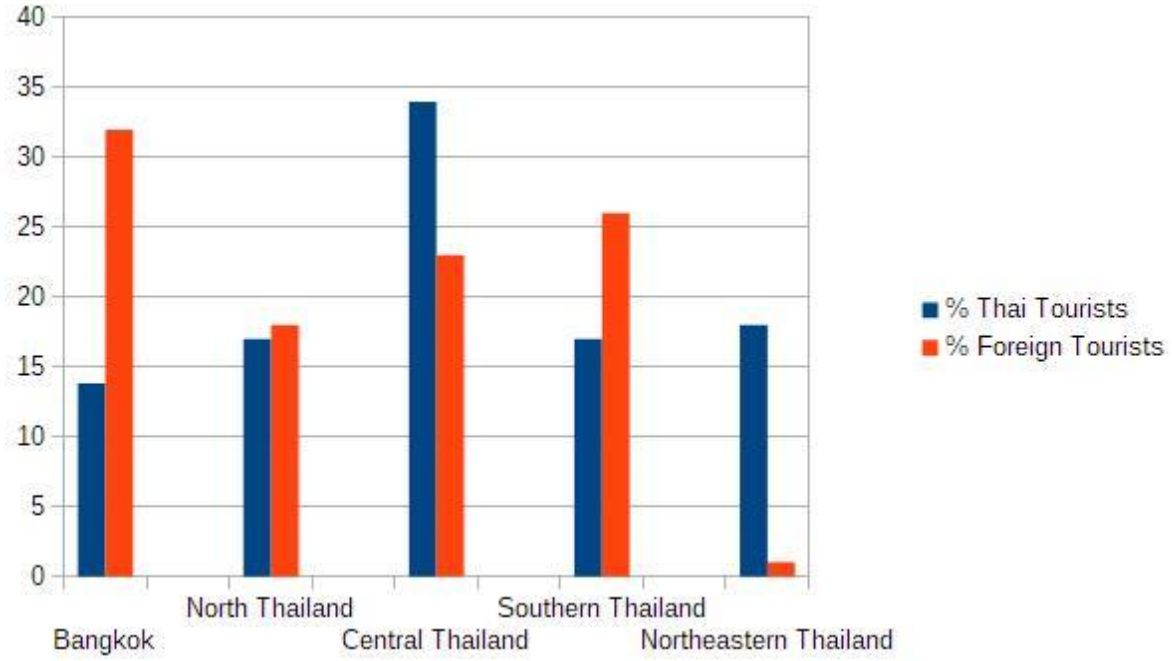
Appendix A: Data Overview

Figure 1: Number of tourists in Thailand by regions



Source: Thai Tourism Development Office

Figure 2: Number of international tourist arrivals in Thailand from 2015 to 2020

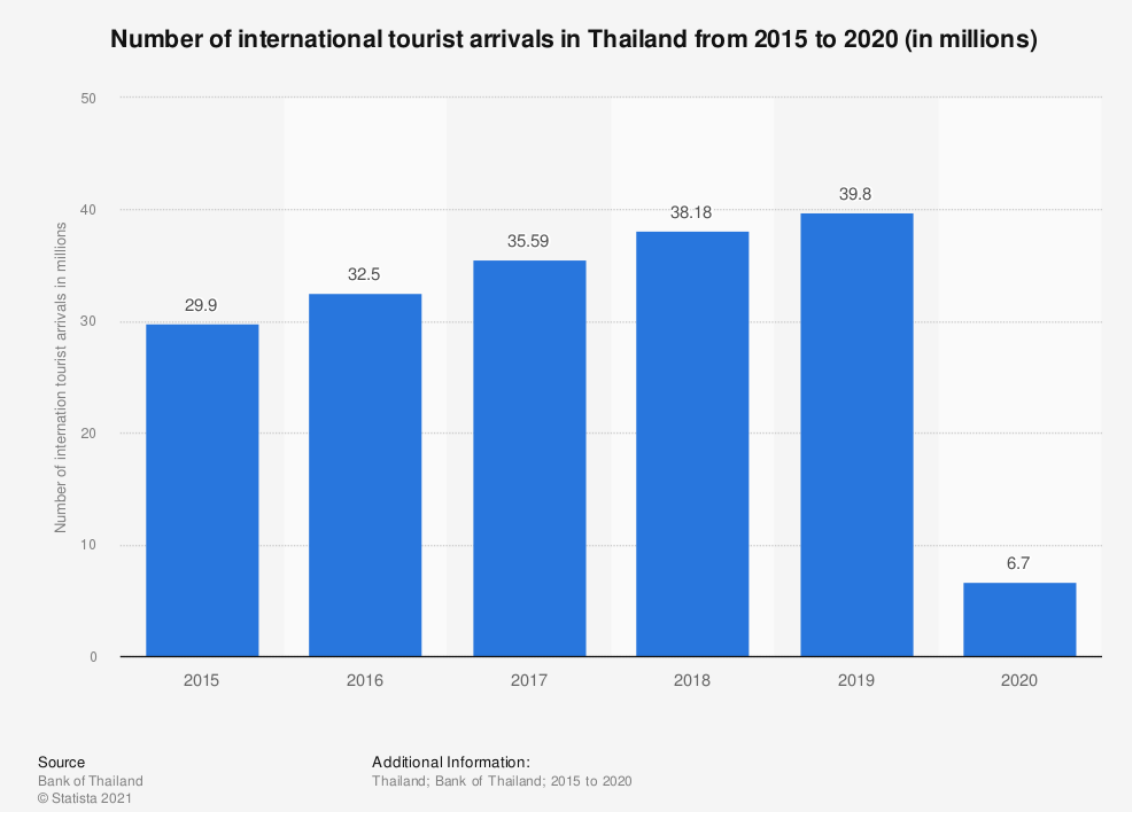


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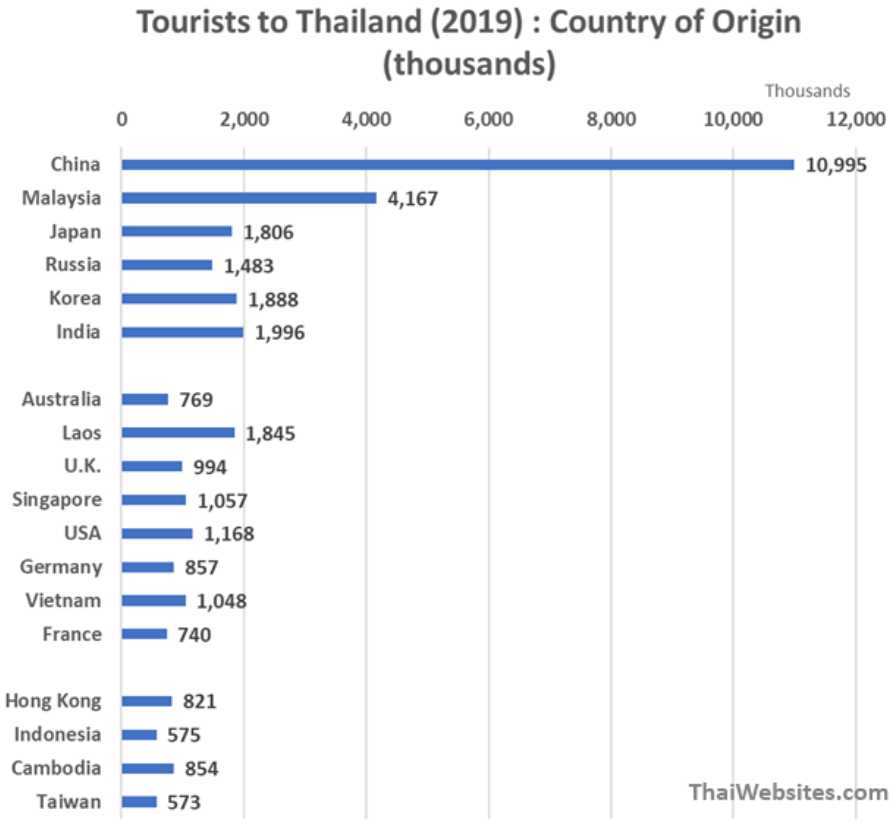
Table 1: World Tourism Rankings

Rank	Destination	International tourist arrivals (2019)[1]	International tourist arrivals (2018)[1]	Change (2018 to 2019) (%)	Change (2017 to 2018) (%)
1	France	-	89.4 million	-	▲ 2.9
2	Spain	83.5 million	82.8 million	▲ 0.8	▲ 1.1
3	United States	79.3 million	79.7 million	▼ 0.6	▲ 3.3
4	China	65.7 million	62.9 million	▲ 4.5	▲ 3.6
5	Italy	64.5 million	61.6 million	▲ 4.8	▲ 5.7
6	Turkey	51.2 million	45.8 million	▲ 11.9	▲ 21.7
7	Mexico	45.0 million	41.3 million	▲ 9.0	▲ 5.1
8	Thailand	39.8 million	38.2 million	▲ 4.3	▲ 7.3
9	Germany	39.6 million	38.9 million	▲ 1.8	▲ 3.8
10	United Kingdom	39.4 million	38.7 million	▲ 1.9	▼ 2.2

Source: Wikipedia

Figure 3: Tourists to Thailand (2019) : country of origin



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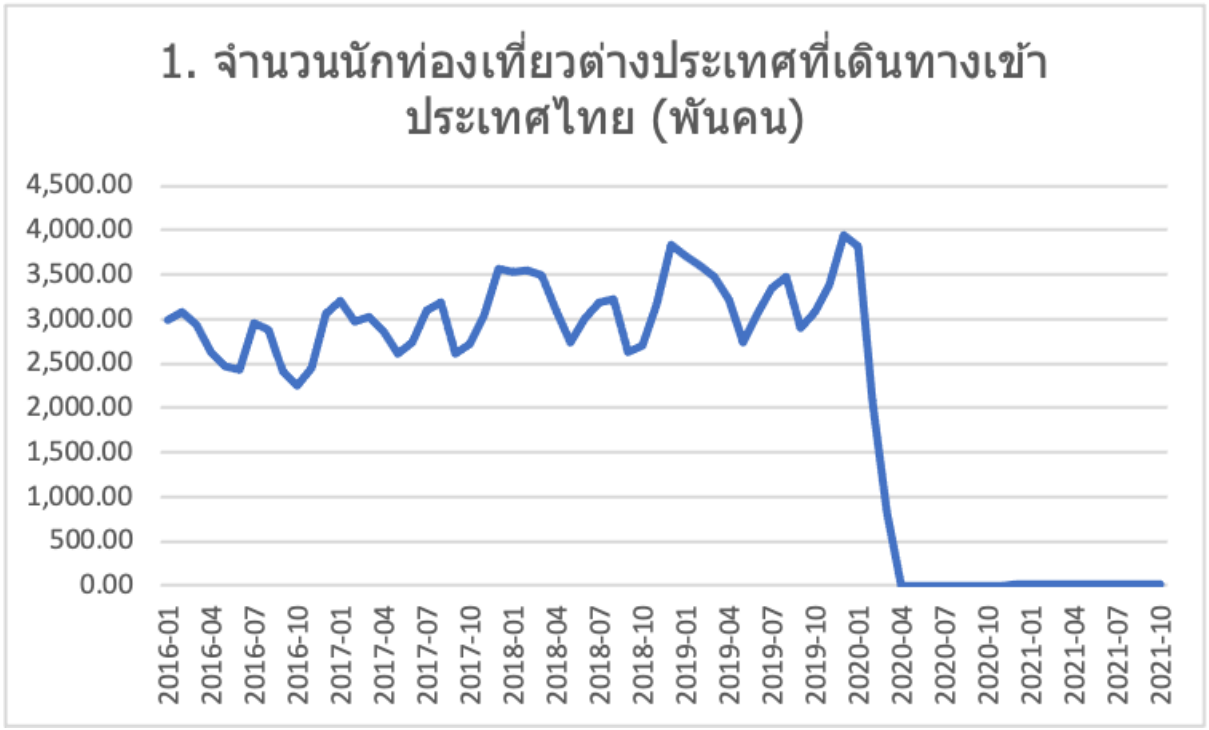
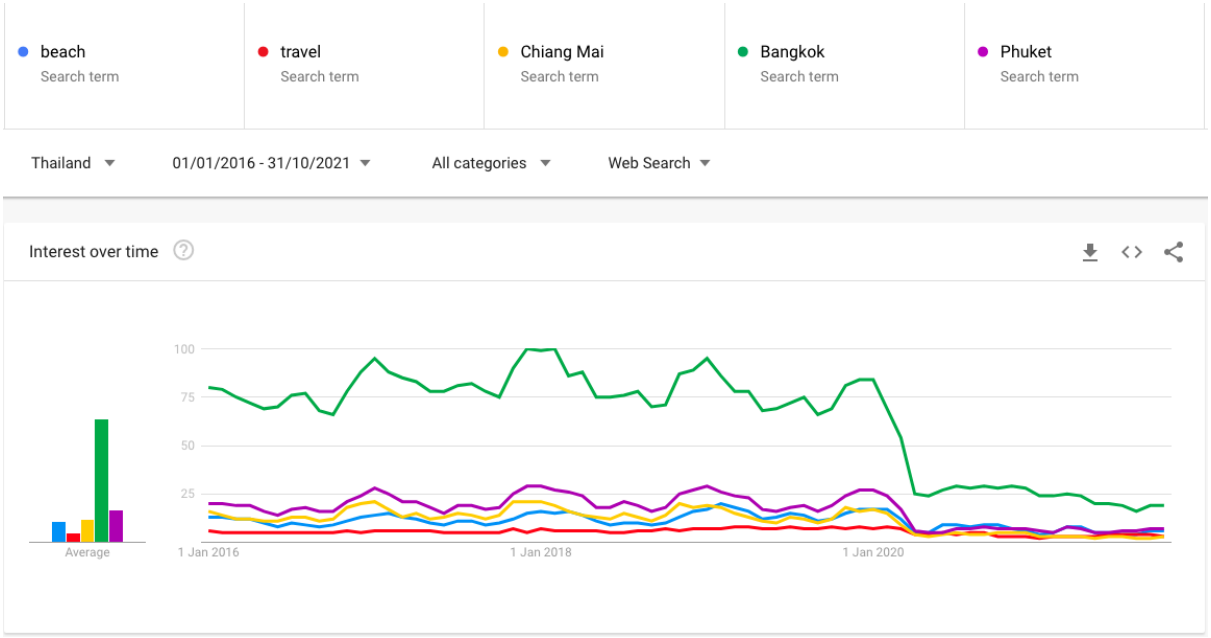
Appendix B: Data for Methods and Results Analysis Part I

Figure 4: Number of international visitors to Thailand (in thousand)



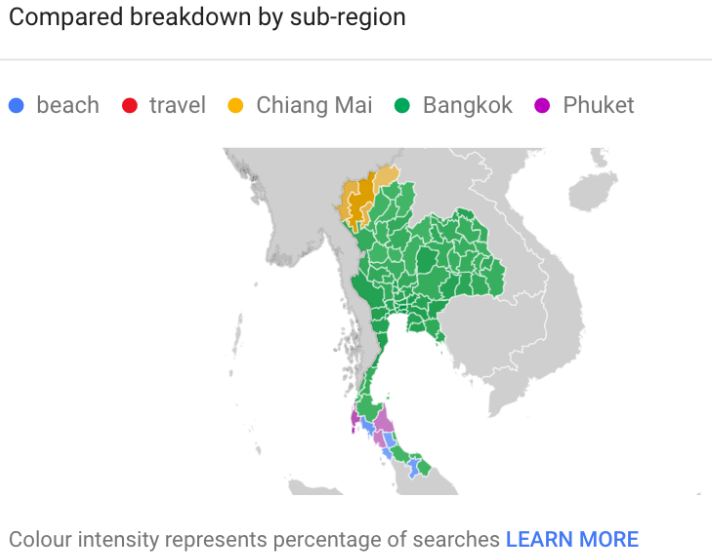
Source of data: Bank of Thailand

Figure 5: English keywords searched on Google in Thailand



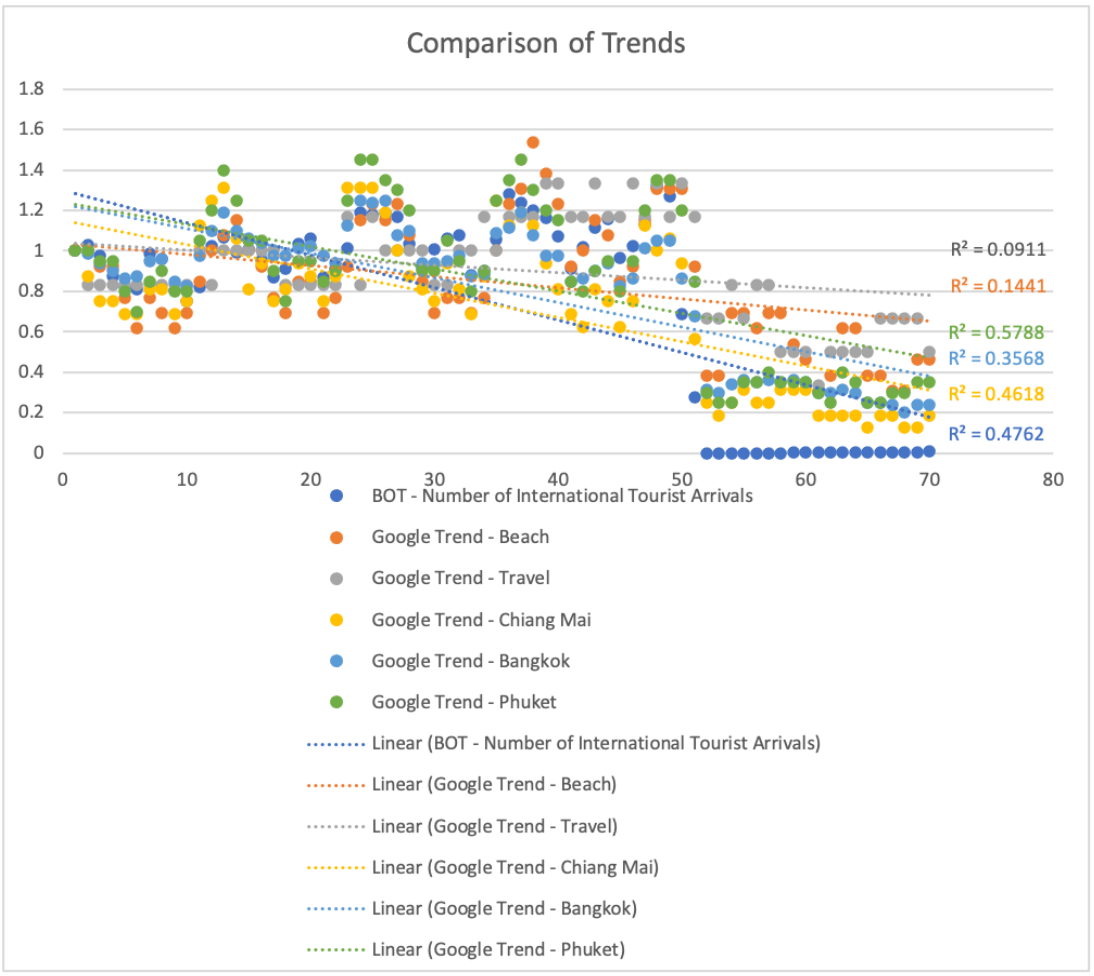
Source: Google Trends

Figure 6: English keywords searched on Google in Thailand by sub-region



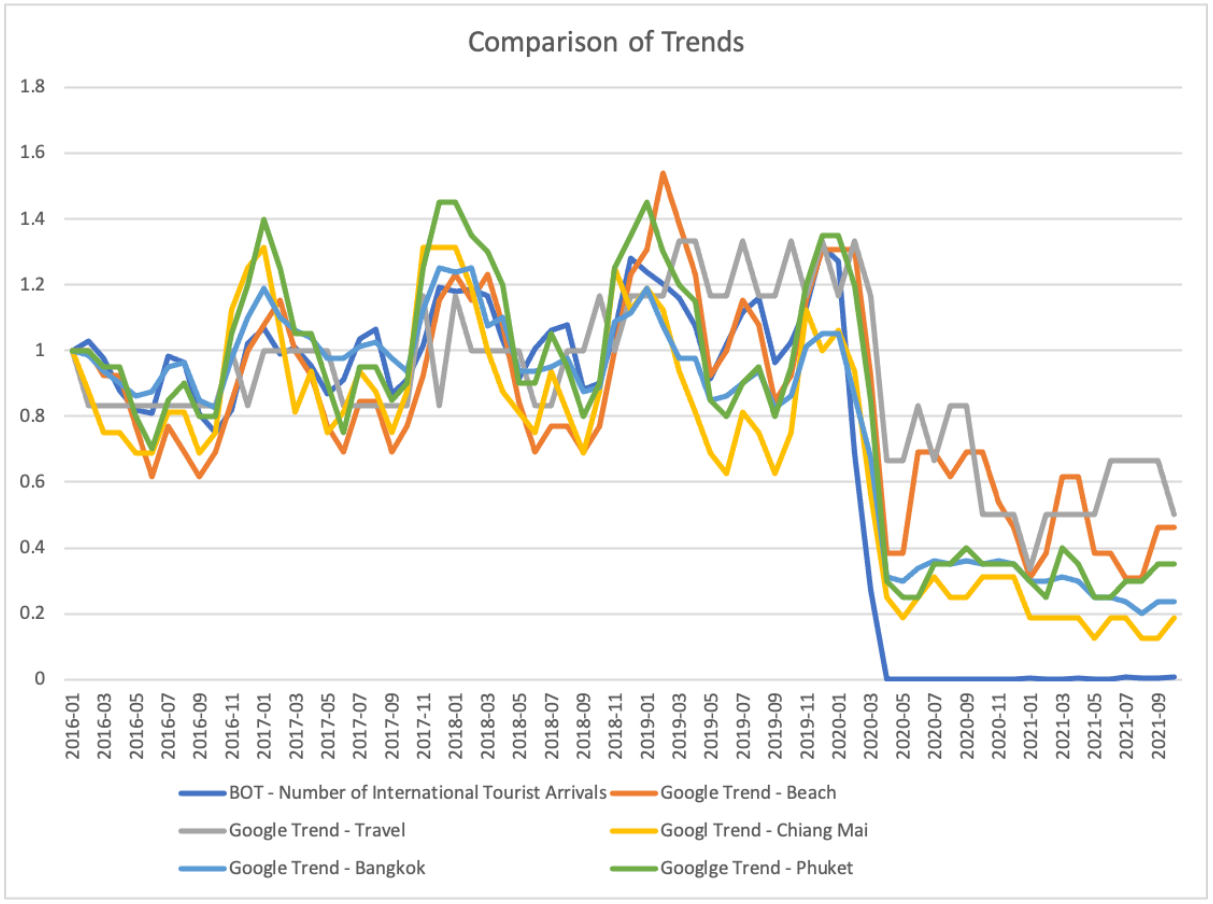
Source: Google Trends

Figure 7: Comparison of number of international tourist arrivals and keywords searched



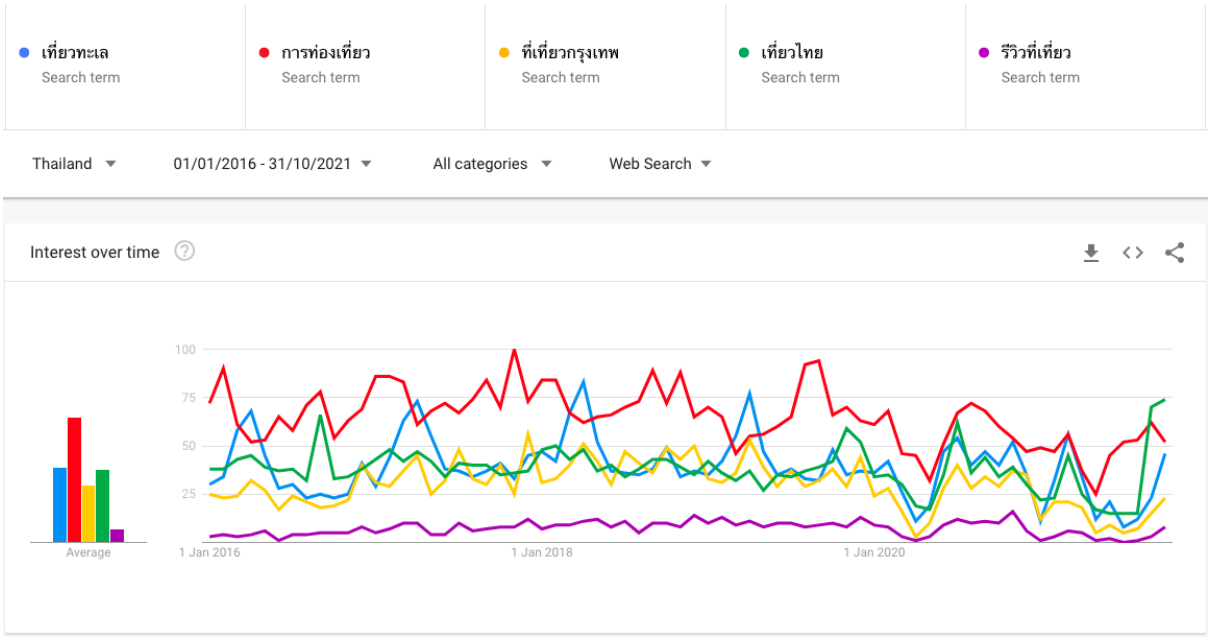
Source of data: Google Trends and Bank of Thailand

Figure 8: Comparison of number of international tourist arrivals and keywords searched



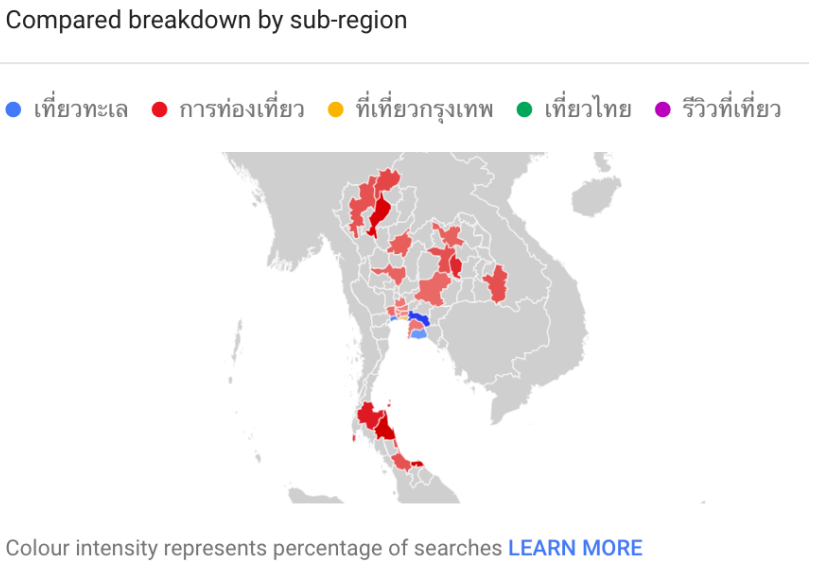
Source of data: Google Trends and Bank of Thailand

Figure 9: Thai keywords searched on Google in Thailand



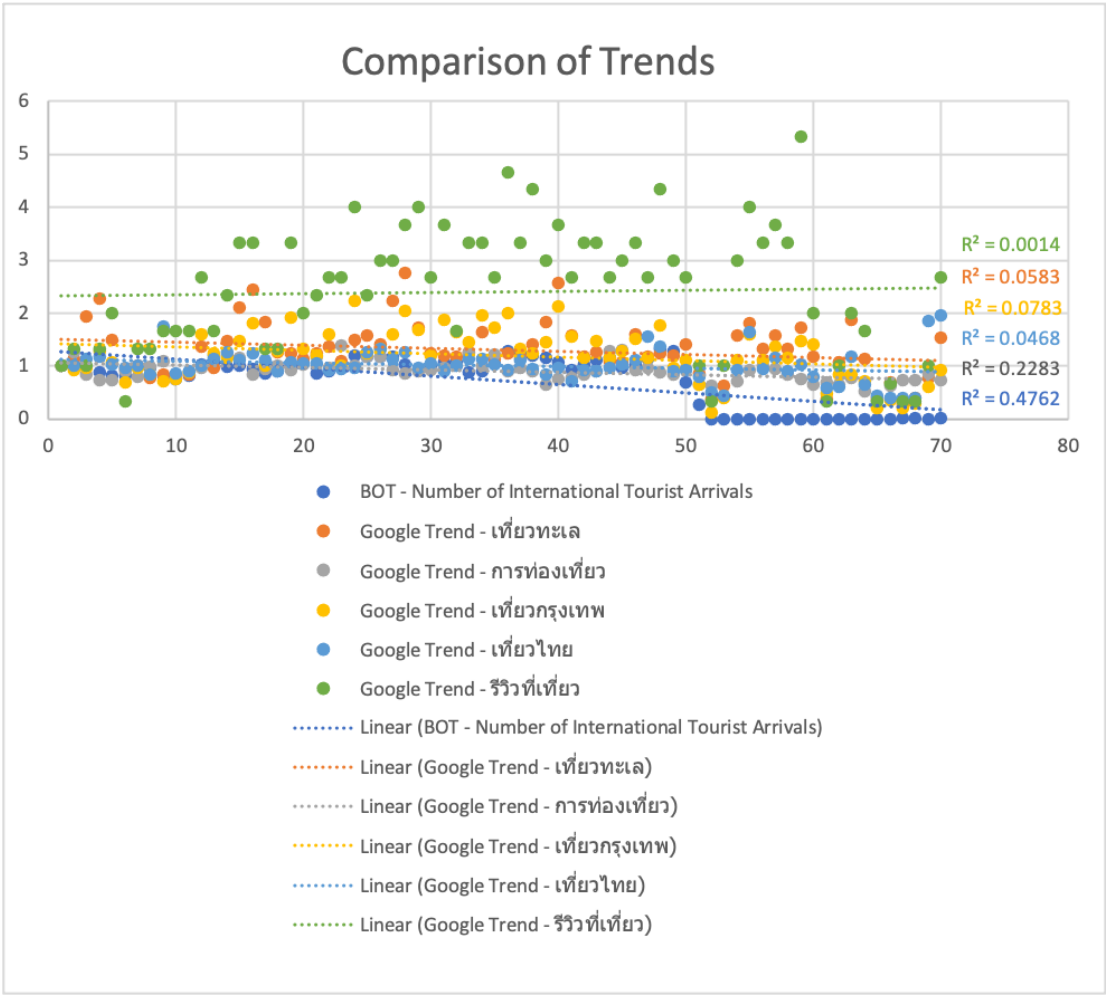
Source: Google Trends

Figure 10: Thai keywords searched on Google in Thailand by sub-region



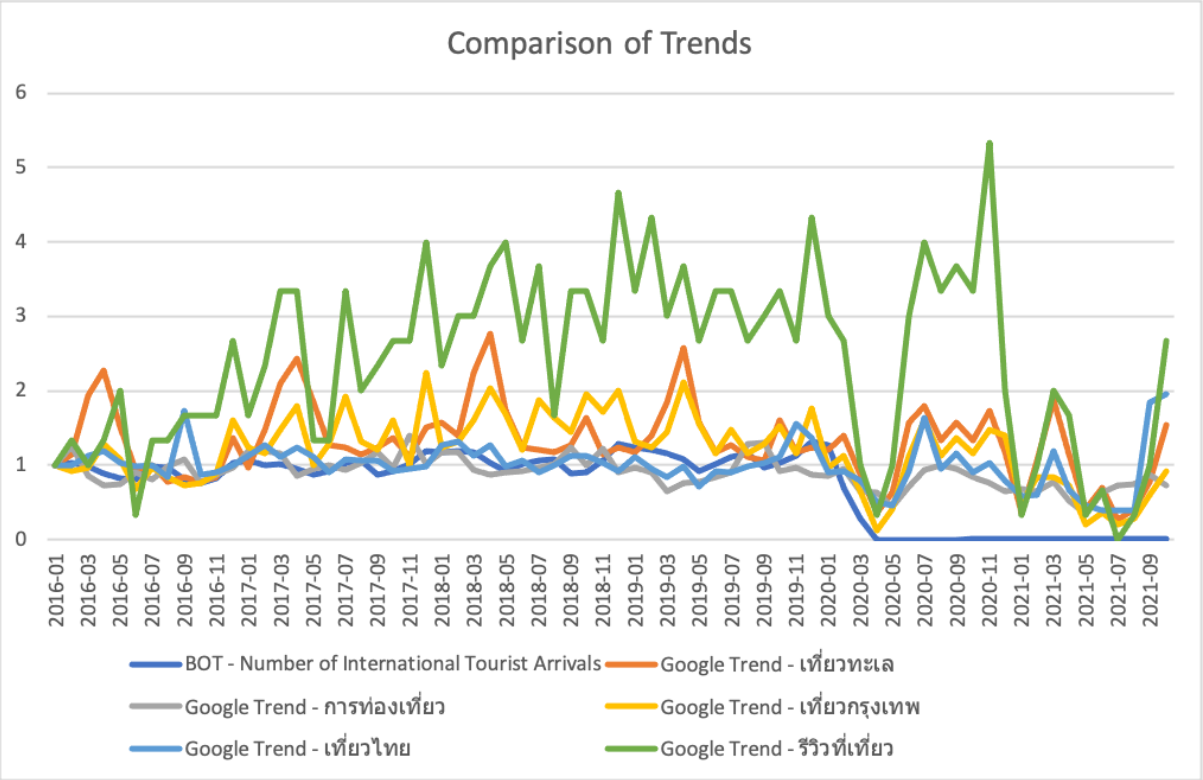
Source: Google Trends

Figure 11: Comparison of number of international tourist arrivals and keywords searched



Source of data: Google Trends and Bank of Thailand

Figure 12: Comparison of number of international tourist arrivals and keywords searched



Source of data: Google Trends and Bank of Thailand

Table 2: ANOVA F-test and Autoregression Model

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.97370822
R Square	0.9481077
Adjusted R Square	0.94563664
Standard Error	0.11152624
Observations	67

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	14.3169129	4.77230431	383.684296	2.0954E-40
Residual	63	0.78360041	0.0124381		
Total	66	15.1005133			

	Coefficients	*tandard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00571774	0.02690771	0.21249461	0.83240723	-0.048053	0.05948851
Lag1	1.55544775	0.1178673	13.1966014	8.5348E-20	1.31990875	1.79098675
Lag2	-0.9355705	0.19586383	-4.7766374	1.1044E-05	-1.3269731	-0.5441679
Lag3	0.35734901	0.11987922	2.98090874	0.00408081	0.11778951	0.59690852

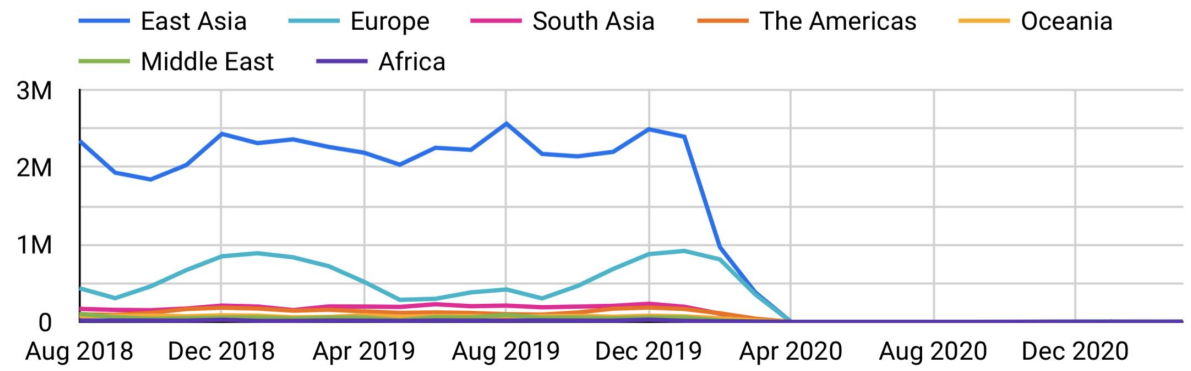
Y(t) = 0.00571 + 1.555Y(t-1) + -0.936Y(t-1) +

Source of data: Google Trends and Bank of Thailand

Tharnnamrin Angkasuponkul
6104641037

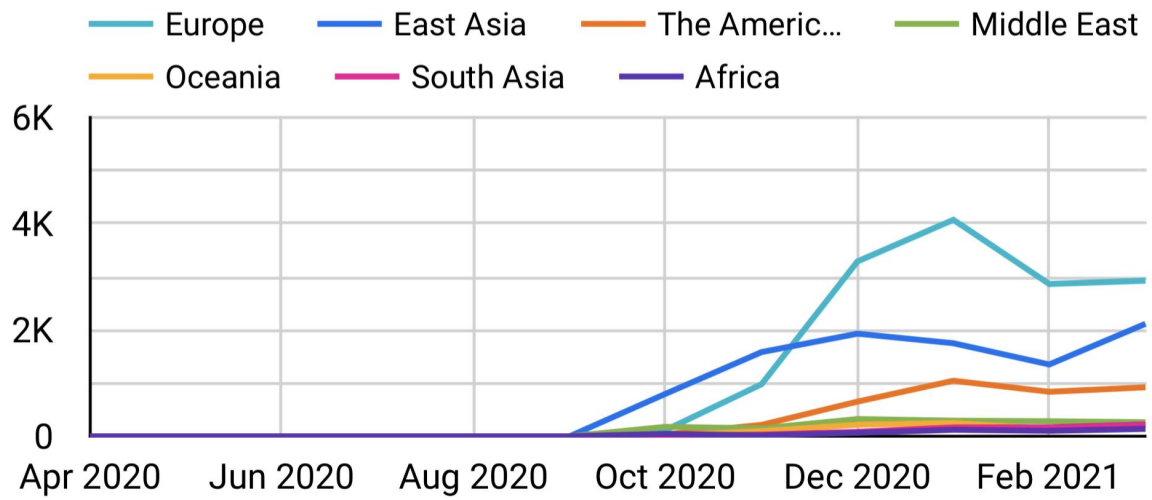
Appendix C: Data for Methods and Results Analysis Part II

Figure 13: Overall tourists to Thailand by region



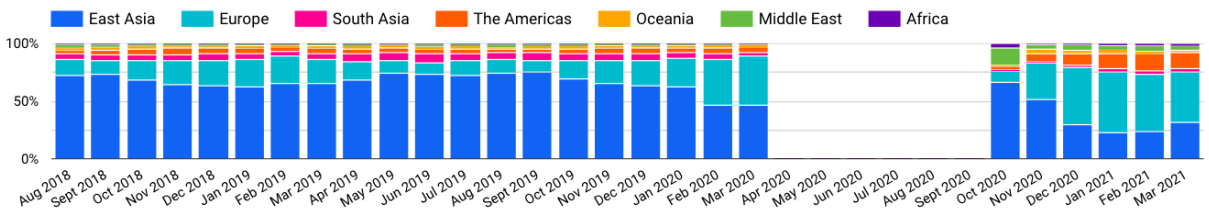
Source of data: Ministry of Tourism and Sports

Figure 14: Overall tourists to Thailand by region after the second wave of COVID-19



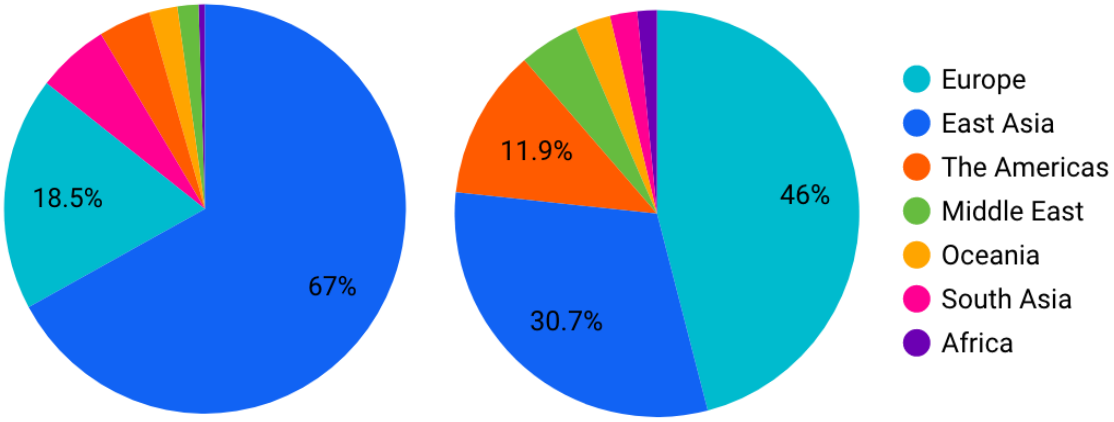
Source of data: Ministry of Tourism and Sports

Figure 15: Historical overall tourists to Thailand ratio by region



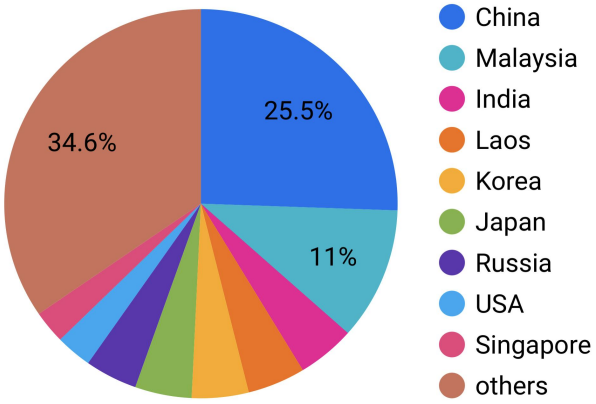
Source of data: Ministry of Tourism and Sports

Figure 16: Tourists to Thailand ratio by region and the ratio after the second wave of COVID-19



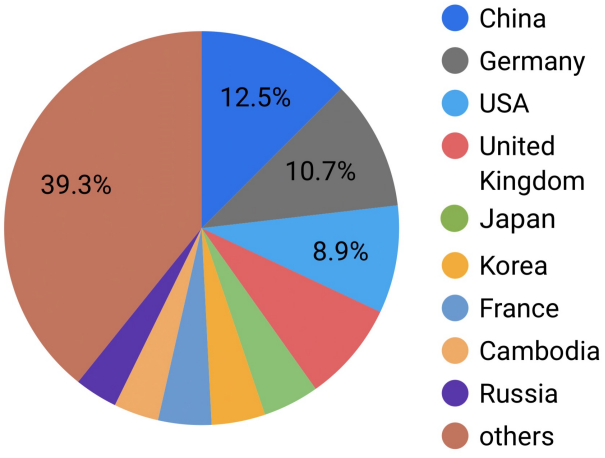
Source of data: Ministry of Tourism and Sports

Figure 17: Tourists to Thailand ratio by country



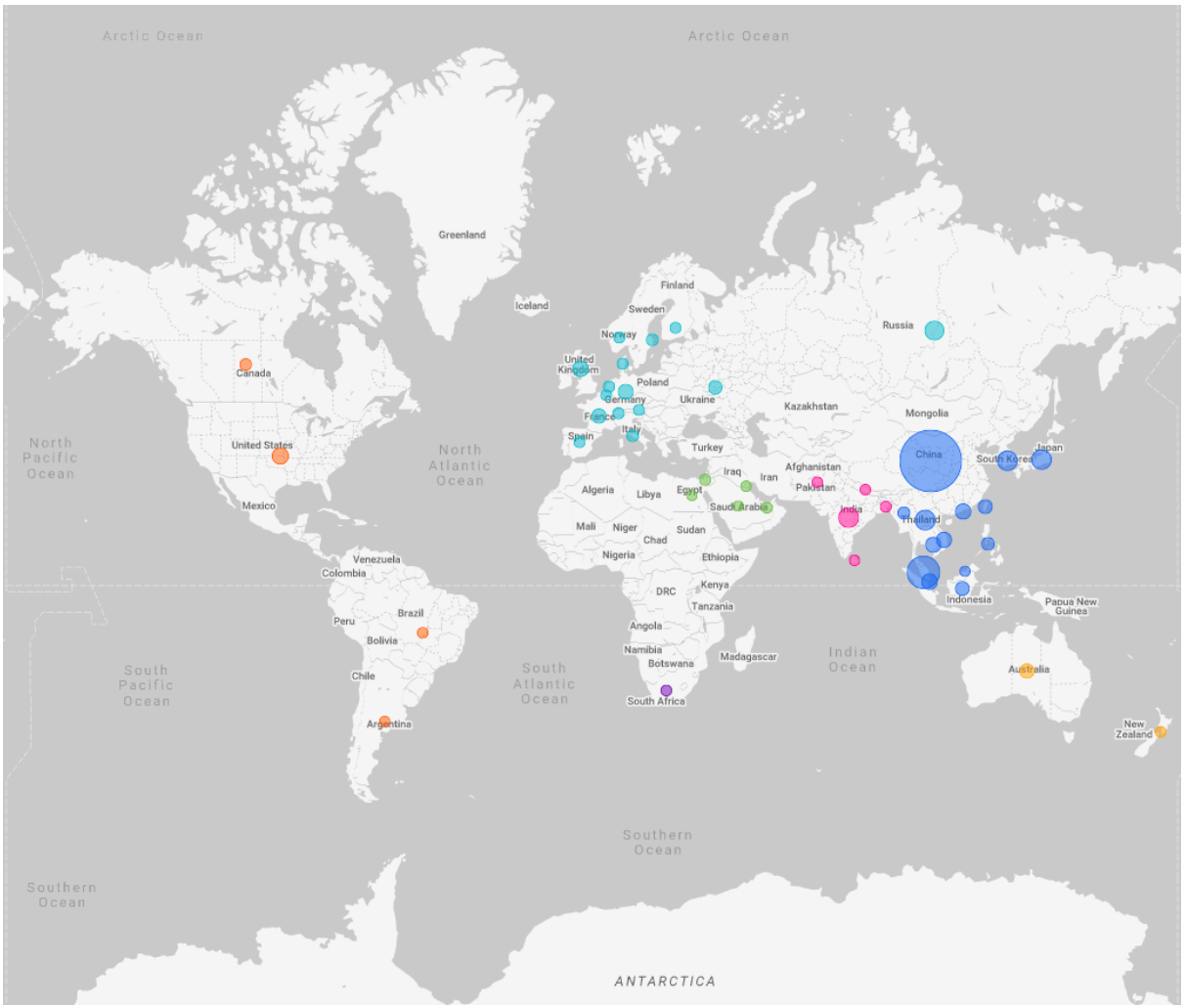
Source of data: Ministry of Tourism and Sports

Figure 18: Tourists to Thailand ratio by country after the second wave of COVID-19



Source of data: Ministry of Tourism and Sports

Figure 19: Map tourists



Source of data: Ministry of Tourism and Sports

Appendix D: Other Related Data

Figure 20: COVID-19 infection rate and death in Thailand

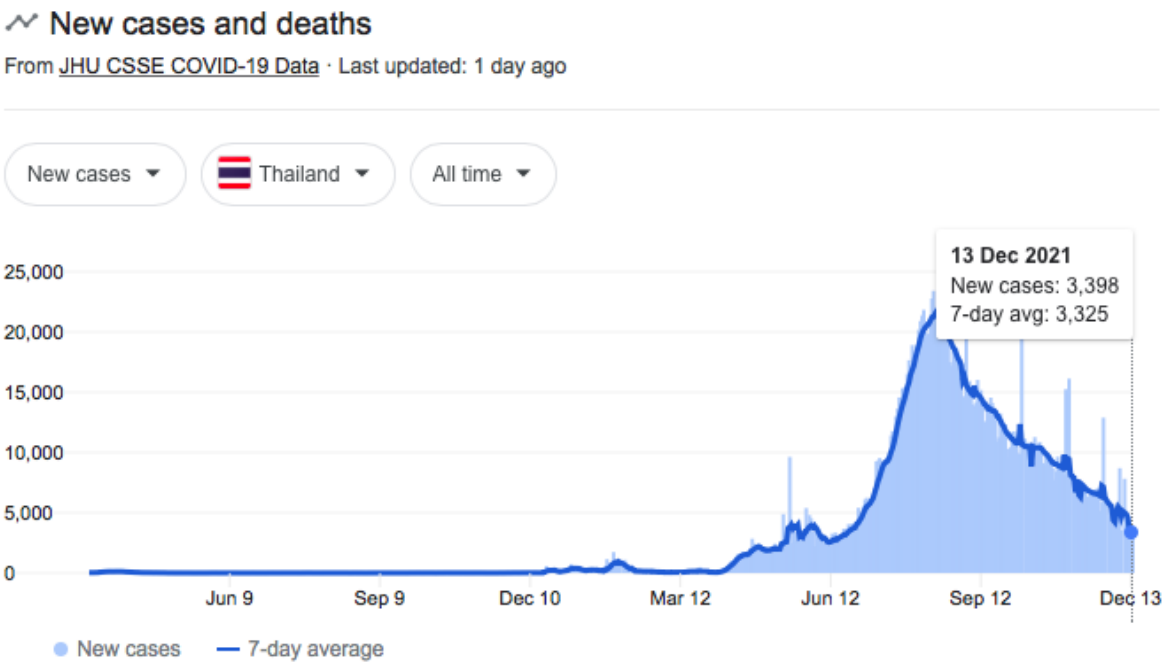
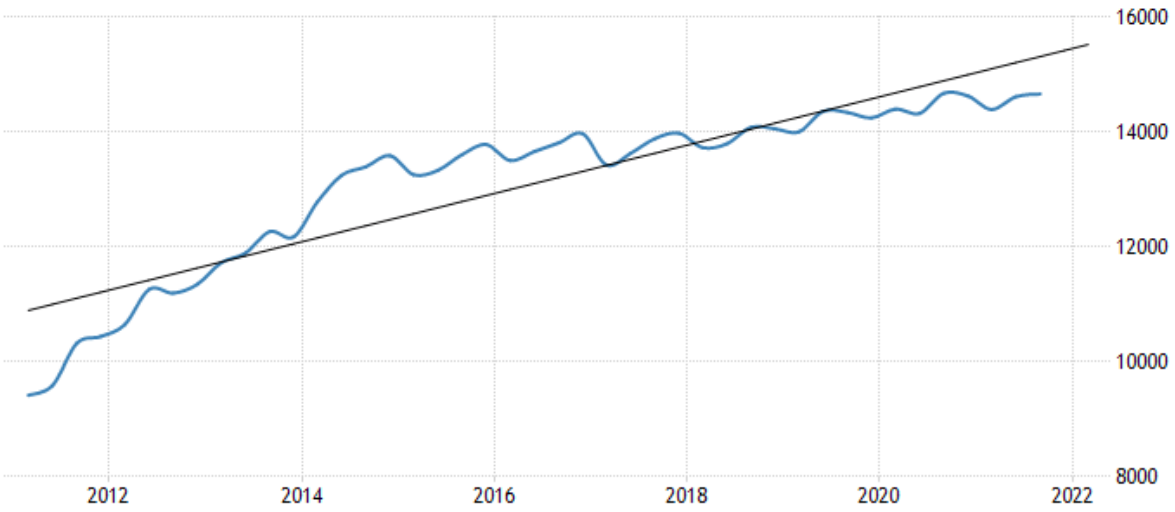


Figure 21: Average monthly income in Thailand



Source: TRADINGECONOMICS.COM | National Statistical Office of Thailand