Forecasting Tourism Market for Fiji based on Indicator Approach

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Forecasting Tourism Market for Fiji based on Indicator Approach

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DECLARATION

The research described in this Master thesis, entitled “Forecasting Tourism Market for Fiji based on Indicator Approach” is to the best of the author’s knowledge that of the author except where due reference is made. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other master.

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ABSTRACT

The tourism market is inextricably linked to a nation’s economy. There is scant evidence, but growing interest, in the context of tourism, in using the composite leading indicator approach, despite it having been widely applied in the business cycle. The aim of this study is to construct a tourism cycle indicator (TCI) to anticipate the cyclical movements of tourism development. The time duration investigated spanned approximately two decades from 2000 to 2017. Apart from utilising the composite leading indicator approach, a filtering extraction method, a dating algorithm for turning point detection and directional accuracy and binomial tests, this study also included Markov regime switching as well, for identifying the transition probabilities. The empirical findings revealed that the movement of the constructed TCI was consistently in advance of the reference series, international tourist arrivals (TA), in Fiji, with an average lead time of 2.75 months. Moreover, the transition probabilities that resulted from the Markov regime-switching model indicated that the duration of the transition from one regime to another was on average 12.86 months. These empirical estimation analysis results highlighted the potential ability of the leading indicator to predict the outlook of the tourism market, additionally, the information gained from the macroeconomic perspective should be useful for policy planning, risk monitoring, and community development.

Keywords: Tourism cycle indicator, near-term forecasting, early warning signals
Peramalan Pasaran Pelancongan untuk Fiji berdasarkan Pendekatan Penunjuk

ABSTRAK


Kata kunci: Penunjuk kitaran pelancongan, ramalan jangka pendek, isyarat amaran awal
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LIST OF ABBREVIATIONS

BB  Bry-Boschan
BRENT  Crude Oil Price
CF  Christiano-Fitzgerald
CMAG  Commonwealth Ministerial Action Group
EIA  Energy Information Administration
EMS  European Monetary System
FDI  Foreign Direct Investment
GDP  Gross Domestic Product
IMF  International Monetary Fund
MsM  Markov Regime-Switching Model
NBER  National Bureau of Economic Research
PACER  Pacific Agreement on Closer Economic Relations
PICTA  Pacific Free Trade Agreement
PSI  Political Stability Index
Q-Q  Quantile-Quantile
REEEP  Renewable Energy Efficiency Partnership
RFMF  Republic of Fiji Military Forces
SARS  Severe Acute Respiratory Syndrome
SSEC  Shanghai Stock Exchange Composite Index
TA  Tourist Arrivals
TCI  Tourism Cycle Indicator
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<td>Tourism Satellite Account: Recommended Methodological Framework</td>
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<td>VE</td>
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CHAPTER 1
INTRODUCTION

1.1 Introduction

Tourism is defined as a complex and global process which mingles people, cultures and customs worldwide. Tourism is also acknowledged to be a key foreign exchange earner that benefits economic growth and development in every country. Furthermore, tourism’s significant roles in job creation and income and wealth creation have brought on the attention of policymakers, governments, business players, investors and even communities. According to the World Travel and Tourism Council, reported in “Travel and Tourism Economic Impact 2018 - World”, the total contribution of travel and tourism to the GDP was USD8,272.3bn which equalled 10.4% of the world’s GDP in 2017 and this growth was predicted to increase by 4.0% in 2018. At the same time, the key facts regarding job creation are that the total contribution of travel and tourism to global employment was 313,221,000 jobs which constitute 9.9% of the world’s total employment when the jobs created, that indirectly support tourism, are also included. Apart from job creation and its role as one of the key sources of national income, the tourism industry has also brought in a total investment of USD882.4bn or 4.5% of the total investment for the world. It was predicted that the total investment in travel and tourism would rise by 4.8% in 2018. This does not only prove the influential ability of tourism to promote the international perception and image of a country but that it can also arouse complimentary domestic policies.
The travel and tourism industry is a leading industrial sector that is linked to direct economic impacts, as well as significant indirect and induced impacts in most countries around the globe. Although the UN Statistics Division-approved Tourism Satellite Accounting methodology (TSA: RMF 2008) only quantifies the direct contributions of travel and tourism, the World Travel and Tourism Council recognises a wider view on tourism’s total contribution, including the indirect and induced impacts from travel and tourism apart from direct contributions alone. The direct contributions of travel and tourism to the GDP reflects the total spending within a particular country by both residents and non-residents, this can also be regarded as the internal expenditure. The Government spending that is directly associated with visitors, such as cultural and recreational development should be expressed in tourism-characteristics sectors, such as hotels, travel agents, airlines, leisure and recreation services by the national accounting bodies. Meanwhile, the total contribution of travel and tourism to the GDP imposes a broader impact on the economy which includes the GDP and job creation. A wider effect is often accompanied by the indirect and induced impacts including investment, the supply chain and induced income impacts.

The term “tourism-dependent economy” may, at first, induce a perception of a paradise island, however, tourism plays a vital role for countries spanning a broad spectrum of economic growth and of economic size. In general, a nation’s economic size is commonly measured by using its gross domestic product (GDP) which outlines the monetary value of all of the final goods and services produced within the borders of the country within a specific period (Gunnion, 2016). The cyclical fluctuations of the growth of tourism demand are affected by unexpected changes in the political, social, and economic environments. Nonetheless, the periodic pattern is also influenced by government policy and is
accompanied by unforeseen crises, such as health hazards and terrorism. These unanticipated shifts from various perspectives are impactful either in the tourists’ destination country or the tourists’ origin country (Kulendran & Wong, 2011). The transition of the cycle creates uncertainty, due to the existence of volatile conditions and risks that arise.

**Table 1.1:** The Economic Contribution of Travel and Tourism

<table>
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<th>Direct Travel and Tourism Contribution</th>
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<tbody>
<tr>
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<td>Transportation</td>
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<td>Industries</td>
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<td>Accommodation services</td>
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<td>Food and beverage services</td>
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<td>Retail trade</td>
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<td>Transportation services</td>
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<tr>
<td>Cultural, sports and recreational services</td>
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<tr>
<td>Sources of spending</td>
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<td>Residents’ domestic travel and tourism spending</td>
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<td>Visitor exports</td>
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<td>Individual government travel and tourism spending</td>
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<th>Indirect Travel and Tourism Contribution</th>
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<tr>
<td>Travel and tourism investment spending</td>
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<tr>
<td>An important investment prospects view of both current and future activity such as new aircraft purchasing and new hotel constructions project.</td>
</tr>
<tr>
<td>Government collective travel and tourism spending</td>
</tr>
<tr>
<td>On behalf of the community, this spending plays its role in variety of ways. For instance, security connection, resort sanitation services, tourism marketing and promotion, etc.</td>
</tr>
<tr>
<td>Impact of purchases from supplier</td>
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<tr>
<td>Domestic purchases of goods and services that dealing directly with the tourists including purchases of food, catering services and trip by travel agents.</td>
</tr>
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**Induced Contribution**

<table>
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<th>Spending of direct and indirect employees</th>
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<td>Food and beverages</td>
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<td>Recreation</td>
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<td>Clothing</td>
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<td>Housing</td>
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*Total travel and travel contribution refer to the contribution to GDP and to the employment.*

Source: Annual Research of World Travel and Tourism Economic Impact, WTTC, 2018.
Whilst a variety of definitions of the term “World Tourism Cycle” have been suggested by previous literature, this paper adopts the belief that the percentage growth of annual tourism exports can act as a proxy for the world tourism cycle (Andraz & Rodrigues, 2016). As depicted in the illustration below, the evolution of the world tourism export cycle, which represents the fundamentals of the tourism cycle, can also act as a good annotation for the occurrence of world economic crises. It is undeniable that ambiguous external shocks from financial instability and economic fluctuations are unavoidable in tourism industry development. Apart from that, the perceptions of tourists and their income levels will also raise the issue of dynamic changes, with high sensitivity, for the tourism industry. Thus, the fundamentals of the tourism cycle are to determine the expansion and recession periods in a nation and to examine the importance of the impact of the natural fluctuations of the world’s economies on the tourism cycle.

![Figure 1.1: World Tourism Exports Cycle, 1990-2017](Source: World Visitor Exports - Foreign Spending in Percentage Growth, WTTC, 2018)
The graphical illustration, above, of the world tourism export cycle, covers the period from 1990 until 2017, the duration of crises have been classified into three broad spectra of periods which are; 1990-1995, 2000-2005 and 2007-2017. There has been a marked and gradual decline in tourism growth during these periods when economic crises have occurred globally. First, the crises that occurred during the period from 1990 until 1995 illustrated two negative movements in the tourism export cycle. The decline was due, mostly, to the currency crisis that occurred in the European Monetary System (EMS) during the years of 1992 and 1993. The reunification of Germany, which undertook to merge the wealthy West German economy with the poorer East German economy, required the German government to invest significantly to ensure the successful assimilation of economic functions. The German government’s budget deficit inclined sharply from 5% to 13.2% and a significant amount of money was transferred from West to East Germany. These accelerated effects on the German economy encouraged a huge outflow of capital, this, in turn, caused a severe depreciation of the currency which tended to lead to high inflation in the country. Deutsche Bundesbank, the German Federal Bank was eager to tighten monetary policy and reduce the expansionary fiscal policy and, thus, incremented the country’s interest rate, steeply, by about 3%. Due to restrictions from the EMS which required the implementation of a corrective monetary policy, other European economies, such as France, and Great Britain experienced a severe deterioration in their economies as a consequence of the increment of Germany’s interest rate.

Proceeding to the next shock or economic crisis, which covered the period between 2000 until 2005 and was clearly reflected in the world tourism cycle. A number of events occurred during this time period which could loosely be classified into three types; terrorism,
armed conflict and natural disasters/health. First, there were numerous terrorists’ violations and attacks which including the September 11 attack in New York in September 2001; the Bali bombings in October 2002; the Madrid train bombing in October 2004; and the London bombings in July 2005 which targeted public transport users. Second, an economic downturn was caused by the initiation of armed conflicts which contributed a significant impact on the tourism industry (Griffin, 2004). In this case, a military invasion took place in Afghanistan in October 2001 and the war on terrorism commenced in Iraq which occurred between March and May 2003. Third, the occurrence of a natural disaster decreases tourism demand instantly. The tsunami in the Indian Ocean during December 2004 is an example of such a natural disaster. Nevertheless, the outbreak of Severe Acute Respiratory Syndrome (SARS) in November 2002 also created a significant impact on the tourism industry. During such situations, tourists have high awareness regarding issues that might jeopardise their safety and thus, they may choose to travel to other safer destinations or choose to stop travelling temporarily.

Next, the study progress to another stage of the tourism cycle covering the period after 2007, the global financial crisis was initiated by the high levels of potentially unserviceable debt that had accumulated in the United States. The Sub-Prime Mortgage Crisis of 2008 brought severe economic consequences, especially on employment, where the implications on youth were the most significant (Tanveer, Marelli, & Signorelli, 2012) at that time domestic tourism demand declined steadily. This event impacted the world visitor exports on foreign spending the most, as illustrated in Figure 1.1. Precautionary steps were crucial to overcome the economic crisis and to quickly recover from the economic setback
1.2 Background of the Study

Figure 1.2 denotes the global GDP growth by industry sector and shows that the growth of travel and tourism to GDP marked the highest growth sector outperforming the other major global economic sectors, outpacing global economic growth. In 2017, the growth of the travel and tourism sector was 4.6% which indicated it to be the fastest growing sector. The second fastest growing global economic sector was the manufacturing industry, with a growth rate of 4.2%. The majority of sectors recorded a growth of less than 4.0% including; the information and communication sector and the retail and wholesale industry, followed by growth lower than 3.0% for the healthcare and social work sector, the agriculture industry, the forestry and fisheries sector, the financial services industry, and the construction industry respectively.

![Figure 1.2: Industry Sector GDP Growth, 2017](Source: Oxford Economics, Global Economic Impact and Issues 2018, WTTC, 2018)

Undeniably, this growth was supported by high performing and favourable economic conditions. The growth was partly supported by continued low interest rates across the key advanced economies, the higher purchasing power and strong spending of consumers,
comparatively low crude oil prices which may have kept airfares at relatively lower prices, and the recovery from the impacts of terrorism affecting certain destinations, after terrorist attacks in 2015 and 2016. Thus, the role of the tourism industry, as one of the global economic sectors, is significant and acts as a strong contributor to the world’s GDP, which may lead to further economic growth.

As far as this study is concerned, the total contribution of travel and tourism to each country’s GDP in percentage terms was chosen as the index for the targeted research country. Even though the absolute figures for travel and tourism revenue in 2017 were higher in countries, such as the United States with US$ 509.4bn out of a total GDP of US$ 19,386.8bn (approximately 2.3% of the total GDP). This was followed by China where the total GDP in 2017 was US$ 12,237.7bn and the total revenue contributed by travel and tourism was US$ 402.3bn which accounted for about 3.3% of the total GDP. This shows that whilst the U.S. ranked higher in terms of tourism’s total contribution, tourism’s revenue contribution to the country’s GDP in percentage terms was, however, relatively lower due to other industries generating a higher percentage of national income.

Therefore, the benchmark indicator used to choose the countries to be studied was based on the percentage contribution of travel and tourism to each nation’s GDP in 2017. This was due to the tourism industry being considered a mainstream sector for revenue generation in the respective countries. When countries are heavily dependent on the tourism sector with a percentage higher than one-third of their GDP, they are categorised as being tourism-reliant countries. In this study, the country chosen was Fiji, a small island nation in the Asia-Pacific region, where tourism represents 40.3% of the nation’s GDP. According to
the World Travel and Tourism Council, the direct regional contribution of travel and tourism to the GDP of the Asia-Pacific region was recorded at US$ 2.7 trillion with the remarkable annual growth rate of 5.4%. At the same time, the rapid growth of the Asia-Pacific regional economy aided by travel and tourism growth contributed 177 million jobs. It is crucial to further investigate the future prospects of tourism growth due to the world’s high reliance on this dynamic and resilient industry.

1.2.1 Fijian Tourism Economic Development

Fiji is blessed with a total of 322 islands occupying 750 thousand square kilometres in the Southwest Pacific Ocean and a land area of approximately 18,376 square kilometres. Fiji is located at the centre of the South Pacific and is roughly 3,000 kilometres north-west of Australia and 2,000 kilometres north of Auckland, New Zealand. Fiji was the home of 905,502 people in the year 2017, with the majority of the population living on the island of Viti Levu which is also the location of Suva, the capital city of Fiji. Furthermore, Fiji is known as a South Pacific paradise which is famous for its tropical islands as well as its friendly people who warmly welcome foreign visitors. Suva, the capital, on the island of Viti Levu, is regarded as the main international gateway for tourists. Fiji has ancient archaeological sites as well as tropical rainforests to entertain visitors, it is also known as one of the world’s top surf break destinations. Breath-taking nature accompanied by amazing and unique culture add to the attractiveness of Fiji.
From the year 1879 until 1916, the British engaged the Indian labourers to work in Fiji’s sugar plantations under an indentured labour system. Nearly 60% of these Indian people chose to remain in Fiji after the abolition of the indentured labour system and this led to the appearance of independent, smallholder, sugarcane farmers over the decades. These Indo-Fijians were primarily dependent on sugar production which provided them with significant economic and political force in Fiji. The 1996 census showed that the population of Fiji had reached 772,655 with an ethnic mix of 51.0% indigenous Fijians, 44.0% Indo-Fijians, and 5.0% other ethnicities. Sugar has played a role as the major industry of Fiji for over 100 years. The contribution of this industry includes; foreign exchange earnings, employment opportunities, contributions to GDP and government revenue and other tourism-related industries had also benefited from it, especially the banking and retail sectors.

However, the tourism sector was recognised as an important and growing sector and surpassed the sugar industry as the largest foreign exchange earner after independence in 1970. Apart from the sugar industry, other important economic contributors are forestry, mining, and agriculture. Furthermore, the relatively well-diversified economy in Fiji is also integrated with the well-developed retail and wholesale sectors. The background to the tourism industry of Fiji is mainly based on a neo-colonial economy associated with foreign exchange earnings and profit-seeking interests as the dominant concerns (Rao, 2002). By virtue of having affluent capital resources and a professional managerial team, Fijian tourism has shown increases in terms of contributions to the GDP, job creation, and foreign exchange earnings.
Undeniably, Fiji’s tourism growth is extremely vulnerable to both internal and external shocks. Fijian tourism has been adversely affected by political unrest, cyclones, fluctuations of the global oil price, shocks in food prices, and the global financial crisis. Upon joining the World Trade Organization in the late 1980s, Fiji embarked on an essential policy shift toward a more market-oriented and outward-looking development policy which further engaged Fiji with international trade. Fiji has practised trade openness by decreasing import restrictions and offering more favourable promotions to export. This open trading strategy has successfully led to better employment opportunities in the tourism and textile sectors.

Figure 1.3: International Tourism Receipts and International Tourist Arrivals, 2000-2017

Figure 1.3 illustrates the international tourism receipts and the international tourist arrivals for Fiji from the year 2000 through 2017. Over the last two decades, the tourism industry in Fiji has portrayed a generally positive trend accompanied by a few declines
caused by political instability, inflation, floods and global crises. After the military coup of 2000, the number of international tourist arrivals more than doubled from 294,000 in the year 2000 to 632,000 in the year 2010 alongside international tourism receipts which increased from USD291mn to USD955mn respectively over the same period. The implications of military coups caused two major declines in 2000 and 2009 as travel to Fiji was banned by significant inbound tourist source markets including the top three markets, namely; Australia, New Zealand, and the U.S.A. The number of international tourists decreased from 585,000 to 542,000 accompanied by a decrease in international tourism receipts from USD952mn to USD688mn. The outstanding performance from 2009 to 2011 was mainly triggered by the increased tourism budget invested by the Fijian government. The tourism incentives proposed by The Fiji Tourism Development Plan 2007-2016 eventually boosted tourism growth. When comparing the two coups which occurred in the years of 2000 and 2006, the tourism industry recovered relatively faster after the coup in the year 2000 with a growth rate of 86.7%. Meanwhile, the recovery from the coup in the year 2006 struggled with a growth rate of only 28.3% based on the evidence of tourist arrivals.

Fiji is a convenient leisure destination for many Australians, due to its location, which is closer than Bali or Thailand which are also popular destinations for Australians. Thus, general elections in Fiji have always drawn attention from Australia’s main political parties. Such attention, regarding the West Pacific region, is driven by worries about the growing influence of China in the region. However, Fijian politics are vastly more complicated than simply the issues related to indigenous nationalism. In 2006, a successful military coup was led by the Fijian military leader, Commodore Frank Bainimarama who
ousted and replaced the Prime Minister, Laisenia Qarase. The South Pacific region is still rippling from the consequences of this military coup, even today.

Externally, Fiji has also been exposed to the risk of losing sugar subsidies, where sugar production is one of the main exports of Fiji’s agriculture industry. At the same time, the special arrangements offering beneficial access to the European Union market were also affected in terms of export earnings. The tourism industry faced longer-term damage due to incremental increases in unemployment, crime and prostitution. Undeniably, political instability will always have an impactful effect on the tourism industry as travellers are less keen to travel to a politically unstable destination. During the coup in Fiji during 2000, labour unions in Australia advised their members not to purchase products made in Fiji. As Australia is one of the top source markets for inbound tourists to Fiji, this created significant effects on the tourism industry where tourism products were slow to sell. An economic depression occurred after the coup, mainly due to the stagnation in tourism and the crash of the sugar industry.

Generally, a rising oil price will lead to inflation and increased budget deficits as the national income of nations are affected. Thus, economic growth will slow as increased oil prices cause increments in production costs which may depress the supply of goods. On the other hand, tourists are exposed to higher transportation costs without any compensation in the form of rising incomes. Inflation refers to the economic condition where the general price level of goods and services increase continuously over a period of time. Thus, each unit of currency is able to purchase fewer goods and services due to the increment in the general
price level. Hence, the tendency for tourists to travel will decrease significantly as their utility and satisfaction levels as consumers diminish.

**Figure 1.4:** Tourist Arrivals and Arrival Growth for Fiji, 2000-2017

Figure 1.4 indicates the growth in international tourist arrivals for Fiji. The tourism sector of Fiji has experienced numerous structural changes, over a relatively short period of time, since the 1980s, due to the rise and fall of the main sectors. The most significant decrease in the growth of tourist arrivals was -28.3% as a result of the military coup 2006. Nonetheless, the average tourist arrival growth of 5.1% between the years of 2000 to 2017 was considered as a slow growth rate, although the number of tourist arrivals was increasing throughout the years. In this case, the constructed TCI may act as a signalling tool for the Fijian tourism market to allocate resources efficiently and to implement policy effectively to minimise the risk burden from worldwide crises.
The growing reliance of the tourism sector for the Fijian economy summoned an economy-wide impact analysis on the travel and tourism sector to ensure continuous growth. With respect to the tourist arrivals and arrival growth of Fiji for the year 2000 to 2017, the fluctuations may have been due to some economic crises as well as natural disasters which are unpredictable. The decrease of international tourist arrival growth between 2005 to 2007 was attributed to the Tsunami which occurred during the year 2004 which scared away risk-averse tourists. Thus, Fiji suffered a significant loss of tourism revenue as the travelling behaviour of tourists changed. Furthermore, the decline in the purchasing power of tourists due to the financial crisis of 2008 led to another downturn for Fijian tourism.

**Figure 1.5: Total Contribution of the Tourism to GDP and Employment for Fiji, 2000-2017**
(Source: Economic Impact of Travel and Tourism, WTTC, 2018)

Figure 1.5 demonstrates the percentage of the total contribution of travel and tourism to the GDP and employment for Fiji. The year of 2017 marked the highest total contribution of the travel and tourism sector to Fiji’s GDP at USD 1,966.3mn which accounted for 40.3%
of Fiji’s total GDP. At the same time, the World Travel and Tourism Council reported that the total contribution was expected to rise by 5.0% per annum to a total of USD 3,242.4mn, which is approximately 43.4% of Fiji’s GDP over the next decade. Furthermore, the tourism industry is also dedicated to creating employment and contributed 36.5% of Fiji’s total employment or 118,500 jobs including jobs indirectly supported by the travel and tourism sector in 2017. It is expected to rise by 2.7% per annum to 153,000 jobs or 43.7% of total employment over the next decade. The Fijian government’s practice of international trade openness accounted for USD 236.7mn or 24.3% of total investment from travel and tourism in 2017. The consistent increment of employment led by the increase of tourism’s total contribution to GDP has continued to tackle the important role in job creation and employment opportunities in Fiji.

Table 1.2: Tourist Arrivals and Market Share of Top Ten Markets for Fiji, 2017

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Arrivals</th>
<th>Market Share (%)</th>
<th>Arrival Growth (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Australia</td>
<td>365,026</td>
<td>43.9</td>
<td>0.4</td>
</tr>
<tr>
<td>2</td>
<td>New Zealand</td>
<td>178,781</td>
<td>21.6</td>
<td>10.4</td>
</tr>
<tr>
<td>3</td>
<td>U.S.A.</td>
<td>79,072</td>
<td>9.5</td>
<td>8.0</td>
</tr>
<tr>
<td>4</td>
<td>Pacific Islands</td>
<td>52,571</td>
<td>6.3</td>
<td>1.3</td>
</tr>
<tr>
<td>5</td>
<td>China</td>
<td>49,301</td>
<td>6.0</td>
<td>1.3</td>
</tr>
<tr>
<td>6</td>
<td>Continental Europe</td>
<td>33,431</td>
<td>4.0</td>
<td>10.8</td>
</tr>
<tr>
<td>7</td>
<td>Rest of Asia</td>
<td>23,594</td>
<td>2.8</td>
<td>16.3</td>
</tr>
<tr>
<td>8</td>
<td>United Kingdom</td>
<td>16,955</td>
<td>2.0</td>
<td>-3.9</td>
</tr>
<tr>
<td>9</td>
<td>Canada</td>
<td>12,734</td>
<td>1.5</td>
<td>2.6</td>
</tr>
<tr>
<td>10</td>
<td>South Korea</td>
<td>8,654</td>
<td>1.1</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>10,822</td>
<td>1.3</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>Total Arrivals to Fiji</td>
<td>830,941</td>
<td>100.0</td>
<td>5.1 (Average)</td>
</tr>
</tbody>
</table>


Fiji is famed for its tourism services and has enjoyed continuous international tourist arrival growth of, on average, 5.1% from its source markets. It is essential to keep track of
Fiji’s tourism performance and to predict future movements of tourism which is the largest foreign exchange earning industry in Fiji. According to the Fiji Bureau of Statistics, the Fijian incoming tourism market is dominated by Australia with total arrivals of 365,026 tourists in 2017 which accounted for a 43.9% market share. The next largest contributor, by market share, was New Zealand with 178,781 total arrivals and a market share of 21.6%. The combination of Australian and New Zealand tourist arrivals accounted for 65.5% of the tourism market, which is a highly significant proportion of Fiji’s tourism market. Other countries had a market share lower than 10.0%, such as the USA with a 9.5% share, followed by the Pacific Islands with a 6.3% share and China with a 6.0% market share. Tourist arrivals from other countries indicated market shares lower than 5.0% of the Fijian tourism market. Overall, most of the source markets recorded a growth in arrivals from the previous year.

1.3 Indicator Approach

Saltelli et al. (2005) provided an insight into the advantages and disadvantages of using composite indicators to conduct research. The application of a business composite indicator from the tourism perspective may possess forecasting ability and be able to determine the turning points of the tourism cycle. Thus, the advantages and disadvantages of a tourism leading indicator are interpreted and discussed in this section.

A tourism cycle indicator has the potential to become a good illustration of the tourism trend as composite indicators can easily interpret several indicators at once. In this example, policymakers and decision-makers would be able to obtain an overview, or summary, of what are complex issues by constructing a tourism cycle indicator. Besides, policymakers should utilise composite indicators for benchmarking analysis, to ensure the
efficiency of fund allocations, and for strategic planning regarding future events. Clearly, a composite indicator is able to provide a bigger and clearer picture for policymakers as it is a straightforward interpretation compared to the trends of multiple indicators. Furthermore, composite indicators allow the comparison of tourism performance across countries and it promotes the examination of progress over time. Moreover, there is more information which can be enclosed within the existing constrained list of indicators.

In contrast, there are also possibilities for the composite indicators to mislead the dissemination and transmission of information from the data sources obtained. At the same time, the robustness of the policy messages can be tested via sensitivity analysis to determine whether it is poorly constructed or interpret wrongly. Contradiction to the beneficial part that mentioned above, the simplicity of big picture may lead to the simplistic policy conclusions which done by the politicians. This problem is encouraged to be overcome by adopting the sub-indicators to ensure sophisticated policy conclusions can be obtained. The inappropriateness on the selection of indicators can lead to political challenges where judgments involved. To overcome this obstacle, the transparency of judgment during the selection of indicators must be considered. Moreover, when the composite leading indicator is poorly constructed, wrong signalling will be provided and may convey the false and less precise policy messages. However, there is always an argument exists that it is challenging and problematic if the disadvantages of composite leading indicator become worsen in few dimensions. This is due to the remedial measures are hardly defined in this situation.

Briefly, it is crucial for all beneficial parties to utilise the constructed composite leading indicator in the correct way to obtain precise interpretations. Such actions would be
helpful for policy decision making and for the allocation of resources. This should enhance the effectiveness and efficiency of the country to perform well and could act as a benchmark for other countries. As the composite indicator is an aggregate dimension of other individual indicators, care should be taken with the selected variables used and it is compulsory to follow the proper construction steps to ensure the usefulness of the tourism cycle indicator.

1.4 Problem Statement

As mentioned by Klein (1950), adequacy of the available data was crucial for the extensive use of econometric methodologies. The construction of national or economic statistics have been readily published on the basic of intuitive concepts. Assumptions was made where the preparation of economic statistics and the derivations of data did not follow to any specific models. Therefore, the readily available economic time series were commonly not suitable for the immediate use of econometric studies. Forecasting is always prone to several kinds of biases and upon limited market knowledge for the forecasters. The issues of forecasting inefficiencies and data credibility often failed the authentic story of where the forecasting ahead. Without the existence of credible data, the forecast will not be effective for the targeted market itself. To solve the relevant issue, valuable data is a necessity for the forecasting procedure. Across the research, it is required to ensure the continuous flow of data to allow for easy replication and the constancy of data presentation is compulsory to overcome the issue. In the current study, The Conference Board (2000) procedure has included the selection criterion for the component series. Thus, despite the forecasting issue, the construction of the composite leading indicator can be entrusted via the indicator selection process.
Moreover, the effectiveness utilisation of forecasting can only be achieved when the situation can be matched nicely with the appropriate characteristics of methodology. The basic selection process advised to be based on several criteria inclusive of the time horizon of forecasting, the accuracy and value of forecasting, the data availability and conformity, and the practitioner’s experience in forecasting (Makridakis & Wheelwright, 1977). Forecasters found that there are four main different types of behaviour which comprises of trend, seasonal variations, cyclical variations, and irregular variations. Trend is defined as a long term movement; cyclical variation is the repetition of the up and down movements caused by the factors that influencing the economy; seasonal variation is mainly due to the effects of seasonality which are spring, summer, autumn and winter; irregular or random variation is the disturbances that caused by unpredictable influences such as weather. In this case, the problem needs to be tackled carefully with the selection of appropriate methodology with the forecasting characteristics for those relevant forecasting studies.

Tinbergen (1951) argued that very high correlations were easily established among quite unrelated variables for a regular cyclical rhythm. Nonetheless, the next main issue in forecasting field is the determination of a continuing pattern or the turning point forecasting. Rather than to handle the turning points for the series, the forecasting is more designated to anticipate the continuing pattern by using accuracy measurements in the data series. Most of the quantitative forecasting models are assuming the constancy of the predictions despite the sudden change in pattern which might violate this assumption. This may lead to a severe deterioration of the forecasting method in terms of the accuracy rate. Although sometimes the changing pattern tends to be less dramatic, it is still a significant matter for the forecasting. During the happening of the issue, the performance of most of the forecasting technique will
become poorer especially when the situation is not well-understood. However, the changes in the basic pattern can be dealt using the adaptation of the parameter values of the forecasting models. These are some promising exceptions that can be applied to overcome the forecasting issue where the predictions are not continuances with the existence pattern or only focuses on a single incident. To overcome these issues, in general, subjective or informal methods have been the most appropriate method in seeking for further improvement for the forecasting performance.

As one of the world’s largest economic sectors, which contributed 10.4% of the global GDP, the travel and tourism sector has created jobs, driven exports and generated prosperity across the world. According to the annual analysis of tourism’s global economic impact from the World Travel and Tourism Council (WTTC), the travel and tourism sector accounts for 313 million jobs or 9.9% of total employment in the year 2017. Strong empirical evidence can influence and support the implementation of correct policy and investment decisions to further develop the tourism sector, this would be especially true for countries with economies that are highly dependent on the tourism industry. The quantified economic and employment impacts of tourism have spurred the interest of this study to investigate better methods and tools to forecast the performance of the tourism sector. By using a signalling or advance warning tool for potential tourism growth, decision makers can utilise the inherent valuable forecasting ability to ensure that resources are allocated efficiently.

Moreover, robust spending power from consumers worldwide pushed 2017 to be one of the strongest years over the last decade towards the growth of GDP. This significant global growth contributed to the travel and tourism sector’s direct growth of 4.6% which
outperformed other sectors, such as financial services and construction which reported growth levels of less than 3.0%. The growth rate of the tourism sector outpaced the global economy for the seventh successive year, and growth performance was particularly strong across Asian countries. This also proves that the tourism industry is resilient, especially, when the destination countries recover strongly from devastating impacts caused by crises or incidents. This power of resilience that is found in the travel and tourism sector is much needed in the establishment of a tourism cycle signalling tool which will allow authorities to be better prepared, with precautionary steps, during periods of high or low performance of the tourism sector.

From the perspective of global tourism, governments are often concerned about inclusive growth and consistent quality job opportunities for the future well-being of their nations. The travel and tourism sector already accounts for approximately one in every ten jobs across the globe and is honoured to be known as a dynamic engine for employment opportunities. Over the past decade, one in five of all jobs created worldwide in the tourism sector were created with governmental support. Accompanied by appropriate regulatory conditions, it is estimated that the tourism sector may create nearly 100 million new jobs in the coming decade. Such strong growth craves for strong management and indeed for comprehensive longer-term planning. For the sake of risk management and effective planning, there is a need for all relevant stakeholders to access all of the available information to ensure the strategic growth of the tourism sector. The constructed tourism cycle indicator (TCI) has managed to provide a basis of empirical evidence to help both public and private authorities in effective decision making for the tourism industry.
In many small island States with developing economies, such as Fiji, the tourism sector is a primary economic driver, supported by other industries, such as agriculture, sugar or garment industries. In 2017, the total contribution of the travel and tourism sector to Fiji’s GDP was USD1,966.3mn which was equivalent to 40.3% of the total GDP. At the same time, the Fijian tourism sector contributed 118,500 jobs which accounted for 36.5% of the total employment in Fiji. The performance of the tourism industry in Fiji has recorded remarkable growth over the last decades despite the numerous declines caused by natural disasters and political instability. The socio-political affairs have created a fragile democratic government and this situation has depressed potential tourist arrivals. Political instability in a country may cause foreigners to be critical of the government of a destination nation and this may affect their decision to travel to that destination. Political instability often refers to the situation where a government has collapsed or is facing a coup. It is a condition where the mechanisms of governance and the rules of government are challenged. The reputation and image of a country undergoing political instability will be affected due to the uncontrolled situation which may cause anxiety for tourists or even the citizens.

Unquestionably, the occurrence of the political unrest after the 2006 military coup brought a tremendous impact on Fiji’s trade deficit which consequently led to an economic crisis. The devaluation of the Fiji dollar, by around 20%, occurred due to the political turmoil. In order to stabilise the Fijian economy, some world powers, which were also some of the main source markets for Fiji’s tourism, which included; Australia, New Zealand, and the European Union worked together to assist with this critical issue. Visitors to Fiji had a prominent role in rebuilding the Fijian economy due to the huge inflow of funds in commercial and private property ventures. Accompanied by this inflow of foreign direct
investment to Fiji, revenue generation and job creation was achieved. The Fijian government thereby recognised the importance of maintaining a vibrant tourism economy in Fiji to overcome future economic crises. Hence, the lack of crisis management readiness that has endured in some countries is considered as harmful to ongoing government revenue. The constructed TCI can provide early warning of impending crises and, thus, with appropriate policy changes, may be able to reduce any potential economic damage and speed the positive revival of the tourist sector.

Apart from the in-country impacts, the regional bloc effect is also significant towards the failure in promoting the political stability of the nation. Over its history of 38 years as an independent nation, Fiji was the first country to have been suspended from the Pacific Islands Forum, due to its failure to manage its election crisis. Other than the suspension from the Pacific Islands Forum, Fiji was also excluded from the discussions on the Pacific Agreement on Closer Economic Relations (PACER) whilst the Pacific Free Trade Agreement (PICTA) also excluded Fiji as one of the member countries in their organisation. According to Australia’s Department of Foreign Affairs and Trade, Fiji was also suspended from the Commonwealth in September 2009 but returned in October 2014, after the stabilisation of its political affairs. These restrictions, constraints and the suspension limited the expansion of Fiji’s tourism market. The suspended collaborations and diplomatic relations among the Pacific countries, especially, the top source markets for inbound tourists; Australia and New Zealand, had a significant impact on Fiji’s national income. Thus far, the application of the political indicator in the tourism cycle analysis has been particularly successful in forecasting the Fijian tourism cycle.
In the present study, the countries with a travel and tourism contribution to GDP higher than 30% were selected due to their heavy reliance on the tourism sector. Fiji, one of the Pacific Island States, with a tourism contribution to GDP of 40.3% is such a tourism-dependent country and was chosen for the study. To ensure consistent development and efficient resource allocation, it is crucial for nations, such as Fiji to grasp information regarding the development of tourism demand which may provide an insight into possible trends. The prior signalling of tourism development in Fiji could also provide valuable information to the government in drafting appropriate tourism policies.

The alleviation of poverty is one of the largest global challenges while at the same time tourism is one of the most powerful drivers of world trade and prosperity. Thus, the development of tourism should be beneficial for whole communities, and, especially, for those who suffer from poverty. However, this statement does not apply nor has it happened in Fiji, despite the significant contribution of the tourism sector. Apparently, the difference between the amenities and infrastructure for tourists and those for the local communities is distinct. This is mainly because the benefits of tourism in Fiji have not penetrated to the bottom of the pyramid. There is a need to reduce economic leakages, as it is estimated that 60% of the tourism revenue is credited to foreign investors and that the domination of foreign investors has also discouraged the local participation in Fiji’s tourism development. In this case, the revenue generated by the Fijian tourism is more diverse than that of other countries’ economies. Despite the role of Fijian tourism as the largest foreign currency exchange earner and the greatest contributor to Fijian GDP, socio-economic impacts are still being faced by the indigenous Fijian communities after more than 30 years. Hence, future tourism
development in Fiji should consider the added-value from the tourism industry which can be directed towards local communities.

As mentioned previously, the major source markets of Fiji’s inbound tourism include; Australia, New Zealand and the USA which in combination contributed 75% of the total market share in 2017. Despite the possibility of a weakening Australian dollar, the Fijian government still has a high dependency on these traditional western markets in their marketing strategy. Regarding the research carried out by Li et al. (2010), the Chinese outbound travel market recorded an estimated 22 million trips in 2009, followed by Japan with 19.2 million and South Korea with 18.4 million trips, each of these countries has the potential to significantly increase their market share as sources of inbound tourists to Fiji.

Currently, travellers in China take more than 4 billion domestic travel trips and 131 million international travel trips. Despite the outstanding potential of the Chinese market, as well as other Asian markets, for inbound tourists to Fiji, Fijian tourism has yet to modify its brand and product management towards these future markets. This delay may lead to the slow development of the Fijian tourism industry which has not taken advantage of this early insight into the changing market to ensure its future prosperity.

The most significant issues that generated the interest in conducting this study were the role of Fiji, as a tourism-dependent country, with a contribution from the travel and tourism sector of more than 30% of its GDP, Fiji’s political instability that threatened suspension from the regional bloc and imposed a tremendous effect on the trade deficit and caused a currency devaluation. Moreover, the performance of Fijian tourism also affects neighbouring countries indirectly. Although tourism growth in Fiji has shown a relatively
positive trend, some issues and challenges including economic leakages and the high dependency on traditional western markets, such as Australia, New Zealand and the United States, despite the increasing role of China and other Asian markets which possess outstanding potential. Thus far, the role of the constructed TCI incorporating the relevant component series can portray an insight for the Fijian government to overcome the issues and minimise the burdens of crises accordingly.

1.5 Objectives of the Study

1.5.1 General Objective

The general objective of this study is to investigate the fluctuation of the tourism market and to establish a forecasting tool that can provide prior signals of any vulnerability in the Fijian tourism market by using a composite tourism cycle indicator (TCI), constructed using the indicator approach.

1.5.2 Specific Objectives

Meanwhile, the specific objectives of the study are portrayed below:

i. To construct a composite TCI as a prior signalling tool for the Fijian tourism industry.

ii. To recognise the turning points and establish an extensive reference chronology for the Fijian tourism industry by applying the Bry-Boschan technique.

iii. To evaluate the predictive performance of the TCI in characterising the Fijian tourism industry.

iv. To determine the transition probabilities of occurrence for crises by employing the Markov-switching technique.
1.6 Significance of the Study

Tourism is a significant economic activity which possesses a strong influence on national economic growth and creates a multiplier effect in the job market as well. Thus, the goal of this study is to promote long-lasting tourism performance by using the indicator construction approach to anticipate tourism development. Throughout the study, there are a variety of benefits indicated from this approach, gained from different perspectives. For instance, the tourism cycle indicator (TCI) with prior signalling ability can capture the information needed for policy planning, risk monitoring, and further community development.

As the tourism market is inextricably linked to a nation’s economy, it is important to forecast fluctuations in the tourism cycle or tourism performance to ease the decision making of policymakers, investors, business players, tourism industry players, and even the community. Since the leading indicator approach has been widely applied in the general business cycle and other macroeconomic fields, it can also be performed in the context of tourism. From the perspective of policymakers or the government, if a prediction can be gained into the future tourism cycle, with prior signalling of between 3 to 12 months, this may provide evidence for the authorities to draft appropriate policies. With effective policies, the nation can attract more investment, either locally or from abroad, thus promoting economic growth.

Furthermore, investors and tourism industry players will be able to assess valuable information via the constructed TCI before making decisions. The assessment of such valuable information may be able to further enhance the performance of the organisations
and thus achieve better financial results. This may increase the confidence level of investors when they are aware of the future prosperity that can be gained by the tourism development of a nation. Better preparation and precautionary steps can overcome obstacles and challenges in the related industries. Nonetheless, this study aimed to perform more comprehensive forecasting in terms of precision and accuracy by using the indicator approach.

1.7 Organisation of the Study

The scope of this study is to establish a tourism cycle indicator (TCI) for Fiji’s tourism development. The TCI is targeted to predict the behaviour of the tourism cycle to ensure that the vulnerabilities of tourism development in the country can be foreseen. This will minimise the economic dangers and reduce risk in the tourism industry and, thus, scarce resources can be allocated efficiently. This thesis is constituted of five chapters. Chapter 1 has started by giving a systematic introduction and providing a clear picture of the area of research, this is followed by Chapter 2 which reviews related literature review from the previous studies. Next, Chapter 3 elaborates on the methodology applied in the study and provides the data descriptions. Chapter 4 confers the empirical findings from the proposed estimation as well as a discussion regarding the statistical results together with graphical illustrations. Chapter 5, the final chapter of the study, recaps the overall picture of the study to ensure the usefulness of the information content obtained via the constructed TCI. It also provides policy recommendations as well as pointing out the known limitations of the study and proposes areas for possible further research.
CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

Scant evidence has been discovered from the non-parametric and non-linear approaches to tourism demand forecasting. Reviews of previous literature are discussed chronologically in the following section which may provide an insight on the systematic review of tourism studies. In order to fulfil the research objectives of this study, a review of relevant literature from different fields of study has also been included to compare the significance of the studies. In this case, Section 2.1 comprises the related literature review on tourism demand forecasting research using a variety of research methodologies and the required fundamental variables. Furthermore, Section 2.2 discusses the related literature review on the use of the leading indicator approach for the evaluation of forecasting performance in different fields of study. This is followed by Section 2.3 which summarises the research gap found in the context of tourism whereby the leading indicator construction approach has been popularised in other fields, such as the business cycle, the real estate cycle, the oil performance cycle, and even stock performance forecasting. In short, this section discusses and compares preceding studies regarding tourism demand forecasting and reviews the limited literature using the non-parametric and non-linear approach on tourism forecasting which has been applied in other fields of study.
2.2 Research Framework

Following the seminal papers of Arthur Burns and Wesley Mitchell which were published in 1938 and 1946 respectively, interest has remained raised, among both policymakers and academicians, towards the role of leading indicators. A debate occurred when policymakers considered leading indicators as a useful tool for the prediction of future economic development. Economists have tended to develop vaguer attitudes towards the role of leading indicators, where some of them feel that the leading indicators provide good signalling insight into future economic development, whilst, others have considered the leading indicators as an exercise in “measurement without theory”. However, there is always an underlying theory that can explain the choice and evaluation of suitable indicators which are related to the reference series. The breadth of literature dealing with ways to develop more sophisticated methods related to the leading indicator approach has been widely discussed.

In the current study, an overview of the leading indicator construction method for the selected tourism-dependent country has been provided. The tourism sector, as a catalyst for inclusive growth, requires a supportive approach to further enhance its growth. The conceptual framework that was utilised was adapted from the National Bureau of Economic Research (NBER), as business cycle indicators have been validated as useful tools in analysing the economic expansion and contractions of business cycles. In capturing and analysing these alternative sequences for the cycle, the originated indicator approach can also be extensively utilised in other markets as well. The process of refinement was mostly led by Dr Geoffrey Moore, an economic researcher at the NBER, who initiated the concept of leading, coincident and lagging indicators. Dr Geoffrey Moore has also been recognised
as the “father of the leading indicators”. The Conference Board (2000) took over the responsibility for maintaining and publishing reports starting in the late 1960s.

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**Figure 2.1: Economic Cycle and Indicator Construction Procedures**
(Source: National Bureau of Economic Research, 1950)
In terms of choosing the cyclical indicators included in the indicator construction procedure, there were a few exceptions which were subjected to the survived time series. After the strict application of these standards, relatively few individual time series were eligible to pass. However, there was no single time series that was fully qualified to be an ideal cyclical indicator. According to The Conference Board (2000), there are six considerations in choosing an appropriate component data series which comprise; the perspective of conformity, consistent timing, economic significance, statistical adequacy, smoothness, and currency. The statistical and economic tests ensure the consistency of the data series to conform to the reference cycle, has a consistent timing pattern, is economically logical, the data collected is processed in a statistically reliable method, the month-to-month movements are not too erratic, and have a reasonably prompt schedule for publishing. Choosing appropriate component indicators can further ensure the credibility and validation of the forecasting performance.

**Figure 2.2: Conceptual Framework**
2.3 Related Literature Reviews on Tourism Forecasting Studies

The study by Rosello-Nadal (2001) anticipated international visitor arrivals to Spain’s Balearic Islands by determining its turning points. The variables that were included in the study were the exchange rate, the OECD’s main economic indicators, the consumer price index, relative prices, foreign trade, the industrial production index and tourist arrivals. The empirical findings found that the national economic variables possessed the ability of prior signalling towards tourist arrivals. The mean duration for the contraction period of tourism growth was 2 years 4 months which was higher than the expansion period at only 1 year 11 months. The researcher also stated that the method used was ideal for short-term decision making by the managerial team.

Kulendran and Witt (2003) proposed that a time series model comprising of the transfer function model and the univariate ARIMA model could perform relatively better than an error correction model in short-term forecasting. The variables used included international tourist arrivals, relative prices, the exchange rate, real income, and the real GDP. The same variables were also used in the study of Kulendran and Wong (2009), however, Kulendran and Wong (2009) employed the stock price index, total exports, and total imports to determine Hong Kong’s inbound tourism. This was followed closely by the study of Kulendran and Wong (2011), where they imposed the real oil price, the substitution price, the unemployment rate, and the consumer price index to investigate the determinants versus the composite leading indicators in predicting the turning points in the tourism growth cycle of Hong Kong. A similar approach was applied, also for Hong Kong, by Tang and Kulendran (2011) who realised that the constructed composite leading indicator could lead the Hong Kong hotel occupancy growth rate by 5 quarters.
From another perspective, Yap and Allen (2011) investigated other leading indicators that influenced Australia’s domestic tourism demand by employing the panel three-stage least squares estimator and the unit root test. The variables used, comprised of the consumer sentiment index, the business confidence index, household debt, disposable income, and the number of overnight stays, which was slightly different from other studies. Contrarily, Claveria and Torra (2014) argued that forecasting using the tourist arrivals variable had a higher accuracy rate compared to the use of overnight stays. Next, the statistical findings from the study of Yap and Allen (2011) revealed that the coefficient of the consumer sentiment index was statistically significant for visitors of friends and relatives at the 5% significance level but was insignificant for holiday purposes. Other than for business travel and tourism, the estimated elasticity of household debt for tourism demand was 2.39 for visiting friends and relatives whereas it was 2.90 for vacation trips.

Moreover, Smeral (2012) extended the field of study to international tourism demand and the business cycle for Canada, Australia, Japan, and the EU-15 countries. The research employed the econometric model, the Hodrick-Prescott filter, and the Wald test to investigate the relationship between tourism demand and the business cycle. Furthermore, the income elasticity in the EU-15 countries was relatively smaller during the slow-growth period at only 1.46 when compared to income elasticity of 2.35 during the fast-growing period. The loss aversion concept can best explain the travelling behaviour of the Japanese where they were found to have a higher preference to avoid losses in terms of the utility of a monetary payoff.
The study of Chang, Hsu and McAleer (2014) developed a tourism condition index for Taiwan and the outcome was believed to be trustworthy in forecasting the contemporary economic environment and tourist arrivals. Three main components were included which were; the tourism industry stock index - acting as a proxy variable for tourism performance, the effective exchange rate - as a proxy for tourism demand, and the interest rate - representing tourism’s capital costs. As well as employing the BEKK multivariate GARCH model, diagnostic checking using the Granger causality test and the Jarque-Bera normality test was also included in the study. Greater spillover effects were found with the economic environmental indicator, whereby, the straightforward findings were useful for both public and private sector decision makers. Furthermore, the interpretation of the publicly available information was also beneficial for the government, investors and business executives who were involved in the tourism industry.

The popularity of using the non-linear approach has brought only a negligible impact on the number of tourism forecasting studies. Chaitip and Chaiboonsri (2014) utilised a non-linear model to detect the future value of the number of international tourist arrivals to Thailand. The forecasting model constituted both high season and low season data. This could be implied from the Markov switching vector autoregressive model (MS-VAR) where each regime represented both high and low season data in Thailand. The first regime was expressed as high season tourism demand or the bull market in Thailand. Meanwhile, the second regime was described as low season tourism demand or the bear market in Thailand.

A non-linear Markov switching regression approach was also applied in the study carried out by Perles, Ramon, and Rubia (2015) to examine the impact of economic crises
generated on the global market shares of tourism destinations. Two basic transmission mechanisms were used to estimate the effects on the declination of tourism demand and the decrement of investments in Spain. The statistical findings revealed that the estimated duration for the occurrence of each crisis was 5.5 years. Specifically, the study suggested that an emphasis on price competitiveness, to attract more foreign direct investment, can act as a remedial measure for the process of tourism competitiveness recovery during a crisis period.

Yamaka, Pastpipatkul, and Sriboonchitta (2015) suggested constructing a Markov-switching Bayesian Vector Autoregressive model (MS-BVAR) to investigate the short-run and long-run relationship of Thailand’s inbound tourism from five major source countries. The results of the transition probabilities found that there was a high persistence for Thailand’s tourism to remain in the same regime. The probability of remaining in regime 1 was 96.10% while the probability of staying in regime 2 was 97.40%. Similarly, the percentage probability of switching between regimes was less than 5% which indicated that Thailand’s tourism would only be affected by extreme events to shift from one regime to another. As a result, the researcher also found that the approximate duration of the high tourism arrival regime was 68 months while the approximate duration of the low tourism arrival regime was 146 months.

In order to promote a sustainable tourism destination, three aspects, namely, social, economic, and environmental can provide positive net contributions. Blancas, Lozano-Oyola, and Gonzalez (2015) emphasised the importance of socio-economic aspects, that are related to the environment, were essential to be included in constructing a composite leading
indicator for Europe. They included the variables of the level of tourist arrivals, tourist expenditure, the seasonality of tourism activity, tourism employment, and tourism sustainability satisfaction to forecast the tourism demand in Europe in their study. The panel approach and sensitivity analysis were employed to meet the objectives of the study.

Concerning the forecasting of Croatia’s inbound tourism demand, the study of Tica and Kozic (2015) indicated that the consumption of foreign guests should be recognised as an important element of budget revenues. Other variables included in their study were; the real GDP, imports and gross wages across a time frame from 1955 until 2012. By employing the Granger causality test, they found that the real GDP together with imports in Poland and gross wages in the Czech Republic and Slovakia were the most important leading indicators to forecast inbound tourism demand for Croatia.

At the same time, Baldigara and Mamula (2015) also modelled Croatian’s international tourism demand. However, they used the seasonal ARIMA model instead of the method employed by Tica and Kozic (2015). The appropriateness of this model for analysing the number of German tourist arrivals to Croatia was defined by the diagnostic checking and testing that was performed. As a result, an adequate model with the seasonal ARIMA (0,0,0) (1,1,3) was chosen for the empirical test. To ensure the highly accurate performance of the model, the empirical results of the mean absolute percentage error (MAPE) were advised to be performed at less than 10%.
Chen, Lin, and Chen (2015) and Chang and Lee (2017) both conducted research into the tourism market in Taiwan, which proved to exhibit cycle characteristics within the series. Both researchers identified two distinct phases of the tourism demand cycle which were a high-growth regime (HGR) and a low-growth regime (LGR). However, Chen et al. (2015) focused on the drivers of Taiwan’s tourism market cycle while Chang and Lee (2017) proposed the importance of macroeconomic determinants in forecasting the tourism demand in Taiwan. In the study of Chen et al. (2015), the empirical findings proved that the tourism market had a relatively higher tendency to remain in the LGR (94.71%), compared to the probability of staying in the HGR (42.67%). In other words, the probability of shifting from the LGR to the HGR was only 5.29%. Thus, the expected duration of the LGR was approximately 19 quarters while the expected duration of the HGR was about 2 quarters.

Apart from the justification for the HGR and the LGR, Chen et al. (2015) also identified the driving forces behind the Korean inbound tourism cycle. The researchers emphasised that the empirical results were able to provide essential information to assist the Korean government with policy implications. The study found that the growth rate of tourist arrivals and international trade was able to encourage the Korean tourism market to remain in the HGR which indicated that these two variables should be monitored to ensure sustainable tourism growth. Contrary to the study of Chen, Lin, and Chen (2015), the probability of remaining in the HGR was relatively higher than staying in the LGR at 71.04% and 53.80% respectively. The expected duration for the LGR was 2.16 quarters while the expected duration of the HGR was 3.45 quarters.
Monitoring the flow of tourism is a concern for every nation especially those largely dependent on tourism revenues. Andraz and Rodrigues (2016) monitored Portugal’s tourism flow using the monthly overnight accommodations of both domestic and international tourists, whilst, also taking into consideration the spending of those tourists. It was found that the tourists from Portugal and Spain had fewer irregular patterns along the evolutionary path due to the recession period. Besides, German tourists tended to demonstrate a leading role in Portugal’s tourism market, where they are regarded as one of the important source markets for tourism enhancement and development.

Apergis, Mervar, and Payne (2017) argued that a low level of consensus had been reached in favour of which specific method should be used in different situations. In their study, they proposed four alternative univariate seasonal time series forecasting models to explore the tourist arrivals in 20 Croatian counties and the city of Zagreb. The alternative models constituted; the seasonal autoregressive integrated moving average (SARIMA), SARIMA with Fourier transformation, the ARAR algorithm, and the fractional integrated ARIMA model. Both in-sample and out-of-sample forecasting were also employed in the study to enhance accuracy. Apergis et al. (2017) concluded that the importance of accurate anticipation in the tourism industry was threefold. It provides information to respond to the supply side of the market, it gives an insight to potential investors, and it is also crucial for policymakers to define different aspects of an institutional setting.

A more recent study was carried out by Sheng et al. (2017) which utilised the tourism prosperity index system, the Delphi method and the entropy method to investigate Macau’s tourism prosperity index. The constructed prosperity index was inclined from 95.28 in the
year 2006 to 103.21 in the year 2015. The indicator components constituted; Macau’s gross domestic product, the total income per capita, and the consumption expenditure. The empirical analysis proved that the annual growth rate of the prosperity index was 0.83%.

Furthermore, Tang, King, and Pratt (2017) predicted the hotel occupancy rate in Hong Kong using publicly available data. They engaged the OECD indices as the dominant leading indicators inclusive of hotel occupancy, the OECD business survey index, and the OECD consumer confidence index. Specifically, the consumer confidence index was able to provide prior signalling regarding the shifting demand for rooms, as trustworthy data, to allow hoteliers to allocate resources efficiently. The estimated model successfully demonstrated that the likelihood-ratio statistics were significant at the 95% confidence level. The methodologies selected were the Organisation for Economic Co-operation and Development (OECD) indicator construction guidelines, the Bry-Boschan dating algorithm, and the Granger causality test. A similar technique using the OECD indicator construction method was utilised by Mendola and Volo (2017) in their study of European countries.

The study of Mendola and Volo (2017), concluded that the three main concerns identified throughout their process of a systematic review were the ability of the present indicators to model tourism destination competitiveness, that greater awareness was required on the methodological choices during indicator construction and the managerial issues detected in the scrutinised studies. The variables utilised embodied price competitiveness, infrastructure development, technology enhancement, the education index, and tourism demand elements. For instance, tourist arrivals, tourism receipts, and the number of tourist overnight stays.
Besides, Chang and Lee (2017) also proved the usefulness of the involvement of macroeconomic determinants in foreseeing the foreign-exchange earnings of the Taiwanese tourism industry using the Markov-switching model, where they found a continuous causal effect. A steady-state probability was detected to retain the foreign-exchange earnings from tourism which is 0.75 for the high growth stage and 0.86 for the low growth stage. The empirical verdict found that the independent variables tended to remain at the LGS rather than shift to the HGS state. This was consistent with the earlier study of Yamaka, Pastpipatkul, and Sriboonchitta (2015) which also discovered two different regimes for Thailand’s international tourism demand, namely, a high tourist arrival regime and a low tourist arrival regime. A strong connection between Thailand’s tourism proxy of foreign-exchange earnings and government policies was also implied in the study. The study suggested that it would be a wise decision to maintain macroeconomic conditions.

Apart from performing quantitative research which can transform numerical data into usable statistics, qualitative research or primarily exploratory research can also be utilised to gain an understanding of the underlying reasons for the state of the tourism sector as well. Ivanov et al. (2017) proposed a self-administered questionnaire to investigate the impact of political instability on the tourism industry of the Ukraine. By applying the Mann-Whitney U-test and the Kruskal-Wallis $X^2$ test, their findings indicated that political instability had negatively affected the Ukrainian tourism industry. The country’s political instability impacted tourism by various aspects, such as, decreased revenues, a reduced number of tourists, the number of overnight stays plummeted, and costs increased all of which did not benefit the economy.
Thus far, tourist arrivals have been the main variable chosen by most of the previous studies covering both local and international tourism demand. Similarly, the level of tourist arrivals, on a monthly basis, was used in the study of Silva et al. (2017) which covered European countries over the years of 2000 to 2012. A multivariate singular spectrum analysis (MSS) algorithm was utilised to identify the leading indicators for European tourist arrivals. Throughout this study, the statistical evidence proved that there were existing cross-country relationships among European tourist arrivals.

The study of Long, Liu and Song (2018), carried out the pooling of tourism demand forecasting for China from 2005 to 2013. The variables chosen comprised of the number of domestic tourists, an income proxy – the gross product by region, the GDP, infrastructure and attractions. Throughout their study, a comparison of the various models; the panel pooled data model, the ordinary least squares model and the naïve benchmark model was made. However, they found that the pooled OLS model performed relatively less well than the other selected models. Thus, they recommended adding a spatial effect with a dependence structure into the regional forecasting models to further improve the forecasting performance. After incorporating both the spatial and temporal effects, the results of the pooling method became more convincing. Furthermore, the empirical results indicated the huge heterogeneity of tourism across the cities in China. It was also found that income was the key factor that enhanced domestic tourism demand in the spatial panel model. Concurrently, there was a strong concordance between both tourist arrivals and the GDP with a wide range in China.
Similarly, to other tourism studies, Valadkhani and O’Mahony (2018) employed the global composite tourism barometer, proxied by the number of total arrivals. Their research investigated the dynamic structural changes in the growth and decline of inbound tourism demand to Australia from 53 different markets. Furthermore, the study also adopted the modified capital asset pricing model (CAPM) incorporated with Markov switching to measure the systematic co-movements of individual arrival series towards the total arrivals to Australia. Accompanied by a switching beta greater than +1 for 15 growing markets, the empirical findings suggested that a diverse portfolio could sustain the Australian tourism sector. Thus, it was suggested that highly efficient marketing spending could be obtained by supporting emerging and substantial growing markets, such as France, Spain, Vietnam, Malaysia, and the Philippines.

Up until the recent study undertaken by Wan and Song (2018), most prior research has embraced the concept that leading and sustainable tourism growth can create a multiplier effect upon multiple tourism-related industries. Previous literature, which has been reviewed, believed that tourism demand forecasting is a crucial task for risk planning and policy management during the decision-making processes of a nation. As tourism demand exhibits growth cycles across a period, Wan and Song (2018) emphasised the importance of the prediction of turning points with probability forecasting by incorporating the Bry-Boschan algorithm. The indicators involved were; the growth rate of visitor arrivals to Hong Kong, real income, changes in the relative real exchange rate, the consumer price index, and the tourism prices of other tourism destinations.
Assaf et al. (2019) modelled and forecasted regional tourism demand for countries in Southeast Asia including Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. Contrary to the study of Long et al. (2018), Assaf et al. (2019) employed the Bayesian global vector autoregressive (BGVAR) model, the impulse response function and sensitivity analysis. The findings revealed the ability of the BGVAR model to capture the spillover effects of international tourism demand. The generalised impulse response function provided crucial details on the interdependencies of various countries with regard to the derivatives of shocks. Next, the sensitivity analysis was able to further establish and validate the forecasting results. The empirical analysis from the impulse response function showed that the tourism industries for border-sharing or neighbouring countries were highly interdependent and vulnerable to shocks from each other. Throughout the one-to-four-quarters ahead forecasting horizons, the BGVAR model consistently performed better than the three alternative VAR models.

It is undeniable that there has been substantial growth recently from internet tourism and travel. The role of information and technology has become overwhelming over recent decades. The studies carried out both by Dinis, Costa and Pacheco (2019) and Law et al. (2019) investigated the role that Google Trends has imposed on tourist arrivals in Portugal and Macau. In the study of Dinis et al. (2019), the composite indicator construction method was used which presented a high mean value of 71.9 and a standard deviation of 9.4 across the study. Moreover, the findings indicated the various behaviours and interests of Internet users worldwide regarding tourism in Portugal. The focus of the search also differed depending on the characteristics of the tourism product. From the perspective of Law et al. (2019), a deep learning approach was applied to tourism demand forecasting in Macau. The
empirical results indicated a better performance from the deep learning approach when compared to the support vector regression and the artificial neural network models. Apart from that, they also found that the highly relevant features provided practitioners with a means of understanding the relationship between tourist arrival volumes and the factors of tourism demand forecasting.

2.4 Related Literature Review on the Use of the Leading Indicator Approach for the Evaluation of Forecasting Performance in Different Fields of Study

Apart from the scant evidence obtained from the literature review on the leading indicator approach in the context of tourism, there is a broad spectrum of study in other fields. For instance, financial vulnerability forecasting, business cycle forecasting, property cycle forecasting, and oil price forecasting using both the parametric and non-parametric approaches. Witkiewicz (2002) employed the Hodrick-Prescott filter on the Swedish real estate cycle. The statistical findings proposed that the real business cycle was highly correlated to the real estate cycle with a correlation coefficient of 0.88. For instance, the peak of the real estate cycle in 1987 was predicted by the local maximum point of the constructed real estate cycle indicator in 1986, whereas, the trough phase of the real estate cycle in 1992 was signalled by the local minimum point of the real estate cycle indicator in 1991.

Proietti (2005) employed the Bry-Boschan technique, the band-pass filter, the Markov chain dating algorithm, and the Hodrick-Prescott filter to develop a new dating algorithm for the business cycle. Proietti (2005) emphasised that the amplitude of the fluctuation period which was less than the minimum cycle duration could be reduced through low-pass filters. The findings revealed that the industrial production index, real
manufacturing and trade sales were more prone to the recessionary phase and tended to be more volatile. Nonetheless, the constructed diffusion index possessed a high coherence, where the probability of recession crossed the 0.5 threshold.

Moreover, the method proposed by the National Bureau of Economic Research (NBER) to construct a composite leading indicator was employed by Seip and McNown (2007) regarding the business cycle of the United States from the year 1955 to 2000. From the results, the interest rate portrayed a lagging behaviour which contradicted the expected results. On the other hand, the money supply was regarded as an unreliable predictor which was inconsistent with prior studies. Apart from being a lagging and coincident indicator, the study found that the consumer price index had a leading pattern. There were six recessions dated over the period from 1960 to 1996.

In the studies of Chen (2007) and Tan and Habibullah (2007), the Markov-switching method was used to measure the business cycle in Japan and ASEAN countries respectively. However, Chen (2007) utilised the Markov-switching panel model which was slightly different from Tan and Habibullah (2007). The estimated duration for the expansionary periods with 0.97 transition probabilities was considered longer than the contractionary period with 0.95 transition probabilities. There were ten turning points that were dated, with five peaks and five troughs. The study of Chen (2007) also proved that the univariate model failed to capture the co-movement of the features.
Moreover, Tan and Habibullah (2007) investigated the business cycles and monetary policy asymmetry using the Markov-switching model for four ASEAN countries; Indonesia, the Philippines, Thailand, and Malaysia. The empirical findings proposed the existence of two-regimes in each of the economies that were studied. Besides, the results also proved that the monetary policies that had been employed had demonstrated a relatively larger impact during recessions. Accompanied by the variables of the real GDP growth rate, the inflation rate, the treasury bill rate, and the money supply growth rate, it was found that credit market imperfections played a crucial role on firm’s investment behaviour.

Having discussed the leading indicator approach that has been applied in different fields of study, it is also known as the NBER barometric method. This method has been widely used in determining the reference chronology for the business cycle, as demonstrated by Bacic and Vizek (2008). They employed this method to forecast the business and growth cycles in Croatia using monthly frequency data from 1995 to 2007. They proposed that the Granger causality test, which is framed in terms of its predictability, as the perfect method to identify the time series with leading properties. Using the combination of parametric and non-parametric methods, the study carried out by Schirwitz (2009), incorporating the Bry-Boschan algorithm, dated 5 peaks and 5 troughs for the German business cycle. Both Bacic and Vizek (2008) and Schirwitz (2009) employed the Bry-Boschan non-parametric method. However, Schirwitz (2009) utilised the Markov switching model, tested on the German GDP, to suggest a consensual business cycle chronology for the German economy.
In the study of Cubadda, Guardabascio, and Hecq (2013), a general to specific approach was utilised to construct the composite leading indicators for 24 European countries using quarterly data. The turning points were then dated using the Bry-Boschan technique. However, the study revealed that the composite index was highly correlated with the GDP with a 0.96 correlation coefficient. The same dating algorithm was applied by Levanon et al. (2015), however, the researchers employed the NBER composite indicator construction method which was different to Cubadda et al. (2013). Levanon et al. (2015) used financial indicators to forecast the business cycle for the United States. The leading credit index is able to improve the current conditions and contribute greatly to anticipating a recession period. Nonetheless, the leading credit index also ranked as the highest among the other components with a quadratic probability score of 0.06 over the study period.

Abu Mansor et al. (2015), Tkacova and Sinicakova (2015), and Puah et al. (2016b) employed the Conference Board indicator approach to construct composite leading indicators for the business cycles of Malaysia, Hungary, and Cambodia respectively. The three studies also included the Hodrick-Prescott filter as their filtering method to ensure the smoothness of the cycle. The empirical findings of the directional accuracy test carried out by Abu Mansor et al. (2015) revealed that the constructed indicator, with a 94.6% accuracy rate, outperformed the existing OECD composite leading indicator in forecasting the Malaysian business cycle. The findings were the same as for the study undertaken by Tkacova and Sinicakova (2015) on the Hungarian business cycle. Puah et al. (2016b) found that the constructed CLI possessed a leading ability of, on average, approximately 7 months ahead for the Cambodian business cycle.
As indicated previously, Bacic and Vizek (2008) carried out research regarding the Croatian economy, in addition, Bakaric, Tkalec, and Vizek (2016) also constructed a composite coincident indicator for the country - post-transition - covering the period from 1998 to 2010. After the correlation coefficients and significance tests were completed, the component series for indicator construction, which were consistent with the general business cycle tendencies, were detected. The chosen component series included the volume of industrial production, real retail sales, the total VAT revenues, and the broad money supply, M4. The research methodology applied comprised of the Markov switching model, correlation analysis, and the logit model.

Apart from the Conference Board indicator approach, the OECD composite leading indicator has also been widely applied in the context of business. Nonetheless, Tule, Ajilore, and Ebuh (2016) applied a composite index of the leading indicators of unemployment in Nigeria between 2008 and 2014 in a quarterly time method. The evidence from this study showed that the constructed composite index forecasting model performed better than the benchmark model in terms of the relative root mean square error (RMSE) values and the adjusted R² values. Moreover, it was empirically proven that the Granger Causality based composite index and cross-correlation could track the turning points of the Nigerian unemployment rate over the 7-year period of the study.

Pham (2017) utilised an early warning system model parametric approach, Probit model, and exchange market pressure to investigate the global shocks on the currency crisis in Vietnam. The convincing results revealed up to a 77.5% accuracy rate in predicting the occurrence of the currency crisis. Furthermore, useful leading indicators, such as changes in
the monetary policy, the growth rate for domestic credit, trade balance deficits, the overvaluation of currency, and international reserves in imports could foresee the occurrence of the crisis occurring in Vietnam.

Nonetheless, Vasicek et al. (2017) also involved the role of leading indicators to anticipate financial stress in 25 OECD countries. By employing Bayesian model averaging, panel model analysis, and the Markov Chain Monte Carlo method, their findings suggested that the constructed financial stress index performed relatively better in forecasting. The correlation between the financial stress index and economic growth ranged from -0.4 to -0.7 across different countries.

Besides, the non-parametric leading indicator approach was also applied to the property cycle in Malaysia as conducted by Puah et al. (2016a) and Voon, Puah, and Wong (2016). Both studies employed the indicator construction steps published by the National Bureau of Economic Research (NBER) and the Bry-Boschan algorithm for turning point analysis. However, the filter extraction method used differed between the studies where Puah et al. (2016) engaged the Hodrick-Prescott filter, meanwhile, Voon, Puah, and Wong (2016) applied the Christiano-Fitzgerald filter for the filtering process. The empirical findings revealed convincing results where the constructed property cycle indicators possessed an average lead time of 3.7 months and 9.75 months respectively.

Moreover, the recent research conducted by Chong et al. (2018) identified the usefulness and accuracy of the NBER indicator construction approach. Chong et al. (2018) utilised the OPEC and non-OPEC crude oil production changes, world crude oil
consumption changes, world crude oil stock changes, WTI future contract prices, open interest, and the U.S. business confidence index as the component series. The empirical findings revealed that the constructed oil price indicator moved ahead of West Texas Intermediate (WTI), which acts as the benchmark price for global crude oil, by an average of 3.6 months. Besides, the constructed indicator obtained as high as a 75.0% accuracy rate resulting from the directional accuracy and binomial testing. Thus, the convincing results validated the predictive power of the selected research methodology.

Up until recently, the composite indicator has been popularised in other fields of study too. Charles, Darne, and Tripier (2017) proposed an uncertainty composite indicator for the United States’ economy. There were three distinct sources of uncertainty which were reviewed which included, financial uncertainty, political uncertainty, and macroeconomic uncertainty. This was followed by the study undertaken by Chadwick and Ozturk (2019) to measure financial systematic stress in Turkey. The constructed financial stress indicator (FSI) was tested with a rolling correlation based weighting scheme and proved that the tension periods could be observed. The findings also revealed that the industrial production growth rate and the business conditions index possessed good forecasting power for economic growth as their correlations were [-0.10, -0.38] and [-0.10, -0.73] respectively.

2.5 Research Gap of Existing Studies

The preceding studies regarding tourism demand analysis can be distinguished into two fundamental categories. The first category emphasises on the time series modelling approach while the second category concentrates on employing econometric techniques or multivariate regression models. Both approaches to forecasting the number of international
visitor arrivals are widely used, but uncertainty persists (Rossello-Nadal, 2001). Basically, the time series model utilises the past value of a variable to predict a future value for it.

To generate future values, econometric or multivariate regression models are often used to identify the significance of influential or underlying variables to a specific dependent variable. For instance, Chen (2007) employed a multivariate regression model in tourism demand forecasting. There are several kinds of determinants that possess information pertaining to the current economic structure including economic variables, non-economic variables and financial databases that may confer a solid influence on the tourism development of a nation. In this study, historical data was imposed from a variety of aspects to foretell the tourism growth for economic development and to act as a prior signalling tool. It is undeniable that there is scant evidence or studies that have focused on the non-parametric approach, which is the leading indicator approach. However, there have been a few researchers, such as Rossello-Nadal (2001), Kulendran and Wong (2009), and Tang and Kulendran (2011) who have explored the composite indicator approach, which is similar to the current research.

Although econometric models are a frequently used method to foretell international tourist arrivals, they suffer from one major criticism, where important information that is only available in the underlying sampling components is often incomplete. For this reason, the econometric models are generally only able to reflect a rough approximation of the real-world situation. Nonetheless, econometric models tend to rely on other possible causal variables or endogenous variables, as there is a higher likelihood of being inaccurate in forecasting. This is because the dependency on other determining variables is often
accompanied by the issue of the sampling mechanism. Nonetheless, the Markov-switching method has been widely applied in the tourism industry. Conventionally the application of tourism demand modelling was mostly entrusted to a single state relationship when investigating the relationship among tourist arrivals and some other fundamental influential variable. In this study, a two-state Markov regime switching method was employed to determine the transition probabilities and to capture the performance of the tourism cycle over the study period. Recent studies, such as Chen et al. (2015), Perles et al. (2015), Chang and Lee (2017), and Wan and Song (2018) have employed the Markov-switching model to forecast the tourism cycle for different countries.

For planning and investment in the tourism context, an early warning signal for the changing states of the tourism cycle is essential for decision making for different authorities. The authorities include the government, tourism players, business investors and communities which all contribute and influence the tourism industry of a nation. The difference between this study and the previously reviewed literature are the determinants or the component series applied to construct the leading indicator. In this case, this study included national economic variables, financial variables and non-economic variables. Although the leading indicator approach is assigned as a measurement without theory, the clues are available in the selected variables through economic theory.
<table>
<thead>
<tr>
<th>Author(s)</th>
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<th>Country/Year</th>
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<th>Findings</th>
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| Rossello-Nadal (2001) | • Tourist arrivals  
• Exchange rate  
• OECD’s main economic indicators  
• Consumer price index (CPI)  
• Relative price  
• Number of total constructions  
• Foreign trade  
• Industrial production index | Balearic, Spain (January 1975-December 1999) | • Indicator approach  
• Autoregressive integrated moving average models (ARIMA)  
• Growth ratio computation  
• Likelihood Ratio and Wald Test  
• Breusch-Godfrey Serial Correlation LM Test  
• Naïve process (“no change” model) | • The mean duration for the contraction period is 2 years and 4 months which is slightly more compared to the expansion period with only 1 year and 11 months.  
• The only variable that significant in the final specification test is general consumer price index.  
• Result from cross-correlation study proven that some of the national economic leading indicators lead tourist arrivals.  
• To forecast the turning point, leading economic indicator approach outperform the ARIMA and the naïve process.  
• This method is ideal for the usage of short-term decisions by managers. |
| Kulendran & Witt (2003) | • International tourist arrivals  
• Relative price  
• Exchange rate  
• Real income  
• Real GDP | United Kingdom (January 1978-December 1995) | • Transfer function models (TF)  
• Univariate ARIMA model  
• Unit root test  
• Engle-Granger cointegration test  
• Error correction model (ECM) | • For short-term forecast, time series models which are TF models and univariate ARIMA can perform relatively better than the ECMs.  
• For longer-term forecast, ECMs perform more accurately.  
• MAPE for six major destinations for 1 quarter of forecast horizon by ECM (18.8%) is higher than the TF (16.9%) in short-term.  
• MAPE for 8 quarters of forecast horizon, ECM (18.3%) performs higher accuracy as compared to TF (35.9%). |
| Kulendran & Wong (2009) | • Gross domestic product (GDP)  
• Exchange rate  
• Total export  
• Total import  
• Unemployment rate  
• Stock price index | Hong Kong (2004Q2-2006Q4) | • Autoregressive Integrated Moving Average (ARIMA) model  
• Single input leading indicator model  
• Granger causality test | • The single input leading indicator model is preferred in forecast the turning point and directional changes.  
• SARS outbreak had impact significantly to the inbound Hong Kong tourism. |
| Tang & Kulendran (2011) | • GDP  
• Exchange rate index  
• Total export  
• Total import  
• Unemployment rate  
• CPI  
• Share price index | Hong Kong (1970Q1-2008Q4) | • Quadratic probability score (QPS)  
• Bry-Boschan technique  
• Logistic regression leading indicator model  
• Granger causality test | • Constructed composite leading indicators can lead the Hong Kong hotel occupancy growth rates within 5 quarters.  
• The expansion period of hotels in Hong Kong is approximately 6.00-6.86 quarters  
• Meanwhile, the contraction period is within 6.67-9.43 quarters in range. |
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<th>Methodology</th>
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<tr>
<td>Kulendran &amp; Wong (2011)</td>
<td>• Tourist real income • Real oil price • Substitute destination price • GDP • Exchange rate index • Total export • Total import • Unemployment rate • CPI • Share price index</td>
<td>Hong Kong (1975Q1-2008Q4)</td>
<td>• ARIMA model • Logistic and probit regression models • Quadratic probability score (QPS) • Bry and Boschan technique • Bivariate Granger causality test • Johansen and Juselius Cointegration test</td>
<td>• The turning points in tourism growth cycle are most influenced by the real income. • Finding reveals that the constructed CLI is more useful than the existing OECDCLI. • The significant causality effect is discovered between economic indicators and the growth rate of tourism demand at 5% significance level. • The estimated expansion periods are within the range of 6.00-8.60 quarters whereas the estimated contraction periods are within 7.62-13.2 quarters for Hong Kong inbounds tourism growth cycle.</td>
</tr>
<tr>
<td>Yap &amp; Allen (2011)</td>
<td>• Consumer sentiment index (CSI) • Business confidence index (BCI) • Household debt • Disposable income • GDP • CPI • Overnight stays (business and visitors of friends and relatives)</td>
<td>Australia (1999Q1-2007 Q4)</td>
<td>• Panel three-stage least squares model • Unit root test</td>
<td>• The coefficient of consumer sentiment index (CSI) is statistically significant for visitors of friends and relatives at 5% significance level, but not significant for holiday purpose. • Other than business tourism, the estimated elasticity of household debt on tourism demand is 2.39 for relatives and friends visiting and 2.90 for vacation trips. • When increment of disposable income, Australian has a higher tendency to foregone domestic travel and chose for overseas.</td>
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<tr>
<td>Smeral (2012)</td>
<td>• Total real tourism import demand • Real GDP • Domestic overnight tourist • Exchange rate • Transportation costs • Marketing expenditure • Consumer tastes</td>
<td>Canada, Australia, Japan, and EU-15 (1978-2009)</td>
<td>• Econometrics model • Hodrick-Prescott filter • Wald test</td>
<td>• The income effect was varying for different source market. • Income elasticity in EU-15 is smaller during slow-growth period (1.46) compared to fast-growing period (2.35). • Loss aversion concept can best explain Japanese travel behavior.</td>
</tr>
<tr>
<td>Claveria &amp; Torra (2014)</td>
<td>• Tourist arrivals • Overnight stay</td>
<td>Catalonia, Spain (January 2001-December 2009)</td>
<td>• Autoregressive integrated moving average models (ARIMA) • Self-exciting threshold autoregression model (SETAR)</td>
<td>• Study found that forecasting using tourist arrivals is more accurate than overnight stays. • ARIMA performs better than SETAR for shorter horizons period. • Root of the mean squared forecast error (RMSFE) shows significant lower values in ARIMA models.</td>
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Table 2.1 continued

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<td>Chaitip &amp; Chaiboonsri</td>
<td>Number of international tourist arrivals</td>
<td>Thailand (January 1998-February 2014)</td>
<td>Seasonal unit root test (HEGY-test extent version)</td>
<td>• The testing initiated that the existence of seasonal unit root effect on the number of international tourist arrivals to Thailand.</td>
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<td></td>
<td></td>
<td></td>
<td>Markov-switching vector autoregressive (MS-VAR) model</td>
<td>• Prediction of future years can be achieved through AS-Maximum Entropy Bootstrap.</td>
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<td></td>
<td></td>
<td></td>
<td>Autoregressive (AR) model</td>
<td>• Stimulation of tourism industry can be obtained throughout this study forsake of the policy makers and planners.</td>
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<td></td>
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<td>• For high seasonal period, most of the forecasting model can demonstrated and generalised for future values.</td>
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<td>• However, only AR (1) Maximum Entropy Bootstrap Based can be utilised for low seasonal period to predict the number of international tourist arrivals.</td>
</tr>
<tr>
<td>Chang, Hsu, &amp; McAleer</td>
<td>Tourism industry stock index (tourism performance)</td>
<td>Taiwan (April 2005-August 2013)</td>
<td>BEKK multivariate GARCH model</td>
<td>• The outcome is believed to be trustworthy in forecasting the contemporary economic environment and tourist arrivals.</td>
</tr>
<tr>
<td></td>
<td>Effective exchange rate (tourism demand)</td>
<td></td>
<td>Granger causality test</td>
<td>• Spillover effects are found with economic environmental indicator and the straightforward findings are useful for public and private decision makers.</td>
</tr>
<tr>
<td></td>
<td>Interest rate (tourism capital costs)</td>
<td></td>
<td>Jarque-Bera normality test</td>
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<tr>
<td>Baldigara &amp; Mamula</td>
<td>Tourist arrivals</td>
<td>Croatia (2003-2012)</td>
<td>Box-Jenkins approach</td>
<td>• Diagnostic checking and performed tested illustrated the appropriateness of the model in analysing the number of German tourist arrivals to Croatia.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Seasonal ARIMA model</td>
<td>• The adequate model with the seasonal ARIMA (0,0,0) (1,1,3) was chosen for the empirical test.</td>
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<td>• MAPE less than 10% indicated the highly accuracy forecasting performance of the model.</td>
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<tr>
<td>Chen et al. (2015)</td>
<td>Tourism receipts</td>
<td>Korea (1976Q1-2012Q2)</td>
<td>Markov regime-switching model</td>
<td>• Two distinct regimes are discovered which categorised as high-growth regime (HGR) and low-growth regime (LGR).</td>
</tr>
<tr>
<td></td>
<td>Growth rate of international trade</td>
<td></td>
<td>Variance decomposition</td>
<td>• The growth rate of tourist arrivals and international trade are significant in maintaining Korean inbound tourism market at HGR.</td>
</tr>
<tr>
<td></td>
<td>Tourists arrival</td>
<td></td>
<td>Granger causality test</td>
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Table 2.1 continued

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<tr>
<th>Author(s)</th>
<th>Variables</th>
<th>Country/Year</th>
<th>Methodology</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Perles, Ramon, &amp; Rubia (2015)</td>
<td>• Market share (tourism competitiveness)</td>
<td>Spain (1970-2013)</td>
<td>• Markov-switching regression model</td>
<td>• The hypothesis showed that Spain’s market shares can be difference across variant economic scenarios and regimes switching. The statistical findings revealed that the estimated duration for the occurrence of each crisis is 5.5 years. Meanwhile, the estimated duration for expansion period is 12.5 years which is the growth season for tourism market share of Spain. Moderately, the study suggested the concern on comparative price competitiveness and attract more foreign direct investment are remedial measures for recovery during crisis.</td>
</tr>
<tr>
<td></td>
<td>• Spanish gross domestic product</td>
<td></td>
<td>• Vector autoregression (VAR) techniques</td>
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<tr>
<td></td>
<td>• Exchange rate (variation of international price competitiveness)</td>
<td></td>
<td>• Granger causality approach</td>
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<td></td>
<td>• Tourism receipts</td>
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<td></td>
<td>• Bed capacity (tourism investment)</td>
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<td></td>
<td>Foreign direct investment (inward and outward)</td>
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<tr>
<td>Blancas, Lozano-Oyola, &amp; Gonzalez (2015)</td>
<td>• Tourist arrivals • Tourist expenditure • Seasonality of tourism activity • Tourism employment • Tourism sustain satisfaction</td>
<td>Europe (1991-2013)</td>
<td>• Cronbach’s alpha method • Sensitivity analysis • Panel approach</td>
<td>Socio-economic that related to environment is essential to be included to construct a composite leading indicator. The key indicators of social, economic, and environment can provide positive net contribution. Combination of three aspects can promote a sustainable tourism development.</td>
</tr>
<tr>
<td>Chen, Lin, &amp; Chen (2015)</td>
<td>• GDP • Growth rate of exports • Inflation rate • Total tourist arrivals</td>
<td>Taiwan (1969Q1-2011Q1)</td>
<td>• Markov regime-switching model • Maximum likelihood estimation test</td>
<td>Two distinct regimes of the tourism demand cycle are detected which are high-growth regime (HGR) and low-growth regime (LGR). Empirical findings proven that the tourism industry has a relatively higher tendency to retain in LGR which is 94.71% compared to the probability to stay in HGR is only 42.67%. The expected duration of LGR is an approximately of 19 quarters while the expected duration of HGR is about 2 quarters.</td>
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Table 2.1 continued

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<tr>
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<th>Country/Year</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
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</table>
| Tica & Kozic (2015) | • Real GDP  
• Imports  
• Gross wages | Croatia (1955-2012) | • Indicator construction method  
• Granger causality test | • Findings shown that the important element of budget revenues especially VAT is the foreign guests’ consumption.  
• Real GDP and imports in Poland, gross wages in the Czech Republic and Slovakia are the most important leading indicators to forecast Croatian inbound tourism demand.  
• The lowest MAPE is 5.1%. |
| Andraz & Rodrigues (2016) | • Monthly overnight accommodations (domestic and international tourists)  
• Tourist expenditures | Portugal (January 1987-September 2015) | • Hodrick-Prescott (HP) filter | • Due to recession, tourism of Portugal and Spain had fewer irregular patterns along the evolutionary path.  
• Portugal have gone through economic stagnation since 2000 with less than 2.00% of annual economic growth, meanwhile undergone contraction period at 2009 with 2.90%.  
• German tourism had a leading role for Portugal tourism.  
• Spain tourism suffer backwards economic during the periods of 1990-1995 and revive back at 2005-2010. |
| Chang & Lee (2017) | • Growth rate of foreign-exchange earnings  
• Gross domestic product  
• Consumer price index  
• Exchange rate | Taiwan (1963-2012) | • Markov-switching model (MsM)  
• Augmented Dickey-Fuller test | • MsM disintegrated foreign-exchange cycles of Taiwan into high growth stage (HGS) and low growth stage (LGS) with steady-state probability of 0.75 and 0.86 respectively.  
• Empirical analysis indicated that foreign-exchange earning has a lower tendency to shift from the state of LGS to HGS.  
• GDP and CPI influence the generated foreign-exchange earnings from Taiwan tourism at HGS while only exchange rate affected in the LGS. |
| Ivanov et al. (2017) | • Accommodation establishments  
• Travel agencies | Ukraine (January 2015-November 2015) | • Self-administered questionnaire  
• Mann-Whitney U-test  
• Kruskal-Wallis X² test | • Findings revealed that political instability negatively impact on the tourism industry of the country.  
• In terms of revenue decreased, number of tourists and overnights plummeted, and costs increased.  
• Statistical results further indicated the differential effect of the political instability on the accommodation formation and travel agencies. |
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</table>
| Apergis, Mervar, & Payne (2017) | • Total tourist arrivals  
• GDP  
• Total exports of goods | 20 Croatian countries (January 1998-July 2014) | • Seasonal autoregressive integrated moving average (SARIMA)  
• SARIMA with Fourier transformation  
• ARAR algorithm  
• Fractional integrated ARIMA model | • Findings revealed that the importance of accurate anticipation in tourism industry are threefold.  
• It provides information to respond the supply side of market, followed by gives an insight for potential investors, and it is also crucial for policy makers to define different aspects of institutional setting.  
• Exportation of goods is one of the most important sectors for the overall economic performance.  
• Despite of case of each country, the preference method is SARIMA model with Fourier transformation. |
| Mendola & Volo (2017) | • Price competitiveness  
• Infrastructure development  
• Technology enhancement  
• Environment  
• Human resources  
• Social development  
• Openness  
• Human tourism  
• Education index  
• Tourism demand (tourism arrivals, tourism receipts, tourism overnight stay) | European countries (2000-2014) | • Organization for Economic Co-operation and Development (OECD) guidelines  
• Systematic review | • The evaluation of indicators’ ability to capture information for tourism competitiveness complexity indicated the needs for enhancement.  
• Empirical findings revealed the guidelines to construct composite indicators by utilizing an operative scheme which facilitate comparability, standardization, and assured quality.  
• Three main concerns are suggested throughout this review, which are the ability of present indicators to model tourism destination competitiveness; the greater awareness on methodological choices during indicators construction; and the managerial issues in the scrutinized studies. |
| Silva et al. (2017) | • Tourist arrivals | Europe (January 2000-December 2012) | • Multivariate Singular Spectrum Analysis (MSS) algorithm | • MSS algorithm used for identifying the leading indicators for European tourist arrivals.  
• Statistical evidence proven the existence of cross-countries relationship between European tourist arrivals.  
• It can help to improve the predictive accuracy of tourism demand. |
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</table>
| Tang, King, & Pratt (2017) | • Hotel occupancy  
• OECD composite leading indicator  
• OECD business survey index  
• OECD consumer confidence index | Hong Kong (1972-2010)       | Organisation for Economic Cooperation and Development (OECD) indicators  
• Bry and Boschan dating method  
• Granger causality test  
• Quadratic probability score (QPS)  
• Basic structure method (BSM) | • Findings revealed that OECD data is dominant indicators for the hotel occupancy rates in Hong Kong.  
• Particularly, consumer confidence index can provide prior signal regarding shifting demand for hoteliers as trustworthy data.  
• The constructed indicator established both demands foretell ability and input for hotel revenue management systems to allocate resources efficiently.  
• The estimated models demonstrated that likelihood-ratio statistics are significant at 95% confidence level. |
| Sheng et al. (2017)       | • Macau GDP  
• Total income per capita  
• Consumption expenditure  
• PGP of native | Macau (2006-2015)            | Tourism prosperity index system  
• Delphi method  
• Entropy method | • Prosperity index of the leading indicator incline from 95.28 (2006) to 103.21 (2015).  
• Annual growth rate of the prosperity index is 0.83%. |
| Long, Liu, & Song (2018)  | • Number of domestic tourists  
• Income (gross region product)  
• Infrastructure and attractions  
• GDP | China (2005-2013)             | Panel data (pooled) model  
• Ordinary least squares (OLS)  
• Naïve benchmark model | • Empirical results indicated the huge heterogeneity of tourism across the cities in China.  
• It was found that income is the key to enhance domestic tourism demand in the spatial panel model.  
• There is a strong concordance between both tourist arrivals and GDP which presented a wide range on spatial distribution. |
| Wan & Song (2018)         | • Number of visitor arrivals  
• Real income  
• Tourism price  
• Consumer price index  
• Exchange rate (relative to USD) | Hong Kong (1995Q1-2017Q1)   | Logistic model  
• Quadratic probability scores  
• Markov-switching model  
• Bry and Boschan algorithm | • Findings revealed that combination approaches, specifically non-linear approaches tended to have a higher sensitivity towards the forecast quality in the pool.  
• Forecasting performance can be improved via model screening.  
• There is 10 turning points are observed with 84.7% positive and only 0.26 of uncertainty score.  
• High sharpness value (62%-357%) and nearly perfect calibration scores (0.008-0.027) proven that the forecasting results are close to boundaries other than predict states precisely. |
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</table>
| Valadkhani & O’Mahony (2018) | • Number of international tourist arrivals  
• Risk-free interest rate | Australia (January 1991-April 2014) | • Modified capital asset pricing model  
• Markov switching model  
• Bai-Perron search model | • Findings revealed the diversification of portfolio and proper management can ensure the sustainability of Australian inbound tourism markets.  
• There are 15 large and growing markets out of 53 markets elected are having switching beta greater than +1.  
• This proven that 1% incline in total arrival series from 15 countries will lead to more than 1% of increment in Australia inbound tourist. |
| Assaf et al. (2019) | • Tourist arrivals  
• Income (GDP)  
• Real exchange rate  
• Relative CPI | Southeast Asia (1985Q1-2014Q2) | • Bayesian global vector autoregressive (BGVAR) model  
• Impulse response function  
• Sensitivity analysis | • Findings revealed the ability of BGVAR model to capture the spill over effect of international tourism demand.  
• Throughout the one-to-four-quarters ahead forecasting horizons, BGVAR perform better than three other alternative VAR model consistently.  
• Empirical analysis from impulse response shown that the tourism industries for border-sharing neighbouring countries are highly interdependent and vulnerable on shocks to each other. |
| Dinis, Costa, & Pacheco (2019) | • Food and beverage services  
• Accommodation  
• Transportation  
• Travel agencies  
• Cultural services  
• Recreation and leisure services | Portugal (March 2013-March 2014) | • Composite indicator construction method | • Findings indicated the varies behaviour and interest of the Internet users worldwide by tourism in Portugal.  
• The interest of search also differs depending on the characteristics of the tourism product.  
• The constructed indicator presented a high mean value of 71.9 and standard deviation of 9.4 across the study. |
| Law et al. (2019) | • Tourist arrival | Macau (January 2011-August 2018) | • Deep learning approach | • Empirical results indicated the better performance of deep learning approach compared to the support vector regression and artificial neural network models.  
• High relevant features provided practitioners a means of understanding the relationship among tourist arrival volumes and factors for tourism demand forecasting. |
Table 2.2: Related Literature Review on the Use of the Leading Indicator Approach for the Evaluation of Forecasting Performance in Different Fields of Study

<table>
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</table>
| Witkiewicz (2002)  | • Disposable income  
                   • Household consumption expenditure  
                   • Employment  
                   • Population  
                   • Construction investment  
                   • Interest rate  
                   • Investment capital | Sweden (1975-1999)                    | • Hodrick-Prescott (HP) filter  
                   • Augmented Dickey-Fuller (ADF) unit root test  
                   • Phillips-Perron (PP) test  
                   • Sensitivity analysis | • Findings show that the real business cycle is highly correlated to the real estate cycle with the correlation coefficient of 0.88.  
                   • Real estate cycle indicator (RECI) predicts the peak and trough correctly.  
                   • Peak of real estate cycle in 1987 is predicted by the local maximum point of constructed RECI in year 1986.  
                   • Trough phase of the real estate cycle in 1992 is signaled by the local minimum point of RECI in 1991. |
| Proietti (2005)     | • Industrial production index  
                   • Real personal income  
                   • Real manufacturing and trade sales  
                   • Employment | Italy (January 1969-December 2002) | • Bry and Boschan technique  
                   • Band-pass filter  
                   • Markov chain dating algorithm  
                   • Simulation smoothing  
                   • Hodrick-Prescott (HP) filter | • Amplitude of fluctuations period less than minimum cycle duration can be reduced through low-pass filters.  
                   • Industrial production index and real sales are more prone to recessionary phase and tend to be more volatile.  
                   • The employment cycle is smoother and might tend to lag the cycle.  
                   • The constructed diffusion index possesses the high coherence where the probability of recession crosses the 0.5 threshold. |
| Chen (2007)         | • Industrial production index  
                   • Industrial power consumption  
                   • Retail sales value  
                   • Effective job offer rate | Japan (July 1980-October 2005)       | • Markov-switching panel model  
                   • Multivariate dynamic factor model | • The estimated duration for expansionary periods (transition probabilities is 0.97) is longer than the contractionary periods (transition probabilities is 0.95).  
                   • There is 10 turning points with 5 peaks and 5 troughs are detected.  
                   • The univariate models failed to capture the co-movement of the features. |
| Tan & Habibullah (2007) | • Real GDP growth rate  
                    • Inflation rate  
                    • Treasury bill rate  
                    • Money supply growth rate | ASEAN countries-Indonesia, Philippines, Thailand, Malaysia (1974Q1-2003Q4) | • Markov regime-switching model  
                    • Maximum likelihood estimation | • Findings proposed that the existence of two-regimes in all the economies.  
                    • Results proven that monetary policy had a relatively larger impacts during recessions.  
                    • Credit market imperfections had a crucial role on firm’s investment behaviour. |
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<th>Author(s)</th>
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<th>Methodology</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Seip &amp; McNown (2007)</td>
<td>• Industrial production • Interest rate • Consumer price index • Money supply</td>
<td>United States (1955-2000)</td>
<td>• NBER composite leading index • Granger causality analysis</td>
<td>• The methodology used can differentiate the leading and lagging characteristics of the variables. • Interest rate portrays the lagging behavior which is contradicted with the expected results. • Money supply is regards as unreliable predictors which is inconsistent with the previous studies. • Consumer price index has a leading pattern. • There are six recessions are defined over the period of 1960 to 1996.</td>
</tr>
<tr>
<td>Bacic &amp; Vizek (2008)</td>
<td>• Industrial production index • Tourist arrivals • Narrow money • Producer price index • Credits to households • Retail trade turnover</td>
<td>Croatia (January 1995-July 2007)</td>
<td>• NBER barometric method (also known as leading indicators method) • Bry-Boschan algorithm • Granger causality • Wald exclusion test</td>
<td>Essentially, Granger causality test is the perfect method for identifying time series with leading properties due to its definition which framed in terms of predictability. • The diffusion index is another source of information which can indicate how widespread of the growth cycle movement.</td>
</tr>
<tr>
<td>Schirwitz (2009)</td>
<td>• GDP</td>
<td>German (1970Q1-2006Q4)</td>
<td>• Markov switching model (parametric method) • Bry-Boschan algorithm (non-parametric method)</td>
<td>Different dating approaches have been tested on German GDP to suggest a consensus business cycle chronology for the German economy. • The ideal reference chronology with 5 peaks and 5 troughs was proposed.</td>
</tr>
<tr>
<td>Cubadda, Guardabascio, &amp; Hecq (2013)</td>
<td>• GDP • Growth rate of the total GDP of 24 countries • Individual growth rate of total GDP • First principal component of the country growth rates • First partial least square factor</td>
<td>24 European countries (1997Q1-2011Q1)</td>
<td>• Monte Carlo analysis • Bry and Boschan technique • General-to-specific method • Vector autoregressive model (VAR) • Wald test • Ljung-Box Q test</td>
<td>The synchronization of business cycle in Euro showed increasing common results. • Business cycle indicator, composite index (CI) is comparable leading the reference series of GDP. • The cross-correlation of CI and GDP is 0.96 which indicates highly correlated. • The construction of composite indicators is decided via the co-movement of individual data series.</td>
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<td>Author(s)</td>
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| Abu Mansor et al. (2015) | • Malaysia real GDP  
• Domestic share price  
• US share price  
• Total exportation  
• Money supply  
• Number of new companies registered  
• Number of tourist arrivals | Malaysia (January 1991-December 2009) | • Conference Board indicator approach  
• HP filter  
• Moving average smoothing procedure  
• Bry-Boschan algorithm  
• Directional accuracy test | • The findings showed that the constructed early warning indicator outperformed the existing OECD composite leading indicator in forecasting Malaysian business cycle.  
• The directional accuracy test results revealed that the constructed indicator with 94.6% of accuracy rate instead of the existing CLI with only 13.5% directional accuracy rate. |
| Levanon et al. (2015) | • Real money supply  
• Interest rate  
• Financial condition index  
• Manufacturing index  
• Average consumer expectation  
• Margin account | United States (1960Jan-2014 May) | • NBER Composite Leading Indicator approach  
• Bry and Boschan technique | • Leading credit index (LCI) improve the current conditions and contribute greatly towards forecasting the recession period.  
• LCI ranked highest among other components with quadratic probability scores (QPS) of 0.06 over the period 1990-2013.  
• The improvement of forecast results ranges from 1% to 7% for a longer time horizon. |
| Tkacova & Sinicakova (2015) | • Industrial production index  
• Stock index  
• Market capitalization in current prices  
• Labor input index  
• Crude steel production  
• Industrial confidence indicator  
• Services confidence indicator | Hungary (1995Q1-2011Q4) | • Conference Board indicator approach  
• Phase-Average-Trend (PAT) methodology  
• Seasonal adjustment  
• HP filter  
• Cross-correlation | • The constructed composite leading indicator forecast the Hungarian business cycle more precisely compared to the CLI developed by the OECD and Eurostat.  
• Reduction on number of false signals and preliminary estimations of the Hungarian economic cycle is obtained.  
• The evolution of industry can be expressed by the industrial production index as well as GDP.  
• Monitor and predict Hungarian business cycle conveniently in short run. |
| Bakaric, Tkalec, & Vizek (2016) | • Industrial production index  
• Volume of retail sales  
• VAT revenues  
• Total credit to households | Croatia (January 1998-December 2010) | • Correlation analysis  
• Logit model  
• Markov switching model | • Correlation coefficients and significant test used to detect the consistency of series with the general business cycle tendencies.  
• Volume of industrial production, real retail sales, total VAT revenues, and broad money are the component series for indicator construction. |
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<tbody>
<tr>
<td>Puah et al.</td>
<td>• FDI&lt;br&gt;• Tourist arrivals&lt;br&gt;• Consumer sentiment index&lt;br&gt;• GDP&lt;br&gt;• Share price&lt;br&gt;• Housing price index</td>
<td>Malaysia (January 1991-December 2013)</td>
<td>• NBER leading indicator approach&lt;br&gt;• Hodrick-Prescott (HP) filter&lt;br&gt;• Bry and Boschan technique</td>
<td>The constructed property cycle indicators (PCI) possess an average lead time of 3.7 months.&lt;br&gt;PCI has detected 10 turning points for meaningful events which comprises of 5 peaks and 5 troughs.&lt;br&gt;PCI translated statistical information into the outlook of property industry.</td>
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<td>(2016a)</td>
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<tr>
<td>Puah et al.</td>
<td>• Money supply&lt;br&gt;• Total exportation&lt;br&gt;• Real GDP&lt;br&gt;• Tonnes of paddy production</td>
<td>Cambodia (January 2002-December 2012)</td>
<td>• Conference Board indicator approach&lt;br&gt;• HP filter&lt;br&gt;• BB technique&lt;br&gt;• Interpolation technique</td>
<td>The constructed CLI move advance compared to the RGDP during the year 2004, 2006, 2008, 2009, and 2011 which proven the important incidents have predicted accurately.&lt;br&gt;Leading ability of the constructed CLI is approximately 7 months on average.</td>
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<td>(2016b)</td>
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<td>Tule, Ajilore,</td>
<td>• Unemployment rate&lt;br&gt;• Foreign trade&lt;br&gt;• Real effective exchange rate&lt;br&gt;• Interest rate&lt;br&gt;• Money supply&lt;br&gt;• Share price index&lt;br&gt;• Total credit&lt;br&gt;• Consumer and business confidence index</td>
<td>Nigeria (2008Q1-2014Q4)</td>
<td>• OECD composite leading indicator&lt;br&gt;• Correlation analysis&lt;br&gt;• Granger causality tests</td>
<td>It is empirically proven that the Granger Causality based composite index and cross-correlation could track the turning points of Nigerian unemployment rate over the 7-year period of study.&lt;br&gt;Evidence from this study shown that the constructed composite index forecasting model performed better than the benchmark model in terms of the relative RMSE values and adjusted R² values.</td>
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<td>&amp; Ebuh (2016)</td>
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<td>Voon, Puah, &amp;</td>
<td>• Lending rate&lt;br&gt;• GDP&lt;br&gt;• FDI&lt;br&gt;• Planned supply of residential stock&lt;br&gt;• Housing price index</td>
<td>Malaysia (2002Q1-2014Q4)</td>
<td>• NBER leading indicator approach&lt;br&gt;• Christiano-Fitzgerald (CF) filter&lt;br&gt;• Bry and Boschan technique</td>
<td>Findings revealed that the leading period of constructed housing cycle indicator (HCI) was approximately 3.25 quarters.&lt;br&gt;There are seven vital turning points found in between the duration of 2002 to 2014 with 3 peaks and 4 troughs.</td>
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<td>Wong (2016)</td>
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<td>Charles,</td>
<td>• Volatility index&lt;br&gt;• Corporate bond spreads&lt;br&gt;• Economic policy uncertainty index&lt;br&gt;• Disagreement index&lt;br&gt;• Financial uncertainty index</td>
<td>United States (January 1985-December 2015)</td>
<td>• Dynamic factor model&lt;br&gt;• Structural VAR model&lt;br&gt;• Forecast error variance decomposition (FEVD)</td>
<td>An uncertainty composite indicator (UCI) for the US economy was reviewed from three distinct sources of uncertainty namely financial, political and macroeconomic.&lt;br&gt;As a result, UCI able to account for the most important dynamics of uncertainty for the US economy which has the crucial role.</td>
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<td>Darne, &amp; Tripier (2017)</td>
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</tbody>
</table>
| Charles, Darne, & Tripier (2017) | • Volatility index  
• Corporate bond spreads  
• Economic policy uncertainty index  
• Disagreement index  
• Financial uncertainty index | United States (January 1985-December 2015) | • Dynamic factor model  
• Structural VAR model  
• Forecast error variance decomposition (FEVD) | • An uncertainty composite indicator (UCI) for the US economy was reviewed from three distinct sources of uncertainty namely financial, political and macroeconomic.  
• As a result, UCI able to account for the most important dynamics of uncertainty for the US economy which has the crucial role. |
| Pham (2017) | • Trade balance per gross domestic product  
• International reserves in import’s weeks  
• Currency valuation  
• Exchange market pressure  
• Money supply  
• Monetary policy  
• Real effective exchange rate | Vietnam (January 1996-February 2016) | • Early warning system (EWS) model parametric approach  
• Probit model  
• Exchange market pressure (EMP) | • Empirical findings revealed that the accuracy in predicting the true currency crisis was up to 77.5%.  
• Global financial shock such as unanticipated changes in monetary policy and growth rate for domestic credit are classified as leading indicators for Vietnam currency crisis.  
• Trade balance deficits, overvaluation of dong and international reserves in import’s weeks are categorised as good signal for currency crisis. |
| Vasicek et al. (2017) | • Stock price  
• Interest rate  
• Nominal effective exchange rate  
• Market return  
• Inverse yield curve  
• Lending rates | 25 OECD countries (1980Q1-2010Q4) | • Bayesian model averaging (BMA)  
• Panel model analysis  
• Markov Chain Monte Carlo (MCMC) | • Findings suggested that the constructed financial stress index is relatively performed better for in-sample forecasting compared to the out-of-sample predicting performance.  
• The panel model is unable to explain the dynamics of financial stress index (FSI) easily.  
• The correlation among FSI and GDP growth is range from -0.4 to -0.7 across different countries. |
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Variables</th>
<th>Country/Year</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Chong, Puah, & Abu Mansor (2018) | • OPEC and non-OPEC crude oil production change<br>• World crude oil consumption change<br>• World crude oil stock change<br>• WTI futures contract price<br>• Open interest<br>• U.S. business confidence index | Malaysia (January 2001-June 2016) | • NBER indicator construction approach<br>• Christiano-Fitzgerald filter<br>• Bry and Boschan dating algorithm<br>• Directional accuracy and binomial testing | • Empirical findings revealed that the constructed oil price indicator moving ahead of West Texas Intermediate for an average 3.6 months.  
• West Texas Intermediate was identified as the benchmark for main crude oil globally.  
• The constructed indicator obtained a high accuracy rate of 75.0% in predicting the global oil price. |
| Chadwick & Ozturk (2019)        | • Industrial production growth rate<br>• OECD business condition index<br>• OECD composite leading indicator | Turkey (April 2005-December 2016) | • Principal component analysis (PCA)<br>• Bayesian dynamic factor model<br>• Variance equal weights | • The constructed financial stress indicator (FSI) tested with rolling correlation based weighting scheme proven that the tension periods can be observed.  
• The information content obtained from FSI also beneficial for the decision makers.  
• Findings revealed that industrial production growth rate and business conditions index possess good forecasting power for economic growth as their correlation are [-0.10, -0.38] and [-0.10, -0.73]. |
CHAPTER 3

METHODOLOGY

3.1 Introduction

The present study examines whether the tourism barometer can act as a yardstick for tourism growth for the nation. By embracing the tourism barometer with leading characteristics, the constructed composite indicator can endeavour to be an advance signalling tool for the tourism industry that may contribute significantly to the economic development of Fiji. It is vital, in the selection of the data components, to ensure the efficiency and effectiveness of the performance of the tourism cycle. In order to achieve the objective, the selection process of a parsimonious component series, a timeframe decision and the selection of appropriate research methodologies and testing procedures were conducted. This section outlines of the data descriptions, conceptual framework, the selection of the component series and the reference series, the indicator construction procedure, the filtering technique used for trend extraction, the turning point dating algorithm, the binomial and directional accuracy tests, the Markov regime switching with transition probabilities and the interpolation technique that were utilised in this study. Additional details are explained in this section to provide a clearer insight into the methodology used in this study.
3.2 Data Descriptions

In order to meet the set objectives, this study has gathered data from a variety of trustworthy sources to ensure the accuracy and persistence of the empirical evidence. For example, the data series were collected from the CEIC Database, The World Bank, the World Travel and Tourism Council (WTTC), the U.S. Energy Information Administration (EIA), the World Bank’s Worldwide Governance Indicators. The availability of the data spans approximately 20 years, between the year 2000 to 2017. The time period was identified upon the adequacy of the available data and conformity for the chosen data components. In order to obtain a clear picture of tourism cycle fluctuations, the data underwent an interpolation technique to create higher frequency monthly data. Following the scrutinising of the previous literature, the potential indicators that were proposed for the current study have been detailed in the following section.

Table 3.1: List of Indicators for Fijian Tourism Cycle

<table>
<thead>
<tr>
<th>Indicator(s)</th>
<th>Description(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CEIC Database</strong></td>
<td></td>
</tr>
<tr>
<td>International tourist arrivals (TA)</td>
<td>Person</td>
</tr>
<tr>
<td>Foreign direct investment (FDI)</td>
<td>Balance of payment: Net inflows (USD million)</td>
</tr>
<tr>
<td>Shanghai stock composite index (SSEC)</td>
<td>Index: Shanghai stock exchange: Composite</td>
</tr>
<tr>
<td><strong>The World Bank</strong></td>
<td></td>
</tr>
<tr>
<td>Political stability index (PSI)</td>
<td>Worldwide Governance Indicator (index)</td>
</tr>
<tr>
<td><strong>World Travel and Tourism Council (WTTC)</strong></td>
<td></td>
</tr>
<tr>
<td>Visitor exports (VE)</td>
<td>Foreign spending: Real price (USD million)</td>
</tr>
<tr>
<td><strong>U.S. Energy Information Administration (EIA)</strong></td>
<td></td>
</tr>
<tr>
<td>Crude oil price (BRENT)</td>
<td>Brent crude oil price (dollars per barrel)</td>
</tr>
</tbody>
</table>

Notes: All the data series are collected from January 2000 until December 2017 upon data availability.
3.3 Selection of the Component Series and Reference Series

A benchmark that can illustrate the current state of tourism market growth in a nation is crucial for studies related to tourism early warning indicators. Despite the suggested variables from reviewing previous literature, namely, international inbound tourists and international tourist arrivals, it was international tourist arrivals that was selected as the reference series, due to its significant contributory ability to portray national tourism development, as it is able to quantify the volume of visitors. In most existing tourism demand forecasting research, international tourist arrivals (TA) has supplied succinct information on the tourism development of Fiji. Valadkhani and Mahony (2018) emphasised the role of international tourist arrivals as the global composite barometer for the inbound tourism market. Moreover, the selected reference series should not be too volatile in describing the cyclical movement of the economic system and it needs to accurately portray the Fijian tourism environment. Hence, the number of international tourist arrivals to Fiji was preferred as the reference series for the construction of the TCI to indicate the Fijian tourism performance.

Apart from the reference series which will act as a benchmark for comparison with the constructed TCI, the appropriate component series also needed to be carefully selected before being aggregated into the composite index. A total of 5 variables with leading characteristics which fulfilled the selection criteria, as previously mentioned, were selected as the component series. The component series was made up of the Shanghai Stock Exchange Composite Index (SSEC), the crude oil price (BRENT), the political stability index (PSI), visitor exports (VE), and foreign direct investments (FDI). Each of the variables
was statistically adequate and their data was published via a reliable website with continuous updates, which fulfilled the selection criteria proposed by The Conference Board (2000).

A stock market index is a tool for investors or financial managers to compare the return on investment and to articulate market performance. The SSEC, as one of the component series, has played its role as China is the top contributor to the investment market in Fiji, which accounted for around 43% of foreign investments allocated in Fiji. Over the past 3 decades, China as a nation has been developing rapidly and the population has become richer. This has consequently led to a rapid increase in the number of middle-class Chinese. According to Fiji’s Bureau of Statistics, the number of Chinese visitors to Fiji has increased significantly over the years, from just 4,000 visitors in 2009 to 50,000 visitors in 2017. This significant increase in the volume of Chinese tourists has proven the increase in disposable income for the Chinese population. The influence of the SSEC towards the TA is twofold, as it comes from both the perspective of consumers and from the insights of investors.

When the stock market has performed well, the number of tourists from China will gradually increase as consumer confidence has increased and the population has become richer. When the confidence level regarding economic prospects improves, their purchasing power becomes higher. In this scenario, travel behaviour will be influenced, as well as the tendency to travel to more exotic locations which may increase. As the Chinese yearn for spectacular beach holidays, their desire to travel to Fiji brings prosperity to Fiji’s tourism market. Moreover, when the economy of China is strong, investors are keener to invest further under a profitable and conducive business environment. The Fijian government has continued to appreciate the Chinese inbound tourist market and believes that it has great
potential to increase in volume. Thus, Fiji and China have enjoyed a very good relationship over the past decades. According to Global Travel Industry News (2018), China occupied more than 43% of the proposed projects and the amount of money that has been invested in Fiji. When stock performance improves, the potential for Chinese visitors to travel to Fiji will be higher, both for leisure and business purposes.

Another macroeconomic variable to be embraced is the price of crude oil (BRENT) which is intimately linked to the global economy, as well as the tourism sector. It is undeniable that changes in the price of oil can create damage to both economic and tourism activities. Becken (2011) emphasised that the impact of oil price changes will be exerted on production and transportation costs, economic uncertainty and disposable income. A high oil price will gradually threaten the tourism sector which is a major foreign earnings industry. Recently, Xu, Silva and Hassani (2018) uncovered a significant causal relationship between the oil price and tourist arrivals. When fluctuations of the oil price occur, the economy became less stable, and travelling becomes optional under such ambiguous conditions. Moreover, when transportation costs increase, travel costs become relatively higher. This will also decline the desire for travel.

When changes in the price of oil exert an impact on production costs, the revenues of companies might decrease accordingly, as their production costs will be higher than before the increase in the oil price. Therefore, the probability of the companies laying off employees will increase, which may lead to a higher unemployment rate. Moreover, disposable income will also be affected. In this case, the number of international travellers will decline as their income is unstable and may be insufficient to support their travel plans.
in such a situation. The SSEC and BREN'T are the two component series, among the five selected component series, which proxy the world’s economic changes. The two series were included as international events may influence or threaten Fijian tourist arrivals as apart from the included domestic variables.

On the other hand, regardless of the world indicators, the PSI, which is a perception measure of the likelihood of a government being able to stabilise its economy due to unconstitutional or violent events, has also been included as one of the component series. Undoubtedly, the devastating effects of political instability on tourism are significant, especially, as witnessed in Fiji’s era of growing political turmoil. Safety and security are prerequisites for a tourism destination for most travellers. Political unrest and/or terrorism influence the decision-making process of travellers to select a destination and such effects can be both immediate and potentially long-lasting. Additionally, the political instability of Fiji will also affect neighbouring countries and the top market sources of inbound tourists, such as New Zealand and Australia where tourists have refused to travel to Fiji due to the economic and political uncertainty.

The emerging role of media, which has reported the effects of Fiji’s political turbulence worldwide, has been impactful on the decline in international tourist arrivals. In addition, the powerful effects of word-of-mouth communication by those who have suffered from negative travel experiences in Fiji may cause potential tourists to change their mind and refuse to travel to Fiji. Such a negative image and reputation resulting from political unrest can persist for many years and will have an impact on the whole nation. As such, tourist demand will be lower and this may lead to a decline in a country’s revenues,
especially, for a tourism-dependent country like Fiji. As the perception of Fiji as a safe
tourism destination gradually decreases, this condition will lead to a further reduction in the
number of international tourist arrivals.

VE refers to the spending by international tourists on leisure and business travel
within a country. VE has been constituted as one of the component series in the constructed
TCI. The level of spending on transportation has also been included in the computation of
the statistics. VE is also regarded as a key component of the direct contribution to travel and
tourism as it is a measure of the amount of money expended by foreign visitors to a country.
According to the Tourism Satellite Account’s recommended methodological framework in
2008, VE also portrays the reservation services accessed by potential tourists apart from the
total inbound tourism expenditures. In this case, the cancellation or reservation of
accommodation, transportation, or even tourism-related activities can be acknowledged
earlier, before the arrival of tourists. The leading characteristics of VE play a significant role
in determining the number of tourist arrivals.

At the same time, an increment in the amount of spending by foreign tourists also
provides more capital for the government to further enhance tourism facilities. When the
budget allocation for the Fijian tourism industry becomes larger, more tourist attractions can
be developed or enhanced to suit the demands of tourists. Undeniably, an increased
allocation of government expenditure would be able to improve the performance of the Fijian
tourism market in both the short-term and the long-term. High capital expenditure is always
demanded to implement high-quality infrastructures and facilities. Thus far, when more
development funds have been allocated, the tourism industry in Fiji has been enhanced and tourist arrivals have gradually shown an upward trend.

As indicated earlier in this section, FDI, which measures the amount of capital invested in one country as opposed to another for business purposes, has also been included as one of the component series. Rossello-Nadal (2001) discovered that leading properties exist on FDI which has a significant contribution towards the anticipation of tourism demand. In addition, FDI in the tourism industry can also boost the economic growth of host countries in several ways. Fauzel, Seetanah, and Sannassee (2017) emphasised that FDI can foster economic growth through an income increment, a local employment increment, a foreign exchange increment and an improvement in the income distribution of a nation. When the inflow of capital to Fiji inclines, a better quality of life can be assured for Fijians. Following further development of the tourism industry with an increment of local participation, the confidence level of tourists increases towards a peaceful environment.

3.4 Indicator Construction Procedure

Burns and Mitchell (1946) extended classical business cycle analysis to generate leading indicators, based on the conceptual framework proposed by the National Bureau of Economic Research (NBER), to offer a more advanced approach. The traditional approach was further developed into an approach dedicated to the measurement of the expansion and contraction length, or the fluctuation amplitude. In general, the business cycle indicates the co-movement of several kinds of economic activity within a cycle (Stock & Watson, 1989).
As pointed out by this framework, it can be significantly applied to this study to construct a tourism cycle indicator (TCI) for the purpose of forecasting. The extension of this approach can provide potential insights for the country and acts as an economic stabiliser. Co-movement of selected series in the tourism cycle possesses forecasting potential. Thus, the leading characteristics of indicators possess the ability to foresee the future development of the tourism sector and assist in the efficient allocation of resources to ensure sustainable tourism.

Despite the beneficial tools used to construct the business cycle indicators (CLI) in the study of Burns and Mitchell (1946), the selection of indicators, published in the Conference Board (2000), have been adopted as the guidelines to be followed in this study. Thus, the tourism cycle indicators (TCI) are going to be selected using such an approach. There are three subdivisions of cyclical indicators which are; leading, coincident, and lagging. In order to accomplish one of the specific objectives of this study, only indicators with leading characteristics are able to provide the required signalling effects towards the tourism market. The reason for this selection was due to the concern that the component series were required to possess the ability to represent the cyclical fluctuation of the national economy, especially regarding the tourism industry.
As indicated by The Conference Board (2000), there are five distinct procedures involved in formulating tourism cycle indicators (TCI). These steps are listed in the following section:

1. Compute month-to-month changes \( (y_{i,t}) \) for each respective component \( (X_{i,t}) \), where \( i = 1, \ldots, n \). Simple arithmetic differences are computed as:

\[
y_{i,t} = X_{i,t} - X_{i,t-1}
\]  

For all of the alternative conditions, a formulation of the symmetric percent change is utilised as:

\[
y_{i,t} = 200 \times \frac{(X_{i,t} - X_{i,t-1})}{(X_{i,t} + X_{i,t-1})}
\]  

(2) Adjustment of the month-to-month changes for each component series by multiplying each of them by the standardisation factor of the component \( (k_i) \). The monthly contributions of each component series can be obtained via this step:

\[
Z_{i,t} = (k_i) \times (y_{i,t})
\]  

(3) Summation of the adjusted month-to-month changes by including all of the component series for each month. The adjusted contribution can be achieved, resulting from the summation step:

\[
S_t = \sum_{i=1}^{n} Z_{i,t}
\]  

(4) Application of the symmetric percent change formula to compute the index in preliminary levels. The initial value of the index for the first month is denoted as \( I_1 = 100 \) and the subsequent month will be interpreted as:

\[
I_2 = 100 \times \frac{(200+S_2)}{(200-S_2)}
\]
Thus, the preliminary index value for the following month will be:

\[ I_3 = 100 \times \frac{(200+S_2)}{(200-S_2)} \times \frac{(200+S_3)}{(200-S_3)} \] (3.6)

(5) Rebase the preliminary index of the TCI into the base year. The preliminary indexes computed in Step (4) are multiplied by 100 and are followed by the division of the preliminary levels mean in the base year.

3.5 Filtering Technique for Trend Extraction

In contemporary business cycle research, a pivotal issue is often the detrending procedure for the macroeconomic time series. The detrending process is to compute the conventional facts of the growth cycles. The same concept has been applied to the constructed tourism composite indicator as well. This general concept has been applied since Nelson and Plosser (1982) who treated the macroeconomic time series to be in a state of difference stationary instead of choosing it to be in the state of trend stationary. As explained by Box, Jenkins and Reinsel (1994), the mean for trend stationary is deterministic. After the trend is eliminated from the data series, the residual series tend to be in the stationary stochastic process. Whilst for the mean of difference stationary is stochastic. The discrepancy among a deterministic and stochastic trend has substantial effects on the long-term behaviour of a process. For time series with a deterministic trend, the shock impacts are eventually removed as the trend always reverts in the long-run. It is likely to cause tourism or economic growth as it is not influenced by any structural and technical changes. For instance, the terrorism effect, political instability or financial crisis are negligible for the linear deterministic trend. Meanwhile, the effects of the shock are permanent for random trend as it never recovers to its time series trend. As the study intends to determine the
impacts of external shocks to the tourism cycle, the difference stationary is preferred for the constructed indicator detrending procedure as supported by the evaluation of the European Commission (2003). In the present study, the most frequently used techniques for signal extraction have been recommended. The non-parametric technique proposed, which is the Christiano and Fitzgerald filter, will be discussed further.

3.5.1 Christiano-Fitzgerald Filter

Christiano and Fitzgerald (1999; 2003) suggested the ‘ideal’ band pass filter, which is the Christiano-Fitzgerald (CF) filter, to eliminate the cyclical movement of the time series. The improved approximation proposed by Christiano and Fitzgerald (1999) is trusted to be able to produce a favourable outcome for the standard macroeconomic series. Voon et al. (2016) engaged this method in their study to inhibit the incompatibility and inconsistency of the series during the dating of turning points. Voon et al. (2016) emphasised that the CF filter is honoured as a convincing de-trending filter and has been widely utilised among relevant studies. This is to ensure that the smoothed series can be obtained for further estimation and approximation. The enhancement of the CF filter can be implemented as follows:

\[ F_t = A_0 x_t + A_1 x_{t-1} + \cdots + A_{T-t-1} x_{T-1} + \hat{A}_{T-t} x_T + A_1 x_{t-1} + \cdots + A_{T-t-2} x_2 + \hat{A}_{t-1} x_1 \]  

(3.7)

where \( A_j = \frac{\sin(jb) - \sin(ja)}{\pi j}, j \geq 1; \)

\[ A_0 = \frac{b-a}{\pi}, \quad a = \frac{2\pi}{P_u}, \quad b = \frac{2\pi}{P_i}; \text{ and} \]

\[ \hat{A}_{T-1} = -\frac{1}{2} A_0 - \sum_{j=1}^{T-t-1} A_j, \quad t = 3, 4, ..., T-2. \]
The estimated parameters $P_u$ and $P_l$, in the approximation equation above, denote the cut-off cycle length on a monthly basis. In other words, cycles that are shorter than $P_u$ and longer than $P_l$ are sustained in the cyclical term, $F_t$. The filter type selected was full sample asymmetric and the stationary assumption chosen was random walk.

### 3.6 Bry-Boschan Dating Algorithm

Bry and Boschan (1971) introduced the Bry-Boschan (BB) dating algorithm test as an adaptation of the original work carried out at the National Bureau of Economic Research (NBER) to determine the selection of cyclical turning points. In the case of the constructed TCI, the cyclical turning points outline two economic phases which are the contraction and expansion periods, thus, the peaks and troughs are determined. Chauvet and Piger (2008) emphasised that the implementation of the Bry-Boschan algorithm is able to identify local maximum and minimum turning points in the series path. The seasonal adjustment method, Census X-12, was utilised in the time series of the indicator as an initial step for determining turning points. Stock and Watson (2010) also utilised an identical method to determine the business cycle indicators’ turning points.

Nevertheless, the steps listed below demonstrate the method to determine turning points proposed by Bry and Boschan (1971). There are six steps involved:

1. The extreme values and substitution values are successfully identified.
2. The moving average of a twelve months cycle is determined.
   i. Points lower or higher than five months on either side are recognised.
ii. Selection of the highest among alternative peaks and the lowest of multiple troughs are enforced.

(3) Corresponding turning points in the Spencer curve are investigated.
   i. In the twelve months moving average, the highest or lowest values within five months of the selected turn are identified.
   ii. Throughout the elimination of lower peaks and higher troughs of shorter cycles, the 15 months minimum cycle duration is enforced.

(4) During the short-term moving average (3-6 months) which depends on the months of cyclical dominance (MCD), the corresponding turns are defined.
   i. Among the chosen turns in the Spencer curve, the maximum and minimum values within five months are identified.

(5) Peaks and troughs of an unsmoothed series are determined.
   i. Among the maximum or minimum values within four months versus the MCD terms, whichever has a larger value in the short-term moving average of the chosen turn is identified.
   ii. The turns within six months duration for the beginning and end of the selected series are eliminated.
   iii. Peaks (troughs) at both ends of series which are lower (higher) than the values closer to end are disqualified and removed.
   iv. Cycles with less than 15 months of duration are phased out.
   v. Phases with less than 5 months of duration are erased.

(6) Final turning points are produced as a statement.
3.7 Directional Accuracy and Binomial Test

A directional accuracy and binomial test have been adopted to determine the accuracy rate of the constructed TCI in anticipating the directional changes of the Fijian tourism cycle. Undeniably, an unreliable forecasting result is considered meaningless for the targeted market. Thus, it is vital to conduct the directional accuracy test in the forecasting field to ensure that the forecasting result carries some worthwhile information for the decision makers. Greer (2003) stated that the users of forecasting analysis only find that large changes in prediction are useful. There are three different scenarios for the forecasts which comprise; large predicted increases, no change, and large predicted decreases. As adopted in the study of Greer (2003), the application of the 5\% significance level was followed in the directional accuracy testing for the current study. The directional accuracy test was computed using the formula as shown below:

\[
\text{Directional Accuracy Rate} = \frac{A_s}{N_s} \times 100\%
\]  

(3.8)

where \(A_s\) indicates the total number of accurate forecasts with large changes whereas \(N_s\) measures the total forecasted numbers with large changes for the actual tourism cycle series.

Following the directional accuracy test, the robustness of the constructed TCI to perform as a forecasting tool was further examined. Accompanied with the proven statistics, the binomial test aims to verify the predictive power of the constructed TCI and validate that the forecasting ability owned by the constructed TCI is not due to mere chance or a wild guess. The null hypothesis for the binomial testing, stated by Greer (2003), is that the
forecasting model is able to predict the direction of change with a probability of 50%. Rejection of the null hypothesis signifies two possible outcomes for the forecasting model. First, the forecasting model is statistically outperforming a wild guess, when the directional accuracy rate records a value higher than 50%. Second, the forecasting is dominated by the probability of a wild guess if the directional accuracy rate happens to be lower than 50%. In this situation, the forecasting model does not own the ability to surpass a wild guess in predicting the directional change of the tourism market cycle.

3.8 Markov Regime-Switching Model

Hamilton (1989) initiated the Markov switching model, which is also acknowledged as a regime-switching model and has been popularised among the non-linear time series models in past literature. A more complicated dynamic pattern of the model can be captured when switching is enabled among these structures. Specifically, the property of a Markovian model is dependent on a past value to coordinate the current value of the state variable. At the same time, the Markov switching model is also suited for illustrating correlated data that displays variant dynamic modes in different time durations. Consistent with the previous study carried out by Perles et al. (2015), the difference between the expansive and contractive tourism cycle can be captured by considering a two-regime model.

Plentiful empirical testimonials have suggested that the time series pattern of macroeconomics, non-economic and financial variables may present a variety of patterns across different time periods. A Markov switching model that combines the constructed tourism cycle indicator and the reference series was employed to examine these dynamic
models through a Markovian switching mechanism. For our current research, the chosen fundamentals are denoted in the equation below, with state-depending coefficients:

\[
y_{i,t} = \begin{cases} 
\beta_0^{(1)} + \beta_{FDI,t}^{(1)} + \beta_{PSI,t}^{(1)} + \beta_{VE,t}^{(1)} + \beta_{BRENT,t}^{(1)} + \beta_{SSEC,t}^{(1)} + \epsilon_t^{(1)} & S_t = 1 \\
\beta_0^{(2)} + \beta_{FDI,t}^{(2)} + \beta_{PSI,t}^{(2)} + \beta_{VE,t}^{(2)} + \beta_{BRENT,t}^{(2)} + \beta_{SSEC,t}^{(2)} + \epsilon_t^{(2)} & S_t = 2 
\end{cases} 
\] (3.9)

where the variables are predominantly based on previous literature with a broader perspective offered from world indicators and non-economic determinants that are unique to this study. The global tourism barometer, which is also known as international tourist arrivals is denoted by \(y_{i,t}\), followed by a series of independent variables comprising; FDI, PSI, VE, BRENT, and SSEC resulting from the component series used for the construction of the TCI.

Particularly, the Markovian state variable possesses the stochastic and recurrent shift of model structures. Nonetheless, the persistence of each regime is determined by the transition probabilities. The regime classification of the Markov switching model is probabilistic and data deterministic. However, the Markov switching model is not easy to interpret due to the unobservable state variables and this is one of its difficulties.
3.8.1 Transition Probabilities

Instead of observing these shifts directly, the probabilistic inference of the series behaviour was also taken into consideration to detect the duration for the next occurrence. The evolvement of the two-state Markov-switching variable regarding the transition probabilities is, thus, portrayed as:

\[
\begin{align*}
\Pr[S_t = 1 | S_{t-1} = 1] &= p_{11} \\
\Pr[S_t = 0 | S_{t-1} = 1] &= 1 - p_{11} \\
\Pr[S_t = 0 | S_{t-1} = 0] &= p_{00} \\
\Pr[S_t = 1 | S_{t-1} = 0] &= 1 - p_{00}
\end{align*}
\]

where the transition probabilities outcome for both \(p_{00}\) and \(p_{11}\) were within the range from zero to one. Furthermore, Hamilton (1989, 1990) also popularised the Markov switching model where the duration of switching from one peak to another trough or vice versa could be counted accordingly. The matrix \(\pi\) that possesses transition probabilities \(p_{mj}\) from state \(m\) to state \(j\):

\[
\pi = \begin{bmatrix} p_{00} & p_{01} \\ p_{10} & p_{11} \end{bmatrix}, \quad p_{mj} = \Pr(S_t = j | S_{t-1} = m)
\]

Once the transition probabilities were estimated, the complete cycle for each date for the transition could be referred. The two-state transition was proposed to be employed in this study as it has been commonly applied in most of the previous literature. The expected duration of the transition period was then calculated using the formula of \(1/(1 - P_{00})\). In
this case, the high value of the transition probabilities indicated the difficulty to shift from one regime to another. This was due to the higher tendency for the phase to remain at the same regime.

3.9 Diebold-Mariano Forecasting Ability Test

The Diebold-Mariano (2012) test is a predictive ability test which intended for comparing forecasts with equal forecasting accuracy. The forecasting ability evaluation required exactly two or more forecasts for the statistics display. The test-statistic for one-step ahead forecasts is computed as follows:

$$ S = \frac{\bar{d}}{s_d} $$

where $d = L_1 - L_2$ and $L_i, i = 1, 2$ is either a squared or absolute difference between the forecast and the actual,

$$ L_i = (\hat{y}_i - y)^2 \text{ or } L_i = |\hat{y}_i - y| $$

where $\bar{d}$ and $s_d$ are the mean and sample standard deviation of $d$. 
3.10 Chow-Lin Interpolation Method

The Chow-Lin interpolation method is a regression-based technique that discloses the value of a series $y$. The value of a series can be detected by relating one or more high-frequency chosen indicator series $Z$ to the low-frequency benchmark series using the following equation:

$$y(t) = Z(t)\beta + \alpha(t)$$ (3.17)

where $\beta$ indicates the vector of the coefficients while $\alpha(t)$ refers to a random variable with zero mean and covariance matrix $V$. For cubic categorised of variables, such as stock, indexes, and flow variables, the same constraints are applied at specific points of time where the interpolated series is equal to the benchmark. Assuming that the errors follow an AR (1) process, the original solution by Chow and Lin (1971) has been to use the generalised least squares estimator to estimate the covariance matrix. At the same time, a state space model is used by the EViews econometric analysis software with the following time series model for the states as shown in the equation below:

$$\alpha(t) = \rho \alpha(t - 1) + \epsilon(t)$$ (3.18)

where $\epsilon(t) \sim N(0, \sigma^2)$ and $|\rho| < 1$. The parameters $\beta$ and $\rho$ are estimated via the Kalman filter and maximum likelihood. Subsequently, the interpolated series was calculated with Kalman smoothing.
The Chow-Lin interpolation method is regarded as a global interpolation method. All of the points in the interpolated series will be affected by the changing of any adding points to the indicator series or benchmark series. Series $y$ will undergo the extrapolation process using the Kalman filter when the indicator series extends beyond the endpoints covered by the benchmark series.

3.11 Concluding Remarks

Chapter 3 has extensively discussed the steps undertaken to construct the composite leading indicator for tourism cycle forecasting and, thus, the objective of this study was met. The basis of the traditional NBER approach is measurement without theory. However, there are always clues that can be found from the chosen component series, along with economic theory. The steps to construct the composite tourism leading indicator were elaborated but followed the guidelines of The Conference Board (2000) which have been well discussed. Secondly, the selection of the potential leading indicator, to ensure the validity and reliability of the composite tourism leading indicator was made. Thirdly, the component and reference series underwent seasonal adjustment using the Census X-12 method to eliminate the seasonal effects that might influence the visibility of the cycle.

Fourthly, the research methodology proposed using a filtering-extraction process to detrend the series involved in the study. The filtering process was employed to eliminate the fluctuations and to enhance the smoothness of the parameters of the selected time series. Fifthly, the cyclical turning points of the component and reference series were dated using the Bry-Boschan dating algorithm. This step was emphasised as it determined the peaks and troughs by outlining the two major economic phases which are the contraction and expansion.
periods. Next, binomial and directional accuracy tests were applied to determine the accuracy of the constructed TCI. Meanwhile, an interpolation technique was applied to interpolate the lower frequency of the raw data into higher frequency monthly data, which was preferable for the objectives of the study.

Sixthly, conventional applications of tourism demand forecasting are generally entrusted to a single state relationship among the exogenous and endogenous variables. Thus, the Markov-switching method, using two regimes, was proposed to capture additional dynamic patterns from the model. Furthermore, the transition probabilities referred to the probabilistic inference of the series behaviour were also taken into consideration and were used to detect the duration of the next occurrence. It is then followed by the forecasting ability test for the indicators used. In brief, the constructed composite tourism leading indicator and the reference series, which is also known as the tourism barometer, can be forecasted in a more accurate way.
CHAPTER 4
EMPIRICAL FINDINGS AND DISCUSSIONS

4.1 Introduction

Chapter 4 discusses the empirical findings, which are classified into four different sections. The first section depicts the indicator construction analysis of the TCI and the TA in terms of a graphical illustration together with additional discussion. This first section has been broadened to include the correlation analysis, the cyclical movements of the reference series and the component series, and a turning point analysis that provides a reference chronology for the Fijian tourism industry. The second section presents the directional accuracy test results which test the robustness of the constructed cycle. Following this, the third section moves on to describe the statistical analysis from the Markov regime-switching model to examine the transition probabilities for the recession and expansion period for the cycle. The fourth section contains the concluding remarks which provide a brief summary of this chapter.

4.2 Indicator Construction Analysis of the TCI and TA

Having discussed the implementation of the indicator construction technique and the growth cycle approach, the cyclical movement of the TCI and the TA were established accordingly. After multiple simulations of the numerous combinations of all of the alternative component series, the chosen component series were aggregated into a composite form referring to the methodology of The Conference Board (2000). The next step was to
proceed to implement the seasonal adjustment, proposed by Moore and Zarnowitz (1986), where this process was carried out using the Census X-12 method. Seasonal adjustment is a statistical method to eliminate any seasonal patterns in a time series and is usually carried out during trend or cyclical analysis. In the present study, the cyclical movement of the constructed TCI and the TA for Fiji were established by using the filtering approach proposed by Christiano and Fitzgerald (2003).

Table 4.1 demonstrates the statistical results of the correlation analysis for the chosen component series in this research. In general, a correlation coefficient of at least 0.55 can be considered to fit one of the selection criteria, as suggested by The Conference Board (2000), where the variables must be in conformity to the cycle. The relationship between the selected component series and the reference series are also significant concerns across the assessments. As mentioned in the previous chapter, the variables also need to be of economic significance, statistically adequate - where the variables are collected from reliable sources, exhibit a consistent timing pattern over the period, movements must not be too erratic, and the variables must be published on a reasonably prompt schedule. Meanwhile, Klein (1950) and Tinbergen (1951) also argued that very high correlation matrix was easily established among quite unrelated variables for a regular cyclical rhythm. In this case, the correlation analysis can be employed to further affirmed the selection of the component series.

Thus far, the selected component series include the price of Brent crude oil - represented by BRENT, foreign direct investment for Fiji - represented by FDI, Fiji’s political stability index expressed by PSI, the Shanghai Stock Exchange Composite Index denoted by SSEC and visitor exports expressed using VE. On the other hand, the chosen
reference series was tourist arrivals, denoted as TA, this series is also regarded as the ‘global tourism barometer’ in most tourism studies. All of the series included in the study have been chosen carefully to fulfil the selection criteria as stated earlier. The data for the variables were collected from the CEIC database, The World Bank and the U.S. Energy Information Administration (EIA). Furthermore, the sample period of this study, of approximately two decades, spanned from 2000 up to 2017. The reliability of the sources and the economic significance of each of the selected series can only further enhance the statistical findings. Moreover, each of the variables is published continuously, which ensures that the information can be further updated without any constraints of data adequacy.

Based on the results of the correlation analysis, BREN, FDI, SSEC, and VE were further affirmed to be suitable component series to be aggregated into the composite index. However, the correlation coefficients of the PSI and the TA showed the lowest values. Although the PSI and the TA did not exhibit strong relationship results from the correlation analysis, they were included as component series in the composite index. This was primarily due to the role of the PSI as a sentimental variable which can reflect a nation’s security and can act as a crucial decision-making criterion for tourists when deciding to travel or stay. The risk-averse behaviour of tourists has been a great concern for Fiji’s tourism evolution across time. It is undeniable that political instability is the propensity of a government to collapse. Fiji as a tourism-dependent country has been trapped by its political issues over the past few decades. Therefore, there is a deep interconnection between the lack of political stability in Fiji and economic growth, which has also influenced tourism performance. Thus, five variables were selected as the component series for the construction of the TCI.
Table 4.1: Correlation Analysis Results

<table>
<thead>
<tr>
<th></th>
<th>LTA</th>
<th>LBRENT</th>
<th>LFDI</th>
<th>LPSI</th>
<th>LSSEC</th>
<th>LVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTA</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LBRENT</td>
<td>0.65</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LFDI</td>
<td>0.82</td>
<td>0.77</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPSI</td>
<td>-0.01</td>
<td>-0.53</td>
<td>-0.29</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSSEC</td>
<td>0.48</td>
<td>0.40</td>
<td>0.43</td>
<td>-0.12</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>LVE</td>
<td>0.96</td>
<td>0.67</td>
<td>0.78</td>
<td>-0.05</td>
<td>0.45</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Notes: Logarithm of International tourist arrivals – denoted as LTA, logarithm of price of Brent crude oil - represented by LBRENT, logarithm of foreign direct investment for Fiji - represented by LFDI, logarithm of Fiji’s political stability index expressed by LPSI, the logarithm of Shanghai Stock Exchange Composite Index denoted by LSSEC and logarithm of visitor exports expressed using VE.

Figure 4.1 illustrates, graphically, the movements of the constructed TCI versus the TA. As was previously pointed out, the constructed TCI performs as the best alternative component series to trace the movement of the TA. This was due to the TCI consistently attributing a signalling effect on the TA. Moreover, the major transitions of the TCI from one turning point to another signalled the approaching shift towards the TA. As a result, the empirical evidence recommended that the constructed TCI was able to trace the general movement of the Fijian tourism industry precisely and in a well-timed manner. There have been several slumps that have occurred in the Fijian tourism market which have been caused by crises that have happened around the world as well as within the nation itself. Chronologically, these macroeconomic events comprise; the Dot-Com Bubble, the coup in Fiji, global oil price hikes, the Fijian military coup, repealing of the constitution, the sub-prime mortgage crisis, and suspension from the Commonwealth.
The Dot-Com Bubble, also known as the internet bubble or technology bubble, burst in the early 2000s. Dot-Com companies are referred to as companies that embrace the internet or technology as key components in their business model. Most of these companies were given huge valuations by stock markets, although these companies only owned limited physical assets. With the creation of a speculative bubble, investors began to pool their funds toward these internet companies, despite no proven track records of profitability. Few actual or tangible products were offered from these Dot-Com companies as most of them were more eager to acquire market share by focusing on brand recognition and fast growth. Eventually, many of the firms reported a lack of profits, thus, an enormous amount of invested capital was lost, which led to a sudden drop in stock prices around the World. Numerous investors faced significant losses when the initially failed commercialisation of the internet caused a huge reduction in their capital.

The bursting of the Dot-Com bubble led to economic downturns across the globe and triggered a cascade effect of lower productivity, financial panic and higher unemployment. Fiji which has shared, traditionally, good bilateral relations with the United States, since its independence in 1970, as the two countries have worked to ensure regional security and, thereby, enhance Fiji’s economic development. The worldwide effects from the bursting of the Dot-Com bubble led to a significant decline in investment due to the huge losses incurred by capital funds. Such cases of financial panic will drag the tourism market downwards indirectly as cash liquidity is much lower after such crises. Thus, many people will choose not to travel, whether for business or leisure.
The civilian coup in Fiji during the year 2000 was led by George Speight who sought to oust the first ever elected Prime Minister of Indian descent, Mahendra Chaudhry. There were several factors which triggered the coup against the Chaudhry Government, which included the issue of corruption and the government’s competence to fulfil its customary responsibilities towards ordinary Fijians. Apart from internal conflicts, Fiji also suffered economic dislocation as a result of the bans from international unions, trade disruption and the potential of suspension from the Commonwealth. Furthermore, this crisis also threatened regional cooperation in terms of sustainable resource management improvement and Pacific Islands Forum economic coordination, given the role of Fiji as a hub of intergovernmental activity.

The price of oil reached a historic level in 2005 as part of an upward trend and was recorded at approximately US$ 60 per barrel. This marked a sudden increase from the level of around US$ 20 per barrel in the year 2000. The global economic turmoil had generated an ambiguous situation in the commodity markets and thus the price of oil had been anticipated to escalate in the following years. This exerted negative impacts on the Fijian tourism industry, as outlined by the fluctuation of the tourism cycle. Moreover, the United Nations World Tourism Organisation (UNWTO) emphasised that hikes in the oil price would influence segments of the tourism industry significantly, such as airlines, cruise lines and providers of land transportation. As tourism is an oil-intensive industry, the increases in the oil price created a significant impact on the Fijian tourism industry.

Political turmoil created severe pain to Fiji’s national economy, especially towards the tourism industry. The top two source markets of inbound tourists to Fiji, namely,
Australia and New Zealand imposed various sanctions to urge the Fijian government to stabilise its political condition. In particular, New Zealand’s government placed the travel bans upon individuals connected with the coup alongside members of the Republic of Fiji Military Forces (RFMF). Hence, any political ties among two nations were cutting effectively. However, as a sign of non-cooperation Commodore Bainimarama expelled diplomats from both New Zealand and Australia from Fiji. The conflicts have subsequently created a tremendous trade deficit and cyclone due to the political unrest.

The Fijian tourism industry generates significant revenue every year which exceeds the revenues from Fiji’s two largest export industries, which are sugar and the garments industry. However, the military coup caused the Fijian dollar to be devalued by 20% during 2009. The economic environment, full of uncertainty, drove tourists away from travelling to Fiji. Potential tourists were anxious due to the ambiguous atmosphere in the country where, notably, travel warnings kept rippling through websites which are accessible around the world. Thus, tourist arrivals decreased significantly, due to the risk-averse behaviour that is observed in most travellers.

Along with the rest of the world, the Fijian economy was also affected by the global financial crisis of 2008-2009, which began with the sub-prime mortgage crisis in 2007. Resulting from the collapse of the Lehman Brothers investment bank in September 2008, the outbreak of an international banking crisis led to a further economic downturn. This was also followed by the Great Recession and the European debt crisis which was also caused by the banking crisis. The bursting of the “sub-prime bubble” had been precipitated by the financial crisis of 2007-2008. Lower interest rates had been the main encouragement for
increased mortgage lending and the high mortgage approval rate attracted a large pool of home buyers. This suddenly increased housing prices. However, there were high delinquency rates when the mortgage buyers were unable to repay their debts in time which accelerated the devaluation of the financial instruments.

The liquidity of cash became relatively lower compared to the period before the bubble. Consequently, stock markets faced steep declines worldwide, although precautionary steps had been applied by the central banks of national governments. This led to prolonged high unemployment and the crisis significantly declined consumers’ wealth, by trillions of US dollars. Furthermore, a snowball effect occurred as a result of the downturn of the world’s economies which also led to the Great Recession and the European sovereign-debt crisis. When the purchasing power parity of consumers is reduced, their tendency to take vacations or holiday trips will be relatively lower as well. Therefore, there was a reduction in tourist arrivals to Fiji in 2009.

The next event, the 2009 Fijian Constitutional crisis, commenced with the announcement, broadcasted nationwide, by Fijian President, Ratu Josefa Lloilo, which repealed the Constitution of Fiji. The constitution defines the supreme law of the State, which should be respected by all Fijians. Thus, public officers or any positions of Fijians must fulfil all of the obligations imposed by the Constitution without question. However, the Fijian President dismissed all of Fiji’s judges and constitutional appointees. Furthermore, Lloilo also assumed governance of the country after the government of Prime Minister Frank Bainimarama was declared illegal. As a result, Fiji was trapped under a “Public Emergency Regulation” and placed under emergency rule for 30 days.
The suspension of the Constitution which led to the “Public Emergency Regulation” provided authority to the police to control the movement of Fiji’s people. Any broadcasts or publications were prohibited if they were deemed to destroy the image of the government or the state of Fiji. Safety and security are vital components to fulfil the requirements of quality tourism. Thus, a safe and secure environment can determine the success, or failure, of a tourism destination. This criterion is much more important than other economic activities in attracting tourists. Travellers are reluctant to take risks, especially, when the tourism destination is not secure, as this will influence the quality of their tourism experience. Thus, the constitutional crisis needed to be tackled, and precautionary steps or remedial measures implemented to overcome the sudden drop in tourist arrivals.

Alongside other international sanctions, suspension from the Commonwealth was apparently aimed to encourage the Fijian government to restore democracy. The Commonwealth, which spans 5 regions and incorporates 53 member states, works to strengthen governance, regenerate the environment, create future prosperity, boost international trade, and protect human rights. Fiji had traditionally been regarded as an important member from the Pacific region during international meetings and discussions. The impact from the suspension from the Commonwealth had a momentous impact in Fiji. For instance, there were limited international opportunities for athletes who were unable to enhance the country’s reputation during competitions. Tourists always possess a higher tendency to travel to countries of higher repute. In 2014, Fiji was reinstated as a Commonwealth full member which was decided by the Commonwealth Ministerial Action Group (CMAG) during the 44th meeting in New York.
Table 4.2 unveils the results of the turning point analysis for the constructed TCI and the TA reference cycles. Both cycles were passed through the Bry-Boschan dating algorithm to detect the turning points after seasonal adjustment and filtering. The chronological references for the major events related to the known scenarios in the Fijian tourism market were tracked. The constructed TCI successfully dated eight important turning points which comprised 4 peaks and 4 troughs during the time period of 2000-2017. On the other hand, the cycle of the TA reference series also dated 8 turning points which displayed fluctuations in the Fijian tourism industry. The turning points dated by the constructed TCI were all earlier than the turning points dated by the TA reference series. Thus, the constructed TCI portrayed a short lead time for the Fijian tourism market at an average of 2.75 months.
Across the analysed duration, a total of four cycles were signalled in advance for Fiji’s tourism market which was in accordance with the major episodes which occurred. Chronologically, the Fijian tourism industry experienced four major events, namely the Fiji coup and the bursting of the Dotcom technology bubble in 2001-2003, global oil price hikes and the Fijian political crisis in 2004-2007, the repealing of the constitution and the sub-prime mortgage crisis in 2008-2009, and Fiji’s subsequent suspension from the Commonwealth in 2006-2014. In providing evidence that was consistent with the sequence of events that occurred in Fiji over the past two decades, the constructed TCI demonstrated the ability to foretell a roadmap of Fiji’s tourism market. This predictive ability may be crucial to assist the government and policymakers to take necessary precautionary steps as a result of the advance signalling. Hence, the prominent lead time and the reliability in forecasting the movement of the Fijian tourism cycle based on the selected variables which are consistently and promptly published will be of significant use to the nation.

Table 4.2: Turning Points Analysis Results of TCI and TA

<table>
<thead>
<tr>
<th>Cycle Condition</th>
<th>TCI</th>
<th>TA</th>
<th>Number of Early Signal(s)</th>
<th>Major Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak</td>
<td>2001M10</td>
<td>2002M01</td>
<td>3</td>
<td>✓ Fiji coup</td>
</tr>
<tr>
<td>Trough</td>
<td>2003M05</td>
<td>2003M07</td>
<td>2</td>
<td>✓ Dotcom bubble</td>
</tr>
<tr>
<td>Peak</td>
<td>2004M08</td>
<td>2004M11</td>
<td>3</td>
<td>✓ Global oil price hikes</td>
</tr>
<tr>
<td>Trough</td>
<td>2006M11</td>
<td>2007M05</td>
<td>6</td>
<td>✓ Fijian political crisis</td>
</tr>
<tr>
<td>Peak</td>
<td>2008M03</td>
<td>2008M06</td>
<td>3</td>
<td>✓ Sub-prime mortgage crisis</td>
</tr>
<tr>
<td>Trough</td>
<td>2009M06</td>
<td>2009M06</td>
<td>0</td>
<td>✓ Constitution repealed</td>
</tr>
<tr>
<td>Peak</td>
<td>2010M10</td>
<td>2010M12</td>
<td>2</td>
<td>✓ Suspension from Commonwealth</td>
</tr>
<tr>
<td>Trough</td>
<td>2013M10</td>
<td>2014M01</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>2.75 months</td>
<td></td>
</tr>
</tbody>
</table>
4.3 Directional Accuracy and Binomial Test Results

As was pointed out in the introduction to this chapter, directional accuracy and binomial tests were implemented using the procedure proposed in Greer (2003). In order to prove that the success of the forecasting was less likely to have simply depended on pure luck, a test is required to ascertain whether the anticipated direction of change was convincing. To be more specific, the binomial test reveals the directional accuracy rate of the forecasted result. A directional accuracy rate that significantly exceeds 50% proves that mere chance was probably not the source of the successful forecast analysis.

The rejection of the null hypothesis indicates the probability of the constructed TCI predicting the direction of change correctly. The result was statistically significant and was accompanied by a directional accuracy rate greater than 50%, thus, it also proved that the forecast was not simply a wild guess and that the constructed TCI possessed genuine forecasting value. A one-tailed test was employed which provided an alternative hypothesis assuming that the probability of success deviated in one direction where \( H_0: P > 0.5 \). Thus, the level of significance was proposed at 0.05 for the binomial test. When the directional accuracy rate was greater than 50% and statistically significant at the 5% significance level, it explained that the constructed TCI possessed real forecasting power which is also supported by the empirical analysis.

The tabulated results indicate that the constructed TCI can predict the major tourism cycle turning points of Fiji with up to approximately 54% accuracy whilst being statistically significant at the 5% significance level. Therefore, the null hypothesis was rejected, where the constructed TCI was demonstrated to not simply be a wild guess. This advocates that the
source of success or the accurate prediction power, owned by the constructed TCI was contributed by the indicator itself. Given the strong evidence from the assessment of directional accuracy, the robustness of the TCI in forecasting the Fijian tourism cycle is well supported. Hence, it is once again suggested that the constructed TCI has a promising predictive power for Fiji’s tourism fluctuation phases and provides reliable early signalling for the Fijian tourism market’s dynamics and vulnerability. The analysis outcome and statistical evidence in improving the forecasting performance of the constructed indicator was supported by the literature done by Pons (2000) and Greer (2003).

**Table 4.3: Analysis Results of Directional Accuracy and Binomial Testing**

<table>
<thead>
<tr>
<th>Lag (Month)</th>
<th>Directional Accuracy (%)</th>
<th>P-value (Binomial)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lag 1</td>
<td>53.95%</td>
<td>0.028</td>
</tr>
<tr>
<td>Lag 2</td>
<td>53.74%</td>
<td>0.030</td>
</tr>
<tr>
<td>Lag 3</td>
<td>53.52%</td>
<td>0.032</td>
</tr>
<tr>
<td>Lag 4</td>
<td>53.30%</td>
<td>0.035</td>
</tr>
<tr>
<td>Lag 5</td>
<td>53.08%</td>
<td>0.037</td>
</tr>
<tr>
<td>Lag 6</td>
<td>52.86%</td>
<td>0.039</td>
</tr>
</tbody>
</table>

### 4.4 Markov Regime-Switching Model

Apart from using the indicator approach for forecasting Fiji’s tourism market dynamics, this study also employed the Markov regime-switching (MsM) method to explore the possible added-value for the additional forecasting towards the Fijian tourism industry. The empirical findings declared the usefulness of the indicator construction method for the Fijian tourism cycle and the results were demonstrated to not simply be wild guesses from
the analysis of the results of directional accuracy and binomial testing as previously mentioned. Thus, the component series chosen were proven to possess a role of statistical adequacy in foretelling fluctuation in the Fijian tourism cycle.

The selected component series for the indicator construction method was then applied to the Markov regime-switching model to derive the process that governs the growth transitions. The main purpose of utilising the Markov regime-switching method was to determine the transition probabilities of the Fijian tourism cycle from one regime to another. Put simply, the process identified the average time period of the tourism cycle to shift from expansion to recession and vice-versa. At the same time, the Markov regime-switching method’s estimation and diagnostic checking of the residuals were also included in the analysis.

Conventional applications of tourism demand forecasting have been entrusted to a single state relationship, generally between tourist arrivals and a fundamental influential variable. The selected component series comprised of economic and non-economic determinants which aimed to capture more information regarding the Fijian tourism cycle. From the perspective of the model-based approach, the dependent variable is the reference series from the non-parametric indicator-based approach, this is supported by the research of Valadkhani and Mahony (2018). The researchers affirmed that the number of international tourist arrivals had a significant role as a global composite barometer for the inbound tourism market.
From the viewpoint of the fundamental variables or independent variables, the selected component series with leading properties were employed in the Markov regime-switching model. The component series comprised; foreign direct investment (FDI) – as a proxy for the favourability for investment towards the Fijian economy, the international crude oil price (BRENT) – as a proxy for production costs and transportation costs, visitor exports (VE) – as a proxy for tourism demand towards the Fijian tourism industry, such as accommodation, the Shanghai Stock Exchange Composite Index (SSEC) – as a proxy for the world’s financial performance and the business perspective in Fiji, and non-economic determinants which were the political stability index (PSI) which portrayed the political environment for Fiji. Spanning from January 2000 until December 2017, the modelling for the Fijian tourism demand could be proposed.

Table 4.4 demonstrates the estimation results of the Markov regime-switching model for the state of transition. In this analysis, regime 1 denotes the expansion phase for the Fijian tourism cycle while regime 2 denotes the contraction phase or recession for the Fijian tourism cycle. During the expansion and contraction phases of the Fijian tourism market, all of the variables were statistically significant at the 1% significance level. At the same time, the estimated coefficients were statistically logical and the Markov regime-switching method results for both regimes recorded an adjusted R-square value as high as 0.98. This value indicated that approximately 98% in the variability of the dependent variables could be explained by the explanatory variables.

Next, the residual standard error measured the goodness-of-fit for the model by analysing how well the data points fit with the actual model. The residual standard error can
provide information on how much difference there was between the projected value from that of the mean of the historical data set. The smaller the value of the residual standard error, the better the goodness-of-fit for the model. On average, a residual standard error within the range of 0.013-0.016 would indicate that the dataset is well fitted to the model and that it is able to evaluate the overall performance of Fiji’s tourism market in a well-timed manner.

Meanwhile, there was only one of the leading indicators, the LSSEC, which was not significant during the recession period of the Fijian tourism market. The statistical analysis determined that the correlation between Shanghai’s stock market and the Fijian tourism industry was statistically insignificant during the recession period. Despite the downturn on the LSSEC, the economy continued growing at a rate of around 6.5% with further growth expected. The Chinese market remains the largest in the world, it is filled with opportunities for overseas business’s and is regarded as one of the most promising world markets currently. This is mainly due to Chinese people possessing sufficient funds to either invest or spend in Fiji, as well as boosting the Fijian tourism market. In addition, Chinese investors might consider making long-term investments, such as establishing of accommodation or other tourism-related businesses in Fiji. Thus, it does not affect the on-going investment cooperation with China in the case of Fiji.

Another point highlighted from the estimation results was the impact of the crude oil price, LBRENT on the Fijian tourism market which varied during the expansion and recession phases. According to UNWTO, two contradictory effects exist for every oil price shock. First, oil price shocks can lead to inflationary effects, where the price of goods and services increase as some of the cost is transferred to the consumer. This is because when
the international crude oil price increases, the production costs will increase accordingly. From the supply side, the rising oil price will lead to an increment in travel costs, most particularly on transportation costs. This will gradually impose a negative relationship between oil price shocks and the number of international tourist arrivals to Fiji.

Second, an unanticipated effect of a substantial change in the oil price may also cause deflation to occur. Such deflation will be a positive influence on consumers in the short term as it will decrease the price of goods and services, thereby, essentially raising consumers’ purchasing power. The debt burden of consumers could be alleviated, as, in effect, there would be a rise in income relative to their expenses. However, there is a negative impact on consumers in the long term. Although deflationary environments generate an incentive for consumers or companies to purchase more goods and services at a relatively cheaper price, this will lead to an increment of debt and the over-budgeting for daily expenses. Some travellers might choose to postpone their spending in the expectation of falling prices. Some companies may be affected by deflation and be forced to reduce their company expenses. In response to falling revenue, companies may lay off workers and the unemployment rate could gradually increase. Consumer confidence falls when income declines. Therefore, tourism, which is in the middle of these competing forces, therefore, attributes inconsistent results during different economic phases.

For the overall picture of the estimation results, three of the variables selected for the component series possessed consistent significant values in both regimes towards the dynamics of the Fijian tourism market. The LFDI, LVE, and LPSI each had a significant positive relationship with the LTA. LFDI and LPSI were positively correlated with the LTA
at a higher magnitude where a 1% change of the LFDI and LPSI would lead to a higher change in the LTA during the expansion period. For the variable LFDI, a change of 1% during the expansion phase of the Fijian tourism market would lead to a 0.15% change towards the LTA, which is a relatively higher gradual change when compared to only 0.004% during the recession period. However, for the LVE, a change of 1% of visitor exports - a proxy for online bookings from tourists led to more significant changes towards the LTA during the recession period. This may be due to the overwhelming number of cancellations of accommodation bookings, transportation and other tourism-related activities during the occurrence of a crisis.

There are two basic phases for each cycle which are the expansion phase and the contraction phase. A peak is defining as the transition from expansion to contraction whereas a trough happens when the changeover occurs from contraction to expansion. Accompanied by a closer study of the expansion and contraction patterns of the Fijian tourism cycle, the potential trends for tourism fluctuations can be foretold by using the information of the past. The leading indicators employed in this model were able to provide some clues as to whether the Fijian tourism cycle would face an expansion or contraction phase for the upcoming period. At the same time, the tourism-related industry, companies, policymakers, and business players could also prepare for such changes in the economy before they occur. Hence, the role of utilising the appropriate model, with leading indicators, is important to represent the duration of the transition probabilities for the Fijian tourism cycle.
Table 4.4: Estimation Results of the Markov Regime-Switching (MsM) Model

<table>
<thead>
<tr>
<th>Regime 1</th>
<th>( LTA_t = 2.842 + 0.151 \text{LFDI} - 0.119 \text{LBRENT} + 0.807 \text{LVE} + 0.076 \text{LSSEI} + 0.194 \text{LPSI} + \varepsilon_t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Coefficient</td>
</tr>
<tr>
<td>(Intercept)</td>
<td>2.842</td>
</tr>
<tr>
<td>LFDI</td>
<td>0.151</td>
</tr>
<tr>
<td>LBRENT</td>
<td>-0.119</td>
</tr>
<tr>
<td>LVE</td>
<td>0.807</td>
</tr>
<tr>
<td>LSSEC</td>
<td>0.076</td>
</tr>
<tr>
<td>LPSI</td>
<td>0.194</td>
</tr>
</tbody>
</table>

Adjusted R-square: 0.982 \( \alpha = 0.016 \)

Notes: Significant codes: 0.01 ***", 0.05 **", and 0.1 "*".

<table>
<thead>
<tr>
<th>Regime 2</th>
<th>( LTA_t = 2.451 + 0.004 \text{LFDI} + 0.110 \text{LBRENT} + 1.097 \text{LVE} - 0.016 \text{LSSEI} + 0.055 \text{LPSI} + \varepsilon_t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Coefficient</td>
</tr>
<tr>
<td>(Intercept)</td>
<td>2.451</td>
</tr>
<tr>
<td>LFDI</td>
<td>0.004</td>
</tr>
<tr>
<td>LBRENT</td>
<td>0.110</td>
</tr>
<tr>
<td>LVE</td>
<td>1.097</td>
</tr>
<tr>
<td>LSSEC</td>
<td>-0.016</td>
</tr>
<tr>
<td>LPSI</td>
<td>0.055</td>
</tr>
</tbody>
</table>

Adjusted R-square: 0.987 \( \alpha = 0.013 \)

Notes: Significant codes: 0.01 ***", 0.05 **", and 0.1 "*".

Expansion refers to the phase of the Fijian tourism cycle during the shift from a trough to a peak. It is a period when tourism activities can be highly promoted, and the number of international tourist arrivals will tend to reach a peak. Moreover, the expansion phase of the Fijian tourism cycle can also be acknowledged as economic recovery. In contrast, the contraction or recession phase refers to the decline in the economy which
generally occurs after the tourism cycle peaks and becomes a trough. When the economy is facing a recessionary period, it is a harbinger for greater difficulties in the development of the Fijian tourism industry.

Table 4.5 portrays the empirical analysis of the time-varying transition probabilities matrix with a two-state transition. A higher value of the transition probabilities indicates greater difficulty for the Fijian tourism cycle to shift from one regime to another regime. The expected duration for the growth period was calculated using the formula of $1/(1 - P_{00})$. In respect to the empirical findings, the probability for the Fijian tourism cycle to remain at regime 1 was 91.4%. Using the formula as mentioned above, the expected duration of the transition probabilities from regime 1 to regime 2 accounted for 14.08 months.

On the other hand, the probability of the Fijian tourism cycle to remain at regime 2 was 92.9% and the expected duration for the cycle to shift from regime 2 to regime 1 accounted for 11.63 months. In summary, the expansion and contraction phases of the Fijian tourism cycle last for approximately 12 months from one phase to another phase. The dynamic changes in the Fijian tourism cycle require more attention from policymakers and tourism-related industries to ensure the continuous growth of the tourism industry which contributes around 40% of the country’s revenues.

<table>
<thead>
<tr>
<th>Regime</th>
<th>Regime 1</th>
<th>Regime 2</th>
<th>Duration</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regime 1</td>
<td>0.914</td>
<td>0.071</td>
<td>14.08</td>
<td>$\begin{bmatrix} 0.914 &amp; 0.071 \ 0.086 &amp; 0.929 \end{bmatrix}$</td>
</tr>
<tr>
<td>Regime 2</td>
<td>0.086</td>
<td>0.929</td>
<td>11.63</td>
<td></td>
</tr>
</tbody>
</table>
This section contains a graphical illustration of the results from the Markov regime-switching model which provides a clearer insight into the movement of the tourism cycle, as displayed in Figure 4.2. The smoothed probabilities are represented by the red line while the filtered probabilities are represented by the straight black line. The filtered probabilities were dependent on real-time information. The smoothed probabilities are an inference on the regime at date \( t \) based on the observations gained through a later date \( T \). There were several major events that were detected from the model-based approach. The model detected the periods of each state which were consistent with the Fijian tourism cycle.

Spanning the period from 2000 to 2017, the transition of the contraction and expansion phases were defined accordingly. The crises which occurred have already been discussed in the earlier section but include the bursting of the Dot-Com Bubble in the early 2000s, followed by the Fiji Coup 2000, the Fijian political crisis - the Military Coup which started in 2002, oil price hikes around the years of 2004-2005, the Global Financial Crisis 2007-2008, the Repeal of the Constitution 2009, and lastly Fiji’s Suspension from the Commonwealth 2006-2014. However, Medhioub (2015) emphasised that there is always a “bounce back” effect from a recession period. Thus far, the MsM detected the major crises that occurred in a timely manner which has proved its usefulness in forecasting the Fijian tourism cycle. As well as the evidence from the role of the leading indicators in forecasting Fijian tourism development, the information can act as a guideline in developing policies and investments accordingly.
After the switching regression analysis, it was also vital to diagnose the role of the residuals in the selected model. In this study, two types of diagnostic checking were applied which were the fitted value of the residuals and the normal quantile-quantile (Q-Q) plot as shown in Figure 4.3. To investigate the presence of a non-linear relationship between the predictor or the independent variables and the outcome of the dependent variable, the pattern of the graph can identify the problem. From the empirical results, the residuals are moving towards a horizontal baseline without distinct patterns. This is a good indication where the model does not have non-linear relationships, as good model data are simulated to meet well with the regression assumptions.
Figure 4.3: Residuals Diagnostic Checking Results
As the residuals are considerably fitted against the values, the diagnostic checking test was preceded by the normality test which was the normal Q-Q plot, as displayed. A normal Q-Q plot is a graphical tool, with a scatter plot, to assess the plausibility of the data set used by the model. It is also used to investigate the underlying theory behind the variables utilised and whether it was reasonable and logical, or not. As visualised in Figure 4.3, the residuals were aligned well on the straight red line. This proved that the model was normally distributed and that the assumption was plausible. Hence, the previous analysis sections were affirmed as the model chosen was not left out in the residuals. Moreover, the model was able to explain well the relationships between the independent variables and the dependent variable.

4.5 Analysis Outcome of Forecasting Ability of Indicators

The forecasting evaluation is performed following Diebold and Mariano (2012) to evaluate the forecasting ability of the constructed TCI based on the non-parametric indicator approach and the model-based approach. As illustrated in Table 4.6, the evaluation statistics inclusive of RMSE, MAE, MAPE and Theil statistics for each of the six forecasts, together with three averaging methods. Majority of the forecasting evaluation criteria pointing towards the constructed indicator which is TCI instead of the cycle extracted from the model-based approach. This suggests that the constructed TCI contains higher forecasting ability in the form of aggregated composite index. The outperforming indicator for each forecasting evaluation criteria is denotes using the shaded boxes. Moreover, the forecast comparison graph of all the comparison indicators are illustrated in Figure 4.4.
Table 4.6: Forecasting Evaluation of Indicators

<table>
<thead>
<tr>
<th>Forecast</th>
<th>RMSE</th>
<th>MAE</th>
<th>MAPE</th>
<th>SMAPE</th>
<th>Theil U1</th>
<th>Theil U2</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCI_CYCLE</td>
<td>0.058</td>
<td>0.047</td>
<td>255.156</td>
<td>121.034</td>
<td>0.554</td>
<td>7.074</td>
</tr>
<tr>
<td>FDI_CYCLE</td>
<td>0.996</td>
<td>0.666</td>
<td>8217.241</td>
<td>173.701</td>
<td>0.947</td>
<td>367.042</td>
</tr>
<tr>
<td>BREN_T_CYCLE</td>
<td>1.009</td>
<td>0.860</td>
<td>6130.137</td>
<td>187.008</td>
<td>0.959</td>
<td>163.543</td>
</tr>
<tr>
<td>VE_CYCLE</td>
<td>0.964</td>
<td>0.743</td>
<td>3675.898</td>
<td>177.449</td>
<td>0.917</td>
<td>81.759</td>
</tr>
<tr>
<td>SSEC_CYCLE</td>
<td>1.009</td>
<td>0.700</td>
<td>5650.571</td>
<td>179.147</td>
<td>0.960</td>
<td>150.078</td>
</tr>
<tr>
<td>PSI_CYCLE</td>
<td>0.977</td>
<td>0.748</td>
<td>5281.210</td>
<td>176.550</td>
<td>0.929</td>
<td>238.879</td>
</tr>
<tr>
<td>Least-squares</td>
<td>0.192</td>
<td>0.161</td>
<td>656.132</td>
<td>188.191</td>
<td>0.946</td>
<td>15.183</td>
</tr>
<tr>
<td>Mean square error</td>
<td>0.061</td>
<td>0.049</td>
<td>282.051</td>
<td>118.986</td>
<td>0.555</td>
<td>7.849</td>
</tr>
<tr>
<td>MSE ranks</td>
<td>0.368</td>
<td>0.289</td>
<td>1857.471</td>
<td>152.981</td>
<td>0.826</td>
<td>56.373</td>
</tr>
</tbody>
</table>

Figure 4.4: Forecast Comparison Graph of Indicators
4.6 Concluding Remarks

This section has attempted to provide a brief summary of the empirical findings relating to the objectives of the current study. The main objective of this study was to construct a TCI for the Fijian tourism market by employing the philosophy proposed by the NBER in the United States. The study began with the selection of a component series and a reference series following the selection criteria outlined by The Conference Board (2000). A correlation analysis was also utilised to determine the causal relationship between the variables selected. There were 5 variables with leading properties that were selected to compile the component series which were BRENTE, FDI, PSI, SSEC, and VE. A seasonal adjustment was then performed using the Census X-12 method along with a filtering procedure for the constructed composite index.

After detrending using the CF filter, the turning points were then detected using the method developed by Bry and Boschan (1971) to fulfil one of the research objectives. The turning point analysis for the constructed TCI and the TA reference series recorded an average lead time of 2.75 months, in a timely manner. There were four complete cycles that were detected which were made up of 4 peaks and 4 troughs. The major events that occurred chronologically for the Fijian tourism cycle were recorded. The events comprised; the Fiji Coup 2000, the Dot-Com Bubble 2001-2003, global oil price hikes 2004, the Fijian Military Coup 2004-2007 which was a political crisis, the Sub-prime Mortgage Crisis and the repeal of the Constitution 2008-2009, followed by the Suspension from the Commonwealth 2006-2014. A visualisation test was also carried out to provide a graphical insight into the Fijian tourism cycle.
Furthermore, a directional accuracy test was undertaken to determine whether the constructed TCI was simply a wild guess, or not. As a result, the constructed TCI recorded as high as a 54% accuracy rate and was significant at the 5% significance level. It was concluded that the constructed TCI performed better than a wild guess and was, therefore, able to bring valuable insight to the Fijian tourism market players. Despite the conventional single state regression analysis, a Markov regime-switching model was also applied to further affirm the selection of the component series. However, the main purpose of applying the Markov switching method was to determine the transition probabilities for the Fijian tourism cycle which could, potentially, bring more detailed information to the policymakers, tourism-related industry players or investors. The duration for the regime to shift from one to another was accounted to be around 13 months. Precautionary steps and remedial measures could, therefore, be applied to enhance the growth and performance of the Fijian tourism industry. The predicted expansion and contraction phases can offer a reliable warning signal regarding Fiji’s tourism vulnerability.

Similarly, to the previous indicator approach, as mentioned, a graphical visualisation of the Markov regime-switching model has also been created to provide a clearer view of the fluctuation patterns. Last, but not least, diagnostic checking was also carried out to ensure that the data selected was well fitted to the model. The diagnostic tests proved that the residuals were considerably fitted against the model and that the normal Q-Q plots verified the normality of the model. Accompanied by the model-based approach, it is thus plausible that the data set with the underlying theories were applied appropriately. Therefore, it is again suggested that the constructed TCI encompasses a promising predictive power with a convincing component series to foretell changes in the Fijian tourism market.
CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Chapter 5 recaps the entire study regarding the construction of the TCI for Fiji which acts as an advance signalling tool for the dynamics of the Fijian tourism market. The purpose of the constructed TCI is mainly to anticipate any market precariousness in the Fijian tourism industry. Incorporating the ideology of the United States’ NBER, the constructed TCI was created following the steps proposed by Moore and Zarnowitz (1986), as per the discussion in the methodology section. The period examined in this study spanned from the year 2000 until 2017 and used monthly frequency data. Apart from a summary of the empirical findings, the present chapter also confers some policy implications and recommendations, this is followed by a discussion on the limitations of the study. The identification and detailing of the known limitations of the research study also opens the door to the final section of the chapter which covers recommendations for further study to both to ensure the validity and credibility of the study and also extend the current work to new areas. In summary, this chapter provides closing remarks for the study.

Tourism performance in Fiji has recorded remarkable growth, however, it is still consistently affected by the external shocks. This study has mainly focused on the construction of a tourism composite leading indicator in order to forecast tourism development for Fiji. Tourism, as the key foreign exchange earner for the country, crucially needs to draw attention from policymakers to ensure the sustainable development of the
tourism sector. The tourism sector is regarded as one of the largest revenue contributors in Fiji especially when considering its multiplier effect on, not only, job creation but also the growth that it encourages in many other sectors, such as; accommodation, transportation or even the telecommunication sector. Undoubtedly, the circulation of money spent by tourists throughout the economy is able to further enhance Fiji’s economic performance. This is certainly due to the indirect impacts that tourism exerts elsewhere in the economic system. For instance, the demand for local tourism products is facing an increasing trend caused by tourists who wish to purchase souvenirs. This will gradually increase the employment rate for local-skilled workers who produce localised tourism products which are popular with tourists.

Therefore, tourism development has a significant role in generating revenue for the nation and effects economic change in terms of revenue growth. The term tourism carries different meanings about different things to different people. The phenomena arising from the interaction of tourists, businesses and tourism-related suppliers, governments and local communities can be summarised as tourism. Tourism, with its ongoing huge role as the main macroeconomic contributor towards Fiji’s national development, attracted the interest for this study. The total contribution of tourism to the GDP for Fiji is currently more than 40%, this provides significant statistical evidence regarding tourism’s contribution to the country’s economic growth, employment and social development. Traditionally, the indicator approach has only been applied in the contexts of business or property but has rarely been employed in the tourism context. Accompanied by the important role of tourism in Fiji and the limited existing research using the indicator approach in tourism, this study has taken
both economic and non-economic determinants into the account in constructing the tourism composite leading indicator for Fiji.

Starting from the selection of the variables to be used as the component series, a parsimonious collection of the variables with leading properties were selected to fulfil the general objectives of this study. Classical business cycle analysis has been extended to be used in the tourism field by adopting the ideology of the United States’ NBER. The aggregation of the component series which included; SSEC, BREN, FDI, PSI, VE also underwent the process of seasonal adjustment, filtering, and standardisation. The indicators SSEC and BREN were utilised to embrace worldwide changes towards Fijian tourism. FDI as a financial indicator was included to evaluate the financial performance of Fiji, meanwhile, VE as a tourism indicator was incorporated to forward-look at the tourism capacity required for potential tourists. Apart from the economic determinants included, non-economic determinant PSI was also embraced, as one of the component series for the construction of TCI, due to its ability to determine the political performance of Fiji.

Thus far, the procedure of indicator construction was completed by following the approach outlined by the NBER. This was followed by the selection of the component and reference series, which took into account the criteria stated by The Conference Board (2000). The seasonal adjustment was completed using the Census X-12 method, as indicated by Moore and Zarnowitz (1986) and the filtering and trend extraction process was carried out using with the CF filter approach, proposed by Christiano and Fitzgerald (2003). The cycle standardisation was the final step undertaken, as detailed in the NBER’s indicator construction method. After the construction of TCI, the turning points were detected using
the BB dating algorithm, initiated by Bry and Boschan (1971). Eight cyclical turning points were detected, with 4 peaks and 4 troughs for the Fijian tourism cycle. The average lead time of 2.75 months possessed by the constructed TCI against the reference series proved its role as an early warning indicator for the dynamics of the Fijian tourism market. At the same time, a reference chronology of the crises had occurred was recorded, which fulfilled one of the specific objectives of this study. Moreover, the directional accuracy test, proposed by Greer (2003), also confers that the constructed TCI was a convincing forecasting tool and did not just depend on mere chance. The directional accuracy and binomial test accounted for an accuracy rate of around 54 percent and were statistically significant at the 5 percent significance level.

Next, the study proceeded to employ the Markov regime-switching model to enhance the empirical findings. The main purpose of the Markov switching method, initiated by Hamilton (1989), was to investigate the transition probabilities of the Fijian tourism cycle and a result of approximately 13 months for one regime to another regime has found. Perles et al. (2015) emphasised the appropriateness in considering a two-regime model for determining the expansion and contraction period for the tourism cycle. All the variables showed a statistically significant relationship with the Fijian tourism industry. Hence, the appropriateness in selecting the component series has been further affirmed. The Markov regime-switching model embraced the variables which are the same as the component series and reference series utilised for the indicator construction. The model has undergone the diagnostic checking to investigate the performance of the model. Empirical findings revealed that approximately 98% in the variability of Fijian tourism can be explained by the selected component series with promising evidence on goodness-of-fit for the model.
5.2 Policy Implications and Recommendation

This section discusses the recommendations for policy establishment in order to minimise the impact of crises on the economy, especially crises related to tourism. This section is focused on tourism-related policies, in an effort to ensure the continuous growth of the Fijian tourism market. The empirical findings highlighted that the Fijian tourism cycle is influenced by both world indicators and domestic indicators. These vital components should be the key areas of focus during policy-making processes and for the tourism management of local government, also known as local authorities.

Based on the empirical estimation, the constructed TCI portrayed a signalling attributes and yielded a short-term forecasting ability towards the Fijian tourism industry. The present study highlighted the potential role of the leading indicator approach to forecast the outlook of the tourism market with little knowledge of the timing or amplitudes of the Fijian tourism cycle. The non-parametric based approach of indicator construction and the model-based approach of the Markov regime-switching model further provided information content from a macroeconomic perspective. Undeniably, the information content from the constructed TCI is able to provide insight into the establishment of policy and the management in the Fijian tourism market or other tourism-related investments. However, although the constructed TCI portray the signaling attributes, it is accounted for 54% of accuracy rate which can merely become a guideline for the policy-makers. The decision makers can accommodate the appropriate component series depends on different situations for the future development of the nation.
Furthermore, the constructed indicator was proven its role as a prior signal tools for Fijian policy-makers in proposing the precautionary measures for any crises or incidents happen. The constructed TCI with aggregated component index is useful for the government to incorporate with future tourism planning for Fiji. The high credibility data which published in a prompt schedule which used in the study can easily solve one of the most common forecasting issues. Furthermore, despite the country-characteristics owned in the past, the component series can be adjusted by the policy-makers in a favourable way to fit in the current condition of Fiji for the future tourism development.

Coupled with the changing economic vulnerabilities related to oil, the affordable pricing of oil is seen to be incredibly important for the growth of the world’s economy, especially the tourism sector. The current study regarding Fijian tourism confirmed that fluctuations of the international crude oil price would bring adverse impacts to Fiji’s tourism industry. Particularly, world economic prosperity would be affected, together with the income of tourists which is a vital criterion for outbound tourism. As indicated in the empirical findings, changes in the oil price will significantly affect tourism demand to Fiji. It is undeniable that an increment in the price of oil will not only affect the tendency or ability of potential tourists to travel, but it will also create an impact on the pricing of tourism-related goods and services. This would include transportation and travel costs, especially, for those who travel long-haul.

Furthermore, the historical shocks in the price of oil have had short-lived impacts on global tourism, as regards to the research carried out by the UNWTO in 2006 (United Nations World Tourism Organization, 2006). The impact of a rising oil price on international
tourism could change when the oil price reaches a higher level of price sensitivity thresholds. Although the negative impacts of an increased oil price on global tourism are less pronounced, price hikes create a detrimental effect on the Fijian tourism industry from both reduced tourism demand and the reduced supply of tourism-related goods and services. The vulnerabilities to oil price changes that have been exposed in the Fijian tourism sector should be addressed by policies related to tourism marketing strategies, transportation systems, product development, and business management.

More specifically, the government may choose to integrate a range of risk factors which embrace oil price shocks during the development of marketing strategies. By embracing the risk of oil price shocks, the Fijian government can promote Fijian tourism in a low-risk manner. This can also ensure that only short-term or minimal shocks would be imposed on the Fijian tourism industry. Apart from enhancing the policies on tourism marketing, an alternative transport system is also in high demand to ensure the long-term view of tourism and transport. Investment in a transportation system based on electricity could be important and beneficial in facilitating tourism development. The Savusavu Tourism Association has also emphasised the importance of discussions between the tourism operators and the Fijian Government. Cooperation among a number of government agencies, such as Transport, Tourism, or Economic Development would be beneficial towards the development of Fijian tourism in terms of investment, research, and the implementation of projects.

Additionally, public-private partnerships can be implemented to reduce oil vulnerabilities in an effective way. Such partnerships may assist businesses to enjoy
cooperative arrangements between two, or more, public and/or private sector organisations. Moreover, these types of partnership, which are usually long-term in nature, use a mixture of public and private resources to ensure a more sustainable business prospect. The combination of government agencies and private sector companies can finance, develop and operate tourism projects in Fiji. For instance, the transportation network and convention centre projects could be financed through a public-private partnership. A current example is the Renewable Energy Efficiency Partnership (REEEP) Project, which is advancing Fiji towards becoming a low carbon tourist destination. At the same time, the focus on energy efficiency will also lead to long-term benefits for the local communities.

Unquestionably, tourism is a service sector that can offer many spillover effects to other economic sectors. Apart from the government's recognition of tourism’s power to generate significant growth for the country, the government has also identified some market failures that have induced either direct or indirect interventions. Funding is considered as a sign of the commitment to the tourism industry and collaborations with private organisations can deliver higher quality tourism products and services. Moreover, appropriate funding allocations can also improve productivity, economic prosperity, security, and sustainability. When incorporating the inflow of FDI, consideration regarding the breadth of investment and variations in scale are crucial in identifying the best funding allocations made by the government. Along with the availability of capital investment in the tourism industry, some downstream industries around tourist spots could be developed in order to motivate increased tourist spending. Higher tourism revenues are contributed to by the high spending power of tourists compared to that of the local communities. Tourism-related products can also trigger cultural exchange and good consumer experiences.
To ensure the continuous flow of foreign direct investment to Fiji, policy intervention is mandatory to stimulate, create and maintain a conducive business environment, allowing businesses to flourish. Local authorities should take initiatives to develop and regulate businesses within their jurisdiction, creating a conducive environment for business development and prosperity. The local governments need to be innovative and proactive in this role. Nonetheless, policy intervention can also stimulate and promote collaboration among firms which may lead to the empowerment of local entrepreneurs. This may gradually create a dynamic and competitive cluster effect enhancing the competitiveness of businesses by diversifying the range of goods and services offered. With the existence of a conducive business environment, the confidence level of foreign investors towards projects in Fiji will be relatively higher. In this case, the approach of embracing public-private partnerships can be strengthened to ensure the sustainability of local developments while resolving the issue of high economic leakages in Fiji.

Additionally, policy intervention should also be applied to the forces of Chinese investors and tourists. The component series that was used to construct the TCI embraced the role of China’s stock market index to measure the financial performance of tourists and the tendency of Chinese investors to invest in Fiji. The empirical results demonstrated that the tourism market in Fiji is no longer characterised as a domestic-based sector which is only dependant on conventional demand and supply. Despite Fiji’s high dependence on its traditional western markets for incoming tourists, the development of new potential markets, especially China, is encouraged to further grow the development of Fijian tourism. Therefore, the constructed TCI implicitly suggested that the movements of Chinese investors or business-based tourists could influence the movements of the Fijian tourism cycle. In order
to boost investment, policy intervention, such as producing a conducive business environment is required to attract more business travellers.

Next, the importance of Fiji’s security and stability was also highlighted in the empirical analysis. Crisis management and business continuity are important for Fiji to sustain the growth of tourist arrivals and to attract more investors for tourism development. The risks related to political instability, such as political violence or coups could jeopardise the safety and security of the people and, more especially, create a lasting impact on the number of tourist arrivals. The policy recommendation for Fiji is to enhance governmental effectiveness in an effort to control political unrest, thus, avoiding the incidence of political instability which may spread to investors or potential tourists, while at the same time maintaining the quality of regulation. While the complete elimination of all of the risks related to political instability is impossible to achieve, multinational business can take place which may limit any potential impacts on business operations. Policymakers are required to constantly review the structure of the tourism sector and to optimise its economic benefits to the country. Moreover, as witnessed by Fiji’s diverse political issues noted during the period of this study, the implications of a favourable business environment are important to neutralise the issue.

In addition, the role of digital capability was also tackled in the component series in order to predict the number of potential tourist arrivals. Insights into the spending behaviour of tourists are another crucial criterion for Fijian tourism-related industries to be well-prepared for the inflow of tourists. Hence, digital connectivity is essential for Fiji to reach out to both potential and existing tourists, as tourism information is increasingly focused to
be online. Effective communications, marketing and promotion can be achieved online. A strong Internet presence has a prominent role in generating brand awareness and affecting potential tourists’ decision making. Thus far, fast, effective and reliable digital connectivity can further enhance Fiji, acting as a tool to enable business expansion, encouraging investment and to ensure that the potential markets are reachable.

In brief, policymakers and the government are encouraged to compile and publish the data required for the construction of the TCI in a timely way. Policy interventions, which may include; public-private partnerships, the application of renewable energy equipment, maintaining a conducive business environment, collaborating with existing businesses in an innovative way, crisis management, and the role of digital capability are recommended for the development of Fijian tourism. By incorporating continuously published data into the constructed TCI together with implementing appropriate policies, the Fijian tourism market can be further enhanced and continue to contribute as one of the main revenue generators for the nation.

5.3 Limitations of the Study

In the process of producing a comprehensive study, the existence of some limitations to the research are always recognised. The access to relevant high-frequency data was certainly an inevitable limitation for the present study. This study employed monthly data from the years 2000 until 2017 to investigate fluctuations in the Fijian tourism market. The TCI was constructed using the indicator approach that is able to provide an early warning signal of tourism market vulnerability and provides an opportunity to establish precautionary steps that may minimise the burden of an upcoming crisis. However, most of the data which
was compiled on a monthly basis was required to be interpolated from lower frequency data into high-frequency data as high-frequency data was not available. This limitation on the availability of resources limited the sensitivity of the empirical estimations. This led to a scarcity of fluctuations in the presented actual month-to-month for the dynamics of the Fijian tourism market.

The tourism industry is a highly interdisciplinary sector which involves a diversity of tourism research. However, there is always a lack of current and accurate tourism-specific data with which to engage in the in-depth analysis of the economic impact of the tourism industry. For instance, the tourist’s confidence index or the service quality accessed by tourists can significantly influence the tourism market. The analysis of data should be consistently undertaken and published, especially, following updated situations. In that sense, major tourism-related data has been utilised in the present study instead of tourism-specific data. Tourism-specific data, such as the total amount of foreign direct investment invested in the tourism sector itself was not available for this research. Moreover, data representing terrorism, disasters, or climate conditions was also insufficient and lacked relevance.

Under the constraints of data limitation as described, the use of a more advanced or dynamic model to forecast the Fijian tourism market cycle is not currently feasible. An empirical estimation with higher frequency and tourism-specific data are fundamental to access the dynamics of the tourism market for Fiji. Thus far, policy formulation could only be made by processing insights of tourism-related data, despite the regular occurrence of unpredictable crises which are unable to be captured when processing data in the traditional ways.
5.4 Directions for Further Study

As already mentioned, the main objective of the present study was to construct a TCI to forecast the cyclical movements of the dynamics of the tourism market. An assortment of macroeconomic variables which included; world-leading indicators, financial implications, as well as tourism-related data, were applied in the study. Then, the Markov regime-switching model was employed to determine the transition probabilities and identify the distinction between expansionary and recessionary phases for the Fijian tourism cycle. This endeavour has been proven to a worthwhile contribution to the existing research literature. However, the vulnerabilities of the tourism market do require more extensive research, despite the demonstrated usefulness of the constructed TCI with its high directional accuracy rate.

In the field of forecasting, further suggested directions of study including the out-of-sample forecasting, sensitivity analysis and robustness regression analysis to determine the robustness and validity of the forecasting results. Sensitivity analysis can be conducted for future study in analysing the influence of different values of independent variables towards the dependent variable under a given set of assumptions. The technique on how uncertainty in the output of a mathematical model can be allocated to variety sources of ambiguous input. A more variant of robustness testing can also be employed in future study to verify the quality assurance of the methodology used. In this case, the predictive power of the forecasting tool can be enhanced further. With the involvement of other indicators, it will provide the policy-makers with more detailed information for future planning.
One of the suggested directions for further studies is to model the tourism market cycle by employing a both more advanced and dynamic model-based approach, such as the Markov-switching vector autoregressive model (MSMH-VAR). Deeper analysis with the statistical adequacy of the tourism cycle is on demand to increase the higher sensitivity of the tourism market. As a result, from utilising such a more advanced model-based approach, more detailed tourism-related information could be obtained for policymakers and tourism stakeholders. With promising new evidence from the results of such estimations, the policymakers may be able to propose tourism-enhancing policies to more efficiently boost tourism development which may also lead to increased revenue growth for the country. Meanwhile, the tourism stakeholders the information to enable better decision making in managing and planning investment in the tourism sector.

Furthermore, an alternative suggested area for further research would be to improve the accuracy of the present indicator’s predictive power by using additional data with statistical adequacy. This step could be accomplished until the necessary data are available in the future undertakings. Provided with this additional data, offering an even better description of tourism activities, the predictive power of the constructed TCI could be further enhanced to serve as a better forecasting tool for the Fijian tourism market. By increasing the accuracy, validation and credibility of the constructed TCI, the users would be able to gain more detailed insights during their decision-making processes. This would be incredibly useful for the local government, policymakers, tourism-related investors, business partners, and even the regional decision makers as the performance of Fiji’s tourism is also impactful on neighbouring countries.
Finally, the present study could be adapted to be used in other countries. This would be especially appropriate for the tourism-dependent countries which depend highly on economic growth from the tourism sector. The construction of leading indicators could be applied to the respective countries to be used to investigate their tourism market cycles. Specifically, a country with a tourism sector that contributes more than 30% to the GDP of the nation, similarly to Fiji, could further develop this leading indicator approach for its tourism industry. This is due to the rising level of interest in studying the significant role of the tourism sector which creates spillover effects into other sectors, such as accommodation, transportation, manufacturing or the communications sectors. Tourism also contributed highly to employment creation by developing the service sector. Thus, it is crucial to understand the role of leading indicators in order to formulate more effective and efficient policies.
REFERENCES


