UNIVERSITY RESEARCH GRANT
FINAL REPORT
Geran Penyelidikan Universiti
Laporan Akhir

UNIVERSITI SAINS MALAYSIA

A.	
	TITLE OF RESEARCH: Time Series Modeling of International Tourist Arrivals in Malaysia for Prediction and SME Business Planning *Tajuk penyelidikan:* (RU Grant Number:1001/PMGT/816066)
B.	**PERSONAL PARTICULARS OF RESEARCHER / *MAKLUMAT PENYELIDIK:***
(i)	**Name of Research Leader: Assoc. Prof. Dr. K. Jayaraman** *Nama Ketua Penyelidik:*
	Name of Co-Researcher: Mr. Soh Keng Lin *Nama Penyelidik Bersama:*
(ii)	**School/Institute/Centre/Unit : Graduate School of Business (GSB) & School of Management (SOM)** *Pusat Pengajian /Institut/Pusat/Unit :*

C. **Research Platform (Please tick (/) the appropriate box):**
Pelantar Penyelidikan (Sila tanda (/) kotak berkenaan):

☐	**A.**	**Life Sciences** *Sains Hayat*
☐	**B.**	**Fundamental** *Fundamental*
☐	**C.**	**Engineering & Technology** *Kejuruteraan & Teknologi*
✓	**D.**	**Social Transformation** *Transformasi Sosial*
☐	**E.**	**Information & Communications Technology (ICT)** *Teknologi Maklumat & Komunikasi*
☐	**F.**	**Clinical Sciences** *Sains Klinikal*
☐	**G.**	**Biomedical & Health Sciences** *Bioperubatan Sains Kesihatan*

D.	**Duration of this research :**
	Tempoh masa penyelidikan ini :

        *Duration : .3 Years............................
        Tempoh :

        From   : ......01-07-2008...........   **To**   : .....30-06-2011................
        Dari: *Ke :*

E.	**ABSTRACT OF RESEARCH**

(An abstract of between 100 and 200 words must be prepared in **Bahasa Malaysia and in English**.
This abstract will be included in the Annual Report of the Research and Innovation Section at a later date as a means of presenting the project findings of the researcher/s to the University and the community at large)

The time series models have been constructed to predict the number of international arrivals into Penang by air and sea based on the available data from January 2002 to December 2007. The month-wise seasonal factor has been determined and consequently the peak, moderate and lean tourists months have been detected. In addition, for the entire Malaysia, the total revenue was estimated for subsequent years based on the international arrivals and the average length of stay. The Malaysian tourism industry has flourished considerably over the years due to the growth of new tourist landmarks together with its rich cultural heritage. The industry generated 6.78% of its total income from exports in 2008. The dynamic relationship between the macroeconomic factors and tourism revenue from January 2002 to December 2008 in Malaysia has been studied. Singapore in particular has been the major contributor for Malaysia in terms of international tourist arrivals and accounted for 50% of the arrivals to Malaysia on the average per year. It was observed from the study that visiting friends and relatives would be the main reason for Singaporeans to revisit Malaysia. A detailed scientific enquiry has also been made on the sustainable ecotourism in East Malaysia and the strategic impacts and policy recommendations for the tourism development towards the sustainable ecotourism to the industry players as well as the policy makers were highlighted.

Abstrak Penyelidikan
(Perlu disediakan di antara 100 - 200 perkataan di dalam **Bahasa Malaysia dan juga Bahasa Inggeris**. Abstrak ini akan dimuatkan dalam Laporan Tahunan Bahagian Penyelidikan & Inovasi sebagai satu cara untuk menyampaikan dapatan projek tuan/puan kepada pihak Universiti & masyarakat luar).

Model siri masa telah dibangunkan untuk meramalkan bilangan ketibaan pelancong antarabangsa ke Penang melalui udara dan laut berdasarkan data yang sedia ada daripada Januari 2002 hingga Disember 2007. Faktor bermusim bulanan telah ditentukan dan bilangan ketibaan pelancong bulan yang puncak, sederhana dan rendah telah dikesan. Tambahan pula untuk keseluruhan Malaysia, jumlah pendapatan telah dianggarkan untuk tahun-tahun berikutnya berdasarkan ketibaan antarabangsa dan tempoh purata persinggahan. Perindustrian pelancongan Malaysia telah berkembang pada tahun-tahun yang sudah telah disebabkan pembangunan landmark baru pelancongan bersama dengan warisan budaya yang kaya. Industri ini telah menjanakan 6.78% dari jumlah pendapatan eksport pada tahun 2008. Hubungan yang dinamik antara faktor-faktor ekonomi makro dan pendapatan pelancongan dari Januari 2002 hingga Disember 2008 di Malaysia telah juga dikaji. Singapura khususnya telah menjadi penyumbang utama ketibaan pelancong antarabangsa ke Malaysia dan telah menyumbangkan 50% dari jumlah kedatangan ke Malaysia pada puratanya setahun. Dari kajian ini juga diamati bahawa alasan utama pelancong Singapura melawat Malaysia adalah untuk melawat rakan-rakan dan kerabat. Satu penyelidikan saintifik juga telah dibuat tentang pelancongan-eco yang berlestari di Malaysia Timur dan kesan strategik dan cadangan polisi untuk pembangunan pelancongan-eco berlestari kepada pemain industri ini serta para pembuat polisi dibentangkan.

F. SUMMARY OF RESEARCH FINDINGS
Ringkasan dapatan Projek Penyelidikan

The data on the international tourist arrivals from different countries to the state of Penang, Malaysia has been considered for study from January 2002 to December 2007 (72 months). It is interesting to observe from the data that on the average there is a 1:4 tourist ratio that came via sea and air respectively to Penang. The 20% of arrivals via sea could have seen visitors coming from Medan and Banda Acheh (both of Sumatra) and short cruises from Singapore, Port Klang (the state of Selangor) or Phuket and Krabi (both of Thailand). The exponential smoothing model (ARIMA $(0,1,1)$ with no constant term) fits well for the monthly time series international tourist arrivals for both by air and sea visiting Penang. Using these best fits, the projected international tourist arrivals for future years may be computed. As far as the international tourists who came by air to Penang, the peak months are June, July, August and December irrespective of the years. June, July and August could have seen visitors coming from countries in the northern hemisphere while December could see visitors coming from the southern hemisphere. Hotels in the state of Penang usually see relatively higher occupancy rates in June because of visitors from the Middle East. Apparently visitors leave their countries to spend time away from cold winters or hot summers. However the lean months of international tourist arrivals occurring from February through May could be explained by a lack of push factors from visitors of foreign countries. On the other hand, the peak arrivals by sea occur during January and it experiences arrivals in excess of 21.3% compared to other months. In fact, peak arrivals for Penang occur during November to January every year by sea. This can be attributed to the short cruises from nearby foreign seaports or sea towns mentioned earlier. With regard to the lean period, the minimum arrivals occur during September (22.1% less) followed by May (11.3% less). Indonesia forms a separate cluster and the number of tourists visiting Penang by air and sea is very high from that country. Although it is quite understandable that neighboring Singapore forms the second cluster in terms of moderate tourist arrivals by air and sea, it is surprising to see that India joins with Singapore in the same cluster in terms of more visitors by sea. The average number of international tourist arrival forming the third cluster in this study come from four countries consisting of Taiwan, Japan, US, UK (predominantly by air) and Australia (predominantly by sea.) Although some tourists from the remaining parts of the world visit Penang, this number seems to be very low and they form the last cluster consisting of more than 21 countries. Based on these findings, it would be helpful for tourism strategists to come up with some appropriate measures for each clusters to increase tourism revenue for the state of Penang.

Pejabat Pelantar Penyelidikan 2009

The pattern of international tourist arrivals for Malaysia from January 2002 to December 2007 and the revenue through tourism have been extensively studied in the project. The top five countries Singapore, Indonesia, Thailand, Brunei and China visiting Malaysia and their contribution to Malaysian economy were investigated. Singapore contributes for more than 50% of tourists into Malaysia and above 46% in total revenue over the study period. The proximity of Malaysia and Singapore, the common heritage of their people, and the stronger Singapore Dollar should see to the sustenance of tourists coming in from Singapore. Malaysia and Singapore have enjoyed close socio-economic relationships because of their common history. It is interesting to observe that while simple seasonal exponential model is the best predictor for visitors from China, visitors from the remaining countries were best explained by Winters' Additive model. From the model, we can say that visitors from China have greater seasonal dependence, whereas visitors from Singapore, Indonesia, Thailand and Brunei showed a variety of patterns for the period studied. This may be probably due to the fact that China is geographically located further from Malaysia compared to the other four countries. It is interesting to observe that for the year 2008, the predicted values using the fitted models are very close to the actual values in turn strengthen the validity and robustness of the models.

The use of seasonal index produced a cycle from Nov-March 2002-2007 for international tourist arrivals for Malaysia irrespective of the mode of transportation. The number of international visitors increased considerably from November and peak happens in January with 6.6% to the base value. This visiting pattern is presumably due to the differences in seasonal weather of the countries. More visitors from Singapore and Thailand come to Malaysia during December because of the lure of year-end sales found in the many retail outlets, mega malls and shopping complexes. Both Thailand and Singapore are border countries with Singapore enjoying a stronger currency have invariably provided the pull factors into Malaysia. It is projected that Malaysia will be an increasingly attractive tourist destination for visitors from Brunei. However arrivals from Indonesia and Thailand are expected to increase moderately. It is predicted that Malaysia will face a monotonous growth in tourist arrivals from Singapore and China and this may be possibly due to the global economic slowdown. Thus, the main market for Malaysia in the next two years will be Singapore and therefore it is necessary for the policy makers in Malaysia to create new products and events to attract Singaporeans.

From the study, several interesting implications can be arrived at for the purpose of tourism strategic planning. First, the Ministry of Culture, Arts and Tourism of Malaysia should maintain the historical sites especially those found in Penang and Malacca. The Malaysian melting pot culture will naturally help to boost and improve the country's tourist revenues. Second, in line with the preservation of historical sites, more tourist information centers should be setup for the convenience of visitors. The idea of this is to create awareness a better understanding of historical buildings in Malaysia. Third, planned visits by Malaysian tourism officials to the tourism departments of the top five visiting countries should foster greater cooperation and stronger relationships with the objective of persuading local officials to actively promote the attractiveness of Malaysia. This can be enhanced by inviting the local tourism officials to gain first-hand experiences of Malaysian tourism hospitality.

Despite the close distance between Malaysia and Singapore, various factors contribute to the seasonal arrivals of tourists. Most Singaporeans visit Malaysia at the end of the year during the long school break. They take advantage of end-of-year retail sales held in Malaysia. There are also a significant number of Malaysians who have migrated to Singapore either due to marriage or work commitments, returning during the holiday period. The similarity of culture and language and the short distance between Malaysia and Singapore strengthens the relationship between these two countries. Many attractive activities such as bungalow stays on hilltops and promotional hotel rates for Singaporeans also appeal to the tourists from Singapore.

Thailand and Brunei share common borders with different parts of Malaysia, one would anticipate more visitors from Thailand and Brunei to come into Malaysia. The Thais have more tendencies to visit the east coast of Peninsular Malaysia, while people from Brunei Darussalam are more likely to visit the west coast of Malaysia because of the different proximity between these countries and Malaysia. The peak months for these countries are also varied to some extent, in which, climate concerns appear to play a role in influencing the visitors to travel to the east coast and west coast. While Malaysia is less likely to receive people from Thailand on the east coast of Peninsular Malaysia in November and February, the people of Brunei have lower tendencies to visit the west coast of Malaysia in October, November and May. This pattern can be explained by the occurrence of the monsoon seasons during these periods. As such, more activities are promoted (e.g. conferences, exhibitions, meetings and seminars) during the monsoon seasons to attract more international visitors to Malaysia.

While people from Indonesia visiting Malaysia are spread considerably throughout the year, more people of the Republic of China visit Malaysia from November to March. Benefits for Indonesian and Chinese visitors in coming to Malaysia lie in common religious beliefs and cultural practices. For instance, Malaysians can converse in various languages including Malay Language (similar to Indonesian Language), Mandarin, Cantonese and other Chinese dialects. Besides, many Indonesians and Chinese students are able further their higher education in Malaysia. However, currently, Malaysia receives fewer visitors from the Republic of China when compared to Indonesia with merely about 5% of the total international tourist receipts and 4.3% of the total international tourist arrivals. Given the expansion of Chinese overseas tourism, marketing plans should be initiated for different segments of this society, such as more signage in the Chinese languages at tourist spots and encouraging all ethnic groups to study Mandarin to woo more visitors from China.

On the whole, the estimated regressions indicate that all the models including the total tourist revenue are strongly influenced by the KLCI. The KLCI rises and declines generally in tandem with regional market trends. Therefore a rise in the KLCI generally will see the national indices of the regional countries. A rising stock index is indicative of greater market liquidity and higher yields, creating a higher disposal income. A higher disposal income would possibly encourage greater spending behavior of tourists such as putting up more luxurious and expensive hotels or wanting longer stays. It is observed that fixed asset investments particularly in Singapore are prohibitively expensive with Singapore ranks at 10th in the top 50 most expensive cities in 2009. Therefore an increase in Singaporean disposal income is plausibly spent on tourism. Statistics have also shown that Singaporeans on the average contributed to more than 50% of Malaysian tourism revenue, and perhaps the higher disposal income could be the reason for an increase in Malaysian tourism revenue.

The present study highlights the relationship between Malaysia tourism importance in social factors, destination attractiveness and economic factors with Singapore tourist satisfaction. The effect of tourist satisfaction as a mediating factor between tourism importance in social factors, destination attractiveness and economic factors, and the intention to revisit Malaysia is examined. With regard to social factors, while Singapore tourists are satisfied with the purpose of visiting friends and relatives, they feel insecure to visit Malaysia. It is understood that the peak season of Singapore tourist visiting Malaysia is happened from November to January every year.

This is because both nations are having same length of school holidays. Since visiting friends and visiting relatives are the main reasons for Singaporean tourists to revisit Malaysia, marketing strategies through promotion of flight ticket, increase in number of flights and improve shared bus services between Johor and Singapore could possibly encourage Singaporean to visit friends and relatives more often. In addition, the hoteliers are also advised to make adjustment in accommodation pricing and the price must be compatible with the services and facilities provided. There are several reasons on most of the tourists will not revisit some specific tourism destinations unless influenced by marketing promotion strategies, special events or interesting attraction because it was costly.

In terms of safety and security, the government should improve safety and security to increase since the Singaporean tourists are not satisfied with Malaysia's current safety level. Malaysia government and private sector should also play an important role via the enforcement of crime prevention and monitoring of crime statistics in order to ensure the better safety and security to the tourists to Malaysia. In tandem with the regaining of tourists' confidence, introduction of tourist police may be another alternative. Singaporean tourists are satisfied with the economic factors, namely exchange rate, price of shopping products, entertainments, fruits, food, and they prefer Malaysia prices compared to Indonesia prices. Lower cost of living and cheaper Malaysian Ringgit could also affect the movement of Singaporean to visit Malaysia. There is no visa restriction for Singaporean to cross the border of Malaysia. The exemption of visa application enables the nations of both countries to cross over freely without any constraints.

In addition, Singaporeans prefer to have entertainment, to shop, and to eat in Malaysia because of str Singapore Dollar. Singapore is Malaysia's important investor. Due to cheaper currency, Singaporean businessmen are interested to purchase properties such as factories and lands to conduct business in M They could use cheaper labour and raw materials to produce the same products. In Malaysia, most of Singapore's firms are small and medium enterprises (SMEs).. Moreover, the tourism related agencies organize attractive and adventurous activities to enhance the involvement of family members or frien boost the influx of Singaporeans to revisit Malaysia. Transportation services, infrastructure and main should be upgraded especially in Johor, Kuala Lumpur, Malacca and Penang because these are the fa places visited by Singaporeans. Alternatively, Tourism in Malaysia is also urged to capitalize on wha instead of creating more and sophisticated new tourism products.

For example, continue effort should be emphasized on the unique of Genting Highlands and Cameron Highlands. Investment in hawker food and street food may be viable as the state has been claimed by people on its food heaven.

The State Tourism Action Council may organize more events and activities during the lean period and extend the promotion of the state tourism preliminary to our neighboring countries such as Brunei, Thailand and Indonesia. For instance, Sabah should showcase its natural national parks to Kalimantan, Indonesia and Brunei from February to June and from September to November every year as Sabah receives less international arrivals within these periods. It is also important to promote the strengths of the state in terms of social, economic and environmental for each state. The unique of flora and fauna, numerous culture and ethnicities and variety of handicrafts are the niche international tourism market in Sabah and Sarawak. Conservation and preservation of these typical areas should be remained and improved to higher standard of living for the local community. Adequate supply of quality accommodation, infrastructure and services on tourist attraction sites are also vital especially to elderly and physically disabled persons. More funding from the federal government is much needed to ensure the upgrading and adaptive reuse of historical buildings, architectural and cultural sites. The proper and reasonable prices of goods and services sold have to be controlled by the authorities. The prices of food, entrance fees and public transportation fees must be imposed according to the ceiling price policy which is sensible especially for tourism products. Besides, optimizing the use of taxes and subsidies to improve social, economic and environmental facilities and infrastructure could be another important move to enhance the sustainability of tourism sector in these states. However, a policy recommended without the action plan and enforcement, the plan to sustainable ecotourism sector would not be succeed ever.

G. **COMPREHENSIVE TECHNICAL REPORT – Enclosed Separately**
Laporan Teknikal Lengkap
Applicants are required to prepare a comprehensive technical report explaining the project.
(This report must be attached separately)
Sila sediakan laporan teknikal lengkap yang menerangkan keseluruhan projek ini.
[Laporan ini mesti dikepilkan]

List the key words that reflectour research:
Senaraikan kata kunci yang mencerminkan penyelidikan anda:

English	Bahasa Malaysia
Exponential smoothing models, Autoregressive Integrated Moving Average (ARIMA) models, Goodness of fit, Confidence Limits, Seasonal Decomposition, Non-hierarchical Cluster Analysis.	Model pelicinan eksponen, Autoregressive Integrated Moving Average (ARIMA) model, Goodness of Fit, Batas Keyakinan, Teruraian Musim, Analisis Cluster Bukan Hirarkis.
Tourism revenue; Economic indicators; Variance Inflation Factor, Correlation; Factor Analysis; Binary Logistic Regression.	Pelancongan pendapatan; petunjuk ekonomi; Faktor Inflasi Kesisihan, Korelasi, Analisis Faktor, Regresi Logistik Binary.
Ecotourism, Socio-demographic variables, International tourist arrival	Pelancongan-eco, Pembolehubah Demografik-Sosial, Ketibaan Pelancong Antarabangsa