MAVCOM

WAYPOINT

Malaysian Aviation Industry Outlook

ACCELERATED GROWTH IN 2017 PASSENGER TRAFFIC | **AUGUST 2017**

WAYPOINT is a bi-annual report that aims at providing a historical review and an outlook for the Malaysian aviation industry. This report will also provide commentary on current issues that are affecting the industry.

KEY HIGHLIGHTS

Passenger traffic growth in 2017 to overtake prior year's growth

Malaysia's passenger traffic market—**third biggest in ASEAN**—grew 10.4% year-on-year (YoY) for the first seven month of 2017 (7M17), totalling 56.9m passengers. On the back of this growth, MAVCOM expects **total passenger traffic for 2017 to grow by 7.8 – 8.8%, translating into 98.3 – 99.2m passengers**.

Third most connected country in ASEAN

In 2016, Malaysia's airports connected passengers—via direct and indirect flights—to **116 international destinations**, which is the third highest in ASEAN after Singapore (153) and Bangkok (151).

The industry contributed an average of RM5.1bn annually to the economy

Between 2010 and 2015, the aviation industry **contributed an average of RM5.1bn annually** to the Malaysian economy. In 2014, the industry **employed nearly 44,000 full-time employees** across various services. Based on the latest available data from the Department of Statistics (DOS) in 2010, the industry **generated twice the output for the economy** for every RM1 of output produced by the industry. The industry's output multiplier is the 28th highest out of 122 industries in Malaysia.

At an aggregate level, CASK exceeded RASK while capacity grew

Total fleet size of Malaysian carriers increased from 213 to 278 aircraft in the six years up to 2016 and is expected to grow further. This **capacity increase coincided with a period of decreasing average fares**, whereby those for domestic and international routes decreased by 5.9% and 8.0% per annum respectively. This has contributed towards Malaysian carriers overall **reporting negative spreads between revenue per available seat kilometre (RASK) and cost per available seat kilometre (CASK), from 2010 to 2016**.

Only two markets for non-scheduled services were profitable

Based on the latest available audited accounts, the 20 non-scheduled services providers collectively reported RM1.6bn in revenue and RM156.8m in operating profits in 2015. However, **only firms operating in the on-demand charter and oil and gas markets reported positive operating profit margins,** indicating stiff competition in the non-scheduled services sub-sector.

Capital expenditure required to address airport capacity requirements

Seven airports in Malaysia are currently operating above their theoretical terminal design capacities; **significant capital expenditure in the short-to-medium term is required to address capacity requirements**.

1. Glossary of Sources

Sources	
ACI	Airports Council International
AirportIS	-
AOT	Airports of Thailand Public Company Limited
ASL Holders	Licence holders of ASL issued by MAVCOM
ASP Holders	Licence holders of ASP issued by MAVCOM
ATAG	Air Transport Action Group
BNM	Bank Negara Malaysia
CAG	Changi Airport Group (Singapore) Pte. Ltd.
DOS	Department of Statistics, Malaysia
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMF	International Monetary Fund
MAHB	Malaysia Airports Holdings Berhad
MOT	Ministry of Transport Malaysia
MOTAC	Ministry of Tourism and Culture Malaysia
Senai Airport	Senai Airport Terminal Services Sdn. Bhd.
Thomson Reuters	-
World Bank	-

2. Table of Abbreviations

Abbreviations	
Act 771	Malaysian Aviation Commission Act 2015
AOL	Aerodrome Operator Licence
ASA	Air Service Agreement
ASEAN	Association of Southeast Asian Nations
ASK	Available Seat Kilometres
ASL	Air Service Licence
ASP	Air Service Permit
ATR	Air Traffic Rights
BBL	Barrel
CAGR	Compound Annual Growth Rate
CASK	Cost per Available Seat Kilometre
GDP	Gross Domestic Product
GHL	Ground Handling Licence
GOM	Government of Malaysia
GST	Goods and Services Tax
HHI	Herfindahl-Hirschman Index
IC	Interpretations Committee of the Malaysian Accounting Standards Board
ICAN	ICAO Air Services Negotiation Event
IFRS	International Financial Reporting Standard
MAVCOM	Malaysian Aviation Commission
RAS	Rural Air Services
RASK	Revenue per Available Seat Kilometre
RHS	Right Hand Side
RM	Ringgit Malaysia
RPK	Revenue Passenger Kilometre
STOLport	Short Take-Off and Landing Airports
UK	United Kingdom
US	United States of America
USD	United States Dollar
YoY	Year-on-year

3. Malaysian Airport Codes

No.	Airport Code	Airport Name	No.	Airport Code	Airport Name
1	BKM	Bakelalan STOLport	24	ODN	Long Seridan STOLport
2	BBN	Bario STOLport	25	MUR	Marudi STOLport
3	BLG	Belaga STOLport	26	MKZ	Melaka Airport
4	BTU	Bintulu Airport	27	MYY	Miri Airport
5	KPI	Kapit STOLport	28	MKM	Mukah STOLport
6	KTE	Kerteh Airport	29	MZV	Mulu Airport
7	KUL	KL International Airport	30	PKG	Pangkor STOLport
8	KUL-T1	KLIA Main Terminal Building	31	PEN	Penang International Airport
9	KUL-T2	KLIA2	32	RDN	Redang STOLport
10	KUL-LCCT	KLIA Low Cost Carrier Terminal	33	SDK	Sandakan Airport
11	BKI	Kota Kinabalu International Airport	34	SMM	Semporna STOLport
12	KCH	Kuching International Airport	35	JHB	Senai International Airpor
13	KUD	Kudat STOLport	36	SBW	Sibu Airport
14	LBU	Labuan Airport	37	SZB	Skypark Terminal Sultan Abdul Aziz Shah Airport (Subang)
15	LDU	Lahad Datu Airport	38	AOR	Sultan Abdul Halim Airport (Alor Setar)
16	LGK	Langkawi International Airport	39	KUA	Sultan Ahmad Shah Airport (Kuantan)
17	LWY	Lawas STOLport	40	IPH	Sultan Azlan Shah Airport (Ipoh)
18	LMN	Limbang Airport	41	KBR	Sultan Ismail Petra Airpor (Kota Bharu)
19	LKH	Long Akah STOLport	42	TGG	Sultan Mahmud Airport (Kuala Terengganu)
20	LBP	Long Banga STOLport	43	TGC	Tanjung Manis STOLport
21	LGL	Long Lellang STOLport	44	TWU	Tawau Airport
22	GSA	Long Pasia STOLport	45	TOD	Tioman STOLport
23	LSM	Long Semado STOLport			

4. Other Airport Codes

No.	Airport Code	Airport Name	No.	Airport Code	Airport Name
1	BWN	Brunei International Airport, Brunei	17	SYD	Sydney (Kingsford Smith) International Airport, Australia
2	CNX	Chiang Mai International Airport, Thailand	18	PEK	Beijing Capital International Airport, China
3	DMK	Don Mueang International Airport, Thailand	19	PNH	Phnom Penh International Airport, Cambodia
4	DXB	Dubai International Airport, United Arab Emirates	20	HKT	Phuket International Airport, Thailand
5	DOH	Hamad International Airport, Qatar	21	SIN	Singapore Changi Airport, Singapore
6	ATL	Hartsfield-Jackson Atlanta International Airport, US	22	CGK	Soekarno-Hatta International Airport, Indonesia
7	BDO	Husein Sastranegara International Airport, Indonesia	23	HAN	Nội Bài International Airport, Vietnam
8	DEL	Indira Gandhi International Airport, India	24	BKK	Suvarnabhumi Airport, Thailand
9	SUB	Juanda International Airport, Indonesia	25	SGN	Tân Sơn Nhất International Airport, Vietnam
10	KBV	Krabi International Airport, Thailand	26	HND	Tokyo-Haneda International Airport, Japan
11	KNO	Kualanamu International Airport, Indonesia	27	VTE	Wattay International Airport, Laos
12	MEL	Melbourne International Airport, Australia	28	BLR	Kempegowda International Airport, India
13	CCU	Netaji Subhas Chandra Bose International Airport, India	29	RGN	Yangon International Airport, Myanmar
14	DPS	Ngurah Rai International Airport, Indonesia	30	BNE	Brisbane Airport, Australia
15	MNL	Ninoy Aquino International Airport, Philippines	31	MAA	Chennai International Airport, India
16	PER	Perth International Airport, Australia			

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SECTION 1: 2017 INDUSTRY OUTLOOK

According to BNM, Asian countries such as China, Indonesia, Korea, and Thailand reported higher YoY GDP growth in 1Q17 as compared to the previous quarter. **Malaysia also reported higher GDP growth of 5.6% YoY in 1Q17** (4Q16: 4.5% YoY) driven by private sector spending and demand for exports. Table 1 summarises the global GDP forecast by the IMF according to types of economies. Emerging market economies—including Malaysia—are forecasted to grow by 4.5% YoY in 2017. The IMF and the World Bank both expect the Malaysian economy to grow by 4.9% in 2017 (see Table 2).

Table 1: Global GDP Forecasts by IMF

Economies	2017 Growth Forecast (%)
Global	3.5
- Advanced Economies	*2.0*
- Emerging Market Economies	*4.5*

Source: IMF

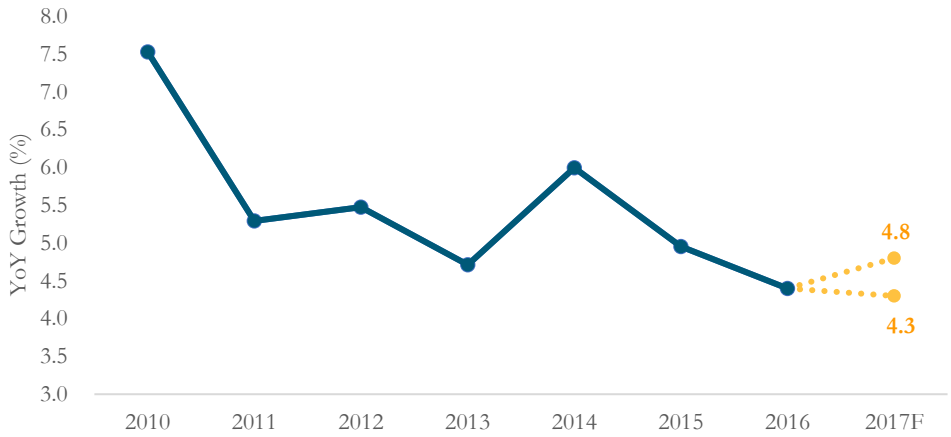
Table 2: Malaysian GDP Forecasts by IMF and World Bank

Institutions	2017 Malaysian GDP Growth Forecast (%)
IMF	4.9
World Bank	4.9

Source: IMF & World Bank

BNM is forecasting that Malaysian GDP would grow by 4.3 – 4.8% in 2017 (see Figure 1), supported by strong private consumption and improvement in exports. Private consumption in Malaysia will be supported by the expectation of sustained growth in wages and employment. Export growth will be sustained by continuous improvement in the global economy.

Figure 1: Malaysian GDP Growth, 2010 – 2017F



Source: BNM

In 2017, **Malaysian carriers are expected to add 14.3% new capacity** in terms of ASKs (see Figure 2). The planned increase in capacity would come from a total of 17 new aircraft to be added throughout the year as seen in Figure 3. **Over the past seven years, the total fleet size for Malaysian carriers saw an increase from 177 to 278 aircraft**. This was driven by an overall increase in narrow-body aircraft, which saw a net increase of 54 aircraft. This reflects the overall business direction of Malaysian carriers which concentrated on fleet renewal and growing their networks in the Asia Pacific region. In the last two years, the turboprop fleet has increased whilst the wide-body fleet has reduced, owing to changes in the business strategies of the various carriers.

Figure 2: Capacity Injection by Malaysian Carriers, 2010 – 2017F

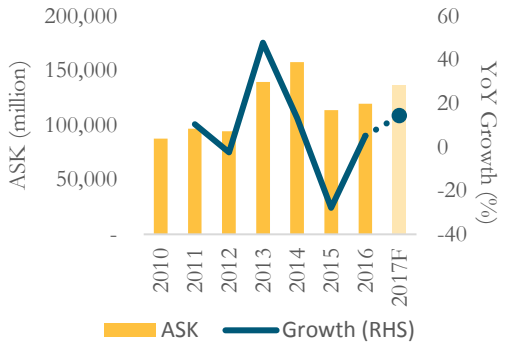
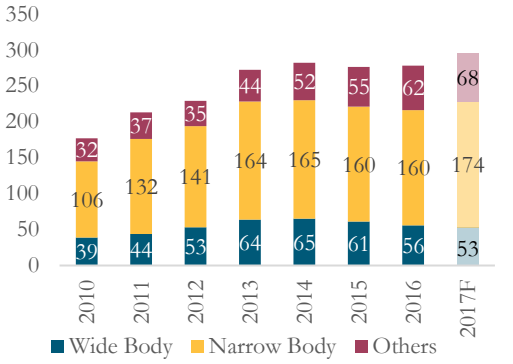


Figure 3: Malaysian Carriers' Fleet Size[1], 2010 – 2017F



Source: MAVCOM Analysis & ASL Holders

IATA expects **global demand for air travel to grow by 7.4% in 2017, with the strongest demand growth coming from the Asia Pacific** region at 10.4% (see Table 3). This bodes well for Malaysia as the majority of passenger traffic originates from within the region. This aligns with the Malaysian carriers' continued geographical focus, especially on China and India.

Table 3: Passenger Traffic Forecasts by IATA

Regions	2017 Passenger Traffic[2] Growth Forecast (%)
Global	**7.4**
- North America	*4.0*
- Europe	*7.0*
- Asia Pacific	*10.4*
- Middle East	*7.0*
- Latin America	*7.5*
- Africa	*7.5*

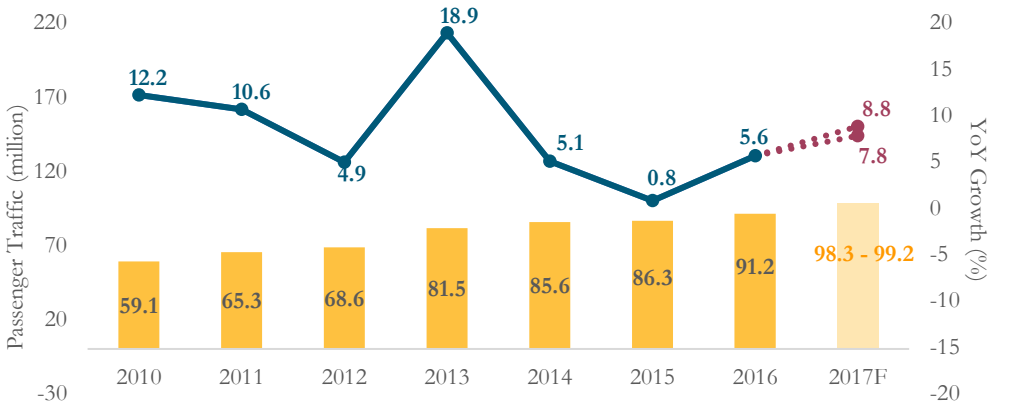
Source: IATA

The strong demand for air travel in 2017 would also be supported by the expectation of lower average fares as airlines continue their aggressive marketing campaigns. **IATA expects global yields in 2017 to decline further by 2.0%**, sustaining the downtrend, which has persisted since 2012.

[1] Based on Malaysian carriers' submissions
[2] In terms of RPKs

Malaysian passenger traffic in 2017 is forecasted to grow at 7.8 – 8.8% resulting in total passenger traffic of 98.3 – 99.2m (see Figure 4). This forecast takes into consideration the historical long-term trend of Malaysian passenger traffic, as well as the historical relationship between passenger traffic growth and Malaysian GDP growth. Furthermore, expectations for growth in passenger traffic in 2017 is underpinned by increased demand due to the growth of the Malaysian economy, which is in turn is driven by higher demand for exports (sustained by improvements in the global economy) and higher private domestic spending. For the first seven months of 2017, total Malaysian passenger traffic grew by 10.4% compared to the same period in 2016.

Figure 4: Passenger Traffic, 2010 – 2017F



Source: MAVCOM Analysis, MAHB & Senai Airport

SECTION 2: MACRO OVERVIEW

The Malaysian Aviation Industry Contributed RM5.1bn to the Malaysian Economy

The aviation industry is defined as air transport (scheduled and non-scheduled passenger and freight), operation of terminals (airports), and other services such as ground handling, air traffic control, and fire-fighting and fire-prevention services at airports. **Between 2010 and 2015, the Malaysian aviation industry contributed an average of 0.6% to the Malaysian GDP, equivalent to RM5.1bn annually** (see Table 4). Approximately 70.0% of this contribution comes from the passenger air transport sub-sector.

Table 4: Aviation Industry's Contribution to Malaysia's GDP, 2010 – 2015

% Contribution to GDP	2010	2011	2012	2013	2014	2015
Aviation Industry	**0.58**	**0.56**	**0.54**	**0.54**	**0.53**	**0.53**
- Air transport	*0.51*	*0.49*	*0.47*	*0.47*	*0.46*	*0.45*
- Passenger air transport	*0.41*	*0.39*	*0.38*	*0.38*	*0.37*	*0.36*
- Freight air transport	*0.11*	*0.10*	*0.10*	*0.10*	*0.10*	*0.09*
- Airport operations	*0.07*	*0.07*	*0.07*	*0.07*	*0.07*	*0.07*

Source: MAVCOM estimates, based on latest available data from DOS

This estimate closely aligns with the figure estimated by ATAG using 2014 data, which stood at 0.58% (see Table 5). From this table, it can be observed that the contribution of the aviation industry to an economy varies, from 0.48% to 3.86% depending on its economic activities.

Table 5: Comparison of Aviation Industry's Contribution to Selected Countries, 2014

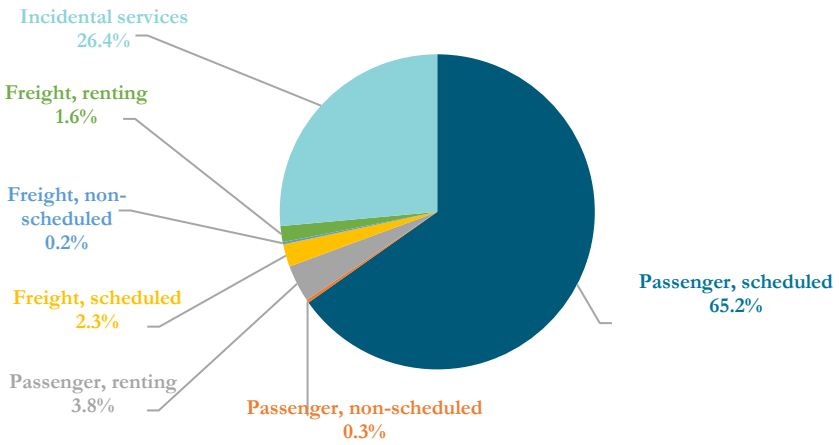
Country	Aviation Industry as % of GDP
Singapore	3.86
United Arab Emirates	2.35
United Kingdom	1.54
Thailand	1.07
Australia	0.95
Malaysia	**0.58**
Indonesia	0.48

Source: ATAG

The **output multiplier for the Malaysian aviation industry is 2.0x**. This means that every RM1 of output produced in the industry generates double the output for the overall economy. Among 122 industries in the country, **the aviation industry generates the 28th highest output multiplier**. The industry with the highest output multiplier is the oil and fats industry (relating to the production of palm oil, palm kernel oil, and coconut oil), which generates an output multiplier of 2.6x.

Based on the latest available data from DOS, the aviation industry employed 43,902 full-time workers, equivalent to 0.3% of the total employed persons in Malaysia. Figure 5 shows that the **scheduled passenger services are the largest employers, employing 69.0% of all aviation workers**, followed by services incidental to air transportation, which includes the operation of terminals (airports) at 26.4% of total aviation employees.

Figure 5: Breakdown of Employment Within the Aviation Industry, 2014



Source: DOS

A technical paper on the output multiplier for the aviation industry is available on MAVCOM's website (please see Technical Paper: Aviation Sector Multiplier).

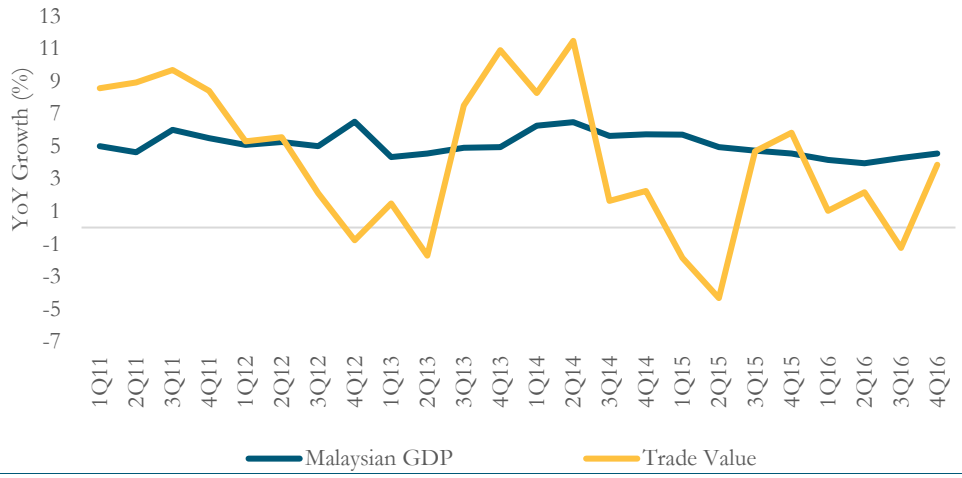
Passenger Traffic Demand and Supply Drivers

Malaysia's Trade Value Growth is More Volatile than Malaysian GDP Growth

As seen in Figure 6, the trend for trade value growth has been more volatile compared to that of the Malaysian economy. There was a **general slowdown in GDP growth in 2015 due to a higher base effect from 2014,** which was a result of frontloading household spending prior to the implementation of the GST in 2014.

Despite stable GDP growth in 2015, trade value weakened due to weak commodity prices, resulting in the decline of commodity-based exports. Higher GDP growth from 3Q16 onwards was supported by an improvement in private consumption, which grew by 6.4% and 6.2% in 3Q16 and 4Q16, respectively.

Figure 6: Malaysian GDP Growth vs. Trade Value Growth, 2010 – 2016



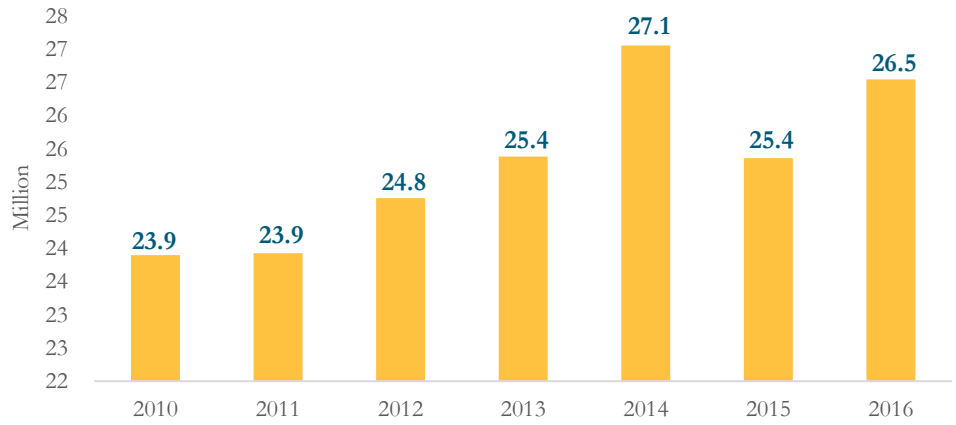
Source: DOS & BNM

Recovery of Tourist Arrivals in 2016

Between 2010 and 2016, tourist arrivals grew at a CAGR of 1.8%. Between 2010 and 2014, tourist arrivals grew steadily, notably by 6.6% between 2013 and 2014, primarily attributable to Visit Malaysia Year 2014. However, **the dual-tragedies involving MAS, as well as the AirAsia Indonesia crash had a negative impact on travel and tourism**. This affected overall tourist arrivals in 2015, which contracted to 25.4m from 27.1m in 2014 (see Figure 7). Furthermore, there were security concerns in eastern Sabah and the haze phenomenon that also contributed to the decline of tourist arrivals in 2015.

Tourist arrivals recovered in 2016, growing by 4.3% YoY to 26.5m. According to MOTAC, the recovery of tourist arrivals into Malaysia was supported by an **influx of tourists from ASEAN countries, China, the Middle East, and North Asia**. The higher tourist numbers from these countries and regions was supported by the aggressive expansion of medium- and long-haul Malaysian carriers into these geographies.

Figure 7: Number of Tourist Arrivals, 2010 – 2016



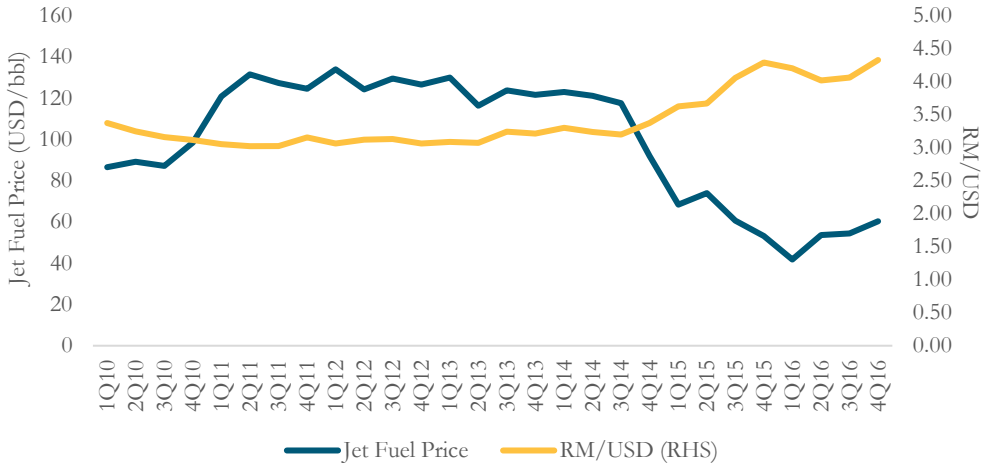
Source: MOTAC

While the latest tourist arrivals estimated by MAVCOM (based on figures sourced from MOTAC) indicate that tourist arrivals dipped marginally by -0.2% in 1Q17 versus 1Q16, **Chinese tourist arrivals grew by 7.7%** in the same period. The slight contraction was driven by a drop in arrivals from Australia, Europe, New Zealand, and North America.

Benefit of Lower Jet Fuel Price was Partially Offset by Appreciation of the USD

Figure 8 shows that jet fuel price decreased significantly from 4Q14 onwards and remained range-bound at USD40 – 70/bbl thereafter. The airlines benefited from the lower jet fuel price as fuel—at 40.0 – 50.0% of their total costs—is their largest cost component. However, the USD had also appreciated substantially from RM3.37/USD in 4Q14 to RM4.32/USD in 4Q16, representing an appreciation of 28.2%. The USD component expenses include jet fuel, aircraft maintenance, aircraft lease payments, and interest expenses. Therefore, the benefit of lower jet fuel price for airlines may be partially offset by the appreciation of the USD.

Figure 8: Trends of Jet Fuel Price and USD, 2010 – 2016

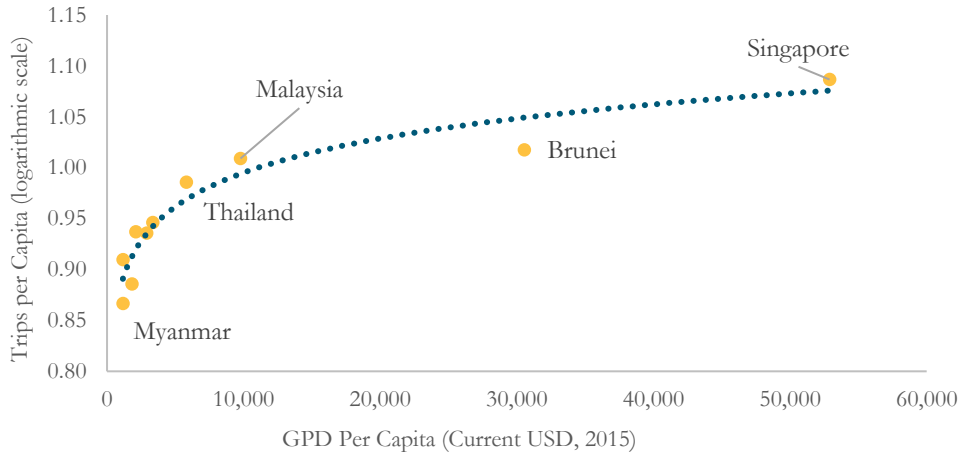


Source: MAVCOM Analysis & Thomson Reuters

Malaysia Ranks Third in Terms of Number of Trips per Capita Among ASEAN Countries

There is a **positive relationship between a country's income levels and the number of trips per capita**. However, income levels only boost the number of trips per capita up to a certain point after which the positive relationship tapers off. In 2015, Malaysia ranked third in terms of number of trips per capita compared to other ASEAN countries (see Figure 9).

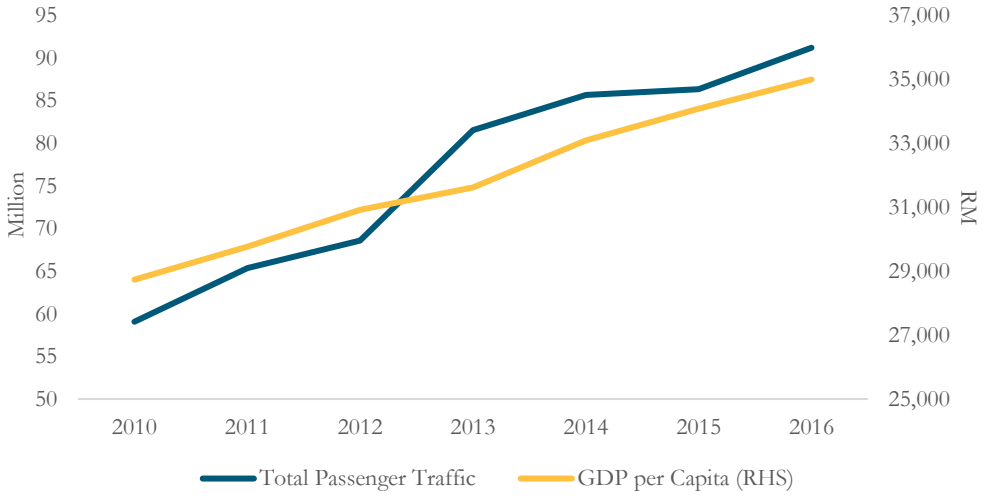
Figure 9: Trips per Capita vs. GDP per Capita of ASEAN Countries, 2015



Source: MAVCOM Analysis, AirportIS & World Bank

In Malaysia, it was observed that **there is a positive relationship between income levels and passenger traffic** (see Figure 10).

Figure 10: Malaysian GDP per Capita vs. Total Passenger Traffic, 2010 – 2016



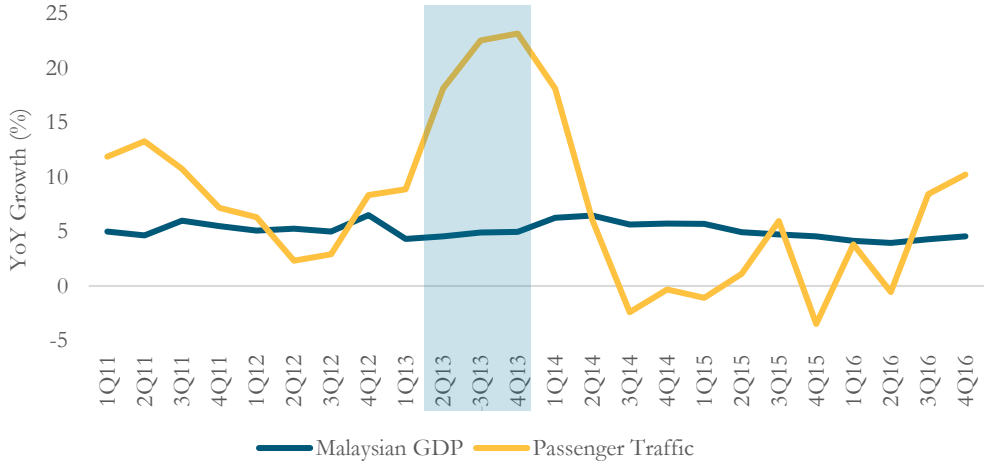
Source: DOS, MAHB & Senai Airport

Passenger Traffic Growth is 1.44x Malaysian GDP Growth

Malindo commenced its jet operations in March 2013 and its turboprop operations in June 2013. There was significant growth between 2Q13 and 4Q13, driven by the incumbents' (MAS, AirAsia, and Firefly) strategies of cutting fares by 9.0%, 7.3%, and 13.0% respectively in reaction to Malindo's entry into the market (see Figure 11).

Figure 11 also shows that **passenger traffic growth has been more volatile compared with the general growth trend of the economy.** Nonetheless, between 2010 and 2016, passenger traffic in Malaysia on average grew at 1.44x the growth of Malaysian GDP.

Figure 11: Malaysian GDP Growth vs. Passenger Traffic Growth, 2010 – 2016



Source: MAVCOM Analysis, MAHB, Senai Airport & BNM

SECTION 3: INDUSTRY STRUCTURE

Types of Licences for Air Carriers

There are two types of licences required by any company operating passenger and/or cargo services in Malaysia. This depends on the type of services provided, as follow:

1. **Scheduled services** – Providers of these services are required to have an ASL issued by MAVCOM.
2. **Non-scheduled services** – Providers of these services are required to have an ASP issued by MAVCOM.

As per Table 6, as at 30 June 2017, **there are seven scheduled services providers and 20 non-scheduled services providers in Malaysia**. There are also other licences that MAVCOM issues to industry players, such as the AOL and the GHL that are issued to airport operators and ground handling service providers in the country. The complete list of licence holders in Malaysia is available on the MAVCOM website.

Table 6: List of Scheduled Services Providers

No.	Providers
1	AirAsia
2	AirAsia X
3	Firefly
4	Malindo
5	MAS
6	MASwings
7	Raya Airways[3]

Source: MAVCOM

Industry Structure Review

Domestic Scheduled Services Market Consists of Four Airlines

As previously mentioned, as at 30 June 2017, there are seven airlines operating in Malaysia that are licensed by MAVCOM. One of the ways to define the structure of the industry is through the measurement of market concentration. **Market concentration is the extent of the degree to which a relatively small number of firms account for a relatively large share of the market.** For this purpose, the market concentration is measured using the HHI[4].

[3] Raya Airways is the only ASL holder that operates dedicated scheduled cargo services
[4] HHI is an index that measures the degree of concentration in an industry, with '0' denoting no concentration and '1' denoting a monopoly

In Table 7, when compared against nine selected countries, **Malaysia's domestic passenger market is ranked sixth with a HHI of 0.3589**. This puts Malaysia at a similar concentration level with Australia despite the latter having 13 airlines operating in its market compared with Malaysia's four. A high concentration ratio is usually associated with a low number of firms in the market. However, data from the ten countries analysed showed that this may not always be the case.

Table 7: Comparison of Concentration Ratios of Malaysia's Domestic Passenger Market Against Selected Countries, 2016

No.	Country	Number of Airlines[5]	HHI
1	Myanmar	11	0.1312
2	Thailand	9	0.1844
3	Indonesia	15	0.1987
4	UK	13	0.2433
5	Philippines	8	0.2957
6	**Malaysia**	**4**	**0.3589**
7	Australia	13	0.3671
8	Vietnam	4	0.4746
9	Cambodia	4	0.4920
10	Laos	1	1.0000

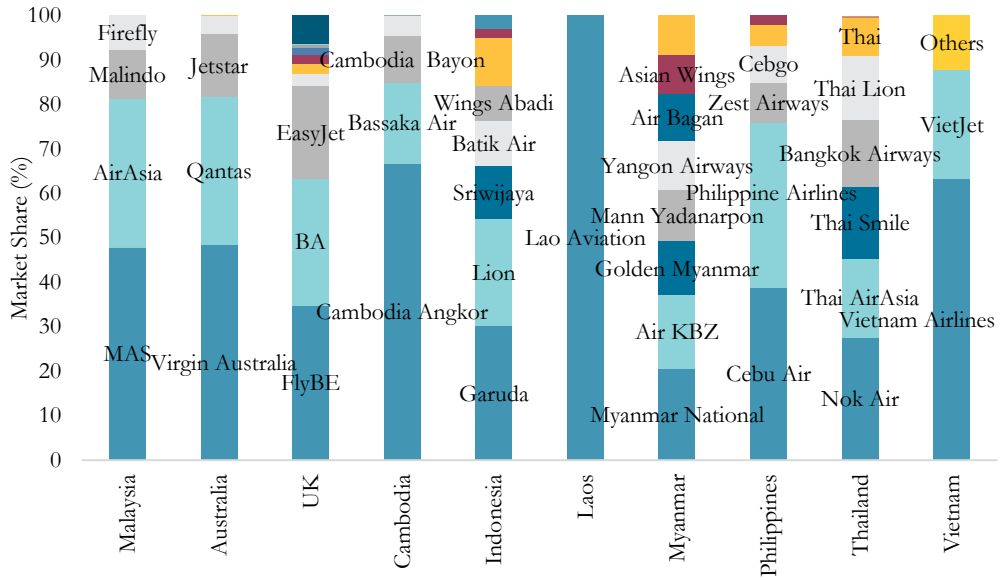
Source: MAVCOM Analysis & AirportIS

In 2016, Malaysian passenger airlines reported RM21.1bn in terms of revenue, which was a -9.0% YoY growth (2015: RM23.2bn). The airlines also reported RM1.6bn operating profits. This was a significant improvement from RM3.5bn in operating losses reported in 2015.

[5] Number of airlines in Malaysia's domestic passenger market excludes Airasia X and MASwings

Figure 12 depicts the distribution of market shares between airlines in selected domestic markets. As highlighted earlier, although Australia has 13 airlines operating in its domestic market, more than 80.0% of its market is dominated by its two biggest airlines, Qantas and Virgin Australia. By comparison, Indonesia—which has 11 airlines in the domestic market—has a lower HHI of 0.1987 because 80.0% of its domestic market is dominated by five airlines.

Figure 12: Distribution of Market Shares of Airlines in the Domestic Markets of Selected Countries, 2016

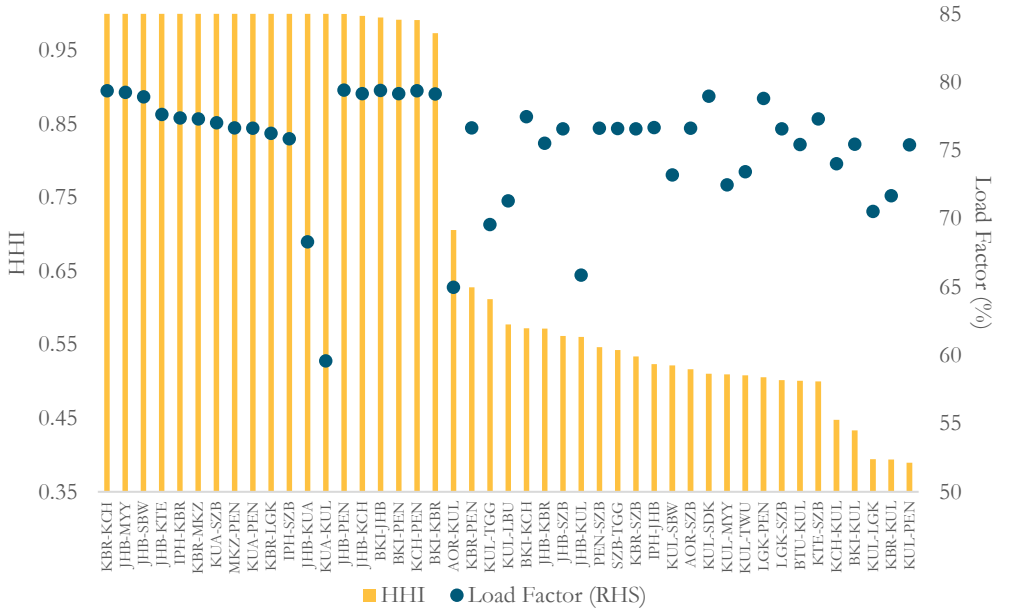


Source: MAVCOM Analysis & AirportIS

30.0% of Domestic Routes are Operated by One Airline

For Malaysia's domestic routes, market concentration levels vary according to routes. Generally, routes with higher concentration levels tend to report higher load factors. High load factors and high concentration levels suggest that the route may be able to absorb additional capacity. In 2016, 13 out of 45 domestic routes have a concentration level of 1.0000, which means there was only one airline flying those individual routes. However, not all of those routes reported high load factors. For example, the KUA-KUL and the JHB-KUA routes reported load factors of only 59.6% and 68.3%, respectively. This could indicate that the level of demand for those two routes was inadequate for the capacity available on the route.

Figure 13: Market Concentration Levels and Load Factors of Malaysia's Domestic Routes (excluding RAS routes), 2016



Source: MAVCOM Analysis & AirportIS

The Market for Non-Scheduled Services is More Fragmented

Compared with the scheduled services market, there are many types of businesses for the non-scheduled services market. For Malaysia, **there are six types of businesses in this market, operated by 20 firms** as at 30 June 2017 (see Table 8).

Table 8: Types of Businesses in the Non-Scheduled Services Market

No.	Types of Business	Number of Companies
1	On-demand charter	8
2	Oil and gas	5
3	Aerial work – cloud seeding & mapping	2
4	Pleasure flying	2
5	On-demand cargo	2
6	Surveying, observation & patrol	1

Source: MAVCOM Analysis & ASP Holders

Air Connectivity Index

Connectivity is a multidimensional concept and it can be defined in several ways. The ICAO defines air connectivity as an indicator of a network's concentration and its ability to move passengers from their origins to their destinations seamlessly[6]. It is also an indicator for the performance of airline networks, airports, and regions.

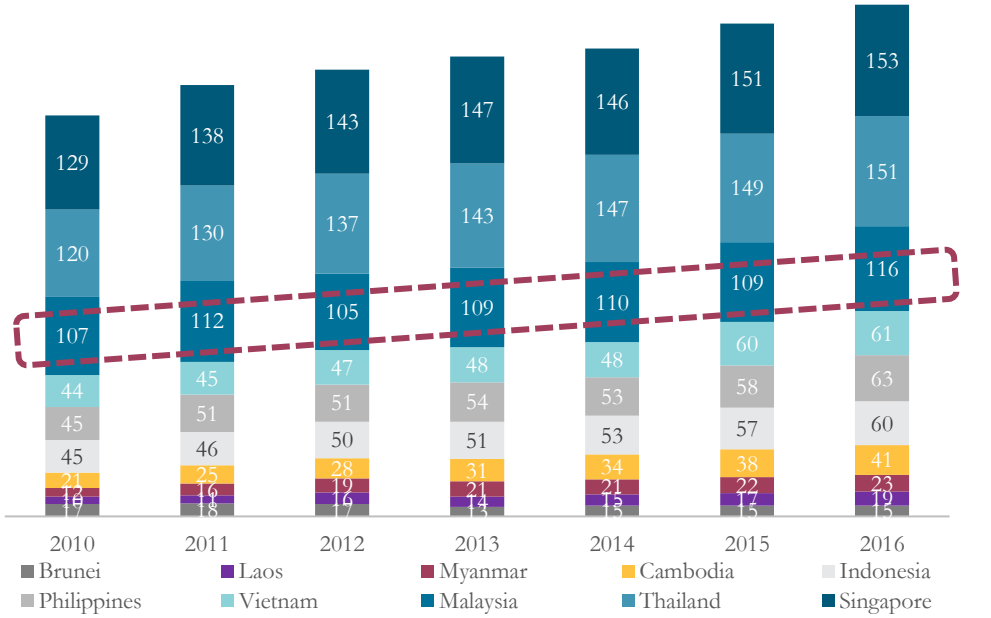
Improved connectivity may promote tourism by making more destinations easily accessible and may also support mobility between countries, allowing businesses to access a wider pool of labour. MAVCOM employs the IATA Air Connectivity Indicator methodology[7] to measure the quality of connectivity at a country and airport level, which focuses on passenger rather than cargo flows.

[6] See ICAO (2013). Enhancement of Air Transport Connectivity and Facilitation. *Worldwide Air Transport Conference* (p. 2). Montreal: ICAO

[7] The IATA methodology combines information on the number of destinations served, the number of seats available to each destination, and the economic importance of the destination as measured by the size of the destination airport (refer to Appendix I)

In terms of the number of destinations[8] served by Malaysian airports, **Malaysia's connectivity has improved from being connected to 107 destinations in 2010 to 116 destinations in 2016**. These numbers—an increase of 8.4%—represent the total destinations that can be reached via both direct and indirect flights from Malaysia. By comparison, Vietnam had increased its total destinations from 45 to 61 (an increase of 35.6%) destinations within the same period. Singapore offered the highest number of destinations in ASEAN at 153 destinations in 2016 (see Figure 14).

Figure 14: Number of Destinations Out of ASEAN Countries, 2010 – 2016

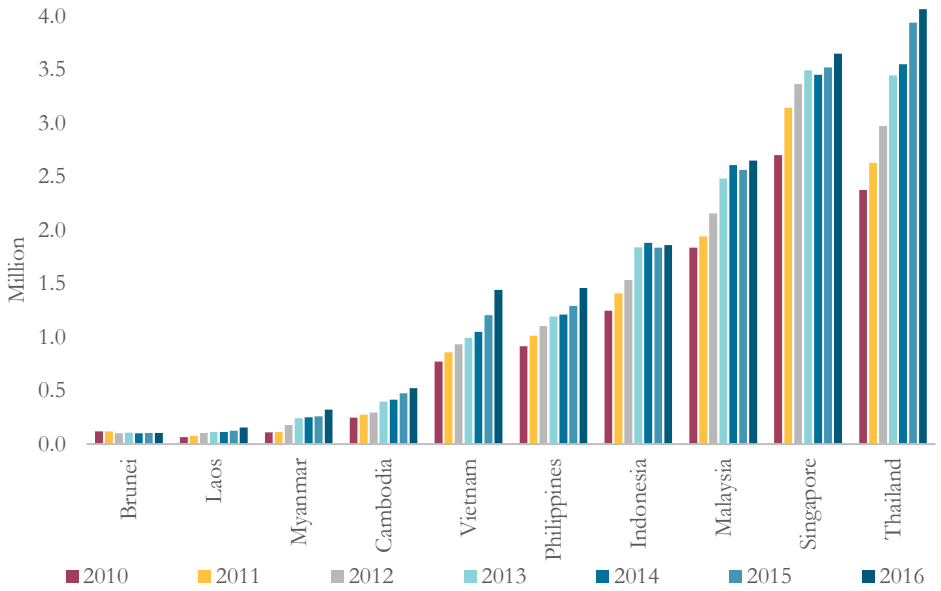


Source: MAVCOM Analysis & AirportIS

[8] See Smyth, M., & Pearce, B. (2007). *Aviation Economic Benefits*. Montreal: IATA

In addition to the number of destinations from any point of origin, connectivity is also influenced by the ease of travel, which depends on the frequency of flights and the number of seats available to each destination. Between 2010 and 2016, Malaysia ranked third in ASEAN, after Singapore and Thailand, for the most number of seats available to each destination (see Figure 15).

Figure 15: Number of Scheduled Seats Out of ASEAN Countries, 2010 – 2016



Source: MAVCOM Analysis & AirportIS

As mentioned earlier, MAVCOM employed the IATA Air Connectivity Indicator to arrive at the air connectivity score. Based on the calculated air connectivity score, **Malaysia was fourth in ASEAN behind Indonesia, Singapore, and Thailand** in 2016. Table 9 shows the air connectivity score of Malaysia relative to other ASEAN countries.

Table 9: Air Connectivity Score Ranking of ASEAN Countries, 2016

Country	Rank	Connectivity	Total Destinations	Total Seats (Million)
Thailand	1	142.7	151	4.06
Singapore	2	103.5	153	3.65
Indonesia	3	88.4	60	1.86
Malaysia	**4**	**79.6**	**116**	**2.65**
Philippines	5	71.6	63	1.46
Vietnam	6	60.8	61	1.44
Cambodia	7	15.1	41	0.52
Myanmar	8	13.8	23	0.32
Laos	9	4.97	19	0.16
Brunei	10	4.91	15	0.10

Source: MAVCOM Analysis & AirportIS

Box 1 explains the impact of the number of scheduled seats, the number of destinations served and the size of the destination airport on air connectivity scores.

Box 1: IATA Air Connectivity Indicator

The connectivity of a country is not only influenced by the number of scheduled seats and the number of destinations served, but also by the size of the destination airport. The size of the destination airport acts as a proxy estimate for the economic importance of the destination.

This explains why Indonesia's connectivity score is higher than Malaysia's, despite having only 1.9m scheduled seats to 60 destinations (Malaysia: 2.65m scheduled seats, 116 destinations). Although Malaysia and Indonesia both have flights to SIN, DXB, and DOH (airport weightage 72.2%, 100.0%, and 45.2% respectively), Indonesia has more seats to these airports. Indonesia also benefits from being connected to KUL, which has a weightage of 50.8%, while Malaysia does not benefit as much from being connected to CGK as its weightage is only 18.4% (see Table 10).

Table 10: Importance of High Quality Destinations and Number of Seats to the Destinations, 2016

Airport	Weightage	Indonesia		Malaysia		Connectivity Difference
		Seats	Connectivity	Seats	Connectivity	
KUL	**50.8%**	**354,225**	**18.0**			**18.0**
SIN	72.2%	461,324	33.3	357,423	25.7	7.6
DXB	100.0%	48,000	4.8	42,718	4.3	0.5
DOH	45.2%	45,715	2.1	34,758	1.6	0.5

Source: MAVCOM Analysis & AirportIS

More than 50.0% of Passengers Fly Through KUL

Table 11 indicates that **52.5m passengers flew through KUL in 2016, more than 50.0% of total passenger traffic in Malaysia**. The difference in passenger traffic numbers between KUL and the second busiest airport in the country, BKI, is significant. This means that KUL has a high connectivity score at 62.1, while the connectivity scores of the other airports are significantly lower at 7.2, 5.1, and 1.1 for PEN, BKI, and SZB, respectively.

Table 11: Busiest Airports in Malaysia Ranked by Passengers Handled, 2016

No.	Airports	Passenger Traffic (million)
1	KUL	52.50
2	BKI	7.29
3	PEN	6.70
4	KCH	4.90
5	SZB	2.84
6	JHB	2.78
7	LGK	2.66
8	MYY	2.20
9	KBR	2.06
10	SBW	1.48

Source: MAHB & Senai Airport

By comparison, other countries such as Indonesia and Thailand have significant numbers of passengers going through their other airports. Indonesia's connectivity score is distributed across two main airports, that is, CGK and DPS (connectivity score 47.0 and 23.4, respectively). Thailand's connectivity is similar to Malaysia's in the sense that it is concentrated at its busiest airport, BKK. However, unlike Malaysia, the connectivity scores of its next two busiest airports are higher at 16.7 and 18.5 (see Table 12).

Table 12: Connectivity Score Breakdown of Top Five Airports in Malaysia, Indonesia, and Thailand, 2016

Malaysia		Indonesia		Thailand	
Airport	Score	Airport	Score	Airport	Score
KUL	62.06	**CGK**	46.95	**BKK**	95.72
PEN	7.23	**DPS**	23.40	**DMK**	16.65
BKI	5.15	**KNO**	4.23	**HKT**	18.49
JHB	0.38	**SUB**	5.72	**CNX**	4.53
SZB	1.13	**BDO**	1.90	**KBV**	3.19

Source: MAVCOM Analysis & AirportIS

Malaysia's Utilisation of ASAs as at 30 June 2017

There are three types of ASAs:

1. **Unrestricted ASAs (Open Skies)** are agreements that have no limits in terms of types of aircraft, number of seats, and number of frequencies that can be deployed by designated carriers in the ASAs.
2. **Restricted ASAs** are the opposite of the unrestricted agreements. For example, the Malaysia-Bangladesh ASA has a limit of 28 frequencies per week for Malaysian carriers to fly into the designated cities in Bangladesh.
3. **Hybrid ASAs** mean that they may have limits on some cities and no limit on others. For example, the Malaysia-Japan ASA has a limit of seven frequencies per week to HND, but no limits for other cities in Japan.

Malaysia has ASAs with **105 countries** around the world. Figure 16 gives the breakdown of ASAs signed by Malaysia according to geographical regions. The nation's first ASA was with the Netherlands in 1964. In the early days, Malaysia enforced ASAs with countries in Europe and Asia, its main trading partners. Since then, Malaysia has enforced ASAs with countries in Africa and South America, consistent with its involvement in the Non-Aligned Movement and the South-to-South Cooperative Network. Meanwhile, Figure 17 gives the breakdown in terms of number of ASAs according to the types of ASAs.

Figure 16: Breakdown of ASAs According to Geographical Regions

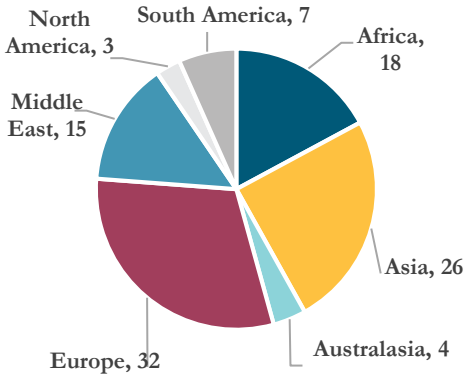
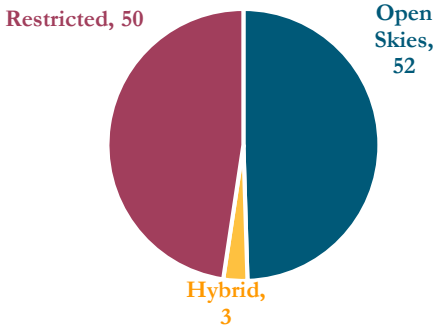


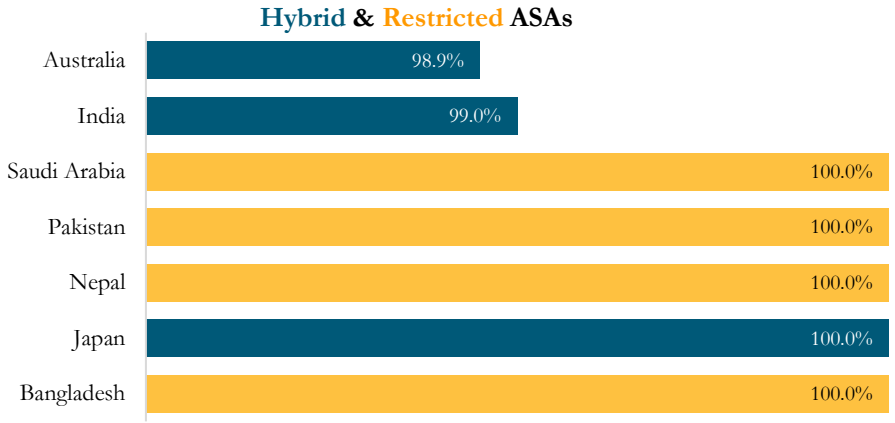
Figure 17: Breakdown of Types of ASAs Signed by Malaysia



Source: MAVCOM Analysis & MOT

In addition, **Malaysian carriers have fully utilised four restricted ASAs** with Saudi Arabia, Pakistan, Nepal, and Bangladesh (see Figure 18). **The three hybrid ASAs with India, Australia, and Japan are also experiencing high or full utilisation levels**, with Australia at 98.9% utilisation to its four cities of BNE, MEL, PER, and SYD, and; India at 99.0% of available capacity utilised to its five cities of BLR, MAA, DEL, HYD, and CCU; and Japan's seven weekly frequencies to HND being fully allocated to Malaysian carriers (see Figure 18).

Figure 18: Utilisation Rates of Restricted and Hybrid ASAs by Malaysian Carriers



Source: MAVCOM Analysis & MOT

Presently, Malaysian carriers utilise only 25 of the 105 ASAs. These are mainly to countries in the ASEAN region, Australia, China, and India, reflecting the size and coverage of their respective networks. **If the 75 foreign carriers operating into Malaysia were included, this would bring the total number of ASAs being utilised to 37**. Some countries—Ethiopia, the Netherlands, Kazakhstan, Oman, and Turkey—are now served only by foreign carriers.

At its peak in April 2000, Malaysia Airlines' network utilised 44 of the 105 ASAs. The more notable countries linked by Malaysia Airlines then were Argentina, Canada, France, Germany, South Africa, and Sweden.

ATRs Awarded by MAVCOM as at 30 June 2017

When ASAs are agreed upon with foreign countries, GOM procures approval for capacity[9] levels for its designated airlines to conduct scheduled passenger and/or cargo flights into the other country, and vice versa, usually on a reciprocal basis. These approvals are known as ATRs and for Malaysia, are procured by GOM under MOT and allocated by MAVCOM under Section 66 of Act 771.

[9] Capacity in this context is defined as the number of service(s) provided for under the ASA, usually measured in the number of flights (frequencies) or seats or tons of cargo offered in a market (city pair, or country-to-country) or on a route during a specific period, such as daily, weekly, seasonally or annually. See ICAO (2009). *ICAN2009*. Retrieved from ICAO: https://www.icao.int/Meetings/AMC/MA/ICAN2009/templateairservicesagreements.pdf

As at 30 June 2017, MAVCOM awarded a total of 231 ATRs to all Malaysian carriers since establishment. Tables 13 and 14 show the breakdown of ATRs awarded to these airlines. MAVCOM may fully or partially award ATRs based on the airlines' applications.

Table 13: Breakdown of ATRs Awarded

Airline	Total Domestic & International Applications	Fail to Operate[10]	Revoked[11]
AirAsia	63	-	-
AirAsia X	31	7	5
MAS	34	-	-
Malindo	100	3	3
Raya Airways	3	-	-
Total	**231**	**10**	**8**

Source: MAVCOM Analysis

Table 14: Breakdown of ATRs Awarded to Malaysian Carriers

Airline	AirAsia	AirAsia X	MAS	Malindo	Raya Airways	Total
Domestic	27	-	5	35	-	**67**
Africa	-	1	-	-	-	**1**
Americas	-	1	-	-	-	**1**
ASEAN	17	1	2	23	-	**43**
India	9	-	6	6	2	**23**
China	6	8	15	20	-	**49**
Rest of Asia	4	6	6	10	1	**27**
Australasia	-	3	-	3	-	**6**
Europe	-	1	-	-	-	**1**
Middle East	-	10	-	3	-	**13**
Total	**63**	**31**	**34**	**100**	**3**	**231**

Source: MAVCOM Analysis

[10] ATRs revoked for failing to operate within six months from ATRs' date of issuance
[11] ATRs revoked for partial utilisation of ATRs

SECTION 4: INDUSTRY PERFORMANCE

Industry Performance Review

Sustained Passenger Traffic Growth Between 2010 and 2016

Between 2010 and 2016, total passenger traffic in Malaysia had grown at a CAGR of 7.7%. There was a jump in passenger traffic from 68.5m in 2012 to 81.5m in 2013. 2013 marked the entry of Malindo and its entry started a price war among the airlines in the market, stimulating demand for air travel in Malaysia. Both domestic and international traffic grew at a similar rate over the same period, at 7.6% and 7.9%, respectively (see Figures 19 and 20).

Figure 19: Passenger Traffic Trend, 2010 – 2016

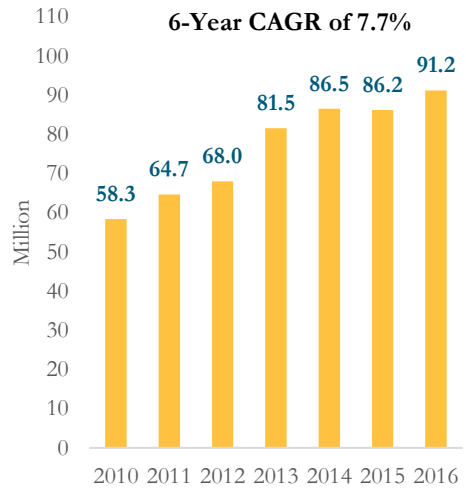
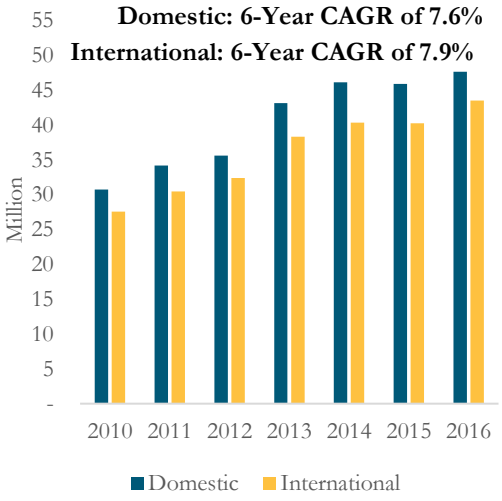


Figure 20: International & Domestic Passenger Traffic Trend, 2010 – 2016



Source: MAHB & Senai Airport

Malaysia is the Third Biggest Passenger Traffic Market in ASEAN

Table 15 shows the size and growth of the passenger traffic markets of individual ASEAN countries. **In 2016, the size of the market in Malaysia, in terms of passenger traffic, was 91.2m**. This places the country third in ASEAN after Thailand and Indonesia. The disparity in terms of passenger traffic is significant in which the biggest market, Thailand, handled 121.7m passengers, while the smallest market, Brunei, handled 0.9m passengers in 2016.

The second biggest market, Indonesia, was supported by its large domestic market of 78.5m passengers. In fact, Indonesia has the biggest domestic market among the ASEAN countries. In terms of growth, Brunei was the only market in ASEAN that reported negative CAGR growth from 2010 to 2016.

Table 15: Comparison of Passenger Traffic Growth in ASEAN Countries

Country	2016 Passenger Traffic (million)			2010 – 2016 CAGR Growth (%)		
	Domestic	International	Total	Domestic	International	Total
Thailand	53.3	68.4	121.7	19.5	11.5	14.5
Indonesia	78.5	20.2	98.7	15.4	6.1	13.0
Malaysia	**47.7**	**43.6**	**91.2**	**7.6**	**7.9**	**7.7**
Singapore	-	58.7	58.7	-	5.6	5.6
Vietnam	25.4	15.9	41.2	19.7	11.6	16.1
Philippines	19.9	14.3	34.2	6.8	8.0	7.3
Myanmar	3.6	3.2	6.7	17.8	3.2	18.7
Cambodia	0.5	4.5	5.0	16.3	12.3	12.6
Laos	0.4	1.4	1.8	11.1	13.2	12.7
Brunei	-	0.9	0.9	-	-0.2	-0.2

Source: MAHB, Senai Airport, CAG, AOT & AirportIS

Malaysian Carriers Have Been Growing Faster than Other Carriers

Between 2010 and 2016, Malaysian carriers contributed 60.3% to the total passenger traffic in Malaysia. The Malaysian carriers' share of passengers had increased gradually from 59.5% in 2010 to 62.4% in 2016 (see Figure 21). Between 2013 and 2016, figure 22 highlights that passenger traffic carried by Malaysian carriers had grown faster than other carriers. This was due to a higher injection of capacity by the Malaysian carriers, particularly after the entry of Malindo in 2013.

Figure 21: Share of Passengers Carried by Malaysian Carriers, 2010 – 2016

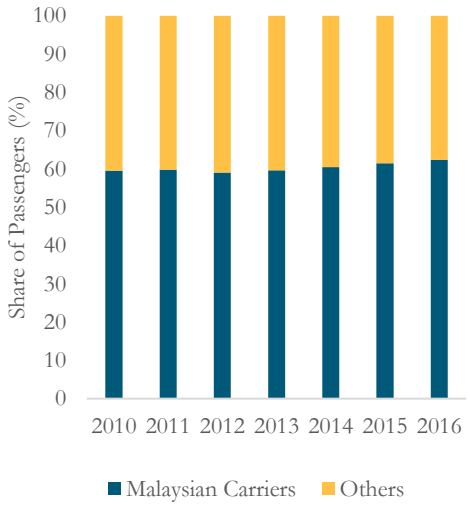
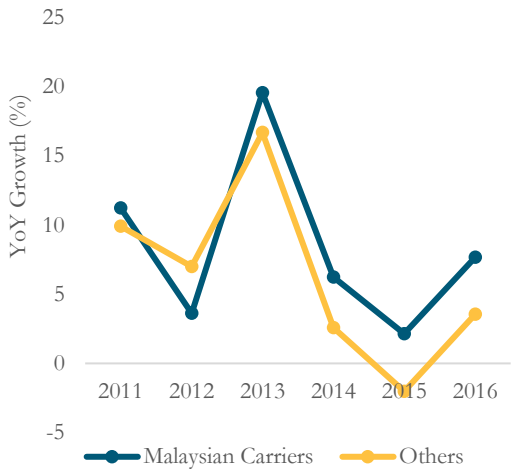


Figure 22: Passenger Traffic Growth of Malaysian Carriers, 2010 – 2016



Source: MAVCOM Analysis, MAHB, Senai Airport & AirportIS

Review of Malaysia's Aircraft Movement and Cargo Traffic

Malaysia's Aircraft Movements Growth has Decelerated

Generally, Malaysia's aircraft movements track passenger traffic closely with a correlation of 0.99 based on quarterly data from 2010 to 2016 (see Figure 23). **Global aircraft movements have been growing steadily between 2012 and 2016** due to multiple factors such as increases in the number of open skies agreements signed and higher propensity to travel. **By comparison, aircraft movements growth in Malaysia has been decelerating since 2013.** This is due to several reasons:

- the entry of Malindo expanded Malaysia's aircraft movements by 14.1% in 2013;
- the three aircraft incidents resulted in a slowdown in aircraft movements growth by 7.4% in 2014; and
- the delisting of MAS from the stock market in December 2014 and its network restructuring exercise the following year primarily contributed to a slowdown in aircraft movements to 3.1% in 2015.

Figure 23: Malaysia Passenger Traffic vs. Malaysia Aircraft Movement, 2010 – 2016

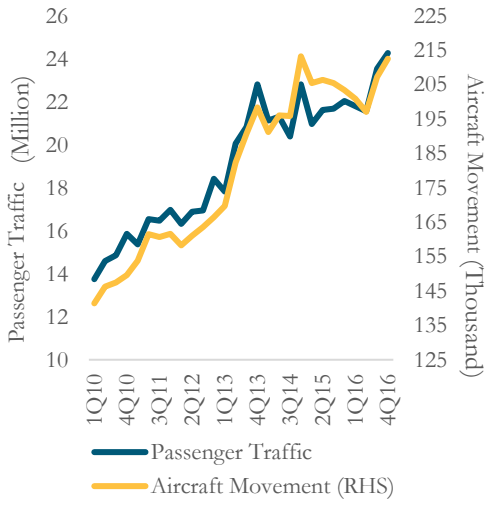
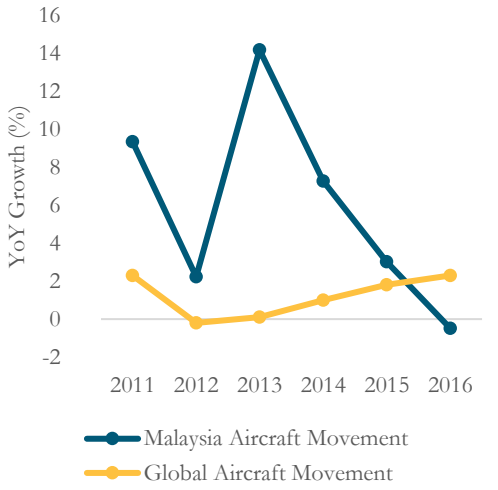


Figure 24: Growth Trends in Aircraft Movements, 2011 – 2016



Source: MAHB, Senai Airport, ACI & IMF

Strong Relationship between Malaysia Cargo Volume Growth and Trade Value Growth

Globally, air cargo (freight and mail) reported strong growth of 4.5% in 2014 after three consecutive years of stagnation. This was despite the fact that **global trade values had shrunk in 2015 and 2016 due to weakened global currencies** (see Figure 25). Meanwhile, on a quarterly basis, **Malaysia air cargo tonnage growth exhibited a strong relationship with Malaysia's total trade value growth with a correlation of 0.72** (see Figure 26).

Figure 25: Global Air Cargo Volume Growth vs. Global Trade Value Growth, 2010 – 2016

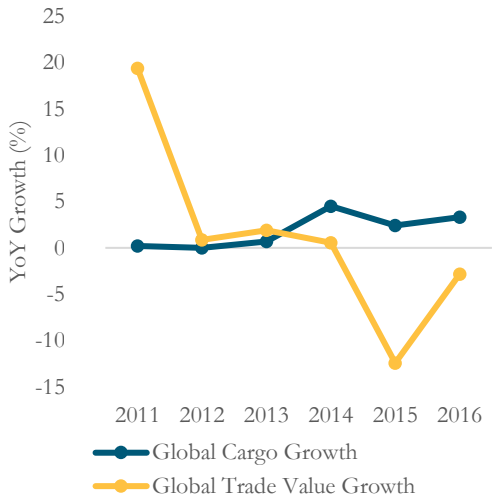
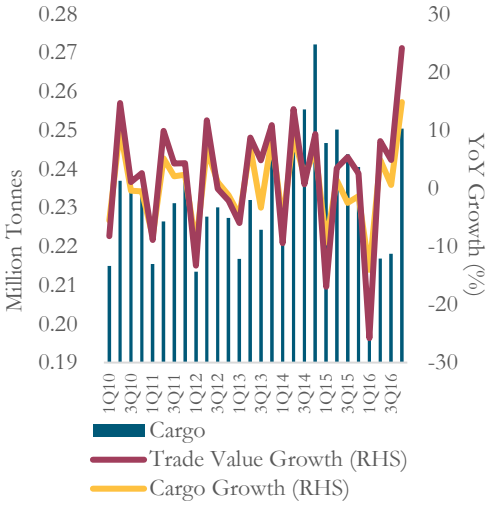


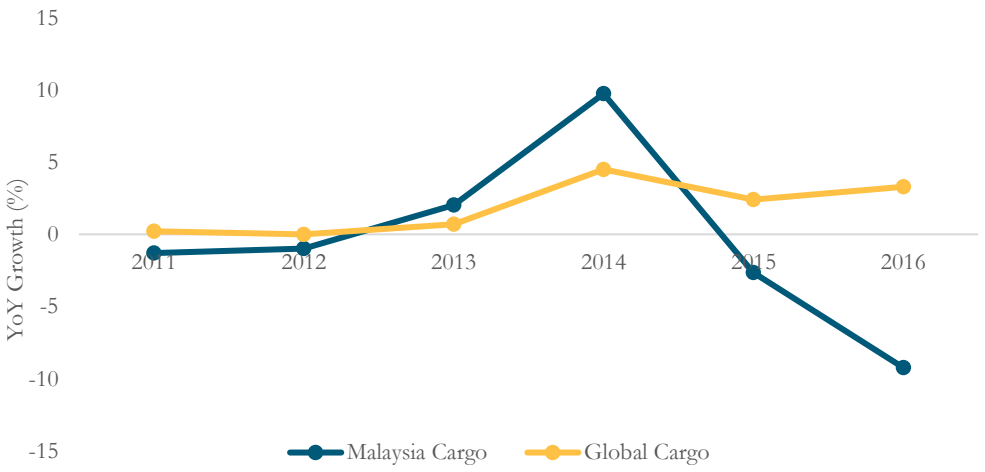
Figure 26: Malaysia Air Cargo Volume Growth vs. Trade Value Growth, 2010 – 2016



Source: MAHB, Senai Airport, ACI & IMF

While global cargo growth registered a soft rebound, Malaysia's cargo volume contracted from 2015 onwards. It was deduced that during this period, lower demand for air cargo in Malaysia resulted in reduction of MABkargo's capacity (see Figure 27).

Figure 27: Malaysia and Global Cargo Volume Growth Trends, 2010 – 2016



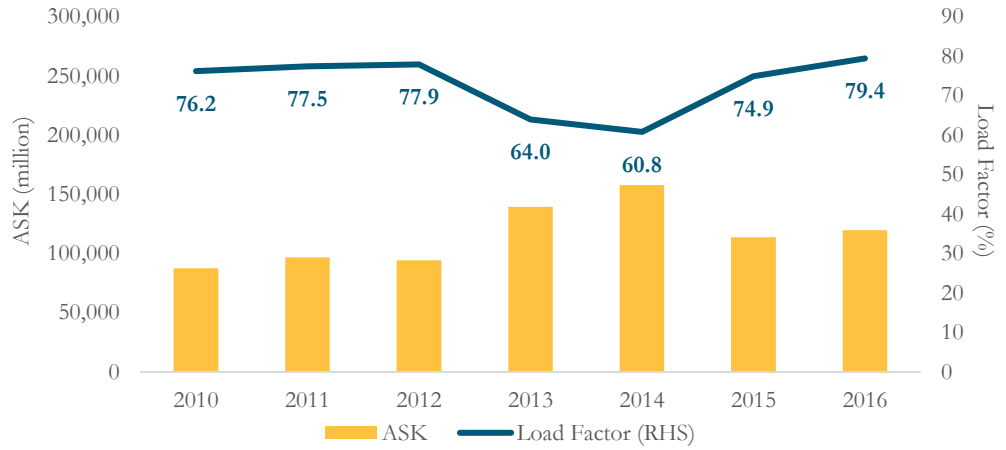
Source: MAHB, Senai Airport ACI & IMF

Review of Malaysian Carriers' Operations

Review on Capacity and Capacity Utilisation of the Malaysian Carriers

Over the past seven years, Malaysian carriers have been reporting load factors exceeding 70.0%, except in 2013 and 2014. The period of overcapacity in these two years were the result of ASKs growing by 47.8% and 13.2%, respectively, even though RPKs only grew by 21.4% and 7.6%, respectively. This resulted in a decline in load factors to 64.0% and 60.8% in 2013 and 2014 (see Figure 28). The market rationalised its capacity in 2015, as ASKs shrunk by 28.5%. As a result, load factor jumped by 141 basis points to 74.9%.

Figure 28: Malaysian Carriers' Capacity and Load Factor Trends, 2010 – 2016



Source: MAVCOM Analysis & ASL Holders

Financial Overview of Malaysian Carriers

Declining Average Fares

Malaysian carriers' revenue had grown at a CAGR of 2.5% despite average fares declining by 3.4% over the last seven years (see Figure 29). This was mainly due to the decline in the price of jet fuel from USD92/bbl in 2010 to USD52/bbl in 2016, putting pressure on the carriers to charge lower fares. Figure 30 highlights the downtrend in average international and domestic fares between 2011 and 2016 with a negative CAGR of 6.6% and 1.8% respectively. Also, domestic fares are more volatile compared to international fares.

Figure 29: Revenue and Blended Average Fares, 2010 – 2016

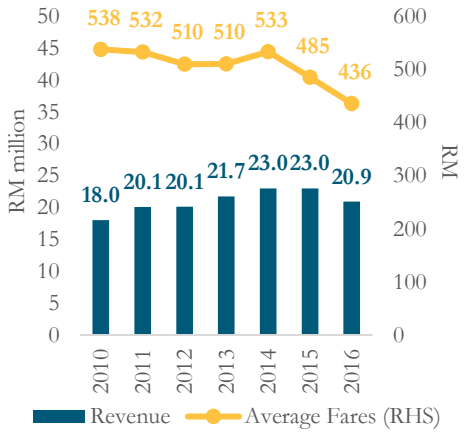
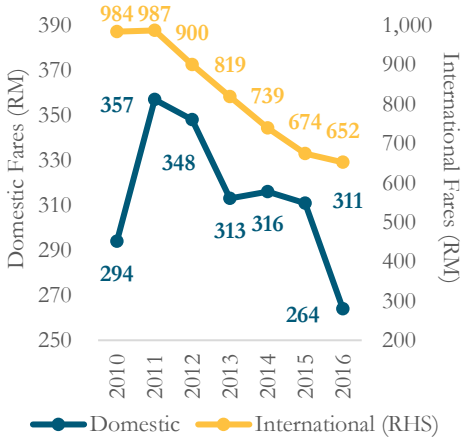


Figure 30: Average Fares for Domestic and International Routes, 2010 – 2016



Source: MAVCOM Analysis, ASL Holders & AirportIS

Table 16 shows that **falling average fares is not exclusive to Malaysia as almost all ASEAN countries also reported a similar trend**. All ASEAN countries, except for Laos and Myanmar, reported a decline in fares on a blended basis. In terms of international fares, all ASEAN countries apart from Laos, reported a greater decline in international fares compared to domestic fares.

Table 16: Average Fares Trends Across ASEAN Countries

Country	2016 Total Revenue (RM million)	2010-2016 CAGR Growth (%)			
		Total Revenue	Domestic Fares	International Fares	Blended Fares
Indonesia	44,651	9.4	0.6	-4.5	-3.2
Thailand	38,740	7.0	-3.1	-5.2	-5.9
Singapore	38,313	2.8	-	-3.4	-3.4
Vietnam	21,135	8.8	-7.2	-3.7	-6.2
Malaysia	**20,915**	**2.5**	**-1.8**	**-6.6**	**-3.4**
Philippines	18,060	5.9	2.0	-3.0	-1.3
Myanmar	3,470	20.7	4.4	-0.4	1.7
Cambodia	2,794	11.0	6.6	-1.6	-1.4
Laos	973	17.4	1.3	4.6	4.2
Brunei	690	-0.6	-	-0.4	-0.4

Source: MAVCOM Analysis & AirportIS

Falling Yields for the Top Three Routes out of KUL and SZB

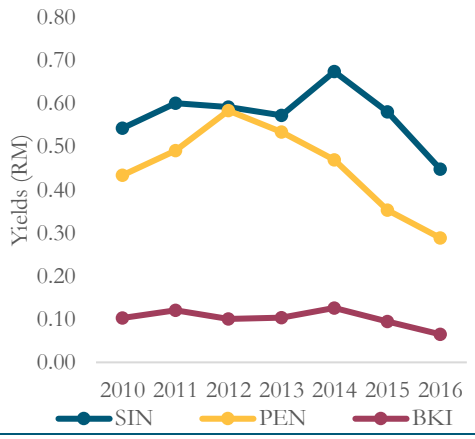
Table 17 shows the top ten destinations out of KUL and SZB, which indicates that the **top three busiest routes in terms of passenger traffic are to SIN, PEN, and BKI.** Between 2010 and 2016, despite strong demand, **these three routes experienced downward pressure on yields** (see Figure 31). Yields for the PEN route came down significantly by 34.6% between 2012 and 2016 due to stiffer competition from Malindo's entry into the market.

Table 17: Top Ten Destinations Out of KUL and SZB, 2016

No.	Routes	Passenger Traffic (million)
1	SIN	3.00
2	PEN	2.00
3	BKI	1.96
4	KCH	1.73
5	LGK	1.63
6	KBR	1.45
7	DMK/BKK	1.45
8	CGK	1.39
9	HKG	1.00
10	SGN	0.77

Source: AirportIS

Figure 31: Yields Performance of the Top Three Routes, 2010 – 2016



Malaysian Carriers' Profitability

The biggest cost driver for airlines is fuel. Malaysian carriers reported negative operating margins from 2Q10 to 2Q11 when jet fuel prices rose from USD89/bbl to USD131/bbl within the same period. The dip in the average jet fuel price from USD117/bbl in 3Q14 to USD68/bbl in 1Q15 helped elevate airlines' profitability, as aggregate margin for Malaysian carriers rose from -6.0% to 6.0% (see Figure 32).

The impact of foreign exchange on margins was not as pronounced as the impact of jet fuel prices. Nonetheless, a significant depreciation in the RM did have a bearing on margins. For example, operating margins shrank from 6.0% in 1Q15 to 0.2% in 4Q15 when the RM depreciated by 18.5% during the same period (see Figure 33).

Figure 32: Operating Profit Margin vs. Jet Fuel Price, 2010 – 2016

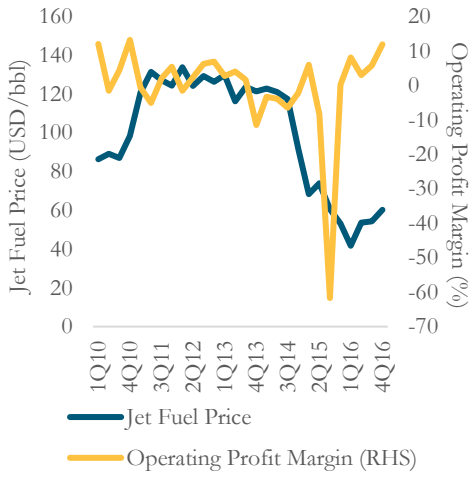
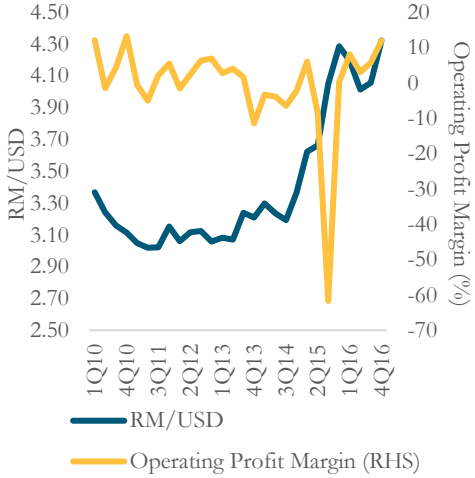


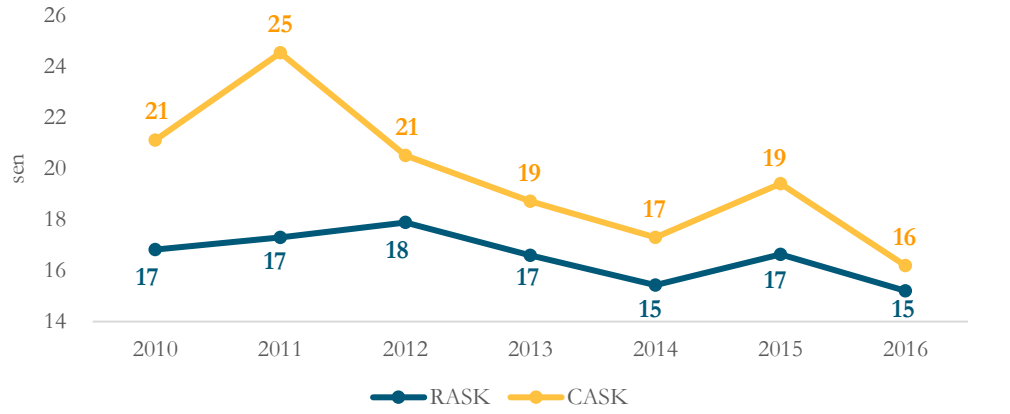
Figure 33: Operating Profit Margin vs. USD Exchange Rate, 2010 – 2016



Source: MAVCOM Analysis & Thomson Reuters

Figure 34 highlights that **Malaysian carriers have been recording higher CASK than RASK throughout 2010 to 2016**. An anomaly can be seen in 2016 when the airlines reported operating profits despite the aggregate RASK being lower than the aggregate CASK. This was due to improvements in the non-passenger airline operations and declines in the prices of jet fuel. These suggest that these components contributed to the Malaysian carriers' improved profitability.

Figure 34: Comparison of RASK Against CASK of Malaysian Carriers, 2010 – 2016

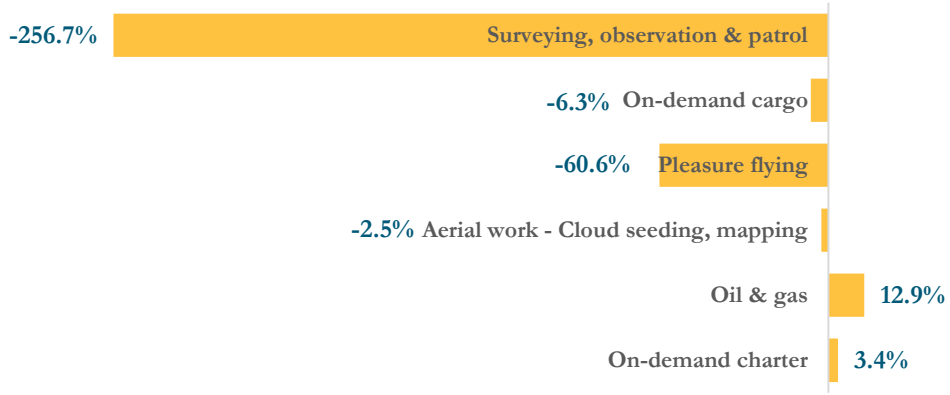


Source: MAVCOM Analysis & Thomson Reuters

Profitability of the Non-Scheduled Services Market

The non-scheduled services market is fragmented due to the different types of businesses. The size of this market is also significantly smaller compared to the scheduled services market. In 2015, **the 20 firms collectively reported RM1.6bn in revenues and RM158.9m in operating profits**. The bulk of profits for this market came from the oil and gas as well as the on-demand charter businesses, which reported positive margins (see Figure 35).

Figure 35: Operating Profit Margin of Non-scheduled Services Providers



Source: MAVCOM Analysis & ASP Holders

SECTION 5: AIRPORTS & INFRASTRUCTURE

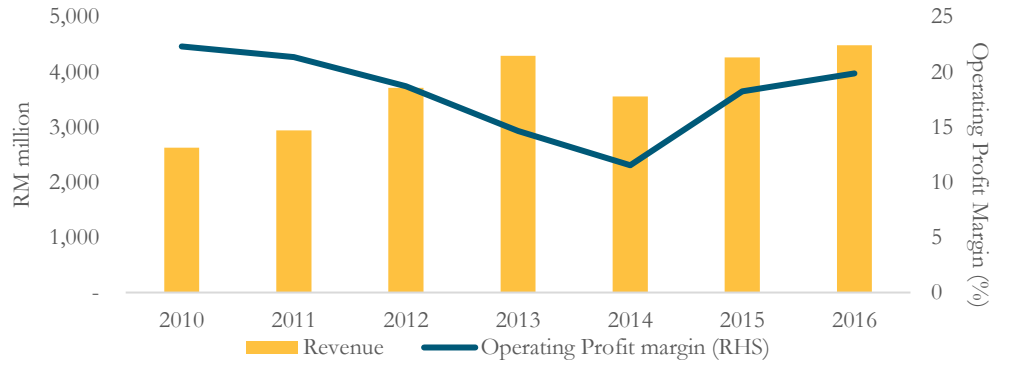
Financial Overview of Malaysian Airport Operators

There are two airport operators in Malaysia that handle passengers commercially; MAHB and Senai Airport. **MAHB is the biggest airport operator, making up more than 90.0% of the total revenue and operating profit of all airport operators** in the country. Therefore, the aggregate financial performance of the Malaysian airport operators is heavily skewed by MAHB's numbers. Figure 36 shows the revenue and operating profit margins trends of these operators. **Between 2011 and 2014, GOM had approved the increase of passenger service charges by 27.0 – 28.0% as well as aircraft landing and parking charges by 30.0% and 64.0%, respectively**. The passenger service charges were increased in 2011, whereas the aircraft landing and parking charges were increased gradually over three years between 2012 and 2014. The upward revision of these charges had contributed towards the growth of airports revenue from RM2.6bn in 2010 to RM3.6bn in 2014, representing a 4-year CAGR (2010 – 2014) of 7.9%. **Over the same period, passenger traffic had grown at a CAGR of 9.7%**, while capacity in terms of ASKs had grown at a CAGR of 15.9%.

In 2014, there was a 17.1% drop in the revenue of airport operators because MAHB had reported significantly lower construction revenue[12] due to the completion of KUL-T2, in which the company had reported construction revenues of RM1.6bn in 2013 and RM662.4m in 2014. Excluding these figures, revenue for the airport operators in 2014 increased by 9.1%, in line with passenger traffic growth and revision to the aeronautical charges.

On the other hand, the airport operators' profit margins did not move in line with passenger traffic growth due to several reasons. First, in 2012, operating profit margins declined because MAHB had started to hire staff in anticipation of the opening of KUL-T2, initially scheduled for May 2013. In addition, MAHB had started to pay its user fee to GOM in 2013, as per its Operating Agreement, which had been signed in 2009. Finally, when KUL-T2 commenced operations in May 2014, there was a mismatch between the cost of running the new terminal—which is three times the size of the KUL-LCCT that it replaced—and the non-aeronautical revenue generated by KUL-T2 in the first eight months of its opening. This gestation period led to the decline in its operating profit margins for the financial year.

Figure 36: Revenue and Operating Profit Margins of Airports Operators, 2010 – 2016



Source: MAVCOM Analysis, MAHB & Senai Airport

[12] The reporting of construction revenue by MAHB is according to the IFRSs, IC 12: Service Concession Arrangements

Terminal Capacity Constraints at Airports

Table 18 shows that **there is currently a mismatch between terminal design capacity and actual passenger traffic** being handled by the airports in Malaysia. Seven out of the 21 airports managed by MAHB are currently handling passenger traffic exceeding their terminal design capacities. These are SZB (190.0% above capacity), LGK (177.0%), KBR (137.5%), LHD (140.1%), MZV (120.2%), MYY (110.0%), and PEN (102.8%). Based on passenger traffic projections provided by MAHB, several airports such as KCH, TWU, SBW, and BKI are expected to exceed their theoretical terminal design capacities within one to five years. This means that significant capital expenditure is required over the period in order to address capacity requirements.

By contrast, the most underutilised airports are MKZ (operating at 11.7% of design capacity) and LBU (27.1%). Most of the remaining airports in the country are currently operating between 52.5% and 98.4% of their terminal design capacities.

Typically, **airports experience waves of peak passenger demand when many flights depart and/or arrive within certain periods** of the day. Therefore, airports may experience congestion within those periods but fewer passengers outside those periods.

Table 18: Terminal Design Capacity and Terminal Capacity Utilisation Rate of Airports Operated by MAHB, 2016

No.	Airports	Terminal Design Capacity (mppa)	Terminal Utilisation Rate (%)
1	SZB	1.50	190.0
2	LGK	1.50	177.0
3	LDU	0.10	140.1
4	KBR	1.50	137.5
5	MZV	0.05	120.2
6	MYY	2.00	110.0
7	PEN	6.50	102.8
8	KCH	5.00	98.4
9	TWU	1.50	84.8
10	SBW	1.80	81.6
11	BKI	9.00	80.7
12	BTU	1.00	80.5
13	KUL	70.00	75.2
	- T1	*25.00*	*102.0*
	- T2	*45.00*	*60.3*
14	LMN	0.08	73.9
15	SDK	1.40	63.1
16	TGG	1.50	60.0
17	IPH	0.50	53.9
18	AOR	1.50	52.5
19	KUA	0.50	49.6
20	LBU	2.20	27.1
21	MKZ	0.50	11.7

Source: MAHB

APPENDIX

APPENDIX I: IATA Air Connectivity Indicator

The IATA air connectivity indicator formula is as follows:

$$\text{Connectivity Index} = \sum \frac{\text{Total scheduled seats} \times \text{Airport weightage}}{10{,}000}$$

Where airport weightage is:

$$\text{Airport weightage} = \sum \frac{\text{Total passengers handled by airport}}{\text{Total passengers handled by no. 1 busiest international airport}}$$

Example calculation:

Assuming KUL has flights to only three destinations—DXB, AMS, and KNO—the connectivity indicator for KUL is calculated as follows (see Table A1a):

Table A1a: Terminal Design Capacity and Terminal Capacity Utilisation Rate of Airports Operated by MAHB, 2016

Destination Airport	No. of Seats	Airport Weightage	Seats × Weightage
DXB	15,800	1.00	15,800
AMS	8,100	0.71	5,751
KNO	2,500	0.15	375
Total			**21,926**

Connectivity score for KUL = 21,926/10,000 = 2.1926

Assumptions:

- The number of seats is based on the total seats from KUL to the given destinations in the busiest month of the year.
- The sum of seats multiplied by airport weightage is divided by 10,000 to scale it to a more manageable number.
- DXB handles the highest number of international passengers in the world, thus it is given a weightage of 1.00. AMS, which handles 71.0% of the number of passengers handled by DXB, is given a weightage of 0.71; KNO which handles 15.0% of passengers handled by DXB is given a weightage of 0.15.

The size of the busiest airport is measured by total international passengers handled by the airport (measured by origin and destination) minus all domestic passengers. This is done to remove biasness towards large domestic airports like ATL and PEK.

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