

The 154th Transport Policy Colloquium: ASEAN-India Regional Report  
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# **Characteristics of ASEAN's LCCs and Centrality Analysis**

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# Comments

- Based on various datasets, Mr. Yamashita's analysis carefully summarizes the recent state of aviation and the transition in airlines in ASEAN.
- AirAsia's strategies particularly stand out in terms of their uniqueness.
- Compared with other transportation sectors, aviation has abundant international datasets—despite many being charged—as to airlines, passengers, airports, and other factors.
- The next step would be to not only aggregate but also analyze the data with specific objectives using statistical methods and other means (e.g., effectiveness of strategy, interpretation of value, impact of policy); this would allow for further enhancing the research.

# LCCs: Their Essence

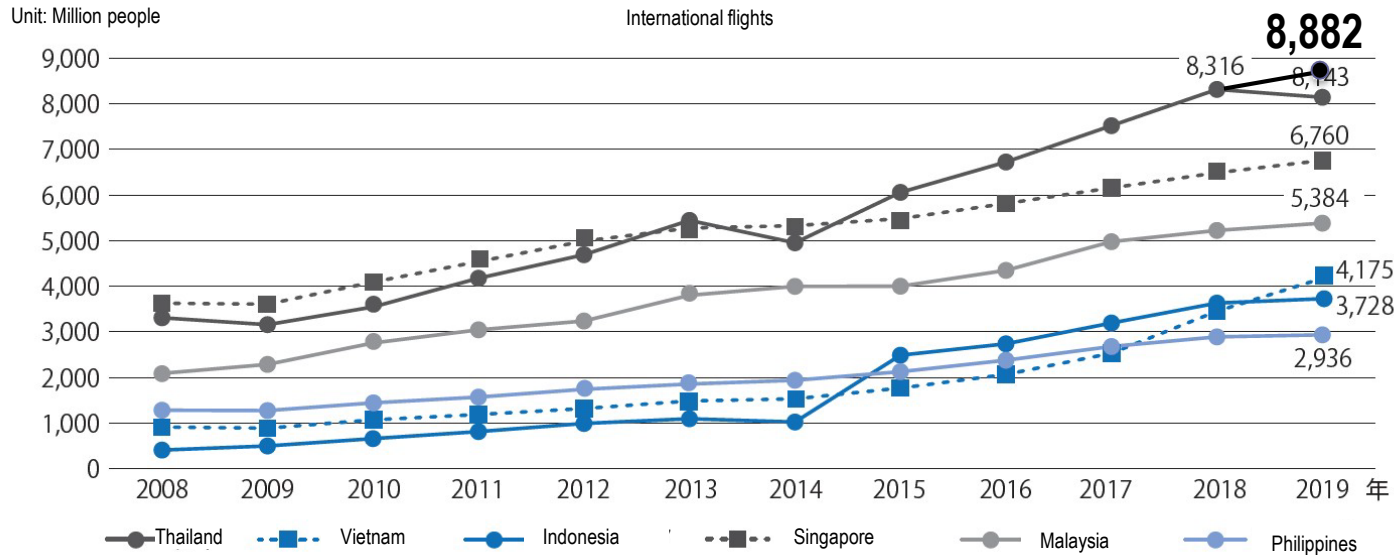
Fig. 1. Characteristics of LCC operation system/service.

(1) Low fare	
(2) High load factor	
(3) Charging of ancillary services (e.g., charged in-flight meals and entertainment, selection of specific seats, checked baggage based on weight)	
(4) Point-to-point network between two locations (cost reduction by eliminating transit service and taking other steps)	
(5) High aircraft utilization with short turnaround time (reduction of cost per seat-kilometer)	Has advantage in short-haul routes. Long-haul aircraft, by nature, are highly utilized.
(6) Utilization of non-congested/secondary airports (reduction of cost by enhancing aircraft utilization and cutting/exempting airport fees)	
(7) Unification of seat class (reduction of cost through simplifying services into economy class-only)	
(8) High-density seating arrangement accommodating many users (reduction of cost per seat)	
(9) Aircraft standardization (reduction of maintenance costs, pilot/maintenance technician training costs, etc., and discount through bulk aircraft purchase)	
(10) Promotion of online booking/sales of flight tickets (reduction of personnel costs, advertising costs, and various commissions)	
(11) Staff serving multiple duties (reduction of personnel costs)	

## Reference

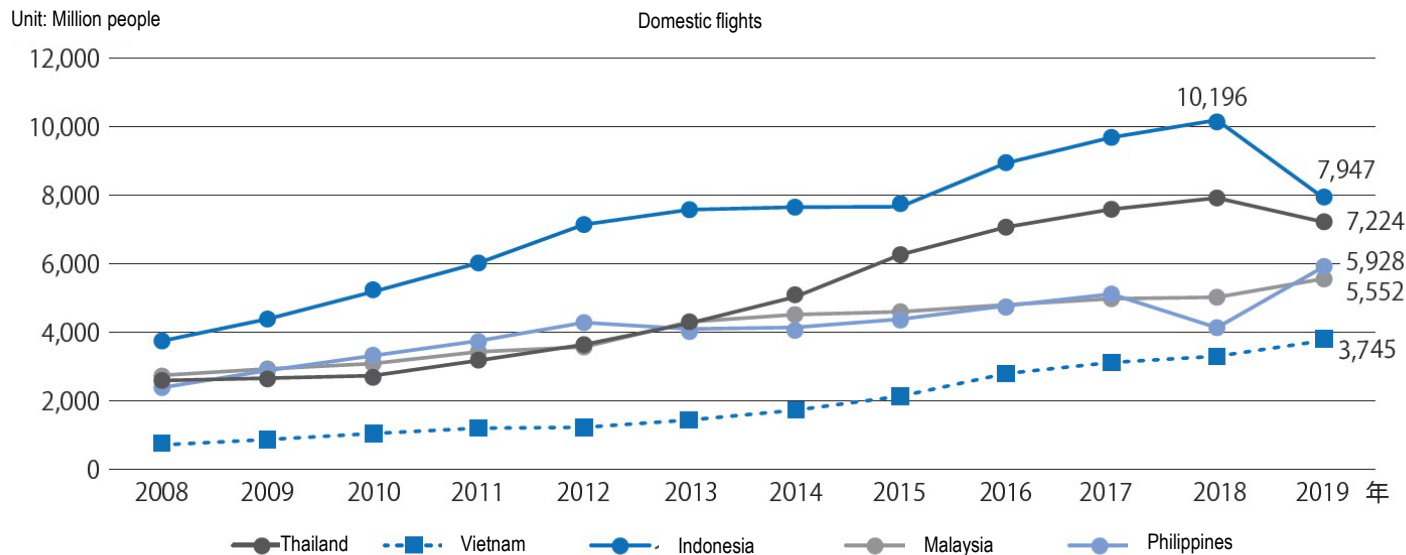
Hanaoka, S.: The Essence of LCCs and the Future of Domestic LCCs, *Takeoff*, 137 (2015), pp. 12–21 (in Japanese).

# Shift in the Number of International/Domestic Flight Passengers in Major ASEAN Countries



← State of Thai Aviation Industry 2019

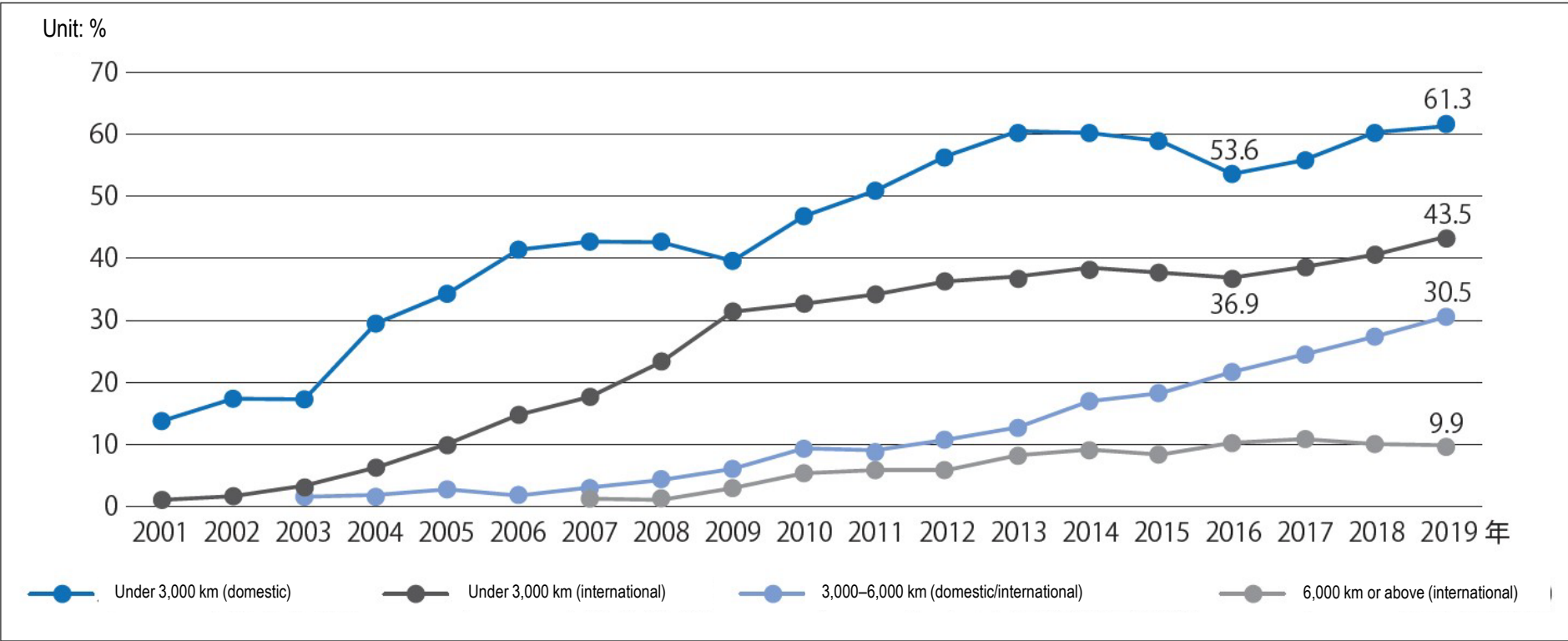
**Passenger number share of ASEAN's international flights to/from Thailand**  
 Thai AirAsia: 16.9  
 Thai Airways: 15.3  
 AirAsia: 10.0



**Indonesia**  
 Increase in fuel prices caused major airfare rise

**Thailand**  
 Allocation of aircraft to international flights reduced the seating capacity of domestic flights, and thereby pushed up airfares

# Share of Per-Stage Length LCC Seat Offering to/from ASEAN Member



Domestic flights with under-3000 km stage length: FSC seat offering increased in 2016–2017, lowering LCC shares. The primary cause of this is increased flights of Batik Air, an Indonesian FSC operator. LCCs subsequently increased their share again from 2018 onward as Indonesian LCCs Wings Air and Citilink, Malaysia's AirAsia, and Vietnam's Vietjet Air increased their flights, while services of Garuda Indonesia were significantly reduced.

Reference

Mitsubishi Research Institute, Inc.: OAG Aviation Worldwide Limited 2021 "Historical Data."

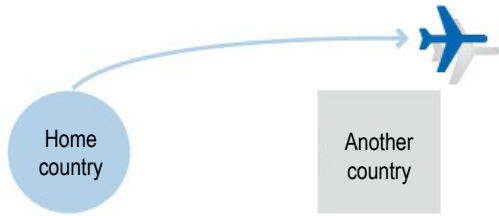
# Characteristics of ASEAN's LCCs

## Why did LCCs grow/spread in ASEAN?

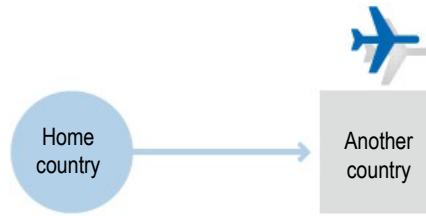
- Matched needs of middle-income class
  - Low fares gave rise to new aviation demand
- Region size suitable for LCCs
  - Short-haul routes are easy to set, given the close proximity of major ASEAN cities
- AirAsia CEO Mr. Tony Fernandes' exceptional management vision
  - AirAsia leads the LCC market; broke barriers to market entry; and has foresight
- Interconnection between regional association and policies of in-region "Open Skies" pact
  - Interconnection with ASEAN Economic Community
  - Same structure as that of the European Common Aviation Area (Division between FSCs [intercontinental flights] and LCCs [primarily in-area flights]), but FSCs are struggling in the long-haul international flight sector.
  - Unlike in Europe, liberalization has been limited to the fifth freedom of the air. Actions are taken with a joint venture model.

# ASEAN Single Aviation Market (ASAM)

## 1. Flying across territory



## 2. Technical landing



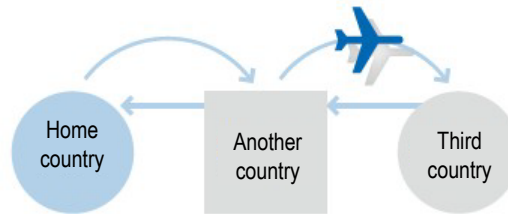
## 3. Right to transport passengers/freight from home country to another country



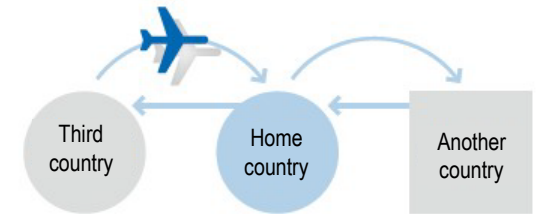
## 4. Right to transport passengers/freight from another country to home country



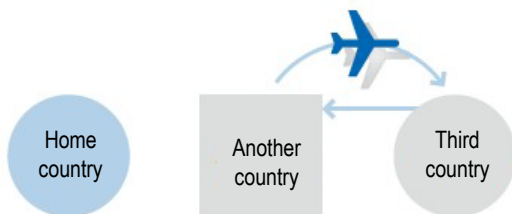
## 5. Beyond-flying right



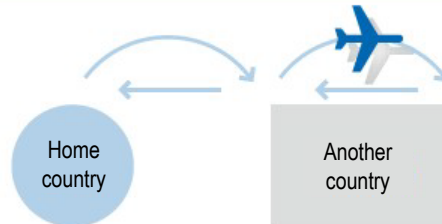
## 6. Trilateral transport with home country as hub



## 7. Trilateral transport



## 8. Cabotage of connecting flight



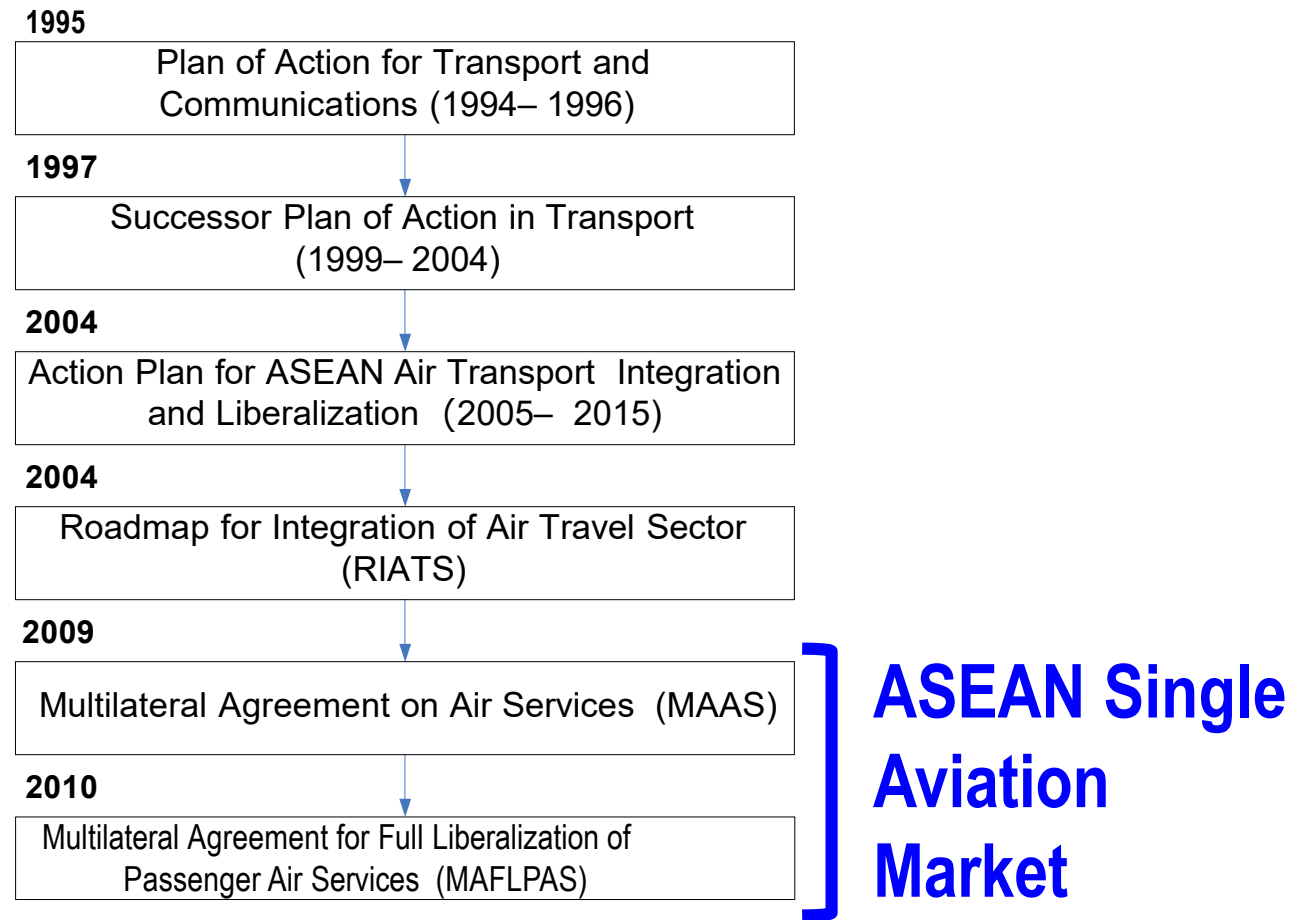
## 9. Cabotage



### Reference

Hanaoka, S. The Arrival of the Wave of LCCs and Where Japan is Headed, *Takeoff*, 131 (2012), pp. 2–9 (in Japanese).

# ASEAN Open Sky Policy Agreement Process



## Main provisions of **MAAS** and **MAFLPAS** agreements

1. **Relaxation of market access (transportation rights)**
2. Relaxation of ownership and control (beneficial ownership and effective control)
3. Adoption of common policy regarding charges, tariffs, and others



# ASAM

	Implementing Protocols (Appendix)
<b>MAAS</b> <b>Signed</b> <b>May</b> <b>2009</b>	Protocol 1. Unlimited <b>third, fourth</b> freedom traffic rights <u>within the ASEAN sub-region</u>
	Protocol 2. Unlimited <b>fifth</b> freedom traffic rights <u>within the ASEAN sub-region</u>
	Protocol 3. Unlimited <b>third, fourth</b> freedom traffic rights <u>between the ASEAN sub-region</u>
	Protocol 4. Unlimited <b>fifth</b> freedom traffic rights <u>between the ASEAN sub-region</u>
	Protocol 5. Unlimited <b>third, fourth</b> freedom traffic rights <u>between ASEAN capital cities</u>
	Protocol 6. Unlimited <b>fifth</b> freedom traffic rights <u>between ASEAN capital cities</u>
<b>MAFLPAS</b> <b>Signed</b> <b>Nov. 2010</b>	Protocol 1. Unlimited <b>third, fourth</b> freedom traffic rights <u>between any ASEAN cities*</u>
	Protocol 2. Unlimited <b>fifth</b> freedom traffic rights <u>between any ASEAN cities*</u>

\*Member states appoint the designated points (airports)

Takes effect when ratified by three countries (ASEAN minus X formula). MAAS took effect in the same year and MAFLPAS went into effect in the following year.

MAAS: Ratified by the Philippines in March 2016, marking the completion of ratification by all member countries.

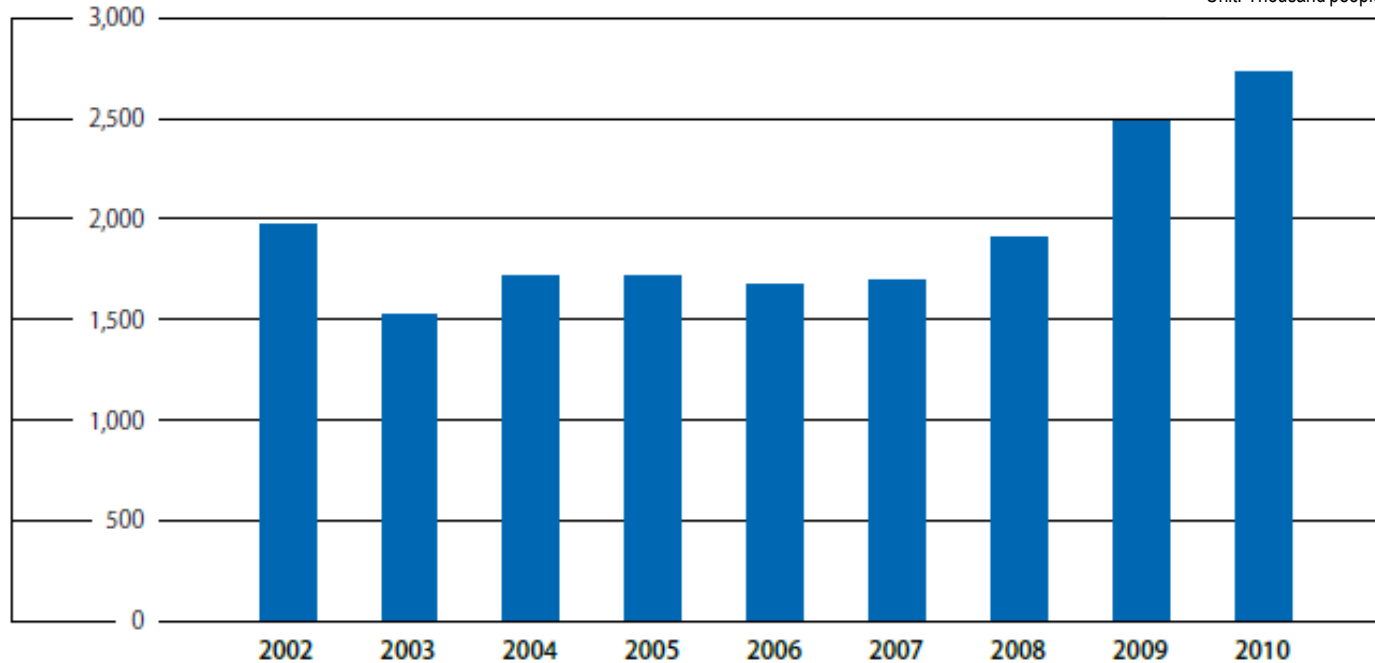
MAFLPAS: Ratified by Indonesia and Laos in April 2016, marking the completion of ratification by all countries.

# Impact of “Open Skies” Regime Adoption in ASEAN

MAAS Protocol 5. Unlimited **third, fourth** freedom traffic rights between ASEAN **capital** cities

Fig. 2. Shift in annual passengers of Singapore–Kuala Lumpur route.

Unit: Thousand people



Liberalization of the third and fourth freedoms of the air (easing of entry restrictions to promote competition) created maximum effect. (MAAS Protocol 5, MAFLPAS Protocol 1)

The Singapore-Kuala Lumpur route was the first to experience an entry deregulation. Singapore Airlines and Malaysia Airlines dominated the market prior to that. LCCs gained approval to enter the market in late 2007—albeit with an upper limit on their number of flights—leading to entries by Tiger Airways and AirAsia. In the second half of 2008, flight restrictions were removed. Jetstar Asia subsequently entered the market and Singapore Airlines and Malaysia Airlines drastically cut their fares, benefitting customers extensively.

## Reference

Hanaoka, S: The Arrival of the Wave of LCCs and Where Japan is Headed, *Takeoff*, **131** (2012), pp. 2–9 (in Japanese).

# LCC Joint Venture Model

- ASAM has yet to see the liberalization of the seventh (transportation between other countries), as well as eighth and ninth (cabotage), freedoms of the air.
- Launching a joint venture in another country within the upper limit of foreign ownership restrictions allows for—in “practical” terms—transport between and within other countries.
  - Offers an advantage of an ability to use **another country’s airport as a hub** for international and domestic flights alike.
  - In terms of beneficial ownership and effective control, the model can be interpreted as a “de facto” relaxation of the latter.
- Advantage of LCCs: No dominant image of nationality
  - Despite four AirAsia airlines operating at Bangkok’s Don Mueang Airport (DMK), there is little awareness as to the differences between Thai AirAsia [FD] (e.g., SIN routes), which serves as a hub, AirAsia [AK] (KUL), Indonesia AirAsia [QZ] (DPS), and Philippines AirAsia [Z2] (MNL).
  - Fits in for domestic transportation in other countries as well.
- Note that neither liberalization efforts nor the joint venture model are effective in congested airports.
  - Departure/arrival slots are considered separately. Aircraft utilization cannot be raised without leeway in the slots. (cf. Reconsiderations are needed for post-pandemic “use it or lose it” U/L rules and vested rights)
  - Significance of secondary airports (e.g. DMK)

# Joint Venture LCCs in ASEAN

- AirAsia Group  
AirAsia (Malaysia)  
Thai AirAsia, Indonesia AirAsia, Philippines AirAsia, AirAsia India, AirAsia X, Thai AirAsia X (Business relinquished) AirAsia Japan, Indonesia AirAsia X
- Lion Air Group  
Lion Air, Batic Air [FSC], Wings Air (Indonesia)  
Malindo Air (Malaysia [FSC]), Thai Lion Air (Thailand)
- Jetstar Group  
Jetstar (Australia), Jetstar Asia (Singapore), Jetstar Japan

Additional information:

Impact of Brexit (UK is no longer part of the European Common Aviation Area)

EasyJet Europe (launched 2017): Aims to maintain hub airport in continental Europe

Ryanair UK (launched 2019): Aims to maintain hub airport in the UK

# Primary Airports in ASEAN

2019: Top 15 airports by number of international flight passengers + two airports

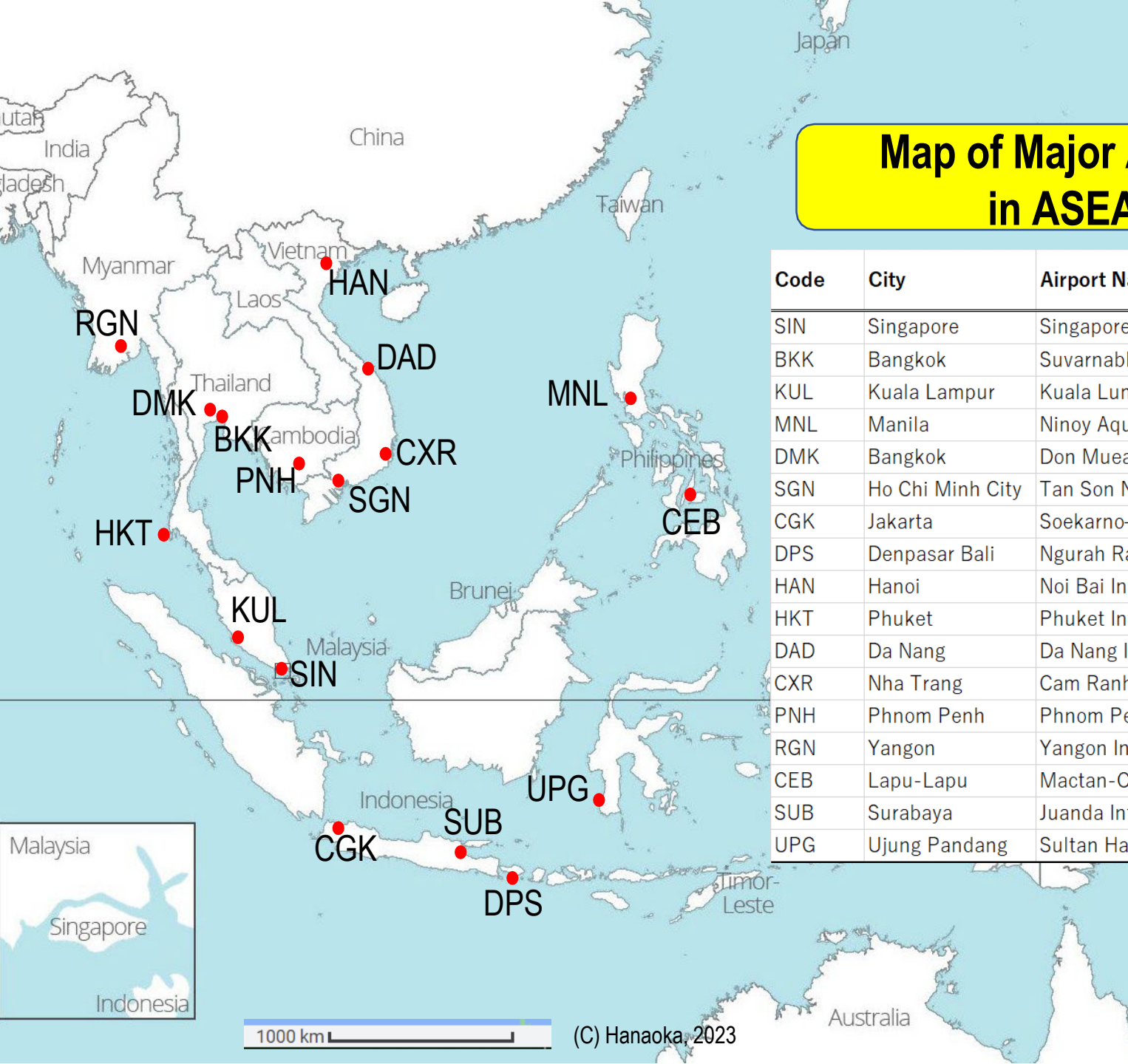
Code	City	Airport Name	Country	Intl	Dom	Transit	Passenger Total	Movement Total
SIN	Singapore	Singapore Changi Airport	Singapore	<b>67,601,000</b>	-	682,000	<b>68,283,000</b>	385,630
BKK	Bangkok	Suvarnabhumi Airport	Thailand	<b>52,933,565</b>	11,963,616	524,663	<b>65,421,844</b>	380,909
KUL	Kuala Lumpur	Kuala Lumpur International Airport	Malaysia	<b>44,854,685</b>	17,402,737	79,047	<b>62,336,469</b>	408,435
MNL	Manila	Ninoy Aquino International Airport	Philippines	<b>24,984,439</b>	22,913,607	-	<b>47,898,046</b>	308,422
DMK	Bangkok	Don Mueang International Airport	Thailand	<b>17,808,324</b>	23,455,238	48,228	<b>41,311,790</b>	284,954
SGN	Ho Chi Minh City	Tan Son Nhat International Airport	Vietnam	<b>15,648,405</b>	25,594,835	-	<b>41,243,240</b>	260,862
CGK	Jakarta	Soekarno–Hatta International Airport	Indonesia	<b>15,166,899</b>	38,745,431	584,295	<b>54,496,625</b>	390,648
DPS	Denpasar Bali	Ngurah Rai International Airport	Indonesia	<b>13,791,400</b>	9,926,030	434,769	<b>24,152,199</b>	155,206
HAN	Hanoi	Noi Bai International Airport	Vietnam	<b>11,445,998</b>	17,858,633	-	<b>29,304,631</b>	189,290
HKT	Phuket	Phuket International Airport	Thailand	<b>10,661,782</b>	7,425,708	6,214	<b>18,093,704</b>	115,915
DAD	Da Nang	Da Nang International Airport	Vietnam	<b>7,146,527</b>	8,397,071	-	15,543,598	98,706
CXR	Nha Trang	Cam Ranh International Airport	Vietnam	<b>6,492,215</b>	3,254,957	-	9,747,172	58,129
PNH	Phnom Penh	Phnom Penh International Airport	Cambodia	<b>5,483,576</b>	483,486	61,574	6,028,636	56,108
RGN	Yangon	Yangon International Airport	Myanmar	<b>4,468,280</b>	2,017,140	31,588	6,517,008	80,388
CEB	Lapu-Lapu	Mactan-Cebu International Airport	Philippines	<b>4,291,589</b>	8,370,466	-	12,662,055	129,844
SUB	Surabaya	Juanda International Airport	Indonesia	2,407,428	13,399,530	819,228	16,626,186	129,863
UPG	Ujung Pandang	Sultan Hasanuddin International Airport	Indonesia	307,488	8,294,394	2,154,916	10,756,798	97,890

## Reference

Airports Council International: Annual World Airport Traffic Report 2020 Edition, 2020.

## Map of Major Airports in ASEAN

Code	City	Airport Name
SIN	Singapore	Singapore Changi Airport
BKK	Bangkok	Suvarnabhumi Airport
KUL	Kuala Lumpur	Kuala Lumpur International Airport
MNL	Manila	Ninoy Aquino International Airport
DMK	Bangkok	Don Mueang International Airport
SGN	Ho Chi Minh City	Tan Son Nhat International Airport
CGK	Jakarta	Soekarno–Hatta International Airport
DPS	Denpasar Bali	Ngurah Rai International Airport
HAN	Hanoi	Noi Bai International Airport
HKT	Phuket	Phuket International Airport
DAD	Da Nang	Da Nang International Airport
CXR	Nha Trang	Cam Ranh International Airport
PNH	Phnom Penh	Phnom Penh International Airport
RGN	Yangon	Yangon International Airport
CEB	Lapu-Lapu	Mactan-Cebu International Airport
SUB	Surabaya	Juanda International Airport
UPG	Ujung Pandang	Sultan Hasanuddin International Airport



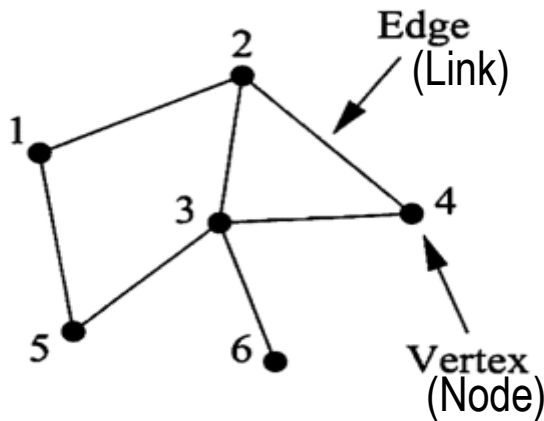
# Centrality Analysis on Network Science

Network science: The world is home to various networks, ranging from spaces of our daily life to natural phenomena (e.g., the Internet, acquaintanceship, neural circuits, food chains, aviation networks, and power grids). Network science is an academic field that studies the patterns through which such diverse phenomena interconnect with one another.

Reference

Caldarelli, G. and Catanzaro, M.: *Networks: A Very Short Introduction*, Oxford University Press, Oxford, 2012

Centrality analysis conducted on ASEAN's 2019 aviation network using the OAG Historical Flight Statistics Database



Reference

Newman, M.: *Networks: An Introduction*.  
Oxford University Press, Oxford, 2010, pp.101

Degree centrality

-Number of links that each node has

Betweenness centrality

-Percentage of a node of focus existing in the shortest path between other two nodes

Note: The physical distance of each link is disregarded



# Centrality Analysis Results

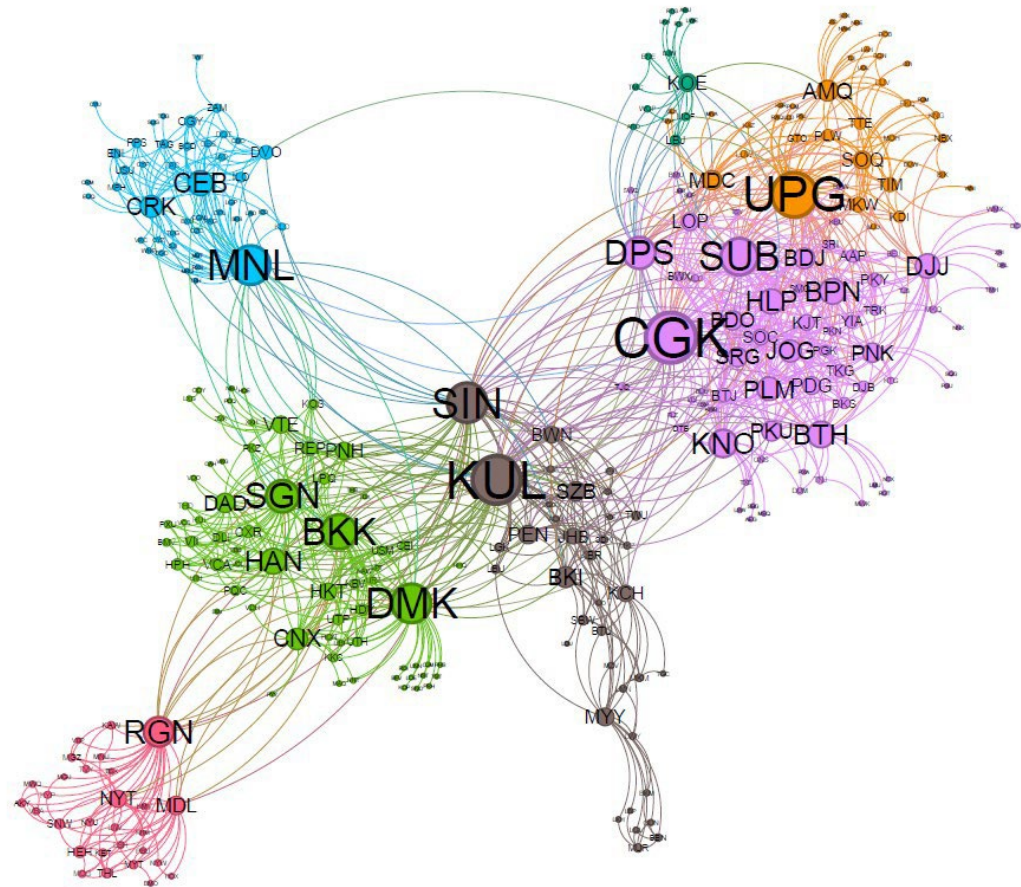
## Degree centrality

No distinction between domestic and international flights. Frequency is disregarded.

Airport	ASEAN	ASEAN + EasternAsia	ASEAN + SouthernAsia MiddleEast Australia	Global
SIN	50	97	92	180
BKK	43	117	82	200
KUL	62	99	104	150
MNL	49	73	65	107
DMK	49	98	67	119
SGN	40	72	56	97
CGK	65	86	79	104
DPS	39	72	52	89
HAN	30	67	47	100
HKT	18	49	29	112
DAD	21	54	22	57
CXR	11	60	12	88
PNH	18	52	23	59
RGN	36	59	42	66
CEB	29	52	30	53
SUB	46	48	48	53
UPG	57	57	59	59

Joint research with Assistant Professor Kashin Sugishita of the Tokyo Institute of Technology

## Intra-ASEAN degree centrality



\*The colors indicate communities (closely linked groups)



# Centrality Analysis Results

## Betweenness centrality

Airport	ASEAN	ASEAN + EasternAsia	ASEAN + SouthernAsia MiddleEast Australia	Global
SIN	<b>0.1632</b>	0.0553	<b>0.1210</b>	<b>0.0109</b>
BKK	0.0706	0.0338	0.0568	0.0050
KUL	<b>0.1620</b>	<b>0.0636</b>	<b>0.0960</b>	0.0043
MNL	<b>0.1766</b>	<b>0.0638</b>	<b>0.0749</b>	<b>0.0074</b>
DMK	0.1321	0.0524	0.0473	0.0040
SGN	0.0676	0.0262	0.0254	0.0025
CGK	<b>0.1746</b>	<b>0.1040</b>	<b>0.0845</b>	<b>0.0072</b>
DPS	0.0848	<b>0.0647</b>	0.0562	0.0038
HAN	0.0397	0.0170	0.0174	0.0021
HKT	0.0050	0.0029	0.0044	0.0012
DAD	0.0060	0.0051	0.0017	0.0003
CXR	0.0009	0.0021	0.0002	0.0003
PNH	0.0108	0.0023	0.0019	0.0001
RGN	0.1063	0.0460	0.0400	0.0045
CEB	0.0401	0.0239	0.0115	0.0010
SUB	0.0496	0.0202	0.0165	0.0034
UPG	0.1011	0.0357	0.0354	0.0033

- Betweenness centrality can be interpreted as the (potential) advantage of a hub airport in an airline network (regardless of operations)
- Bangkok (BKK, DMK)  
Relatively low value as a result of having two airports in one city (possibility of there being not too many overlapping routes)
- Soekarno-Hatta (CGK) and Manila (MNL) have advantages as transit airports for international and domestic networks
- Changi (SIN) is relatively weak in terms of East Asian network