# THE COMPETITIVENESS OF AIRPORT REGIONS IN SOUTHEAST ASIA :

## The Lesson from Two Arch Rivals in Europe

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**ABSTRACT**

Nowadays, airports are not just the place for aviation. In globally operating markets, airports have become critical assets in the competition between regions. From the example of two arch rivals in European Union, namely Amsterdam and Frankfurt, two different development models are nominated - the Aerotropolis Model and the Efficient Gateway Model. The conditions of each model and their applications are analysed and compared to Changi Airport (Singapore) and Suvarnabhumi Airport (Thailand). Changi Airport, surrounded by highly developed areas, has a great potential to be the heart of an Aerotropolis. In contrast, Suvarnabhumi Airport is surrounded by floodplain and farmland on the eastern vicinity of Bangkok. The development conditions of Thailand's major airport could get along well to the Efficient Gateway rather than the Aerotropolis Concept.

***Keywords :*** *Airports / Airport Regions / Competitiveness / Europe / Southeast Asia*

## 1. INTRODUCTION

The presence of an international airport makes an airport region different from general metropolitan regions. Since air traffic is an important means of transport, airports became critical assets for regions. Airports are not just the terminal for air transport anymore. They promote capital investment and create employment in a wide range of activities. International airports are playing the role of regional and national intermodal interchange hubs. With highly competitive situations in air transport services, several airports proposed their own expansion projects. Areas adjacent to the airport, so-called 'Airport Cities', also have a crucial opportunity to be developed into air transport related activities and other commercial purposes. For this reason, a number of large public projects were developed in airport regions. International airports produce significant effects on jobs, industries, and revenues on a broad scale, which can be estimated in 4 categories, as follow[1]:

- Direct employment is business activity located on the airport, such as activities related to the servicing of aircraft and passengers.
- Indirect employment relates to activities supplying goods and services to airport users, such as supplying aircraft fuels and supplying aircraft equipment, which need not be located on the airport.
- Induced employment is generated by the purchase of goods and services by those workers in direct and indirect employment.
- Catalytic employment is generated because the airport improves the accessibility of markets for manufacturing or service firms and provides opportunities for economic activities that require a substantial inflow of people, such as in the tourism and conference sectors.

The economic impact of an airport produces a polarisation between connected activities on the site and around it (airlines, airport operators, handling agents, control authorities, concessions, aircraft servicing, warehousing, etc.), and spread the effects of these activities (jobs, traffic, etc.) on a much broader scale at the regional level and beyond. This polarisation of activities and jobs could cause other effects, e.g. on traffic patterns and intensity, on workforce demand, on local facilities, and housing demand. Furthermore, airports may play the role of regional and national inter-modal interchange hubs according to their locations on the crossroad of different modes of transport and different scales of mobility. Airports and the other activities in the regions are inter-dependent. The specialities of airport regions, as explained above, make planning for them different from planning in other regions[2].

## 2. AREAS IN AIRPORT REGIONS

Airport regions were divided into three main areas of three airport regions in this study, as illustrated in Figure 1.

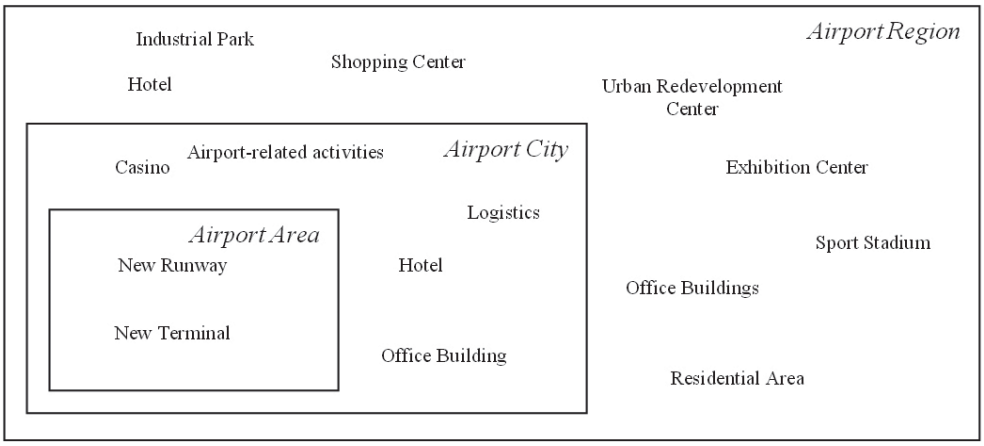



Figure 1: Areas and Projects in Airport Regions

Airport Area is an area containing an airport. Airport City is the more or less dense cluster of operational, airport-related as well as other commercial and business activities on and around the airport (however, this cluster is called an Airport City only if it shows the qualitative features of a city: density, access quality, environment, service, etc.). Airport Region is a region containing an airport.

## 3. TWO DIFFERENT CONCEPTS ON THE DEVELOPMENT OF AIRPORT REGIONS

Since international airports enhance the economic shift from the main cities towards the urban periphery in metropolitan areas, the surroundings of the airport are one of the most consistently growing parts of the metropolises. Currently, two different development approaches – Aerotropolis and Efficient Gateway - came into the discussion. The Aerotropolis model relies mainly on the development of 'Airport City[3]'. Schiphol Airport at Amsterdam is an important example for the Aerotropolis development concept, as well as the other Asian metropolises like Kuala Lumpur, Seoul (Incheon), Hong Kong (Chek Lap Kok) Singapore (Changi) and Bangkok (Suvarnabhumi). On the other hand, "Efficient Gateway Model" - led by Frankfurt and Zurich metropolis – followed a different concept by designing and managing their transport infrastructure to draw the attractions from their airports to the whole catchment area of the airport.

### 3.1 Aerotropolis Model

The Aerotropolis concept - developed by Prof. John Kasarda – defines the role of airports and aviation-driven economic development in shaping current urban growth and form. Major international airports became important nodes for production and enterprise in the global scale with speed, agility, and accessibility. International airports have been increasingly recognised as strategic instruments for the development of local and regional economics and stimulation of their competitiveness at the continental and global levels. They tend to promote capital investment and to create employment in a wide range of activities.

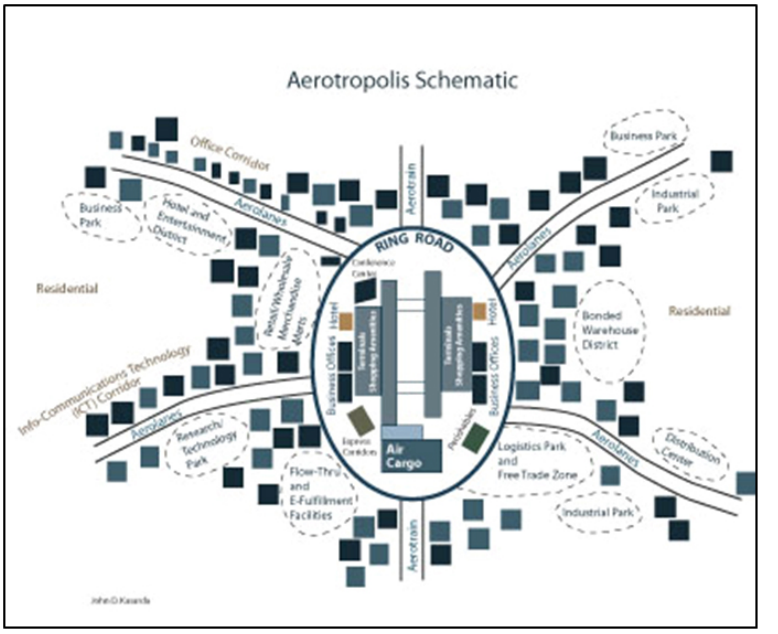



Figure 2: Aerotropolis Schematic[4]

With the concept of Aerotropolis, a new urban form is emerging, stretching up to 25 kilometres outward from airports. Similar in shape to the traditional metropolis made up of a central city core and its commuter-linked suburbs, the Aerotropolis consists of an airport city core and outlying corridors and clusters of aviation-linked businesses[5]. A spatially compressed mode of the Aerotropolis based on development features at and around major international airports is illustrated in Figure 2.

The presence of an international airport makes an Aerotropolis different from general metropolitan regions. Since air traffic is an important means of transport, airports became critical assets for metropolis. With highly competitive situations in air transport services, several airports proposed their own expansion projects. Areas adjacent to the airport, so-called "Airport Cities" or Aerotropolis, also have a crucial opportunity to be developed into air transport related activities and other commercial purposes. For this reason, a number of large public projects were developed. This new urban form stretched as much as 25 kilometres from gateway airports. The concept of Aerotropolis has been widely accepted in several countries, such as the Netherlands, Malaysia, the Republic of Korea, and Hong Kong.

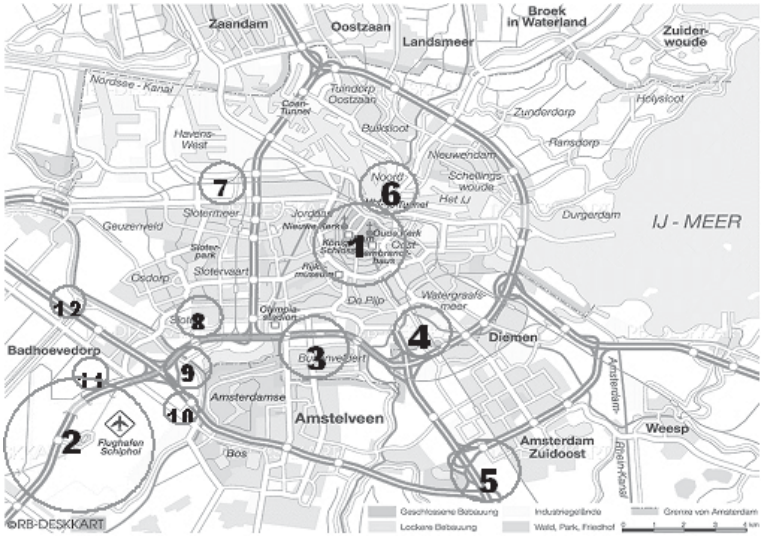
## 3.2 Efficient Gateway Model

Although the concept of the Aerotropolis has been widely accepted in several countries, it was not the only instrument for development of metropolises with international airports. "Efficient Gateway Model" - led by Frankfurt and Zurich metropolis – followed a different concept by designing and managing their transport infrastructure to draw the attractions from their airports to their existing CBDs at the city centres and to the areas in the catchment areas of the airports. With this concept, international airports should be planned in the same direction as the whole regions because they are the connection nodes from the regions to the world.

With this development concept, the competitiveness of the regions depends on their local resources and attractiveness, especially for industrial development. International airports are just the gateway to and from the other regions. The policies on airport development rely mainly on the development strategies of the whole regions. This concept does not focus only on the airport and airport city, but the major development strategies should be appropriately distributed throughout airport regions. Projects on airport city should be avoided because the agglomeration of activities around the airport may decrease airport efficiency as the gateway of the region.

## 3.3 The Application of Aerotropolis Model at the Amsterdam Airport

The Amsterdam Airport is at the core of the Netherlands's national strategy as defined in the fourth report on regional planning and development (1988), and it aimed at supporting the international distribution function of the Netherlands and at tapping into the flows of globalisation. The market share held by the Netherlands in European headquarters' locations is 20%, half of which is located in a sector of an airport. For European distribution centres, this figure is 50%, a third of which are located in a sector of the airport[6].




1. Amsterdam City Centre
2. Amsterdam Airport Schiphol
3. Amsterdam Zuid-As
4. Amsterdam Amstel III
5. Amsterdam Zuid-Oost
6. IJ Oevers
7. Amsterdam Teleport
8. International Business Park Riekerpolder
9. Oude Haagse Weg
10. Schiphol East
11. Sky Park
12. Lijnden/Lutkemeer

Figure 3: Development projects in Amsterdam Region

For supporting the role of economic development centre, Schiphol has created Schiphol Real Estate BV (SRE) to operate a major urban territory (2,400 ha). SRE is promoting the transformation of a remote site (Elzenhof) and the former hangars/Fokker industries (Schiphol Oost) into airport business parks. It is building up a major international business centre "Amsterdam Airport City" in the core of the airport, right next to the railway interchange.

By the limitation of their location and resources, Amsterdam decided to focus on their specialisation – business and trade industry. They accepted that they cannot compete with the Frankfurt Region in industrial development. The City of Amsterdam is developing a redevelopment plan of the IJ-oevers, the northern waterfront around the Central Station. The project "Amsterdam Zuid-As" is also developing on the city's southern periphery, a few kilometres north of the airport. The Province of North-Holland sees the Zuid-As and the airport as one development zone. This corridor, so-called "Cash-corridor", has the assets of an airport, future High Speed Train stations, an international business location, and abundant housing potential for Amsterdam[7]. However, Amsterdam Airport Schiphol is reaching their highest capacity. A project to relocate the entire airport to an island some thirty kilometres form the coast is now being considered[8].

## 3.4 The Application of Efficient Gateway Model at the Frankfurt Airport

The development of the Rhein-Main Region has been done under a different approach to Amsterdam Model. The city of Frankfurt has a high potential location for international business. The presence of a top international airport, like Frankfurt Airport, provided highly competitive advantages for the region[9]. Frankfurt airport is surrounded by the city's forest, a well-guarded green belt. Expansion of the airport area is only debated for operational purposes. On the airport platform itself, nearly all areas are used for aviation activities.

Since downtown Frankfurt is a top location for international business, the "Banking District" is the region's major international asset. The airport is to serve this asset, in the first place. Travel times between the city centre and the airport are quite short by road and by train. In the airport city area, Frankfurt Airport accommodates only the biggest European airport conference centre offers 170,000 m2 of business and retail space on top of the AirRail terminal, and is planning the construction of the new headquarters of Lufthansa. Furthermore, the City of Frankfurt tries to channel investment into its own enormous redevelopment areas in the inner city not around the airport, such as the Messe (fairgrounds), Europa-Viertel, and Frankfurt 21, the planned restructuring of the Central Station area. The development projects around the airport are restricted by several laws and planning regulations[10].

Furthermore, the European High Speed Train network has been extended and now connects Frankfurt to several major cities on the continent, such as Berlin, London, and Paris. The HSTs become more competitive with air traffic in time and comfort on distances up to 500 km. For example, Frankfurt Airport expanded its catchment area to the North-western region by ICE train (Inter City Express). With new railway facilities, the travel time from Cologne to Frankfurt decreased from 2.30 hours to 1.45 hours. The passengers and freights, which used to go north to Amsterdam Airport, come back to Frankfurt Airport because the travel time can be compatible.


1. *Frankfurt City Centre*
2. *Frankfurt Airport*
3. *AirRail Center Frankfurt*
4. *Europa - Viertel*
5. *Frankfurt Main Railway Station*
6. *Office Park Niederrad*
7. *Walldorf Industrial Area*
8. *Trade Port Kelsterbach*
9. *Caltex Refinery*
10. *Hoechst Industry*

Figure 4: Development projects in Frankfurt Region

## 3.5 The comparison between two arch rivals in European Continent

The development of the Amsterdam and Frankfurt metropolis is different in several aspects. With the comparison of two different models, it can be analyzed and discussed in 4 categories as follows:

- **Current Situation.** In 2006, Frankfurt Airport handled a record of 53 million passengers.This made it the 8th busiest airport in the world and the third busiest in Europe by passenger traffic. In addition to being an important passenger traffic hub, the airport is the seventh busiest cargo airport in the world and the busiest in Eupore, handling 2.1 million tonnes of cargo in 2006. For Amsterdam Airport, it was the 12th busiest airport in the world (the fourth in Europe) and the 16th for freight transport (the third in Europe)[11].
- **Location.** The Netherlands is located at the far north of European continent. The country's catchment areas are limited by geographic condition because they cannot expand up north. Furthermore, they are in between two major aviation hubs on the

continent, namely London and Frankfurt. On the other hand, Germany is located at the center of European continent. Their catchment area is much larger than that of Amsterdam. Frankfurt Airport can be directly connected to most countries in European Union.

- **Development Potential of the Region.** Most of the areas in Amsterdam Region are under sea level. That means the Netherlands has very limit resources for industrial development. However, they have a great potential for water-based transportation. Frankfurt Region is located on the river basin (Rhine and Main River). Road transport in Germany is widely accepted as the highest standard in European Union. Moreover, the catchment area of Frankfurt Airport can provide a large number of industrial locations.
- **Selected Development Strategy.** In the Netherlands, The development of Amsterdam Airport is at the core of the Netherlands's national strategy and it is aimed at supporting the international distribution function of the Netherlands and at tapping into the flows of globalisation. The Aerotropolis concept would help fulfil the national goal. This concept is a great solution to overcome their limitations on location and natural resources for industrial development. On the other hand, Frankfurt Airport is considered as only one element among many of them in nation development strategy. Frankfurt Airport, as the major gateway of the nation, should be able to create economic prosperity for the whole nation, not only to the city of Frankfurt.

Table 1: Comparison of Amsterdam and Frankfurt Region

| Issues | Amsterdam | Frankfurt |
|---|---|---|
| Current Situation | 12th in passenger (4th in Europe)<br>16th in cargo (3rd in Europe) | 8th in passenger (3rd in Europe)<br>7th in cargo (1st in Europe) |
| Location | Far north of European continent (limit catchment area) | Center of European continent (large catchment area) |
| Development Potential of the Region | Under sea-level and scared in resources for industrial development | On river basin and rich on resources for industrial development |
| Selected Development Strategy | *Aerotropolis* concept, and mainly on business and services industries | Efficient Gateway model with good land-based connection to the whole region |

From table 1, it could be concluded that the development of airport regions depends on regional strengths and weaknesses and each development model has its own pros and cons. Although Amsterdam and Frankfurt selected different approaches for their airport regions, they both achieved the goal of being world class airports. That means the Aerotropolis Model is appropriate for the situations and condition like Amsterdam Region. On the other hand, the Efficient Gateway Model fits to the situation for the region located at the middle of the continent like Frankfurt Region. This conclusion will be applied to analyse the development of airport regions in South-East Asia.

## 4. INTERNATIONAL AIRPORTS IN SOUTH-EAST ASIA

South-East Asia Region includes nine countries: Myanmar, Thailand, Laos, Vietnam, Cambodia, Malaysia, Singapore, Indonesia, and Brunei. In this region, there are two aviation hubs at Thailand (Suvarnabhumi) and Singapore (Changi). These two international airports consider each other as rivals. However, their development conditions are totally different. For this reason, the development strategy should be different, too.

### 4.1 Suvarnabhumi Airport Region Development Strategy

Suvarnabhumi Airport Project is a national priority of the government and is designated to be the aviation hub of Southeast Asian region. It can accommodate 45 million passengers per year, 76 flights per hour and 3 million tons of cargo per year. Suvarnabhumi Airport covers an area of some 8,000 acres. The new international airport is located about 15 kilometres on the east-bound highway and is about 25 kilometres from downtown Bangkok.

The royal Thai Government decided to use the Aerotropolis project as a major tool to increase the share of business and trade activities, mainly by drawing those of Singapore. In the year 2003, Thailand's National Economic and Social Development Board, planned to apply the Aerotropolis concept for the new Suvarnabhumi Airport, to be the model of 21st century urban development. This development plan would provide land for airport-related businesses, including manufacturing, distribution facilities, hotels, offices, exhibition complexes, R&D, retail activities, and aviation-dependent professional services. Planning also included residential areas for workers and tourism and leisure uses, some of which may serve business visitors and attract tourists in their own right. The form and efficiency of the Suvarnabhumi Aerotropolis will be largely shaped by its transport infrastructure that provides fast access to the airport from its immediate environs, the Eastern Seaboard as well as from Bangkok's city centre. The land use plan for 2035 will accommodate around 350,000 persons in the area of 23,300 hectares[12]. NESDB estimated that economic impact by the Aerotropolis - the catchment areas of 100 kilometres from the airport - would generate more than 130 billion US Dollars for Thailand's economic system in the year 2035.

### 4.2 Changi Airport Region Development Strategy

Singapore is a major Asian transportation hub, strategically lying on the midpoints of certain sea and air trade routes. The transportation industry comprises over 10% of Singapore's GDP despite an increasingly diversified economy. Changi Airport, the main airport of Singapore, is another major aviation hub in Southeast Asian region. It is located in Changi, 20 kilomters east of the commercial center of Singapore, with an area of 3,200 acres. The airport is an important contributor to the Singapore economy – accounts for over 4.5 billion Singapore Dollars annually. Also, more than 13,000 people are employed at the airport[13].

The Singapore government decided to focus on the country's specialisation in business and trade industries, as well as the good connection between water- and air-based transportation. Therefore, they selected the Aerotropolis Model for the development of its airport region. Since Singapore is a city-state with the very small area of 700 km2, the whole area of the country has been planned to facilitate the Aerotropolis status. The national economy relies mainly on international trade and business. A new terminal (Terminal 3) is scheduled to open

on 2008 and Terminal 1 and 2 will be renovated. Changi Airport was built with ground transportation considerations in mind from the onset, with the East Coast Parkway built and opened in tendem with the airport, providing a direct link to the city center. At a distance of about 20 kilometers, the expressway was built almost entirely on reclaimed land, thus minimising disruptions to the existing road network on Singapore's East Coast.

## 4.3 The comparison between two Southeast Asian airport regions

The lesson from the two major rivals on the European continent was applied to analyse the development approaches of two airport regions in Southeast Asia. Both airport regions in Southeast Asian selected the Aerotropolis Model for their development strategy. However, it is still questionable whether the Aerotropolis Model is the appropriate solution for the Southeast Asian airport regions or not. With this comparison table, it can be analyzed and discussed in 4 categories.

- **Current Situation.** In 2006, Suvarnabhumi Airport handled a record of 43 million passengers.This made it the 15th busiest airport in the world and the first busiest in Southeast Asia by passenger traffic. In addition to being an important passenger traffic hub, the airport is the 19th busiest cargo airport in the world and the second busiest in Southeast Asia, handling 1.2 million tonnes of cargo in 2006. For Changi Airport, it was the 22th busiest airport in the world (the second in Southeast Asia) and the 9th for freight transport (the most busiest in Southeast Asia)[14].
- **Location.** Singapore is an island nation located at the southern tip of Southeast Asian mainland. On the other hand, Thailand is located on the center of Southeast Asian sub-continent. Their land-based catchment area is much larger than that of Singapore. Suvarnabhumi Airport has a great potential for the on-ground transport connection to most countries in Southeast Asia, as well as to Middle Asia and the southern part of China.
- **Development Potential of the Region.** Singapore has an on-going land reclamation project with earth obtained from its own hills, the sea-bed, and neighbouring countries. As a result, Singapore's land area grew from 581.5 square kilometres in the 1960s to 699.3 square kilometres (269.1 sq mi) today[15]. Many of the smaller islands have been expanded and joined together through land reclamation in order to form larger, more functional islands. That means Singapore has very limit resources for industrial development. However, they have a great potential for water-based transportation. The Bangkok Region is located on the river basin. Thailand will become a new intersection of land-transport of Southeast Asia in the next decade. The major North-South and East-West economic corridor of Southeast Asian sub-continent will be intersected at Pisanulok Province – 300 km. north of Bangkok. Moreover, the catchment area of Bangkok Airport can provide a large number of industrial locations.
- **Selected Development Strategy.** Both airport regions in Southeast Asia selected the Aerotropolis Model for their development guidelines. The Royal Thai Government is working on the Suvarnabhumi Aerotropolis project. Singapore's policy has focused on efficient ground transport from Changi Airport to the existing CBDs. Several modes of transportation are now available and the travel time in each mode from the airport to CBDs is not longer than 15 minutes.

Table 2: The comparison between the two Southeast Asian airport regions

| Issues | Amsterdam | Singapore | | Frankfurt | Bangkok |
|---|---|---|---|---|---|
| Current Situation | 12th in passenger (4th in Europe) 16th in cargo (3rd in Europe) | 22nd in passenger (2nd in SE Asia) 9th in cargo (1st in SE Asia) | | 8th in passenger (3rd in Europe) 7th in cargo (1st in Europe) | 15th in passenger (1st in SE Asia) 19th in Cargo (2nd in SE Asia) |
| Location | Far north of European continent (limit catchment area) | Far south of SE Asian mainland (limit catchment area) | | Centre of European continent (large catchment area) | Centre of SE Asian sub-continent (large catchment area |
| Development Potential of the Region | Under sea-level and scared in resources for industrial development | Need land reclamation and scared in resources for industrial development, but great potential on business and trade industries | | On river basin and rich on resources for industrial development | On river basin and rich on resources for industrial development, and great potential for land-transport connection to most SE Asian countries |
| Selected Development Strategy | *Aerotropolis* concept, and mainly on business and services industries | *Aerotropolis* concept, and mainly on business and services industries | | Efficient Gateway model with good land-based connection to the whole region | *Aerotropolis* concept |

Four airport regions in this study were divided into two pairs: Amsterdam / Singapore and Frankfurt / Bangkok. Amsterdam and Singapore share the same conditions. Both regions are located on very far side of their continent. Their land connectivity is very limited, as well as resources for industrial development. Both airport regions selected the Aerotropolis Model as their development guideline, which is appropriate for each region's conditions and situations. On the other hand, Frankfurt and Bangkok airport region could be considered as being in a similar situation. They are located at the heart of their own continents and have potential for industrial development. Frankfurt applied the Efficient Gateway Model as its development guideline. Unfortunately, Bangkok did the different direction. Bangkok chose the Aerotropolis Model and planned to draw air-transport related developments around Suvarnabhumi Airport. This is an eye-catching development direction. Theoretically, the strengths of Thailand tend to be appropriate with the Efficient Gateway Model, but Thailand decided to go on another way, which contrasts with its development potentials. Thailand did not develop their strengths and wanted to change to another field which is not Thailand's specialisation. This decision may cause Thailand a large number of its non-profitable budget and lose their competitiveness with Changi Airport.

## 5. CONCLUSION

This study pointed out that the concept of Aerotropolis may be an effective instrument of metropolis' economic development. There are several successive examples of this concept, like at Amsterdam Airport and Changi Airport in Singapore. However, the adoption of this concept to Asian Metropolis is still questionable. The situations and conditions of international airports in Asia are quite different from those in the Western world. In some conditions, like at Suvarnabhumi Airport, it may be better if the impacts of an international airport are absorbed by the existing CBD and distribute the airport's multiplier effects to the entire areas of the regions. This development direction may be appropriate in some conditions

than the new development projects around the airport. The "Efficient Gateway Model" like in Frankfurt Region might be the appropriate approach for some situation, especially where the airports are located on the centre of the regions with efficient ground transport connection. Impacts of the presence of an international airport could be distributed effectively to the whole nation. This development model could be better fit to the conditions of Suvarnabhumi Airport Region in Thailand.

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