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Beata Gierczak-Korzeniowska[1a], Andrzej Kowalczyk[2b]

[1] University of Rzeszów, Institute of Economics and Finance at the College of Social Sciences, Poland

[2] University of Warsaw, Faculty of Geography and Regional Studies, Poland

ORCID: [a] 0000-0003-2460-2543, corresponding author e-mail: beatagierczak@ur.edu.pl; [b] ORCID: 0000-0002-7862-7001

The Concept of the Aerotropolis Based on the Development of Hong Kong International Airport

Abstract: Large airports have become key hubs in the global economy, offering speed, efficiency and connectivity. They are also 'powerful engines' of local economic development. Currently passenger terminals are seen as modern shopping centres and recreational facilities, while hotels, entertainment complexes and conference facilities are very often located in airport-surrounding areas, thus creating a new urban structure called the aerotropolis. The basic benefit of the emergence of the aerotropolis in the region is the creation of new jobs (Dallas-Fort Worth Airport provides four hundred thousand jobs within a five-mile radius of the terminal, and O'Hare half a million. The twenty-four aerotropolis world-wide are home to one fifth of companies in the IT, financial, consulting, scientific and technical sectors.) whose growth is seven times faster than in the centres of other cities. This newly-formed urban structure is revolutionizing logistics and transport as well as the way we live. In 2011, Time magazine called the aerotropolis one of 120 ideas that would change the world. Therefore, the aim of the work is to describe and analyse the changes taking place at Hong Kong International Airport and its surroundings which are significant from the point of view of the creation of an urban structure called the aerotropolis. The article describes the evolution of Hong Kong International Airport and its surroundings, pointing to particular aspects of its development in the process of the formation of the aerotropolis. The publication is of an illustrative nature and is based on the analysis of literature pertaining to the subject and Internet resources. The study is based on a number of reports, including those of scientific, social and economic background, as well as electronic documents and grey literature.. The maps, on the other hand, are a result of field research and personal experience of one of the authors gained from a stay in the discussed place.

Keywords: Aerotropolis, HKIA, airport, airport city, transport, transport infrastructure

1. Introduction

Transport infrastructure has always shaped the evolution and economic position of cities and regions. The first major cities grew largely around seaports. Then came urban development along rivers which were seen as the backbone of the industrial revolutions both in Europe and the United States. The advent of railways greatly facilitated domestic transport, marking the beginning of the third wave of urban development outside of the main terminals. In turn, the expansion of suburban road systems gave rise to the fourth wave of urban development. Currently, the fifth wave of transport-oriented development is under way, where large commercial airports have become important factors driving business locations and economic growth of cities and regions.

Due to the constantly growing number of passengers and cargo, large airports are increasing their potential and improving infrastructure, not only for transport connections. Both airports and their regions engage in this process, taking over many of the socio-economic functions that until now were characteristic of the cities themselves. In 1997, J.G. Ballard[1] predicted that "the airport will be the true city

[1] A British novelist, short story writer, and essayist.

of the 21st century". His thesis is confirmed by John Kasarda, an American management consultant and scientist, who shows politicians and business leaders how Ballard's forecasts are to be fulfilled. By characterizing the aerotropolis, i.e. the structure resulting from the development of the airport and its surroundings, he emphasizes the synergy effect consisting in the multiplication of benefits by combining various functions related to the airport directly or indirectly. As Kasarda (2010) states, in the process of their development, airport-related areas attract new functions unrelated directly to aviation, but rather to the companies associated with it. As a consequence, airport-related areas attract features traditionally reserved for city centres, such as leisure, recreation, culture or entertainment.

The emergence of tourism in a particular region and is subsequent dynamic development was an important impulse for the emergence of the aerotropolis, and thus the development of the network of air connections and modernization of existing airports (Turton, 2004; Chung and Whang 2011; Rogerson and Rogerson, 2017). The development of tourist infrastructure for leisure and entertainment, located near the airport, in a sense refers to the book called *Fantasy City*, where Hanningan (1998) shows how American cities, looking for new opportunities for themselves in post-industrial economy, transform into the places of entertainment, rest and adventure.

The aerotropolis provides companies with fast, long-distance access, helps them reduce costs, increase productivity and expand market reach, making them more competitive and participate more effectively in the international division of labour. Metropolitan and regional trade in high-value goods and services is accelerated by airlines which function as the Physical Internet. This can be attributed mainly to the universal globalization, internationalization and striving to integrate individual economic systems.

However, the positive development of the aerotropolis will require a combination of airport, urban and business planning in a synergistic manner, so that the development can be economically efficient, aesthetic as well as environmentally and socially sustainable. A question arises whether it is feasible. The ongoing discussion concerning the idea of aerotropolis is not free of sceptical opinions. Increasingly, it is assumed that in addition to fulfilling its basic function, that is movement, air transport should, among other things, be organised in line with the idea of sustainable development. This means that fulfilling ever-growing transport needs of humans may not increase pressure on the natural environment (Trzepacz, 2010). Gudmundsson and Höjer (1996) and Upham (2001) even use the term 'sustainable mobility,' referring to the European Commission programmes which seek ways to reconcile the interests of the natural environment with those of transport users. With regard to air transport, the authors cited above note that it has, above all, the greatest difficulty implementing one of the basic principles of sustainable development, i.e. preservation of natural resources for future generations. In addition, in numerous works (Beck et. al. 1992; Jones et. al., 1996; Brasseur et. al., 1998; Vedantham and Oppenheimer, 1998; Unal et. al., 2005) attention is drawn to noise as a source of negative effects of the development of airport functions and to pollution resulting from the development of air transport.

Many researchers ask whether the aerotropolis will serve people or just business. There are voices arguing it will comprise a city model driven by a combination of business imperatives and state control, with a high level of security which suits airports. Individuality and identity will disappear under dictatorship of speed. Other remarks include the fact that, for example, an airport shopping centre does not really resemble the city market, because everything is preprogrammed, with limited spontaneity and initiative.

The main purpose of the article is the description and analysis of changes taking place at Hong Kong International Airport and its vicinity, important from the point of view of the formation of the urban structure called the aerotropolis. A complementary objective includes providing the background and elaboration on the concept of the aerotropolis. Therefore, the following research tasks were assumed, namely to collect and prioritise chronologically relevant issues related to the terminology of the aerotropolis and its origins and to identify the most significant socio-eco-

nomic events and developments in the area, indicating the stages in the development of this structure on the basis of Hong Kong International Airport.

2. Aerotropolis – the genesis and essence of the concept

The term aerotropolis was first used in 1939 by New York commercial artist Nicholas DeSantis, who presented an imaginary drawing of a skyscraper rooftop airport in the city centre in the November issue of a popular magazine (DeSantis, 1939). Even then, "visualized" desire to integrate the airport with the city was noticeable, although that trend had been developing since the beginning of the development of civil aviation. Airport designers tried to integrate the airport with the surrounding city productively and use the facility as a springboard for the development of communities around the airport. In the 1920s and 1930s, European architects even suggested connecting the airport to the existing types of buildings, including amusement parks, exhibition halls and train stations.

Years later, John D. Kasarda returned to that idea while analysing economic development driven by the presence of large airports (Kasarda 2000a). Kasarda (2010) proposed the definition of the aerotropolis as a model for the next stage in the development of airport-surrounding areas, when new investments related to the airport directly or indirectly appear around the airport city. Kasarda believes that like the traditional metropolitan model consisting of a centrally located downtown called the city and ring-shaped satellite areas and suburbs, the aerotropolis consists of the airport, called the airport city, connected with the surrounding areas by transport corridors, and parallelly located different functional areas within the distance of 30 km, including companies related to aviation industry, passenger services, office buildings, and even housing estates orientated towards airport employees and frequent air travellers (Stangel, 2014).

From a geographical perspective, the main feature making the airport city and aerotropolis relate to different situations is their spatial extent and the diversity of functions. Using a systemic approach, it can be assumed that the concept of the airport city describes situations where the airport is, by far, the most important component of the system and plays a leading role (it is the core of spatial and functional layout which has developed around it). The aerotropolis, on the other hand, covers a much larger area, which shows a growing functional diversity over time, meaning that the leading role of the airport is gradually weakening. Undoubtedly, it is still a very important element of the system, but other subsystems start to function more and more independently. Thus, in terms of time, the airport is undoubtedly the causative factor of the process of spatial and functional changes (its role can be compared to the growth pole in accordance with F. Perroux's theory), but in further phases of the process some elements of the system may operate irrespectively of its existence. In other words, in case of the aerotropolis, the role of the airport in stimulating development begins to be indirect ("discreet"), whereas in cases corresponding to the concept of the airport city, its role is still leading.

It should be remembered that the aerotropolis is not formed naturally and spontaneously with the existing urban fabric, as it is a largely artificial creation which must be designed and implemented.

The aerotropolis is, therefore, a new structure of the city based on the airport and integrated ground transport to quickly connect customers, suppliers and corporate partners. Essentially, the aerotropolis is a city focused on efficiency and accessibility for businesses (DiNardo, 2013), whose infrastructure, land use and economy are focused primarily on the airport. It consists of aeronautical, logistical and commercial elements of the airport. The following facilities are also built in such areas: thematic parks, entertainment centres, sports facilities, exhibition grounds and golf courses. Everything is created on the basis of the common conviction that in the 21st century, above all, efficient, large, well-connected airports are of great importance for development and regional prosperity. The main value of the aerotropolis lies in the fact that it offers companies fast connectivity on a huge scale. It is of

great importance as those companies operate in the sectors of advanced technologies and business services.

Kasarda and Lindsay (2011), authors of the book called *Aerotropolis. The way we'll live next* claim that as in the 18th century cities were built around ports, in the19th century around railway stations, and in the 20th at the motorways, the 21st century will belong to the cities concentrated at the airports[2]. They believe that "aviation cities" are new types of settlement which represent the logic of globalization[3]. The level of transport technology defines the city in an absolute way; transport always determines the shape and appearance of the city. In one of his interviews, Lindsay says: "Not every great city will be an aerotropolis, but those cities which are an aerotropolis will be great ones"[4]. In the aerotropolis, Abstract economic flows materialize in the form of a new urbanization, and the elusive and changing streams of capital reveal their efficient possibilities in the cities of the future. Their domain are Asian countries including China, India and Saudi Arabia. This form of rhetoric is a sign of certain buzz which accompanies the promotion of new ideas on the free market of ideas, and although it is not completely new, it must be admitted that it has a strong persuasive force (McKinley, 1993).

3. The development process of Hong Kong International Airport

Hong Kong International Airport may serve as an example illustrating the validity of the assumptions underlying the aerotropolis concept and spatial as well as socio-economic processes taking place at the neighbouring Lantau Island. Kasarda made reference to Hong Kong International Airport and Lantau Island early on, in his first texts concerning the concept of aerotropolis (Kasarda, 2000a, 2000b, 2010).

When the concept of the aerotropolis refers to the transformation of geographical space and socio-economic changes related to Hong Kong International Airport, it should be initially noted that the spatial and functional system in the northern part of Lantau Island (Fig. 1) consists of four basic subsystems covering larger areas:

- Hong Kong International Airport;
- the city of Tung Chung (also known as Tung Chung New Town);
- Hong Kong Disneyland Resort;
- Ngon Ping 360; as well as two subsystems of a linear nature:
- road and rail subsystem consisting of North Lantau Highway motorway (12.8-km-long stretch which forms part of Route 8 motorway) and express lines called the Airport Express and the Tung Chung Line,
- the Lantau Link which is 3.5 km long consists of bridges and road and railway viaducts connecting Lantau Island (through the island of Ma Wan) with the island of Tsing Yi; the Lantau Link connects the road and rail infrastructure of the island of Lantau with Tsing Yi, which has several connections to the mainland.

Most of the investments mentioned refer to the strategic plan known as "Port and Airport Development", which was initially drawn up by the British colony authorities in Hong Kong in the early 1980s. It consisted of four key parts: (1) a plan to build a new airport (Airport Core Programme, ACP) in the north of Lantau Island, (2) a plan to build container terminals at Kwai Chung, Stonecutters Island and Tsing Yi Island, and in the eastern part of Lantau Island (the intention was later abandoned), (3) expansion and modernization of the railway network, as well as (4) expansion and modernization of the motorway and expressway network (Airport Core Programme, 2017).

[2] Aerotropolis: an interview with Greg Lindsay (http://www.bldgblog.com/2011/03/aerotropolis-an-interview-with-greg-lindsay/, accessed: 10.01.2017).

[3] The phenomenon of globalization is correlated with the similarity of global Airport Cites and Aerotropoli in naming and signage systems as well as symbols being universal and legible for all people regardless of their country of origin and cultural diversity.

[4] Aerotropolis: an interview with Greg Lindsay (http://www.bldgblog.com/2011/03/aerotropolis-an-interview-with-greg-lindsay/, accessed: 10.01.2017).

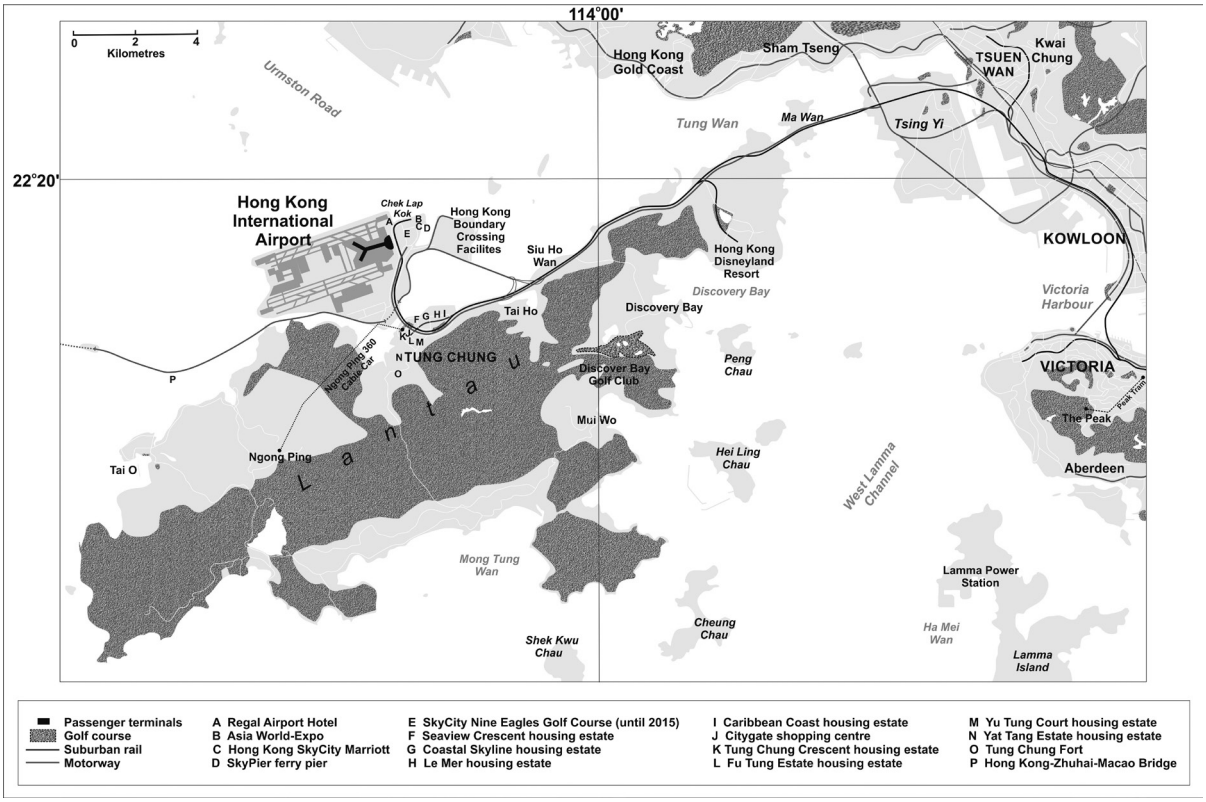

Figure 1. Lantau Island (Source: A. Kowalczyk's own elaboration)

A special place in the Port and Airport Development Strategy plan was occupied by the section called Airport Core Program, whose most important investment was to build an international airport from scratch, which would allow closing of the existing Kai Tak Airport located in a densely populated part of the city of Kowloon, one of the two largest urban centres of Hong Kong.

The dynamic development of Hong Kong meant that in the 1970s the matter of transferring the airport beyond the densely built-up areas became relevant again. After taking into account numerous factors, it was assumed that the new airport would be built in the region where Chek Lap Kok island formed a significant part, near the northern coast of Lantau Island (next to Tung Chung). However, in 1983, for political reasons (the issue of the transfer of Hong Kong to the People's Republic of China) and economic reasons, the work on the plan of the new airport was discontinued and the idea was abandoned until 1989. After many months of negotiations between the government of the United Kingdom and the People's Republic of China (which was to return to China in 1997), in September 1991 an agreement was signed which provided for the new airport to be put into operation within eight years.

According to the adopted assumptions, the Airport Core Program consisted of 10 large investments:

(1) an international airport called Hong Kong International Airport, which was to be built in between 1991 and 1997;
(2) railway infrastructure which was to connect the airport with Kowloon and Victoria; it was to consist of the Airport Express rail and a new urban railway line called Tung Chung Line; both were to be part of the Mass Transit Railway Corporation (MTR), established in 1975;
(3) the Lantau Link roadway, which consisted of road and rail bridges linking Lantau, Ma Wan and Tsing Yi islands (Kap Shui Mun Bridge and Tsing Ma Bridge);
(4) the Western Harbour Crossing, a tunnel under Victoria Harbour, which was to form part of Route 3 motorway;
(5) the North Lantau Expressway, a 6-lane motorway between Tung Chung and bridges linking Lantau with the rest of Hong Kong (Lantau Link);

(6) sections of Route 3 in Kwai Chung (3 km) and Tsing Yi Island (2.1 km), which was to connect Lantau Link with West Kowloon Expressway;
(7) a 6-lane West Kowloon Highway (4.2 km), which was to be built on reclaimed areas;
(8) engineering works involving the acquisition of new areas (as a result of draining or backfilling of coastal waters) on the western side of the Kowloon Peninsula (then the area occupied by the peninsula was to increase by 30%);
(9) 20 ha of land reclaimed from the sea in the vicinity of the Central District in the downtown part of Victoria, where an Airport Railway station was to be constructed;
(10) Phase I of the construction of North Lantau New Town, which was to include the town of Tung Chung and the adjacent areas; as part of these activities, apartments for 18.000 people were to be built; the 'new town' was conceived as a residence for people (and their families) employed at the new airport (and its accompanying facilities), as well as a gateway for visitors to Hong Kong (Airport Core Programme, 2017)[5].

It should be recalled that in 2018, Hong Kong International Airport ranked 8th for passenger traffic among the largest airports in the world (74.517.402 passengers, List of busiest airports by passenger traffic, 2019) and 1st (in 2017) for cargo transshipment (5.049.898 tonnes, List of busiest airports by cargo traffic, 2019). Thus, it belongs to the largest airports in the world. The importance of Hong Kong International Airport, not only for Hong Kong but also for mainland China, may be supported by the fact that it provides 550 connections with more than 110 cities already located in the People's Republic of China (Fact sheets, Hong Kong International Airport, 2019). The intensity of air traffic at Hong Kong International Airport can be proved by the fact that in 2018 at peak hours the number of flights per hour reached 68. At that time the airport apron provided 105 parking places for passenger planes, 43 for cargo planes and 33 for aircraft under maintaintenance or parked for a long period (Fact sheets, Hong Kong International Airport, 2019).

As mentioned, in 1982 the preparation of the urban development plan for the new international airport was commenced, and one year later the work was already terminated. In 1987 the planning phase of the new airport started, and in 1990 the Provisional Airport Authority Hong Kong was formed, which was transformed into the Airport Authority of Hong Kong in 1995 (Wong, 2017).

The construction of Hong Kong International Airport began in 1991. According to the previously prepared plan, the airport was to be built on the area covering the small islands of Chek Lap Kok (3.02 square kilometres) and Lam Chau (0.08 square kilometres) and reclaimed areas (9.38 square kilometres), which gave a total area of 12.48 square kilometres (Hong Kong International Airport, 2017)[6]. While the construction of the airport continued, a reclamation project along the northern coast of Lantau was under way. It was aimed at creating new land from the sea to build communication routes connecting the airport with the rest of Hong Kong: the North Lantau Highway, the Airport Express rail and the Tung Chung Line (MTR) line. The North Lantau Highway was built first in 1997 (Siu Ho Wan, 2017).

Hong Kong International Airport was opened at the beginning of July 1998. The main part of the airport consisted of two parallel runways (3800 m x 60 m) of Category II and IIIA and Terminal 1, with an area of 570.000 square meters. At the same time, the Airport Express rail link began service (the Tung Chung Line reaching the centre of Tung Chung started operating in June) (Siu Ho Wan, 2017). Putting the airport into service did not mean the investment works in its immediate vicinity were terminated. Already at the beginning of 1999, a 5-star hotel belonging to Regal Hotels International group was opened north of the passenger terminal (http://www.hotelonline.com/News). The Regal Airport Hotel with 1171

[5] In Polish geographical literature on the subject, mention of the idea of 'new cities' in Hong Kong appeared in a publication in 2006.
[6] According to official data, in 2018, Hong Kong International Airport occupied an area of 12.55 square kilometres (Fact sheets, Hong Kong International Airport, 2019).

rooms (https://www.regalhotel.com), became not only the largest transit hotel in Hong Kong, but also one of the largest hotels in this territory.

However, the opening of the aforementioned hotel was not synonymous with the completion of the expansion of the infrastructure comprising Hong Kong International Airport. Already in 2001, the Hong Kong Airport Authority prepared Master Plan 2020 (Hong Kong 2030 planning vision and strategy. Final report, 2007). According to this development plan, in the following years, a number of investments was to be put into use in the middle of the decade.

Opened in December 2005, AsiaWorld-Expo convention and exhibition centre was one of the two convention centres (along with Hong Kong Convention and Exhibition Centre located in Wan Chai area in Victoria) in Hong Kong. The 10-storey building has over 70.000 square metres of space, including AsiaWorld-Arena, Hong Kong's biggest multifunctional entertainment arena (14.000 seats) and conference venues including AsianWorld-Summit (the largest in Hong Kong), able to seat from 700 to 5000 people depending on needs, as well as Runway 11, designed for 500 to 3800 people. It is worth mentioning that it is owned by Hong Kong SAR Government, and operated by AsiaWorld-Expo Management Ltd., which means that AsiaWorld Expo can be considered an example of an initiative consistent with the concept of public-private partnership (AsiaWorld-Expo, 2017).

With the constantly growing passenger and cargo traffic at Hong Kong International Airport, in December 2006, the Airport Authority of Hong Kong prepared a forecast anticipating servicing nearly 80 million passengers and handling 8 million tonnes of goods, as well as the implementation of 490.000 flight operations in 2025. The forecast made it clear that it was necessary to build the third runway to face such aircraft movements (The three-runway system of Hong Kong International Airport, 2016).

In February 2007 the construction of new Terminal 2 was completed. At the same time, the adjacent SkyPlaza office, commercial and service centre (38.000 square metres of retail space and 30.000 square metres of office space) was opened, totalling 140.000 square metres (Table 1) (Hong Kong International Airport HKG/VHHH, 2017). Although Terminal 2 was much smaller than Terminal 1, it contained facilities rarely seen at airports, such as the IMAX (UA IMAX Theater@Airport), the Dream Come True Education Park and GreenLive Air. In addition, in the vicinity of the terminal there are parking spaces for 36 coaches (in total there are approximately 3200 parking spaces near both terminals) (Fact sheets Hong Kong International Airport, 2019).

In September 2007, SkyCity Nine Eagles Golf Course (a 9-hole course) was officially opened between T erminal 2 and Asia World-Expo (https://www.golfinhongkong.com/). Subsequently, in March 2008 a decision was made to build an air cargo terminal (246.000 square

Table 1. Basic data about the facilities and services provided for passengers at Hong Kong International Airport in the spring of 2017 (Source: own elaboration based on Fact sheets, Hong Kong International Airport, 2017)

Selected facilities	Terminal 1 built/opened in 1998	Terminal 2 built/opened in 2007
Area	570 000 m^2	140 000 m^2
Passenger check-in counters	321	56 (eventually 112)
Seats in the unrestricted area	11 700	500
Seats in the dining area	1200	400
Lifts in the unrestricted area	115	32
Toilets in the unrestricted area	51	9
Nursing rooms	18	5
Shops	+240 (mainly in the restricted area)	+80 (mainly in the unrestricted area)
Restaurants	+60	ca 30

metres of space). The investment commenced in the same year and was completed in mid-2013 (initially it was to be commissioned in 2011) (Hong Kong International Airport HKG/VHHH, 2017). The most important first tier cargo handling facilities forming part of the cargo area of Hong Kong International Airport include Cathay Pacific Cargo Terminal, Hong Kong Air Cargo Terminals, Asia Airfreight Terminal and DHL Central Asia Hub and Air Mail Centre (Table 2). The cargo area of the airport also accommodates Airport Freight Forwarding Centre (area of 6 ha, including 133.000 square metres of storage space) and Tradeport Logistic Centre (area of 1.4 ha, storage area of 31,000 square metres), which are administered by Airport Freight Forwarding Centre Ltd. and Tradeport Hong Kong Ltd. In addition to the storage of goods, these companies (called second tier cargo handling facilities) provide storage space for other companies, deal with customs services and various logistics services (Air cargo, Hong Kong International Airport, 2019).

Table 2. The main cargo handling facilities at Hong Kong International Airport in the spring of 2019 (Source: elaboration based on Air cargo, Hong Kong International Airport, 2019)

Name	Operator	Area (ha)	Capacity	Cost of investment (HK$)
Asia Airfreight Terminal	Asia Airfreight Terminal Co. Ltd.	8	1.5 mln tonnes/year	2.5 billion
DHL Central Asia Hub	DHL Aviation (Hong Kong) Ltd.	3.5	35 000 parcels/hour 40 000 documents/hour	1.6 billion
Hong Kong Air Cargo Terminals	Hong Kong Air Cargo Terminals Ltd.	17	2.6 mln tonnes/year	8 billion
Cathay Pacific Cargo Terminal	Cathay Pacific Services Ltd.	11	2.6 mln tonnes/year	5.9 billion
Air Mail Centre	Hong Kong Post	2	700 000 packages/day	?

In July 2008, the airport authorities had begun to prepare a development plan of the area towards 2030 (Master Plan 2030 Study), which was sent for consultation in June 2011. It contained two variants. The first provided for a thorough modernization of the existing runways and terminals. The second option provided for the construction of a new runway and new passenger and cargo terminals as well as their accompanying facilities. For this purpose, however, it was necessary to drain 650 hectares of the sea on the north side of the current airport. In the course of public consultations with the participation of experts, the second option was given more voices, thus in December 2011 the concept of airport development consisting in draining the sea and building a completely new infrastructure was presented to the Hong Kong authorities (The three-runway system of Hong Kong International Airport, 2016).

Also in 2008 the construction of a 7-storey Airport World Trade Centre office building was completed (Airport World Trade Centre, 2017), and a new 5-star hotel opened in December in the immediate vicinity of Asia World-Expo, SkyPier and SkyCity Nine Eagle Golf Course. It is called the Hong Kong Skycity Marriott Hotel and offers 658 rooms, 5 restaurants, 14 conference rooms and extensive sports and recreation facilities (https://www.marriott.com/hotels/travel/hkgap-hong-kong-skycity-marriott-hotel). In January 2010, a ferry pier connecting Hong Kong International Airport with Mainland China and Macau was opened, marking the completion of activities consisting in the extension of the multifunctional infrastructure close to the airport. SkyPier complex consists of two parts including a ferry terminal and SkyPier border crossing, as well as new North Satellite Concourse aircraft terminal, which can simultaneously serve 10 narrow-body passenger aircraft (http://www.hongkongairport.com/eng/media/press-releases/). SkyPier opening meant full completion of the investment called Hong Kong SkyCity, including (a) AsiaWorld-Expo (along with Airport World Trade Centre), (b) Terminal 2 (along with SkyPlaza) and (c) SkyPier (along with the Hong Kong

Skycity Marriott) (Hong Kong SkyCity, 2017). Referring Hong Kong SkyCity project to urban concepts related to planning and operation of major airports and their surroundings, it can be concluded that it was consistent with the assumptions of the idea of the airport city, the more that those facilities were created on the initiative and belonged to the Airport Authority Hong Kong.

After an environmental impact assessment (EIA) which had taken place between 2012 and 2014, in March 2015, Hong Kong government decided to start preparatory work related to the expansion of Hong Kong International Airport. One of the first steps was the introduction of an additional fee (for each passenger) included in the airport charge to cover part of the costs (18%, The three-runway system of Hong Kong International Airport, 2016) related to the construction of a new runway and its accompanying infrastructure (The three-runway system of Hong Kong International Airport, 2016). It should be noted that although most of the investments to expand Hong Kong International Airport are to relate to reclaimed areas, part of the work is to concern some areas of the existing airport, because the new runway is to be created between the current runway and existing taxiways, i.e. in the vicinity of the existing runways (07L / 25R, or North Runway) (Background brief on issues relating to the development of three-runway system at the Hong Kong International Airport, 2015)

According to the calculations, the costs of the investment itself will amount at HK$ 114.1 bn (the total value, including project work, was estimated at HK$ 141.5 bn), while HK$ 47.3 bn (41.5%) is the cost of drainage of the area adjacent to the airport, HK$ 21.2 billion (18.5%) covers the construction of the runway and, among others, taxiways, and HK$ 15.4 billion (13.4%) is to cover the erection of new and extension of the existing passenger facilities (The three-runway system of Hong Kong International Airport, 2016).

The new passenger terminal will encompass 283.000 square meters of floor area and simultaneously handle 57 aircraft. It has a high-speed rail link (2.4 km long) with Terminal 2, completed in 2007, which is to be expanded (The three-runway system of Hong Kong International Airport, 2016).

At the end of April 2016, the Hong Kong authorities adopted the first version of the plan for land reclamation near the existing airport (Chek Lap Kok Outline Zoning Plan) (Fig. 2) (Background brief on issues relating to the development of three-runway system at the Hong Kong International Airport, 2016), which was tantamount to the start of preparation for engineering works on reclamation for the new investment.

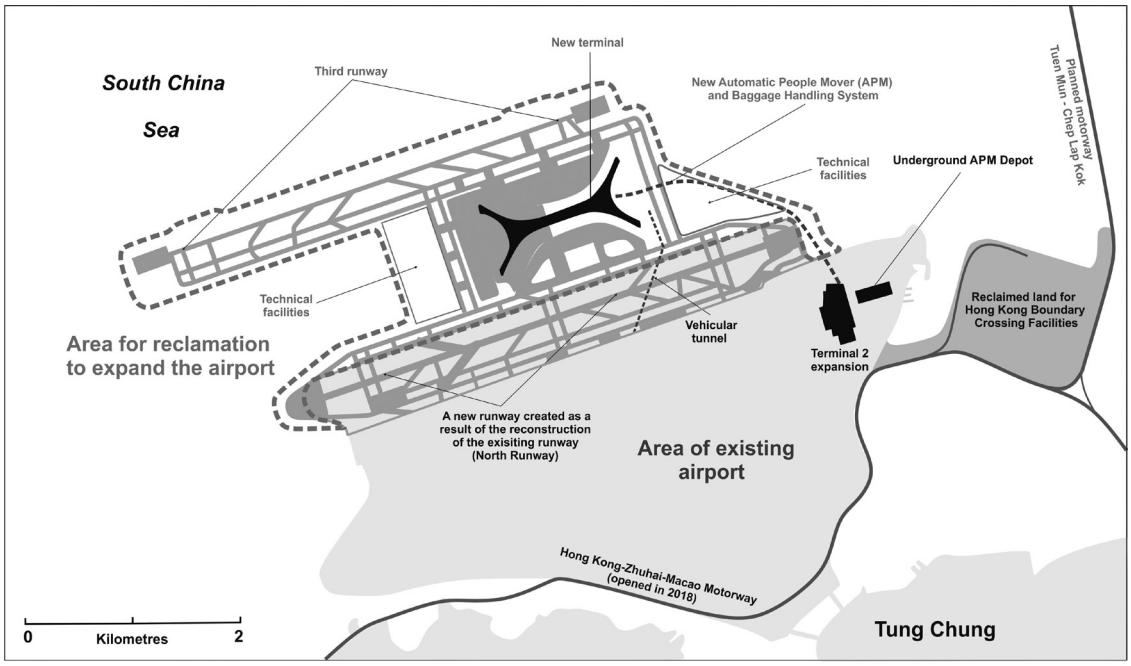

Figure 2. Hong Kong International Airport expansion plan as agreed in 2016 (Source: A. Kowalczyk's own elaboration)

Reflecting on Hong Kong International Airport, it should be mentioned that in 2018 Hong Kong International Airport employed 73.000 people (Fact sheets, Hong Kong International Airport, 2019), which meant that it was the largest employer on Lantau Island and one of the largest in Hong Kong (Fig. 3).

4. Conclusions

It seems that the described example of changes taking place in the surroundings (and in the spatial and socio-economic sense) of new Hong Kong International Airport fully meets the assumptions underlying the concept of the aerotropolis. It comes as no surprise, because J. Kasarda, who developed the model, evokes Hong Kong International Airport and Lantau Island in his publications. The example of Hong Kong fully confirms the validity of the idea of the airport city. In a relatively short period of time, in the vicinity of the international airport, facilities were created existing not only in close relationship with Hong Kong International Airport, but located in the territory administered by the airport authorities and, in most cases, belong to the Airport Authority Hong Kong (Fig. 3).

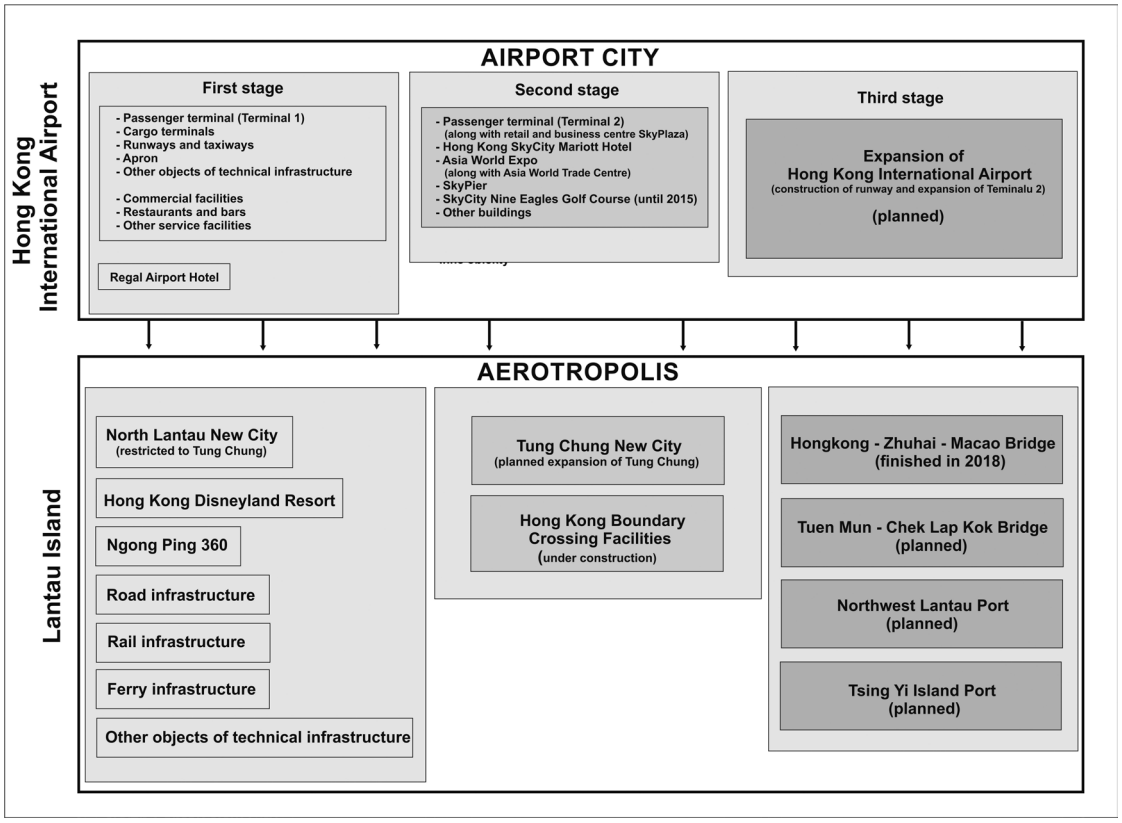

Figure 3. The development of Hong Kong International Airport and the emergence of an urbanized zone in the northern part of Lantau Island as defined by the concept of the airport city and aerotropolis (Source: A. Kowalczyk's own elaboration)

However, in relation to the case of Hong Kong International Airport and the changes taking place on the northern coast of Lantau Island, the assumption that they meet the conditions outlined by J. Kasarda may not be so obvious. At least now, because the airport still dominates over other components of Lantau's territorial and social system. However, it should be assumed that after the completion of the investment plans included in Tung Chung New Town Extension Study, the newly created city, although still closely related to the airport, will operate increasingly in areas unrelated to air transport and ground transport (in 2019 in Tung Chung were headquarters of Hong Kong Airlines, HK Express and Metrojet Ltd.). This

may be supported by the implementation of plans for the construction of new seaports in the nearby Tai O and Tsing Yi Island. In both cases, they will be located near Tung Chung (6–8 km southwest and 10–15 km northeast), so it can be assumed that their role in the functioning of the city will be as significant as the one of Hong Kong International Airport. The role of Tung Chung (with 45.000 inhabitants in 2019, Population of Cities in Hong Kong, 2019[7]) may also increase due to the ongoing construction of a transportation hub called Hong Kong Boundary Crossing Facilities. Although it is located in the immediate vicinity of the airport, it will also have a separate road connection with the eastern part of Tung Chung.

Concluding the considerations and referring to various theories to suit the description of the phenomenon of Hong Kong International Airport and its emerging aerotropolis, it is worth remembering the economic base concept. When Hong Kong is seen as a relatively autonomous territorial and social system (supported, among others, by its specific legal, administrative and economic status within the People's Republic of China), the aerotropolis on Lantau Island plays both endogenous (relative to Hong Kong) and exogenous role (relative to the rest of China and the world). It is difficult to establish which features will decide the future of the 'new town' on the north coast of Lantau. To date, Hong Kong has successfully demonstrated and used its separateness from the rest of China. However, the rapid development of Shanghai, Beijing, and above all, Guangzhou metropolitan area (relatively close to Hong Kong) could marginalise Hong Kong, along with Hong Kong International Airport and the future city of Tung Chung New Town (probably this name will disappear with time). Hong Kong authorities (with the support of the government of the People's Republic of China) created a development program toward 2030, but what will happen later is difficult to predict. The answer to the question of whether the airport city in the north of Lantau will survive or will transform into an aerotropolis in unknown.

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