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# IMPACT OF AEROTROPOLIS ON URBAN GROWTH AND RELATED COMMERCIAL ACTIVITY

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## STRUCTURED ABSTRACT

**Purpose** - Airports have historically been placed on the outskirts of cities on land that was considered to be unsuitable for substantial economic development. Less than a century ago, airports were primarily a simple conduit point where wealthy travellers and freight were able to go from point A to B. The importance of airports and other transport hubs, has changed significantly in the last decade with air travel becoming the predominant means of travel, with a large portion of the population either using the airport or being reliant upon it for their livelihood. Airports have in recent years become major employers, developers, and centres for urban growth with cities growing up around the airport infrastructure. This trend is now referred to as Aerotropolis (Wikipedia) and is seen as a major influence on future city development.

**Design/methodology/approach** - This study investigates the impact of airports on urban growth, with cities now growing up around the airport. Case studies are used to determine whether this growth is a local occurrence, or are airports becoming a major determinant of future urban growth patterns?

**Findings** – Airports are now major employers within the city and contribute a significant portion of the GDP. Air travel has increased over the last twenty to become a major contributor to the growth of modern cities.

**Originality/value** - This is an emerging area of research with the rapidly changing revolution of city centres moving from proximity to railway, motorway and ports, towards airports. The research provides an insight into the impacts of airport growth on surrounding commercial activity. This research forms the foundation for a larger study, comparing strategies for management and development of airports in a 21st century global context.

**Social Implications** – With increasing employment and commercial activity, centred around airports, this research identifies the challenges faced by commercial activities from changes in urban growth patterns.

**Keywords**: Aerotropolis, urban growth, development, transport hubs

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Nominated Theme: **Commercial sector**

## INTRODUCTION

This paper explores and expands on the hypothesis that airports will become the future central business districts of cities of the future. Consumer demand has created a secondary source of income for airports with increasing retail outlets and service providers based either within or surrounding the airport. At the same time, stakeholders have placed increased pressure on airports to improve their financial returns, which in many cases, requires the airport to develop the land that they have been holding for future airport operation growth.

Airports have become significant employers, property developers, and centres for urban growth, with cities growing up around the airport operations infrastructure. This trend is now referred to as Aerotropolis (Wikipedia) and is seen as a major influence on future city development (Choa 2012). As an indication of employment opportunities within the airport environment; Heathrow airport employs 76,500 people (LHR

Airports Ltd 2015), Dubai 90,000 (Dubai airport 2014) Brisbane 21,000 (BNE Airport 2014) and Sydney 52,890 (Sydney Airport Ltd 2015). These figures represent people that are employed within the airport community, not necessarily just by the airport company. For each city the airport is a major employer, which is translated into a significant impact on the local economy. Sydney airport '*translates into more that 258,300 jobs in freight and tourism for the people of Sydney, and 6.4% of the NSW economy*" (Sydney Airport Ltd 2015). Choa (2012) cites a 10% increase in passenger numbers as creating a 2% growth in the local economy. *Every regularly scheduled flight that travels through a hub airport supports around 2000 jobs* (Choa 2012 pg 18)

In order to predict the future growth of a city, it is important to look backwards and see how cities have evolved over time. Bagwell (2012) outlines a chronology of the transport revolution from 1770 through to 1985 within Britain. The chronology highlights the importance of transportation on the movement of goods, which has a flow on effect to impacts on social behaviour as well as the city growth patterns. The transport revolution and the impact on the relevant countries economies as well as infrastructure, is well documented with references around the globe (Bagwell 2012, Duranton 2012, Aljoufio 2013, Weiner 2013, He 2013).

In the 18th century transportation was based around horses, railways and waterways with sailboats to move passengers and freight. Communities were, through necessity, refined to being centred on rivers or the rail line. With the advent of motor vehicles in the early 1900s, and the proliferation of roading infrastructure cities started forming around motorways and associated infrastructure. Airports have become more than just a conduit for freight and wealthy travellers, with travel becoming more economical and therefore within the reach of the average person. Airport travel has increased at a phenomenal rate with markets being global. The cost of travel has decreased in real terms, with the average airfare from Australia to England in 1980 being between $2000 to $2500 return, which equates to $5,800 to $7,200 in 2015 dollars taking into account inflation over the time period. For most people an airfare twenty five years ago, required considerable savings to pay for, and travel was therefore considered to be a luxury good. Today, airfares for the same travel from Australia to England are still around $2000 with off peak or sale tickets being cheaper again, which makes them around a third to a quarter, of the price of travel in 1980. The increase in competition, more fuel-efficient aircraft, and the increased demand, by passengers and freight, has made travel a lot more affordable for the average person, and is no longer considered to be a luxury good.

The cheaper air travel is also reflected in freight charges, with airfreight being a lot more cost effective than twenty five years ago. Manufacturing is now considered to be a global activity with goods being able to be freighted very quickly and efficiently to anywhere in the world. The expectation of consumers is no longer, that goods manufactured overseas are dearer than local production, due to freight costs.

Glaeser et al (2003) hypothesise that the growth of cities, based on a USA study, is determined by 3 trends; 1) cities with strong human capital bases grew faster than cities without skills, 2) people moved to warmer climates, and 3) cities are moving towards relying on public transportation rather than cars. This theory has been built upon over the years with many examples around the modern world where public transport is important to the citizens of the city. When the commercial activities of the city are considered, then agglomeration and linkages become important factors in location. Scott (2014) refers to agglomeration of activities as being one of the most important frameworks for the city design. With airports being part of the public transportation system, they are becoming major hubs in the movement of people. The size of passenger movement is measured by all airports to determine and reflect operation costs. With passenger movements reaching 38million for Sydney in 2014, compared with Hartsfield-Atlanta International airport (USA) being 96 million (Airports Council International statistics 2014) and Dubai expected to exceed this figure in 2015, airports have become the main transport conduit for most cities.

Airport revenue is categorised into activities being either aeronautical or non-aeronautical. Aeronautical revenue relates to the activity and infrastructure that are directly associated with the movement of the aircraft and operation of the airport. Non-aeronautical revenue comes from all the commercial activities both within the terminal and the surrounding land. Airports have, through financial necessity, over the last decade, altered their commercial strategies to increase their non-aeronautical revenues to around half their total revenues. Historically airports operated with the main source of income coming from airside activities, however that model made airports vulnerable to the downturn in passenger numbers due to external forces such as Bird flu, Sars, and terrorism. Increasing the non-aeronautical activity is seen as providing a stability

to what is now a major commercial activity with airport annual operating costs, excluding capital costs, being in the hundreds of millions per annum (Brisbane $409m, BNE 2014).

In order to allow for future growth Airports hold a large land base surrounding the runways and terminal and large capital budgets. As the airport grows in demand, expansion of runways and operation facilities need to be planned for. Airports are forced to expand their commercial property holdings, to maintain financial stability, in an industry that can be volatile due to instances outside their control. The expansion of freight movements, passengers and the commercial property activities has created an environment similar to a small city. It is this expansion in commercial activity, that is the basis of this research, in illustrating the formation of a community with a significant contribution to employment for the city.

## DESIGN

The two case studies chosen for this research are Dubai and Brisbane. These two cities have been chosen as one is the conduit to a rapidly growing city, and the other is a more established airport that has developed and expanded, into a transport hub in Australia over the last twenty years. Although they are of differing size they are both essential to their city's expansion and economic growth.

### Brisbane

Brisbane airport is the main international airport serving the state of Queensland Australia, along with the Brisbane the capital city of Queensland. Brisbane airport enjoys the ability to operate 24 hours, which enables it to maximise its ability to encourage aircraft movement. Brisbane airport is located approximately 15 kilometres from the central business district, within a built up urban area.

Brisbane Airport Corporation (BAC) is the management operator of the airport. Brisbane airport is a non-listed company that is owned by a mixture of superannuation funds with the major shareholders being QIC Limited, Amsterdam Airports Schiphol, and the Colonial First State Global Asset Management. BAC holds a 99 year lease of the airport which expires in 2096.

Brisbane has identified one of its main long-term strategies, to become a major transport hub and is geographically located to capture an increase in commercial activity. Over the last twenty years the freight movement through Brisbane airport has increased by 942%. This compares as the highest increase of any capital city in Australia, with Sydney at 322%, Melbourne 391%, Perth 417%. The majority of the Brisbane airport freight growth (642%) has occurred over the period 1995-2005 with the expansion of the freight handling facilities. The volume of freight in tonnage, for Australia, is still predominantly out of Sydney, followed by Melbourne then Brisbane. The freight volume closely correlates with the population of these cities.

The airport *is a suburb in its own right, the largest airport in Australia by land size (2700 hectares) and the third largest airport in Australia by passenger numbers with more than 22 million passengers travelling through the airport in FY15*. (Brisbane Airport Corporation 2015) The airport has a Master Plan for the next twenty years, which was approved by the Australian government in January 2015. Within the Master Plan, there are 500 hectares set aside for future commercial property development. The commercial holdings at the moment have 80,000 square meters of office space, which the Property Manager of BAC, Mr Tormey advised at a RICs luncheon (BNE Property September 2015), was equivalent to the size of Toowong, which is an inner suburb of Brisbane.

### Dubai

In 2014, Dubai airport became the third largest passenger hub in the world for international passenger throughput, surpassing Heathrow airport in the UK. In 2014 Dubai airport commissioned an Oxford Economic Report that determined the airport contributed 27% of Dubai's GDP and supported 416,500 jobs, which is 21% of the total employment of Dubai. (Dubai Airport 2015) The report forecasts that by 2030 the contribution will rise to $88b, which will account for 44.7% of Dubai's GDP. With the predicted increase in throughput the number of jobs supported by the airport is expected to also rise, by 2030 to 1,174,000 raising the airport to contributing to 35% of the country's employment. The passenger throughput at Dubai airport, as reported by the airport company in 2013, was 66.4 million with capability of 70 million. With the planned growth, Dubai airport is expected to be the largest passenger hub in the world by the end of this year.

Dubai has a population of 2.4 million, at September 2015, as reported by the Dubai Government Statistics Centre. This population is increased to 3.4 million if the 'active population' is included. The active population is defined by the Statistics centre as being people who are working in Dubai but not living there. Many Dubai workers choose to live in neighbouring Emirates, which may be less than an hours, drive from the city but offer much lower rents. Dubai went through a boom period in the early to mid 2000s, with mega construction projects, which attracted a large construction related workforce. This workforce was brought in from Pakistan, India, Philippines and surrounding Middle Eastern countries. With the Global Financial Crisis (GFC) in 2007-8 the majority of construction projects in Dubai were put on hold or go slow, with completion being made within a few years. The recorded demographics by the Dubai Statistics Centre are interesting as they show a steady increase from 2007 to 2015 of around 100,000 permanent residents per year with the population increasing from 1.5 million in 2007.

The steady increase in population since the GFC, indicates that Dubai is growing in areas outside construction. The large free trade area of Jebel Ali and the associated Port have helped sustain the Dubai economy over the GFC period and the subsequent growth of the city.

As with the large freight throughput, Dubai airport caters for 70 million passengers as at 2015, which is expected to increase to 200m within twenty years. In 2014 Dubai surpassed Heathrow as the third busiest airport in the world based on passenger numbers. The United Arab emirate of Dubai is now serviced by two airports with a new airport at Jebel Ali being completed and opened in 2014. The Al Maktoum airport is predominantly for cargo however there is passenger throughput as well with just over 800,000 in 2014.

The freight portion of the main Dubai airport is referred to as the Dubai International Airport Cargo Gateway. A mega terminal was completed in 2008, which increased the freight throughput to 2.7 million tonnes a year. This freight number is expected to double with the opening of the Al Maktoum International airport.

The Dubai International airport is located approximately 10 kilometres from the central business district, referred to as Downtown area, and adjacent to Deira, which is the old downtown of Dubai. The city has grown up and encompassed the airport, and then progressed South-West, along the coast towards Abu Dhabi.

The new Al Maktoum International airport is located on the Abu Dhabi side of the city, and approximately 65 kilometres from the main airport or 55 kilometres from Dubai Downtown. Both airports are operated by the Dubai Airports Company, which is fully owned by the Dubai government.

## FINDINGS

Airports around the world have increased their aeronautical and non-aeronautical (commercial) revenues significantly over the last twenty years. This increase has arisen through a combination of an increasing number of passengers and freight movements. Airports have also become commercial operators, which can be evidenced by the high number of capital airports in Australia now owned by superannuation funds. Where twenty years ago, airports were solely for the movement of freight and passengers, now they are a multi use commercial precinct, incorporating: retail, offices, restaurants, hotel, service providers, and industrial activity. The larger land holding airports also include golf courses, preschools, and the majority of activities that you would expect to find in any city commercial precinct.

Brisbane airport has grown to encompass 80,000 square metres of office space and operates 430 businesses. An employment population of 21,000 (BNE, 2014), work within the airport and precinct. The BNE Masterplan 2014 is estimating that the employment population will increase to 50,000 within the next 20 years.

Savills (2014) Office market report indicates a total of 2,200,000 square metres of office space in Brisbane city. The airport at 80,000 square metres, comprises nearly 4% of the total stock, excluding the terminals and airport operations. The Australian government employment statistics (2014) show that the Brisbane area has a job eligible population of 1,145,000 people including the north and south regions.

Figure 1 below illustrates the extent of the proposed development at Brisbane airport. (Source: BNE 2014). The Brisbane airport masterplan allows for 25 new buildings to be constructed within the property arm of BAC with $2.9 billion to be spent over the next 10 years.

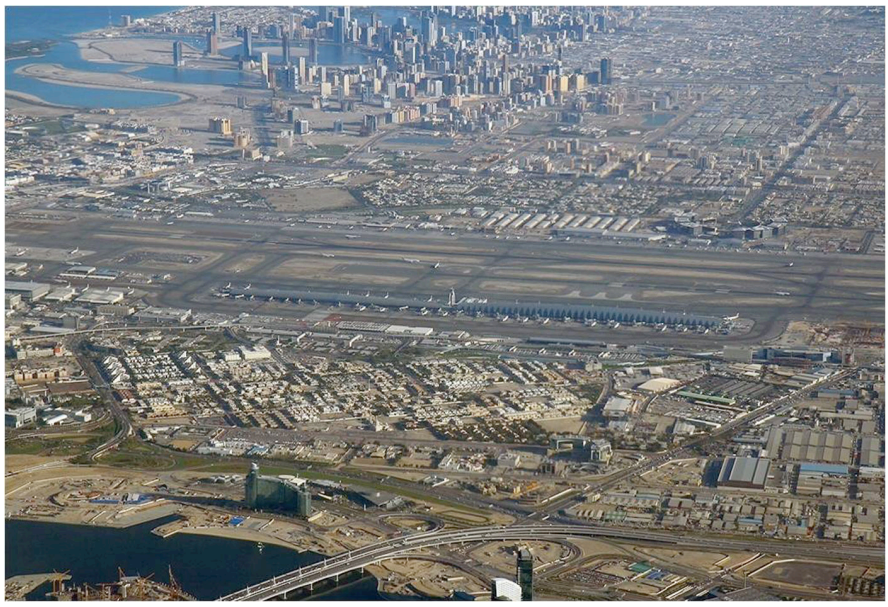
Figure 1 Brisbane Airport Masterplan.

Source: BAC 2014

Commercial revenue makes up 52% of the total revenue for Dubai International Airport (Dubai 2013). The commercial revenue has risen at a steady rate with 23% increase for the 2013 year. The future capital works and planned commercial activities at Dubai airports are on a trajectory of further increases into the foreseeable future. This growth is predominantly due to the expansions of the terminals and associated commercial activity that comes with handling 66 million passengers a year. The airport growth is forecast to increase the airport community to 1,174,000 within the next fifteen years.

The Dubai Airport Masterplan expects 675,000 square metres of additional terminal space to be added by 2020. Figure 2 below shows the proximity of the airport to the city downtown area, which is located at the top of the picture.

Figure 2. Dubai International airport 2015.



Source: Dubai Airports Ltd 2015

## CONCLUSION

Air travel has emerged as the main transportation system for the movement of passengers around the world. With the introduction of budget airlines and cheaper airfares, the average person now treats travel by air, in the same manner as rail travel was considered as recently as twenty five years ago. Air travel has become a predominant and economical means of travel by residents, and should therefore be considered by local governments as part of the cities public transport system. Many airports around the world, including

Brisbane and Dubai, have a train service to the airport, which connects with the local public transport system.

The movement of freight by air has also increased, although while aircraft cannot economically carry large freight objects and volume, there will still be the need for sea freight. The Antonov AN225 is the largest freight carrying aircraft in the world, which is frequently used in Australia's mining states to transport large pieces of mine equipment that is needed urgently and can therefore not wait for the slower sea and rail freight. Antonov is a soviet aircraft company, which was founded in 1989 to carry large and heavy freight. As this is a reasonably new operation, it is expected to grow substantially over the coming years, which will see changes in the way heavy and large freight is carried. Air freight is increasing and expected to continue increasing into the foreseeable future.

The case studies of Dubai and Brisbane highlight the rapid increase in the role of airports in the employment and commercial space occupied within a city. As airports become busier they are generating related service requirements, which then have to employ additional people. The related services are not confined to airport activities, but extend to social and community activities that are required by the airport community, such as pre-school, child care, places of worship, and shopping facilities such as supermarkets. As most people choose to live close to their place of employment, the desire to live close to the airport will be stronger, which in turn will put additional commercial demands on the airport community.

This research forms the foundation for a larger ongoing study, comparing strategies for management and development of airports in a 21st century global context.

**References**


Aljoufio M et al (2013) Spatial–temporal analysis of urban growth and transportation in Jeddah City, Saudi Arabia. Cities. Vol 31 (April) pgs 57-68

BNE Property 26 May 2012. BAC Unveils Plan for Airport Property Growth.

BAC (Brisbane Airport Corporation) (2014). Annual report.

Bagwell P (2012) The Transport Revolution 1770-1985. Routledge

Choa C (2012) The Rise of the Aerotropolis. Modus: RICS. vol 17 (May), pgs 14-19

Dempsey P (2000) Airport Planning & Development Handbook: A Global Survey. McGraw-Hill

Dubai Airports Ltd (2014) http://dubaiairportsreview.com/chairmans-introduction/

Dubai Airports Ltd (2015) Dubai Airports Strategic Plan 2020

Duranton G & Turner M (2012) Urban Growth and Transportation. Review of Economic Studies. vol 79, (4) pgs 1407-1440,

Glaeser et al (2003) Urban Growth in the 1990s: Is City Living Back? Journal of Regional Science, vol 43 (1) pgs 139-165

He X (2013) Essays on transportation infrastructure, urbanisation and economic growth: evidence from China. School of Economics, University of Adelaide.

Savills (2014) Brisbane Office Market Report

Scott A & Storper M (2014) The Nature of Cities: The Scope and Limits of Urban Theory. International journal of Urban and Regional Research, vol 39 (1) pgs 1-15

Weiner E (2013) Urban Transportation Planning in the United States.

Wikipedia 2015. https://en.wikipedia.org/wiki/Main_Page