GLOBAL AIRPORT CITIES

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Contents

The Way Forward

By John D Kasarda

Airports, like many major transportation interchanges, have long attracted commercial development. This attraction has grown as air passenger and cargo traffic has increased and as cities have continued to expand outward towards, and sometimes around, airports.

Airport area growth is being shaped by (1) firms providing air transportation services, (2) firms which are frequent consumers of air transportation, (3) businesses which cater to the ancillary needs of air travellers and employees of the previous two types of firms, and (4) companies which may simply be searching for accommodating sites with good regional highway access. These various types of business activities create a ratcheting effect, accelerating airport area growth in a largely organic manner.

Now however, a new land use and business model is emerging providing structure to and distilling value from the earlier organic development experience at and surrounding many airports.

The business case underlying the airport city model recognises that: (1) passengers, service-sector businesses, and shippers have unmet needs, (2) those needs can be systematically addressed as these three primary airport area growth drivers continue to increase in size and economic importance, and (3) critically, that airport operators and their enterprise partners can benefit financially by addressing those needs.

The airport city model is therefore increasingly being incorporated into airports' commercial and land-use plans to generate additional non-aeronautical revenues while serving 21st century air travellers, businesses and shippers.

The new model is almost universally used in the planning for greenfield airports, with airport cities at Hong Kong, Incheon, Kuala

The Grand Hyatt at Dallas/Fort Worth International Airport which serves as a virtual corporate headquarters for business executives.

Lumpur and Dubai blossoming into full-blown aerotropolises.

The spatial and functional core of the airport city is the passenger terminal, which has been likened to an urban central square. It operates as its multimodal commercial nexus offering a variety of specialised goods and services.

Urban functions such as offices, hotels and exhibition complexes evolve near the terminal, analogous to a metropolitan central business district, surrounding the central square, creating a city-like environment at and immediately around the airport.

As aviation-linked businesses cluster further outward, primarily along connecting transportation corridors, a more expansive aerotropolis (airport-integrated urban economic region) takes shape. Let me describe the evolution of these new urban forms, beginning with the commercially diversifying terminal and then moving progressively outward to the airport city and then the greater aerotropolis.

The evolving terminal enterprise

At the largest international airports passenger terminals are morphing into luxury shopping malls and artistic and recreational venues, as well as locations to exchange knowledge and conduct business.

No longer restricted to magazine shops, food courts and duty free, they now contain gallerias and shopping streets featuring brand name boutiques, speciality retail and upscale restaurants, along with live music, arts, entertainment and cultural attractions. International brands are being complemented by locally-themed merchandise and dining outlets.

Concierge-staffed business lounges and trade facilities are sprouting up in the terminals, as well as concourse-connected four and five-star hotels.

Hong Kong International Airport (HKIA), which opened in 1998, is a good case in point. Its main terminal hosts a galleria (The Atrium) with more than 20 high-end designer clothing shops. The airport is also developing a gold exchange for international traders.

In early 2010 HKIA premiered the world's largest terminal commercial lounge. This 15,000sqft full-service business center supports up to 300 users with wireless hotspots, workstations, printers and meeting facilities along with large-screen TVs and advanced video conferencing systems.

When not working, business travellers can enjoy an all-day buffet and an á la carte menu

along with personal amenities such as spa-type massages, barber services and manicures. For overnight stays there is the 1,171-room Regal Airport Hotel, the largest in Hong Kong and which is connected to both Terminal 1 and Terminal 2.

Singapore Changi Airport, opened in 1981 and more recently introduced cinemas, fitness centres, and a tropical butterfly park, while Amsterdam Airport Schiphol, upgraded in the mid-1990s and is home to a lively casino and Rijksmuseum art gallery.

These not only help to reduce travellers' stress but also improve their 'airport experience', which can be a determining factor for transfer passengers choosing an airline and its hub.

Other airports taking on new enterprise functions include Frankfurt International Airport, which now has the world's largest airport clinic serving more than 36,000 patients annually and Dallas/Fort Worth International Airport (DFW), whose terminal-linked Grand Hyatt Hotel serves as a fly-in virtual corporate headquarters for many US businesses.[1]

Beijing Capital Airport's tenants include banks. Stockholm-Arlanda Airport's chapel conducted nearly 500 weddings in 2009.

1 Byrnes, Nanette. "Home is Where The Airport Is." BusinessWeek, Issue 4047, August 2007, Pp. 89-92.

Purchasing everything from powdered milk to Rolex watches, passengers at Dubai International Airport generated more than $1.1 billion in retail sales in 2009.

The economic influence of airports is far greater than that of prior era transit-oriented development, such as projects near downtown train stations. An increasing number of airports employ more than 50,000 workers, which would qualify them as metropolitan central cities by the US Census Bureau's definition.

When the hundreds of thousands of daily flyers are added – plus those greeting passengers – the consumer populations of many gateway airports are larger than most medium-sized cities.

For example, more than twice as many people pass through Atlanta's Hartsfield-Jackson International Airport terminal each year – some 90 million in 2008 – as visited the US tourist meccas of Disney World, Graceland and the Grand Canyon, combined.

Given the higher incomes of air passengers, which typically are two to four times the national average, and their often massive numbers – some 30 million to 90 million people compared with 8 million to 12 million who visit large shopping malls – it is not surprising that major airport retail sales per square foot are up to six times greater than those for shopping malls and downtown shops.

Terminal-based stores at major US airports in 2007 generated

sales from just under $6,500 per sqm to over $27,000 per sqm, according to *Airport Revenue News*. This compares with $4,800 per sqm for non-anchor tenants in the average US mall that same year, according to the International Council of Shopping Centers.

John F Kennedy International Airport topped the US in concessions revenue in 2008 with $442 million, up from $405 million sales in 2007, despite the economic recession and air traffic declines.

Some airports in Asia and the Middle East substantially trump US hub airport commercial revenues. Incheon International Airport, for example, derived over $1 billion in retail revenues in 2008.

Despite a small downturn in 2009, Incheon projects nearly $3 billion in sales by 2017. Dubai International's billion-dollar-plus terminal-generated retail sales have been growing in excess of 20% annually.

Whether prior sales growth will be sustained at many airports when the final 2009 and 2010 figures come in seems doubtful. Yet, when the global economy and aviation sector recover (as they inevitably will), strong terminal retail growth is anticipated.

The rise of the airport city

In addition to incorporating an expanding variety of shopping, leisure and business support venues into passenger terminals, airports are continuing to develop their public-access property with hospitality, entertainment, and recreation clusters; office and retail complexes; conference and exhibition centres; and facilities for processing time-sensitive goods. The private sector has joined in, developing similar facilities just beyond the airport fence.

The largest concentration of hotel rooms on the US West Coast surrounds Los Angeles International Airport (LAX). London Heathrow's new Sofitel Hotel, with direct access to Terminal 5, measures up in design and guest amenities to any downtown London five-star facility.

In addition to overnight transit passengers, it attracts wealthy international and extended-stay business travellers, and has rates as high as €3,000 per night. With 45 meeting rooms, a 180-seat theatre and a convention centre accommodating 1,700 delegates, the airport hotel is the third biggest conference venue in the UK.

Major conference venues have sprouted up near other hub airports such as Atlanta, Chicago,

SkyCity is the core of an evolving airport city at Hong Kong International Airport. Shown is the plan for Phase I of the development, completed in 2008 and includes over a million square feet of retail, offices and hotels , a nine hole golf course and a 1.5 million square foot exhibition and trade centre.

Frankfurt and Paris. For example, Airopolis, Roissy is a €300 million, 130,000sqm development near Charles de Gaulle International Airport consisting of a convention centre with 3,000 seats, three exhibition halls (45,000sqm), a 14,000sqm showroom, 21,000sqm of offices and three four-star hotels, all due to open in 2011.

Likewise, Dublin Airport has planned a 700,000sqm airport-linked commercial complex consisting of 500,000sqm of office space targeted to internationally-oriented businesses and 200,000sqm of hotel, convention, and retail facilities. An automated people mover will shuttle business people and other travellers from the airport city complex to international gates in six minutes.

Incheon International Airport is also developing large commercial tracts around its aeronautical core. Called 'AirCity', it consists of office

possibly convention facilities on a large tract near its passenger terminal. A maglev train system is in the works that will quickly connect the terminal and all AirCity commercial nodes.

Hong Kong International Airport's SkyCity is being developed in a similar vein with office, retail, entertainment, hotel and exhibition complexes. SkyCity's first phase opened in late 2006 and contains SkyPlaza, a multi-purpose commercial complex connected to the passenger terminal and express train station.

The lower floors of SkyPlaza provide a 300,000sqft retail centre, including a 4D Extreme Screen theatre. Above this is Class-A office space with a total gross floor area of 300,000sqft.

SkyCity's first phase development also includes an air express train-connecting 750,000sqft international exhibition centre (Asia World Expo) with full-time trade offices, SkyPier (a China cross-boundary ferry terminal), a 650-room Marriott Hotel, and the Nine Eagles (nine-hole) golf course. Future phases will consist of a business park, hotels and leisure and entertainment facilities to be developed in a pedestrian friendly manner, replacing the

buildings, hotels, a golf driving range and a water park, with a global medical centre and Disney-scale theme park with casino hotels planned. Airport management is planning further development of offices, hotels, shopping and

current golf course.

Airport city locators

Airport cities have evolved with different spatial forms predicated on available land and ground transportation infrastructure, yet virtually all emerged in response to four basic factors:

1 Airports need to create new non-aeronautical revenue sources, both to compete and to better serve their traditional aviation functions.
2 The commercial sector's pursuit of affordable, accessible land.
3 Increased passenger and cargo traffic generated by gateway airports.
4 Airports serving as a catalyst and magnet for landside business development.[2]

The most common airside and landside airport city commercial facilities include:

• Restaurants, catering and other food services, some locally-themed
• International brand and specialty retail shops
• Banks and currency exchanges
• Duty free shops
• Airline lounges
• Private meeting rooms
• Hotels and accommodation

2 LeTourneur, Christopher. "The Bricks and Mortar of Global Commerce." Airport World, Vol. 6, No. 6. December 2001-January 2002, Pp. 36-40. Kasarda, John D. "Logistics and the Rise of the Aerotropolis." Real Estate Issues 25, No. 4, Winter 2000, Pp. 43-48. Kasarda, John D. "Planning the Aerotropolis." Airport World, Vol. 5, No. 5, October-November 2000, Pp. 52-53. Kasarda, John D. "From Airport Cities to Aerotropolis." Airport World, Vol. 6, No. 4, August-September 2001, Pp. 42-45.

- Office buildings
- Convention and exhibition centres
- Cultural and entertainment attractions including museums, art galleries and cinemas
- Kiosks of all types
- Leisure and recreation venues including golf courses, race tracks and gaming
- Personal and family services such as fitness facilities, spas and child daycare for airport employees and passengers
- Medical and wellness facilities
- Wedding chapels
- Factory outlet stores oriented to both air travellers and locals

- Auction, exchange and trade complexes
- Aviation-related industries such as aircraft maintenance, repair and overhaul
- Logistics and distribution, including perishables and cool-chain facilities, as well as value-adding logistics (labelling, testing, kitting, etc)
- Free Trade Zones (FTZ), special economic zones and bonded warehouses.

Güller and Güller[3] provide a useful framework for classifying aeronautical and non-aeronautical activities locating at and around airports. They distinguish three

categories of activities based on the extent to which they are related to air traffic.

Core aeronautical activities are part of the technical operation of the airport, directly supporting the air traffic function.

Airport-related activities have a direct relation to airfreight or air-passenger movements (logistics and distribution activities or terminal retail and hotels). Their competitiveness and/or business revenues are closely tied to the scale of air traffic.

Airport-oriented activities choose the airport area because of the image of the airport and its

3 Güller, Mathis and Michael Güller. From Airport to Airport City. Airports Region Conference, Barcelona, Spain, 2001.

Amsterdam Airport Schiphol.

typically excellent ground accessibility. The price of land and surface connectivity, rather than relation to air traffic, are the key factors in determining those activities locating in the airport area.

Along with air traffic patterns, surface connectivity, land price and the nature of the local market (industrial structure and nearby resident population commercial demands) play a role in the type of airport-area development and activities taking place. So do airport boundaries.

Those airports with limited developable land will see substantial airport-related and airport-oriented commercial development taking place 'outside the fence' and therefore may not benefit directly from the real estate returns. They will, however, benefit from any additional passengers and cargo that such development generates.
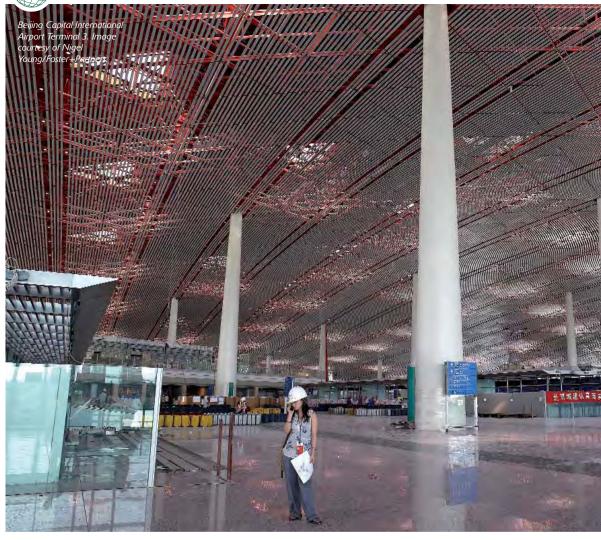
The boundaries of numerous airports were established many decades ago, well before they assumed significant commercial and competitive development roles. Yet, just as urban development did not stop at the political boundaries of metropolitan area central cities, so airport-dependent development will not stop at the formal boundaries of airports.

Outside the airport fence, value-capture is emerging as a key issue in airport city development.

Since airport areas are attracting businesses, workers and residents at a heightened pace (research by the University of North Carolina's Kenan Institute has shown that employment growth near airports has been growing considerably faster than the metropolitan suburban area that the airport is located in), airport area commercial

Beijing Capital International Airport Terminal 3. Image courtesy of Nigel Young/Foster+Partners

development reflects employee and resident needs in terms of incidental services, including basic housing, recreation, food services and retail.

Often these needs are being provided in large mixed-use residential developments near the airport with many now becoming metropolitan area population growth nodes.

Managing new commercial development

Consistent with their growing non-aeronautical functions, airports are altering their operational units and management structure. Numerous airports (both public and private-sector operated) have established commercial and/or real estate divisions to develop their landside areas as well

as foster development beyond airport boundaries.

They include among others, Aéroports de Paris (ADP), DFW, Fraport, Amsterdam Schiphol, Singapore Changi and Spain's Ferrovial Group.

ADP established a real estate division in 2003 to act as the developer, general contractor and construction project owner

and manager of landside commercial properties at Paris Charles de Gaulle and Orly airports.

China Capital Airport Holdings (CAH), a state-owned enterprise that operates much like a private entity, is rapidly proceeding with its ambitious Beijing Airport City. Working with partners such as Airport City Development Corporation Ltd, (ACL) and

municipalities such as Shunyi, it is developing shopping, entertainment, education, exhibition, sports and leisure, logistics, light manufacturing, finance, trade and housing at and around Beijing Capital International Airport. Its Airport City Logistics Park, being led by ACL, covers over 2.5 million square metres.

DFW's management is aggressively expanding its commercial and real estate divisions to lease airport land to a wide variety of commercial tenants. It is also forming public-private partnerships to develop over 2,000 hectares of property for office, hospitality, retail and entertainment.

Hong Kong has likewise established both commercial and real estate divisions to boost its terminal retail and develop its adjacent SkyCity commercial complex.

Malaysia Airports Holdings Berhad (MAHB) is developing Kuala Lumpur International Airport's (KLIA) airport city, commercially anchored by its large Gateway Park, which in addition to retail and office development, includes motor sports, an automotive hypermarket and leisure venues drawing on local and aviation-induced markets.

Incheon International Airport Corporation (IIAC) is forming a variety of joint ventures with the private sector to develop its AirCity, encompassing hotels, office buildings, logistics zones, shopping, entertainment and tourism districts, as well as housing and services for airport city workers and residents.

Dubai Aviation City Corporation (DACC) has been established to build and manage Dubai World Central (DWC), a $33 billion airport-centred set of cities under development 25 miles south of downtown Dubai. Anchored by the new Al Maktoum International Airport, scheduled to open in mid-2010, DWC will include logistics office towers, aviation-related industry, hotels, a megamall, golf course, and housing for 40,000 on-site workers.

Through its Schiphol Real Estate subsidiary, Amsterdam Airport Schiphol operates on the basis of private-sector principles and has been a key revenue generating arm for its operator, the Schiphol Group. Approximately 70% of the Schiphol Group's profits come from aviation-linked commercial activities.

The Airports Authority of India (AAI) has turned to private-sector conglomerates such as GMR and

Vancouver International Airport.

the GVK Group to lead consortia to operate and expand Delhi and Mumbai airports as well as construct and manage the new Hyderabad and Bengaluru international airports. Since shifting these airports into private-sector leadership, both passenger-service quality and airport revenues have improved dramatically.

Further extending their corporate reach, some airports are even buying and/or operating other airports through special investment management divisions. ADPI, Incheon International Airport Corporation, Schiphol Real Estate, MAHB, Fraport, Ferrovial and Vancouver Airport Services (YVRAS) are among those pursuing cross-border airport ventures.

Private-sector groups such as Macquarie Airports (now MAp) also own interests in and often manage multiple airports around the world that rely heavily on the airport city model.

These new operational structures and cross-border ventures are testimony that airports are evolving from basic aeronautical infrastructures into

multi-functional extended enterprises, serving both aeronautical needs and profitable commercial development. To many not familiar with the new realities of airports, this enterprise model might appear to be a deviation from the norm, but it is fast becoming the 21st century way forward for large and medium-sized airports.

The airport city management model is thus quite distinct from the more traditional civil-engineering and aeronautical systems airport management model typically guided by government employees who run airports like public utilities using public-sector principles.

The equally important commercial development role requires different strategies and operational skills driven by private-sector principles, fusing innovative management, finance and marketing with logistics and real estate knowledge.

The airport city model requires airports to do business the way businesses do business. They must be far more nimble in their investment and operating decisions than is the case with most 'public enterprises', which frequently need political approval for even minor decisions.

The move to a corporate organisational form of airport city management promises to reduce the role of politics, lessen bureaucracy and increase operational efficiency. Moreover, corporate organisation is much more in line with airport city objectives: earning a positive financial return with an obligation to maintain capital which is generally audited annually.

A paradigm shift is also required in airport master planning. These plans must be as focused on commercial layout and efficiencies as on aeronautical layout and efficiencies.

Ideally, the commercial and aeronautical components would be synergised for optimal reinforcement. This is much more likely to occur when a larger holding company is responsible for both the aeronautical and independent, but related, airport city development.

Airports from Amsterdam to Zurich and from Beijing to Seoul have embraced the airport city management model to develop their terminals and landside areas as a pivotal means to financing airport operations while contributing to their profitability, cost-competitiveness in attracting airlines and passenger satisfaction.

Other international airports, not quite to the same scale have given commercial development a high priority such as Athens, Tancredo Neves, Brisbane, Calgary, Dublin, Stockholm-Arlanda, Taiwan-Taoyuan and Vancouver.

They all have implemented the airport city concept in their business models, explicitly or implicitly, and are incorporating a range of traditionally urban economic functions to

diversify their land-use and revenue streams.

The upshot is that airports are undergoing a significant transformation, taking on commercial functions previously reserved for private enterprise and spatial forms previously reserved for cities. Many larger airports also have the density of highway and rail connections that are usually associated with metropolitan downtowns. This is reinforcing their new roles as drivers of business location and urban development over an extended area.

The emerging aerotropolis

With the immediate airport area serving as a region-wide multimodal transportation and commercial nexus, strings and clusters of airport-oriented hotels, convention, trade and exhibition facilities, office parks, information and communications technology complexes, recreation and entertainment venues, time-sensitive goods handling and mixed-use residential/commercial developments are forming along airport corridors up to 30km outward.

Because of excellent airport corridor accessibility, (highway, as well as often rail) these strings and clusters of businesses efficiently serve local residents as well as air travellers.[4]

Much airport area development is being underpinned by improving ground transportation. Highways have been widened and brought closer to the terminals. Trains have arrived in the form of metro, light rail and suburban lines, including airport express rail service to city centres.

Going further, airports in Amsterdam, Frankfurt and Paris are directly connected to the European high-speed rail networks, with platforms below air terminals. This improved regional and national surface connectivity not only reinforces development along airport corridors but is also spurring development in interstitial areas between access corridors.

Serving as models of planned postmodern urban mega-development, the largest of these airport edge cities have become globally significant destinations in their own right. For example, the city of Las Colinas (Texas) just east of DFW, is home to the global headquarters of four Fortune 500 companies – including ExxonMobil – and 2,000 other firms, as well as upscale residential, shopping, hotel and recreational complexes.
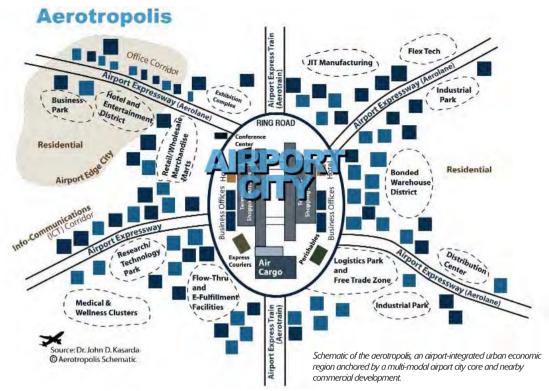
Amsterdam Zuidas, located six minutes from Schiphol's terminal, houses the world headquarters of ABN Amro and ING banks, along with numerous European corporate headquarters. It has more than 150,000sqm of Class A office, retail, and hospitality real estate. Nearly 9,000 multi-family residences are in the works.

New Songdo International Business District, located near Incheon International Airport, is being developed by New York City–based Gale International and South Korea's POSCO E&C as a 600-hectare, global business and trade centre.

The size of downtown Boston, this $35 billion mixed-use project, is currently the largest private sector development in the world. Much of this 'Instant City' is already built with the final phase scheduled for completion in 2015. Using New Songdo as a model of planned aviation-linked urban mega development, Gale International, in partnership with Cisco Systems, is considering similar scale airport edge cities in China, India and South East Asia. These are being designed to be among the most electronically networked and environmentally sustainable cities in

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4 Schaafsma, Maurits, Joop Amkreutz, and Mathis Güller. *Airport and City, Schiphol Real Estate, Amsterdam Schiphol Airport, 2009.* Van Wijk, Michael. *Airports as Cityports in the City-region, Netherlands Geographical Studies, 353; Utrecht, 2007.*

Aerotropolis

Schematic of the aerotropolis, an airport-integrated urban economic region anchored by a multi-modal airport city core and nearby commercial development.

the world, in addition to their aviation connectivity.[5]

Airport edge cities, together with airport corridor and other airport-centric commercial and residential development are giving rise to a unique 21st century urban form – the aerotropolis.

Analogous in shape to the traditional metropolis made up of a central city and rings of commuter-heavy suburbs, the aerotropolis form consists of an airport city and outlying corridors and clusters of aviation-oriented businesses and their associated mixed-use residential developments.

Reflecting the new economy's demands for connectivity, speed and agility, aerotropolis form follows function, with corridor and cluster development, wide lanes and fast movement.

Airport expressway links (aerolanes), complemented by airport express trains (aerotrains), bring cars, taxis, buses, trucks and rail together with air infrastructure at the multimodal commercial core – the airport city. Aviation-linked business clusters and residences radiate from the airport city, forming an extended airport-centric urban region, the aerotropolis.

A spatially compressed model of the aerotropolis showing its current, and likely future, evolution is illustrated above. No aerotropolis will look exactly like this but most will eventually take on similar features, led by newer greenfield airports that are less constrained by decades of earlier surrounding development. The aerotropolis is thus much more of a dynamic, forward-looking model than a static, cross-sectional model reflecting historic development to date.

This dynamism is well-reflected around Hong Kong International Airport where SkyCity is becoming

5 Lindsay, G. (2010). "Cisco's Big Bet on New Sondo: Creating Cities From Scratch." Fast Company, (142), 88-95.

the multimodal Central Business District (CBD) of a far-reaching aerotropolis, extending to southern coastal China. In addition to its highly-efficient Hong Kong island and Kowloon expressway and air express train connection, SkyCity is being linked by the express train to its nearby Disney theme park that opened in 2006, about 10 minutes from the airport. The airport express train connects within five minutes to Tung Chung, a massive new town housing 45,000 airport workers and their families, complete with schools, churches, shopping and medical facilities.
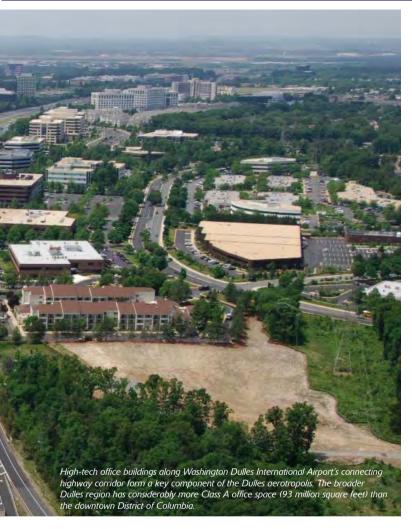
SkyCity is also seamlessly connected through high-speed turbo jet ferries to the economically booming Pearl River Delta in southern coastal China. These high-speed ferries shuttle passengers, shoppers, workers and tourists back and forth between SkyCity and key delta locations in 30–45 minutes.

Such connectivity to the mainland exists for efficient movement of air cargo, as well. HKIA logistics ferries link the airport to the delta's major manufacturing centres, shuttling parts and finished goods back and forth between the airport and the mainland.

High-tech office buildings along Washington Dulles International Airport's connecting highway corridor form a key component of the Dulles aerotropolis. The broader Dulles region has considerably more Class A office space (93 million square feet) than the downtown District of Columbia.

particularly attractive location for the business services sector. drawing regional corporate headquarters, conference centres, trade representative offices and information-intensive firms that require executives and professional staff to undertake frequent long-distance travel.

Business travellers benefit considerably from quick access to hub airports, which offer a greater choice of flights, destinations and flexibility in rescheduling; they also help travellers avoid the costs of overnight stays.

Chicago's O'Hare International Airport area has become the second-largest office market in the US Midwest, while the Dulles region, centred around Washington DC's Dulles International Airport in the northern Virginia suburbs, contains more Class-A office space than downtown Washington DC.

Firms specialising in information and communication technology and other high-tech industries consider air accessibility to be especially crucial. High-tech and other knowledge-based professionals travel by air much more frequently than do most other workers, giving rise to the term 'nerd birds' in the United States for commercial aircraft connecting technology capitals such as Austin, Boston,

Further integrating HKIA with both Hong Kong and the delta will be a new expressway linking Hong Kong to Macau and Zhuhai on the mainland. This expressway, scheduled for completion in 2016, will connect through the airport island (Lantau).

It will not only enhance SkyCity's role as a destination for shoppers, tourists, traders and other business people from Hong Kong and

Mainland China, but also cement HKIA's role as the quadramodal (air, highway, rail, and waterborne) nexus of a highly expansive and growing Hong Kong aerotropolis.

Aerotropolis advantages

Driving the aerotropolis are advantages they provide to business in the new speed-driven, globally networked economy. The aerotropolis is proving to be a

Raleigh-Durham and San José. Many high-tech firms are locating along major airport corridors, such as along the Washington, DC–Dulles Airport access corridor and Chicago O'Hare's I-94 corridor.

The aerotropolis is proving equally advantageous to many goods processing sectors. Today's most competitive manufacturers use advanced information technology and high-speed transportation to provide fast and flexible responses to customers' unique needs. These firms build agile production systems that quickly connect them to their suppliers and customers around the globe, allowing them to source parts and ship assembled goods in a 'time-definite' manner (on-time, just-in-time, every time).

A manufacturer's ability to meet customer demand also depends on the existence of a comprehensive ground-to-air shipping network of air cargo carriers, trucking companies, freight forwarders and logistics providers.

This network has been strengthened as demand for time-sensitive manufacturing and distribution grows. Made possible primarily by proximity to an airport, a ground-to-air shipping network allows manufacturers to minimise their inventories, shorten production-cycle times and quickly access novel inputs for customised products that create additional value.

The economic impact can be huge. Memphis International Airport (world headquarters of FedEx) has helped create over 160,000 jobs in its metropolitan area. More than 12,000 people work at the company's airport's facility each night.

One in four jobs in the Memphis region is tied to the airport which had an annual economic impact of $29 billion in 2007. FedEx's growing European regional hub employs 2,500 people at Charles de Gaulle is likewise beginning to have a major economic impact by attracting a range of time-critical goods-handling businesses to the Roissy area.

Fuelling further aerotropolis development, restaurants, superstores, factory outlets, and consumer services of all types are locating along airport corridors to serve a dual customer base of air travellers and residents.

Athens International Airport (AIA), for instance, has a large IKEA and a Kotsovolos megastore, as well as a major factory outlet complex in an

airport retail park located less than three kilometres from its main terminal. The vast majority of their shoppers are locals.

Upscale retail is also gravitating to airport areas. Led by airport edge city Tysons Corner, the Dulles Airport region has the second largest concentration of retail in the United States, following New York City's Manhattan Island. The Las Vegas Strip, a corridor

Athens International Airport Retail Park hosts factory outlets and megastores.

extension of McCarran International Airport, generates as much revenue from shopping, hotels and entertainment venues as it does from gambling.

As airport-integrated economic regions evolve some are even developing their own place identities such as the 'Amsterdam Airport Area,' or 'Dulles' – the aerotropolis as a preferred business and commercial destination is fast emerging.

Aerotropolis planning needs

Although much aerotropolis development has been spontaneous and haphazard – often spawning congestion and environmental problems – in the future it can be markedly improved through strategic infrastructure and urban planning.

Dedicated airport expressway links (aerolanes) and airport express trains (aerotrains) should efficiently connect airports to major regional business and residential concentrations.

Special truck-only lanes should be added to airport expressways, as should improved interchanges to reduce congestion.

Time-cost accessibility between key nodes should be the primary aerotropolis planning metric rather than distance.

Businesses should be steered to locate in proximity to the airport

based on their frequency of use, further reducing traffic while improving time-cost access.

Airport area goods-processing activities (manufacturing, warehousing and trucking) should be spatially segregated from white-collar service facilities and airport passenger flows.

Noise and emission-sensitive commercial and residential developments should be sited outside high-intensity flight paths.

Cluster, rather than strip, development should be encouraged along airport transportation corridors with sufficient green space between clusters.

Placemaking and wayfinding should be enhanced by thematic architectural features and iconic structures.

Mixed-use residential/commercial communities housing airport area workers and frequent air travellers should be developed with easy commutes, designed to human scale, providing local services and a sense of neighbourhood.

In short, aerotropolis development and sustainable 'smart growth' can – and should – go hand-in-hand. Many mixed-use residential clusters along airport corridors, for example, can be designed under 'new urbanism' guidelines

emphasising internal 'walkability' and community.

Others, such as Amsterdam Zuidas or New Songdo International Business District, though of immense scale, can be designed for improved sustainability as well as economic efficiency, benefitting both place and region.

Information and communication technology should also be pivotal in future aerotropolis planning. Multi-media technologies should produce tastefully themed electronic public art along airport transportation corridors that highlight the culture, history and economic assets of the region the airport serves.

Regional marketing through informative and aesthetically pleasing public art should likewise characterise the airport's terminals. Entrance and exit roads should be nicely landscaped with any dilapidated structures or unsightly areas along them shielded by vegetation or mural painted walls. By setting both the first and final impressions for many air travellers, the airport and its aerolanes represent a region's official welcome and send-off.

Global information and communications technology (ICT) networks will also help shape the aerotropolis. Advanced

information processing technologies and multi-media telecommunications systems served by high-density fibre-optic rings and satellite uplinks and downlinks should be incorporated throughout the airport region, instantly connecting companies to their global suppliers, distributors, customers, branch offices and partners.

Incheon's New Songdo City.

Firms that require the fastest possible networking will thus have an additional reason to locate in the aerotropolis. This advanced ICT infrastructure is already appearing not only around major international airports like Incheon, Chicago O'Hare, Schiphol and Washington-Dulles, but also around US air express hubs such as Memphis and Louisville which serves UPS.

As multi-modal transportation and advanced communications infrastructure further develops at and around airports, the commercial real estate value of areas surrounding them will advance. A principal future determinant of aerotropolis land value, lease rates, and the type of commercial use on a given property will be the time and cost of moving people and products to and from the airport and via the airport, to distant markets.

The local time/cost proposition will be a function of the site's place along airport transportation corridors, and not necessarily of spatial distance. For example, a site 10km from the airport, but one

stop on a high-speed rail line from the airport, will be worth more than a site five kilometres away with poor road and rail connections. To put it another way, the three As – accessibility, accessibility, accessibility – will become the critical component of the three Ls – location, location, location – in establishing aerotropolis real estate value.

Connectivity to markets will also influence aerotropolis land values. Market connectivity is measured by a combination of the number of distant markets served, multiplied by the frequency of service to these markets, sometimes weighted by the size of the markets served or their hub status. Hence, an airport with five flights daily to a distant market will be better connected to that market than one offering two flights daily. Likewise, a flight to Atlanta or Chicago will generally yield greater market connectivity than one to Albuquerque or Cleveland.
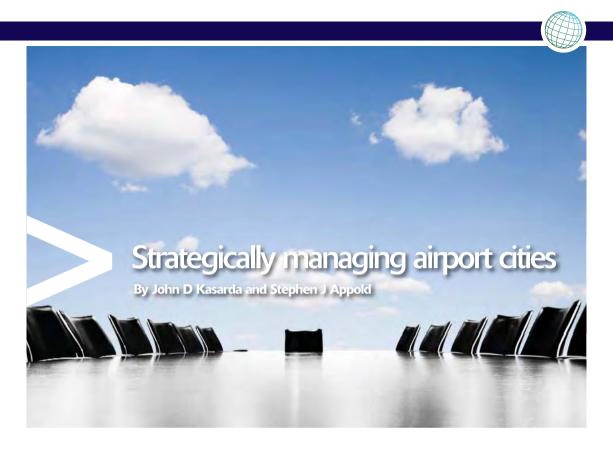
Looking ahead, local and regional planning constraints will certainly exist, especially at and around older airports that are surrounded by many decades of prior development.

It will take many decades of future planning and coordinated stakeholder efforts to adapt their surrounding land-uses to these principles. In such physically constrained cases, planning must be targeted and strategic as space becomes available, with an eye towards the way a particular development will be leveraged by the airport and by greater region-wide development.

This will not occur under most current airport area planning approaches, which tend to be politically localised, functionally fragmented, and often conflicted. A new approach is required bringing together airport planning, urban and regional planning and business site planning in a synergistic manner so that future aerotropolis development will be more economically efficient, aesthetically pleasing and socially and environmentally sustainable.

The real question is not whether aerotropolises will evolve around major airports (they surely will). It's whether they will form and grow in an intelligent manner, minimising problems and bringing about the greatest returns to the airport, its users, businesses, surrounding communities and the larger region and nation it serves.

Strategically managing airport cities

By John D Kasarda and Stephen J Appold

The opening chapter pointed out that many of the initial airport cities and aerotropolises developed organically with only limited planning guiding them. A largely haphazard pattern of growth left them not nearly as spatially and economically efficient or attractive as they might have been.

Consequently, airport city operators, mainly airports and their holding companies, have often missed opportunities to strengthen their financial position and reinforce their regional economies.

While these airport cities have generally been highly successful, as this new development model spreads, the competitive challenges may increase. Competition among airports – whether within a multi-airport metropolitan area for passenger traffic or within a larger geographic scope for cargo shipments or passenger hub status – will increasingly imply competition among airport cities.

The choice of airport within a region, or airline and its corresponding passenger hub, may hinge in part, on the quality of the airport city and the unique experience it creates for shippers and business or leisure travellers.

In the same way, the prospects for airport cities are closely tied with those of their airport. The dominant airport in a metropolitan region will likely spawn the dominant airport city.

Likewise, the dominant passenger hub will likely develop a more extensive airport city. Airport dominance is partially determined by airline dominance. Airline decisions, in turn, depend upon the attractions of a region, since airlines serve markets, not airports.

Therefore, successful airport cities often are de facto coalitions between the regions, which generate passenger and goods movements, the airlines which transport them and the airports which link the movements and destinations.

Despite their competitive elements, airport cities largely complement each other. Air transportation quickly and efficiently connects distant regions and the businesses that serve them. Research has documented that improvement in one part of the aviation system results in benefits elsewhere.

More importantly, airport cities complement the metropolitan regions they serve. Firms, and thus regional economies, increasingly need to look outward in order to prosper – whether that is for trade in goods or services.

Aviation has become part and parcel of this process. As regions seek competitive advantage and better jobs, airport cities can improve regional functionality by providing strategically located commercial environments offering their tenants and users not only fast and agile long-distance connectivity but also services that improve their business processes.

This calls for airport cities to move beyond commercial or real estate investments to provide for the ancillary needs of air travellers. They must also become integrated functional service providers which accentuate the strengths of regional business resources. Therefore, the next wave of airport city development will require regional cooperation creating synergies between downtown areas, major suburbs, and other regional locations.

In the process, airport cities and their corresponding regions will likely differentiate, doing what they do best in the global economy. Systematic strategic management of airport cities, cognisant of the opportunities and threats, thus becomes a prerequisite for reaping the full benefits for airport cities and their greater metropolitan region.

Strategic airport city visioning

Airport city strategy formulation begins with a vision which is informed by an assessment of global economic trends, regional resources, and the management capabilities of the airport and those of potential competitors and partners.

Human skills development, specialisation and trade are the central factors in creating prosperity. Airports, airport cities, and aerotropolises (moving progressively outward and becoming more inclusive) are regional and national competitive tools.
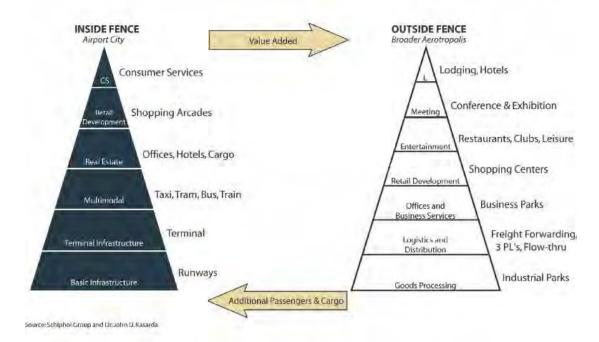
More than just commercial real estate, they function as trade facilitation and enterprise performance enhancement platforms by reducing the cost of long-distance connectivity and the costs of doing business over a geographically wider range of markets.

They operate as key nodes of a high-speed physical internet, quickly connecting products and people over long distances. Despite the rise of e-commerce and video conferencing, the web will not move a box and business, for many, it remains a contact sport.

Nor will advances in communication technology replicate the excitement of travel. Airport cities help maximise the regional and overall gains from trade, whether by facilitating the flow of goods through integrated terminals or supporting the tourist sector or aiding in the provision of business services through more efficient employee travel.

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INSIDE FENCE                    Value Added →        OUTSIDE FENCE
Airport City                                         Broader Aerotropolis

CS         Consumer Services              L          Lodging, Hotels
Retail     Shopping Arcades              Meeting     Conference & Exhibition
Development
Real Estate  Offices, Hotels, Cargo      Entertainment  Restaurants, Clubs, Leisure
Multimodal   Taxi, Tram, Bus, Train      Retail Development  Shopping Centers
Terminal     Terminal                    Offices and      Business Parks
Infrastructure                           Business Services
Basic        Runways                     Logistics and    Freight Forwarding,
Infrastructure                           Distribution     3 PL's, Flow-thru
                  ← Additional Passengers & Cargo  Goods Processing  Industrial Parks
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Source: Schiphol Group and Dr. John D. Kasarda

Airport cities accomplish that by reducing what transport economists call 'terminal costs' and the costs of the 'last mile'. They also work indirectly, visually signalling the attractiveness of a region for inward investment.

Airport cities are supported by several related large-scale trends. The continuing economic growth and integration of regional and global economies helps create the passenger and goods traffic that is necessary to support airport cities.

The overall sectoral restructuring of the global economy with employment moving from farm to factory to office helps shape the demand for airport city functions.

Finally, the continuing urbanisation of the population, concentrating in some regions and in some areas within cities more than in others will further steer the demand for airport city functions.

Those factors suggest that while all airport cities share a common overall function, the way in which it is implemented will differ, depending upon local conditions. A global division of labour implies a certain degree of division of among airport cities, determined, in part, by regional strengths and capabilities.

A number of airports, but not all, can be cargo gateways or airline hubs by virtue of their location. Low

production costs allow some to anchor export-oriented production platforms and process the accompanying shipping.

For others, that is not a realistic option. Those with large, well-educated labour forces may evolve into centres of business service supply while other airport cities will support tourist destinations.

Airport city operators need to select functions which agree with and enhance the natural endowments labour supplies and the location of their regions. Each will have different passenger demographies, enterprise networks, and mixes of shipments. Consequently, they

Philadelphia International Airport strategy workshop.

will have different facilities and different physical forms. The differentiation will help increase the benefits.

Airports and airport cities themselves also vary in their strengths and weaknesses. Location within a region sometimes affects the functions which can be effectively carried out in airports cities, as do the character of ground transportation systems and the existing pattern of urban development.

Available land area also has a clear impact on airport city development. Regional governance institutions, particularly those controlling surface transportation infrastructure and regional land use, further affect what can be accomplished (or not accomplished) by airport cities. Airport city operators need to select functions and make plans which are consistent with these factors also.

A well-designed, smoothly-functioning airport city can accentuate regional strengths and counteract shortcomings by operating efficiently, facilitating movement and reducing the costs of doing business.

Such a competitive tool can sustain the advantage enjoyed by established regions – and overcome the disadvantage of late developers. The strategic management challenge is to formulate a plan that would

accomplish that goal and develop an organisation which could implement that plan.

Demand drivers in review

As suggested throughout the following chapters, passenger, business enterprise, and shipper demand are the immediate drivers of outside the fence growth. Passengers, business service providers and shippers often need ancillary services supporting their processes. As the volume of traffic rises, an increasing number and variety of these demands reach viable service thresholds which can be met, but sometimes aren't, by entrepreneurial airport operators.

To be sure, many of those demands can be met outside the airport fence. However, an on-airport location often provides customers an extra benefit. In fact, over time several airport city functions have moved to the terminal. On-site hotels, for example, allow guests easier and quicker access to the gates, reducing expense and time costs for travellers while decreasing ground traffic.

At the same time, regional and urban growth powered by a restructuring economy fuels a demand for additional commercial space. As cities continue to grow in size and income, demand outstrips the central city supply of space, leading to the formation of satellite centres or edge cities.

Many large cities are polycentric, having a number of important commercial nodes. In many cases, given the timing of urban growth and development, the Central Business District (CBD) may hold only one-fifth or less of a metropolitan area's employment.

As the overall economy continues restructuring, successive waves of functions are pushed out of central urban areas. Manufacturing and warehousing have been largely cast out and now sometimes cluster near airports even when not aviation-related.

Retail and services have even been spun-off to outlying areas and some are congregating around airports, particularly when ground transportation systems and residential patterns allow for easy work force and consumer access.

Airport cities, like selected other components of the built environment, also fill a symbolic role. It is no surprise that airport cities are at their largest and their most glamorous in the capitals and mega-cities of the developing world.

It is there that the demand for grand architectural symbols of emergence and upscale 'experience places' may be the highest and providing that symbol and the appropriate experience may have the greatest financial payoff. Nevertheless, almost all regions can benefit from the extra consideration from investors and site selection specialists that an attractive airport city can bring.

Memphis International Airport.

Other legal and institutional factors can be important airport city growth drivers also. Shannon Airport's duty free sales, mentioned in the initial chapter, were not driven by the need to drink alcohol and smoke cigarettes in preparation for a flight.

The sales were created by the opportunity for travellers to avoid substantial taxes in their country of destination. Such special factors undoubtedly drive the extreme heights in airport sales of some other products as well.

While large airport cities may be the province of rising global cities, there is demand for airport city functions at smaller, but nonetheless vibrant airports. A major challenge for the strategic management of airport cities will be to improve market intelligence sufficiently to meet as many of the needs of travellers, firms, and shippers as possible, not only for financial gain but also in order to boost regional competitiveness.

At the same time, management and operations need to be refined to serve smaller markets effectively. This has clearly occurred with respect to food and beverage service – a mainstay of most terminal retail offerings.

Airport city supply factors

Airport cities function as regional competitiveness tools which are made ever more useful by transportation and urban trends. Nevertheless, almost all existing airport cities have been developed by airport operators or their holding companies.

That is, airport cities are often components of larger business organisations which contribute to and benefit from regional prosperity but have a narrower immediate mandate, that of providing transportation infrastructure. That has implications for the motivations of the developers, the issues in implementation, and the creation of value for the ultimate consumers.

From the point of view of airport finance, airport city functions are important sources of non-aeronautical revenue. Most of the airport city features described in this volume can generate revenue and potentially additional passengers and cargo as well.

They will, however, often require considerable investment and entail a level of financial risk, particularly if demand and costs are miscalculated. A challenge for airport city development will be to devise revenue strategies which optimally balance risks and returns.

As large land and capital-intensive facilities, airports often have sizeable fixed financial obligations which must be met regardless of the level of traffic in any given year – a fact now pressing down on many airports.

Aeronautical charges, including landing fees and terminal rents may cover the main costs of providing aeronautical infrastructure but the pressure to cut aviation costs can be substantial. Passenger user fees and taxes can supplement the basic revenues but these also add directly to air transportation costs, often reducing demand.

The financial situation at airports with respect to aeronautical revenues differs substantially. Economists sometimes argue that aeronautical charges are too low at congested airports and that an increase in charges, possibly via some type of slot auction mechanism, is needed in order to relieve congestion and generate additional funds for capital investment.

Political forces frequently prevent this. To such airports, non-aeronautical revenues represent an alternative opportunity to generate additional revenue from the air transport value chain.

Uncongested airports face the opposite problem. If anything, they need to lower the costs of using the airport. Non-aeronautical revenue provides an alternative means of helping support aeronautical infrastructure and increasing the attractiveness of using the airport. Non-congested airports need to take care not to extract from the aviation value chain, but to add to it by filling otherwise unmet needs.

The revenue situation is complicated by regulatory arrangements. Accounting practices can affect the financial return that an airport operator can earn on airport city investments. Single till practices combine airport aeronautical and non-aeronautical revenues in setting charges to airlines.

Dual till standards, which consider aeronautical revenues only in setting such charges, keep non-aeronautical revenues in a separate account.

The form and philosophy of aeronautical revenue regulation can also have an impact on such returns. Regulating rates of return on investments may discourage efficiency-enhancing management interventions. Revenue cap regulation, the other major method of controlling aeronautical charges, sometimes requires extensive information about costs and, depending upon implementation, can also dampen financial returns.

The revenues generated by airport city functions may not only help lower airline costs but also help support expensive aeronautical investments. In many cases, airport city functions can offer a higher return on capital than aeronautical functions. The

higher return may encourage investment in aeronautical infrastructure as a way of generating non-aeronautical business.

The available evidence suggests also that single till airports with substantial airport cities have lower aeronautical charges than other airports. Dual till airports with significant airport cities may benefit treasuries in some countries by paying substantial dividends to their public owners.

Regulatory regimes can impact the level of motivation of airport management towards airport city revenues and thus towards their development. Conversely, regional governments also need to understand their value to regional income in order to support the needed investments.

A major strategic concern for airport city development is communicating the potential benefits and designing a revenue governance system wherein airport management incentives are aligned with the broader regional competitiveness goals.

Airport revenue strategies

Five basic non-aeronautical revenue strategies – service enhancement, value capture, business process re-engineering, horizontal and

vertical integration, and portfolio diversification – are finding their way into common airport practice and thus airport city strategy.

Three of them are closely tied to operations, one to how the operations are managed, and one to financial performance concerns. These strategies overlap and combine in creating the several elements of airport cities discussed across a number of chapters herein.

More broadly, as air traffic increases, a widening array of evolving passenger, enterprise, and shipper wants achieve minimal market thresholds at a deepening set of airports, enabling service enhancement.

As they do so, savvy airport operators can address those demands. Many of these needs can be satisfied by those outside airports but, as suggested above, additional consumer added-value is often created by an airport location.
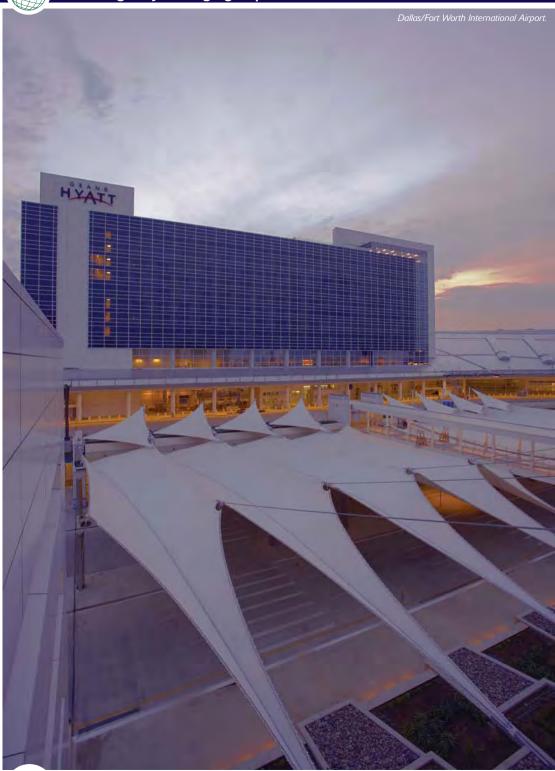
A number of these needs are discussed in the chapters in this volume. Immediate passenger needs, such as food and beverages, are among the most obvious but a range of value-adding freight forwarding services also become feasible as traffic increases.

Some of those services create an additional attraction for the airport city, possibly even drawing business away from alternative airports, such as airports within the region or competing transfer hubs.

Satisfying emerging needs is particularly valuable because they do not necessarily detract from the revenues available to the other partners in the air transportation value chain, such as airlines. Many components of airport cities also tap into latent consumer needs

Dallas/Fort Worth International Airport.

without subtracting from the revenues available to airlines and other providers.

The increase in air traffic allows for market segmentation – finding subsets of customers which closely share needs or preferences – among the passenger, enterprise, and shipper needs. Airport operators can then more closely match their service offerings to needs, facilitating value capture.

Doing so not only creates greater consumer satisfaction but it also allows airport operators to tap into what economists term a 'consumer surplus'. A 'surplus' is created when a consumer, in this case a traveller or a shipper, is willing to pay more for goods or services than their price.

With the advent of yield management, airlines have become increasingly adept at capturing a portion of the consumer surplus by offering travellers a closer approximation of what they demand and charging accordingly.

In order to augment revenues, airports need to become increasingly sophisticated at finding under-charged or under-served market segments and at their own yield management.

Some international airports have ventured into this territory by constructing separate terminals for general aviation, VIPs, low-cost carriers, and luxury carriers. A number have implemented express security clearance lanes, available to those travelling on premium tickets or with high frequent-flier status.

The combination of traffic growth and market segmentation, along with the action of the broader trends outlined above, make it possible to simplify the procedures travellers and shippers need to perform in accomplishing their aims. Thus, business process re-engineering can lead to increased activity in airport cities.

Terminal retail is, in fact, an example of adapting airport business practices to more closely fit traveller needs – shopping at the airport, generally after clearing security rather than before.

Airport hotels, mentioned above, are attractive to business travellers because they provide clearance and conserve time. Airport conference centres have allowed professionals based in disparate locations and with tight schedules to meet while eliminating unwanted and inefficient ground travel.

Shippers benefit from one-stop customs processing. Up to 20 documents are required to process an import or export shipment and these may be distributed over half a dozen offices which may themselves be spread throughout a metropolitan region. 'Single-window' consolidated procedures reduce the terminal costs mentioned above.

Similar procedures for potential tenants and facility builders speed airport city development. Tenants and builders often need to endure a needlessly long approval process which is triggered by an application. Considering development options beforehand and simplifying procedures for uses satisfying local criteria can avoid time waste while preserving adequate control.

The shifting responsibility for activities can result in airport-centred horizontal integration (offering services in multiple geographic markets) and vertical integration (providing upstream and downstream services) within the air transportation value chain. Integration can increase market power even as it allows a cumulated knowledge base to be better utilised.

European, Asian, Latin American, and Australian airports are often freer to engage in horizontal integration than US airports generally are. BAA owns six UK airports while Macquarie Airports (now MAp) owns interests in five.

Many other airports have cross-holdings and sometimes full ownership. Similarly, contractors specialising in everything from ground transportation to aircraft fuelling to the management of terminal retail facilities and parking facilities, are active across many airports.

Airport operators also integrate vertically by increasingly entering into passenger and aircraft services, ground transportation, lodging and hospitality, office and industrial facilities for air transport-consuming firms.

Airports thereby participate in a longer portion of the air transport value chain. Airport city development is frequently a form of vertical integration building on the achievement of service thresholds for new needs, the differentiation of markets, and the reallocation of tasks among value chain participants.

The US practice of granting airlines with long-term lease agreements (signatory airlines) partial control over terminal management decisions may also introduce a degree of vertical integration with airlines.

The border between airline operations and airport operations is somewhat arbitrary. As many sectors have moved away from direct ownership and control of all aspects of operations, in some cases, a reallocation of tasks from airlines to airports may be warranted, particularly when an airport or its subcontractor can perform the appropriate tasks more efficiently or more cost-effectively.

An analogous re-organisation has already taken place in several industries, including automobile, electronics and aircraft manufacturing. In the US, airline food service has largely been replaced by meals at terminal-based concessionaires. Some airports offer common use terminal equipment to its tenants, thereby increasing the efficiency of terminal facilities and reducing costs to the airlines.

The possibilities for efficient reallocation may extend to other

London Heathrow courtesy of BAA.

which is not directly tied to the short-term vagaries of air traffic. While air traffic trends have been generally upward, annual variations may have become more pronounced over the last decade as security threats, fuel cost spikes and economic downturns affect air traffic.

Portfolio investments provide a route for airport operators to gain revenue from under-utilised assets without full operational integration into the air transport value chain. Individual airport cities, therefore, range between portfolio investments which may diversify revenues and functionally-integrated investments which build on the specific synergies between air transport and land use. These are not always incompatible functions as the supply of available land can sometimes outstrip aviation-related demand, as the chapter on Denver Airport explains.

One challenge for some airport city operators over the coming decade will be to more carefully select tenants and gradually transform themselves from real estate portfolio managers to operating units comprised of complementary functions.

Service enhancement, value capture, business process re-engineering, horizontal and

airport-based operations. Concierge-staffed airport business lounges, discussed earlier in this book, are an example of a combination of new services, improved value capture and shifting responsibility for tasks in a way that benefits the entire value chain.

Airport portfolio diversification, by definition, stands apart from

operations and their management. Some airports have engaged in real estate development unrelated to aviation. Athens and Brisbane airports, for example, have retail factory outlet centres. At neither airport, are these facilities primarily oriented towards air travellers.

One attraction of commercial real estate development is that it can provide a revenue stream

vertical integration, and portfolio diversification, each reviewed above, are the general revenue-enhancing options available to airport managers.

The revenues gained can reduce airline operating charges or augment the funds available for commercial aviation, can shift revenues among value chain participants, or can restructure the flow of funds to smooth income over time or more efficiently share risk. Because airports are likely to continue to need substantial amounts of credit, the verdict of capital markets on revenue strategy innovations will be critical.

Capital markets are an important consideration in airport management. The most effective revenue strategy open to many airports may be to lower their costs of borrowing by maximising their credit rating.

For publicly-traded firms, the stock market often gives rapid and sometimes brutal, assessments of new management revenue strategies. The bond market, in which most airports operate, may be slower to react but the impact on costs may be just as harsh.

Therefore, all innovative revenue strategies will need the approval of the financial community. A strategic airport city challenge will be to

manage the mix of revenue development and finance costs to maximise benefit as financial markets tighten and loosen.

Airport city development – a regional context

Airport cities are not only business ventures and regional competitive tools, they are, quite obviously, urban realms. As such, they need to complement other urban formations within their metropolitan area.

Airport city planning needs to be integrated with urban and regional planning. Airport city strategy formulation needs to develop in tandem with that of the most important partner, the metropolitan region. Unfortunately, few at airports or in regional governments fully understand how airport cities benefit regions and downtowns.

If the combination of traffic growth leading to achieving service thresholds, allowing market segmentation and a realignment of airline and airport functions has powered the growth in terminal retail and services, a cross-subsidisation of aeronautical and non-aeronautical functions facilitates the outward expansion of the airport city.

As airport cities continue to grow, airport city strategies

increasingly add another factor to their business models, a cross-subsidisation between airport functions and urban functions.

Just as the boundaries between airline and airport functions and between aeronautical and non-aeronautical functions have diminished, the line between airport and urban functions is blurring.
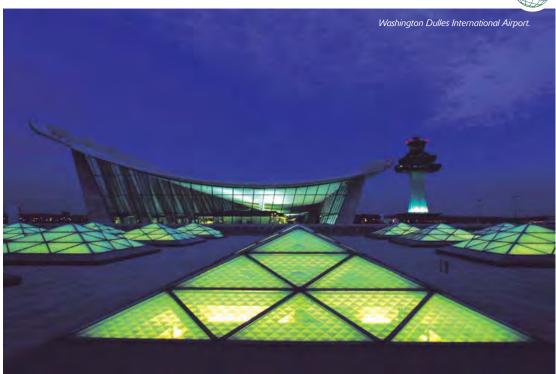
Airport area facilities serve a niche market – but it is a viable and growing niche which, judging by the expansion of airport cities, has broadening appeal. That appeal centres on business travellers and shippers.

Leisure travellers rarely want to end their travel at an airport yet business travellers are happy to do so. Business travel is driven by the need to visit clients or associates face-to-face. If that meeting can occur at or near an airport, travel time and costs may be minimised.

When cost is minimised and benefit maximised, flying to a particular location increases and airport conference facilities near hub airports reduce the costs of holding meetings and conferences.

From the standpoint of tourism revenues, airport cities offer a 'smaller portion of a larger pie' – lowering traveller costs and thereby eliciting greater volume. Similarly, offices near or at airports reduce the

Washington Dulles International Airport.

costs of making air-enabled sales calls and technical support visits.

Distribution facilities at airports do much the same for goods transport. In each case, however, the airport city facilities allow regions to capture activities that it otherwise would not – or that might otherwise not occur at all.

Airport cities are now beginning to exhibit economies of scope in that a kernel of heavily airport-dependent activities increases the attraction of an airport location to business activities which are somewhat less tied to the airport.

Over time, airport cities can draw businesses which are not linked to aviation but are tied to the businesses which are. That allows airport cities to maximise the value delivered to passengers, shippers and their regions.

Airport cities can, do and increasingly will draw traditional 'downtown' functions, just as many suburbs have. Edge cities have developed in multiple locations throughout metropolitan regions, not just at airports.

Therefore, whereas airport cities are generally synergistic with regional resources, they can also compete against other locations within metropolitan regions. Yet, to the extent that airport cities successfully compete with alternative regional locations, that signals a consumer advantage that might otherwise be lost to the region.

A strategic vision of the airport economic region – the aerotropolis – is also needed. That vision will need to appreciate the complex needs of contemporary businesses in a restructuring economy and it will need to understand the processes used in making facility and business location decisions.

Site and building characteristics can often tip the scales in choosing a region. Many factors drive location decisions,

including cost, labour accessibility, floor plate size, and a need for information security.

Satisfying some of these needs is critical and many firms require facilities which are purpose-built. Therefore, overall regional competitiveness can suffer from attempts to direct business demand to particular locations.

Any location is likely a compromise between alternative attractions. In general, the attraction of an airport area is increased by a lack of sufficient appropriate space elsewhere in the metropolitan region and by proximity to residential labour sheds. As noted above, urban expansion is a significant airport city growth driver.

Ground transportation has a double-edged effect on airport cities. Efficient ground transportation expands an airport's catchment area and helps connect labour sheds to airport city employment centres but it also can reduce the motivation to locate near an airport in a competitive region. A firm's location decision may therefore be

less of a compromise than it otherwise might be.

Even firms which are very heavily dependent upon air cargo are finding that being located 20 minutes from a hub airport provides sufficient access. An efficient ground connection could make that location 30km away, possibly allowing a firm more ready access to a labour pool or lower real estate costs.

Because business travel is often combined with leisure travel, many central cities continue to enjoy an unexpected attraction for selected business functions. Typically downtown business locations are attractive for their cultural resources and their urban experience.

A large city, such as San Francisco, now functions as a high status bedroom community with rich amenities serving Silicon Valley, similarly Friday evening traffic may be heavier going towards New York's central Manhattan district than away as suburbanites head to the city for an evening out. Developing downtown cultural attractions boosts regional and airport city appeal.

Amsterdam's Zuidas district, with six-minute access to Schiphol's passenger terminal, ready commuter connections and direct entry to all the cultural amenities of Amsterdam's inner city illustrates key aspects of the possible synergies between airport cities and downtowns and suburbs.

The central city was not likely to have garnered the Zuidas office building development in any case. Appropriate sites were not available nor is the central city easily accessible to commuters. Other suburban sites, which have continued to flourish, offered airport and commuter connections but not the cultural attractions demanded by the high-value tenants.

The airport itself was too space-constrained for the volume of demand. The Zuidas location, directly on a major train line, with quick airport and easy city access was the best compromise – one which is itself evolving.

Other regions will have different needs, different constellations of resources and therefore different solutions with airport cities, central cities and suburbs complementing each other.

Airport city development is a regional zero-sum game only if other regional locations fail to develop themselves in accordance with their potential and the needs of the market. The central city of Amsterdam is increasingly a leisure, not business, destination. Critically, airport cities are able to serve the needs of tenants who might not otherwise have located in the region.

As airport cities expand beyond the fence and the benefits of regional cooperation become evident, the need for a coherent regional business model becomes increasingly clear.

Ironically, this need may be most evident where airport city

development has progressed the farthest, possibly because that is where the need is most acutely felt. The largest airport cites discussed in this volume are often on sites controlled by a single organisation, whether that be an airport operating company, and airport real estate holding company, or a large private developer.

Airport cities in development, such as those in Amsterdam, Detroit and Memphis, which include land held by multiple private owners and explicitly include downtowns in their strategic plans, face coordination problems which may require new enabling legislation to create appropriate governance mechanisms.

The challenge will be to establish aerotropolis area development corporations or other institutions with powers sufficient to the task of enhancing regional competitiveness. The implementation challenge for all airport city functions will be to deliver the maximum possible value.

Airport city implementation challenges

The strategic management of airport city development extends far beyond identifying the over-

arching mission, global drivers, broad market opportunities and general sources of competition. Governance institutions linking information, incentives and desired performance need to be created and organisations need to be designed. A lucky few regions may have happened upon such structures but often they need to be established, sometimes against entrenched interests.

Much of the focus in organisational design is directed towards maximising the efficiency and effectiveness of operations. This is no less critical for airport city functions as it is for aeronautical functions.

A sometimes dizzying array of business activities call airports home and a surprising number of these are mission critical. To the extent that some travellers use a particular airport because of the convenient hotels or ground transportation links, a problem with either would diminish the competitiveness of the entire airport city.

Similarly, problems with specific freight forwarders or ground handlers would discourage shippers. Hence, management across organisations and negotiations with partner service providers is emerging as a significant managerial capability,

Philadelphia International Airport strategy workshop.

particularly for those airports that have out sourced many functional responsibilities.

Airports are inevitably public-private partnerships in some form or another and that means that politics affects airports and airport cities. Privatisation may be a mechanism for dealing with the challenges, but it does not necessarily imply de-politicisation. The key management intervention

may be to ensure that political and private incentives align with the public interest.

The implementing organisations need to be staffed and activities coordinated. That is a difficult task. Human resource management will take on heightened importance.

As the size of airport cities increases and the range of activities widens, so does the set of required skills. Airports need to rethink their skills development programs to be more inclusive.

Moreover, they need to cast a wider net than they have in the past. A shortage of experienced retail or hotel managers, for instance, can impinge on the operation of the entire airport city, they therefore need to be proactive by ensuring shortages do not arise.

More immediately, airport cities bring together professionals with very different management objectives. Aeronautical operations, retail service delivery, and real estate development, for example, entail different investment patterns, strategic risks, management skills, and daily challenges that often leads to culture conflicts between managers with quite different responsibilities. The challenge is to find a way to create synergies from such potential conflicts.

The Direct Factory Outlet at Brisbane Airport.

As suggested above, marketing, in the form of uncovering latent demands, positioning, and promotion will become increasingly important to airport city success and as the concept diffuses, the most immediate needs are addressed, and competition heats up.

To date, much airport city development has been copy-cat like. Airport cities will need to differentiate themselves by focusing on the needs of their passengers, shippers, enterprises, and area residents, in order to gain market advantage.

Memphis and Athens airports, for example, have positioned their terminal retail and food and beverage offerings somewhat differently than Frankfurt, Amsterdam or Hong Kong. Airport cities are already improving their market intelligence capabilities and the fruits should be visible over the coming years.

Financial management has always been a critical airport function but its task is made more complex by the growing diversity of airport city functions. From a financial point of view, airport city development often represents an opportunity to diversify revenues.

However, most non-aeronautical revenues are closely tied to passenger traffic. Less flying implies less parking and less buying, etc. When traffic declines,

concessionaires often ask for and generally receive rent decreases. Airport city revenues can fluctuate from year to year with the business cycle.

Despite the renewed upward trend in air traffic, airports, along with other participants in the air transport value chain, face considerable financial risk. While organisations always attempt to reduce their own risk, sharing risk can sometimes improve economic efficiency and enhance total airport city revenue. Therefore, some airports have explored methods of risk sharing on a formal or informal basis, making adjustments in charges as business cycles require.

Developing management information systems will be an evolving challenge. For the foreseeable future, supporting aeronautical operations will likely form the most important challenge but, like other businesses that grow and diversify, airport cities will likely become more dependent upon their information systems to efficiently manage operations, aid in market analysis and investment policy.

Closer coordination of airport city operations will likely be needed in the future as they complete their transformation from a collection of real estate ventures into coherent, functioning wholes. Little comparative information about the capabilities and effectiveness of airport cities' information systems exists, but is certainly needed.

Strengthening each of these five basic management functions is critical to improving the financial performance of airport city investments and creating regional advantage. As airport cities mature, passengers, enterprises and shippers will become more discerning.

Airport city operators will need to become increasingly adept at uncovering and satisfying market needs in a timely, cost efficient, and financially responsible manner.

Airport cities face a promising but turbulent future

The many chapters of this volume survey the state of airport cities today. Airport cities have become more ambitious in terms of commercial diversity and performance, if not size.

The planning and development of airport cities has become a global trend that could well become one of the most significant urban phenomena of the 21st century. Airports are now positioning themselves as much more than just international gateways, but as drivers of economic development and prosperity.

Nevertheless, airport cities face a turbulent future. Fortunately, their managers can now see further into the future than their predecessors. They can now give increasing attention to understanding, quantifying and incorporating risk into strategic decision-making.

In this era of turbulence and uncertainty, those managing and/or developing airport cities must also

be increasingly attuned to financial markets since financing is a primary requisite to almost all large-scale real estate endeavours.

Airport cities have now sufficiently matured that physical planning can span progressively longer time frames. Building and site life-cycle analysis should be an intrinsic component of airport city policy, focusing on environmental performance including longer-term site reuse options.

Operational environmental sustainability will continue to be a central strategic concern. While the emphasis in architecture is still on buildings, airport cities will be increasingly moving into sustainable land use planning by integrating air and ground transportation with land development.

Building for speed reduces needless movements and pollution-generating congestion. Water use will likely grow in importance as an environmental concern and many airports have already reacted.

Airport city aesthetics are likely to mature and extend increasingly far from passenger terminals, leading them to appear as functional and efficient, yet inviting, as they are. Creating a strategic vision of the airport city is the first step towards improved appearance as well as function.

The shared vision may be expressed in an urban development plan which complements its exisiting business plan. Form-based codes, specifying the appearance of buildings, roadways, and other architectural features helps provide an architectural coherence that reflects airport city functional integration.

Such codes detail the strategic vision by guiding the development of airport city public space. High quality design aids in wayfinding and signals the efficiencies provided for users and investors.

Efficiency, sustainability, and beauty will increasingly be the watchwords for airport city and aerotropolis planning and development. Consistently focusing on these three broad objectives will help guide airport operators even through periods of revenue turbulence.

The chapters which follow illustrate some of the actual development and highlight much of the thought leadership giving rise to 21st century airport cities. Only part of this still unfolding story has been told, with an exciting future ahead.

Airport City Pioneers

By John D Kasarda and Stephen J Appold

The economic opportunities and challenges facing commercial airports haven't changed much since they first began to appear in the 1920s.

Airports, as a vital component of the transportation value chain, provide speedy, long-distance connectivity, which improves business competitiveness and the livelihoods and lives of the residents in the metropolitan region it serves.

However, that same value chain also imposes costs such as aircraft noise and increased traffic congestion while airports consume large quantities of land and are expensive to operate.

Developing non-aeronautical revenue sources in combination with managing land use have been key means to addressing these issues for decades. While the general approaches may have been relatively constant, specifics of their implementation, orientation and scale have not.

A host of new airport features and functions have evolved to meet changing facility and commercial demands as the flying public grows and changes, and as new business and leisure processes develop.

Early history

Hotels, restaurants and leisure facilities have been standard features of commercial airport design almost from their beginning when US urban planners frequently toured major European airports seeking models for emulation.[1]

By the mid-1930s, factories ringed select airports – partially for the accessibility advantages, but also in order to tap into the opportunities presented by the dawn of the Air Age.

Architects and planners groped their way towards the economic integration of airports with their cities while taking account of the social, environmental and central business challenges.

This era produced the famous ideal-type integration of airport and city described by Le Corbusier, inspired by Berlin's Tempelhof Airport, and the Lehigh Cement airport design competition which included several entries integrating many of today's airport city functions.

1 Hanks, Stedman S 1929. International Airports, New York: The Ronald Press Company.

Paris-Orly Airport.

Perhaps the first prototype 'airport city', now a US National Historic Landmark, was built in this era and continues, with runway modifications, to serve as the core of Randolph Air Force Base in Texas.

At the same time, the now classic landmark airport-community study of Hubbard, McClintock, and Williams established a framework for planning airport area land use.[1] Their recommendations included positioning the airport as near to the Central Business District (CBD) as possibly feasible to maximise access while situating runways to minimise noise.

The then unforeseeable rapid rise in air traffic combined with the introduction of jet aircraft requiring longer runways necessitated a mid-century round of airport relocations. However, the twin objectives of limiting noise and improving access still hold.

An early challenge of on-airport business development was that it could not be supported by the relatively low-volumes of passenger air traffic at the time.

[1] Hubbard, Henry V., Miller McClintock, and Frank B. Williams. 1930. Airports: Their Location, Administration and Legal Basis. Cambridge: Harvard University Press.

Airport-based commercial success thus depended upon a local clientelle drawn, in large part, by the romance of aviation.

By some accounts, that romance began declining after the Second World War but New York's JFK (then known as Idlewild Airport) included a first-class restaurant with a view of aircraft operations.

Nevertheless, when Paris' Orly Airport opened in 1961, boasting a 300-seat cinema, several hotels, exhibition space, a Michelin-starred restaurant, and shops stocking luxury products from all over France and its colonies, it became one of the biggest attractions in Paris, surpassing the Palace of Versailles as a destination for a time.

Airport commerce

The dramatic growth of air traffic since the 1960s had a mixed impact on airport commercial activity. On the one hand, the rise in passenger traffic increased demand for goods and services at airports. On the other hand, it also raised demand for space for aeronautical purposes, sometimes crowding out non-aeronautical activities. Leisure activities were frequently relocated off-site, if for no other reason than to relieve the traffic burden.

The increase in air traffic also implied that the flying public went increasingly down market as the cost of air travel significantly decreased. By the mid-1980s, those deplaning at the low-cost People Express Newark Airport terminal were greeted by the pungent aroma of a hot dog stand reminiscent of an American bus station.

At the same time, as new terminals were constructed and older ones renovated and expanded, airports increasingly took on the form and feel of shopping malls. This led some critics to ask whether airports were primarily becoming shopping centres that happened to offer flights.

In truth, the 'commercial airport' with an orientation towards

2 Pascoe, David. 2001. Airspaces. London: Reaktion Books.

Singapore Changi's 24-hour cinema.

serving the growing numbers of travellers with conveniently located goods as well as air service has a long history. By the late 1940s, the legality of duty free shopping for air travellers was established. Shannon International Airport in Ireland started the world's first 'Free Zone' to capture considerable expenditures by passengers on refuelling stop-overs between Europe and the US during the 1950s and 1960s.

The concept spread to other airports and by the early 1980s, with a favourable passenger demography and farsighted vision, Dubai International Airport established its world-class shopping operation, Dubai Duty Free, to tap the wallets of transit passengers between Asia and Europe.

It later offered innovative marketing techniques, such as raffle prizes of luxury BMWs and Mercedes, to attract travellers and shoppers from around the globe. With Dubai Duty Free's 2009 sales reaching US$1.14 billion, Dubai

International Airport is now ranked among the world's leaders in terminal retail.

When Frankfurt Airport's new terminal opened in 1972, it had extra space beyond passenger needs, allowing it to develop terminal retail in new directions. By the late 1980s, its retail offerings included 94 shops, 33 restaurants, four cinemas, and Germany's largest discotheque.[3]

The discotheque was eventually closed – in part due to its popularity in drawing immense crowds and creating a safety hazard. Frankfurt International's retail offerings continued to blossom, however.

The airport terminal retail concept received a major revamping with the opening of Pittsburgh's AIRMALL in 1992. The terminal was designed to achieve retail scale thresholds by funnelling virtually all passengers through a single central shopping area.

The concentrated passenger flow not only supported restaurants and other passenger services but also higher-end stores such as Clinique, Jos A Bank Clothiers and Victoria's Secret, maximising the diversity of offerings for the level of passengers. Pittsburgh's AIRMALL also introduced 'street pricing' with product charges roughly comparable with those at suburban malls and downtown stores.

With the introduction of brand shops and street pricing, retail sales per passenger tripled, encouraging airports around the world to follow suit. By the mid-1990s, most had substantially diversified and expanded their terminal retail offerings utilising brand-name shops and street pricing. They also began to offer a variety of services to passengers, airport employees, and 'meeters and greeters' such as upscale restaurants and leisure, entertainment and cultural venues.

In Asia, Singapore Changi International Airport has been a pioneer in innovative terminal commercial development since its opening in 1981 – branding Singapore and providing a pleasant, memorable passenger experience have been its twin objectives.

More than 200 retail outlets, many with Singaporean and South East Asian themes, populate its three terminals, as do entertainment and leisure venues, including 'green areas' containing scenic waterfalls and a butterfly park. Artwork exhibits a sense of local history and even food outlets provide a local flavour with a number modelled after the facades of Singapore's Chinatown of the 1960s.

Landside development

An airport city, as its history shows, is much more than terminal food and beverages and retail and service offerings. In the

3 Doganis, Rigas. 1992. *The Airport Business*. Routledge: London.

early 1970s, before large airports seriously began considering such terminal diversification, an entire airport-centred city was proposed for rural Connecticut.

Its aim was to address the aircraft noise issue while accommodating the increasing integration of passenger and cargo air transportation into business processes, while also relieving New York's air congestion.[4]

Indeed, McKinley Conway, the founder of *Site Selection* magazine, explained and publicised the advantages of airport-centred

business development, including logistics facilities, office parks, and retail complexes, from the early 1950s onward, culminating with his 1977 book, *The Airport City and the Future Intermodal Transportation System*.[5]

Despite the visionary templates, airports often stumbled into new airport city roles. By the 1980s, the central geography of the Netherlands, the country's substantial involvement in logistics, and the swiftly growing value of air shipments relative to surface freight helped Schiphol to

see itself as not just a busy cargo airport but also as a 'mainport' complementing Rotterdam's major seaport in fuelling national economic growth.

The rerouting of the Netherlands' main trunk rail line in 1995 and the related terminal expansion gave the airport's commercial presence a major boost. More importantly, the rail connection made airport and nearby off-airport office development feasible.

Amsterdam Airport Schiphol's real estate arm (Schiphol Real

4 Edward N. Hall. 1972 "The Air City" Traffic Quarterly 26: 15-31; J.E. Hesse 1970. Research on the Concept of an Airport/Industrial City, United Aircraft Research Laboratories, April. 5 Subsequent refinements can be found in Conway, H. McKinley. 1980. The airport city: development concepts for the 21st century. Rev. ed. Atlanta, GA: Conway Publications and especially Conway, H. McKinley. 1993. The airport cities 21: the new global transport centers of the 21st century. Norcross, GA: Conway Data.

Amsterdam Airport Schiphol.

Estate) continues to develop a range of properties at the gateway under the AirportCity brand, which was adopted in 1998. The related Schiphol Area Development Company (SADC) guides aviation-related property development outside the airport fence.

Following the airport city model, Frankfurt also expanded commercial development beyond the terminal in the early 1990s with large connected office buildings, conference and exhibition centres, and business-class hotels.

Hong Kong and Incheon later followed suit with their respective

'SkyCity' and 'AirCity' commercial property developments near their terminals. These commercial boundary-shifting efforts marked another important advance in the airport city development model.

Blessed with 7,284 hectares of property and with land becoming increasingly scarce in the rapidly-growing Metroplex, Dallas/Fort Worth International Airport (DFW) established a real estate division in the mid-1990s to plan and develop 2,000 of these hectares following the airport city model. In addition to a world-class Grand Hyatt

hotel connected to its international terminal, DFW began to create six airport commercial zones, most with distinct property mixes.

The most ambitious airport city plans are undoubtedly to be found in Asia. Following Singapore, Hong Kong and Incheon, Kuala Lumpur International Airport, which opened in 1998, was designed to be not only the aviation foundation but also a commercial anchor for Malaysia's Multimedia Super Corridor stretching from the city of Kuala Lumpur to the airport some 50 kilometres south.

Hong Kong International Airport.

Its innovative terminal layout and 10,000 surrounding hectares of palm oil tree fields were envisioned from the start as an airport city comprising retail, hotel, office blocks, and leisure and recreation zones.

In the Middle East, the clear leader in airport city development has been Dubai. Building on its location between Asia and Europe and its proximity to other major Gulf region markets, Dubai has developed one of the most

successful airport free zones. The Dubai Airport Free Zone provides 1.2 million square metres containing offices, logistics and distribution facilities, and high-tech manufacturing for over 1,500 companies.

Contemporary extensions

With aeronautical growth at Dubai International Airport (DBX) projected to outstrip capacity, the emirate's leaders have designed a major aerotropolis, called Dubai World Central,

around its soon-to-open Al Maktoum International Airport.

Although slowed somewhat by Dubai's 2009–2010 real estate crisis and economic downturn, this $33 billion complex spanning some 140sqkm will consist of a number of mini cities featuring logistics, finance, aerospace, retail, office buildings, hospitality, education, recreational and residential development.

Dubai World Central sets the bar extraordinarily high for its airport city and aerotropolis

development that constitutes the most ambitious model going forward in terms of vision and scale.

Dubai's neighbors in the Middle East from Abu Dhabi to Qatar to Saudi Arabia are implementing ambitious airport city and broader aerotropolis processes. Fuelled by rapid economic development, China and India are likewise aggressively pushing ahead, with each nation having at least a half a dozen airport cities and aerotropolises

under development or in the planning stage.

Many are being developed by private sector entities, such as the GMR Group in India (Delhi and Hyderabad Aerotropolises) and the Airport City Development Co Ltd (ACL), which is constructing a major air logistics park at Beijing Capital International Airport.

China's neighbour, Taiwan, is planning an 8,000 hectare aerotropolis around its air gateway, Taiwan Taoyuan International Airport, consisting

of seven large functional zones ranging from convention and exhibition space to aerospace manufacturing.

In the US, Memphis, Detroit, and Atlanta are exploring airport cities as urban and regional renewal tools. Latin and South America have been slower coming to the table. Yet, places like Brazil's Confins International Airport are showing that the airport city and aerotropolis models can be the best way forward for both

Abu Dhabi International Airport.

airport revenue generation and surrounding regional economic development.

Airport cities have so far developed primarily at and around the largest international airport. However as with Belo Horizonte, the concept is being productively implemented at smaller airports and is progressively being applied down the global urban hierarchy.

Airports in Dublin, Manchester, Munich, Washington Dulles, Vancouver, Vantaa (Helsinki) and Zurich, among others, are demonstrating that they can successfully boost regional income

by meeting the local business needs and through a closer melding of airport and urban functions, in addition to serving as cargo gateways and adapting terminal retail to their passenger demographics.

Airport cities continue to evolve as significant commercial destinations, as instruments of regional economic competitiveness, and as drivers of new urban growth.

Yet, an airport's most important function is still to speed up the long distance movement of passengers and goods in order to

improve the utilisation of regional resources by reducing the total cost of long distance connectivity, mainly by economising on time.

As many new non-aeronautical activities become anchored around this key aeronautical function, the airport city as postmodern transit-oriented development is rapidly taking shape. Pioneers such as Shannon, Schiphol, Dubai, Singapore, Pittsburgh, Frankfurt, Dallas/Fort Worth, Hong Kong, Kuala Lumpur and Seoul blazed the path for this 21st century urban form.