

International gateway airports are driving and shaping business location and urban development giving rise to an emerging airport-oriented urban form – the aerotropolis, says John Kasarda.

From Airport City to Aerotropolis

An increasingly fast-paced, economically-networked world is changing the rules of industrial competition and business location. These rules are being altered by a catalytic convergence of digitization, globalization, aviation and time-based competition.

The combined thrust of these forces is creating a new economic geography with international gateway airports driving and shaping business location and urban development in the 21st century as much as highways did the 20th century, railroads in the 19th and seaports in the 18th. Today, these airports have become key nodes in global production and commercial systems and engines

of local economic development, attracting air commerce-linked businesses of all types to their environs.

As more and more businesses cluster around these airports and along transportation corridors radiating from them, a new urban form is emerging – the aerotropolis.

AIR COMMERCE IMPERATIVES

Providing high quality goods and services at competitive prices remains necessary but no longer sufficient for commercial success. Speed and agility have taken centre stage, as modern businesses increasingly emphasize

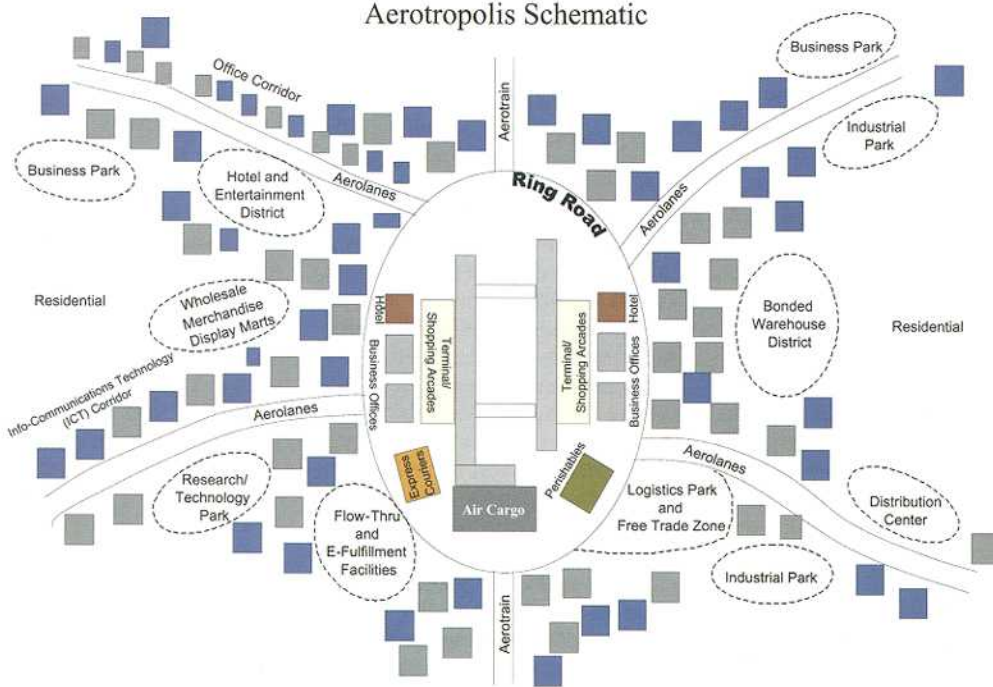
intra- and inter-firm networking; international sourcing and sales; flexible, customized production and rapid delivery of products and services. Such companies are selecting strategic locations to optimize their domestic and international supply-chain flows, firm networking and customer response times.

The advent of e-commerce further raised the competitive priorities of speed and agility. According to Forrester Research, 166 million packages were shipped in 1999 by Internet retailers (e-tailers), with approximately 70% going by express delivery. Despite the recent death of many dot.com companies, e-commerce is continuing to mushroom. E-tailers

Many industrial and entertainment opportunities have been created around the new Hong Kong International Airport



Aerotropolis Schematic



alone are expected to ship 1.1 billion packages annually by 2003, with overall global e-commerce approaching US \$6 trillion in transactions in 2004.

Most of this explosive growth will be business-to-business (B2B) supply-chain transactions where material and components will be ordered through the Internet and shipped to next-stage producers. However, as many US e-tailers discovered during the 1999 and 2000 Christmas seasons, as valuable as the Internet is in generating sales, the Web cannot move a box. Order fulfilment frequently broke down, with the 'WWW' – worldwide wait – costing some e-tailers plenty.

To meet the imperatives of speed, agility and reliability in order fulfilment, e-commerce distribution centres are being built near gateway airports that have extensive flight networks, a location trend that is sure to accelerate in the decades ahead. Complementing airport-linked fulfilment centres are high velocity flow-through facilities for perishables (either in the physical or economic sense), just-in-time supply chain and emergency parts provision centres, and reverse logistics facilities for the repair and upgrade of high-end technical products such as computers and cell phones. Air logistics parks are being built adjacent to or near airports to provide a variety of these time-critical functions as well as facilities for supply chain sequencing, kitting, reconfiguration, and subassembly.

The clustering of such time-critical goods-processing facilities around airports is stimulating further expansion of air cargo, air express, less-than-load (LTL) trucking, freight forwarders, and third party logistics providers along major arteries leading into and out of gateway airports. All these are contributing to a US\$200 billion air logistics industry that is currently responsible for transporting 42% of the value of world merchandise trade.

AIRPORTS AS NETWORK MAGNETS

Not only time-sensitive goods-processing and distribution facilities are being drawn to gateway airports. As the world's service economy also shifts into fast-forward, these airports are also becoming magnets for corporate headquarters, regional offices, and professional associations that require officers and staff to undertake frequent long-distance travel. Airport access is likewise a powerful attraction to information-intensive industries such as consulting, advertising, legal and financial services, data processing, accounting and auditing, which often send out professionals to distant customer's sites or bring in their clients by air. Business travellers benefit considerably from hub airports, which offer greater choice of flights and destinations, more frequent ser-

vice, more flexibility in rescheduling, and generally lower travel-related costs, (for example, hub airports make it easier to avoid the time and expense of overnight stays). When overnight stays are required, these airports offer clusters of on-site or nearby hotels, restaurants, shopping, and entertainment facilities for travellers.

The accessibility and travel flexibility hub airports provide have become essential to attracting major conventions, trade shows, and merchandise marts. Two US megafacilities – Infomart and Market Center, both of which are located on the I-35 corridor between Love Field and Dallas-Ft Worth International Airports in Texas – offer examples of this attraction. Infomart is a huge, ultra-contemporary merchandise display building for information and communications technology (ICT) companies. Market Center – a cluster of six large buildings that contain nearly seven million square feet of display space for fashion clothing and home merchandise – is the world's largest wholesale merchandise mart. Hundreds of thousands of buyers and vendors fly into Dallas annually to conduct business at these operations. In 1999, Market Center alone attracted buyers and vendors from all 50 US states and 84 countries. They purchased 300,000 airline seats and filled 720,000 nearby hotel rooms while conducting an estimated \$7.5 billion in wholesale transactions.

CARGOPOLIS ARRIVES AT MONTREAL

Aéroports de Montreal has unveiled a new name for the cargo communities at Montreal-Dorval and Montreal-Mirabel international airports – Cargopolis. The name draws attention to the vitality and scope of cargo operations in Montreal while conveying Aéroports de Montreal's 24-hour commitment to serving cargo carriers, says the airport.

"Together, the airports form a state-of-the-art logistics platform. They have it all – location, infrastructure, services, develop-

ment potential, transportation links, and a very competitive cost structure. Cargopolis captures the spirit and vibrancy of this shared vocation," says its vice-president of marketing and airline development Sophie Hennion.

Cargo has long been a mainstay at the city's two international airports. It recently received a further boost with the new Foreign Trade Zone at Montreal-Mirabel and the airport's new Cargo Transit Center and Perishable Products Facility.

Knowledge networks and air travel networks are also increasingly overlapping and reinforcing each other. Research has shown that high-tech workers, for example, travel by air at least 60% more frequently than those in the general workforce. As a result of this mobility, frequent and extensive air service has become essential to the location of many information processing, telecommunications, and other high-tech firms. In the US, clusters of high-tech facilities and information and communications technology firms have located along major airport highway corridors, such as those along the Washington Dulles International Airport access corridor in Northern Virginia and the expressways leading into and out of Chicago's O'Hare International Airport. The same is occurring in Europe (for example, along the A4 and A9 motorways radiating from Amsterdam Schiphol Airport), South America (around Sao Paulo's Viracopas International Airport) and Asia (near Bangkok's Don Muang International Airport).

AIRPORT CITIES AND THE AEROTROPOLIS

Emerging corridors, clusters, and spines of airport-linked businesses are giving rise to a new urban form – the aerotropolis – stretching as much as 15 miles (20 kilometers) from gateway airports. The airports function as the multi-modal convergent nucleus and commercial nexus of this diffuse airport-integrated urban complex, analogous to the function central business districts (CBDs) play in the traditional metropolis. Indeed, under the rubric of Airport City, some of these airports have assumed the very same roles of

metropolitan CBDs by becoming major employment, shopping, meeting, and entertainment destinations in their own right.

An excellent example is Amsterdam's Schiphol. It employs 52,000 people daily – more than the 50,000 resident criteria to attain metropolitan central city status in the US. Two major motorways link the airport to downtown Amsterdam and the broader urban area. A modern train station, directly under the terminal, efficiently connects travellers to the city centre, the rest of the Netherlands, and much of Western Europe.

Schiphol's terminal contains expansive, well-appointed shopping and entertainment arcades accessible both to travellers and the general public. Another arcade of retail shops called See Fly Buy stores is in the area after customs. This area also includes restaurants of all varieties, banks, business centres and even private rooms for a sauna, massage, or a few hours sleep. Many Amsterdam residents come to Schiphol to shop and relax in the public section, especially on Sundays and at night when most city retail stores are closed.

Directly across from the terminal is the World Trade Centre with meeting and commercial facilities and regional headquarters of such firms as Thomson-CSF and Unilever. Two five-star hotels adjoin this complex. Within a 10-minute walk is another complex of high quality office buildings housing aviation-related business and internationally-oriented companies in financial and commercial services. The commercial value of this property is reflected in its office rents that command a solid premium in the Amsterdam area. Research by the international real estate firm Jones Lang LaSalle showed

office rentals in the immediate airport area in 2000 were averaging 363 Euros (\$320) per square meter per year, compared to 250 in the Amsterdam city center and 226 in other Amsterdam suburban areas.

The A4 and A9 high-speed motorways are within 500 and 1,000 meters respectively of the airport centre. Radiating from Schiphol along these motorways are strings and clusters of business parks, logistics parks, industrial parks, distribution centers, information and telecommunication complexes, and merchandise clothing marts – all of which are airport-intensive users.

AEROTROPOLIS FORM AND PLANNING PRINCIPLES

In response to the new economy's demands for networking, speed and reliability, the aerotropolis is optimized by corridor and cluster development, wide lanes, and fast movements. In other words, form follows function.

Although aerotropolis have so far evolved largely spontaneously – with previous nearby development often creating arterial bottlenecks – in the future they will be improved through strategic infrastructure planning. For example, as generically illustrated in the *Aerotropolis schematic* (see p43), dedicated expressway links (aerolanes) and high-speed rail (aerotrails) will efficiently connect airports to nearby and more distant business and residential clusters. Special truck-only lanes will be added to airport expressways, as well. Seamlessly connected multi-modal infrastructure will accelerate inter-modal transfers of goods and people, improving transport system effectiveness and further influencing business locations and resulting urban form.

The metric for determining land value and particular business locations will be time-cost access to the airport. Firms of various types will bid against each other for accessibility predicated on the utility each gives to the related combination of time and cost of moving people and products to and from the airport. Lease rates and land values will no longer be measured by traditional bid-rent functions that decline linearly with spatial distance from the primary node (here, the airport) but by speed to the airport from alternative

sites via highway and rail arteries.

To many, this new land use and structure will appear simply as additional sprawl along main airport transportation corridors. Yet the aerotropolis is actually a highly reticulated system based on time-cost access gradients radiating outward from the airport. In short, the three "A's" (accessibility, accessibility, accessibility) will replace the three "L's" (location, location, location) as the most important business location and commercial real estate organizing principles. Of course, the two are related.

Air-commerce clusters and spines are already taking on distinct spatial form around major gateway airports such as Chicago O'Hare, Dallas-Ft Worth, Miami, New York Kennedy, Washington-Dulles, Los Angeles, London Heathrow, Paris Charles de Gaulle, and Amsterdam Schiphol. In Asia, Hong Kong International (with its dedicated aeroplanes and aerotrain to Kowloon and Hong Kong Central) is evolving its own aerotropolis form. Its spatial impact will eventually include Southern China via fast-ships connect-

ing nearby coastal mainland manufacturing centres to the airport.

An aerotrain and aeroplanes are being constructed to connect South Korea's newly opened Incheon with downtown Seoul and clusters of high-tech, commercial and residential development. Kuala Lumpur's new international airport was planned from the start to anchor a 21st century aerotropolis-like complex known as the Multimedia Super Corridor.

One of the most efficient airport cities now evolving into an aerotropolis is Singapore Changi. At its landside core, the passenger terminals house memorable arcades designed around thematic retail, restaurant, and entertainment centre concepts. Open 24-hours a day, Changi's arcades also include lounges, business centres, transit hotels, fitness centres, saunas and local area networks (LANs) providing computer-equipped passengers with free wireless access to the Internet.

Changi's wide, uncongested aerolane to the downtown will soon be complemented by an aerotrain going directly from the city centre to the termi-

nals. An air logistics park adjacent to the airport is designed to further improve Singapore's rapid fulfillment functions and allow third-party logistics providers (3PLs) to offer distant customers highly customized products at minimum response time. Virtually every major 3PL in the world is active in and around Changi.

As is the case with Schiphol, Incheon, Hong Kong, and other global gateway airports, Changi has become a powerful economic engine attracting foreign investment, facilitating trade, and generating its own airport-oriented urban form. Such airports are also becoming many nations' primary asset to compete in the fast-paced, globally-networked economy. □

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