

July 26, 2006

Airport Cities and the Aerotropolis

Dr. John D. Kasarda

Airports have historically been understood as places where aircraft operate, including the runways, control towers, terminals, hangers and other facilities which directly serve aircraft, passengers and cargo. This historical understanding is giving way to a broader, more encompassing concept which recognizes the fact that in addition to their core aeronautical infrastructure and services, virtually all major airports have increasingly developed non-aeronautical commercial facilities and services.

No longer restricted to magazine shops and fast food outlets, passenger terminals now feature brand name boutiques, specialty retail, and upscale restaurants along with entertainment and cultural attractions. Singapore Changi, for instance, has cinemas; Beijing Capital Airport, banks; Hong Kong International, dozens of designer clothing shops; Las Vegas McCarran, a museum; Fraport, a hospital; Amsterdam Schiphol, a Dutch Masters art gallery; and Stockholm Arlanda, an intensively utilized chapel where over 400 weddings occurred in 2005.

Given the significantly higher incomes of airline passengers (typically three to five times higher than national averages) and the huge volumes of passengers flowing through the terminals (often in the tens of millions annually) it is not surprising that retail sales per square meter average three to four times greater than shopping malls and downtown shops. As a result, terminal commercial lease rates tend to be the highest in the metropolitan area.

In addition to incorporating a variety of commercial functions into passenger terminals, airports are developing their landside areas with hotels, office and retail complexes, conference and exhibition centers, logistics and free trade zones, and time-sensitive goods processing facilities. Consequently, many airports today receive greater percentages of their revenues from non-aeronautical sources than from aeronautical sources (e.g., landing fees, gate leases, passenger service charges). These non-aeronautical revenues have become critical to airports meeting their facility modernization and infrastructure expansion needs, as well as being cost-competitive in attracting and retaining airlines.

The growth of non-aeronautical activities at airports not only favorably impacts their finances. Airport-centric commercial development is also making them leading urban growth generators as they become significant employment, shopping, trading, business meeting and leisure destinations in their own right. The evolution of these non-aeronautical functions and commercial land uses has transformed numerous city airports into airport cities.

The New Airport Management Model

Consistent with their growing non-aeronautical roles and functions, airports are altering their operational management. Numerous airports (both public and private sector operated) have established real estate or property divisions to develop their landside commercial areas as well as foster development beyond airport boundaries (e.g., British Airports Authority, Aéroports de Paris, Dallas-Fort Worth International Airport, Frankfurt Airport [Fraport], Amsterdam Schiphol, Singapore Changi). These new operational structures offer testimony that airports are evolving

from basic aeronautical infrastructures into complex multifunctional enterprises serving both aeronautical needs and commercial development. The current trend in airport management is therefore to complement traditional technical airport functions with terminal and landside commercial activities. Such activities include, among others;

- duty free shops
- restaurants and specialty retail
- cultural attractions
- hotels and accommodation
- business office complexes
- convention and exhibition centers
- leisure, recreation, and fitness
- logistics and distribution
- light manufacturing and assembly
- perishables and cold storage
- catering and other food services
- Free Trade Zones and Customs Free Zones
- golf courses
- factory outlet stores
- personal and family services such as health and child daycare

To many not familiar with the new realities of airports, the Airport City model might appear to be a deviation from the norm. But it is in fact becoming the new model of international

airport development and management. Airports from Amsterdam to Zurich and from Beijing to Seoul have embraced this planning model to develop their terminals and landside areas as a pivotal means to financing airport operations and contributing to their own competitiveness. To note just a handful:

- Beijing is rapidly proceeding with its highly ambitious Capital Airport City, whose master plan takes an expansive definition of appropriate functions including, among others, shopping, entertainment, education, sports and leisure, light manufacturing, finance, trade, and housing.
- Aéroports de Paris 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 Charles de Gaulle and Orly International Airports.
- Dallas-Fort Worth International Airport management has been in the real estate development business for three decades, leasing land to commercial tenants.
- Hong Kong International Airport's SkyCity is opening a 1 million square meter retail, exhibition, business office, hotel and entertainment complex near its passenger terminal. The first major phase will be in full operation by the end of 2006.
- Kuala Lumpur's (KLIA) new Airport City will be commercially anchored by its large Gateway Park that, in addition to retail and office development, includes motor sports, an automobile hypermarket, and leisure venues drawing on the local as well as aviation-induced market.
- Incheon's "Winged City" encompasses international business areas, logistics zones, shopping and tourism districts, as well as housing and services (e.g., medical) for Airport City workers and residents.

- The new Bangkok International Airport (Suvarnabhumi) is expected to open in late 2006. Its master plan includes the development of an Airport City within airport boundaries to include an international business center, international conference and exhibition center, a shopping center, office buildings, hotels, car-parks, hospitals, restaurants, an entertainment center, and an international resident community.
- Amsterdam Schiphol, through its Schiphol Real Estate Group, has been involved for well over a decade in landside commercial development. These developments include business office complexes, hotels, meeting and entertainment facilities, logistics parks, shopping, and other commercial activities branded under the AirportCity name. Nearly 58,000 people are employed at Schiphol, which integrates multimodal transportation, regional corporate headquarter offices, retail shopping, logistics, and exhibition space to form a major economic growth pole for the Dutch economy.

Other international airports, not quite the scale of Amsterdam Schiphol or Seoul's Incheon have given commercial development a high priority in their master planning (e.g., Brisbane Airport, Vienna, Canada's Calgary, Zurich, and Stockholm's Arlanda Airport). The majority of these have embraced the Airport City concept in their strategic development models, either explicitly or implicitly.

As a result, airports are undergoing a metamorphosis, taking on many of the commercial functions of a metropolitan Central Business District (CBD). With the growing number of boutiques, restaurants, meeting facilities, and entertainment and cultural attractions, passenger terminals resemble parts of downtown. Many airports also have the density of highway and rail

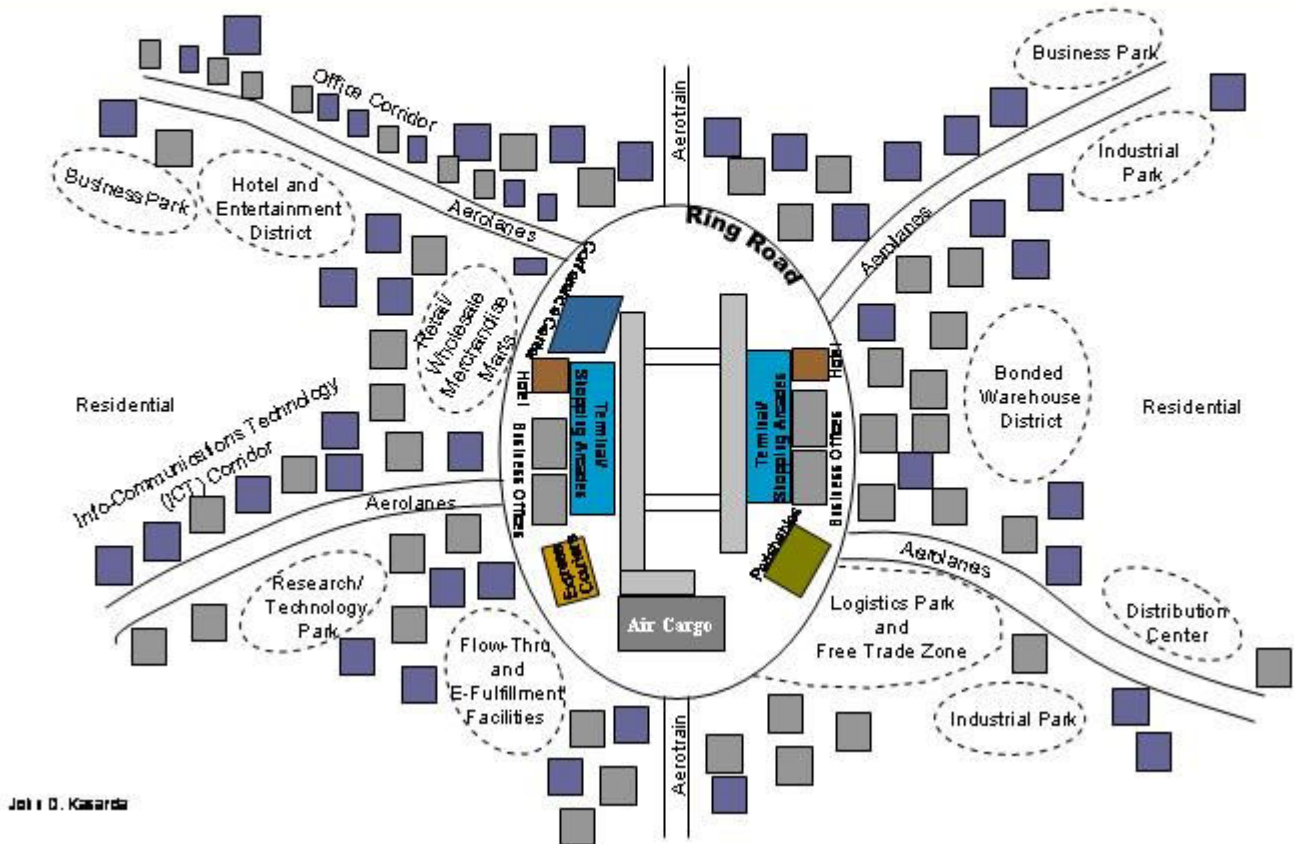
connections that are usually associated with CBDs. This is reinforcing their new roles as drivers of business location and urban development over an extended area.

The Rise of The Aerotropolis

Even greater aviation-oriented commercial development is occurring well beyond airport boundaries. With the airport itself serving as a region-wide multimodal transportation and commercial nexus, strings and clusters of airport-linked business parks, information and communications technology complexes, retail, hotel and entertainment centers, industrial parks, logistics parks, wholesale merchandise marts and residential developments are forming along airport arteries up to 20 kilometers outward.

This more dispersed airport-linked development is giving rise to a new urban-form—the Aerotropolis. Similar in shape to the traditional metropolis, made up of a central city and its commuter-linked suburbs, the Aerotropolis consists of an airport city core and extensive outlying areas of aviation-oriented businesses and their associated residential developments. A synthesized model of the Aerotropolis based on development features around major international hub airports is illustrated in Figure 1.

Figure 1 Aerotropolis Schematic



Reflecting the new economy’s demands for connectivity, speed and agility, the Aerotropolis is optimized by corridor and cluster development, wide lanes, and fast movements. In other words, form follows function. Airport expressway links (aerolanes) complemented by airport express trains (aerotrain) bring cars, taxis, buses, trucks and rail together with air infrastructure at the multimodal commercial core (the airport city). Aviation-linked business

clusters and associated residential developments radiate outward from the airport city, forming the greater Aerotropolis.

Aerotropolises are emerging because of the advantages airports provide to business in the fast-paced, globally networked economy. Today's most competitive manufacturers, for example, use advanced information technology and high-speed transportation to provide fast and flexible responses to customers' unique needs. Such firms build agile production systems that connect them to their suppliers and customers, allowing them to source parts and ship assembled products as needed.

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 minimize their inventories, shorten production-cycle times, and quickly access novel inputs for custom products that create additional value.

Like time-sensitive goods processing industries, the service sector has increasingly found airport areas to be an attractive location. Airports have become magnets for regional corporate headquarters, conference centers, trade representative offices, and information-intensive firms that require executives and staff to undertake frequent long-distance travel. Business travelers benefit considerably from quick access to hub airports, which offer greater choice of flights and

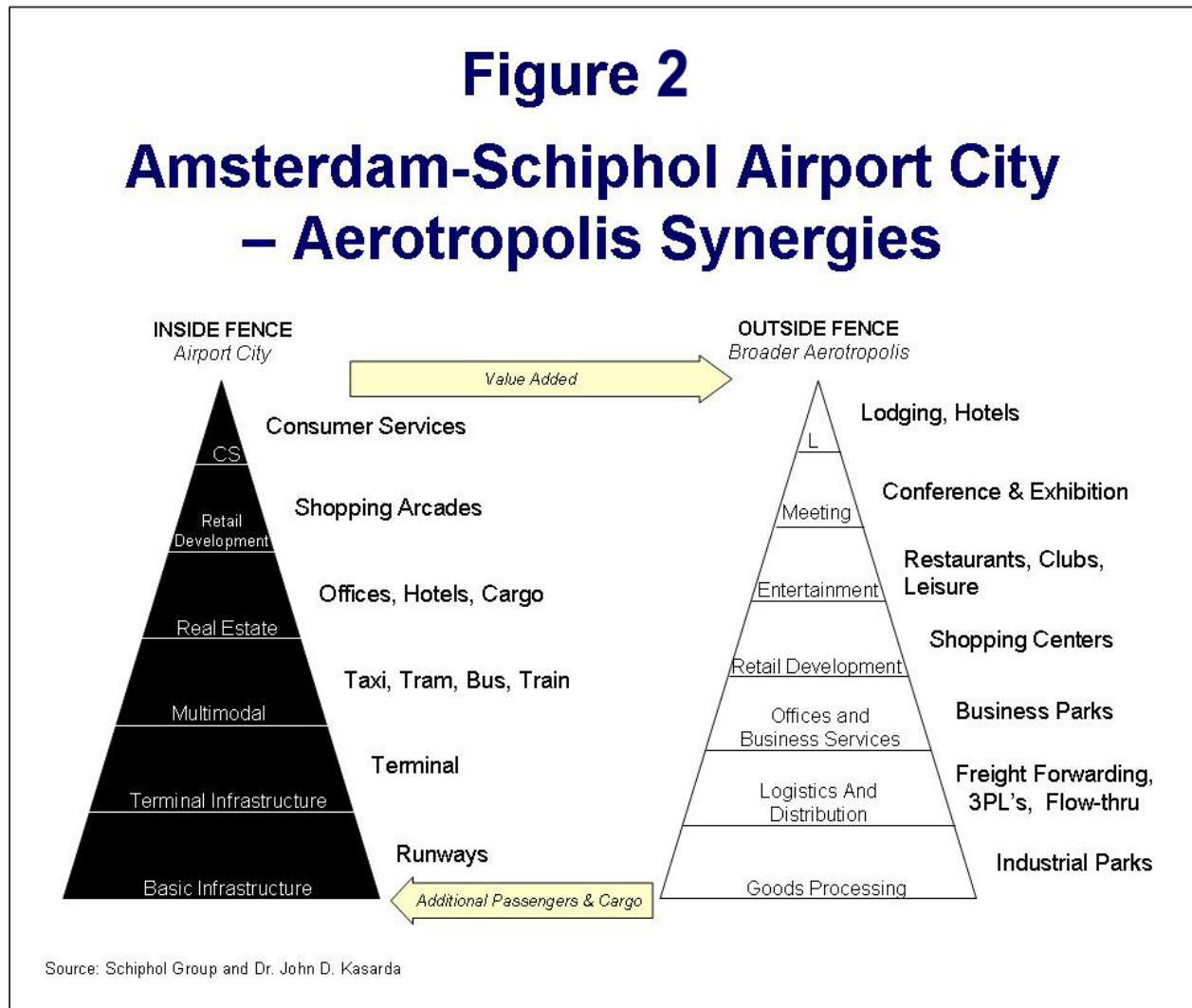
destinations and more flexibility in rescheduling as well as often avoiding the costs of overnight stays.

Firms specializing in information and communications technology and other high-tech industries consider air accessibility especially crucial. High-tech professionals travel by air at least 60 percent more frequently than other professionals, giving rise to the term “nerd birds” in the U.S. for commercial aircraft connecting “techie” capitals such as Austin, Boston, Raleigh-Durham, and San Jose. Many high tech firms are locating along major airport corridors, such as those along the Washington Dulles Airport access corridor in Northern Virginia and the expressways leading to Chicago’s O’Hare International Airport. In this sense, knowledge networks and air travel networks increasingly reinforce each other.

Lastly, commercial services of all types have begun relocating to airport areas in order to attract a dual customer base of travelers and locals. Airports now offer on-site or nearby hotels, restaurants, shopping, fitness centers, and entertainment facilities. As these offerings grow, areas within five kilometers of major airports are adding jobs considerably faster than suburbs located at similar distances from a metropolis’ center, but not near an airport. Such job growth stimulates residential projects—further fueling Aerotropolis development. Airport areas are even developing their own “brand” image—“the DFW Area” ... “the O’Hare Area.” for instance.

In sum, by offering speedy distant market connectivity to aerotropolis businesses, the airport provides important value to these businesses. Aerotropolis businesses, in turn, generate

additional passengers and cargo for the airports, resulting in reciprocal benefits. Figure 2 illustrates these reciprocal benefits for Amsterdam Schiphol's Airport City and its greater Aerotropolis.



The Future Aerotropolis

To serve the economic demands of connectivity, speed, and agility, the Aerotropolis will require localized infrastructure planning of unprecedented scale. To date, most Aerotropolises have evolved largely spontaneously, with existing nearby development often creating arterial bottlenecks. In the future, strategic infrastructure planning could reduce this congestion. Dedicated expressway links (aerolanes) and high-speed rail (aerotrails) should efficiently connect airports to business and residential clusters near and far. Special truck-only lanes should be added to airport expressways, as should improved highway interchanges to reduce congestion. Multimedia technologies should produce themed electronic public art along airport transportation corridors that highlight the culture, history and economic assets of the region the airport serves.

Global information and communications technology (ICT) networks will also help shape the Aerotropolis. Advanced information processing technologies and multimedia telecommunications systems served by high-density fiber-optic rings and satellite uplinks and downlinks will evolve around airports, instantly connecting companies to their global suppliers, distributors, customers, and branch offices and partners. Companies that require the fastest possible networking will thus have an additional reason to locate in the Aerotropolis. This ICT infrastructure is appearing not only around major passenger airports like Incheon and Washington Dulles but also around U.S. air express hubs such as Memphis (which serves global shipper FedEx) and Louisville (which serves United Parcel Service).

As multimodal transportation and advanced communications infrastructure develops at and near airports, businesses will have even more reason to move to an Aerotropolis. The

principal determinant of land value, lease rates, and the type of commercial use on a given property will be the cost of moving people and products to and from the airport and, via the airport, to distant markets. This value/cost proposition will be measured primarily in time to the airport—a function of the site’s place on local transportation arteries, and not necessarily of spatial distance. For example, a site 10 kilometers away, but one stop on a high-speed train line, from the airport will be worth more than a site 5 kilometers away with poor road and rail connections. To put it another way, the three “A’s” (accessibility, accessibility, accessibility) will become the critical component of the three “L’s” (location, location, location) in Aerotropolis real estate value.

At first glance, one might misconstrue Aerotropolis land uses as simply additional sprawl along main airport transportation corridors. In reality, the Aerotropolis grows according to a rational system based on time-cost access gradients radiating outward from the airport. Constructing appropriate multimodal ground transit and locating commercial facilities consistent with the form and function of the Aerotropolis will contribute substantially to the emerging needs of business, more efficient cargo and passenger flows, and the future competitiveness of urban areas.

These outcomes will not occur spontaneously, however. Aerotropolis optimization will require bringing together airport planning, urban planning, and business site planning in a synergistic manner so that development is economically efficient, aesthetically pleasing and environmentally sustainable.

Author Note: John D. Kasarda, PhD, is Kenan Distinguished Professor of Management and Director of the Kenan Institute of Private Enterprise at the University of North Carolina's Kenan-Flagler Business School. He advises airports and government officials around the world on airport city and Aerotropolis development.