Chapter 13
Cargo Service Dynamics and Service-Oriented Architecture in East Asian Airports

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ABSTRACT
This chapter examines the effects of primary production and key economic factors on the cargo traffic in the East Asian airports between 1999 and 2005. Through econometric and cluster analyses, results in this chapter found a dramatic increase in the relative importance of physical capital to human capital. More specifically, adequate provisions and utilizations of physical facilities in landside operations appear to be more significant driving forces for an airport’s cargo traffic performances compared to those of airside operations. In spite of the greater importance that the East Asia airport industry has attached to cost-effective operations in the recent years, airports may no longer be able to rely on size for a sustainable competitive edge with the reductions in the returns to scale. Meanwhile, there is still a close direct association between a nation’s economic development and the volume of cargo traffic at its airport.

INTRODUCTION
Notwithstanding the fact that airports are traditionally established with the intention of human movements, the importance of air cargo services to businesses, the economy and the airport cannot be understated. According to Yung et al. (2008), increasing affordability of air cargo transport has heightened the role of airfreight in the distribution systems of many companies and put air cargo service at the foundation of international trade. Consequently, the availability of efficient air cargo services will offer a strong inducement for local and foreign companies to set up their businesses.
in a particular economy. The latter will benefit from additional trade gains as these companies also contribute to the growth in trade volumes by replacing part of the traditional method of local sourcing of parts, local production, local marketing and independent transportation and services with global sourcing of parts, global production, global marketing and global logistics alliances (Edger 1995). Meanwhile, Oum et al. (2003) noted that air cargo service is becoming more significant to an airport despite being a small business compared with the passenger business. Worldwide average annual cargo traffic statistics shows a growth of 7.9% in freight-tonne kilometers on international scheduled services compared to 2.1% on domestic services during the last decade (Zhang and Zhang 2002a).

Ohashi et al. (2005) anticipated that the average annual air cargo growth in Asia would lead all other international geographic markets in the next 20 years, following the recovery from the 1997 financial crisis. At the same time, liberalization of the airline industry has increased the freedom of airlines to choose where to base their domestic hubs and inter-continent gateways and which airports to use when routing their connecting traffic in a hub-and-spoke network. As airports compete with one another for airlines business, the ability to provide valued airport services such as fast processing of aircraft, passengers, cargo and baggage become one of the most pertinent issues in the unending quest towards competitiveness in the regional market. Owing to the higher market concentrations¹ that exist on the cargo side than on the passenger side of the industry, the competition among airports for air cargo traffic is expected to be higher.

Several studies in the existing literature have presented a cross-sectional snapshot analysis across major Asian airports to assess and identify important factors contributing to airport competitiveness. Park (2003) looked at service, demand, managerial, facility and spatial qualities, whilst Nijkamp and Yim (2001) studied the physical, technological, organizational, financial, ecological aspects in an airport. Ohashi et al. (2005) focused primarily on air cargo transshipment airports and examined the monetary and time cost factors. Gardiner et al. (2005) identified general factors, such as night curfews, freight forwarders and airport charges, which may exert influences on the competitiveness of the air cargo service in an airport. However, common in these studies, the discussions on how the landscapes of the air cargo service industry have evolved over time are at a minimal.

Other studies have attempted to conduct longitudinal analyses on a specific airport. For examples, Raguraman (1997), Tsai and Su (2002), Zhang (2003) and Lee and Yang (2003) traced and analyzed the air hub development strategy pursued by the government and airport authorities in Singapore, Taiwan, Hong Kong and South Korea respectively. Some of these frequently adopted strategies include the investing in physical and technological infrastructures, streamlining custom administration in their import and export licensing, upgrading the skills of the workforce and so forth to speed up air cargo processing procedures. Nonetheless, as airports are unique to one another in terms of intrinsic characteristics and operating environments, it is difficult to generalize the relative importance of the various constituents in the overall development strategies on airport performances from direct comparisons among these case studies.

Against this backdrop, the first objective of this chapter is to analyze how human and physical architectural aspects of an airport oriented towards the provision of air cargo service as well as the external environment have affected the demand for the airport cargo service in East Asia between the years 1999 and 2005. Specifically, the air cargo traffic is assumed to be related to primary production factors and macroeconomic and regulatory conditions such as physical and human capital, national income, trade volume, customs service efficiency and so forth through a Cobb-Douglas