

FIFTH EDITION

# MANAGING AIRPORTS

AN INTERNATIONAL PERSPECTIVE

**ANNE GRAHAM**



# Managing Airports

*Managing Airports* presents a comprehensive and cutting-edge insight into today's international airport industry. Approaching management topics from a strategic and commercial perspective, rather than from an operational and technical one, the book provides an innovative insight into the processes behind running a successful airport. This fifth edition has been fully revised and updated to reflect the many important developments in the management of airports. It features:

- New content on: evolving airline models and implications for airports, self-connection, digital marketing, sensor and beacon technology, policy decisions and economic benefits, and climate change adaptation.
- Updated and expanded content on: airport privatisation, economic regulation, technology within the terminal, non-aeronautical innovations, service quality and the passenger experience.
- New and updated international case studies to show recent issues and theory in practice, including studies from emerging economies such as China, India and Brazil.

Accessible and up-to-date, *Managing Airports* is ideal for students, lecturers and researchers of transport and tourism, and practitioners within the air transport industry.

**Anne Graham** is Professor of Air Transport and Tourism Management at the University of Westminster in London, UK. One of her key areas of expertise and knowledge is airport management, economics and regulation, and she has over 30 years' experience of lecturing, research and consultancy on these topics. She has published widely with recent books including *The Routledge Companion to Air Transport Management*, *Airport Finance and Investment in the Global Economy*, *Aviation Economics* and *Airport Marketing*. Between 2013 and 2015 Anne was Editor-in-Chief of the *Journal of Air Transport Management* and is on the Editorial Board of a number of other journals.



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# Managing Airports

## An international perspective

### Fifth edition

Anne Graham

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# Preface

When the first edition of this book was published in 2001, the airport industry had received relatively little attention in the published literature and had been very much overshadowed by the airline sector. Hence this was the motivation for writing this book. Shortly after publication, the airport sector had to cope with the unparalleled consequences of the events of 9/11, the Iraq War, the outbreak of SARS and the continuing threat of terrorism. These issues were consequently considered in the book's second edition, which was published in 2003. Five years on, the third edition in 2008 concluded that 9/11 had been a significant turning point for the industry and since then it had been operating in a much more unstable environment. This was not just due to security concerns, but also because of changing airline structures and increased environmental pressures. Another five years passed and the world experienced a severe global economic crisis, political unrest and a number of natural disasters. So again, this was the backdrop for the fourth edition of this book. As I now write this fifth edition amidst heightened fears of terrorist attacks, unpredicted political change and its consequences, the occurrence of extreme weather events and advances in technology (enabling a realization of the unimaginable), the only certainty seems to be that the world, and with it the airport industry, will continue to face a future of many uncertainties.

Whilst in general considerably more has now been written about the airport industry, there is still limited coverage in one place of all the important managerial and business aspects of running an airport and how these link together. Therefore, the aim of this book, as in previous editions, is to provide a comprehensive appreciation of the key management issues facing modern-day airport operators. As well as providing an up-to-date review of all the latest developments and trends, the discussions concerning certain developments, such as the passenger experience, security and technological innovations, have been expanded. Previously uncovered topics such as self-connection, beacon technology, climate change adaptation – to name but a few – have now been included. At the same time, other themes such as airport privatisation, competition and economic regulation have been revisited, given the changing airport–airline relationship and external environment.

Airports are now complex businesses requiring a range of competencies and skills. The emphasis here is on the economic, commercial and planning areas at a strategic level. An approach has been adopted reflecting the very international nature of most of the industry. The book uses material from a wide range of airports and has a very practical focus. New case studies have been provided, not only to cover new topics, but also to reflect the



shift of economic power and corresponding traffic growth to emerging economies and other challenges that face more mature markets. The book provides an overview of all the key management challenges facing airports, and so by necessity the scope has to be very far-reaching. The book will enable the reader to acquire a broad and up-to-date insight into the workings of the industry which will meet the needs of anyone who wishes to work, or is already working, in the airport sector.

# Acknowledgements

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# Abbreviations

AA2000	Aéropuertos Argentinas 2000
AAHK	Airport Authority Hong Kong
AAI	Airport Authority of India
ACCC	Australian Competition and Consumer Commission
A-CDM	Airport-Collaborative Decision Making
ACI	Airports Council International
ACL	Airport Coordination Limited
ACROS	Airport Climate Risk Operational Screening
ACSA	Airports Company South Africa
AdP	Aéroports de Paris
AENA	Aeropuertos Espanoles y Navegacion Aerea
AGI	Airports Group International
AIF	Airport Improvement Fund
AIP	Airport Improvement Program
AOT	Airports of Thailand
APD	Air Passenger Duty
API	Advanced Passenger Information
ARI	Aer Rianta International
ASAS	Airport Surface Access Strategy
ASQ	Airport Service Quality
ATC	Air Traffic Control
ATF	Airport Transport Forum
ATRS	Air Transport Research Society
ATM	Air Transport Movement
ATU	Airport Throughput Unit
BA	British Airways
BAA	British Airports Authority (only prior to 1987; from 1987 the company was known only as BAA, and then in 2012 it changed its name to Heathrow Ltd)
BCIA	Beijing Capital International airport
BOT	Build, Operate, Transfer
BSCA	Brussels South Charleroi Airport
CAA	Civil Aviation Authority
CAAC	Civil Aviation Administration of China
CAPEX	Capital Expenditure
CBA	Cost Benefit Analysis
CDA	Continuous Descent Approach

CDG	Charles de Gaulle
CGE	Computable General Equilibrium
CIP	Centralised Image Processing
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CPH	Copenhagen Airport A/S
CPI	Consumer Price Index
CSR	Corporate Responsibility Strategy
CUSS	Common-Use Self-Service
CUTE	Common Use Terminal Equipment
DAA	Dublin Airport Authority (up until 2014)
DB	Deutsche Bahn
DDF	Dubai Duty Free
DEA	Data Envelopment Analysis
DGAC	French Civil Aviation Authority
DHS	Department of Homeland Security
DIAL	Delhi International Airport Private Limited
DMU	Decision-Making Unit
EBIT	Earnings Before Interest and Tax
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
EC	European Commission
ECAC	European Civil Aviation Conference
EEA	European Economic Area
EIA	Economic Impact Analysis
ETS	Emissions Trading Scheme
EU	European Union
EV	Enterprise Value
FAA	Federal Aviation Administration
FAC	Federal Airports Corporation
F&B	Food and Beverage
FIDS	Flight Information Display System
GA	General Aviation
GAO	General Accounting office
GDP	Gross Domestic Product
GIP	Global Infrastructure Partners
GRI	Global Reporting Initiative
GVA	Gross Value Added
HTA	Hochtief AirPort
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IDP	International Departing Passenger
IPO	Initial Public Offering
ISO	International Organization for Standardization

KPIs	Key Performance Indicators
L&T	Larsen and Toubro
LAGs	Liquids, Aerosols and Gels
LCC	Low-Cost Carrier
LCT	Low-Cost Terminal
LOS	Level of Service
LTO	Landing and Take-off
MAG	Manchester Airport Group
MAP	Macquarie Airports
MAS	Multi-Airport System
MBMs	Market-Based Options or Measures
MCT	Minimum Connect Time
MIAL	Mumbai International Airport Private Limited
MII	Majority in Interest
MLIT	Ministry of Land, Infrastructure, Transport and Tourism
MPPA	Million Passengers Per Annum
NFC	Near Field Communication
NPAIS	National Plan of Integrated Airport Systems
NPR	Noise Preferential Route
NRI	Non-Resident Indian
NO <sub>x</sub>	Nitrogen Oxide
OAG	Official Airline Guide
O&D	Origin and Destination
OFT	Office of Fair Trading
PFC	Passenger Facility Charge
PNR	Noise Route
POS	Point of Sale
PPP	Public-Private Partnership
PRM	People with Reduced Mobility
PSC	Passenger Service Charge
PSO	Public Service Obligation
QC	Quota Count
QSI	Quality Service Index
QSM	Quality Survey Monitor
RAB	Regulated Asset Base
RDF	Route Development Fund
RFID	Radio Frequency Identification
ROCE	Return on Capital Employed
ROIC	Return on Invested Capital
ROR	Rate of Return
RPI	Retail Price Index
SARS	Severe Acute Respiratory Syndrome
SDR	Special Drawing Right
SESAR	Single European Sky Air Traffic Management



## ABBREVIATIONS

SMP	Substantial Market Power
STEBs	Standard Tamper Evident Bags
TFP	Total Factor Productivity
TSA	Transportation Security Administration
UK	United Kingdom
UNWTO	United Nations World Tourism Organization
US	United States
UAE	United Arab Emirates
VFP	Variable Factor Productivity
VFR	Visiting Friends and Relatives
WEB	Wider Economic Benefit
WEI	Wider Economic Impact
WACC	Weighted Average Cost of Capital
WLU	Work Load Unit
YVRAS	Vancouver Airport Services

# 1 Introduction

Airports are an essential part of the air transport system. They provide all the infrastructure needed to enable passengers and freight to transfer from surface to air modes of transport and to allow airlines to take off and land. The basic airport infrastructure consists of runways, taxiways, apron space, gates, passenger and freight terminals, and ground transport interchanges. Airports bring together a wide range of facilities and services in order to fulfil their role within the air transport industry. These services include air traffic control (ATC), security, and fire and rescue in the airfield. Handling facilities are provided so that passengers, their baggage and freight can be transferred successfully between aircraft and terminals, and processed within the terminal. Airports also offer a wide variety of commercial facilities ranging from shops and restaurants to hotels, conference services and business parks.

As well as playing a crucial role within the air transport sector, airports have a strategic importance to the regions they serve. In a number of countries they are increasingly becoming integrated within the overall transport system by establishing links to high-speed rail and key road networks. Airports can bring greater wealth, provide substantial employment opportunities and encourage economic development – and can be a lifeline to isolated communities. However, they do have a very significant effect, both on the environment in which they are located and on the quality of life of residents living nearby. Growing awareness of general environmental issues has heightened environmental concerns about airports.

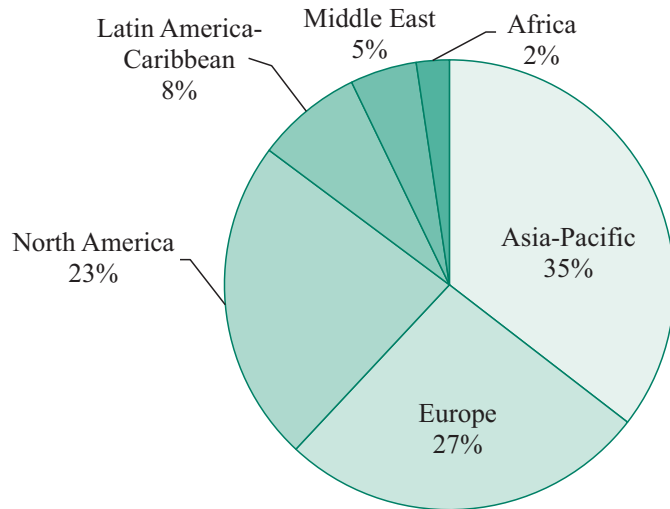
The focus of this book is on management issues facing airport operators. These operators vary considerably in their ownership, management structure and style, degree of autonomy, and funding. Typically, airport operators themselves provide only a small proportion of an airport's facilities and services. The rest of these activities are undertaken by airlines, handling agents, government agencies, concessionaires and other specialist organisations. The way in which operators choose to provide the diverse range of airport facilities can have a major impact on their economic and operational performance and on their relationship with their customers.

Each airport operator will thus have a unique identity, but all have to assume overall control and responsibility at the airport. Each will be faced with the challenging task of coordinating all the services to enable the airport system to work efficiently. The providers of services are just some of the airport stakeholders that operators need to consider. Others include shareholders, airport users, employees, local residents, environmental lobbyists and government bodies. A complex situation exists, with many of these groups having different interests and possibly holding conflicting views about the strategic role of the



airport. All the stakeholder relationships are important, but the development of a good relationship with the airlines is critical as ultimately this will largely determine the air services on offer at the airport.

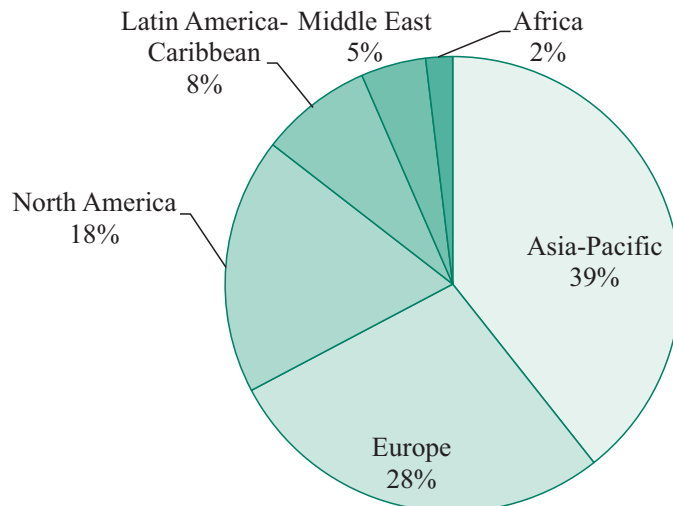
Globally the airport industry is dominated by the regions of Europe, Asia/Pacific and North America in terms of passenger numbers and cargo tonnes (Figures 1.1 and 1.2).



**Figure 1.1**

Airport passengers by world region, 2016

Source: ACI



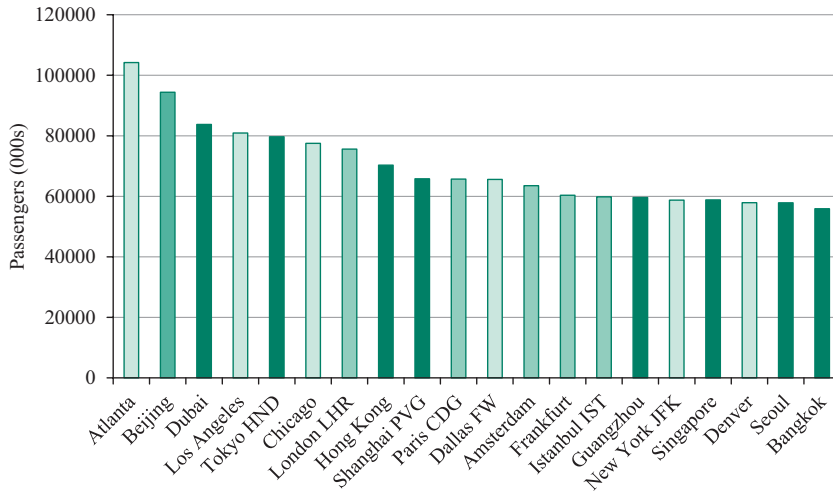
**Figure 1.2**

Airport cargo tonnes by world region, 2016

Source: ACI

In total, Airports Council International (ACI) airports handled 7,700 million passengers, 110 million cargo tonnes and 92 million aircraft movements in 2016.

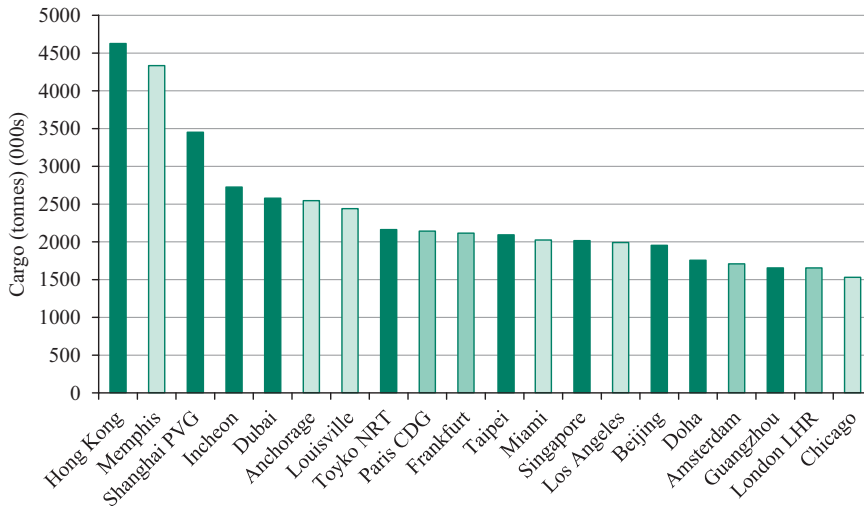
The importance of these three global regions is reflected in the individual traffic figures of the various airports (Figures 1.3–1.5). Out of the 20 largest global airports, six are US airports, nine are Asia Pacific/Middle Eastern airports and five are European (Figure 1.3).



**Figure 1.3**

The world's 20 largest airports by total passengers, 2016

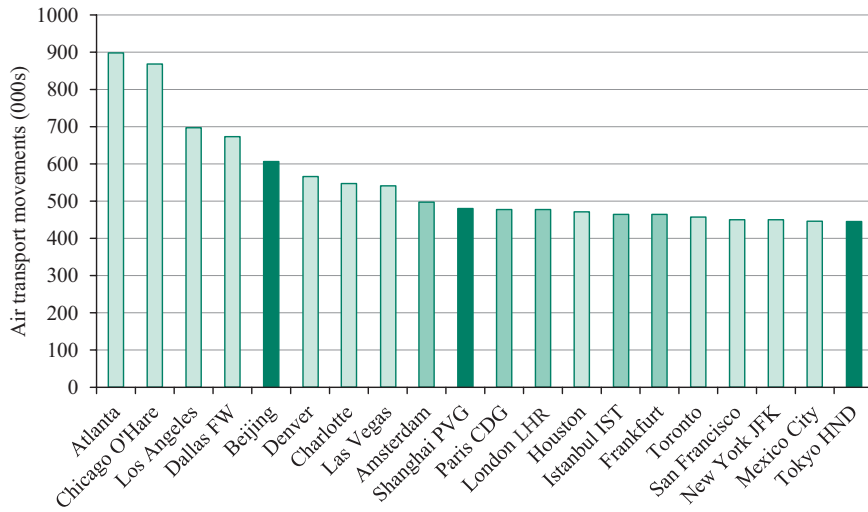
Source: ACI



**Figure 1.4**

The world's 20 largest airports by cargo tonnes, 2016

Source: ACI



**Figure 1.5**

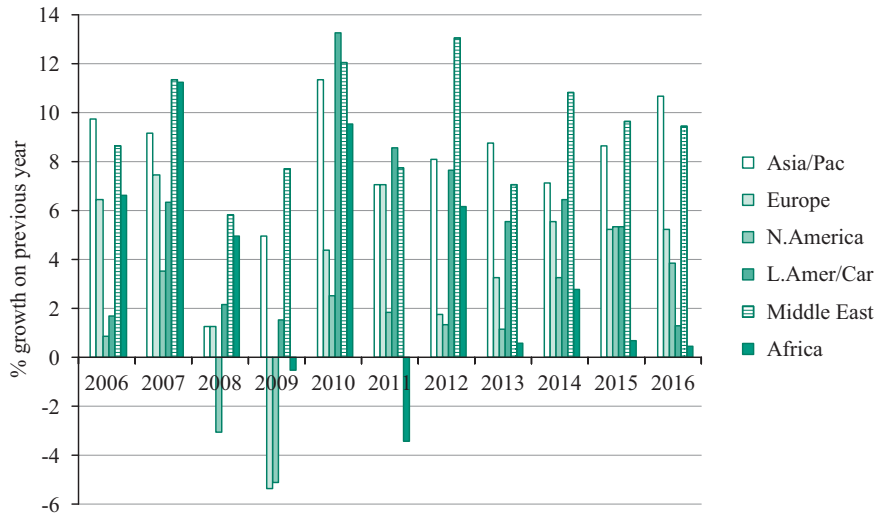
The world's 20 largest airports by aircraft movements, 2016

Source: ACI

Not all the major cargo airports coincide with the major passenger airports. Memphis is the world's second largest cargo airport because FedEx is based there. Similarly, UPS has its base at Louisville. In terms of aircraft movements, North American airports tend to have comparatively high numbers because the average size of aircraft is smaller due to competitive pressures and the dominance of domestic traffic. The larger than average aircraft size in Asia means that none of the busiest airports in terms of movements are situated in this region, except for Beijing and Shanghai.

The aviation industry had been growing virtually continuously since the Second World War, with periodic fluctuations due to economic recessions or other external factors such as the Gulf War in 1991. However, this growth was dramatically halted due to the events of 9/11 in 2001 combined with a global economic downturn. Since then, the airport industry has experienced a number of volatile years, with further incidents including the outbreaks of SARS (2003) and swine flu (2009), the Eyjafjallajökull ash cloud (2010), the Japanese earthquake (2011) and the Arab Spring uprisings (2010–12). These events have had various impacts in different world regions, as illustrated by Figure 1.6. For example, the influence of SARS in the Asia/Pacific region in 2003 can be seen clearly, as can the effect of the social and political unrest due to the Arab Spring uprisings in the African region in 2011. Of major significance almost everywhere was the global credit crunch and economic recession, which had a devastating impact on traffic in 2008 and 2009. Traffic growth returned for all regions in 2010 and 2011 (except Africa), and has continued to rise, but with a considerable variation within different regions.

In 1999, North America had 47 per cent of the global market share of passenger numbers, followed by Europe with 30 per cent. Traffic in Asia/Pacific accounted for just 15 per cent of the total. Since then the share of traffic in this region has increased dramatically,



**Figure 1.6**

Airport passenger growth by main region 2006–16

Source: ACI

particularly in China, where Beijing was the second largest airport in the world in 2016 with nearly 94 million passengers – having been in only ninth position with around 50 million passengers 10 years earlier. In addition, the Middle East area has seen very significant increases in traffic volumes, particular at Dubai airport, which handled over 84 million passengers in 2016 compared with fewer than 30 million in 2006.

The growth in demand for air transport has had very significant economic and environmental consequences for both the airline and airport industries. Moreover, since the 1970s there have been major regulatory and structural developments, which have profoundly affected the way in which the two industries operate. Initially most change was experienced within the airline sector as a consequence of airline deregulation, privatisation and globalisation trends. The pace of change was slower in the airport industry, but now this sector, too, has developed into a fundamentally different business. The trend towards airline deregulation began in 1978 with the deregulation of the US domestic market. Many more markets were subsequently liberalised or deregulated, initially as the result of the adoption of more liberal bilateral air service agreements. In the European Union (EU), deregulation was achieved with a multilateral policy that evolved over a number of years with the introduction of the three deregulation packages in 1987, 1990 and 1993. The 1993 package, which did not become fully operational until 1997, was the most significant and had the most far-reaching impact. This European deregulation allowed a large low-cost carrier (LCC) industry to develop, which has had major consequences for many airports. This deregulation trend has continued in other parts of the world, a very significant milestone being the introduction of the EU–US open aviation area in 2008.

At the same time the airline industry was being deregulated, airline ownership patterns changed. Most carriers, with the notable exception of those in the United States, traditionally were state owned and often were subsidised by their government owners. However, this situation has changed substantially as an increasing number of governments have opted for partially or totally private sector airline ownership, primarily to reduce the burden on public sector expenditure and to encourage greater operating efficiency. The other most significant development within the airline industry, partly due to deregulation and privatisation trends, has been the globalisation of the industry and the emergence of transnational airlines. Three major alliance groupings – Star, oneworld and Sky Team – have emerged with global networks. They dominate the airline business, accounting for over half of all traffic. Airline joint ventures and mergers have followed and are becoming increasingly popular.

The airports found themselves caught up in this environment of change. Radical restructuring occurred, which in many ways mirrored that which had fundamentally changed the airline industry. Three key developments have been witnessed within the airport sector, as follows.

- 1 Airport commercialisation. The transformation of an airport from a public utility to a commercial enterprise and the adoption of a more business-like management philosophy.
- 2 Airport privatisation. The transfer of the management of an airport, and in many cases the ownership as well, to the private sector by a variety of methods. These include share flotations, the adoption of strategic partnerships and the introduction of private management contracts.
- 3 Airport ownership diversification. The emergence of a number of different types of new investors and operators of airports, such as financial investors and infrastructure companies, some of which have interests in a number of airports around the world.

This book discusses the implications of the development of the airport sector, which has moved from an industry characterised by public sector ownership and national requirements, into a new era of airport management where the private sector and international airport companies play a major role. Airports are now complex enterprises that require a wide range of business competencies and skills – just as any other industry. Airports no longer see their purpose simply as providers of infrastructure, but rather as providing facilities to meet the needs of their users.

Chapter 2 describes the changes in ownership and management models that have taken place, and reviews the current structure of the airport industry. These developments have had a major impact on airport economics and have significantly increased the need to benchmark performance, which is considered in Chapter 3. These airport industry trends, occurring at the same time as deregulation within the airline industry, have also meant that the traditional airline–airport relationship has been changed irreversibly. Chapter 4 looks at this, focusing primarily on airport charging, regulation and slots issues.

As the airport sector evolves, it has begun to focus on serving the needs of different types of customer rather than offering a more generic product that appeals to all. This is discussed in Chapter 5, as are regulatory and technological developments that are occurring in essential passenger processes such as security, border control and check-in. The consequences of these developments are assessed in Chapter 6, which considers the 'passenger experience' and the challenges in achieving overall passenger satisfaction, which has become a major concern for many airports.

A key consequence of airport commercialisation and privatisation trends is that airport operators are devoting much more time and effort to building up the non-aeronautical or commercial areas of the business. Chapter 7 looks in detail at this area of operation. Airport competition, hardly considered a relevant issue by many airports just two decades ago, is also becoming increasingly important. Marketing, which for so long has been a basic business competence in most other industries, but largely ignored in the past by many airports, is now a firmly accepted management practice at airports. This is discussed in Chapter 8.

The remaining chapters take a broader view of the airport business and consider the role airports play in the environment and surrounding communities. This needs to be clearly understood if future growth in the airport industry is to continue. Chapter 9 discusses the economic and social impacts of airports and how they can act as catalysts for business and tourism development. Chapter 10 goes on to consider the environmental impacts and ways in which airports are attempting to minimise the adverse effects. Finally, Chapter 11 brings together the key issues in order to make predictions for the coming years and to assess the future prospects for the industry.



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# 2

## The structure of the airport industry

### Traditional airport ownership and management

The aim of this chapter is to discuss the structure of the airport industry, particularly in terms of the ownership and governance models that are used. It traces the development of the airport sector as it has moved from an industry characterised by public sector ownership and national requirements into a changed era of airport management, where the private sector and international companies play a significant role.

Virtually all airports were traditionally owned by the public sector. European airports serving major cities such as Paris, London, Dublin, Stockholm, Copenhagen, Madrid and Geneva were all owned by national governments, as were many other airports outside Europe, such as those in Tokyo, Singapore, Bangkok, Sydney and Johannesburg. Elsewhere, local governments, at either a regional or a municipal level, were the airport owners. This was the situation with most US airports. Regional airports in the United Kingdom also followed this pattern. Manchester airport, for example, was owned by a consortium of local authorities, with 55 per cent ownership resting with Manchester City Council and the remaining 45 per cent split evenly among eight councils of other nearby towns. In Germany, Dusseldorf airport was jointly owned by the governments of North Rhine, Westphalia state and the city of Dusseldorf, while the joint owners of Hanover airport were the governments of the state of Lower Saxony and the city of Hanover.

With a number of airports, there may have been both local and national government interest. For example, Frankfurt airport was jointly owned by the state of Hesse (45 per cent), the city of Frankfurt (29 per cent) and the federal government (26 per cent). Similarly, Amsterdam was owned by the national government (76 per cent) and the municipalities of Amsterdam (22 per cent) and Rotterdam (2 per cent). Vienna airport was another example, owned by the Republic of Austria (50 per cent), the Province of Lower Austria (25 per cent) and the city of Vienna (25 per cent). Basel-Mulhouse or EuroAirport, situated on the border between Switzerland and France, was (and still is) a unique airport being jointly owned by the national governments of both Switzerland and France.

It was only in the 1990s that there started to be a significant presence of privately (or partially privately) owned airports. Before this, the only privately owned airports were small general aviation (GA) or aeroclub airports and so the influence of the private sector on the airport industry was very limited. Thus public ownership, at a local and/or national



level, used to be the norm. However, the way in which the government owners chose to operate or manage the airports varied quite significantly and had a major impact on the airport's degree of independence and autonomy. The strictest form of control existed when the airport was operated directly by a government department, typically the Civil Aviation Authority (CAA), Ministry of Transport or, in a few cases, the military. This was the common practice for airports in areas such as Asia, the Middle East, Africa and South America. In Canada, the National Department of Transport directly operated the 150 commercial Canadian airports. Within Europe, Greece was a good example of a country where airports were effectively run by the CAA.

In other cases, semi-autonomous bodies or companies, but still under public ownership, operated the airports. In some instances these organisations managed more than one airport, as was the situation in Europe with the British Airports Authority (BAA) and Aer Rianta Irish Airports. There were also airport authorities or companies that operated just one major airport. This was the case at Amsterdam airport and many of the German airports. In the United States, airport authorities also existed for some airports, such as the Minneapolis–Saint Paul Metropolitan Airports Commission. In a few cases there were multipurpose transport authorities, such as the Port Authority of New York and New Jersey or Massport in Boston, which operated other transport facilities as well as airports.

There were also a few examples of airports being operated on a concession basis for the central government. At the larger Italian airports (e.g. Venice, Milan), companies with public (usually local) shareholdings and perhaps some minority private shareholdings as well held the operating concession for a long-term period, such as 60 years at Milan airport. The concession could cover management of the total airport and handling services (e.g. Milan, Turin) or just some of the services such as terminal management and handling (e.g. Palermo). At French regional airports, the concessions were given to the local chambers of commerce with the national government retaining some control over the airfield facilities. At Zurich airport, the Zurich Airport Authority, which was owned by the Canton of Zurich, was responsible for the planning and overall operation of the airport and the airfield infrastructure, while a mixed public–private company, FIG, managed and constructed the terminal infrastructure.

## Moves towards commercialisation

These publicly owned and often strictly controlled airports were historically regarded as public utilities with public service obligations (PSOs) (Doganis, 1992). Consequently commercial and financial management practices were not given top priority. In the 1970s and 1980s, however, as the air transport industry grew and matured, and as the first steps towards airline privatisation and deregulation took place, views about airport management began to change. Many airports gradually started to be considered much more as commercial enterprises and a more business-like management philosophy was adopted. Thus 'commercialisation' of the airport industry began to take place. The pace of change varied considerably in different parts of the world, with Europe generally leading the way. By contrast, airports in areas such as Africa and South America generally held on to more traditional attitudes towards airports and experienced less change.