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5.1 Introduction

The operating environment of an airport company is shaping its framework for doing business. It may foster the business development but also limit the degrees of freedom. Factors to take into consideration are not limited to but include:

- regional location and catchment area,
- traffic quality (volume and mix, connectivity),
- overall status of the economy (macroeconomic indicators),
- status of international trade and tourism,
- foreign investment policy and tax regime,
- demographics and population growth, and
- aviation policy and regulatory regime.

Economic development measured by GDP growth still appears to be the single most important factor for the passenger sector, driving employment, disposable income, and the propensity to fly (Airbus, 2017; Boeing, 2017). Profillidis and Botzoris (2015) also confirmed a significant correlation between air passenger transport activity and regional economic activity as reflected by GDP.

Section 5.2 will analyze the effect of international traffic flows on airport demand, while Section 5.3 will discuss various factors which may be attributable to an airport site or its country of location.
networks. Consequently, airport success is essentially dependent on airline network success, which—in turn—is reliant on route economics. Airline consolidation and route network rationalization mean that airports operate in a dynamic environment (Hanlon, 2007; Goedeking, 2010).

In addition to the overriding importance of the status of the economy, several other factors may shape airline networks, ultimately directing traffic flows. These include competitive considerations like market structure and maturity but also singular events, for example, the availability of new airport capacities, of new aircraft technology, or particular events (Burghouwt, 2007; Airline Leader, 2017a).

Table 5.1 summarizes the effects of these issues on the 10-year growth rates of interregional traffic flows with reference to 2006, and how this development is projected into the future.

### Table 5.1 Change in major passenger traffic flows 2007–16/FC 2017–36 (CAGR %)

| RPKs (bn) | AFR | LAC | MEA | EUR | NAM | ASP |
|-----------|-----|-----|-----|-----|-----|-----|
| 2007–16   | 2017–36 | 2007–16   | 2017–36 | 2007–16   | 2017–36 | 2007–17   | 2017–36 | 2007–16   | 2017–36 |
| ASP       | 15.0 | 6.7 | −1.4 | 6.7 | 15.0 | 6.4 | 4.7 | 3.7 | 9.2 | 5.9 |
| NAM       | 5.8  | 5.9 | 4.4  | 5.6 | 13.2 | 5.0 | 2.2 | 4.5 | 4.7 | 3.7 |
| EUR       | 3.4  | 4.7 | 3.7  | 4.3 | 5.9  | 5.3 | 4.0 | 3.2 | 1.4 | 2.6 |
| MEA       | 14.0 | 7.6 | −    | −   | 13.0 | 5.2 |    |    |    |    |
| LAC       | 0.7  | 7.2 | 8.4  | 6.2 |      |    |    |    |    |    |
| AFR       | 8.8  | 6.5 |      |    |      |    |    |    |    |    |

Note: Bold—within region.
Source: Compiled by author from Boeing, 2008, Current Market Outlook 2008–2027. Boeing Commercial Airplanes, Seattle, WA; Boeing, 2017, Current Market Outlook 2017–2036. Boeing Commercial Airplanes, Seattle, WA.

Then compound annual growth rates (CAGRs) during the period 2007–16 provided in Table 5.1 evidence that some regions have grown significantly faster than others. The main bulk of total passenger growth occurred in emerging markets such as the Middle East and Asia-Pacific, while the more mature North American and European markets were clearly lagging behind. This significant structural change is expected to flatten out over time and projected growth rates up to 2036 are less divergent. Still, it has already resulted in Asia-Pacific taking the lead in terms of aircraft takeoffs. Fig. 5.1 details the total of 2.8 million departures in January 2016.
The effect of this development on airport demand is obvious. Moreover, it is interesting to note that in 2013 just 55 airports handled 50% of global passenger traffic. This high degree of concentration was also reflected in the fact that only AMS, CDG, DXB, FRA, and LHR offered more than 80 long-haul destinations, while 26 others offered somewhere between 40 and 80 (ADL, 2014). This, in turn, results in a comparatively high share of transfer passengers at primary and secondary hubs as discussed in Chapter 1, The nature of airports.

The need of transportation in general—and air transport in particular—is derived from the well-being of the world economy and the overall investment climate. The center of economic gravity has meanwhile shifted away from North America and Europe toward Asia-Pacific. For the last two decades, approximately, local growth rates of population and level of economic activities have outpaced those of other regions. Rising employment has created a new middle-class and hiked disposable income as well as the propensity to fly. Fig. 5.2 depicts the overall growth during the 10-year period, 2007–16, with reference to the base year 2006.

Figure 5.1 Regional distribution of aircraft takeoffs in January 2016. Source: Adapted from Reichmuth, J., Berster, P., 2018. Past and future developments of the global air traffic. In: Kaltschmitt, M., Neuling, U. (Eds.), Biokerosene—Status and Prospects. Springer, Berlin/Heidelberg, 13–31.
Relative to global average of 78%, the Middle East achieved exceptional growth, although from a relatively low basis. Nevertheless, it has become one of the key players in air travel. Due to its advantageous location, it serves as a hub between Asia-Pacific, Africa, and Europe. More than 80% of the world population lives within an 8-h flight from the Persian Gulf, very much to the benefit of the local carriers and airports.

During this period, the Asia-Pacific region achieved substantial growth in commercial aviation, in both percentage and volume terms. The key driver of this development is the rapidly growing GDP. The growing middle class across Asia-Pacific adds to increasing demand. This expansion has also led to international joint-venture subsidiaries that are often low-cost carrier (LCC) models, making air travel more affordable for many citizens. Moreover, the Asian-Pacific market is meanwhile rather liberalized and lacking alternatives regarding other modes of transportation which are more common in North America and Europe. The latter is partially due to its geography.

The Latin America/Caribbean region and Africa have slightly outgrown the global average for the passenger sector. Europe is at par, while North America clearly stays behind.

This overall scenario clearly affected regional airport development. Figs. 5.3 and 5.4 present the top five passenger and cargo airports per region as of 2016. The league tables make visible that there are winners and losers both in terms of regions and individual airport growth. The illustration of 10-year growth rates for the period 2007–16 reveals substantial differences regarding traffic development. While a few airports grow (well) in excess of the global CAGR of 6% in the passenger sector and 3.2% for cargo, respectively, others remain below.

In the passenger sector, the Middle East airports, African Addis Ababa (ADD), and Istanbul (IST) in Europe are success stories. The same holds true for the cargo sector, except for Leipzig (LEJ) replacing IST. They all have their individual secrets to success: government support for new airport capacities and airlines (ME3 carriers = Middle East airlines: Emirates, Etihad, and Qatar) in the Middle East, significant foreign investment at ADD as well as expanding Turkish Airlines at IST and DHL moving their European hub to LEJ.

**Figure 5.2** Regional passenger growth for the period 2007–16.

*Note:* Scheduled traffic.

*Source:* Author based on International Civil Aviation Organization (ICAO), 2010. ICAO Database—Air Transport Statistics. ICAO, Montreal; ICAO, 2017. Annual Report of the Council—Air Transport Statistics. ICAO, Montreal.
How are the three sample airports faring?

- **CPH** achieved 3.4% CAGR (cf. Table 2.2) for passengers but is not among the top five passenger or cargo airports in 2016 presented in Figs. 5.3 and 5.4.
- **ICN** achieved 7.4% CAGR (cf. Table 2.2) for passengers, but in 2016 not among the top five Asia-Pacific passenger airports; instead, it is among the leading cargo airports with a CAGR of 7.4%.
- **MEM** lost a huge amount of passengers at a CAGR of −9.8%, due to the merger of Delta/Northwest (explained in Feature 6.1). As a result, it is not among top five North American passenger but cargo airports with a respective CAGR of 1.6%.

**Figure 5.3** Top five PAX airports in 2016 ranked per 10-year CAGR. *Note:* Numbers assigned to airport three-letter codes refer to 2016 regional ranking.

*Source:* Author based on Albatross Airports Database, 2018. Marketing Data for the Airport Industry. Momberger Airport-Information, Sainte Anastasie; International Civil Aviation Organization (ICAO), 2010. ICAO Database—Air Transport Statistics. ICAO, Montreal; ICAO, 2017. Annual Report of the Council—Air Transport Statistics. ICAO, Montreal.
Uneven airport growth may also be attributable to several other factors than those mentioned above. These are possibly more specific for an individual airport site or the country of its location, or even to extraordinary, singular effects.

5.3 Site-specific factors

In addition to overall economic climate and the effects on GDP highlighted in Chapter 1, The nature of airports, various other factors may affect traffic volumes. Obviously, there is a notable overlap with the macroeconomic situation and

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Figure 5.4 Top five CARGO airports in 2016 ranked per 10-year CAGR. Note: Numbers assigned to airport three-letter codes refer to 2016 regional ranking.

Source: Author based on Albatross Airports Database, 2018. Marketing Data for the Airport Industry. Momberger Airport-Information, Sainte Anastasie; International Civil Aviation Organization (ICAO), 2010. ICAO Database—Air Transport Statistics. ICAO, Montreal; ICAO, 2017. Annual Report of the Council—Air Transport Statistics. ICAO, Montreal.
aviation policy in general. Others, again, may be more specific to the very site of an airport. Most academic research, for example, indicates improved performance of capital/hub airports (Lin and Hong, 2006; Assaf, 2011; Perelman and Serebrisky, 2012). Table 5.2 summarizes major site-specific factors and indicates

| Factors                                | Implications                                                                 | Effect |
|----------------------------------------|-----------------------------------------------------------------------------|--------|
| Political instability                  | Arab Spring 2010–12; tremendous setback of holiday activities in Turkey after attempted coup in 2017—to the benefit of Spain and other warm water destinations | –      |
| Status of international trade and tourism | See above and/or terrorist attacks, e.g. 9/11, Egypt, Tunisia; various exchange rate effects on holidaymakers’ budgets | –      |
| Pandemics                              | SARS pandemic—primarily in Asia in 2002–03                                 | –      |
|                                        | Ebola virus—primarily in Africa in 2014                                     |        |
| Government support for aviation        | Several governments execute airport projects on a mega-hub level, providing attractive growth opportunities to airlines, e.g., - Al Maktoum International Airport (Dubai World Central, DWC) - Beijing Daxing International Airport - Changi Airport’s East Extension (Singapore) - Hong Kong International Airport’s Three-Runway System - Istanbul New Airport (including private investment) | +      |
| Aviation policy                        | Degree of deregulation/liberalization (Feature 5.1 will go more into detail regarding the impact on airports) | ±      |
| Tax regime/incentives                  | See above plus additional tax holidays (temporary reduction or elimination) and/or other incentive programs | +      |
| Foreign investment policy              | Nationality requirements/foreign ownership restrictions limiting market access | –      |
| Type of economic regulation of airports | Combination of cost allocation and tariff mechanism is limiting revenue and profits | –      |
| Catchment area (population living within 1 h to 2 h drive of the airport) | - Demographics and economic situation of that population (disposable income, propensity to fly) - Important companies/employers in the region and type of international connectivity they need - One-off events/special attractions such as Olympic Games or seasonal festivals etc. | ±      |
| Airport competition                    | - Overlapping catchment areas - Low number of airports per million inhabitants (Fig. 8.2 exemplifies airport density across Asia) | –      |
| Airline customer base and respective business model | - FSNCs: network operations involving a multitude of connecting flights - LCCs: traditionally point-to-point operations (no connecting flights but accidental hubbing), high degree of churn, incentive-oriented | +      |
| Airline alliances                      | Anchor hub of home/flag carrier and its alliance partners for connecting their networks (taking place on the ground) | +      |
| Means/ease of access, intermodality    | Available infrastructure for ground transportation (highways, railway, light rail) | +      |
|                                        | Intermodal connections                                                      | +      |

FSNC, Full service network carrier; LCC, Low-cost carrier; SARS, severe acute respiratory syndrome.

Source: Author.
their relevance for local traffic volumes and/or their resulting (positive or negative) impact on airports.

Two prominent and rather topical examples included in Table 5.2 are the effects of political instability or even terrorist incidents in Turkey and North Africa. Leisure travelers shifted away from destinations which were perceived unsafe in light of security or geopolitical developments to countries such as Greece, Italy, Portugal, and Spain. The latter itself then became victim of the tragic events in Barcelona in August 2017 (Harper, 2017).

Other site-specific factors are related to the reasoning of airlines for choosing an airport. Market potential and cost are obviously of high importance but also a perspective for future growth. As a consequence, airports need to ensure that their operational processes and infrastructure are efficient and can be tailored to the requirements of (the main) airline customer(s). The development of Lufthansa’s second German hub in Munich (MUC) many years ago, for example, is primarily attributable Frankfurt’s (FRA’s) capacity shortcomings. The needs of LCCs and cargo operators will be more specific than those of full service network carriers. All of them are similar, however, in demanding a competitive level of fees and charges.

While airlines can select between competing airports, passengers have full transparency in terms of search engines on the web, providing both a high degree of flexibility and options. Availability of service and ticket price is very high on their agenda. Table 5.3 compiles the most important factors affecting airline and passenger choice of an airport.

### Table 5.3 Determinants of airport choice

| Airline                        | Passengers                                      |
|-------------------------------|-------------------------------------------------|
| • Catchment area/potential demand | • Destination portfolio                          |
| • Competitive situation       | • Flight availability and frequency              |
| • Infrastructure: slot availability, facilities | • Ticket price                                  |
| • Growth potential            | • Image/reliability of airline                   |
| • Network compatibility and expected route profitability | • Alliance policy and FFP                       |
| • Airport cost and discounts (incentives/marketing support) | • Ease/means of access to airport                |
| • Environmental restrictions (operating hours) | • Cost to airport and car parking               |
| • Others                       | • Commercial facilities                          |
|                               | • Image of airport and ease of use               |
|                               | • Others                                         |

*FFP, Frequent flyer programs.*

*Source:* Adapted from Civil Aviation Authority (CAA), 2013. CAA Passenger Research: Satisfaction with the Airport Experience Heathrow, Gatwick and Stansted, CAP 1044. Civil Aviation Authority, London; Graham, A., 2014. Managing Airports, fourth ed. Routledge, Abingdon.
This selection of choice factors applies in general, yet airline and passenger satisfaction levels will be different for each individual airport site.

A survey conducted by the UK Civil Aviation Authority (CAA, 2013) at the three London airports Heathrow (LHR), Gatwick (LGW), and Stansted (STN) found the following priorities of terminating passengers:

- airline’s route network,
- airport location and accessibility, and
- ticket price.

For transfer passengers, airport location/accessibility is obviously irrelevant.

These findings were generally confirmed by Collaborate Research’s investigation on consumer behavior in the UK aviation sector for the CAA (2015), involving a higher share of price-sensitive holidaymakers. The ranking, however, changed with price—getting good value rather than the cheapest fare—moving to the top followed by ease of airport access.

### 5.4 Regional location and financial performance

This section’s discussion is based on empirical data contained in ACI’s airport economic reports (2014, 2015, 2016, 2017) introduced earlier.

The comparison of unit cost across regions (measured per WLU) remains rather stable over time (cf. Fig. 4.10 denominated in Special Drawing Rights, SDRs). For the analyzed period, processing one workload unit, however, results in drastically higher operating expenses and capital costs at European and Middle Eastern airports than across all other regions and in comparison to global average (Fig. 5.5). Cost levels appear to be significantly different, driven by different price levels and/or capital spending for expansion of existing or new capacity. (Chapter 8 will investigate the effects of investment spending).

| Region | Capital costs (USD/WLU) | Total operating expenses (USD/WLU) |
|--------|-------------------------|-----------------------------------|
| AFR    | $5 $5 $4 $5            | $5 $6 $6 $7                       |
| ASP    | $5 $4 $3 $3            | $7 $6 $6 $6                       |
| EUR    | $7 $7 $7 $6            | $15 $14 $13 $13                   |
| LAC    | $8 $2 $4 $4            | $8 $8 $7 $9                       |
| MEA    | $6 $7 $7 $4            | $15 $14 $16 $15                   |
| NAM    | $6 $6 $6 $5            | $7 $6 $7 $7                       |
| World  | $6 $5 $5 $5            | $9 $9 $9 $9                       |

*Figure 5.5* Total operating expenses and capital costs (USD/WLU) in 2012–15. *Source:* Author based on ACI data.
The analysis of unit revenue consequentially reveals a very analogous picture for income from airside charges but also commercial revenue (Fig. 5.6). Both effects are presumably caused by different macroeconomic parameters and market conditions, that is, price levels as well as the political environment. The individual regional/local growth dynamics may add to that (cf. Sections 5.2 and 5.3), especially regarding airports serving the respective capital cities.

As regards the revenue structure, it becomes obvious from their corresponding means that airports located in the Asia-Pacific and Middle Eastern regions have an almost balanced portfolio of aeronautical and commercial income. The slight aeronautical overweight is clearly higher in other regions, particularly regarding African airports. Fig. 5.7 details the average revenue for the period under consideration.

The considerable regional (and also underlying airport—individual) variations in commercial revenue are primarily resulting from the volume and mix or “quality” of passengers in terms of spend per head and of course the supply of attractive shopping facilities and offers by the airport operator and/or its concessionaires.
According to the “Airport Commercial Revenues Study” conducted by Moodie International & SIAIP Group (2013, 2014), the highest proportions of 59% and 60% in 2012 and 2013 have been recorded at airports in the Americas, handling between 10 and 30 mppa. In contrast to these peak values, the lowest shares have been seen at large European airports in excess of 30 million passengers a year in 2012 and for Asia-Pacific airports handling between 10 mppa and 30 mppa in 2013. At these airports, nonaeronautical revenue comprises 39% of total revenue on average during the periods under consideration.

It is worth noting that the share of nonaeronautical income at European airports came down from 48% in 2010, accounting for 41% in 2012, and 40% in 2013 on average (ACI Europe, 2012, 2014, 2015). At Asia-Pacific, Middle East, and North American airports, however, significantly higher shares in excess of 45% have been generated. The gradual erosion of commercial revenues across Europe is attributed to competition from online retail (“Amazonation”) and off-site parking options/ride-hailing apps (mainly Uber and Lyft) as well as changing consumer behavior in a mature market (Davitt, 2015; Steer Davies Gleave, SDG, 2017; Vogel, B. and Cross, 2017). Together, they make up for roughly one-half of the nonaeronautical revenue across Europe and on global average. Notwithstanding, from a historical perspective, it was the European region driving toward commercialization and a whole new look at airports—and eventually privatization. This is why specifically European airports had frequently been referred to as “shopping mall plus runway.” Recent data gives evidence, however, that duty-free and travel retail is increasingly under pressure despite rising passenger numbers. More and more airport operators around the world are facing this dilemma, indicating that the heydays may be over (Butterworth-Hayes, 2017; Beltran, 2018; Rozario, 2017).

For further stimulation of growth in the commercial sector, the “airport city concept” is being employed where sufficient space is available. It is an advanced stage of the transformation of the business, basically providing all of the commercial functions of a modern metropolitan center on site. The concept clearly aims at growing income resulting from landside activities for the sake of diversification and serving as a cushion in times of crises. A further expansion of this notion is the “aerotropolis,” which even involves a whole airport-centered urban economic region (Bates, 2012; Kasarda, 2013; LeighFisher, 2013a).

Dusseldorf (DUS) and Aeroporti di Roma (ADR) are interesting examples for successful implementation of these concepts. ADR launched its Rome Fiumicino Business City construction in spring 2018. The EUR 190m (USD 220m) project covers a 91,000 m² sustainable airport city design, featuring a conference hotel, tourism offices, business lounges, embassy offices, a supermarket and retail outlets as well as a medical center plus ample of green spaces (Bates, 2018; Center for Asia Pacific Aviation, CAPA, 2018). Realistically it needs to be added that this is a limited option available to large airports only, while the vast majority does not have the economy of scale and scope to support an airport city (ACRP, 2017; Airline Leader, 2017b).

For a further breakdown of revenue, Fig. 5.8 differentiates the structure and level of aeronautical charges for the regions in comparison to global average.
Both the actual values and the relative shares of revenue generated from passenger-related and landing charges vary significantly across the regions for the analyzed time. Passenger-related revenue includes passenger/terminal charges, security charges, and transfer/transit charges. The revenue per passenger varies substantially between USD 2.38 on average for North American airports and USD 12.56 in the Middle East. It needs to be noted, though, that NAM airports charge additional terminal rentals for space utilization or airlines have invested themselves in their own terminal building, alternatively.

Landing revenue includes charges for the use of runways, taxiways, runway protection zones, and clearways but not aircraft parking. It ranges between USD 1.08 for Latin America—Caribbean and USD 2.92 for African airports, on a per passenger basis. Hence, total revenue is significantly different across regions, again reflecting a different macroeconomic environment and market conditions.

It also becomes obvious that the majority of airports have structurally put their emphasis on charging passengers rather than aircraft-related services (cf. Fig. 4.5). The latter refer directly to aircraft handling and are associated with charges such as landing, parking, air bridges, noise/environmental, and navaid. Typically, these are weight/size-based and applied per aircraft landing/takeoff/movement. From this angle, the revenue generated is highest in Asia and Europe at around USD 430/455 per ATM, followed by Middle East airports around USD 419 per ATM, and the three other regions substantially below this level and the worldwide average of USD 289.

Different regional price levels may have an impact on the passenger- and aircraft-related charges. Table 5.4 and resultant Fig. 5.9 introduce airport-specific data for plausibilization. Table 5.4 assembles the charges indices of 50 international airports as worked out by consultancy LeighFisher (2012, 2013b, 2014, 2015), ranked in increasing order. The objective of its annual review is to identify infrastructure-related charges associated with the turnaround of eight commonly used aircraft types, carrying a typical passenger load on international flights. (Ground handling is not included.) The index is computed by converting the aggregated charges for the different aircrafts in local currency to a single unit of

![Figure 5.8](image-url)

**Figure 5.8** Average passenger- and aircraft-related charges (USD/PAX) 2012–15.

*Note:* NAM passenger-related revenue incl. AIF + PFC, which are particularities of US airport financing (see Chapter 4, State of the industry, and for additional details see Chapter 9, Ownership structure).

*Source:* Author based on ACI data.
### Table 5.4 Ranked charges indices per passenger of selected airports for the period 2012–15

| Airport          | Code | 2012 | 2013 | 2014 | 2015 | Average |
|------------------|------|------|------|------|------|---------|
| Dubai            | DXB  | 22   | 23   | 17   | 17   | 19.8    |
| Jakarta          | CGK  | n/a  | n/a  | 21   | 21   | 21.0    |
| Hong Kong        | HKG  | 24   | 22   | 20   | 22   | 22.0    |
| Kuala Lumpur     | KUL  | 29   | 23   | 22   | 20   | 23.5    |
| Mumbai           | BOM  | 29   | 29   | 23   | 35   | 29.0    |
| Helsinki         | HEL  | 33   | 33   | 29   | 29   | 31.0    |
| Singapore        | SIN  | 32   | 36   | 30   | 30   | 32.0    |
| Sao Paulo        | GRU  | 41   | 36   | 29   | 23   | 32.3    |
| Jeddah           | JED  | 33   | 32   | n/a  | n/a  | 32.5    |
| Oslo             | OSL  | 38   | 37   | 31   | 29   | 33.8    |
| San Francisco    | SFO  | 42   | 38   | 33   | 34   | 36.8    |
| London Gatwick   | LGW  | 37   | 39   | 35   | 37   | 37.0    |
| Stockholm        | ARN  | 44   | 44   | 37   | 31   | 39.0    |
| Bangkok          | BKK  | 45   | 44   | 35   | 35   | 39.8    |
| Miami            | MIA  | 44   | 44   | 35   | 37   | 40.0    |
| Cancun           | CUN  | 44   | 42   | 34   | 41   | 40.3    |
| Warsaw           | WAW  | 46   | 44   | 37   | 35   | 40.5    |
| **Seoul Incheon**| ICN  | 47   | 45   | 41   | 33   | 41.5    |
| Lisbon           | LIS  | 42   | 45   | 42   | 42   | 42.8    |
| Los Angeles      | LAX  | 47   | 44   | 38   | 42   | 42.8    |
| **Copenhagen**   | CPH  | 47   | 48   | 42   | 38   | 43.8    |
| Dusseldorf       | DUS  | 46   | 48   | 42   | 41   | 44.3    |
| **Mexico City**  | MEX  | 40   | 41   | 48   | 52   | 45.3    |
| Prague           | PRG  | 49   | 50   | 42   | 42   | 45.8    |
| Milan–Malpensa   | MXP  | 41   | 56   | 48   | 43   | 47.0    |
| Dublin           | DUB  | 52   | 52   | 44   | 42   | 47.5    |
| Berlin Tegel     | TXL  | 53   | 52   | 47   | 43   | 48.8    |
| Washington Dulles| IAD  | 51   | 55   | 43   | 49   | 49.5    |
| Delhi            | DEL  | n/a  | 50   | 41   | 58   | 49.7    |
| Beijing          | PEK  | 54   | 53   | 43   | 50   | 50.0    |
| Brussels         | BRU  | 56   | 55   | 49   | 44   | 51.0    |
| Vienna           | VIE  | 59   | 59   | 49   | 48   | 53.8    |
| Munich           | MUC  | 54   | n/a  | n/a  | n/a  | 54.0    |
| Rome Fiumicino    | FCO  | 48   | 62   | 55   | 53   | 54.5    |
| Madrid           | MAD  | 55   | 63   | 53   | 49   | 55.0    |
| Amsterdam        | AMS  | 61   | 60   | 52   | 47   | 55.0    |
| Auckland         | AKL  | 58   | 58   | 58   | 53   | 56.8    |
| Johannesburg     | JNB  | 74   | 63   | 50   | 52   | 59.8    |
| Tokyo Narita     | NRT  | 82   | 61   | 50   | 48   | 60.3    |
| Budapest         | BUD  | 59   | 70   | 60   | 58   | 61.8    |
| Paris            | CDG  | 65   | 68   | 59   | 55   | 61.8    |
| Moscow           | SVO  | 66   | 63   | 53   | 67   | 62.3    |
| New York         | JFK  | 68   | 66   | 55   | 66   | 63.8    |
| Sydney           | SYD  | 82   | 73   | 52   | 55   | 65.5    |
| Zurich           | ZRH  | 71   | 70   | 64   | 64   | 67.3    |
| Frankfurt        | FRA  | 71   | 74   | 66   | 62   | 68.3    |
| Osaka            | KIX  | 92   | 70   | 58   | 55   | 68.8    |
| Vancouver        | YVR  | 81   | 75   | 62   | 59   | 69.3    |
| Athens           | ATH  | 76   | 76   | 67   | 60   | 69.8    |
| New Jersey       | EWR  | 84   | 84   | 73   | 72   | 78.3    |
| Toronto          | YYZ  | 100  | 87   | 70   | 70   | 81.8    |
| London Heathrow  | LHR  | 90   | 100  | 100  | 100  | 97.5    |

**Note:** Sample airports in bold print.

**Source:** Compiled by author from LeighFisher, 2012. Review of Airport Charges 2012. LeighFisher Ltd, London; LeighFisher, 2013b. Review of Airport Charges 2013. LeighFisher Ltd, London; LeighFisher, 2014. Review of Airport Charges 2014. LeighFisher Ltd, London; LeighFisher, 2015. Review of Airport Charges 2015. LeighFisher Ltd, London.
currency, the SDR (cf. Fig. 4.10) and relate it to passengers. The highest value represents the most expensive airport, which is then indexed to 100 while all others are expressed relative to this.

According to LeighFisher, the sample includes virtually all airports handling more than 10 million international passengers p.a. and is intending to represent different approaches to pricing in varying public or private sector environments under diverse regulatory regimes. In addition to this bias toward larger and European airports, another limitation of the “Charges Review” is that Johannesburg is the only African sample airport. For the Middle East, only Dubai is covered in 2014 and 2015, while 2012 and 2013 also include Jeddah. Nevertheless, this approach appears to be well suited for giving an indication of international price/charges levels.

Based on the individual indices tabulated in Table 5.4, regional means have been computed for the period 2012 up to 2015 including. Fig. 5.9 is comparing these to a fictitious flight carrying 250 passengers using ACI’s data presented in Fig. 5.8.

**Figure 5.9** Tentative turnaround cost of fictitious sample flight.

*Note:* *AFR* only Johannesburg; *MEA* only Dubai airport in 2014 and 2015; NAM revenue data includes AIF and PFC but not terminal fees.

*Source:* Author based on ACI and LeighFisher data.

According to the average index, airports in the mature markets such as North America and Europe but also across Africa appear to consistently levy highest charges, followed by those located in the Asia-Pacific region and in Latin America and the Middle East. Despite the limitations of the sample and although not fully compatible with ACI’s data, this is generally confirming the different regional cost and price levels observed in this (and earlier) chapters.

Fig. 5.10 shows that airports also need to generate income from all sorts of commercial activities, as aeronautical revenue is frequently subject to some kind of economic regulation (limiting airside charges) and not sufficient to cover the airports’ total costs (opex + capex). This makes it arguable whether or not users pay the full infrastructure cost, as suggested long ago by ICAO (2012, 2013). Still, airline associations and representatives request for tighter regulation as discussed later in Chapter 10, Regulatory regime.
On the medium-term average, the percentage of aeronautical revenue in relation to total costs is only sufficient to cover the operating expenses but not the capital costs in terms of interest charges and depreciation of assets—above all airside infrastructure such as runways and terminal facilities. Exceptions are Middle East airports, where aeronautical revenue is not even sufficient to make up for operating expenditure, and African airports, where the total cost (including capital cost) is being excelled (102%). This appears to be a rare exception, related to the very high 69% share of aeronautical income in contrast to undersized revenue from commercial activities as displayed in Fig. 5.7. In general, however, growing commercial revenue appears to be a prerequisite for the airports’ ability to modernize and expand to accommodate future traffic volumes.

Figure 5.10 Aeronautical revenue vs total cost (USD/WLU) across regions 2012—15.

Note: For AFR aeronautical revenue in % of total cost = 102%.
Source: Author based on ACI data.

On the medium-term average, the percentage of aeronautical revenue in relation to total costs is only sufficient to cover the operating expenses but not the capital costs in terms of interest charges and depreciation of assets—above all airside infrastructure such as runways and terminal facilities. Exceptions are Middle East airports, where aeronautical revenue is not even sufficient to make up for operating expenditure, and African airports, where the total cost (including capital cost) is being excelled (102%). This appears to be a rare exception, related to the very high 69% share of aeronautical income in contrast to undersized revenue from commercial activities as displayed in Fig. 5.7. In general, however, growing commercial revenue appears to be a prerequisite for the airports’ ability to modernize and expand to accommodate future traffic volumes.

Feature 5.1 Aviation policy

This feature exemplifies potential effects of aviation policy by focusing on selected aspects of European legislation. The main attention is centered on regional airports. Due to their significant importance for the economic development of a region, airports have frequently been subject to political activities. Due to predominantly public ownership, politicians may also be tempted to capitalize on the integration of airports into the socioeconomic engine with considerable effects for regional employment and other social benefits.

In Europe, the European Commission (EC)—in its capacity as an economic regulator and competition authority—has come up with several Directives and Regulations to create a level playing field for airlines and a more efficient use of scarce airport capacities to the benefit of the traveling public. Fig. 5.11 gives an overview of the thresholds aiming to ensure an adequate treatment of regional airports. While regional is not clearly defined, it essentially refers to

(Continued)
Figure 5.11 European legislation pertaining to aviation as of 2018.

*Source:* Compiled by author from Airports Council International (ACI) Europe, 2017. European Regional Airports. ACI Europe, Brussels; European Aviation Safety Agency (EASA), 2018. Regulations. <https://www.easa.europa.eu/document-library/regulations> (accessed 12.08.18.); European Commission (EC), 2018a. European Civil Aviation Handbook: Part I. Regulations and Directives. <https://ec.europa.eu/transport/modes/air/internal_market/handbook/part1_en> (accessed 12.08.18.).
smaller airports primarily serving short and medium range routes and/or point-to-point destinations. It should be noted that several pieces of legislation are currently being reviewed.

As listed under section “Economics” in Fig. 5.11, the EC also became active again in the area of state aid for airports and airlines. Small remote airports had attracted attention of politicians in the member countries in their pursuit to foster regional development and employment. This resulted in the development of publicly funded regional airports, many of which are still not financially viable. Frequently dependent on one or few LCCs, such publicly—also partially EU-funded airport infrastructures—turned out to be not sustainable and poor value for money (European Court of Auditors, ECA, 2014).

Against this background, the EC adapted its (at the time) new Guidelines on State Aid to Airports and Airlines in 2014 (EC, 2014), replacing the Community Guidelines of 2005 on the financing of airports and start-up aid to airlines departing from regional airports. The new Aviation Guidelines were revised as part of the Commission’s state aid modernization strategy in order to harmonize the legal principles applying to state aid and with a view to ensuring fair competition between airlines and regional airports. They were based on the view that there are too many nonviable regional airports in the European Union. It minimizes the general interest objectives of these airports: economic and regional development, accessibility, tourism, etc. (Lepièce, 2014).

The new rules essentially mean that airports will not be granted financial aid for operations and investments after a transitional period of the next 10 years. During this transitional phase, the state is only permitted to channel operation subsidies or investment subsidies to those airports, which are classified as eligible, meeting the tightened requirements and conditions for approval. In order to facilitate the transition to a complete application of state aid rules to airports, the Commission intends to allow a flexible approach during a 10-year period. In 2024, airports will then have to manage their business without any state subsidies for operation or investments (Lepièce, 2014).

As the Commission sets out to improve efficiency and profitability, it will prevent airports exceeding 5 mppa from receiving state aid. Those handling less than 3 mppa will see their operating aid phased out during the transition period. Airports below 0.7 mppa will still be entitled to 80% of existing grants but face an uncertain future, since the EC intends to revisit the issue in 5 years’ time (Clark, 2014; Reals, 2014). Table 5.5 illustrates which member states’ airports are subject to the new guidelines.

(Continued)
The new regulations are expected to affect a number of airports across Europe, and eventually drive them out of business, as it is unrealistic to assume that most regional airports can become profitable within the next 10 years (Clark, 2014; Osborne and Flottau, 2014). Extreme pressure was exerted on smaller airports owned by cities or regional governments as, for example, German Zweibruecken (ZXW) and Altenburg—Nobitz (AOC) or Charleroi (CRL) in Belgium. In these cases, the EC concluded that they had received state aid which was not compatible with EU rules and needed to be recovered.

Public authorities are allowed to grant support where justified, particularly for improving accessibility of a region and/or significantly contributing to its

| Country       | <700,000 | 700,000–3 million | >3 million |
|---------------|----------|------------------|------------|
| Austria       | 2        | 3                | 1          |
| Belgium       | 3        | –                | 2          |
| Bulgaria      | 1        | 2                | 1          |
| Croatia       | 3        | 3                | 1          |
| Cyprus        | –        | 1                | –          |
| Czech Republic| 3        | 2                | 1          |
| Denmark       | 1        | –                | 1          |
| Estonia       | –        | 1                | 1          |
| Finland       | 15       | 1                | –          |
| France        | 28       | 7                | 9          |
| Germany       | 5        | 9                | 10         |
| Greece        | 13       | 5                | 4          |
| Hungary       | –        | –                | 1          |
| Ireland       | 1        | 2                | 1          |
| Italy         | 11       | 10               | 14         |
| Latvia        | –        | –                | 1          |
| Lithuania     | 2        | 1                | –          |
| Luxemburg     | –        | 1                | –          |
| Malta         | –        | –                | 1          |
| Netherlands   | 2        | 2                | 1          |
| Poland        | 4        | 3                | 2          |
| Portugal      | 4        | 2                | 3          |
| Romania       | 11       | 2                | 1          |
| Slovakia      | 2        | 2                | –          |
| Spain         | 16       | 10               | 14         |
| Sweden        | 24       | 6                | 2          |
| United Kingdom| 25       | 9                | 16         |
| **Total**     | **176**  | **84**           | **88**     |

*Source: Reproduced from FlightGlobal: Reals, K., 2014. Outside the box. Airline Bus. 30 (9), 38–39.*
economic development. I contrast to that, the duplication of unprofitable airport infrastructure or undue favoring of certain airlines is considered to be a waste of taxpayers’ money and a distortion of competition in the single market. By the same reasoning state aid granted to Frankfurt—Hahn (HHN) and Saarbruecken (SCN) in Germany, Alghero (AHO) in Italy, and Vasteras (VST) in Sweden received full approval (EC, 2018b; Deutsche Bank, 2015).

Ever since the Commission ordered governments to claw back millions of euros in illegal subsidies given to airports and airlines. In November 2016, it ordered Ryanair, Hapag-Lloyd Express, and Tuifly to repay EUR 10.7m (USD 12m) for illegally subsidized costs at Klagenfurt airport in Austria (Toplensky, 2017).

In May 2017, the EC simplified the 2014 state aid regime, including rules for public investment in airports. In striving to focus on measures of biggest impact on competition, it extended the scope of the “General Block Exemption Regulation” to (ports) and airports. This will enable Member States to implement a wide range of state aid measures without prior approval by the Commission. This essentially means that:

- public investments in regional airports <3 mppa are now legally possible without prior control (applicable to 420 or 80% of airports across the EU handling about 13% of total traffic), and
- public authorities may cover operating costs of small airports <200,000 ppa (applicable to almost 50% of EU airports handling only 0.75% of total traffic).

The Commission further justified the changes because it found that similar past investments did not negatively impact on the Internal Market or competition. Aid to reduce operating costs at any larger airports still constitutes illegal state aid (EC, 2017; Toplensky, 2017).

Two pending issues in the field of European aviation policy are the capacity crunch and Brexit. The first one has partially been addressed by the European (Juncker) Commission as part of its “New Aviation Strategy for Europe” as of December 2015 (EC, 2015). It is supposed to foster innovation and generate growth for European business, while letting passengers benefit from increasing connectivity and safer, cleaner as well as cheaper flights. This includes various activities in the following four main areas:

- pursuing an ambitious EU external aviation policy,
- tackling limits to growth (including airport services, capacity, and Single European Sky, SES),
- maintaining high EU standards, and
- innovation and digital technologies.

Being effective for close to 3 years, it remains to be seen in how far the new strategy will contribute to the provision of adequate capacity in the air and on the ground, thus preventing a growing number of Europe’s airports to be fully congested.

The second subject matter is equally challenging: while Britain’s departure from the European Union on March 31, 2019 is rapidly approaching, many of
the uncertainties regarding aviation remain. It is questionable whether the United Kingdom will continue to enjoy the privileges of the Single Aviation Market in terms of future traffic rights and an envisioned transition agreement to buy more time is nowhere in sight. Airbus published its risk assessment in June 2018 and is reconsidering its local engagement and investment, due to British government’s slow progress in areas such as customs, border controls, trade agreements, and access to European regulators. It concluded that any form of Brexit—be it harder or softer—will be damaging to the country. This view is being shared by aerospace manufacturers and airlines alike. Manufacturers are concerned about the security of their supply chains, while airlines are worried if they can continue flying their routes (Osborne and Flottau, 2018a,b).

The meaning of a no-deal scenario for market access and airline ownership and control is hardly more than speculation—the same holds true regarding the implications for airports. As of July 2018, the EC maintains that most flights will cease since the UK certificates issued to EU airlines would no longer be valid, neither would EU-issued licenses for UK-based airlines (Saeed, 2018).

5.5 Summary

The operating environment of an airport is impacting on its financial performance. The analysis of empirical airport data taken from ACI’s economic surveys for FYs 2012–15 reveals distinct differences across regions in terms of unit cost and revenue as well as passenger- and landing-related revenue per PAX and aircraft-related revenue per ATM.

These effects are resulting from a mixture of various factors. Among them are the consequences of international traffic flows for airport demand as well as site-specific circumstances, including aviation policy. Diverse economic and market conditions resulting in different price/cost levels add to that.

Due to their importance for the economic development of a region, airports have frequently been subject to political activities. Therefore, the chapter feature is on potential effects of aviation policy on regional airports. It is focusing on the EC’s (2014) guidelines on state aid and their amendment as of May 2017. The latter may give some comfort to the concerns of affected airports as to the requested profitability.

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