Airport business resilience: Plan for uncertainty and prepare for change

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Abstract
In recent years, there has been sustained turbulence in markets around the world. Economies are emerging from recession, but the pace of recovery is mixed while geopolitical uncertainty and security threats appear to be increasing. In a connected world, problems rarely remain geographically isolated, which means there is continued economic uncertainty in many major global markets. However, uncertainty is not always negative. The pace of technological change is rapid; the influence of mobile and digital platforms extends across all areas of business, including aviation. While such developments are generally positive, change itself creates uncertainty and new technology can be a disruptive influence. Airport managers and investors must balance the drive toward commercial optimisation against the inherent investment risk in realising new opportunities; these challenges are magnified in a market that has a more uncertain and variable outlook. Airport business models are adapting to this new reality, and there is increased recognition of the need for flexibility, creativity, and vigilance in planning, building, managing, and financing airports. The most effective counterbalance to future uncertainty is to develop business models that are resilient, but not resistant, to change. In this context, business resilience means managing risk and capitalising on opportunity. It involves preparing and organising for change, and being ready to change direction when unexpected events occur, or the operating environment changes. It is adopting a mind-set of surprises being the ‘new normal’, and realising that it’s not a question of ‘if’ the unexpected will happen, but rather ‘when will it happen?’, ‘what will happen?’, and ‘are we prepared?’. Resilience, then, is strength with flexibility, and focus with situational awareness. Many airport operators are adapting to this new normal and recognising the need for greater flexibility, creativity, global awareness, and social awareness in the management of airports. While there are limitations to flexibility in an infrastructure-intensive business, this paper considers some of the measures that can be taken to optimise airport financial performance in a dynamic market where rapid change has the potential to disrupt existing business models.

Keywords
airport business planning, resilience, managing risk, airport strategy, revenue diversification, technological change

INTRODUCTION
In recent years the global economy has been subject to almost unprecedented turbulence which has resulted in a climate of uncertainty. The aviation industry has proved particularly vulnerable to external events such as terrorism, pandemics and extreme weather. Rapid change in
consumer markets and technologies is creating a situation in which businesses should increasingly expect future disruptive factors to challenge ‘business as usual’ models.

While often perceived as an operational issue, resilience is an increasing feature of airport business management, and shapes how business models evolve to meet new challenges: airlines have become more cost sensitive; alliances are expanding; many Middle Eastern carriers are aggressively growing; growth is becoming more centred on emerging markets; new aircraft offer market opportunities; and the private sector is taking an increasing role in the global industry. In this context, resilience means managing risk and capitalising on opportunities. It involves preparing and organising for change. No one can predict the future, but certain strategies can build a more resilient business model that can better cope with change. No one wants to think about what might go wrong, but avoiding the issue is not a sustainable strategy.

This paper uses three questions to investigate how airports can improve business resilience and better withstand future disruptive factors, external shocks and market uncertainty:

- What are the business fundamentals of resilience?
- What strategies can management use to improve the resilience of their business?
- What disruptive factors will challenge resilience in the future?

**WHAT ARE THE BUSINESS FUNDAMENTALS OF RESILIENCE?**

A number of interdependent variables drive airport business performance, as illustrated in Figure 1.

Although traffic — passenger and cargo — is just one element of an airport’s business plan, it directly drives an airport’s revenue and costs, and ultimately influences every part of the business and its operations. Exploring the potential variability of demand enables assessment of the possible impact of such variations on cost, revenue and capital investment needs — which in turn influences the planning of airport facilities and operations.

This provides a foundation for looking at ways to offset the financial

![Figure 1 Drivers of airport business performance](image-url)
impact that results from lower traffic levels, such as revenue enhancement or cost-reduction measures. The range of potential measures available will help to determine the overall risk that can be attributed to a particular business plan forecast. If a future fall in traffic can be offset by cost-reduction measures, then greater confidence can be attributed to the business plan’s profit forecast. In contrast to many other businesses, however, airports have a high proportion of fixed costs — a function of the high level of capital investment involved — and there is thus less opportunity to quickly reduce cost if demand falls.

Similarly, should traffic exceed forecasts, having infrastructure that can readily adapt to higher traffic flows (or a different mix of traffic type) adds confidence, since the ultimate focus for management, investors and lenders is the deliverability of forecast profits.

The long-term nature of airport planning, and of related decision-making, means that investment decisions are therefore hugely reliant on the assessment of future demand. These decisions have to be made without certainty about what the future holds, but there are nevertheless a number of strategies that airports can adopt to improve business resilience.

WHAT STRATEGIES CAN MANAGEMENT USE OF IMPROVE THE RESILIENCE OF THEIR BUSINESS?

Actively manage and plan for traffic risk

There are many factors that influence the competitiveness of an airport, as illustrated in Figure 2, but the underlying characteristics of the local airport catchment are the primary factors driving the resilience of demand at most airports, as shown in Figure 2. If there is proven demand for specific markets or routes, then it is reasonable to assume that there will be an airline to provide a corresponding service, and therefore that demand at the airport for these proven markets is more resilient to changes in airline strategy or individual carriers ceasing operations.

![Figure 2](image_url)  Factors influencing an airport’s competitiveness and market share
Airports, however, that have a high level of hub operations (i.e., transfer traffic) from one airline can be more dependent on the strategy of that carrier than airports with a greater spread of carriers, which puts them in a vulnerable position. Unfavourable developments can lead to an almost permanent loss of transfer traffic associated with a dominant carrier, because it is linked to the carrier’s strategy or performance and not just to the local airport catchment — as we have seen at Pittsburgh after the US Airways retrenchment and at Brussels after the Sabena collapse. Brussels Airport took over a decade to return to the same number of passengers it was serving before the Sabena collapse, adopting a proactive route development strategy to develop a more diversified airline mix.

Airports with a strong catchment will naturally be more attractive to many carriers and therefore likely to have a more robust position when it comes to negotiating airport charges. If an airport adopts strategies which encourage a greater diversity of airlines to serve it, rather than passively accommodating the business plan of one particular carrier, it can help to reduce its exposure to this kind of risk.

A comprehensive air service marketing strategy, where the airport identifies potential airlines and proactively pitches route forecasts and business cases to them, is a key component of building a more resilient route network at an airport and is therefore central to the future resilience of the underlying business. The principles are the same as for any business aiming to target new customers. Many airlines have very limited internal capacity to research opportunities, so airports that pitch and present a case in ways that are relevant to them (i.e., in terms of route economics, yield and projected profitability) have a much higher chance of success. It is also good practice to work with local businesses and tourism bodies in developing the pitch. Glossy brochures alone will not succeed: airlines want to know the business case.

Negotiating long-term airline agreements can often appear to provide the climate for more confident investment decisions. There remains an inherent risk, however, that airlines may choose to break those agreements, leaving the airport with bespoke facilities, excess capacity and higher costs that cannot be used or paid for by other airlines. In many ways, long-term airline agreements can therefore increase the risks for airports.

Forecasting demand is a critical tool in building resilience into business plans and operational strategies, and in evaluating the viability of a potential airport investment. The key to successful risk management and contingency planning is evaluating how demand is likely to respond to various scenarios other than the ‘business as usual’ case. External shocks — such as extreme weather, airline failure and terrorist events — are by their nature unpredictable but, from a forecasting perspective, management, investors and lenders increasingly want to understand how vulnerable any business plan is to such setbacks. In the case of many of the shock events that can happen, experience of them now exists, allowing us to estimate their impact on demand and the likely speed of recovery from them — or, on the other hand, whether any permanent damage may result. This point is explored later in this paper by examining the recent history at Budapest Airport but, in addition to stress testing, means deploying scenario planning techniques to understand how changes in traffic impact other
areas of the business so that whole business responses can be developed. Rather than relying on a single traffic forecast, a range of future traffic scenarios are developed, each with defined and mitigating business responses. Given the causal relationships within the airport business, this can reveal strategies and responses which may not be immediately obvious to management and can therefore help airport management to develop flexible long-term plans that improve the resilience of future financial performance.

The intent should be to balance the various categories of scenario that can be defined and tested, and to develop a plausible case or series of cases. Part of this process involves accepting that the air transport sector is prone to shocks from one event or another, and hence that stress testing is always advisable. In addition to event shocks, the impact of changes in longer term industry trends or variables, such as the price of oil, are just as important to help assess resilience of demand at the airport.

Some typical stress tests include modelling the following:

- The effect of an economic event or shock:
  - arising from the demand side (eg a recession);
  - arising from the supply side (eg an airline failure) which impacts demand at the airport;
  - such as a ‘grey swan’ event (eg terrorism, extreme weather).
- The degree of exposure to a specific carrier.
- The reliance on a specific market sector (eg transfer activity, business travel, leisure travel).
- The competitive response from other nearby airports, or from alternative transport modes, and the threat that this may pose.

Taken together, these provide the framework for an investor or management team to evaluate and quantify the demand risk at the airport, which provides the foundation for developing potential response strategies — measures that can be taken to address or contain future threats. This is especially relevant for master planning or decisions about facility expansion. Understanding the range of risk (and opportunity) helps in deciding how to develop appropriately flexible and adaptable facilities. Such development may increase costs in the short term, but will likely result in positive payback over the long term.

**Don’t rely on regulation: you can’t beat the market**

An airport earns its income from two primary sources:

- aeronautical fees levied on airlines, passengers, and users;
- commercial activity centred on terminal concessions, car parking and property.

Traditionally, airports have relied heavily on fees charged to airlines and passengers. Influenced by the rise of low-cost carriers around the world, however, airlines have become more cost sensitive and more prepared to shift operations to keep their costs competitive. This is especially true if the airport does not serve a strong primary market (such as a capital city or an important business centre), has few carriers serving it or operates as a hub for a single carrier, thus making it vulnerable as discussed above.

Many airports have their aeronautical charges set by a regulator. There are several different models around the world of how this is implemented, but typically regulation is seen as a way of ensuring that the
costs of airport development are, at least in part, borne by its users. Increasingly, however, regulation does not provide a guarantee of income over the long term, since, to maintain traffic, airports need to set charges based on market conditions. This explains why, in many cases, airports set charges below levels allowed for by their regulator, Stansted being a good example in the UK.

Airline pressure during the decision-making process can lead to less favourable, or delayed, price increases — often as a result of political influence. For example, the theoretical price increases following the development of Terminal 3 at New Delhi — based on a cost-recovery methodology originally enshrined in the legal documentation associated with the concession — did not, in the end, lead to the permitted price rises. Equally, regulator-approved charge increases at Rome were delayed for many years, probably as a result of ministerial concern about the financial viability of Alitalia. There are many examples of airports around the world where commercial and political pressures mean that they cannot set charges at the approved regulatory level, for fear of losing traffic.

There is therefore a growing need for airports to develop a diversified revenue base and, as a result, airports have increasingly focused on developing revenue from commercial activity in order to build greater resilience into their business operations.

**Diversify the revenue base**

Airports typically have three main sources of commercial income: (1) terminal concessions or rents; (2) car parking (and at most airports, car hire); and (3) property. Terminal and parking incomes are directly linked to passenger demand; property tends to be less strongly linked, although passenger demand can be reflective of the strength of the regional economy, which drives the demand for property.

**Concessions:** Within the terminal, the use of minimum guarantees, which provide a minimum concession fee to the airport operator irrespective of performance, can help to mitigate the impact of fluctuating demand on airport income. In some cases, however, this can reduce the incentives for a concessionaire, so a balanced perspective is needed. Ultimately, it is important to recognise that if demand is weak, then the viability of concessions will be under threat. If businesses are not viable, the airport operator may suffer, regardless of the contract terms or guarantees in place.

Long-term concession agreements can help provide greater security of income and can encourage concessionaires to invest in the long-term development of the product. This can reduce flexibility or make it difficult to remove a poor performer, however. It is important that, as circumstances change, airports are able to regularly retender their concessions to ensure that the commercial offer is attractive to the types of passengers using the airport and capitalises on the commercial potential of new infrastructure. Contracts of over five or ten years significantly reduce the opportunity to react to changing market conditions.

**Car parking:** Car parking is another key revenue stream directly related to passenger demand. Yield management provides a mechanism for flexibly adjusting prices to maximise revenue, and is one approach used to improve overall income resilience. Rather than seeking to grow revenues purely by meeting demand (which involves significant capital expenditure in parking structures and hence is subject
to traffic risk), yield management aims to optimise revenue and address any capacity constraints.

Increasing the range of the car-parking offer, for example, valet services and business-oriented products, can help to make the revenue stream less elastic to gross demand by reflecting the propensity to pay of different types of passenger. Business passengers are less sensitive to price and often more interested in such products as valet parking, whereas leisure demand is highly elastic and far more cost-conscious, especially if there are off-airport alternatives available.

Off-airport parking competition is a significant issue at many airports and can reduce the yields that can be achieved. To meet the off-airport challenge, airports are increasingly using greater product variety, web-based booking, and are working with consolidators.

Property: Given the risks that arise from fluctuations in demand, sourcing new income from activities that are less passenger demand dependent — such as property development — can also improve the resilience of overall airport income. Passenger demand and property opportunities fluctuate with the economic cycle, so longer term leases or contracts can help reduce risk. Airports often use ground leases, rather than directly building and marketing commercial facilities themselves, as such specialist expertise may not be available within the airport company. This reduces exposure and, as in the terminal, they leave the building fit-out and leasing responsibilities to the property developers. The ‘airport city’ is the ultimate manifestation of developing income streams that are less related to airport demand and improves the resilience of an airport’s financial performance by reducing exposure to the most significant variable, traffic risk.

Unique revenue development

Opportunities: As with any business, there are situations unique to individual airports that can provide commercial advantage and enhance financial resilience. For example, Dallas/Fort Worth generates revenues from natural gas extraction on some of its land. Las Vegas has slot machines at many of its gates, taking advantage of its gambling constituency. Many airports reflect the inherent characteristics of their passengers in their retail offer — for example, football shirts are big business at Glasgow Airport. Although the specific shops may vary, there is an increasing uniformity in terminal retail around the world. Perhaps one day we will be able to haggle the price in duty free at New Delhi, or a bazaar will be opened at Marrakech.

Other interesting uses of property include: a blueberry plantation and golf course adjacent to Bacon County Airport in Georgia, USA; a solar forest at Long Beach, California; and wind turbines on the roof of the airport administration building at Boston-Logan International Airport. Uniqueness is not always a positive, however — the car salvage yards and ‘tyre mountains’ that used to ring Brown Field (a small general aviation airport near San Diego) may have earned revenue from land rents but, as well as being a real eyesore, the income meant management became less focused on addressing fundamental issues in the core aviation business, which probably undermined the long-term health of the overall business.

Finally, in recent years, many airports have increasingly become equity and/or operational partners in airport
privatisation and public–private partnerships (PPPs) worldwide. This is a way of airports earning additional income, but also recognises that their own locations may limit the potential to grow. By expanding their geographic footprint, they can access higher growth markets to strengthen revenue, while also mitigating against traffic and business risks within their own markets.

**Deliver a great passenger experience**

The interdependencies within the airport business strongly suggest that customer-facing issues need to be addressed. For example, with the move to airside-dominated retail in recent years, simply having a great retail facility is no longer a guarantee of enhanced revenues. If passenger propensity to spend is reduced by the stress of queuing, either at security or within the retail outlet, and the time available to browse the retail offer is reduced as a result, then revenues will be lower. As with so many aspects of the airport business, adopting a holistic perspective can help to build greater resilience into overall airport profitability than can be achieved by looking at individual areas in isolation.

Although airports can rarely afford to develop lightly used facilities, from a commercial perspective they cannot afford to delay expansion for too long either. Poorly designed space, passenger congestion and counter-intuitive way-finding are not conducive to high retail spending. If a passenger’s journey through an airport is intuitive and stress free, and they have good sight of the whole retail offer, they are likely to spend more money. Shops hidden in corners generally do not trade well, but strategically sited retail anchors can draw passengers to less well sited adjacent areas, acting as magnets to help drive up revenue in the adjacent stores.

Equally, providing information such as signage or layout plans all helps passengers to better orient themselves. In recent years, the use of smartphone apps has helped airports to overcome some of these issues and optimise revenues within the physical limitations of their terminals. Digital technology is now allowing airports to increase their revenue from advertising, without cluttering the terminal with more and more hoardings.

Security is a major bottleneck in many airport terminals. Long queues, excessive delays and poor customer service at security both exacerbate passenger stress and use up valuable time. The higher the stress, the less likely they are to spend in the airside concessions which they encounter immediately after security. Some studies have shown that longer queues at security equate to less revenue, as passengers have less time to shop. The key metric is airside dwell time: time lost getting airside leads directly to lower revenues.

Social media plays an increasing role in airport communication, and provides the opportunity to promote offers and build loyalty with the passenger. There are play areas for children in many airports that help parents to relax and put them in the right frame of mind to shop.

In summary, investment in the passenger experience is an essential ingredient for developing revenues that are more resilient. With the low-cost carriers increasingly driving growth and investment decisions, however, the demand for lower charges means that airports can reduce their investment risks and improve resilience by only providing relatively modest, common-use facilities and directly charging carriers for
additional bespoke services or facilities they may want.

Focus on operational and infrastructure flexibility
Since airports have a high proportion of fixed costs, it can be difficult to respond quickly and effectively to a change in circumstances. A reduction in demand is generally difficult to offset through decommissioning facilities or reducing staffing levels.

Outsourcing is one tactic that has been used by airports both to reduce their cost exposure and to introduce more flexible labour practices and efficiencies. Common examples include contracting for cleaning, security services and car park management.

Airport operating costs are a function of both demand and infrastructure. Cleaning, heating and lighting costs are as much determined by the size of the terminal as they are by the number of people using it. This makes it harder to reduce costs quickly, but outsourcing and technological advances are providing potential new ways to better flex operations in line with demand. This is especially relevant at an airport where there is considerable peaking in the airline schedule.

Correctly sizing expansion facilities is one of the most critical commercial decisions airport managements have to make. Given the time that it takes to develop new facilities, and the risk that demand may change considerably during the period of construction, this is especially challenging. Using a modular approach and avoiding building additional facilities for use by one airline can reduce future risk. Although it may add to the overall costs in the long term, it can improve the resilience of an airport’s profitability to changing market conditions. New developments do not merely solve capacity needs: they can also maximise potential revenue, and retail planning is now more commonly at the heart of terminal planning and design.

Unless concession obligations define otherwise, airports can typically defer investment or maintenance decisions by a few years if market conditions change. Safety demands that maintenance issues cannot be ignored, but in the short term they can be prioritised and managed to offset financial pressures.

Case study: Budapest
In February 2012, Budapest Airport had to respond to the collapse of its national carrier, Malév. The response of management provides a case study of how airports can respond to disruptive change and capitalise on the opportunity created from adversity.

In 2011 Budapest handled almost 9 million passengers. Malév was the main carrier, accounting for 37 per cent of the airport’s passengers; it was also the airport’s most important customer, generating almost 50 per cent of its income. Within just five days of Malév ceasing operations, other airlines had taken over 60 per cent of its point-to-point traffic. By the end of 2012, the year-on-year fall in arriving and departing passenger numbers at Budapest Airport was only 4.7 per cent. As Malév used Budapest as its hub, some 1.5 million transfer passengers were lost permanently, but within five weeks 80 per cent of the point-to-point traffic had been taken up by other carriers. Although many network carriers ramped up services, it was the low-cost sector — primarily Ryanair and Wizz Air — that took advantage of the Malév collapse.

Budapest Airport initiated a series of coordinated actions to rebuild the traffic
base and to mitigate the financial impacts of the Malév collapse.

**Traffic replacement**

On the day of the Malév bankruptcy, Wizz Air and Ryanair announced the launch of nearly 40 new routes, recognising the strategic opportunity which had been created by the demise of Malév. This had impacts on other European airports, which quickly adjusted their seasonal schedules to provide airlines with the aircraft capacity to aggressively target the vacant Budapest slots. Network carriers also responded. Within 72 hours of the Malév announcement, Lufthansa and Air Berlin launched new services. During 2012, Aegean Airlines, Brit Air, Transavia and Blue1 all launched new routes from Budapest, while Ryanair operated 28 routes and Wizz Air launched ten new daily flights, upping the number of its aircraft based at Budapest from four to six. Many other airlines also reacted to the situation by increasing the frequency of existing flights or expanding their capacity by using larger aircraft to serve Budapest. As a result, load factors improved significantly, but the number of aircraft movements fell by around 23,000.

While management was very proactive in its response to the collapse of Malév, it is also true that many airlines had been anticipating the situation and rapidly adjusted their networks to take full advantage of it. They recognised the strategic opportunity to grab market share, and quickly moved capacity from lesser performing routes.

Budapest Airport’s market share for low-cost carriers increased from 26 per cent in 2011 to 52 per cent in 2012. To meet the new requirements of full-service and low-cost carriers within the confines of a single terminal building, the airport not only developed different service levels but also created separate areas on the apron. Airlines can now choose between different levels of service (with associated differences in cost) that are in line with their needs — for example, the airport has introduced a differentiated gate boarding product.

There are two aspects to note in the Malév collapse. First, the underlying strength of the Budapest market, which was growing strongly before the Malév collapse, was attractive to airlines, and airport activity had been constrained in the years leading up to the crisis by the dominance and financial weakness of Malév. The rebuilding of the traffic base did not significantly dilute aeronautical revenue yields as one might have reasonably expected. Secondly, Budapest Airport had an organised air service marketing team that had prepared for the eventuality of a Malév collapse and may have already had draft agreements in place with other carriers. It was therefore able to respond immediately and rapidly to the opportunities that quickly emerged.

**Operational and infrastructure efficiencies**

Management undertook a number of immediate actions to reduce the direct costs of operations. First, they closed the old Terminal 1 and concentrated all operations at Terminal 2. This not only immediately reduced operating and maintenance costs, but optimised commercial revenue, since T2 included a recently enhanced commercial offer, known as SkyCourt. The retail offer in T2 was then fine-tuned to reflect the new passenger profile. T1 reopened in 2012 as a conference and event venue, providing new commercial opportunities. This highlights the benefits of having infrastructure capacity that is flexible and that can be adapted to market conditions.
In addition, the airport accelerated a planned cost-reduction programme. Wages were frozen, the headcount was reduced by 25 per cent, and new working practices and shift patterns were introduced. Given that Malév was the main cargo customer, a planned cargo city development was deferred, and instead some existing buildings were refurbished to be let. Recognising the importance of a diversified revenue income, especially with the loss of income from Malév, which had leased various buildings at the airport, planning for the development of a new business park continued.

Taken together, these responses meant that Budapest Airport’s earnings before interest, taxes, depreciation and amortisation (EBITDA) fell from €104m in 2011 to €100m in 2012, so profitability fell proportionately less than traffic volumes. This demonstrates that, in replacing the Malév traffic, the airport had not significantly diluted its yields, and that its aggressive cost control and efficiency measures had mitigated the effects of the inevitable short-term drop in commercial and property income.

**The takeaway**

The overall lesson from the Budapest Airport/Malév episode is that airport management had prepared well in advance for the potential collapse of its largest customer. They had analysed its repercussions, understood their business risks and prepared business contingency plans. They did not simply focus on traffic replacement or emergency cost reduction, but took a series of coordinated actions that ultimately minimised the negative impact on profitability. An interesting question is the extent to which the private ownership and operation of Budapest both allowed — and indeed required — it to plan for and respond to events in the way it did.

Since 2012, traffic has continued to grow at Budapest, and it expects to handle more than 9 million passengers for the first time in 2014 — more than before the Malév collapse. The airport also successfully closed a €1.3bn refinancing in September 2014, during which the resilience of the airport’s business model was a key focus.

**WHAT DISRUPTIVE FACTORS WILL CHALLENGE RESILIENCE IN THE FUTURE?**

As one of the most globalised industries, air transport is subject to continual change, and there are many potential disruptive factors — some, which we have seen before, will always be with us; some will be brand new and some of these will be completely unexpected. Typically these are considered as downside risks, but resilience is about capitalising on emerging opportunity as much as it is concerned with containing risk.

**Airlines**

The airline industry is in a state of constant flux. The impact of the low-cost model on short-haul travel over the past 20 years has shown how significant the effects can be. It has provided growth opportunities for many airports, but on the other hand it has brought greater competition between airports and put pressure on aeronautical revenue. Combined with the introduction of private sector investment in airports, this has led to a greater business focus and a more commercial mindset.

Looking ahead, there is increasing expectation of the long-haul low-cost model proving viable, as Norwegian and Air Asia X are currently attempting to prove. This, along with the availability of new aircraft models such as the Boeing
787 Dreamliner, could mean that more airports will be able to support direct long-haul services that could trigger both expansion and higher income.

Airlines are aware of their own demand risks and have been improving their resilience by significantly growing ancillary revenues. These might initially compete with the commercial offer at airports, but in the long term we could see the emergence of a more cooperative approach between airlines and airports which puts passenger experience first and ultimately yields greater income for both airports and airlines.

**Competition**

In many markets, there is likely to be greater competition from surface modes, especially high-speed rail in Europe. Governments are increasingly seeking to develop high-speed rail services and — as we saw with the impact that Eurostar has had on London-to-Paris air traffic — this could materially affect demand on some routes.

**Regulation**

The passenger experience is likely to continue to become a more important feature of the way airports are regulated. In recent years we have seen this trend worldwide, be it through standards set in PPP concession contracts, or through economic regulation, with aeronautical charge levels linked to meeting predetermined service levels.

This is especially the case in emerging economies, where a key driver of PPP structures is to expand capacity, provide investment for new facilities, leverage international operational expertise and improve the passenger experience. In view of this, PPP contracts increasingly involve a number of qualitative measures such as minimum level-of-service targets, facility availability and queue time metrics. Performance is often assessed through passenger surveys, and leads to financial penalties or incentives.

Regulation is therefore expected to focus more on outcomes, not merely on cost recovery. Meeting environmental targets, such as emissions or carbon footprint, can be expected to be incorporated more commonly in the future, as more sophisticated regulatory structures emerge that take a more holistic perspective.

**Climate change**

As well as the need to design more resilient infrastructure to withstand increasingly extreme weather, airports will need to become much more aware of their carbon footprint. At first glance this would seem to imply lower or capped traffic growth and thus constitute a material threat. Technology advances could enable a reduction in carbon, however — for example, through the reduction in the transport of products that comes from the growth of online shopping, the installation of smart lighting/heating in terminals and smart parking to reduce vehicle emissions.

Given that a significant part of an airport’s directly controllable carbon emissions come from surface access, measures to reduce this will become an increasing business imperative in order to ensure that the core aeronautical business can still grow. Pressure may grow for greater accessibility to public transport, and an increase in its use could reduce car park revenue.

The move to market-based measures to meet carbon neutral goals, such as proposed by ICAO, will introduce a further financial dimension to emissions management. Managing rising demand within a constrained carbon and emission footprint will be a key challenge for the future, and one that new aircraft technology alone,
for all the emissions reductions and fuel efficiency increases that it offers, may not solve. Climate change may also present an opportunity for airports — the falling cost of solar panel technology could enable airports to leverage their property portfolios and introduce new income streams.

Security
Ongoing changes in security threats and screening protocols have been one of the biggest disruptive factors in commercial aviation operations, especially after the terrorist attacks in the United States on 11 September, 2001. The underlying factors that led to these terrorists attacks largely remain and aviation still appears to be a favoured target. As such, we can expect further changes to screening protocols as threats change and are better understood. Investment in new technology is the obvious response, given ever-tighter constraints on terminal space combined with the commercial, operational and customer service imperative to keep security queues short. Screening techniques that avoid separately scanning laptops and liquids are already available, and their adoption is likely to expand significantly. For example, IATA’s Smart Security Program (SmartS) has the aim of establishing a faster, more convenient and less intrusive checkpoint process by early 2020. In the United States, the Transportation Security Administration (TSA) pre-check system for frequent travellers has been successfully deployed at many major airports. The greatest challenge now will be persuading aviation regulators to accept new security technologies and processes, especially in the context of heightened global security threats.

Over the longer term, improvements may mean that less staffing is required which, given that security staff costs are one of the largest single operating cost items at many airports, could materially improve profitability.

Automation has transformed many other industries in the past 20 years; it is hard to envisage that airports will be any exception, and automation of the baggage handling process in particular offers real opportunities. Most airports still rely on a very traditional, labour-intensive baggage handling and screening operation. Automation and high-speed checked baggage screening systems hold out the prospect of greater efficiency, reliability and availability and reduced cost, although the initial investment costs may be high.

New technology
The advent of the internet was one of the catalysts for the development of the low-cost carrier market, and new technology is increasingly likely to be disruptive to ‘business as usual’. The spread of smartphone technology provides opportunities for enhancing commercial revenues, and social media provides a means whereby airports can engage directly with their passengers in a way they have never hitherto been able to do. This looks set to transform the traditional retail experience (and the general overall airport experience), giving airports the prospect of boosting their commercial revenues from a smaller physical footprint. Although this provides an opportunity for smaller airports, it may also allow larger airports to reduce the costs of their terminal operations and logistics support.

Airports enjoy the commercial benefit of a highly captive market, but the way shopping patterns on the high street evolve will translate over time to airports. Virtual shopping is already taking place at airports around the world, with schemes allowing passengers to have purchases delivered to
their homes or offices becoming more widespread. At London Gatwick, passengers can now order goods online using iPads, and the supermarket Tesco has established a virtual store so that holiday-makers can have groceries delivered for when they return home. Retailers will become more sophisticated and the experience more personalised. For example, in the same way that online retailers track buying habits, some retailers have started to ship their products and capture the sale data, so that when a customer returns to the store the staff can immediately see their previous purchases and profile. This growing use of sophisticated retail and passenger profiling techniques means that airports will need to keep pace with the latest trends, technology and techniques to ensure that the commercial offer is personal, fresh, vibrant and relevant, so as to deliver future revenue increases.

The overall airport experience

The whole airport experience will always need to reflect changes in consumer taste and expectations, be it from the retail perspective or the way in which passengers move through the airport. While check-in desks have steadily been replaced by self-service kiosks over the past ten years, in the next ten years the idea of a podium check-in may seem outdated — in much the same way that human toll collectors at toll road and bridge facilities are becoming relics of the past. Again this provides opportunities for airports to ‘do more with less’, but will require both changes in philosophy and investment in new technology to realise the benefits.

Passenger profiling is often suggested as a way of improving security and efficiency. This raises legitimate privacy and discrimination concerns, but the use of mobile technology does offer the potential to develop a less intrusive experience and deliver commercial upsides. For example, passengers could enter their information ahead of immigration or security, reducing the queue times at common bottlenecks. Future generations will not have the luxury of simply building new capacity when required, but technology may provide an alternative way to remove the common friction points from the passenger journey.

Similarly, the increased adoption of biometric techniques creates a platform for more passenger self-service in areas such as check-in, bag drop-off, security clearance and boarding. QR codes are already being used to streamline the ticket check process, but biometric solutions are also likely to transform the retail experience and point-of-sale. For example, loyalty programmes could be established. Overall, the enhanced convenience for passengers may offset concerns about privacy.

Technology observers believe that wearable computing could redefine how we use and interact with technology and information. Smartphones may have been hogging the innovation spotlight in recent years, but turning up almost unnoticed until very recently has been ‘wearable tech’ — be it Google Glass, smart watches or smart jewellery. Virgin Atlantic recently evaluated Google Glass on its suitability for facilitating the check-in process and improving the personalisation of the customer experience. Over time, the confluence of wearable technology, biometrics, profiling and automation can potentially provide a more seamless — and highly customised — airport experience for passengers.

CONCLUSIONS

Airports are typically resilient businesses. Research by LeighFisher indicates that, from 2000 to 2012, EBITDA as a
percentage of turnover rose at a compound annual growth rate of 1.1 per cent across a basket of 50 airports worldwide, as illustrated in Figure 3. There are few examples of a commercial service airport closing (unless it is being replaced by a new greenfield airport in the same region), whereas there have been many airline bankruptcies, especially in the deregulated era. That in itself creates risk for airports, given that an airport’s revenue is vulnerable to traffic fluctuations. Airports, however, can counteract their vulnerabilities with commercial activity to enhance long-term revenue resilience more effectively than other types of infrastructure.

Privatisation over the past 25 years has brought a greater focus on airports’ financial performance, and short- and longer-term resilience is therefore under much greater scrutiny, particularly in view of the fact that the airline customer base has, historically, been financially fragile. For an investor who is a minority shareholder, resilience is especially important, as they cannot directly effect change. A controlling stake in an airport at least provides the ability to force through change to safeguard investor interests, if the need to do so arises.

Airports already have many resilient features, but contingency planning, risk profiling, and managing dependencies can further enhance resilience. Regular strategic planning exercises can be useful in identifying the future challenges and in developing strategies that can respond to change and capitalise on opportunity. One cannot predict what lies round the corner, but it is prudent to look ahead in as comprehensive a manner as possible, since to rely on a single strategy, or plan for only one possible future, is inconsistent with enhancing business resiliency.

As the future unfolds, airports will need to be, and remain, alert to the rapid changes now taking place on every front. Regulation and business priorities will, increasingly, converge on improving the passenger experience, but within the context of a constrained operating and infrastructure footprint. Managing the risk of market, regulatory and environmental disruption is one aspect of building resilience. On the positive side, though, new and potentially disruptive technology has the ability to deliver greater profitability from enhanced revenue, passenger experience, processing efficiency and airport capacity. But in view of the unpredictability, as well as the exciting possibilities of the future operating environment for airports the world over, both safety and operational resilience priorities demand that they need to be on the leading edge, rather than the bleeding edge, of change.