Managing Airports—from Brexit to Self-Connect: A Selection of Articles from ICF

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Introduction

I am delighted to offer you this selection of articles and thought pieces from my colleagues at ICF Aviation. The range of topics encompassed in this booklet is illustrative of the diversity of issues that clients ask us to engage on in the course of our project work.

As aviation consultants we increasingly observe that pure technical aviation issues are rare. The issues we grapple with are a nexus of political, financial and operational concerns. Brexit is a good example of this—airports face the real possibility the UK may no longer be a European Common Aviation Area, with consequences for airline route networks and the way airlines structure themselves. Airports also must grapple with the wider economic consequences of the likely Brexit mode.

ICF works as extensively with airlines, aircraft manufacturers and governments as it does with investors and operators of airports, and we therefore believe that we are well placed to understand and make sense of the multi-faceted nature of the aviation business.

If you would like a more in-depth discussion about any of the issues we raise in these articles please feel free to make contact.

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Disruption Dilemmas:

Navigating Uncertainty in Airport Business Plans

By Kata Cserep, ICF

Forecasting used to be a relatively simple task. You would plot history on graph paper, get your favourite ruler out, draw a trend line and keep going.

If you were a bit more sophisticated, or when I started working in this field, you would establish a hypothesis for what might explain growth, collect as much historical data as you could, feed this into an econometric model, estimate your coefficients, input some independent variables and produce a set of outputs. You would feel relatively confident about the forecast, subject to the usual caveats about the independent variables.

For the last five plus years, however, the majority of airport business plans that we have advised on have involved structural change, capacity issues, policy change or external shocks, which do not lend themselves as well to econometric approaches. This is not to suggest that there is no longer value in using econometrics in long term forecasting; there is.

For example typical questions we are asked include:

- What happens if my main airline collapses or leaves?
- What if Heathrow gets another runway?
- What if bilaterals with China are relaxed?
- How will high speed rail impact my domestic passengers?
- What will the lifting of the 5/20 rule mean for my airport?

These are not the type of questions that can be answered by backward-looking modelling, as these events have generally never happened at the airport in question so they will not be embodied in historically established

correlations (although other shocks may be contained in the historical numbers which may or may not be comparable with those future shocks that are troubling our clients).

But investors and operators are certainly right to ask these questions because they can have a huge impact on an airport, often in a short space of time, often with relatively little notice. Investors, particularly in the private equity community, may be seeking an exit within a five-ten year horizon and therefore be very much focussed on the short term—they do not take kindly to an econometric forecaster telling them it will all come out in the wash over a fifty year horizon assuming a constant traffic elasticity to GDP. For example, Malev had limped along for some time, and then very quickly disappeared in the winter of 2012. The subsequent back-filling by Ryanair and Wizzair can certainly be considered a success, and an ex-ante analysis of the traffic base at the airport would have provided some reassurance that much of the traffic was resilient, but what of the aero and non-aero revenue mix following the dramatic decline in long-haul? The changing demand on infrastructure? These have a very real impact on the financial performance of an airport asset.

So, what have we learned, and what would we advise airport owners and investors, in this ever more unpredictable and volatile world?

A brief overview of the five general approaches that are used in airport business planning follow.

1. Monte Carlo Techniques

These can be useful in cases where the relationship with independent variables is strong and data are of a good quality. Monte Carlo simulation generates a large number of possible forecasts based on the historical variances in the independent variables, and applies them to the future assumptions. The results can be quite informative and provide a good indication of the range of possible outcomes. It is however only useful when your input variables can be described by a continuous distribution and is thus less useful for modelling discrete shocks.

2. 'P50' Cases versus 'P80'

As forecasters we are often asked to produce a forecast which has a certain level of probability of delivery (P80 = 80% probability of achieving at least the forecast value [i.e. a P50 has an equal chance of being lower as higher, and so generally equivalent to base]). What 'P80' generally comes down to is removing upsides from our base analysis—that new route to Beijing that we project for 2018 probably goes missing in a P80 case. This may be considered analogous to the band produced by Monte Carlo along a continuous range of inputs, but instead modelled with more discrete inputs and guided by judgement at the time of the forecast.

3. Scenarios and Sensitivities

Scenarios and sensitivities are often used inter-changeably although technically speaking a scenario is a set of assumptions, while a sensitivity is the varying of one assumption. For example, we may run a scenario where a new entrant sets up a hub at an airport, tourists from China double and airport charges fall 5%. A sensitivity may be to vary local GDP by half a percent over the forecast period. These can also be informative, provided the right questions are asked. Sensitivities generally lend themselves better to econometrical models, while scenarios often require a greater degree of judgement, the use of benchmarks, comparators or case studies. An interesting question to consider is how these sensitivities/scenarios are used to inform decision making. For example, when an investor is bidding to acquire an airport asset, what is the appropriate value or weight to be placed on each scenario? How do you decide what to bid on when you are faced with 40+ scenarios that give a range of +/- 50% around a base case? Interestingly in our experience this call is not one that the forecaster is often consulted on. This is where the user or audience of the forecast can be a major determinant.

4. Debt versus Equity Cases

We are often asked to deliver a different forecast to potential debt providers on a deal to the one delivered for equity. Sometimes but not always 'debt' will commission a separate piece of work from a different technical advisor (TA) which is either done from first principles, or is a critique of the equity providers TA's work. This comes down to the production of a 'P80+' case that is shorn of upsides and in which cash flow to debt is safe. Further stress tests on a debt case can involve a variety of shock scenarios including collapse of a major airline, a major recession, WW3, etc.

5. Dealing with Uncertainty Through the Discount Rate

The principle is often that specific risk, such as the route to Beijing not arising, is dealt within the business plan whereas more systemic risks (risks arising from the country where the investment being made, or the premium demanded by equity) are dealt within the discount rate. We note that advisers and their clients are not always consistent in identifying where systemic and specific risks are to be addressed (e.g. shading a traffic growth forecast in a particular country because it is regarded as risky whilst simultaneously adding a country risk premium to the discount rate). This can of course have a meaningful impact on the business plan.

Some Recent Examples

Three recent examples help to illustrate the type of business plan shock that airport investors and operators may be facing, and the different considerations for exploring and managing the uncertainty in each case.

Brexit

In one of the many political surprises of 2016, the UK electorate voted to leave the EU in June 2016. The impact on airports can be traced to several pathways, including:

- **Uncertainty**—This can lead to delays to holidays and business investment decisions, as potential travellers adopt a 'wait and see' attitude.
- **GDP impact**—Any expected and actual change in GDP, which is generally expected to be negative relative to pre-Brexit, is likely to have a correlated impact on total air travel demand.

List of selected airlines that have disappeared in the last decade:

- Eos (2008)
- XL Airways (2008)
- Zoom (2008)
- Mexicana (2010)
- Kingfisher (2012)
- Spanair (2012)
- Malev (2012)
- Cyprus Airways (2015)
- Transaero (2015)
- VLM (2016)
- TranAsia Airways (2016)

- **Foreign exchange impact**—The devaluation of the pound (15% against the USD, 10% against the EUR, as of November 2016 relative to June 2016) has had an immediate impact on the purchasing power on both outbound and inbound visitors. The former are generally worse off, the latter better off, ceteris paribus, as the pound has become weaker against these major currencies.
- **Aeropolitical impact**—Brexit has raised several aeropolitical scenario options, including the UK leaving the European Common Aviation Area, depending on the terms of the exit that are eventually negotiated. This could have significant impacts on both UK and European airports, as airlines adjust to new licencing and bilateral arrangements. The freedom to carry passengers from any EU country to any other EU country could for example not be available to UK airlines; nor could Ryanair, an Irish registered airline, potentially be allowed to transport passengers between the UK and third countries. This would inevitably results in winners and losers.

When modelling the possible impacts of Brexit, it is important to be clear on the scenario in question. What exactly do you assume about each of the above pathways and the exact political process that is yet to be defined?

Furthermore, one must reflect airport specific differences, since not all airports will be affected in equal measure (or even the same direction). For example, Heathrow has a relatively balanced mix of inbound and outbound passengers, which provides some counter to the UK GDP impact through foreign exchange benefit. In contrast, a largely outbound UK airport such as Manchester or Newcastle, could have more to lose from the foreign exchange impact (unless of course there are other factors such as airline deals that provide some certainty).

Therefore, when modelling Brexit impacts, ICF recommends developing clear scenarios that are tied to airport specific bottom-up and long-term forecasts.

National Planning Decisions

Planning decisions impact the total volume and distribution of capacity in an aviation market and can impact passenger choice by altering the availability and relative attractiveness of different options. A recent well-known example is the London runway debate, but others include night noise restrictions in Frankfurt and other cities, plans for further extensions to China's high speed rail network or the construction of a new airport in any major city.

When forecasting, investors and management need to consider the market for the airport in question and identify if any planning decisions are likely to impact the airport or one of the competitor airports. If so, they also consider which traffic segments are likely to be most affected.

For example, when modelling the likely impact of a third runway decision on the rest of the London system, we considered each traffic segment in turn to assess that long haul was more likely to switch or prefer Heathrow, than for example short haul LCC due to significant difference in future charges. Of course this is just one element of the decision, and other factors we considered included passenger distribution by district, surface access, overall cost of travel and price elasticity of demand.

Disruption Dilemmas: Navigating Uncertainty in Airport Business Plans

Other examples we have worked on include the impact of rail links such as Edinburgh or Barcelona, high speed rail competition in France (Toulouse and Lyon), local planning permissions at London City airport or the impact of new competing greenfield airports such as Navi Mumbai or the new Goa airport. In the face of national or local planning decisions, ICF recommends scenarios that clearly define opening date of new capacity (remember these WILL change), segment-by-segment consideration of competition and appropriate case studies or benchmarks.

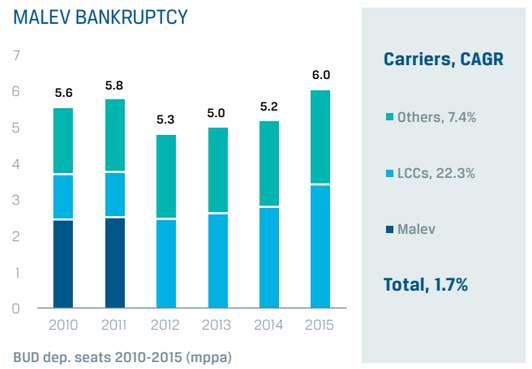
Airline Collapse

Airline collapse is a relatively common concern for investors, as airlines have a habit of collapsing.

From a business plan perspective some of the main questions to consider are:

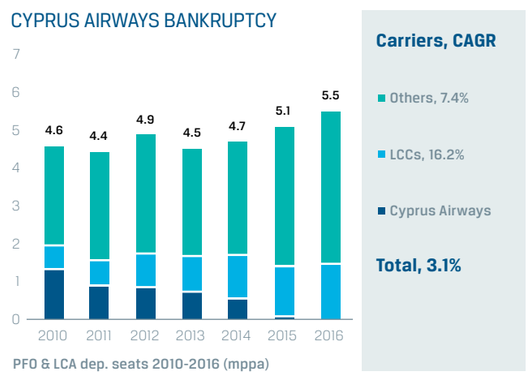
1. How dependent is your airport on transfer traffic?
2. What is the health of your current airlines overall and how does your airport fit into their network?
3. What routes might be at risk (either through low traffic base or overcapacity) and which are likely to get replaced if the current operator pulls out?

In the Malev collapse of 2012, Ryanair and Wizzair stepped in quickly to fill the short-haul O&D market, but not the long-haul or transfer segments that were a core of the Malev network. By 2015, seat capacity exceeded the previous peak of 2011, before Malev's collapse, but aircraft movements remain below those levels.



BUD dep. seats 2010-2015 (mppa)

Similarly in Cyprus, total capacity has increased 17% since the collapse of Cyprus Airways in early 2015, with both LCC and full service carriers stepping in to take advantage of the vacancy.



PFO & LCA dep. seats 2010-2016 (mppa)

ICF recommends route level airline forecasts supported by analysis of O&D and transfer, as well

as load factors if possible. This can help to provide a much more reliable picture of what current and future airlines are likely to do in the face of a supply side shock.

Key Issues for Considering Uncertainty in Airport Business Planning

For an investor or operator facing the challenge of making decisions in the face of considerable unpredictability, the following main areas are worth considering.

1) Demand and supply fundamentals of the airport

- Why does the airport exist? Why are airlines operating here and how are they thinking about my airport? How much of my customer base is 'solid'? How much is more 'flighty'?

2) Industry trends and their likely impacts

- Are new aircraft going to open up my airport to new markets or are they going to enable my competitors to bypass my hub?
- Is distribution technology going to bring a swathe of self-connecting travelers to my airport who will put pressure on my terminal facilities?

3) The uses and users of the business plan

- What are my near term versus long term objectives, and what is my risk stance?
- When should forecasts be produced and updated? There is unlikely to be much value from updating an entire airport business plan model every time CAPA shows a press release about a possible new route. This is just noise. However, for protracted bid processes, it is appropriate to keep updating forecasts if significant new information becomes available (e.g. policy change announced, major supply side development, etc.). It may be inconvenient for the master planners but it will ultimately result in a better plan—one which is less likely to be 'wrong' from day 1.
- Similarly, following the acquisition of an airport it is more than just advisable to refresh forecasts and plans. A bid case is unlikely to be the best ongoing management tool for the first two years of ownership in such a fast moving industry.

Disruption Dilemmas: Navigating Uncertainty in Airport Business Plans

About the Author

Kata Cserep joined ICF in 2005. Ms. Cserep leads ICF's airports practice and regularly advises airports with longer term strategic advice relating to traffic, pricing, regulations, incentives, and transactions. She is an expert at communicating the key demand and supply issues facing airports and the implications for business planning.

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Airport Infrastructure Lite – What are the Next Investment Opportunities after TCR?

By Simon Morris, ICF

Abstract

With growing competition and a limited pipeline of airport transactions, airport investors are increasingly turning to ancillary airport businesses as a means to accessing the aviation asset class.

The 2016 sale of TCR, a ground service equipment leasing provider, attracted significant interest from both private equity and infrastructure investment firms. Ultimately, the company was acquired by 3i and Deutsche Alternative Asset Management—both investors associated with more traditional infrastructure investments. The type of investor TCR attracted indicated that it was considered to have the potential to offer infrastructure-like return characteristics.

As the market leader in its sector, the TCR opportunity could be considered a "one-off". However, the success of this transaction indicates that other similar transactions may follow. In this white paper, ICF explores the infrastructure characteristics of the TCR case and considers other businesses associated with airports that could attract infrastructure investors.

Airports – A Saturated Asset Class?

For the last two decades, airports have gained prominence and acceptance as infrastructure assets though they do not initially appear to meet all the characteristics of a "classic" infrastructure investment. Airports are protected by high barriers to entry, robust cash flows and sound regulatory safeguards, but they are also at risk from airline collapses, modal competition and price erosion. Despite these risks, their success as a class of infrastructure asset is apparent from the line of investors that forms around any new airport transaction opportunity and the high multiples of EBITDA (and multiples of RAB) that are paid.

The shortage of airport investment opportunities and fierce competition for airport assets has caused many investors to consider related types of assets. Current thinking indicates that such businesses may slip under the radar of more orthodox funds and for that reason constitute relative bargains in a sellers' market.

This thinking explains why TCR attracted such intense investor interest.

What Defines "Infrastructure Lite" Business Investments?

While TCR demonstrated many infrastructure investment characteristics (e.g. barriers to entry and a strong market leading position), these characteristics were set against intense competition and low margins in the ground handling sector. This type of business is better defined as "infrastructure lite".

The TCR Case Study

TCR is a Belgian-based entity that specialises in leasing ground support equipment (GSE) to ground handlers—the unglamorous tugs, tractors and ground power units that keep an airport's ground operation functioning. When considering whether or not TCR could be considered infrastructure, we found that the company presented a balance of attributes that both met and did not meet traditional infrastructure characteristics.

Is TCR Infrastructure?

Yes: TCR grows with worldwide aviation demand and is itself closely linked to GDP. Additionally, to maintain and operate GSE, TCR enjoys airside access to airports. Because that access is scarce—limited by security, regulation or governance at most airports—it creates a barrier to entry for others. TCR also holds a strong market leadership position where "pooling" of GSE is demanded by airports because of environmental and traffic considerations. TCR actually pioneered the concept of fleet pooling at Heathrow in 2004. By collectively owning and renting back an airport's GSE equipment, pooling effectively creates a single GSE operator at the airport.

No: TCR's association with the ground handling business appears at the outset to be unhelpful as a sector where cutthroat price competition and low margins are endemic. GSE asset lives are typically short and the acquisition cost of individual GSE assets is low (not usual features of infrastructure businesses).

Clearly, TCR is not a pure infrastructure asset, making it harder for investors to build a business case to justify paying infrastructure multiples. However, the company does offer a sufficient number of attractive infrastructure characteristics to be considered "infrastructure lite", explaining why it attracted competitive bids from multiple infrastructure investment players.

Airport Infrastructure Lite

Identifying Airport Ancillary Business Infrastructure Lite Investments

Following the successful 2016 sale of TCR, investors will be considering what other types of business at an airport could be classified in the same way. We have used a four-step process to consider this question.

Step 1: Determine Airport-Related Activities

The first step is determining what other ancillary businesses operate at an airport. Not surprisingly, there is a vast range of undertakings, even just considering the immediate terminal and airfield context before taking into account MROs, hotels, cargo terminals and other freestanding activities. Exhibit 1 provides some examples.

EXHIBIT 1. EXAMPLES OF AIRPORT-RELATED ACTIVITIES

Terminal

- Baggage handling systems
- Lifts, escalators and walkways
- Jet bridges
- Terminal seating
- Common Use Terminal Equipment (CUTE)
- Flight Information Display Systems (FIDS)

Airfield

- Airfield lighting and signage
- Pre-conditioned air
- Fire and rescue
- Meteorological services
- Vegetation management
- Ground Service Equipment (GSE)

Step 2: Identify Target Companies

The second step is to identify the companies operating in each of the ancillary business areas. ICF has conducted this exercise, producing an extensive database (longer than it is possible to present in this paper). Interestingly, many of the businesses identified are already private equity owned, and given that the path for TCR was from private equity to infrastructure fund, private equity ownership could be regarded as a first step in "re-rating" businesses as infrastructure.

However, for various reasons, the list of realistic potential targets is much shorter. Many airport ancillary businesses can be excluded on the basis of lack of scale. Additionally, a significant sub-set of businesses operate across sectoral boundaries (e.g. a lift manufacturer may have great contracts at international airports, but aviation as a subset of its overall activity is immaterial) thus complicating its value as an aviation asset.

Airport Infrastructure Lite

What type of airport ancillary business might make good infrastructure lite investments?

Investors should look for airport service businesses that go beyond a one-off sale to sales which benefit from an ongoing relationship and may involve maintenance, asset renewal or even potentially operation of an activity at an airport.

Step 3: Assess Their Potential for Long-Term Airport Relationships

Possibly the most important step is to question whether ancillary businesses have "stickiness" with respect to the airports they serve. In other words, investors should be on the lookout for businesses that go beyond a one-off sale to arrangements constituting an ongoing relationship. This may involve maintenance, asset renewal, or even potentially operation of an activity at an airport.

For example, after an airfield lighting manufacturer makes the initial sale of a system to an airport, it has a privileged position for airfield lighting asset renewal. Not typically vulnerable to generic replacement of system parts, this arrangement could be associated with a long-term maintenance contract on the airfield lighting system. This supplier is well placed to achieve such continuity, but many airport ancillary businesses are not.

Step 4: Question Infrastructure Characteristics of the Business

From the winnowed-down list, the next question is: Does this business display infrastructure characteristics? In an investment and academic context, the definition of "infrastructure characteristics" appears extremely malleable but often boils down to the elements described in Exhibit 2.

EXHIBIT 2. INFRASTRUCTURE CHARACTERISTICS

In Exhibit 3, ICF has matched the infrastructure characteristics identified above to selected airport-related areas and confirmed that activities such as baggage handling and fuel farms meet many of the infrastructure characteristic boxes and therefore could strongly be identified as airport ancillary business infrastructure lite investments.

EXHIBIT 3. INFRASTRUCTURE CHARACTERISTICS OF AIRPORT-RELATED BUSINESSES

	Barriers to entry	Long duration assets	High upfront costs	Long-term, stable cash flows	Inflation related contract
Baggage Handling Systems	●	●	●	●	●
FIDS	●			●	●
CUTE	●	●		●	●
Jet Bridges	●	●			
Airfield Signage	●		●	●	
Fire and Rescue	●	●	●		
FBO	●	●	●		
Fuel Farms	●	●	●	●	●

This process provides a potentially promising shortlist of investment opportunities. The relevant entities that are currently in private equity hands may potentially be considered ripe for "re-rating" and infrastructure fund interest. For others, particularly those in private hands, the case needs to be made that access to infrastructure fund capital and networks provides opportunities for capital and geographical growth, as was the case with TCR.

ICF expects the airport ancillary business sector to provide many interesting opportunities for infrastructure funds in the coming months and years. We expect the "airport infrastructure lite" asset class to gain more prominence and acceptance, as airports did only a couple decades ago.

About the Author

Simon Morris has more than 20 years of experience in the aviation industry, and his expertise primarily lies in business planning. He leads the London Airport team in projects worldwide, building on work in due diligence and comprehensive business and strategic planning for owners, investors, and private-sector interests.

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Self-Connection Strategies

Capturing the Smart Traveler

By Kata Cserep, ICF

Airport Connections are Changing

The explosive growth of low-cost carriers (LCCs) and retreating traditional network airlines from short-haul services has led to a transformation of the connecting opportunities for passengers, especially at airports where LCCs mix with traditional long-haul hub airlines.

Due to their business models, which focus on simplicity, LCCs do not typically offer passengers a traditional connecting service, which has led passengers to find and make their own connections. These are often preferable, and sometimes are the only option.

There are many reasons why self-connections make sense for passengers:

- **Routing:** Many markets are simply not served by "traditional" carriers. Their focus on higher yielding long haul and their hub nature presents opportunities for new markets to be served through self-connection.
- **Price:** LCCs have a lower cost base so are able to serve the markets at a lower price to the consumer. Also, in some cases, flying on two separate tickets can help to avoid significant aviation taxes.
- **Availability:** LCCs have grown to 30% of global capacity and present significant feed potential with the volumes they currently carry.
- **Schedule:** On many routings with limited service, an LCC option may provide a superior schedule, reducing total journey time.

The fast growing self-connect segment will drive volume and revenue growth at innovative airports.

Self-Connection is Set to Grow

The aviation industry continues to evolve, and numerous indicators support the continued growth of the self-connection market.

- **LCCs driving market growth:** LCC volumes are forecast to double in the next 10–15 years.
- **LCCs evolving:** LCCs themselves are growing new and incremental revenue streams, and connecting options have not yet been fully pursued.
- **Legacy carriers retrenching from short haul:** Airlines such as Air France and Alitalia are cutting short-haul capacity, providing opportunity for other airlines/models.
- **Alliances evolving:** The major alliances are known to be looking at supporting LCC association or "lite" memberships; this will further drive demand for self-connections.
- **Smarter travelers, enabled by technology:** Passengers are becoming wiser to the options available and the savings that can be made through self-connections thanks to booking engines that are now able to create self-connecting itineraries.

What's in it for Airports?

Traditionally, airports have not catered specifically to self-connecting passengers but simply treated them as a subset of local passengers. Many airports have no idea how many passengers make their own self-connections in their terminals. ICF analysis suggests that airports such at Gatwick in the UK could have as many as a million self-connecting passengers a year.

Some airports have woken up to the potential of self-connections, and they offer enhanced transfer products for those on two separate tickets, either independently or via their airline partners. Examples include Changi's Tiger Connect; London's Gatwick Connect, Scoot's Scoot-Thru; and Milan's ViaMilano. Potential benefits for airports from targeting self-connections include:

- Incremental passengers
- Increased non-aeronautical revenues through food and beverage, duty free, and other commercial spending
- Ancillary revenues through advertising, insurance, and brand partnerships

What is the Business Case?

The benefits of a targeted self-connection service do not come free, so it is important that any airport considering this strategy carefully weighs the costs and benefits thoroughly. Geography, the existing network, and regional competition all play a big role in determining the potential scale of the operation. It will also involve some increases in capital and operating expenditures to cater to the increased numbers as well as investments in marketing and airline engagement.

With LCC traffic expected to double in the next 10–15 years, taking action now to understand and address this opportunity is important to ensure your airport attains its full growth potential. Please contact ICF to learn more about this important trend and how we can assist your airport with self-connection strategies.

About the Author

Kata Cserep joined ICF in 2005. Ms. Cserep leads ICF's airports practice and regularly advises airports with longer term strategic advice relating to traffic, pricing, regulations, incentives, and transactions. She is an expert at communicating the key demand and supply issues facing airports and the implications for business planning.

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UK Aviation and BREXIT:
Pragmatism vs Politics

By Edmond Rose and Rob Walker, ICF

One of the greatest uncertainties now facing the aviation community and its investors is regulatory.

Aviation has been an early casualty of the UK's vote to leave the European Union (EU). And no wonder. Air travel is highly influenced by economic headwinds, currency fluctuations, and an uncertain climate for business. The Brexit vote brought the prospect of the full trifecta, while the currency reaction increased dollar-denominated costs for UK carriers and reduced sterling earnings for non-UK carriers.

One of the greatest uncertainties now facing the aviation community and its investors is regulatory. The UK is not only a major part of Europe's aviation—28% of seats flying within the EU operate to, from, or within the UK—it is also interlocked in Europe's aviation agreements. The two most crucial are membership of the European Common Aviation Area (ECAA) and participation in the EU-US "Open Skies" agreement.

Pragmatically, there are plenty of interests at play both in the UK and in the rest of the ECAA which should want the UK to stay within the Common Aviation Area. Irish, Hungarian, and Norwegian carriers have significant operations between the UK and the rest of the ECAA, which potentially become disallowed if the UK is not inside the club. Airline consolidation, still proceeding more slowly in Europe than in the United States, would be hindered by having the UK on the outside. After all, one of Europe's largest existing consolidations, IAG, is anchored by British Airways, a UK carrier.

There are also strong interests in keeping the UK within the EU-US aviation agreement. If the UK is not part of that agreement, a result could be regulatory headaches for the transatlantic joint ventures which include the largest network carriers on both sides of the ocean. UK not being part of the agreement would also disrupt the rights of EU carriers to fly between the UK and the US and UK carriers to fly between EU points and the US, even if they are only sparingly used.

So, there is a good chance that the UK will want to maintain its positions in the Common Aviation Area and within the EU-US agreement, alongside Norway and Iceland. However, politics will also play a part in what actually happens. Aviation is just one area where the UK has to negotiate with the EU.

There are also other negotiating ambitions at play. Within aviation, there are questions such as the European Commission's interest in removing ownership and control rules between the EU and the US, while many in the US have called to restrict access for foreign carriers on grounds of their labour arrangements or alleged unfair competition. The new Trump administration may be more ready to hear these siren calls. These factors could complicate and prolong negotiations and definitely add to regulatory risk.

The pragmatic outcome is therefore not a foregone conclusion. Airlines which are exposed to potential risk from changes in the UK's regulatory position in European aviation are already looking for new ways to serve their markets. That is likely to mean setting up new entities in EU countries (for UK carriers) or in the UK (for carriers from outside the UK). It is no surprise that easyJet is doing just that, making the most of the opportunity to look for the most favourable country to use as a base.

And meanwhile, the airline sector will suffer from continuing uncertainty all round. Nimble adjustment of capacity and cost will be watchwords for some time until the outlook is clearer.

About the Author

Edmond Rose draws on his proven airline leadership experience to lead projects for airlines, investors and suppliers. He has held leadership and senior management positions with Virgin Atlantic and British Airways, and has served as a consultant to the industry on projects ranging from low cost carrier strategy to airport runway slot management. As Director of Commercial & Revenue Planning at Virgin Atlantic Airways, he led Fleet and Network Planning, Revenue Management (RM) and Pricing, Passenger Service System operations, and alliance partnership activities as well as leading strategy formulation. Edmond pioneered Virgin Atlantic's partnership strategy work that resulted in negotiating a profit-sharing JV with Delta Air Lines, then implemented Virgin-Delta code-sharing and RM cooperation. He sponsored the introduction of new fleets of A330 and 787 aircraft into Virgin Atlantic and directed its short-haul start-up project. Edmond also has a background in aviation regulatory matters and has led customer insight and loyalty work.

Rob Walker–see page 29.

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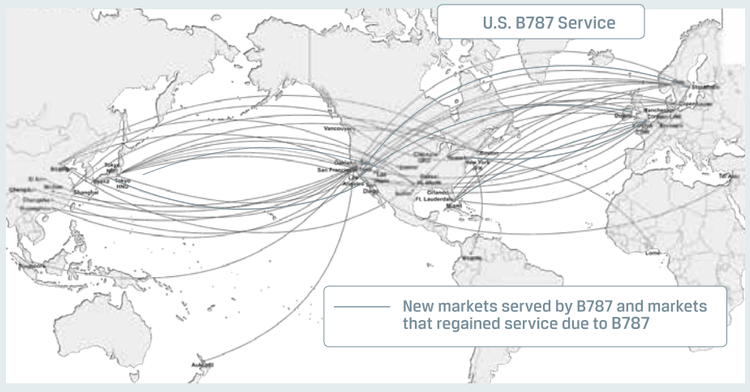
How New Technology Aircraft Are Transforming Air Service Development

By Rob Walker, ICF

The introduction of new technology aircraft marks a change in air service marketing for cities around the globe. These advanced aircraft allow airlines to fly routes that were previously out of range or heavily reliant on large volumes of transfer passengers. They will continue to drive new nonstop services, taking advantage of longer ranges and better fuel efficiency than historical long-haul aircraft. The trend toward new international services from hubs to non-hubs and even long-haul point-to-point will continue to grow, bringing new players and opening new markets at an unprecedented rate. The map below shows new (or regained) routes enabled by the Boeing 787.

INTERNATIONAL SERVICES LAUNCHED WITH BOEING 787 AIRCRAFT FROM THE U.S.



Source: ICF analysis based on OAG July 2016 data

In addition to new routes, a further 100 routes have now switched exclusively to using new generation aircraft types, further reinforcing the trend toward service from a hub to a non-hub airport—or even point-to-point routes—and less reliance on traditional hub-to-hub routes.

A Closer Look at the New Technology Aircraft

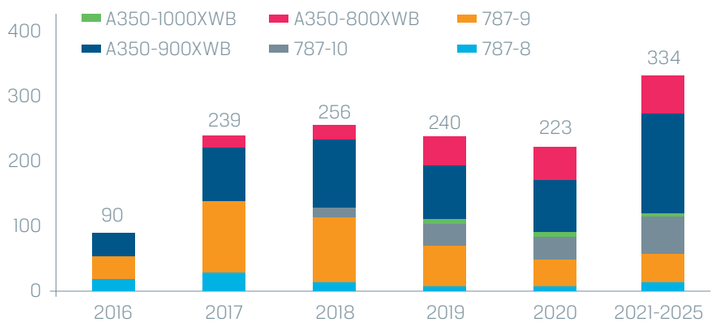
Aircraft such as the next-generation Boeing 777, the Boeing 787, and the Airbus A350 incorporate new airframe, engine, and wing designs for significant improvements in aircraft range and fuel efficiency.

Entering commercial service in 2011, the Boeing 787 "Dreamliner" was the first commercial airliner made mostly of light-weight composite carbon fiber material rather than aluminium, allowing fuel savings of around 20% compared to existing aircraft of similar size. Despite production delays and various initial in-service problems, the 787 has enjoyed a high degree of success becoming the fastest-selling airliner to date since launch.

The Airbus A350, a long-range twin-engine jetliner made primarily of composite materials, is a rival to the 787 and entered commercial service in January 2015. These new fuel-efficient aircraft are allowing carriers to serve long-haul routes profitably that were previously uneconomical with the Boeing 777, Boeing 747, Airbus A340, and other older long-range aircraft.

There are almost 500 Boeing 787 and Airbus A350 aircraft currently in service. As shown on the chart below, nearly 1,400 orders for these two aircraft have been placed by airlines worldwide. By 2020, a further 1,000 next generation aircraft will be delivered. Not all of these aircraft will be incremental to carriers' fleets. Most likely, a majority of the new aircraft will replace current, older aircraft. Asia is the leading market for next generation wide-body aircraft deliveries, with Asian carriers accounting for close to 30% of 787 and A350 aircraft orders as Asian markets boom. Carriers across the world have ordered these new technology aircraft, including the major European and U.S. airlines. Among U.S. carriers, United was the first carrier to operate the 787—commencing in 2014—followed by American, which received its first 787 in 2015. United, American, and Delta each expect additional 787/A350 deliveries ranging from 40 to 65 aircraft over the next ten years.

AIRCRAFT DELIVERIES FOR BOEING 787 AND A350 WORLDWIDE



Source: CAPA Fleets, September 2016

How New Technology Aircraft Are Transforming Air Service Development

Market Upheaval in Scandinavia and China

Recent developments in Scandinavia and China serve as representative cases for the enormous impact when new technology aircraft are introduced to the market. A good example of new markets opening up is the evolution of service between Scandinavia and North America. Historically, routes from Scandinavia relied heavily on the need to transfer either in Europe or one of the East Coast North American hubs. The advent of longer range, more fuel efficient aircraft and Norwegian Airlines' emergence in the market with numerous 787s has facilitated rapid growth in nonstop services between these two continents: most notably, the emergence of nonstop services between Scandinavia and the West Coast of North America, and Scandinavia and smaller East Coast markets.

In 2005, there were 12 nonstop routes between Scandinavia and North America. Today, there are 29 nonstop routes, 19 of which are served by 787s. The number of passengers flying nonstop between Scandinavia and North America has increased 43% since 2013 when the 787 was introduced.

2005 ROUTE MAP BETWEEN SCANDINAVIA AND NORTH AMERICA

2005—12 Routes

2016—29 Routes

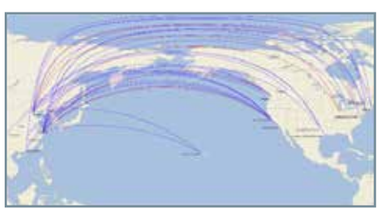
Red lines represent routes from 2005 that are still operated today. Blue lines represent new routes including 2016 announced routes.

Similarly, in 2005, Chinese access to North America was focused on large hub airports. There were 12 routes between China and North America, the majority flying between the major hubs in each region (e.g., Beijing and Shanghai to Los Angeles, San Francisco, Chicago, New York, and Toronto). Since then, 27 new routes have opened up—11 of which are operated by Boeing 787s. Of these 11 new services, only two are connecting hub-to-hub airports.

2005 ROUTE MAP BETWEEN CHINA AND NORTH AMERICA

2005—12 Routes

2016—39 Routes



Red lines represent routes from 2005 that are still operated today. Blue lines represent new routes including 2016 announced routes.

DID YOU KNOW?

The number of passengers flying nonstop between Scandinavia and North America has increased 43% since 2013 when the 787 was introduced.

Choice of New Routes

ICF has analyzed market data from 2013 to highlight the rationale behind many of these new route launches. Indirect market sizes (those passengers travelling via hubs) provide a good guide for which markets airlines often consider. As shown in the table below, of the top 10 unserved long-haul markets from the U.S., eight are now served, mainly as a result of new aircraft technology and business models.

2013 INDIRECT MARKET SIZE DATA FOR TOP 10 UNSERVED LONG-HAUL MARKETS FROM U.S.

Rank (2013)	Market	Distance (km)	Indirect Market Size 2013 (o/w)	Status	Served or Planned?	Growth Since Launch (L12m Market Size)
1	LAX-SGN	13,130	77k	Vietnam Airlines planning with A359 in few years	Planned	n/a
2	DEL-SFO	12,381	59k	Air India served (777)	Served	37%
3	SFO-SGN	12,599	56k	Vietnam Airlines planning with A359 in few years	Planned	n/a
4	DUB-SFO	8,183	54k	Aer Lingus served A330	Served	23%
5	CPH-LAX	9,029	47k	Norwegian 787	Served	48%
6	ARN-LAX	8,863	43k	Norwegian 787	Served	45%
7	CPH-MIA	7,845	39k	Norwegian 787 to Florida (FLL)	Served	48%
8	ARN-MIA	7,996	38k	Norwegian 787 to Florida (FLL)	Served	53%
9	BRU-LAX	9,053	34k	n/a	-	22%
10	HYD-JFK	12,948	34k	n/a	-	28%

Source: IATA Airport IS

The China-U.S. market has seen even greater levels of stimulation with new non-stop service at a time when traffic between these two countries has also grown significantly. This deployment has been driven by market sizes and pent up demand as well as carrier strategies focused on their own hubs and partner airline hubs to help ensure commercial success.

What all these new routes have in common is that they received significant levels of market stimulation recognizing the importance of an effective air service development program to increase airport volumes.

How New Technology Aircraft Are Transforming Air Service Development

New Narrow Body Market

While the introduction of 787/A350 aircraft has often focused on the "longer" long-haul markets, airports and airlines should recognize the potential offered by next generation narrow bodies—such as the A321LR—that are just 3 years off entering service. They will have the ability to open up even more mid-long-haul markets on thinner routes than 787s can be expected to serve. They will also offer highly competitive unit costs potentially enabling further stimulation of the LCC long-haul market to levels that 787/A350s alone could not offer.

Bottom Line

As airport management thinks about the best routes to attract and the best airlines to serve those routes, it must consider all of the dynamics occurring in the industry. Understanding the aircraft in use and on order by each airline plays into the evaluation of what routes can be successful at an airport. With the new technology aircraft, international long-haul routes, which were once too thin to command a large widebody, now become a possibility. Staying on top of changes in the aviation industry is paramount to a solid and successful air service program.

About the Author

Rob Walker joined ICF in 2010 and has more than 10 years of direct aviation experience across a wide range of markets and projects. He is an experienced market forecaster in mature and emerging markets producing detailed bottom-up forecasts and longer term econometric-driven demand projections, which often involve airport systems with overlapping catchment areas.

Combining his airline and airport experience, Mr. Walker is an experienced master planner producing detailed traffic forecasts for design day modeling and providing air service marketing capabilities for airports. He regularly uses NetWorks—ICF's network planning model—to provide detailed market and airline traffic analysis for airlines in support of their network strategy and business plans.

Prior to joining ICF, Mr. Walker worked at British Airways and Virgin Atlantic in a variety of commercial positions, including sales and marketing, revenue management, strategy, and network planning. Working closely with other areas, including government and legal affairs and economic forecasting, he has been involved in shaping strategy for work related to growth, mergers, and fleet plans and ensuring sales targets are met.

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A Better Way to Manage Airports: Passenger Analytics

By Eliot Lees, David Anderson, ICF

Executive Summary

Airport managers increasingly face operational challenges from steady passenger growth, terminal congestion, rising costs, and difficulty in funding infrastructure. These factors are a simple recipe for deficient facilities, poor service, and unhappy passengers. However, the emerging field of passenger analytics is beginning to be applied to airports, with highly encouraging results. Passenger analytics offers new tools and processes to help airport managers make more effective decisions that improve airport performance, make better use of terminals, generate nonaeronautical revenue, and enhance the passenger experience from curb to gate. Because of a lack of data sharing with other key stakeholders (airlines, government entities, concessionaires, etc.), airport managers have never had a complete view of what goes on at their own airports. Passenger analytics changes this dynamic through a combination of sensor tracking technology, predictive modeling, and new management practices. The innovative combination of information, planning, and coordination can fundamentally change how today's airports are managed. This paper discusses the challenges that airports face and how passenger analytics and proactive management can help to meet current and future needs

Airport Efficiencies: Historic (and Ongoing) Challenges

The current realities of major U.S. hub airports are no surprise to passengers who have experienced the frustration of long security lines, crowded terminals, and long delays getting from the curb, through security, and to the gate. The primary ongoing challenges are three fold:

- Strong passenger growth at our largest airports is creating significant congestion—longer lines, more foot traffic, and a more crowded experience navigating throughout terminals.

Management by information

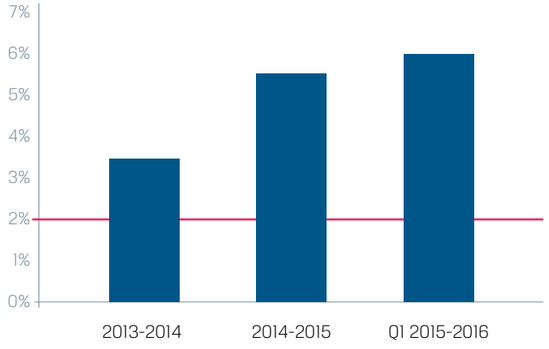
Using passenger analytics can improve terminal space efficiency—enhancing the passenger experience—and help make more strategic decisions.

- A long time horizon is required for the necessary terminal expansion to accommodate passenger growth, more flights, and space for customer amenities.
- Paying for terminal expansion faces funding challenges.

Historically, airport managers have had access to very limited information about how passengers, meeters and greeters, and other stakeholders use the airport. For both real and perceived concerns about proprietary, competitive, and turf issues, airlines are reluctant to share all but the highest level of passenger information. The information they do have is often limited and generic. The result? Airport management has equally limited generic insight into terminal passenger flows or bottlenecks within the terminal. How significant is this problem? For airport managers tasked with improving efficiencies, keeping passengers happy, and keeping costs down, this lack of insight has reached a critical stage.

Because passenger terminal flow patterns can vary significantly based on season, day, and hour, specific times may see serious congestion within particular zones: the curb, the airline check-in area, security checkpoints, commercial areas, hold rooms, the gate, passport control and customs, arrival areas, and ground transportation access points. And of course this congestion, confusion, and delay can contribute negatively to the overall passenger experience.

EXHIBIT 1. YEAR-OVER-YEAR GROWTH FOR TOP 25 LARGEST U.S. AIRPORTS, IN AGGREGATE 2013 to first quarter 2016



The largest U.S. airports are currently growing much faster than the national average of 2.0% annually

*Note: for Q1 2016 only 13 airports have reported activity
Source: ACI World Airport Traffic April 2016

Anecdotal evidence of congestion and bottlenecks from day-to-day observations and passenger complaints have resulted in rough rule-of-thumb planning metrics to address problems. But these solutions typically involve building more space—something many major airports are not in a financial position to do.

A new solution—passenger analytics and information-based management—is emerging as a promising tool to help airport managers face these challenges. It is a solution that makes use of cost-effective sensor technologies to optimize the space airports already have and make more strategic decisions based on highly detailed, trusted information.

A Better Way to Manage Airports: Passenger Analytics

Understanding Passenger Analytics: A Three-Step Process Toward Airport Performance Optimization

Passenger analytics involves three interconnected elements that capture passenger movement information within the airport terminal and use these data to make more informed and effective decisions about management and layout:

1. Systematic data capture
2. Analysis and predictive modeling
3. Performance optimization

1. Systematic data capture

Wi-Fi. Bluetooth. Closed-circuit television. Radio frequency identification. Infrared tracking. The use of these tracking technologies has been honed in other industries, principally in big box retail, stadium management, and transportation logistics. However, over the past several years we have seen tracking technology installed at airports to follow passenger movement. The ability to capture detailed passenger information is beginning to change the way airport managers think, react, and plan.

Sensor technologies can systematically track passenger movement within an airport, and those data can then be linked to a range of other information sources such as airline passenger data, FIDS, OAG schedules, and retail points of sale. The combined data are fed into a centralized information database, which is assessable by airport management.

Choosing the best technology solution is an individual and important consideration because with variations in airport terminal layouts, there is no one-size-fits-all solution. A better approach is likely a purpose-built solution using multiple technologies and applications. Two key points airport managers will want to consider when making strategic sensor technology decisions are clarifying current airport data analytic capabilities and understanding airport goals for use of current and future data.

Answers to these strategic questions will lead to other considerations, including where to warehouse this information, the role of other airport stakeholders—airlines, commercial concessionaires, government entities—in providing and/or accessing information (an airport operational database), and to what extent can/should this information be monetized. These issues may need to be thought through as part of an airport IT strategic plan.

2. Analysis and predictive modeling

Data are only as useful as their ability to measure and analyze information in a meaningful way. Technology is a tool, but one that must be wielded effectively. Thus, building a database of historical trends—and using these data to build predictive modeling—is key to optimizing airport performance. Analysis of current and historical data enables airport managers to understand passenger behavior as well as the root causes of airport congestion and bottlenecks.

Managers can designate specific zones within the airport and then build models to predict detailed passenger flow within those zones. This step of the process also includes establishing key operational performance measures (KPIs), identifying optimization potential, and analyzing cost benefits. The result is not only understanding where and how current congestion occurs, but also predicting where future bottlenecks may emerge so that managers can take steps to mitigate or eliminate them.

Where passenger analytics can help:

- Curb management
- Airport lobby
- Check-in desks
- Security screening
- Wayfinding and advertising
- Retail and commercial areas
- Gate management
- Passport control
- Bag claim
- Ground services (car rental, limousines)
- Car parking

From frustration to efficiency

Taking a streamlined and systematic approach toward airport optimization can make for a cost-effective, customized, impactful approach that yields tremendous benefits to major airports:

- Enhancing the overall passenger experience from curb to gate
- Generating additional nonaeronautical revenue
- Increasing utilization of capacity to do more with less
- Keeping airline costs per enplaned passenger lower
- Maintaining markedly more efficient use of airport assets, freeing up resources for strategic expansion in the right place, at the right time.

As operational and physical improvements are considered, managers can model the impact of potential changes before putting them in place. Data-based information about more efficient use of current capacity and the need for additional capacity enables managers to properly allocate funds and determine the best timing—if necessary—for build out.

3. Performance optimization

The final step of performance optimization involves a transformation of the airport management process. Traditional airport management has typically been a reactive process, largely because of a lack of information. Tracking technology and predictive modeling enables an airport to develop a new management approach, management by information. Getting airport staff to change how they conduct business and make decisions may be the most challenging part of the process.

Through the active capture of information—tracking queuing behavior, facility bottlenecks, passenger flows—and then predicting ongoing resource demands, management can use information to establish KPIs, refine retail product mix, and work collaboratively with airport stakeholders (airlines, TSA, concessionaires, third-party vendors).

Because this approach involves multiple disciplines within an airport—IT, operations, business office—and new ways of interacting with airport stakeholders, airport management may need to rethink organizational structure, communication and coordination with stakeholders, and the decision-making process. A shift to "management by information" may involve redesigning the airport organization along strategic objectives rather than functional lines.

Successfully implemented, management by information will improve airport performance, enhance passenger experience, generate additional nonaeronautical revenue, reorient airport management objectives, and more effectively allocate physical and human resources.

About the Author

Eliot Lees specializes in aviation due diligence, business strategy, and infrastructure-related development such as airport/city projects, air cargo, aircraft maintenance, logistics centers, business/industrial estates, fixed base operators, aerospace manufacturing, and fueling. He has worked on a wide range of client engagements in airports, airline, and aerospace.

Prior to joining ICF, Mr. Lees was an investment banker specializing in municipal and tax-exempt financing. He spent more than 10 years in various finance positions with leading New England financial institutions, including as Vice President at the Bank of New England in Boston, Massachusetts.

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Enhancing the Passenger Experience

By Eliot Lees, ICF

What does enhancing the passenger experience truly mean? What actions can airport managers take to improve the passenger experience?

Airports, airlines, third-party providers, architectural and engineering firms, are not on the same page with what this concept really means. Conferences are being organized around how to create and implement this strategy. Is it design? Is it branding? Is it customer service? Is it passenger engagement? Is it technology?

Enhancing the passenger experience is about all of the above—and more.

Today's industry literature indicates that the passenger experience is focused on new and innovative commercial offerings, airport branding, the creation of a sense of place, and digital engagement through new technology. These elements are important to upgrading the passenger experience. However, too often airports focus on retail, passenger marketing, and communication but do not deliver on the efficient, uncongested, and informed passenger path from the curb to the gate. And as airports well know, the challenge gets harder each year as passenger volumes continue to grow. Consequently, passengers often are too frustrated and hurried to take advantage of all of the innovative offerings and services that an airport has worked hard to develop.

An integrated, multidisciplinary business strategy is needed. Commercial, IT, planning, and operations must work together with a common focus and a common purpose: to remove the frustration, uncertainty, and confusion from the passenger journey and provide the offerings and services that passengers want. This strategic change in culture and in approach will truly enhance the passenger experience.

Key Elements to Enhancing the Passenger Experience

- Physical Layout
- Technology Stakeholder Engagement
- Wayfinding and Signage
- Employee Organization and Responsibilitys

Elements in this Integrated, Multidisciplinary Business Strategy:

Physical Layout—Building more terminal infrastructure can improve the passenger experience, but it is expensive and it takes a long time to realize. Instead, airport management can make the most out of current facilities. By carefully analyzing the passenger journey and rethinking how the passenger interacts with each element of the terminal experience (through wayfinding, airport employees, technology, and stakeholder management), airport management can optimize the performance of existing infrastructure and improve the passenger experience.

Wayfinding and Signage—Effective signage can lessen confusion and uncertainty by guiding the passenger from the curb through check-in, security, and the path to and from the gate in a clear, logical, and helpful manner. Digital signage, interactive wayfinding, and electronic communication all help to enhance the flow and movement of passengers through a terminal.

Technology—Emerging sensor technology that captures, measures, and facilitates the analysis of passenger flow and queuing is being applied at airports to better understand how and when bottlenecks occur. Airport management can capture data that allow the rethinking and refining of physical layout and signage as well as how to engage and coordinate with other airport stakeholders—all with the objective of enhancing the passenger experience.

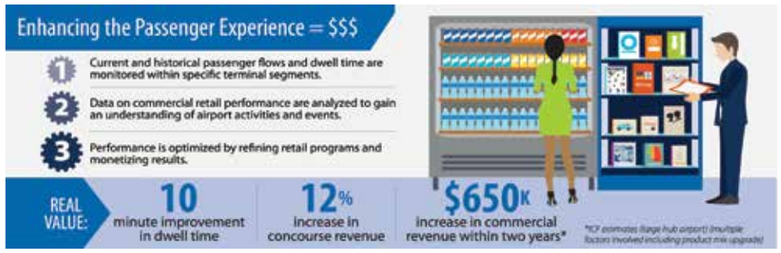
Stakeholder Engagement—Changing the dialog with stakeholders is critical. As part of an integrated approach to enhancing the passenger experience, airport employees must move from a role of airport oversight to one of stakeholder engagement. Airport management has control over only a portion of the passenger experience. Too often the airport is blamed for poor passenger experiences that are not within its control. Airport management must become adept at analyzing, evaluating, and coordinating with the other stakeholders as part of the overall delivery service to the passenger. Airport management needs to engage airlines, the Transportation Security Administration, the Customs and Borders Patrol, and third-party providers in a new and more collaborative way. Management must use sensor technology to show these stakeholders what is actually going on and how their actions impact overall terminal performance and the passenger experience.

Employee Organization and Responsibility—Employee effectiveness is essential. As part of this new approach to enhancing the passenger experience, airport employees must move from a role of airport oversight to one of stakeholder engagement. Airport management objectives

must be refocused to the passenger experience. Data and analysis offered by new technology offer insights for implementation. Airlines and other stakeholders can be engaged and assist with integrated solutions. The airport organizational structure, communication, and even tenant contracts may need to be modified to accomplish these changes. Without a strategic new management philosophy and supporting resources and tools, this promising innovative approach will only go a small way to "enhancing the passenger experience.

Conclusion

A better passenger experience translates into money—If an airport can execute this new strategy effectively, the enhanced passenger experience will translate into measurable financial benefit. This paradigm shift produces a return on investment. An efficient, uncongested, and informed path for passengers from the curb to the gate means more dwell time within the terminal, more opportunities for passengers to enjoy what the airport offers, and more time for passengers to spend money on concessions. More efficient use of the airport terminal also means better, more balanced passenger flow; better and more productive space utilization; and ultimately, less investment in capital expenditure.



Airport Managers can "Enhance the Passenger Experience" and Realize the Value of this Innovative Initiative by:

- Refocusing airport management, commercial, IT, engineering, and operations objectives to the passenger experience;
- Analyzing big data that new technology provides; and
- Engaging in new ways with airlines and other stakeholders.

About the Author

Eliot Lees leads ICF's airport operational consulting practice, which combines process flow analysis, facility layout, organizational strategies, and new technology to improve airport performance and enhance the passenger experience. He has worked extensively with airports and third-party operators in business strategy and strategic planning, transaction due diligence, and infrastructure-related development, both in the US and internationally.

Prior to joining ICF, Mr. Lees was an investment banker specializing in municipal and tax-exempt financing. He spent more than 10 years in various finance positions with leading New England financial institutions, including as Vice President at the Bank of New England in Boston, Massachusetts.

Mr. Lees has an M.B.A. from Boston University and a B.A. in Economics from the University of Massachusetts.

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A New Agenda in Airport Regulation Enters Service

By Simon Morris, ICF

Abstract

The classic model of airport regulation in which a regulator imposes prices on an airport is becoming increasingly out of date. Instead, a new agenda for regulation has emerged based on commercial negotiation between airport and airlines with the regulator intervening only if absolutely required. In this new facilitation-based regulation agenda, the role of the regulator changes from 'What solution should we impose'? to 'How can we assist parties to reach their own solutions'?

The facilitation-based regulation agenda provides a far less burdensome regulatory process and has considerable advantages to airports, airlines, and other stakeholders by enabling them to manage the process and shape solutions to meet their needs, including capital expenditure, service, operations, and traffic development as well as prices. Investors are likely to prefer this approach, as it avoids the periodic risks associated with successive regulatory processes. The specific features of the facilitation-based regulation agenda vary among countries. The very different contexts of Copenhagen's and London's airport systems illustrate the facilitation-based agenda in practice.

A Changing Airport Regulation Landscape

Formal economic regulation of airports originally emerged in 1986 alongside the privatisation of airports in the United Kingdom. In line with privatisations in other industries, UK airport privatisation initially followed the now-classic utility model of regulation: prices at major airports were set for successive 5-year periods by an independent regulator on the basis of a price formula linked to

inflation—known then as RPI-X, with RPI being an inflation measure and X being linked to 'efficiency'. In the United Kingdom, this was developed into a model of heavy-handed airport regulation based on operating and capital cost forecasts less commercial revenue (known as the single till approach). Airlines were allowed to make submissions—almost invariably negative in tone—but were not involved in the final price setting.

While questions and criticisms arose concerning the details of the way in which the method was applied (e.g., Was the capital expenditure gold plated? Was the cost of capital too high?), this approach was frequently seen as the ideal to be aspired to by other countries—even if they lacked the resources, information, and expertise to apply it.

Despite this perceived ideal, a wide range of other regulatory approaches has emerged across the world. These approaches have been designed to deal practically with the circumstances in specific countries, and they rely much less on the intervention of an omniscient regulator. Most of the approaches have involved airports and airlines getting together in one way or another to set prices. They have required far fewer processes and less expertise to get things done and—equally importantly in many cases—they generally have been far less expensive.

Over time, these individual—and in many cases unheralded—developments have begun to evolve into a cohesive whole that we may now describe as the facilitation-based regulation agenda. The results of this agenda now look to be more effective in most circumstances than the old orthodoxy.

Facilitation-Based Regulation Agenda

The facilitation-based regulation agenda is concerned with finding workable, practical, and sustainable solutions secured through negotiations between the parties involved as much as possible rather than a regulator imposing outcomes on the parties.

The facilitation-based agenda can potentially cover a range of concerns. However, there are four central issues:

- Are formal price controls necessary in the circumstances of specific airports?
- Can prices and other regulatory concerns (such as service and capital expenditure) be dealt with through negotiations?
- How can price-setting approaches give room for commercial give and take?
- Can we find ways to deal with high-risk, long-term investments that do not fit into conventional regulatory approaches?

Taking each of these issues in more detail:

Deregulation where possible: There is increasing recognition that many airports face competition in a variety of forms, putting downward pressure on prices. As a result, normal price controls may not be needed at all in many situations under a facilitation-based regulation agenda. Alternatively (or in combination), the possibility of imposing tougher regulation in the event

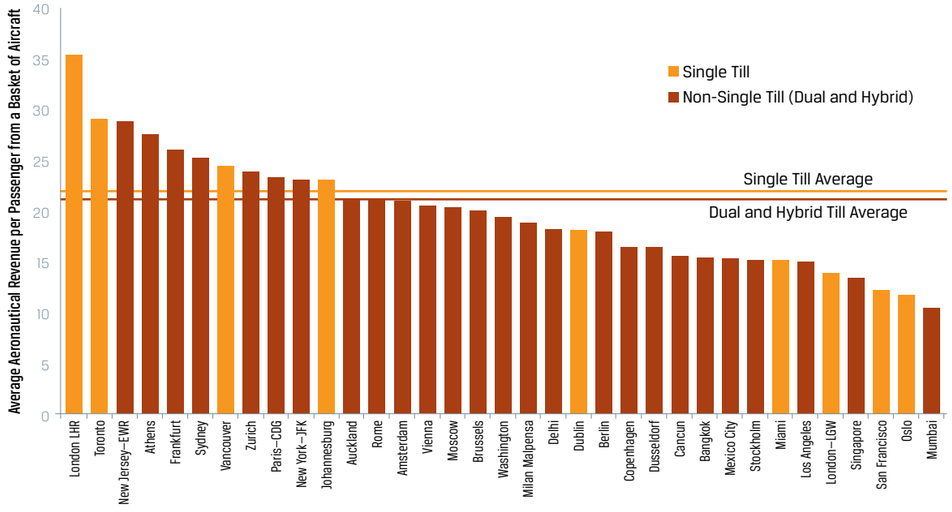
A New Agenda in Airport Regulation Enters Service

of abuse of dominant position can be enough to promote good behaviour. In Australia, for example, the main airports are regulated only through annual price and performance monitoring, coupled with periodic reviews of airport behaviour.

Use of commercial negotiations: In a facilitation-based regulation agenda, instead of imposed regulation, prices and other issues can often be set through commercial negotiation. Where required, the regulator can set the process for the negotiation and act as a fall back in the case of nonagreement.

Cost approaches that allow flexibility: The classic single till approaches supported by the International Air Transport Association (IATA), under which all commercial income is applied to reducing airport charges, are effectively cost plus systems. They provide little or no room for give and take in reaching commercial agreement without the airport ending with returns below its cost of capital. Dual till and increasingly hybrid[1] approaches—under which at least part of commercial income and costs are retained by the airport—mean that the airport has room to make concessions without becoming nonviable. Previously, it was thought that this flexibility would cause higher prices. However, there is evidence that the stronger incentives for efficiency in capital and operating cost expenditure under dual or hybrid till approaches may, over time, lead to charges that are similar to, or lower than, those under pure cost plus single till approaches. At the very least—as depicted in the accompanying bar chart—there is no clear evidence of a single till advantage with single till airports at both the upper and lower ends of the range.

EXHIBIT 1. AIRPORT CHARGES (US$) AT SINGLE TILL AIRPORTS COMPARED WITH DUAL AND HYBRID TILL AIRPORTS



Source: ICF analysis with data derived from Leigh Fisher reports

[1] For further discussion see 'In Praise of Hybrids' R Sharp Journal of Airport Management Vol 7 Number 1, 2012.

More robust and long-term price setting processes for high-risk, long-term investments: Many countries face the crucial issue of sustaining major expenditure in areas such as new terminals, runways, or new airports while trying to avoid the heavily front-end loaded charges required by traditional cost-based regulatory processes. These problems arise from the fact that costs of new facilities that have not been eroded by depreciation or inflation are highest at a time when the level of utilisation—and therefore the charging units over which costs can be spread—are at their lowest. The size of such developments is also likely to make them higher risk. Avoiding these problems requires the use of long-term approaches rather than typical 5-year reviews. The solution is likely to be outside the conventional regulation pattern, and to require commercial negotiation.

Overall, the facilitation-based regulation agenda is likely to create a much more commercial, market-orientated, and flexible approach to regulation than the traditional model.

Issue	Facilitation-Based Regulation Agenda	Traditional Regulation
Are formal price controls necessary with deregulation?	▪ May not be needed as competition and the countervailing power of airlines may put downward pressure on prices ▪ Threat of controls can also be used as effective deterrence to market abuse	▪ Perceived as needed to control airport
Can prices and other regulatory concerns (such as service and capital expenditure) be dealt with through negotiations?	▪ Generally yes	▪ No
Do price-setting approaches give room for commercial give and take?	▪ Of central importance for negotiation to work ▪ Favours hybrid and dual till approaches	▪ Not relevant
Can high-risk, long-term investments that do not fit into conventional regulatory approaches be addressed?	▪ Requires innovative solutions that may not fit traditional models	▪ Outside the scope of consideration

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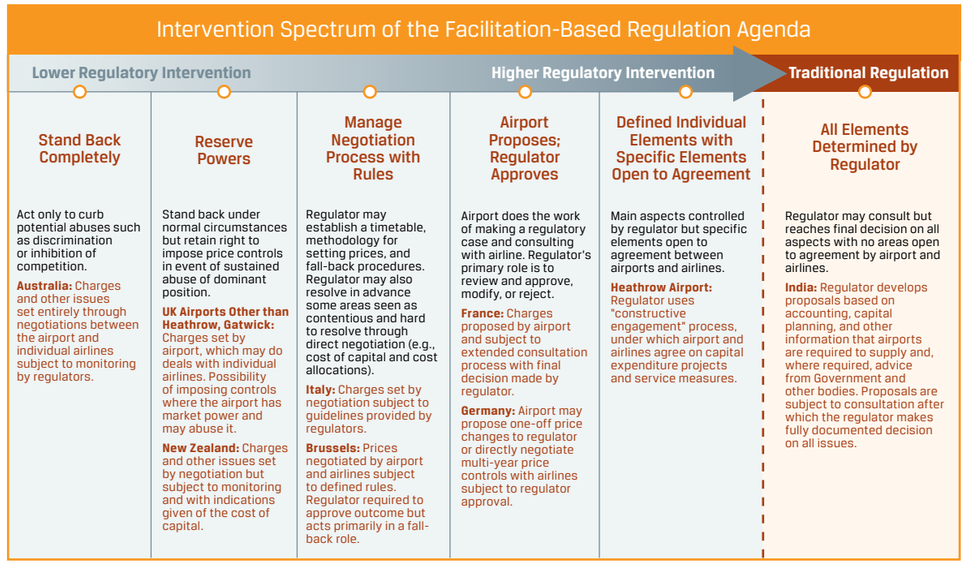
New Roles for New Regulators

With the new, more commercial approach to regulation under the facilitation-based regulation agenda comes a requirement for a very different role on the part of regulators. Put simply, much of what regulators do will change from determining and imposing outcomes to assisting airlines and airports with finding collective solutions.

Not all facilitation-based regulation agenda approaches have adopted all aspects of the new agenda. Individual countries have selected points that reflect their own specific requirements along a regulatory intervention spectrum applying a range of approaches as portrayed in the exhibit below.

EXHIBIT 2. INTERVENTION SPECTRUM



Regulators and Negotiations

Some regulators are careful not to become involved in negotiations in order to avoid compromising any final decisions, should they need to be made. Other regulators believe that the process of reaching agreement is better promoted by a more active management role. They may, for example, set agendas and sit in as observers on the formal consultation sessions—though there should also be scope for less-formal meetings (including one-to-one meetings with individual airlines), which may facilitate reaching a final decision.

At first sight, it might seem that one or other parties involved in the commercial negotiations would be likely to see an advantage to triggering intervention by the regulators in their fall-back role. However, this would underestimate the benefits perceived by both parties in managing their own destinies and ensuring that the issues of central importance to them are not vulnerable to the

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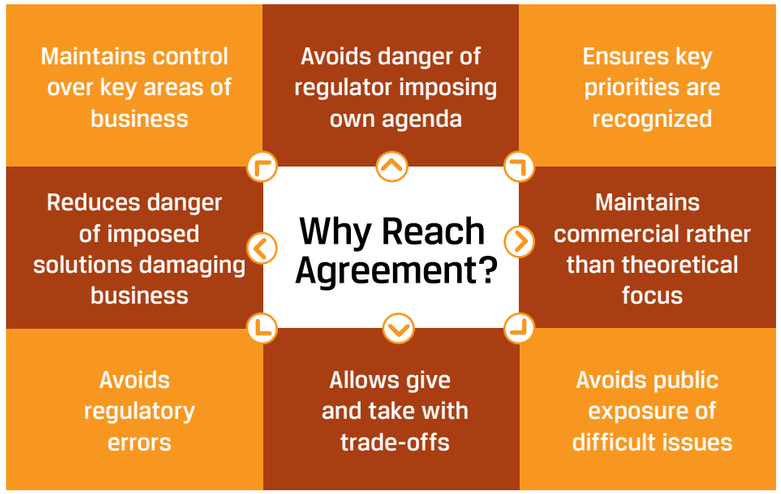
decisions of third-party regulators, who would inevitably have agendas of their own. Some of the benefits of reaching agreement between the parties are shown in the diagram below:

EXHIBIT 3. WHY REACH AGREEMENT



Benefits of the Facilitation-Based Regulation Agenda

In many cases, a facilitation-based regulation agenda may suggest that formal regulation is unnecessary and that competition—possibly backed by the threat of imposition of controls in the event of market abuse—may be enough. However, where regulatory involvement is necessary, the facilitation-based regulation agenda has substantial benefits for airlines, airports, regulators, and investors, as it:

- **Addresses** all important issues to airlines and their passengers, potentially covering capital expenditure, service, marketing, and operational issues—not just price levels and structures.
- **Enables** proper prominence to be given both to establishing the investments needed by users and how very major projects—such as new runways, terminals, or entire airports—are to be financed over a substantial time period.
- **Reduces** regulatory costs substantially for all parties. Discussions between airports and airlines can be much more focused and cost effective without the series of dense and long (several hundred pages) documents that regulators in India or the United Kingdom, for example, have regularly produced as a matter of course.
- **Avoids** the need for substantial levels of specific expertise (and the bureaucracy required to support it) on the part of the regulator. The work done for the review can primarily be undertaken by the airports and the airlines with the regulator, if required, acting primarily in a reviewing role.
- **Decreases** both the likelihood of regulatory failure and its consequences, offering comfort to existing and potential investors. The parties are directly involved in the issues with which they are dealing and therefore have strong interests in providing robust, workable solutions. If the results do eventually cause problems, the parties can quite reasonably be expected to bear the consequences of their own negotiating decisions rather than of settlements imposed on them by third parties.
- **Encourages** positive commercial attitude between airports and airlines. Normal trading agreements between established suppliers and customers offer a process of give and take between parties. This process reduces the likelihood of negative public posturing that appears to be characteristic of parties in the course of standard regulation based on a 'zero-sum' outcome, which inevitably reduces the likelihood of future trust and cooperation.

Case Studies

Copenhagen

While other examples, such as Australia, have been more widely heralded, Copenhagen has a long tradition of operating under what we would now describe as a facilitation-based regulation agenda, which has been evolving over time.

Under the revised approach established in 2009, charges are primarily set between the airport and airlines, though with the possibility of the regulator (the Danish Transport Authority) acting in a fall-back role in the event of a sustained failure to agree.

Key aspects of the Copenhagen system include the following:

- The airport and airlines are required to agree on price controls over a period of time, with a default position of 4 years (in the initial setting under this system, the airport and airlines effectively agreed on a 5.5-year formula).
- Reaching agreement follows a timetable specified by the regulator. This commences with the airport making a proposal supported by a prescribed information package covering historic and forecast traffic, costs, income, and capital expenditure, together with price and efficiency comparisons.
- In the event of failure to reach agreement, the regulator will set charges using a fall-back procedure.
- No methodology is specified for setting agreed prices between the airport and airlines. However, a move to fall back will require the adoption of a closely specified regulatory approach. Inevitably, the perceived likely outcome of a possible fall-back approach will have an important bearing on the expectations of the parties and on the negotiation range for the final agreement reached.

- The price methodology in the fall-back position is based on a hybrid till approach with the airport charges subsidised by a proportion of the non-aeronautical revenue less all costs including the cost of capital. The level of this contribution is between 10 and 50 percent, with the level chosen depending on whether the airport has been able to maintain the competitiveness of charges against comparable rival airports.
- To assist the parties in assessing the possible outcomes of a fall-back approach, at the outset of the consultation process the regulator specifies the cost of capital and the asset and cost allocations that would be applied in a fall back. The asset and cost allocations are made following a review of the airport's own estimation methodology and the results of the review.

Two major agreements between the airport and airlines have now been reached under this system covering, successively, a 5.5- and a 4-year period. In addition, a separate agreement deals with the charges for the use of a low-cost pier. In each case, agreements were achieved between the airport and airlines after tough negotiations, without the need for intervention by the regulator—though the regulator was present at formal consultation sessions. As in some cases elsewhere, the agreements have covered capital expenditure, operational issues, service, and price structures in addition to price levels. As a consequence of the agreements, the airport has achieved a sustainable basis for its investment in the future and strong incentives to continue to improve its efficiency, while at the same time protecting the interests of airlines and passengers. Prices at Copenhagen continue to be low compared to its Northern European peers.

Although there were areas where the airlines or the airport could complain that the outcome did not meet all their aspirations, the approach appears to have operated successfully and robustly in practice. In most good commercial negotiations, the expectation is that each side gets something, but neither gets everything.

UK—Major South East Airports

Until the last 5-year regulatory review ending in 2014, the major airports in the London area (Heathrow, Gatwick, and Stansted) were all operated by BAA and regulated using a traditional, heavy-handed, regulatory approach.

However, two developments had a major impact on the way these airports have been approached by their regulator, the UK Civil Aviation Authority (CAA):

- The breakup of the former BAA with both Gatwick and Stansted being sold to other parties in the interests of promoting competition, leaving Heathrow Airport Holdings Limited as a successor company.
- The passing of new legislation giving the CAA considerably more flexibility on regulation; under this new legislation, price controls in any form are considered only when the airport fails a market power test—effectively where there is a prospect of abuse of a dominant position.

The additional freedom provided to the CAA has enabled them to move substantially away from their 28-year historically traditional regulator-imposed

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methodology. The result has been to create a nuanced approach for the three airports that reflects many facilitation-based regulation agenda issues:

- **Stansted**, which had recently agreed upon deals with its main suppliers (easyJet and Ryanair), reflecting its competitive environment, was moved out of price controls. The CAA saw it as facing substantial airline countervailing power in a competitive market. The absence of price controls has brought Stansted into line with other airports in the South East region, such as Luton and London City.
- **Gatwick**, which had unilaterally produced a set of guarantees on prices and other issues and declared its intention of negotiating price agreements with its airlines, was also moved out of price controls. However, its pricing has been made subject to monitoring by CAA to ensure prices remain low, with the clear threat of reimposing price controls if the airport does not act appropriately.
- Only **Heathrow**, where capacity is highly constrained (98 percent of available slots year-round are used) and where the airport is seen as retaining substantial market power, remains under conventional price controls. These are essentially a continuation of the previous single till regime.

The CAA has specified that when, following a decision by the UK Government, a new runway is specified for Heathrow or Gatwick, the airport concerned should seek to reach a long-term agreement with its airlines. This agreement would cover charges and other relevant provisions over the lifetime of the asset. The CAA would review the agreement to ensure that it was in line with the public interest (and would presumably act as a fall back if no agreement was achieved) but would not be directly involved in negotiations.

From having three traditionally regulated airports, the UK currently has only one. It remains to be seen whether even this will continue into the long-term future, especially given the proposal discussed above for negotiating charges associated with any new runway. It is significant that Gatwick and Stansted, now released from heavy-handed controls, handle 39 million and 21 million passengers per year respectively—much larger than many airports throughout the world where regulation has previously been thought to be necessary.

Conclusions

The facilitation-based regulation agenda represents a more grown up view of regulation, which has powerful advantages over the old orthodoxy. Airports in countries around the world have shown that the facilitation-based regulation agenda can be thoroughly workable. It also allows settlements to be reached between the parties who have most to gain and lose—and who most of all will need to live with the outcome once it has been reached.

The new task is to learn systematically which facilitation-based regulation agenda approaches work most effectively and when. To encourage that learning, we need a general understanding that the facilitation-based regulation agenda is not a second best for those airports with problems

implementing an orthodox ideal. Facilitation-based regulation should now become the default option, offering the best outcomes for airports, airlines, regulators, and investors alike.

About the Author

Simon Morris has more than 20 years of experience in the aviation industry, and his expertise primarily lies in business planning. He leads the London Airport team in projects worldwide, building on work in due diligence and comprehensive business and strategic planning for owners, investors, and private-sector interests.

Previously, Mr. Morris worked at A.T. Kearney and LeighFisher.

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The Kingdom of Saudi Arabia's Aviation Market

Journey Towards Liberalisation

ICF's industry experts have compiled the following brief but comprehensive overview of the Kingdom's complex aviation market. This ICF overview focuses on four mission-critical topics of liberalisation:

- Recent developments in the Kingdom's aviation marketplace
- Aviation growth challenges in Saudi Arabia
- Government and GACA response initiatives
- Opportunities for investors

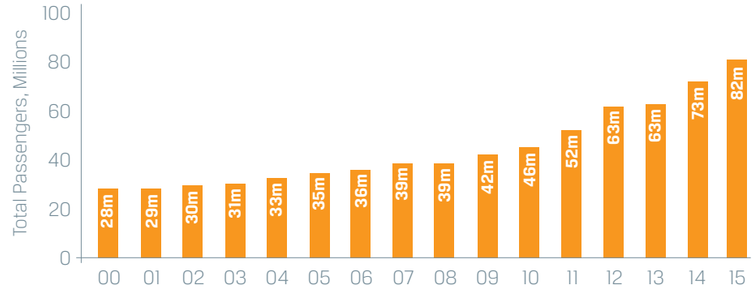
Saudi Arabian aviation has come a long way in a short time. However, the move to a fully liberalised aviation marketplace is not over. The pace of reform needs to continue if the General Authority of Civil Authority (GACA) wishes to achieve its aims of making its airports more globally competitive, improving the level of passenger service, and encouraging the private sector to invest while ensuring a high level of safety and security.

Recent Developments in the Kingdom's Aviation Marketplace

The Kingdom's airports handled more than 82 million passengers in 2015. Since 2000, air traffic has grown substantially, especially with an increase of international and domestic flights. During the past 15 years, air traffic has grown 7.3% per year and 12.3% in the past 5 years alone.

SAUDI ARABIA COUNTRYWIDE AIR TRAFFIC GROWTH

Total Passengers, 2000-2015



Source: ICF

Source: ICF

Saudi Arabia's aviation landscape has continued to evolve and liberalise in the past few years. The achievements listed below represent the results of GACA's vision for air transport to liberalise and expand in an open competitive market. Underlying these results is the strategic market intelligence applied by ICF in its support for GACA.

Aviation Growth Challenges in Saudi Arabia

To fulfil this vision, GACA, under the stewardship of Saudi Arabia's Minister of Transport Sulaiman Bin Abdullah Al-Hamdan, addressed key structural issues that have constrained aviation growth in the past:

- **GACA's role:** GACA has had a wide range of sometimes conflicting roles. Not only was it the safety and price regulator for both airports and airlines, but it also acted as airport operator and navigation services provider. These responsibilities included setting airline domestic ticket price caps—a major intervention in the marketplace that has inhibited the development of a competitive environment for new airlines. The political difficulties of raising such caps has meant that prices have not been increased in more than 15 years, while inflation index has increased by at least 40% and airline cost index by more than 100%.
- **Airline financial problems on domestic routes:** Partly because of the domestic price caps, airlines historically have suffered financial losses on these routes. Such losses caused the bankruptcy of one of the first low-cost carriers, Sama. Flynas, Saudi Arabia's only other LCC, made losses every year since its formation in 2007 and will report its first-ever profit in 2015. For obvious reasons, the price cap has reduced appetite by future new airlines to serve the domestic market.
- **Airlines withholding capacity:** At the same time, given the cost pressures on many routes, airlines operating in the domestic marketplace have been reluctant to add seat capacity, despite substantial demand.
- **Support of air links to small cities:** The regional market has been severely underserved in the past, with limited frequency and capacity because of poor facilities and the lack of incentive to operate these "thin," low-yielding routes.
- **Lack of investment:** For decades, capital investment in the Kingdom's regional airports has been largely ignored. Instead, the focus has been primarily on enhancing infrastructure for the Kingdom's "gateway airports" of King Khalid Airport International Airport (Riyadh), King Abdul Aziz International Airport (Jeddah), and King Fahd International Airport (Dammam).

Government and GACA Response Initiatives

The government and GACA have responded to these concerns through a wide ranging set of initiatives:

- **GACA's role:** In 2013, GACA announced that a holding company would be created with the remit of separating the services provided by the executive arm of the company from the control and policy-making sections. The holding company also is mandated with the privatisation of the Kingdom's airports.
- **Domestic fare cap:** GACA took tentative steps toward reforming the fare cap in 2014 when it allowed domestic carriers to lift ticket prices within 10 days of departure. More recently, consensus rests on less regulatory intervention and the phasing out of price controls so airlines have far more flexibility and freedom in how they set prices based on market drivers.
- **Focused support for air links to small cities:** In January 2016, GACA announced an initiative which will see the launch of the Watani hub program. Hail Airport has been chosen as the Kingdom's first hub to serve all airports in the Kingdom's north. The second phase of the Watani project will see the creation of a second hub to serve airports in the Kingdom's southern regions.
- **Lack of investment:** In addition, GACA has started upgrading some of its regional airports for a better passenger experience. Capital expansion plans for 10 regional airports are under way at Al-Ahsa, Al-Wajh, Sharurah, Wadi alDawasir, Qaisumah, Rafha, Turaif, Arar, Qassim, and Al-Jouf. One important consequence of these measures is that passengers using regional airports will be able to travel internationally, directly bypassing the international airports such as Riyadh and Jeddah. This bypassing in turn will help foster regional development.

Opportunities for Investors

Private-sector participation in all the Kingdom's airports by 2020 will see further injections of capital and international expertise to drive efficiency and profitability.

A vigorous privatisation process leading to private sector participation in all of the Kingdom's airports has commenced with both Prince Mohammed Bin Abdulaziz Airport in Madinah (2011) and Terminal 5 at King Khaled International Airport in Riyadh (2016). These airports have been concessioned to the private sector. King Abdulaziz International Airport at Jeddah and King Fahd International Airport at Dammam are slated for privatisation in late 2017. The remaining airports are expected to privatise between 2018-2020.

In a direct move to attract more foreign investors and expertise, GACA recently announced that no obligation exists to have a local Saudi partner. For some airports, local ownership will be capped at 25%.

Medinah Airport was the first successful major airport privatisation. Under a 25-year build-operate-transfer scheme, the TIBAH Consortium, a joint venture comprising local companies Al-Rajhi Holding and Saudi Oge as well as Turkey's TAV Airports, was successful in winning the competitive tender in 2011.

Other examples of the government's efforts to transition airport assets to the private sector include:

- Concessioning 10 VIP lounges to a private operator (a joint venture between al Musbah and Plaza Premium) in 2011.
- Private-sector involvement in the operations and management of KAIA's new fuel farm which awarded to a local Saudi operator (Al Bakri Holdings) in 2014.
- The award of a second ground-handling pan airport licence to Swissport in 2015.
- Listing of both the Saudi Airlines Catering Company and the Saudi Ground Services Company on the Saudi Stock Exchange in 2012 and 2015, respectively.

ICF has contributed to many of the successful initiatives highlighted above. Specifically, ICF has advised on multiple assignments within Saudi Arabia including issues relating to liberalising aviation, introducing airline competition, and encouraging private-sector investment in airports. This support in making the Saudi aviation landscape a progressive and vibrant marketplace demonstrates ICF's commitment to international aviation growth development.

About the Author

Abbas Mirza, Vice President with ICF's Aviation Group, is a former head of commercial at Heathrow Airport, BAA, and brings over 20 years of commercial and financial experience to his assignments. Mr. Mirza is a leading expert in financial modelling of airport revenues and costs for airports with a remit to maximizing asset values. In addition to his commercial and retail expertise, Mr. Mirza has significant experience in the airport transaction arena, working and preparing material for governments, civil aviation authorities and private investors on airport privatisations.

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