



Brussels Airport Market Monitoring

2018

**Regulatory Body for Brussels Airport
Operations**

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1. Introduction

The European aviation sector is an important part of the European economy. Around 1 billion passengers are transported to and from the European Union every year, along with more than 16 million tonnes of cargo. Indeed, airports are seen more and more as engines of economic growth – through the facilitation and generation of economic activity and jobs.

Brussels Airport remains Belgium's most important airport, with a direct added value of almost 80%¹. In 2018, 25,675,939 passengers and 543,493 tonnes of cargo were transported through the airport.

Due to the airport's potential monopoly power, the authorities imposed a model of economic regulation after its privatization in 2004. The Regulatory Body for Railway Transport and for Brussels Airport Operations (hereafter the Regulatory Body) has to ensure that the rules and conditions laid out in the operating license – as granted to the airport operator Brussels Airport Company – are respected in this. The Regulatory Body has to ensure the quality of the service provision and the interests of users and passengers, as well as the airport charges.

By means of market monitoring, the Regulatory Body aims to follow market developments and investigate these further.

This market monitoring report will look at the market in which aviation operates and the evolutions within (cfr. macro-economic analysis). Afterwards, developments within the aviation sector itself will be taken into consideration. This will include traffic numbers and its evolutions, as well as the competition between airports on the one hand and between airlines on the other. This gives an indication of the quality of the airport itself and the mutual interaction between the airlines. Next, the evolutions and trends in the market will be further investigated, such as load factor and the effect of consolidation (cfr. micro-economic analysis). Finally, the quality of the airport and the perception by passengers and users will be looked at.

¹ NBB – Economic importance of air transport and airport activities in Belgium (July 2017).



Macro-economic analysis of the transport and aviation sector

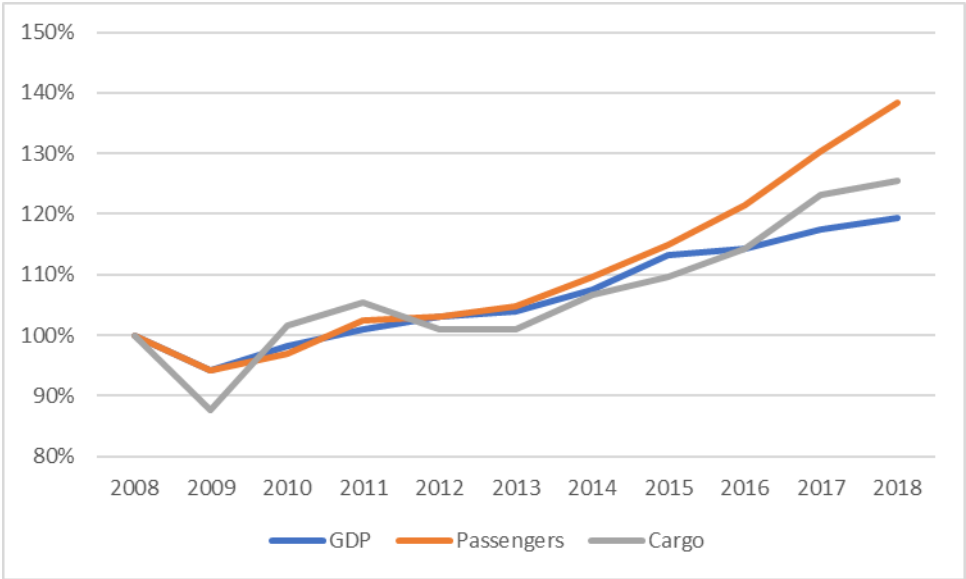
2. Macro-economic analysis of the transport and aviation sector

2.1 Link between aviation and economic growth

2.1.1 GDP growth and aviation in Europe

Principally, developments in transport are determined by economic growth and future trade flows. This also applies to aviation. The demand for air transport is a derivative one. An evolution in the number of passengers should therefore be considered alongside economic growth. In normal circumstances, after all, there will be greater demand for air transport as economic growth, and thereby the prosperity of the population, increases. Economic growth can be represented as Gross Domestic Product (GDP). GDP is the market value of all goods and services that are produced in the applicable country in a single year. **Figure 1** clearly shows a link between GDP and air transport in Europe.

Figure 1: Link between GDP and air transport in Europe



It can be determined that passenger transport is strongly linked to changes in GDP. Economic growth is accompanied by an – often sharp – rise in the number of passengers. During a recession, the reverse trend can be seen. Exceptions in this regard can generally be explained by other events. Moreover, there has been a similar evolution in terms of both tourism and business travel².

The figure clearly illustrates that the evolution in freight transport is also linked to GDP growth. However, freight traffic is more volatile than passenger transport and GDP. It should be stated here that freight transported by air is often highly technological and of high value, implying that growth in tonnage is not the only determining factor³. Furthermore, the service sector has become more important than the industrial sector in many countries, including developing countries. The former sector is less import and export-intensive, meaning that while it does contribute to economic growth,

² ICAO Circular 299-AT/126

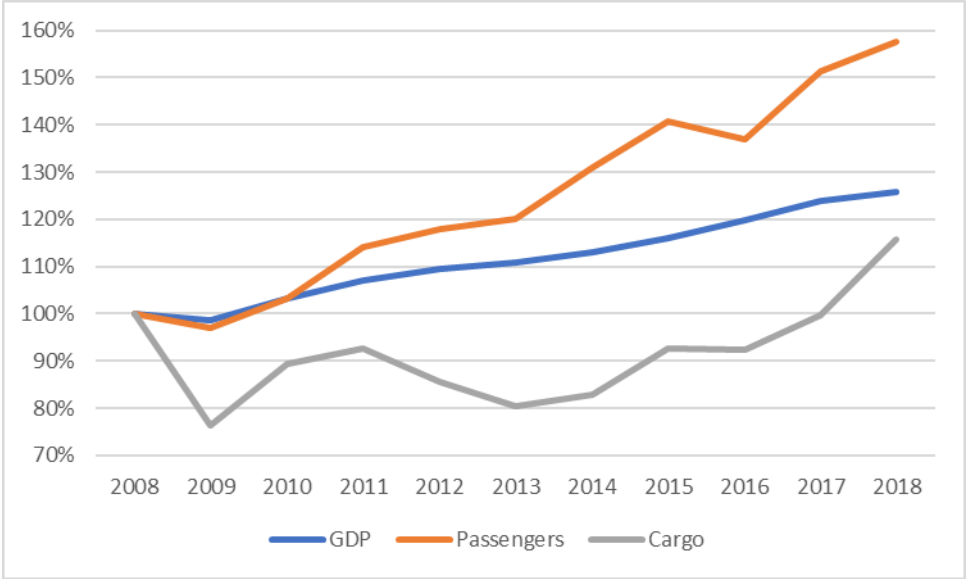
³ Electronic products are becoming smaller and smaller in size, for example.

this is not reflected in global trade. Nevertheless, it is expected that air freight will always hold an important position in the international evolution of aviation.

2.1.2 GDP growth and aviation in Belgium

A relatively similar link can be seen in Belgium between GDP growth and air transport. With regard to passenger transport, growth in the aviation sector has even surpassed the national economy's growth rate over the past few years – barring 2016. This is illustrated in **Figure 2**.

Figure 2: Link between GDP and air transport in Belgium



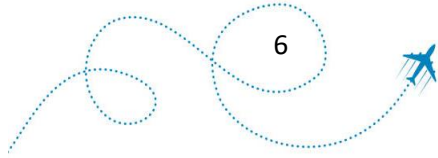
The gross added value also had a higher rate of growth here, with an annual growth of 7.4%, in comparison to the GDP growth percentage during this period (of 1.5% on average). The added value for the aviation sector rose by 15 to 16 percent between 2013 and 2015. This meant that the sector saw an added value of 6 billion euros, representing 1.5 percent of Belgian GDP⁴.

One possible explanation for the larger growth figures for airports in Belgium, and more specifically for Brussels Airport, may lie in the attractiveness of Brussels⁵. Its central location within Europe has triggered a lot of companies and international institutions to site their headquarters in and around Brussels. This obviously stimulates air transport. The enlargement of the European Union, combined with the fact that Brussels is Europe's capital city, has likewise caused a rise in the number of passengers.

In contrast, freight transport by air has seen a smaller growth in relation to GDP over the past few decades. However, since 2017, the sector in Belgium has been seeing strong growth and it appears to be catching up. Nevertheless, the evolution of freight traffic in Belgium was still performing below the European average until 2018, where the growth figures are more or less the same as the GDP growth

⁴ Belgian National Bank, July 2017. *Economic importance of air transport and airport activities in Belgium*.

⁵ In relation to the EU28 average.



figures. Some causes– including the fierce competition and the issues around noise pollution – are discussed further in section 3.1.2.

2.2 Future perspective for aviation

As already identified above, aviation is strongly influenced by evolutions in economic growth. It could also be argued here that globalisation and urbanisation are changing the global demand for aviation and will continue to do so. It is becoming increasingly more important to have smooth connections between regions. Additionally, the rise of the middle classes in developing countries will also ensure that aviation continues to advance, given that they will also be able to spend more money/income on flying.

According to the European Commission, aviation will rise by around 5% annually until 2030.

According to Brussels Airport Company, the average economic growth of 2.9% over the next 20 years will go hand in hand with a rise in passengers of 3.8% per year and in cargo of 4.7% per year.

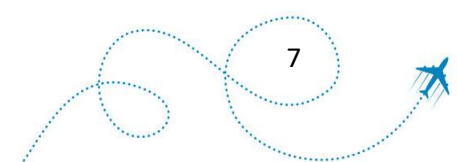
Obviously it should be noted here that the supply must meet the demand. This not only includes airport capacity (section 2.2.2), but also aircraft production. In the latter respect, the (only) two major suppliers of large aircraft in the civil aviation industry are Airbus and Boeing. Both suppliers received 1,640 new orders last year and delivered around 1,100 aircrafts. In this context, it is also worth mentioning the problems with the Boeing 737 MAX and the potential consequences of a (temporary) delivery stop on the possible number of routes to be flown, among other things.

2.2.1 Globalisation and economic centres

In general it is expected that globalisation will continue, as well as with the trend that global economic networks are concentrated in a limited number of urban regions. The regions will help to determine the global economy, which clearly makes international accessibility essential for them. Indeed, it is always important to be able to fly from one place to another quickly and efficiently. In this context, it is also worth mentioning that March 2018 saw the first direct flight by an aircraft (Boeing Dreamliner 797-9) between London and Perth (Australia), covering a distance of 14,499km in 17 hours.

Great potential and/or a possible threat from this also exists for Belgium and Brussels Airport. According to “The Global Competitiveness Report 2017-2018”, Belgium currently occupies twentieth place on the list of most competitive global economies. There is fierce competition for Belgium and the airport with a few neighbouring countries, however. The Netherlands is in fourth place, for example, and Germany in fifth. The United Kingdom occupies eighth place, Luxembourg nineteenth and France twenty-second.

As a region, then, it is becoming more and more important to be easily accessible from anywhere in the world.



2.2.2 Capacity Shortage in 2035

According to demand forecasts, aviation traffic will become increasingly important and will continue to grow. It is also important that this can be achieved, because aviation not only follows economic growth, but it is also a key driver for the economy.

The anticipated growth will have major consequences on the current landscape, however. According to a study from Eurocontrol⁶, up to around 12% – equivalent to 19 million – of the total number of predicted flights in 2035 will not be able to take place based on the current capacity of European airports.

It is, of course, worth mentioning here that the current capacity problems are also linked to the concentration of flights. In this sense, the predicted capacity shortages could already be reduced by, for example, spreading the flights out more over the day, or taking measures to increase the peak hour capacity.

Nonetheless, it could be argued that many European airports have limited to no space for expansion (both within and outside peak hours). This provides growth opportunities for certain airports, such as mid-sized hubs like Brussels Airport that have not yet reached their full capacity.

Obviously, this makes it important to invest in the airport(s) in a timely manner in order to attract growth in passengers and cargo, with job creation around the airport forming part of the same endeavour.

It was in this context that the airport operator, Brussels Airport Company, presented its strategic vision 2040 in November 2016, through which it seeks to expand its capacity with a view to doubling both passenger and freight transport. This is to be achieved by enlarging the runways and building two new terminal piers.

At present, the airport is able to sustain a maximum of 74 aircraft movements per hour in normal weather conditions. Optimising the current runway infrastructure (and procedures) will enable a rise to 84 movements per hour, equivalent to a capacity of around 30 million passengers. Bringing the capacity to 93 aircraft movements per hour would require infrastructure adaptations involving, on the one hand, an extension of the taxiway alongside runway 07R/25L across its entire length, and on the other hand, extending the 07R/25L runway itself with an accompanying taxiway.

⁶ Eurocontrol (2018), *European aviation in 2040. Challenges of growth.*

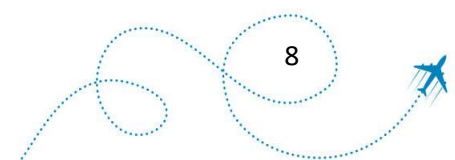
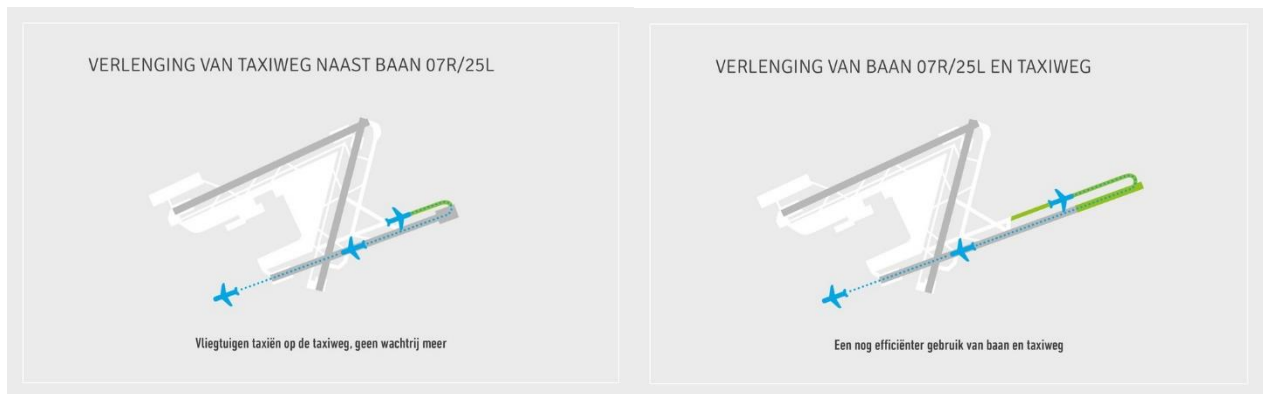
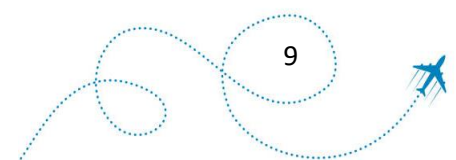


Figure 3: Options for expanding capacity at Brussels Airport – strategic vision 2040



Source: www.brusselsairport2040.be

Analogously, the strategic vision 2040 states that Brussels Airport will be essential to the growth of the Belgian economy. According to various prognoses, the European economy will grow by 44% by 2040, while Belgium's growth will amount to only 33%. If the airport can grow along with European air traffic, however, this may help to ensure growth and prosperity in Belgium (including via job creation). Should the airport fail to grow along these lines, neighbouring countries will attract tourists and business travellers and the airport will be able to offer fewer connections to the rest of the world. If Belgium's economy wants to increase accordingly, the airport must be afforded the necessary opportunities for growth. The accessibility of the airport region must be as easy as possible.





Brussels Airport Market Developments

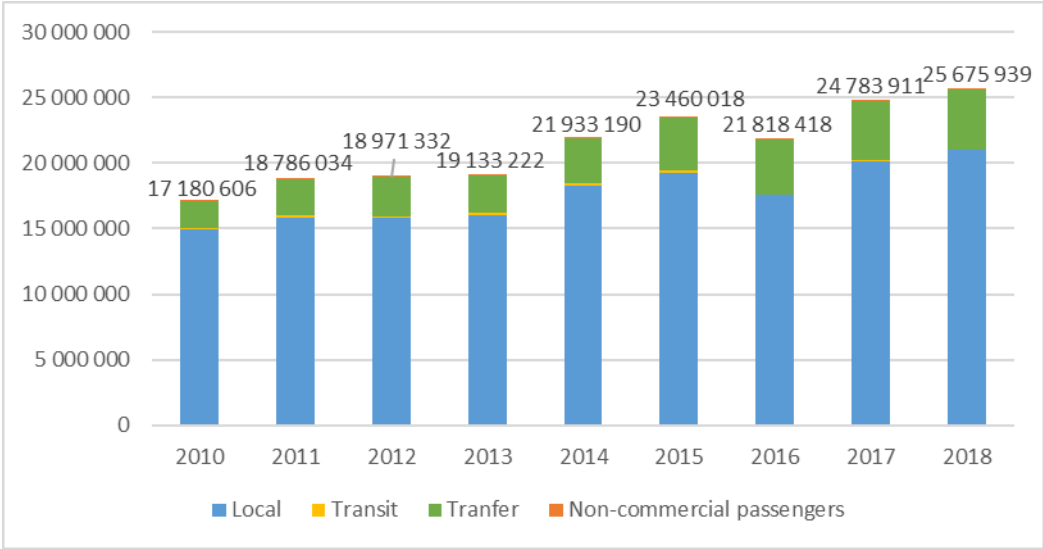
3. Market Developments

3.1 Brussels Airport Transport Volumes

3.1.1 Passengers

Figure 4 illustrates the evolution in the number of passengers at Brussels Airport by type. The total number of passengers in 2018 amounted to 25,675,939, a rise of 3.6% compared to 2017.

Figure 4: Evolution in number of passengers (by type) at Brussels Airport



The figure points out that Brussels Airport is an “Origin & Destination (O&D) Airport”. In 2018, more than 80% of the number of passengers were departing or arriving (local) passengers. This type of traffic is less volatile than transfer (or transit) traffic, given that it is also less dependent on airline decisions to change airport. Brussels Airport has therefore seen a stable growth in passenger numbers in recent decades – since Sabena went bankrupt – with the exceptions being in 2009 as a result of the economic crisis and in 2016 resulting from the terrorist attack. On average, growth has been above 5% over the past ten years. Furthermore, these types of passengers also provide greater certainty of a positive added value for the Belgian economy.

Despite the fact that Brussels Airport is an O&D airport, the number of transfer passengers has also risen increasingly in recent years. This shows the importance of Brussels Airport as a hub for the airline alliance “Star Alliance” – of which Brussels Airlines is a part. Brussels Airlines has succeeded in developing a transfer product, with a focus on serving African destinations, a geographical region that is not (yet) well-served by other European airlines in the Star Alliance. Due to the Lufthansa Group's decision at the end of 2016 to buy up the remaining shares, there remains some uncertainty as to Brussels Airlines' future business strategy, in particular with regards to this “transfer product” at Brussels Airport.

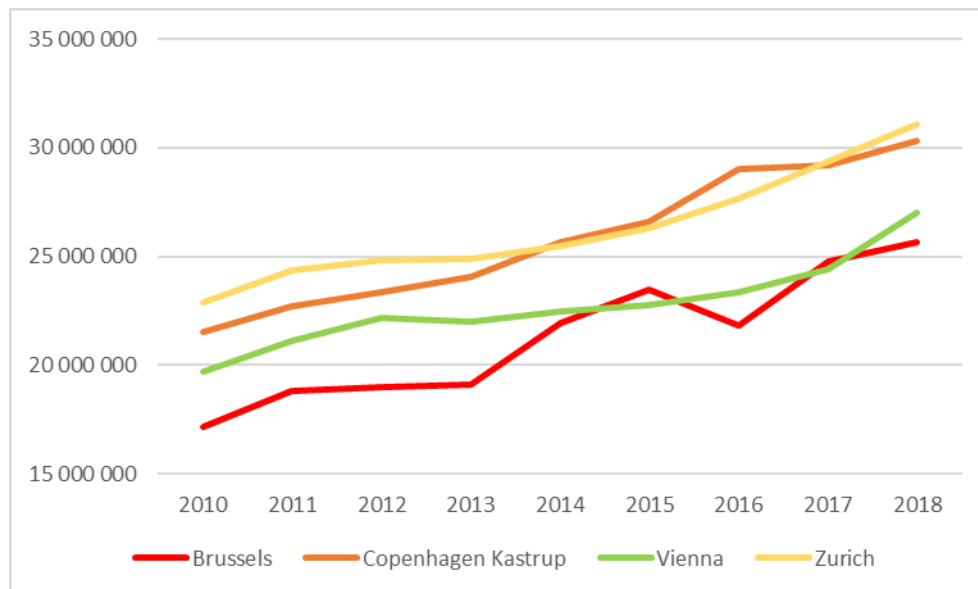
The fall in transit figures (around 90% compared to 2015) can be attributed to Jet Airways' move from Brussels Airport to Amsterdam end of March 2016.

3.1.1.1 Comparison of / competition from reference airports

In accordance with the Royal Decree of 27 May 2004 regarding the conversion of Brussels International Airport Company into a public limited company governed by private law, and regarding the airport facilities, the Regulatory Body is obliged to compare Brussels Airport with the so-called “reference airports”. These are the surrounding airport facilities or those with a profile comparable to those airport facilities that are subject to an operating license. The list of examples as laid out in the operating license contains the airports of London Heathrow, Paris Charles de Gaulle, Amsterdam Schiphol, Frankfurt am Main, Zürich, Copenhagen and Vienna. Appendix 1 contains an overview of the statutes for these airports (cfr. ownership). It cannot be stated that private airports inherently produce better results, given that this depends upon multiple factors, including the level of competition. It can be stated, however, that more and more public airports are structured and functioning as a private enterprise⁷.

The evolution in passengers at the reference airports is shown in **Figure 5**.

Figure 5a: Evolution in number of passengers at mid-sized reference airports of Brussels Airport



With its 25,675,939 passengers in 2018, Brussels Airport is primarily comparable with the other mid-sized airports of Zürich, Vienna and Copenhagen. Zürich and Copenhagen saw similar growth to Brussels, while Vienna Airport saw a higher increase in 2018 (around 10.8%). This was largely attributable to a major rise in the number of local passengers (via Austrian Airlines) and is not a direct result of any competition with Brussels Airport. Due to the very strong growth of Vienna Airport (as regards passenger numbers), Brussels Airport is once again the smallest of the reference airports.

⁷ ACI Europe, “The Ownership of Europe’s Airports 2016”.

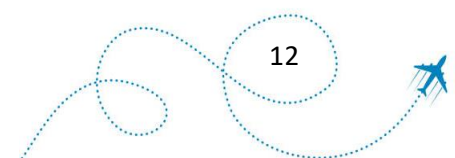
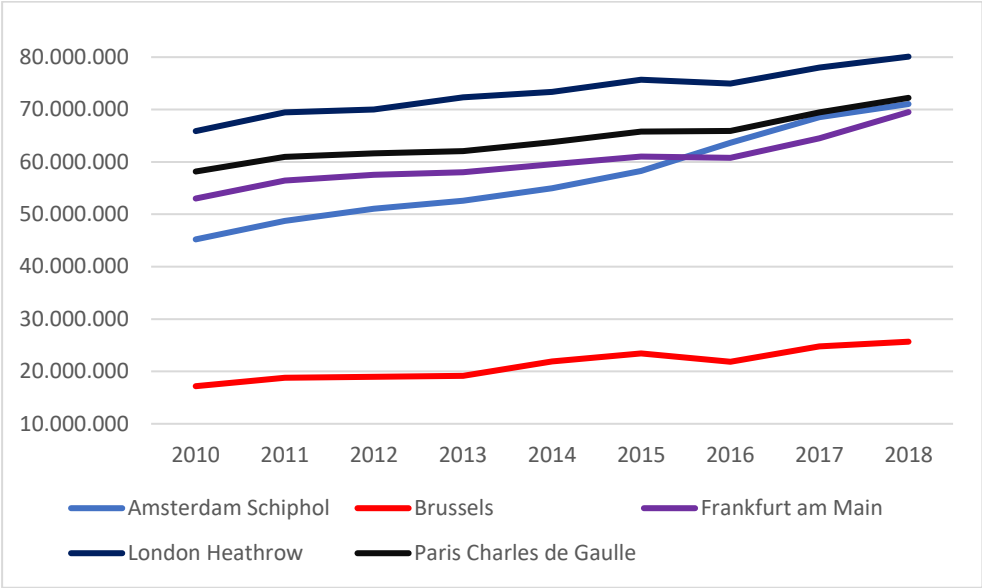


Figure 5b: Evolution in number of passengers at large reference airports of Brussels Airport



The other (large) reference airports for Brussels Airport have also seen growth comparable to that of Brussels in 2018. Only Frankfurt Airport saw – at around 7.8% – a relatively higher growth.

In addition, London Heathrow continues to have the largest number of passengers (around 80 million), followed by Paris Charles de Gaulle (around 72 million). These two airports are mainly important to compare (see competition) with Brussels Airport as regards long-distance flights, this being for a (limited) number of destinations.

Amsterdam Schiphol Airport has been on the rise for a number of years and is trailing very closely with around 71 million passengers. It is notable here that the major rise of 2016 (around 9.2%) – which was partly linked to the ‘redirection’ of passengers from Brussels Airport as a result of the terrorist attack – has nonetheless continued in 2017 (by around 7.7%) and in 2018 (by around 3.7% compared to 3.6% at Brussels Airport). Given this, Schiphol has developed itself into one of the world's largest hubs. This airport had the most direct connections in Europe in 2018, after Frankfurt. The competition between Brussels Airport and Amsterdam Schiphol Airport is therefore very real, for both short and long-distance flights. Moreover, both airports maintain a more or less similar pricing structure, and the price bracket for commercial flights is thereby also similar (Chapter 4 makes a comparison of the reference airports' various tariffs). It is worth noting here, however, that Amsterdam Schiphol is at the limit of its capacity and that this will offer opportunities for Brussels Airport. An important point in deciding the competition in their favour will be to also ensure better accessibility (less congestion, etc.).

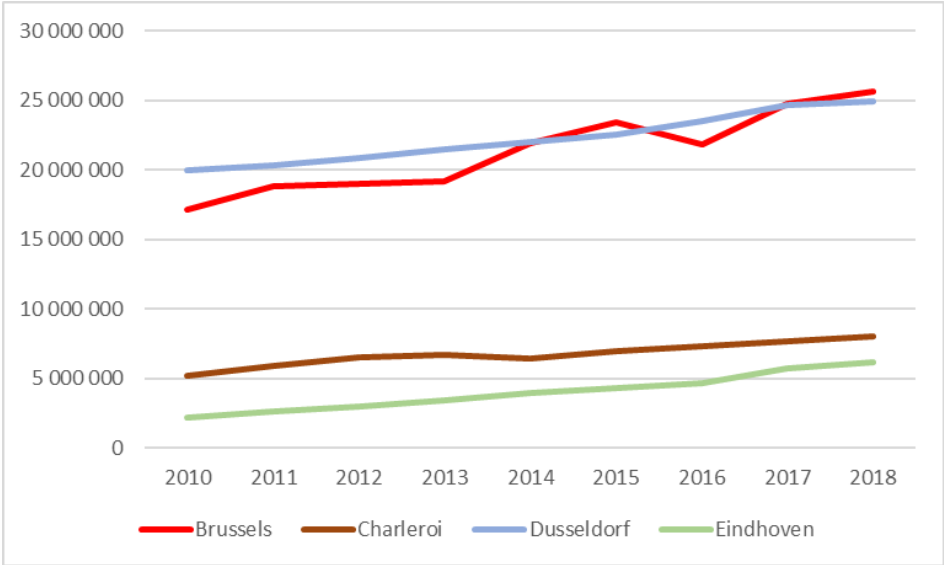
3.1.1.2 Comparison of / competition from other airports

Naturally, it is also worthwhile to compare the performance of Brussels Airport with that of (other) airports that may also be in direct competition. In doing so, we must first look at the *geographical distance* between the various airports. Besides Belgium, Brussels Airport's ‘catchment area’ also contains parts of northern France, the southern Netherlands and western Germany, where around 15 million people live within a 90 minute drive of the airport. The profile must also be taken into account:

what capacity does the airport have or can it accommodate, to which destinations can one (currently) fly, what are the major alternatives for transfers, and so on. This is how the Brussels Airport's *catchment* area was attempted to be defined.

Based on these criteria, it is certainly useful to compare Brussels Airport's performance with that of Charleroi, Düsseldorf and Eindhoven – **Figure 6**.

Figure 6: Evolution in passengers at other competing airports in Brussels Airport's immediate surroundings



Despite the fact that Charleroi Airport transports far fewer passengers, Brussels Airport is nonetheless exposed to a certain kind of competition, namely in short-distance flights, in the tourist travel market. Charleroi Airport is around 50km south of Brussels and mainly targets low-cost airlines. Despite the fact that there is real competition in this market segment, there has also been a recent trend among European low-cost airlines of expanding their presence at primary airports at the cost of secondary or regional airports. This is also what happened in 2014-2015 with Ryanair, which moved a number of routes from Charleroi to Brussels. It should not be expected, then, that the number of low-cost airline flights from Brussels will suddenly disappear in its entirety, meaning the competitive threat for Brussels is relatively limited.

Brussels Airport is experiencing similar competition from Eindhoven Airport – which is 51% owned by the Schiphol Group. This regional airport has a far smaller capacity and offers fewer (frequent) flights and destinations. In spite of this, the airport has managed to attract more and more Belgian customers and is a source of limited competition for Brussels Airport. It is estimated that around 1 in 5 passengers at Eindhoven are Belgian. The reasons cited for going to Eindhoven – instead of Zaventem – can be put down to the lower price, better accessibility and efficient operation of this airport (including fewer strikes).

Düsseldorf Airport – which is located around 200km east of Brussels Airport – is also a source of competition. The airport transported around 25 million travellers in 2018, similar to Brussels Airport. Düsseldorf Airport is also a major hub for the two largest airlines of Lufthansa and Air Berlin. As

indicated above, the full takeover of Brussels Airlines by Lufthansa may foster even further competition with this airport in the future.

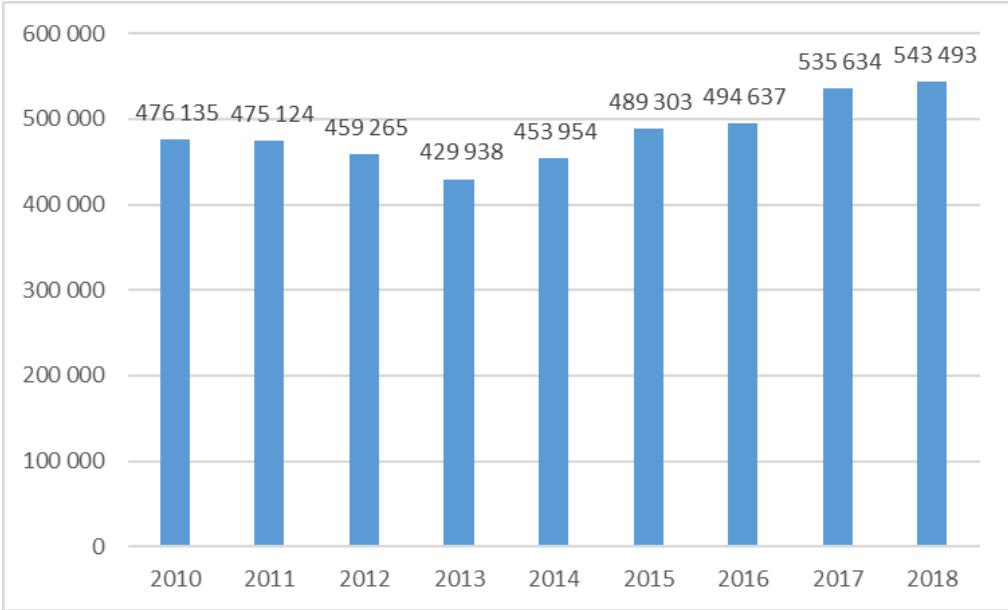
Of course, more (regional) airports around Brussels do exist, such as Lille or Maastricht. However, the competition with these airports is negligible due to their limited scope.

Finally, it could be stated that the competition for transfer passengers is also increasing. As already mentioned above, competition with Schiphol Airport, as well as Moscow or Helsinki, should not be forgotten here either. A further example would be rising competition from the new generation hubs in the Middle East (Dubai, Qatar) and Turkey (Istanbul). They are expanding their capacity at full pace and are focusing on larger aircraft, meaning that certain hubs may well be bypassed (in the future).

3.1.2 Cargo

The freight volume at Brussels Airport grew by around 1.5% in 2018 compared to 2017 to 543,493 tonnes and has been growing steadily for several years (Figure 7). E-commerce and high-tech, specialist industry are (and will stay) important market segments. The transport of pharmaceutical products in particular saw strong growth figures (+32%). Belgium is leading the world in pharmaceutical air transport, a sector that represents 11.4% of Belgian exports. Alongside this, it is also important to mention that lighter products are transported at Brussels Airport when compared to the weight of products that are traditionally transported by air.

Figure 7: Evolution in cargo (tonnes) at Brussels Airport



In 2018, 161,131 tonnes of cargo were transported via flights exclusively intended for freight (“full freighters”). This is a drop of 5% compared to last year and is a continuing trend. The share of these carried out by an integrator (“express freight”) came to 219,938 tonnes, representing a drop of 1.7%. The share of “combi-freight” or “belly cargo” (flights that transport both passengers and cargo) has risen sharply (+14.1%), however, to 162,424 tonnes. This enormous rise was thanks to the addition of new destinations.

Owing to the growth and the importance of cargo for Brussels Airport, a non-profit organisation associated with all companies and organisations active in air freight transport was set up in 2016. The new association, Air Cargo Belgium, is the official representative of the freight community at Brussels Airport. The aim of Air Cargo Belgium is to promote collaboration between the companies and stakeholders to strengthen Brussels Airport's competitive position in the field of freight transport and to gain market share in the future. This led to Ethiopian Airlines Cargo, among others, becoming active once again at Brussels Airport at the end of March 2016, and even expanding its activities.

Indeed, the airport is working on an ambitious development project within the freight zone. The construction of a highly modern 8,700m² logistics building commenced in 2018, and was opened early 2019.

3.1.2.1 Comparison of / competition from reference airports

Thanks to the small growth in cargo volume, Brussels Airport has continued to transport the most cargo among the mid-sized reference airports. Vienna Airport was the only other to see any growth (around 2.6%). All other ‘mid-sized’ and ‘large’ reference airports experienced a fall in their tonnage of cargo transported. As indicated above, the weight is by no means the only determining factor.

Figure 8a: Evolution in tonnes of cargo at mid-sized reference airports of Brussels Airport

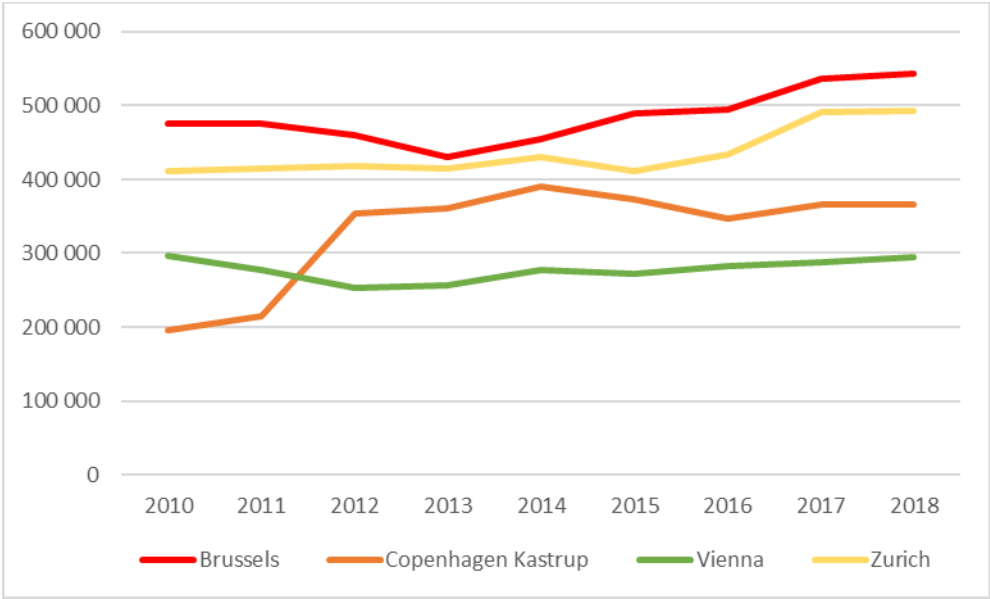
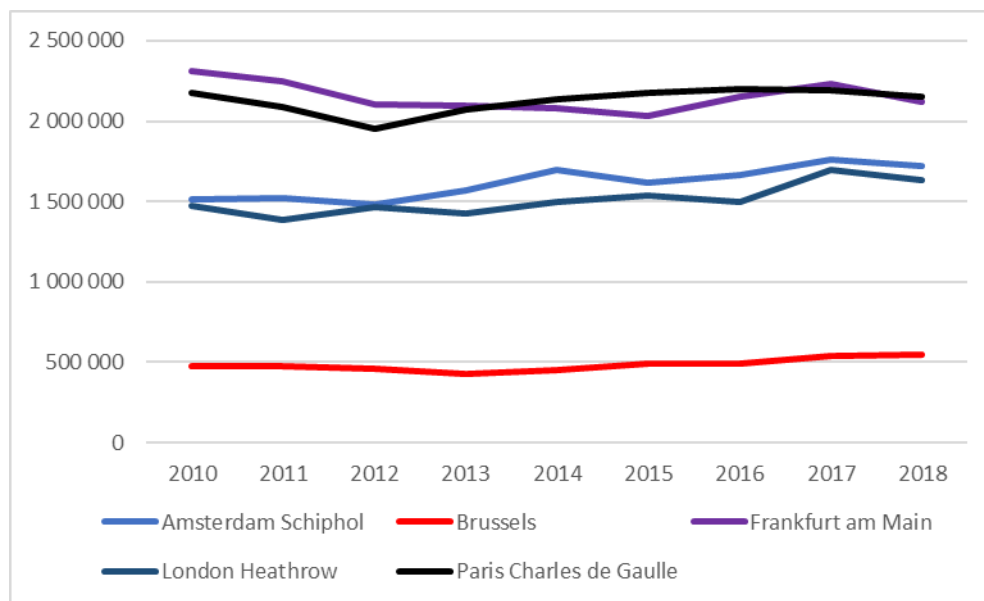


Figure 8b: Evolution in tonnes of cargo at large reference airports of Brussels Airport



As regards direct “competition” with Brussels: Paris, Amsterdam and Frankfurt are the most important ones to mention. Charles de Gaulle is the largest among the reference airports with around 2.15 million tonnes of cargo transported in 2018, a fall of around 1.8% compared to 2017. Frankfurt also saw a fall in freight transported of around 4.7% to 2.1 million tonnes. Compared to these airports, Brussels Airport has a very high “night rate”.

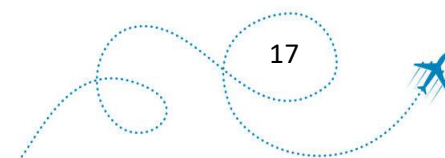
Part of the (small) growth at Brussels Airport is also a direct result of the mutual “interplay” between the reference airports, including Amsterdam Schiphol Airport. For example, the South American airline LATAM began freight flights at Brussels Airport in April 2018, for which there was no more space at the Dutch airport, which is practically at full capacity. This was also the reason why extra cargo flights from Singapore Airlines and Emirates were accommodated in the past.

3.1.2.2 Comparison of / competition from other airports

A different trend can be derived for freight transport. Besides the ‘competitors’ mentioned above, there is a lot of freight transport at Liège Airport, while Leipzig Airport should also be considered a potential ‘competitor’, among others.

Liège Airport transported around 870,000 tonnes of cargo in 2018, giving it a very large share of Belgian freight traffic (around 60%). Nevertheless, Air Cargo Belgium indicates that Brussels and Liège have more of a complementary than a competitive relationship. Policy must therefore preferably ensure that Belgium does not lose ground in comparison to neighbouring countries, something which has been happening in recent years as a result of the strict noise standards, among other things. Singapore Airlines' freight at Brussels, for example, has fallen by around 80,000 tonnes compared to 2008.

The competition with Leipzig is among the most important in this. In 2008, DHL moved its inter-continental hub from Brussels to Leipzig following a long-running conflict about night flights and noise pollution, but also owing to the greater possibilities for expansion at Leipzig. Less than seven years



later, DHL has begun to re-invest in Brussels once more. Additionally, while the former inter-continental hub has been downgraded to a European hub, it remained possible to discern systematic growth in its activities. There was an expansion of its capacity as well, but not of the number of night flights. DHL opened its refurbished hub in 2018, whereby an automated sorting system for small and large packages forms the heart of the refreshed logistical operation.

As depicted in Brussels Airport's Strategic Vision 2040, the ambition and the need (see Belgian economic growth) to further expand the cargo element certainly remain.

For comparison, Leipzig Airport transported around 1.2 billion tonnes of freight in 2018, this being almost double the amount of freight transported in 2010. At Brussels, this figure rose by only 14% (and by 36% at Liège).

3.2 Airline competition

3.2.1 Market share and “home carrier” significance

One of the determining factors for the growth of an airport is the presence and operation of the so-called “home carrier”.

For Brussels Airport, this is Brussels Airlines. They have a market share of around 35%. They have further expanded their capacity in the past few years and have seen the number of passengers rise accordingly. As already stated, they also have a very considerable share of the number of transfer passengers.

In **Figure 9**, the annual growth of the “home carrier” Brussels Airlines is compared with the growth of Brussels Airport (in passengers). It goes without saying that – owing to the relatively high market share – a link can be discerned between both players. However, Brussels Airlines' growth figures are also generally higher than those of Brussels Airport, which further shows the significance of the “home carrier”. Furthermore, Brussels Airport is also influenced far more strongly by the terrorist attack in 2016 and its ramifications.

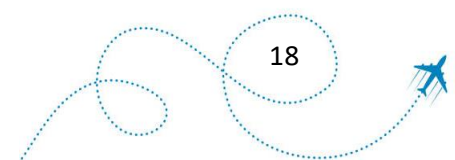
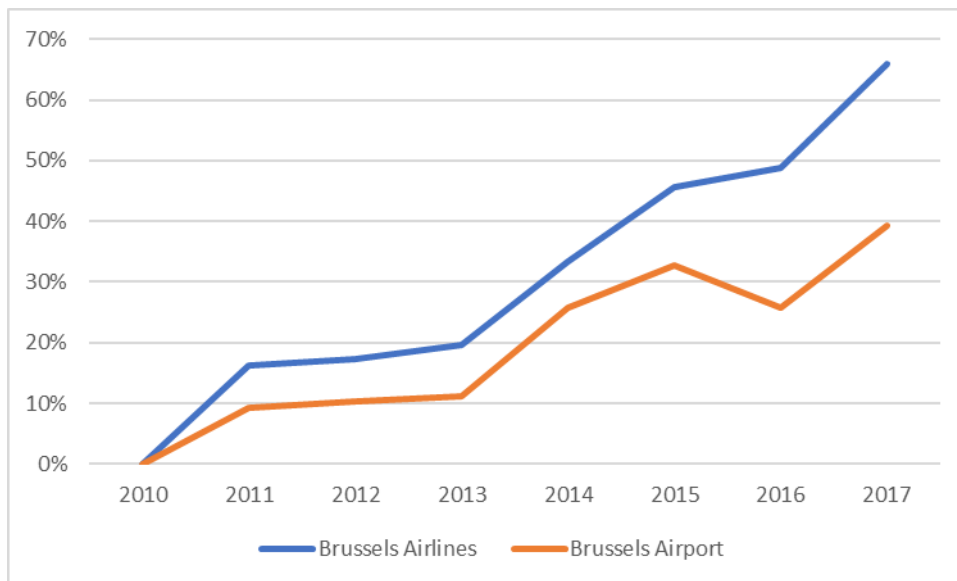


Figure 9: Annual growth of “home carrier” vs. BXL airport from 2010



However, as a result of the full takeover by Lufthansa, it is unclear which business model will be applied in the future.

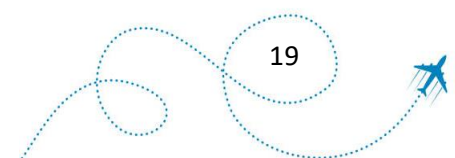
As is already clear from **Figure 9**, the takeover by Lufthansa is not only of vital importance for Brussels Airlines itself, but also for Brussels Airport. If Brussels Airlines is threatened with the loss of Zaventem as a hub, this would have major consequences for the airport's growth figures. After all, owing to its small home market, Brussels Airlines is reliant upon the supply of passengers to fill its long-haul flights.

3.2.2 Dynamic of low-cost versus traditional (network) airlines

The liberalisation and unification of the European aviation market has provided for greater competition between the airlines over the past few decades. Flying has become cheaper and the service offering (cfr. routes and frequency) has risen enormously. Competition is at its height around the hub airports, such as London Heathrow, Madrid Barajas, Rome Fiumicino and Schiphol, where multiple airlines are struggling for a limited number of slots and, thereby, connections.

Low-cost airlines have managed to gain more and more market share over the past few years, including at Brussels Airport. Moreover, these airlines are becoming increasingly active in the long-distance and transfer connection market. In this way, low-cost airlines may be in a position to exert pressure on the hub function of certain airports by offering direct flights for connections that currently still run via that hub airport, as well as forcing down costs and turnaround times and competing with certain “home carriers” through lower prices.

This is because flying has become cheaper and, due in part to the rise of low-cost airlines, the competition between European airports has also risen rapidly. Not only have the number of routes and seating capacity risen sharply as a result, but low-cost airlines are far less dependent upon particular airports. What is more, the traditional network airlines have also become less dependent upon a single airport, for example by transitioning to the multi-hub system. Only time will tell whether the market power of airports is set to drop, be it now or later on.



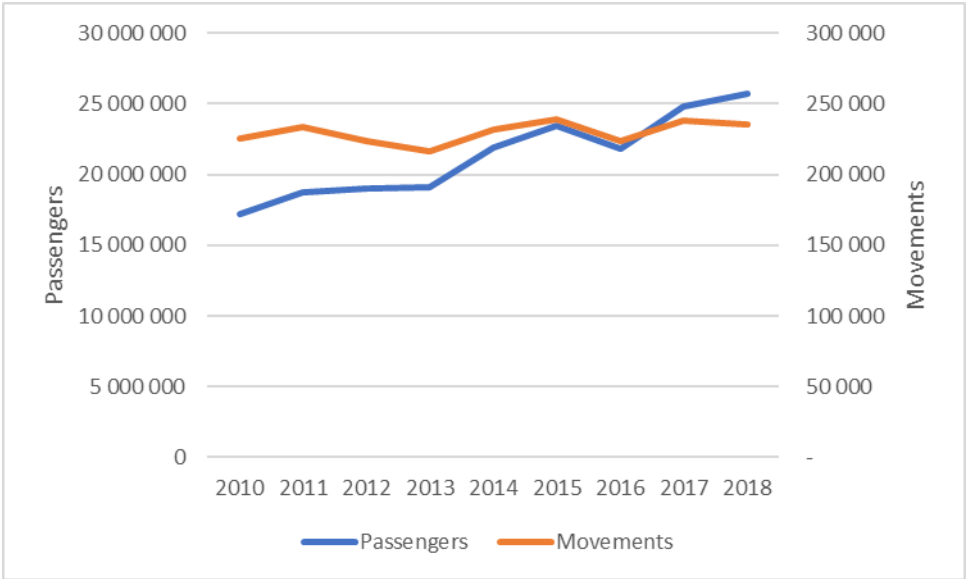
It should be noted here that the notion of a low-cost airline *in itself* no longer exists. Nowadays, certain business models are being adopted by different types of airlines and the more classical ones are also placing greater emphasis on cost savings. As already mentioned above, low-cost airlines are also broadening their market by focusing more on transfer passengers and destinations further afield, as well as on business passengers. This is partly occurring by means of carrying out operations from primary airports too.

3.3 Trends in aviation

3.3.1 Load factor and aircraft type

For efficiency reasons, and due in part to the limited capacity at many airports, a downward trend can be discerned in the number of flight movements compared to the number of passengers (and the tonnage of cargo transported). The number of movements at Brussels Airport has decreased by 1%, despite a 3.6% rise in the number of passengers (and a rise in the tonnage of cargo transported of around 1.5%). This is depicted in the figure below.

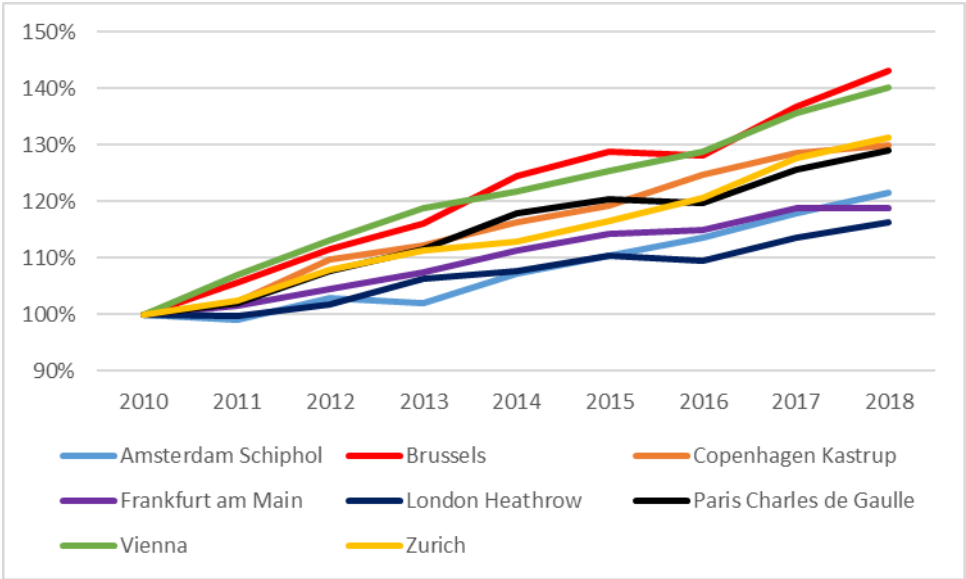
Figure 10: Comparison of passengers and movements at Brussels Airport



In this context, greater use is made of larger aircraft and an improved load factor can be seen. In 2018, the number of passengers per flight rose by 5.8% compared to 2017 to an average of 127 passengers per flight.

Figure 11 gives an indication of the evolution in the number of passengers per flight at Brussels Airport in comparison to its reference airports. It shows that all airports are making use of larger aircraft and/or better load factors compared to 2010, but that Brussels has seen a relatively larger increase.

Figure 11: Evolution in number of passengers per flight (movements) at Brussels Airport and reference airports



To meet the trend for larger aircraft, Brussels Airport also brought a threefold boarding bridge for passengers into service in 2018. Thanks to this new bridge, passenger boarding and disembarking from larger aircraft can take place more quickly. The bridge will be used for larger aircraft of the Airbus A330 and A350, and Boeing 777 and 787 models. The bridge can also be used for the Airbus A380 – the largest passenger aircraft in the world.

The need to be able to accommodate the latter type of aircraft – and one of the reasons for the investment in this bridge – has partially diminished, however. This is because Emirates airline – the largest customer of this type – is now aiming for shorter flights and no longer intends to make use of the A380, which may lead Airbus to pull the plug on its A380 programme.

3.3.2 Technological developments (incl. sustainability)

There are continuous technological developments in the aviation sector, often with the aim of saving on fuel, materials and weight, thereby reducing the operational costs of aviation. These include adaptations to aircraft engines, aerodynamics or upscaling with respect to use of materials.

Indeed, the transport and aviation sector is facing high diesel and kerosene prices, among other things. According to the International Air Transport Association, the price of kerosene has risen by more than 50% in the past two years.

Kerosene is responsible for a large share of airline costs. In 2018, kerosene accounted for more than a quarter of airline costs at Zaventem. To protect themselves against wildly fluctuating kerosene prices, the larger airlines often take out an insurance policy for long-term contracts. Not everybody can afford to do this, however.

In order to make aviation less dependent upon fluctuating resource prices, the sector is continually working on the development of light and fuel-efficient aircraft to improve efficiency. It has been

suggested that a fleet of around 10 years old uses roughly 5% more kerosene than brand-new aircraft⁸. Furthermore, according to IATA⁹, the more 'common' aircraft designs in 2030 could be around 30% more economical than those from 2005.

The various aircraft manufacturers are therefore ensuring that new aircraft are highly economical. Naturally, this also has other advantages. These aircraft are also quieter and emit less CO₂.

Climate change

Certainly, aviation does have a major influence on the climate through the emission of CO₂, nitrogen oxides and water vapour, among other things. Scientists agree that a reduction in greenhouse gases such as CO₂ will be needed in order to combat or delay climate change. Considering the agreement that was reached during the Climate Summit in Paris in late 2015 to limit global warming to well under 2°C, it will be necessary for the aviation sector to make its own efforts. Partly in this context, the United Nations has entrusted the international civil aviation organisation ICAO with drawing up a plan to reduce aviation emissions. A package of measures should achieve a 50% reduction of CO₂ by 2050 compared to 2005.

The current national climate policy, however, does not provide for specific aviation policies at present. Depending on the measures to be taken, this may of course lead to a major impact on aviation and more specifically on the airlines and airports. For example, one of the many matters under discussion is prohibiting short(er)-distance flights or making them very expensive. This would naturally have consequences for the entire sector.

It is clear that the aviation sector does lead to consequences for climate change and that these must be limited. Conversely, however, climate change will also affect aviation. This involves effects on safety (heavier rainstorms, ice, wind and turbulence), routing (air current patterns) and infrastructure at airports (extremes of precipitation, more speed/length needed for take-off). Naturally this may also alter the demand for aviation (e.g. geographical destination).

3.3.3 Consolidation (inc. effect on hubs)

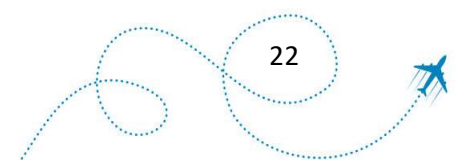
By analogy to the full integration of Brussels Airlines into the Eurowings Group, it is expected that the consolidation of the – as of now fragmented – European aviation market will continue. To save costs and increase market coverage, airlines will be working on upscaling and collaboration.

It will become ever harder to survive without this trend, as the bankruptcies in the past few years have revealed. This was how Air Berlin, Monarch and VLM Brussels Airlines (which originated as Thomas Cook Airlines) went bankrupt in recent years. The British regional airline flybmi followed in early 2019, which also carried out flights for Brussels Airlines.

Clearly, this attempt at consolidation may have an effect on European airport connectivity. It may cause some airports to lose their position as a hub. As already indicated above, maintaining this position as a hub will also be crucial for Brussels' connectivity. Although there will naturally be other

⁸ Clearly there are also other factors, such as the weight or the manner of e.g. descent, that play an important role.

⁹ *Technology Factsheet*, IATA (2018)



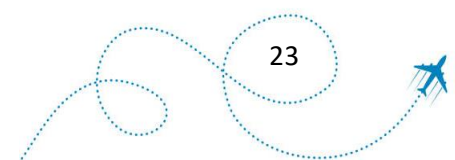
aspects in play too (such as the consolidation strategy), this is what makes it so important for the airport to continue investing in outstanding facilities to create a distinctive transfer product.

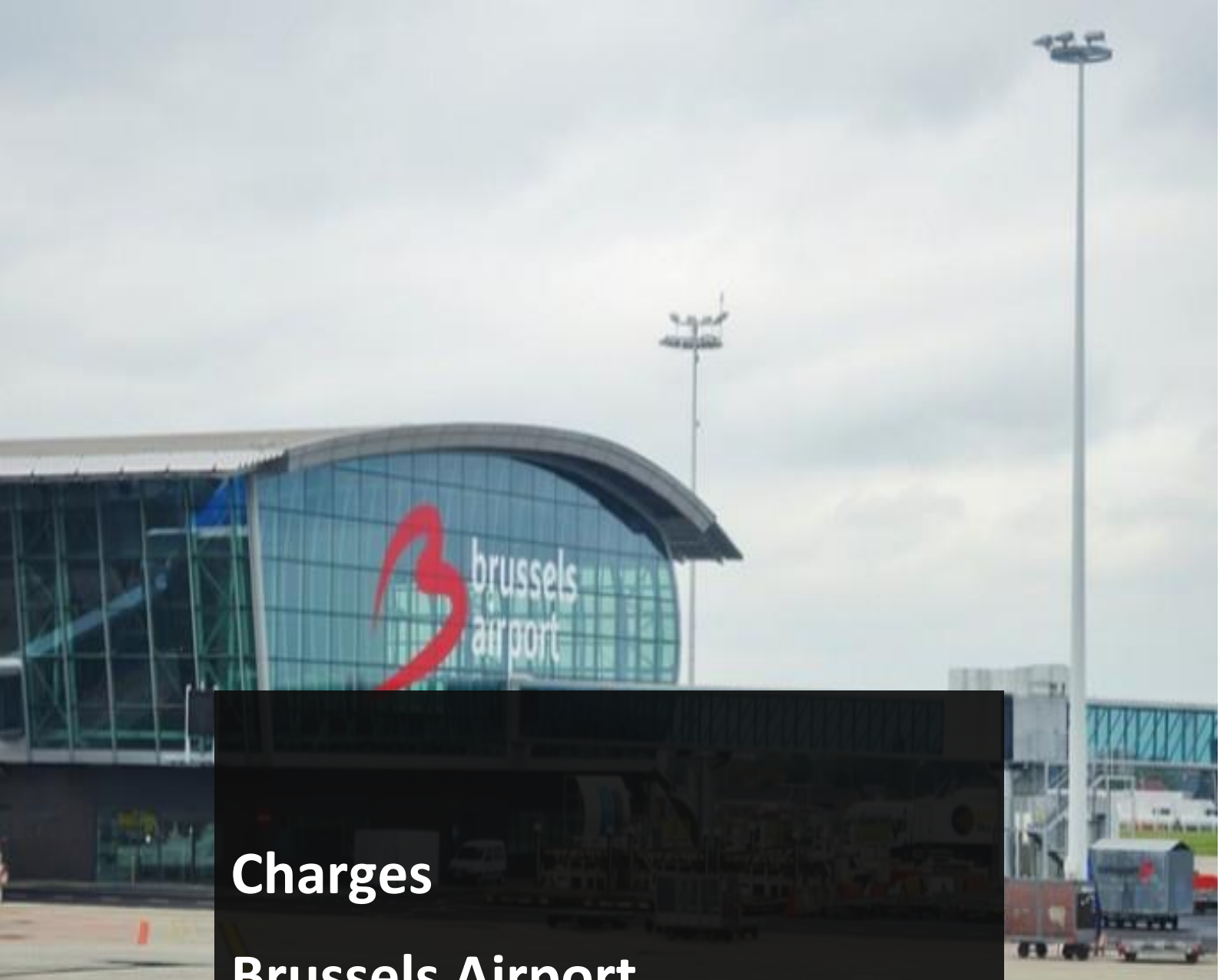
3.3.4 Connections with new (and growing) markets

In order to maintain positive growth in passenger numbers in the long term, it will be important to realise (further) connections with growing markets.

It can be seen, for example, that the demand for direct connections between Europe and Asia is rising sharply, due in part to the growing interest in travel among the Chinese population. Brussels Airport has also introduced new flights between Brussels and the Asian continent in 2017 and 2018, which will play an important role in stimulating tourism to Belgium. Moreover, direct connections to China have also been introduced for Belgian businesses (Pearl River Delta). The same also applies to India.

Additionally, Brussels Airport – via Brussels Airlines – remains a real hub for African passengers, 65% of which are transferring to destinations in Europe or Asia. What is more, Brussels Airlines transport around 1 million passengers on the African network annually, a figure that continues to grow.





Charges

Brussels Airport

4. Charges for regulated activities

4.1 Pricing for Brussels Airport

Brussels Airport Company sets the charges for the regulated activities for each regulatory period (of five years). These include those airport activities from which the proprietor can derive an income that is controlled, namely:

- Take-off and landing of aircraft;
- Stationing aircraft;
- Passengers' use of the facilities at their disposal;
- The fuel provision for the aircraft by means of centralised infrastructure;
- Operations carried out with a view to ensuring the safety of passengers and the security of the airport facilities.

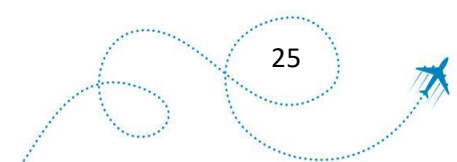
The charges at Brussels Airport that apply from 1st April 2019 (until 31st March 2020) for these regulated activities are laid out in the table below.

Table 1: Regulated charges at Brussels Airport to be applied from 1st April 2019

Charge	Formula	Charge per factor
Landing & take-off	$[U] \times [W] \times [E] \times [D]$ <i>Unit tariff, Weight factor, Environmental factor, Day/night factor</i>	U = €3.16 for passenger flights U = €2.63 for cargo flights W = 20 (min) – MTOW – 175 (max) E = [0,7 - 2] D = [1 - 3]
Parking	$[U] \times \text{MTOW} \times \text{\#hours}$	U = €0.75 for passenger flights U = €0.21 for cargo flights
Passengers	Passenger charge + Bussing charge (per departing passenger)	Originating passenger = €21.82 Transfer passenger = €11.46 Transit passenger = €0.53
Safety	Security charge	Originating passenger = €7.26
PRM	Passenger with Reduced Mobility Charge	All departing passengers = €0.47

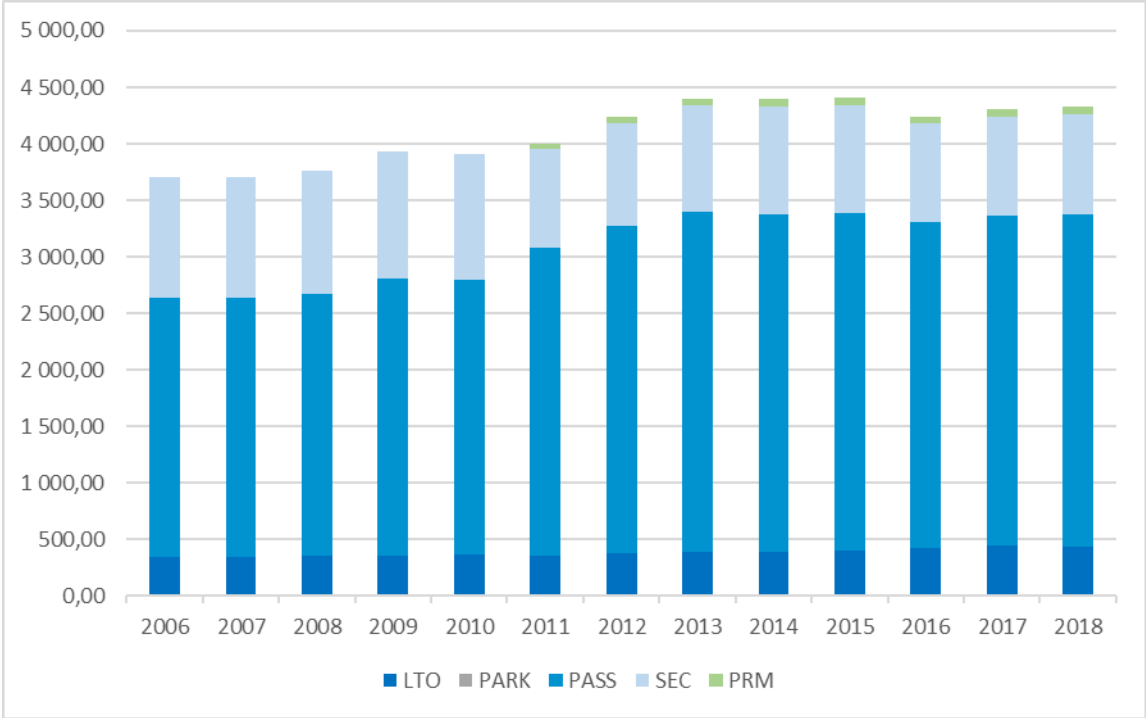
These charges are determined on the one hand by the costs incurred (capex and opex), and on the other by the passenger numbers as forecast (on top of other charges incurred such as environmental expenses).

Figure 12 provides an overview of the evolution of these charges over the past three regulatory periods. The charges are generally fixed within a regulatory period and – save for any exceptions due to extenuating circumstances, such as the consequences of the attacks in 2016 and other safety and security measures imposed – these are solely dependent upon certain indexes and factors.



The comparison in the figure below thereby relates to a single passenger flight taking off from Brussels Airport. Specifically, a weight of 77.4 MTOW and 142 departing passengers are assumed, with no parking time and the same departure time and environmental factor.

Figure 12: Evolution in price for a specific flight from Brussels Airport



This pricing takes no account of the charging changes brought about by the events of 22nd March 2016 or other additional safety measures, which have only come into force from 1st April 2019.

4.2 Comparison of reference airport charges

As a result of the considerable range of charging structures (incl. incentive programmes) at the reference airports, comparing the charges at different airports is not easy. Depending on the flight being operated, the number of passengers or cargo being transported, the share of transfer passengers, how long the aircraft will be parked, the time of take-off and landing, and many other factors, the outcome will be different. In **Figure 13**, the regulated charges¹⁰ at Brussels Airport for one specific flight are compared with those of the reference airports. This involves a B757 transporting 200 passengers to a destination in the EU, with 2 hours of parking time and take-off and landing during the day, at a ‘connected stand’. **Figure 14** provides an overview for a somewhat smaller flight – as is more typical at Brussels Airport – by means of an A319 transporting 100 passengers.

¹⁰ The applicable charges are those from April 2019.

Figure 13: Comparison of regulated charges at reference airports (B757 scenario)

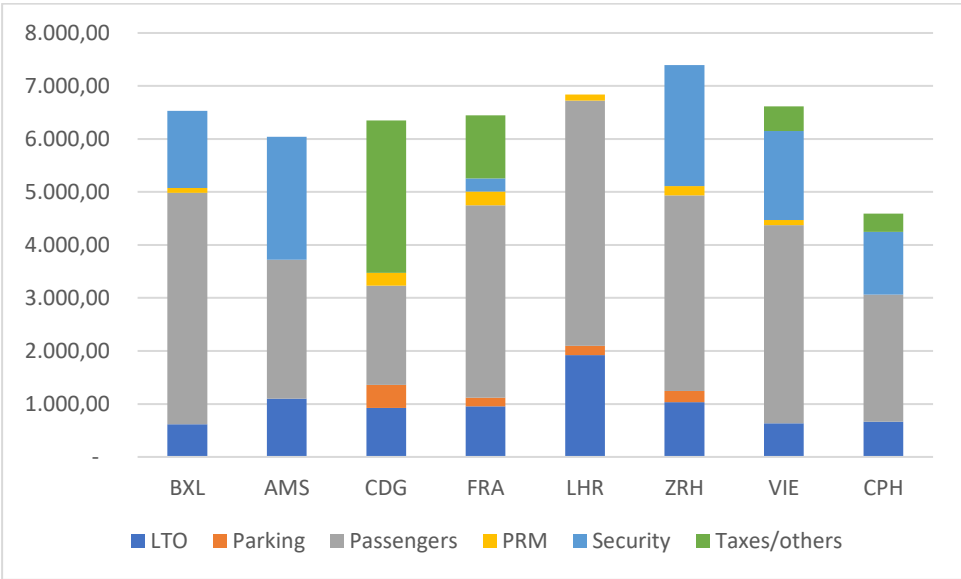
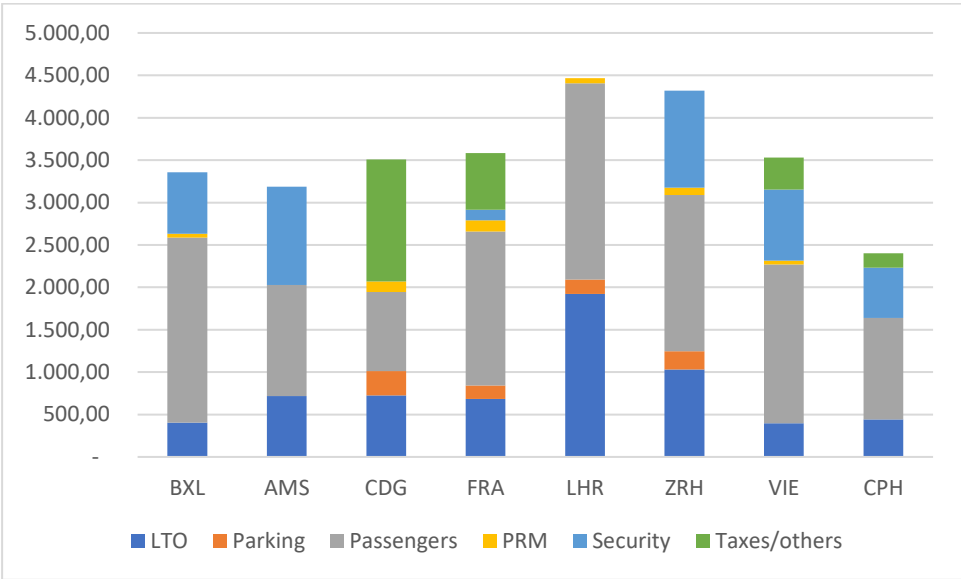


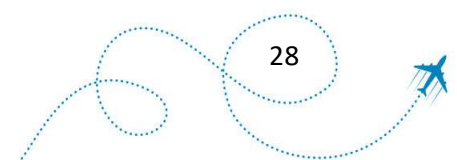
Figure 14: Comparison of regulated charges at reference airports (A319 scenario)



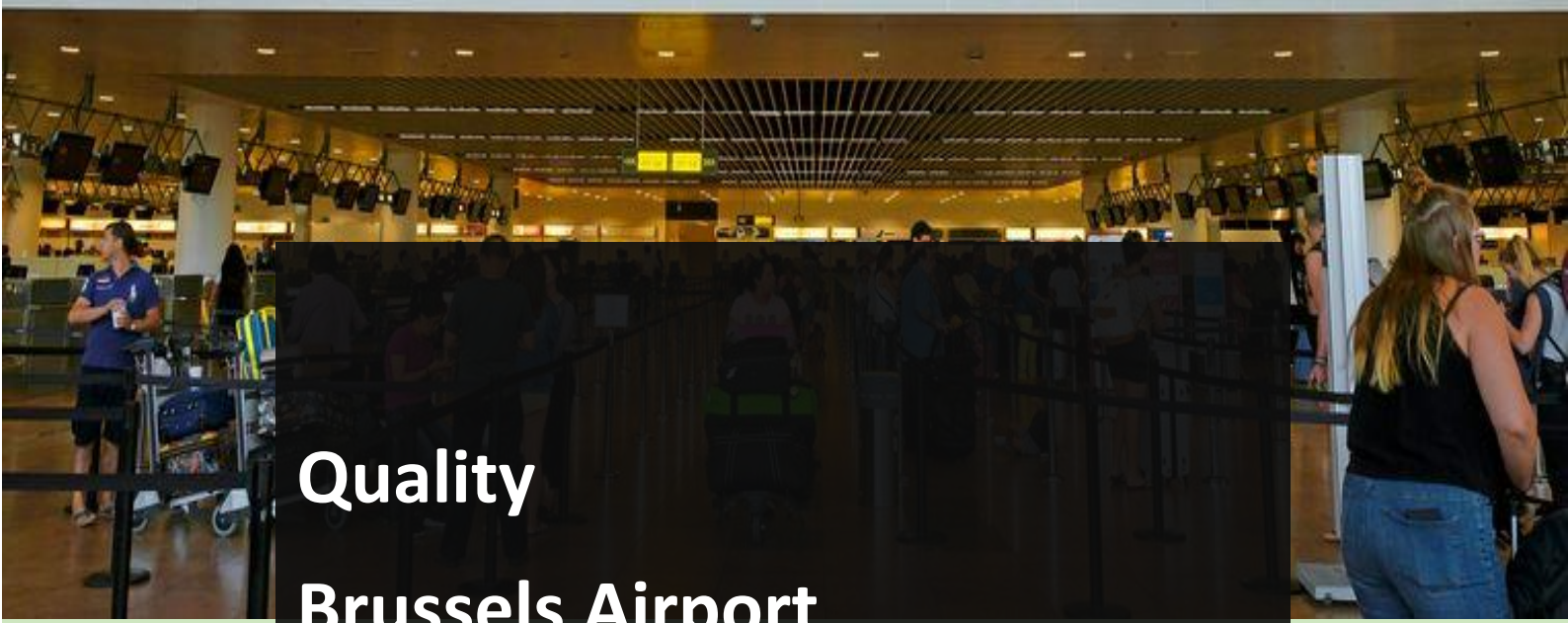
The figures reveal that Brussels maintains low to medium charges in comparison to its reference airports. For Brussels Airport, a relatively large share of the regulated charges runs to the “passenger charges” here, while the “LTO charges” are relatively low in comparison to the other reference airports.

Naturally these results should be taken with a pinch of salt. The charges for passengers and security at Brussels Airport from 1st April 2019, for example, have seen a relatively sharp rise owing to the safety and security measures imposed on the BAC, due in part to the 2016 attacks, which then had to be shared out over a relatively limited period of time within the regulatory period of 5 years.

Furthermore, it should be noted that the charges (incl. the “passenger charges”) are also determined based on the expected number of passengers. The higher the number of passengers, the lower the price per passenger becomes, making a flight with more passengers proportionately cheaper when compared to the current situation. This also explains why Brussels comes out looking relatively expensive in the first scenario and relatively cheap in the second. Were the most common flights at Brussels Airport to be compared with the reference airports, Brussels would be among the cheaper ones. Nonetheless, the significance of ensuring that the charges are effective in the right categories (including in the future) is very clear.



Departures						Vertrek						Départs						Abflüge					
LINE	FLIGHT	DESTINATION	STATUS	DOOR	STAIRS	LINE	FLIGHT	DESTINATION	STATUS	DOOR	STAIRS	LINE	FLIGHT	DESTINATION	STATUS	DOOR	STAIRS	LINE	FLIGHT	DESTINATION	STATUS	DOOR	STAIRS
KL	1234	AMS	OK	1	1	KL	1234	AMS	OK	1	1	KL	1234	AMS	OK	1	1	KL	1234	AMS	OK	1	1
BA	5678	LHR	OK	2	2	BA	5678	LHR	OK	2	2	BA	5678	LHR	OK	2	2	BA	5678	LHR	OK	2	2
AF	9012	CDG	OK	3	3	AF	9012	CDG	OK	3	3	AF	9012	CDG	OK	3	3	AF	9012	CDG	OK	3	3
DL	3456	JFK	OK	4	4	DL	3456	JFK	OK	4	4	DL	3456	JFK	OK	4	4	DL	3456	JFK	OK	4	4
UA	7890	LAX	OK	5	5	UA	7890	LAX	OK	5	5	UA	7890	LAX	OK	5	5	UA	7890	LAX	OK	5	5
AA	1122	MIA	OK	6	6	AA	1122	MIA	OK	6	6	AA	1122	MIA	OK	6	6	AA	1122	MIA	OK	6	6
WN	3344	MDW	OK	7	7	WN	3344	MDW	OK	7	7	WN	3344	MDW	OK	7	7	WN	3344	MDW	OK	7	7
B6	5566	LGA	OK	8	8	B6	5566	LGA	OK	8	8	B6	5566	LGA	OK	8	8	B6	5566	LGA	OK	8	8
J5	7788	DFW	OK	9	9	J5	7788	DFW	OK	9	9	J5	7788	DFW	OK	9	9	J5	7788	DFW	OK	9	9
DL	9900	ATL	OK	10	10	DL	9900	ATL	OK	10	10	DL	9900	ATL	OK	10	10	DL	9900	ATL	OK	10	10
DL	1111	SEA	OK	11	11	DL	1111	SEA	OK	11	11	DL	1111	SEA	OK	11	11	DL	1111	SEA	OK	11	11
DL	2222	PHX	OK	12	12	DL	2222	PHX	OK	12	12	DL	2222	PHX	OK	12	12	DL	2222	PHX	OK	12	12
DL	3333	DFW	OK	13	13	DL	3333	DFW	OK	13	13	DL	3333	DFW	OK	13	13	DL	3333	DFW	OK	13	13
DL	4444	MDW	OK	14	14	DL	4444	MDW	OK	14	14	DL	4444	MDW	OK	14	14	DL	4444	MDW	OK	14	14
DL	5555	ATL	OK	15	15	DL	5555	ATL	OK	15	15	DL	5555	ATL	OK	15	15	DL	5555	ATL	OK	15	15
DL	6666	SEA	OK	16	16	DL	6666	SEA	OK	16	16	DL	6666	SEA	OK	16	16	DL	6666	SEA	OK	16	16
DL	7777	PHX	OK	17	17	DL	7777	PHX	OK	17	17	DL	7777	PHX	OK	17	17	DL	7777	PHX	OK	17	17
DL	8888	DFW	OK	18	18	DL	8888	DFW	OK	18	18	DL	8888	DFW	OK	18	18	DL	8888	DFW	OK	18	18
DL	9999	MDW	OK	19	19	DL	9999	MDW	OK	19	19	DL	9999	MDW	OK	19	19	DL	9999	MDW	OK	19	19
DL	0000	ATL	OK	20	20	DL	0000	ATL	OK	20	20	DL	0000	ATL	OK	20	20	DL	0000	ATL	OK	20	20



Quality
Brussels Airport

5. Quality at Brussels Airport

Brussels Airport Company is obliged to produce an annual report for the Regulatory Body on the efficiency of its airport management in terms of pre-determined and approved quality indicators and in relation to the reference airports.

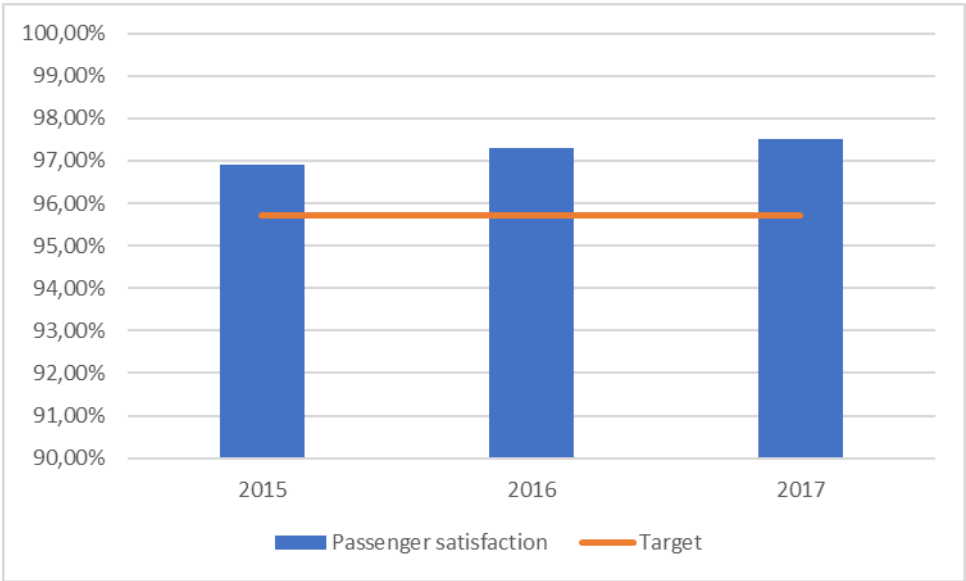
The airport carries out satisfaction surveys for this using the internationally recognised ASQ methodology (Airport Survey Quality). These measure passenger satisfaction by means of a benchmarking programme. BAC also maps out certain technical indicators.

5.1 Evolution in passenger satisfaction

5.1.1 General passenger satisfaction

Using the ASQ methodology, general passenger satisfaction is measured as the percentage of passengers who consider their general satisfaction with the use of Brussels Airport to be sufficient. The norm here for the airports is set at 95.7%. Brussels Airport has always exceeded this standard over the past few decades. In general, a very small rise in passenger satisfaction can also be seen annually. Brussels Airport's performance is around average when compared to the reference airports.

Figure 15: General passenger satisfaction at Brussels Airport¹¹



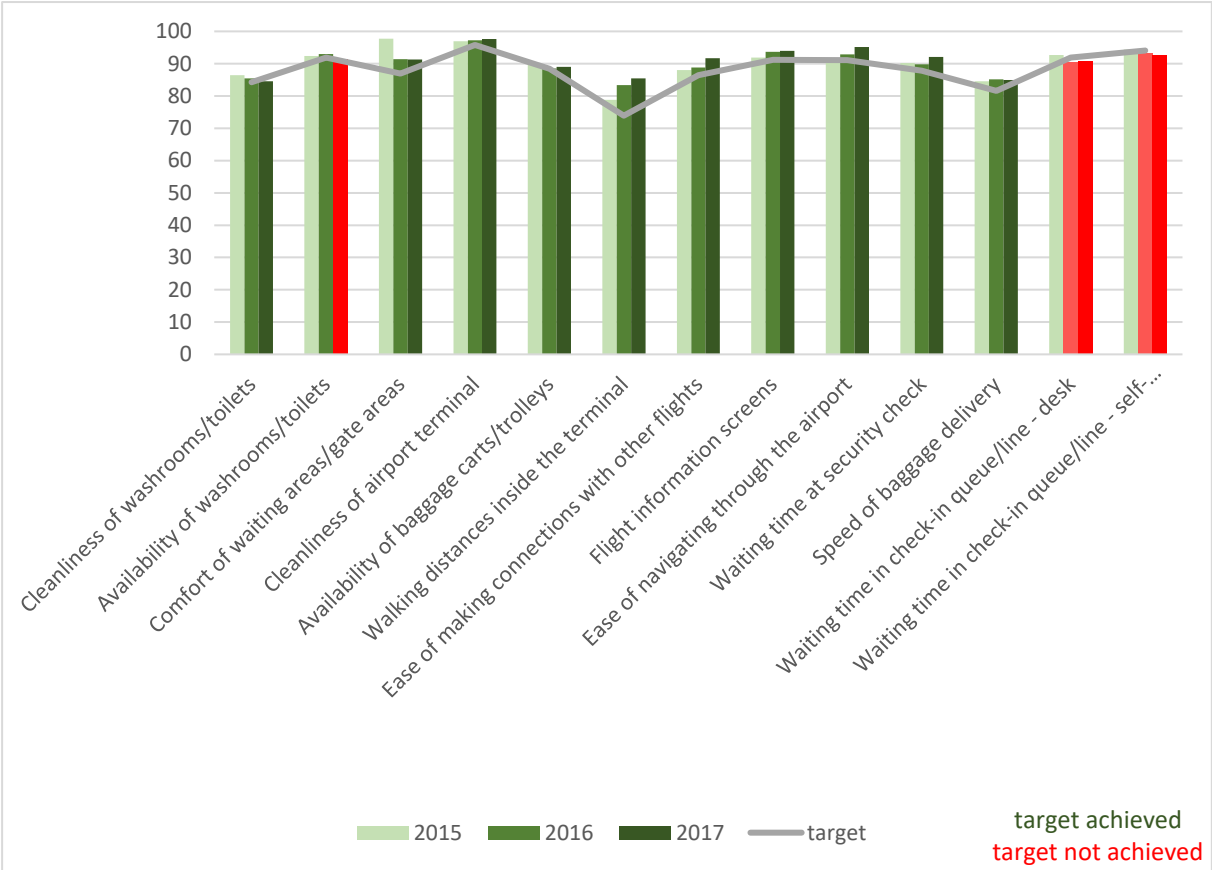
It is difficult to say whether the upward trend in passenger satisfaction is due to investments by Brussels Airport itself. It can be suggested, however, that there is always a – very small – rise to be discerned coinciding with additional investments, such as when the connector to Pier B was opened in 2016.

¹¹ Previously, a different satisfaction methodology was used (cfr. BRUSS – Brussels Airport Satisfaction Survey), meaning the results are not comparable. The standard was consistently exceeded then too.

5.1.2 Other basic indicators

Figure 16 provides an overview of the various quality indicators related to passenger satisfaction (perception) in recent years in relation to the target to be achieved. 2018's figures for this are not yet available. Brussels Airport's performance for almost all indicators¹² is average compared to the reference countries here.

Figure 16: Achievement of quality indicators, including evolution



For those indicators not meeting the standard, Brussels Airport Company will draw up an action plan by default. It could be stated here that the “availability of washrooms/toilets” indicator fell below the standard in 2017 owing to problems with the piping in Pier A being replaced. These works continued in 2018, after which a renovation of the sanitary blocks was commenced. The aim of this renovation is to improve the capacity, location and “look & feel” of the toilets, as well as offering technical solutions for them.

The indicators for “waiting time in check-in queue/line desk & self-service kiosk” also fell short of the standard (and have done for some years). This could partly be blamed on the printers (for boarding passes and luggage tags) being too old and causing problems – these have now been replaced. On the other hand, Brussels Airport Company also argues that the number of lines or kiosks used is determined by the airlines themselves and that Brussels Airport is only obliged to ensure that the

¹² The airport is only performing worse than the reference airports for the “availability and cleanliness of washrooms/toilets” indicators.

requested numbers are available. Considering that the maximum number of lines has never been used so far, Brussels Airport's view is that this is not an urgent problem. Nevertheless, Brussels Airport will be implementing an automatic system from 2019 to measure waiting times and thereby advise the airlines on the ideal capacity.

Partly in this context of driving down check-in waiting times at the airport, Brussels is working to test out the "Airport City Terminal" project, in collaboration with SNCB. In the testing phase, two kiosks will be installed at Antwerp-Central station, so people can check in while waiting for the train. Naturally, it is already possible (and preferable) to check in online as well, which indeed already happened in around 52% of cases in 2018.

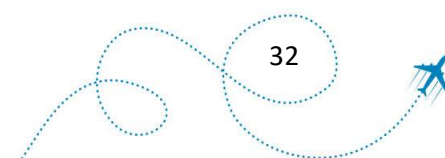
5.2 Availability of materials

There are also a range of other indicators relating to the availability of the infrastructure, based on objective measurements. Just as with the indicators mentioned above, the standard is determined by BAC, following consultation with the users, and this is then approved (or otherwise) by the Regulatory Body. The table below provides an overview of the results achieved for 2017.

Table 2: Indicators for availability of materials vs. target

Indicator	2017	target
Availability of electrical installations	99,9%	99,0%
Availability of heating, ventilation and air conditioning of buildings	99,8%	97,0%
Availability of boarding bridges	99,6%	98,0%
Availability of common use terminal equipment	100,0%	99,8%
Availability of escalators, stairways and moving walkways	98,9%	98,0%
In system time for originating baggage	0,1%	< 0.25%
In system time for transfer baggage	0,2%	< 0.75%
Availability of inbound baggage transportation system	99,8%	99,0%
Customer availability of the sorter system	99,7%	98,0%
Availability of flight information display system	100,0%	99,8%
Availability of Brussels Airport website	100,0%	99,5%
Lost property at screening	62,8%	< 71%
Dwelling time at check-in	70,3%	70,0%
Measurement of waiting time at security control ¹	94,5%	95,0%
Measurement of waiting time at fast lane security control	82,0%	95,0%
Measurement of waiting time at border control - connector	6 min.	n.a.
Measurement of waiting time at border control - connector	7,5 min.	n.a.
Performance (no delay) of bussing operations	99,7%	t.b.d.
Docking satisfaction of dockable passenger aircraft	81,0%	80,0%
Customer availability of 400 Hz units	99,8%	98,0%
Customer availability of preconditioned Air	99,8%	98,0%
Availability of docking guidance system	96,4%	99,4%

¹ reason: increased hand luggage volumes per passenger and increased ETD target (terror attacks)

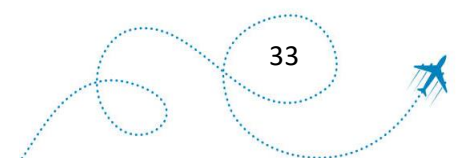


5.3 Ground-handling

The license holder should sign agreements with the ground-handlers regarding the level of service provision, to include ground-handling. In this context, Brussels Airport Company also proposed an amended agreement in 2018, given the need for greater clarity and further additions to the existing agreement as revealed by their quality management system.

It is naturally important that the quality of ground-handling is high, given that this can and does have a major impact on the passengers. This became apparent during the Aviapartner and Swissport baggage handlers' strikes. The reasons behind the strikes were largely due to social conflicts.

The ground-handlers also make use of centralised infrastructure that is developed by Brussels Airport. It is important that Brussels Airport continues to invest in order to ensure this infrastructure remains in line with the necessary standards.



6. Conclusion

Aviation, as with other transport sectors, is strongly influenced by economic growth and future trade flows. Moreover, aviation is also an essential engine for the economy.

For Europe, it is expected that aviation will rise by around 5% annually until 2030. Brussels Airport is expecting a rise in passengers of 3.8% per year and in cargo of 4.7% per year for the next 20 years. This has also been seen in recent years at Brussels Airport, with the number of passengers rising to 25,675,939 in 2018; a rise of almost 50% compared to 2010. The volume of cargo transported has also seen a small rise over the past few years, to 543,493 tonnes in 2018.

Should the expected evolution take place, the European aviation sector – without further adjustments – will be seeing a capacity shortage of potentially up to 12% by 2035. As an airport, then, it is important to invest in the necessary infrastructure in order to stimulate growth, as well as to make the airport more attractive and thereby take on competitors.

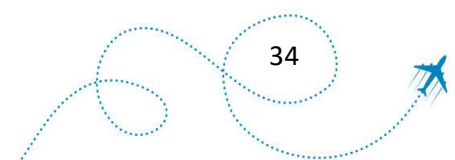
Brussels Airport does, after all, face the usual competition from surrounding airports, such as Charleroi and Eindhoven, as regards local passengers, and from larger hub airports, such as Amsterdam Schiphol, as regards transfer passengers.

Indeed, in the first instance, Brussels Airport is a real “*Origin and Destination Airport*”, with a share of more than 80%. However, the number of transfer passengers has also been rising steadily in recent years, owing to the transfer product that Brussels Airlines had developed, with a focus on serving African airlines – a potential growth market.

The exact future of the airport will naturally depend upon a range of factors here. These are often associated with trends that are already visible in the sector even now. They include the load factor, but mainly the size of new aircraft – and the facilities to be able to accommodate them – as well as technological developments and the speed with which these can be produced (to counterbalance the issues around rising kerosene prices, for example). Another factor is a result of the current/future trend of market consolidations. Brussels Airport's home carrier – a very important player for the airport – has been fully integrated into the Eurowings Group, for example. This may have consequences for the airport as a hub, among other things, which only time will tell.

Certainly, the authorities will have a major role to play in the future of the airport in the context of capacity restrictions and noise standards, for example, as well as – given recent developments – potential future climate policies for aviation.

In general, it could be suggested that – despite the competition – Brussels Airport is seeing a positive evolution and maintaining a clear policy (cfr. investments) for its users and passengers. This can also be observed in the quality standards imposed, which are generally being met and where Brussels Airport's performance is average.



Appendix 1: Shareholders at the reference airports

London-Heathrow Airport

25.0%	Ferrovial S.A.
20.0%	Qatar Holdings
12.6%	Caisse de d.p.t. et placement du Qu.bec
11.2%	Government of Singapore
11.2%	Alinda Capital Partners
10.0%	China Investment Corp.
10.0%	Universities Superannuation Scheme (USS)

Paris-Charles de Gaulle Airport

50.6%	French State
21.5%	Institutional investors
8.0%	Schiphol
8.0%	VINCI Airports
4.8%	PREDICA
2.3%	Retail investors
1.8%	Employees
3.0%	Others

Frankfurt International Airport

31.4%	State of Hesse
20.0%	City of Frankfurt
8.5%	Deutsche Lufthansa AG
3.0%	RARE Infrastructure Ltd.
37.1%	free float shares

Amsterdam-Schiphol Airport

70.0%	Dutch government (via Ministry of Finance)
20.0%	City of Amsterdam
8.0%	Aéroports de Paris Group
2.0%	City of Rotterdam

Copenhagen Kastrup Airport

59.4%	Copenhagen Airports Denmark ApS (CAD)
39.2%	Danish State
0.1%	Foreign investors
1.3%	Danish investors

Vienna Airport

20.0%	City of Vienna
20.0%	Lower Austria Province
10.0%	Employees' foundation
39.8%	IFM
11.2%	free float shares

Zürich Airport

33.3%	Canton of Zürich
5.1%	City of Zürich
61.6%	free float shares

