

# Economic benefits of European airspace modernization



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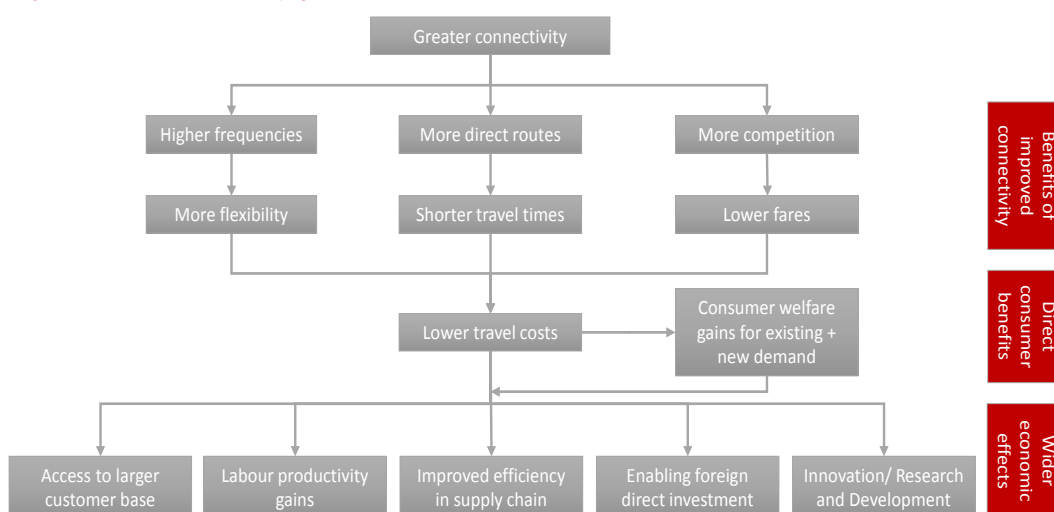
## Executive summary

### Connectivity by air is key to competitiveness and growth

The air transport network plays an important role in today's globalized society. The connectivity it generates is a key element for the competitive position of European countries, regions and cities. It drives consumer and wider economic benefits.

A superior connectivity performance minimizes travel costs for passengers, businesses and shippers. Aviation facilitates global contacts, mobility and trade. It stimulates productivity, trade, R&D and foreign direct investment. In addition, **the aviation industry is a major industry in its own right, supporting about 12 million jobs and 4.1 percent of GDP in Europe.**<sup>1</sup> It is therefore no surprise that air transport connectivity and related issues play an increasingly important role in European policy discussions.

Figure 1.1 Connectivity growth drives consumer and wider economic benefits

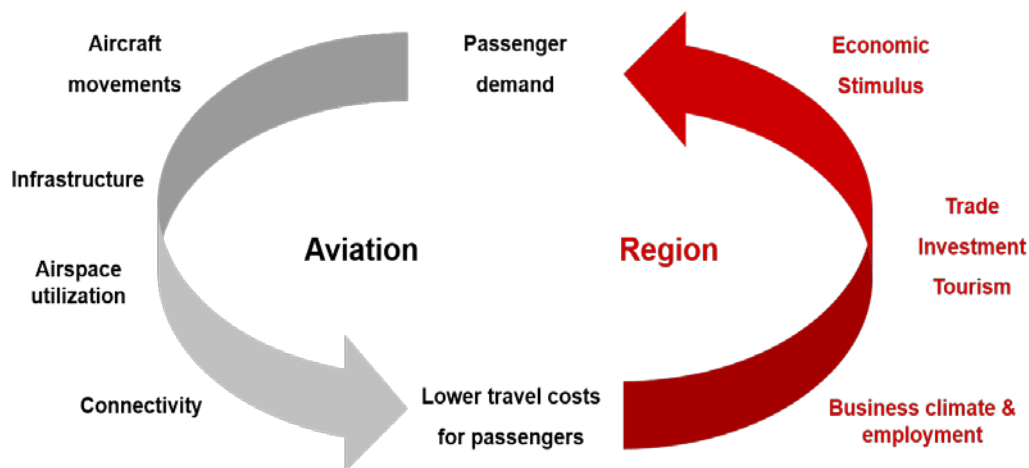


Source: SEO

The relationship between connectivity and economic growth is a two-way relationship. Air travel contributes to the efficient functioning of the economy. Economic growth again stimulates the demand for air travel. In other words, there is a 'virtuous circle' between connectivity growth and economic growth.

<sup>1</sup> InterVISTAS (2015)

Figure 1.2 Virtuous circle of connectivity growth and economic growth



Source: SEO

## The objectives of this study

Europe is in a strong position in terms of connectivity. Since the start of liberalization of the European air transport market about 25 years ago, consumers have benefitted from connectivity growth within Europe as well as to/from other world regions. These gains include more directly and indirectly served destinations, higher frequencies, shorter travel times and lower fares. The connectivity gains have substantially reduced consumer's costs to get from A to B and induced significant consumer welfare benefits, as well as gains for the wider economy. But there are challenges to deal with if these gains are to continue. Sufficient capacity both in the air and on the ground and an efficiently organized airspace are key in this respect.

However, the European air transport system is not operating at its optimum level. Flight trajectories are longer than needed. On average, flights in European airspace are 3% longer than the great circle distance between origin and destination airport. Airspace inefficiencies and capacity bottlenecks cause delays of around 10 minutes per flight. In contrast to the US, which has just one single Air Navigation Service Provider (ANSP), Europe has 38 ANSPs to handle approximately the same geographical area, resulting in higher than needed costs of Air Navigation Service Provision for airlines and passengers. Examples of these costs are higher ANSP user charges and longer than needed flight trajectories, with associated fuel burn and environmental burden. But the much-needed modernization of European airspace is progressing slowly and is lagging behind the targets set. Furthermore, airport capacity is expected to fall short of future demand growth.<sup>2</sup>

**This study provides strong evidence on the economic benefits that airspace modernization and removal of airport capacity constraints could generate for consumers, businesses, trade, tourism and investment.**

<sup>2</sup> Eurocontrol (2013)

IATA commissioned SEO Amsterdam Economics to independently quantify the economic benefits of European airspace modernization and European airport capacity enhancements. Benefits in terms of safety generated by the modernization of the European airspace are not the subject of the present study.

The results provide evidence that if airspace is not modernized and airport capacity fails to keep up with aviation demand growth, significant potential benefits for the European airline industry and European economy will be foregone for consumers and businesses.

This study uses two different approaches to assess the economic impacts: the welfare approach and the economic contribution approach. The welfare approach focuses primarily on consumer (user) benefits. We use a generalized travel cost model to estimate these consumer benefits. The economic contribution approach refers mainly to GDP and jobs. Econometric estimations have been used to estimate GDP and job impacts. Although there is some overlap between both approaches (for example, cost savings for business travellers are reflected in GDP growth), they are different approaches, of which the results cannot be added up.

The study distinguishes between different scenarios. **The ‘Airspace Modernization’ scenario** assumes modernization of European airspace, which will lead to more efficiency, more airspace capacity and lower cost levels. **The ‘Maximizing Connectivity Benefits’ scenario** assumes removal of any airport infrastructure capacity constraints on top of airspace modernization, based on the unaccommodated demand in Eurocontrol’s ‘Regulated Growth’ scenario. Economic impacts in both scenarios are all in comparison to a ‘do nothing’ scenario (‘Baseline’). Results are presented for the ESRA08 region, which are all European countries and Morocco.

## Key results

### Airspace modernization drives efficiency and connectivity growth to the benefit of the European consumer

**Airspace modernization could deliver European consumers an additional € 32 billion of welfare benefits in the year 2035**, compared to a ‘do nothing’ scenario (in which no further airspace modernization takes place). Consumer benefits ripple through the rest of the economy and create wider economic benefits. We estimate these agglomeration, productivity and labour market effects to create **additional wider economic benefits of € 1.7 billion in 2035**.

The total present value of airspace modernization<sup>3</sup> over the period 2015-2035 period cumulates to **€ 126 billion**. These benefits consist of:

- More efficient air navigation services provision at a higher capacity, which translates into airline cost savings and lower air fares;
- Time and reliability savings: travel times are shorter because routings will be more direct. Passengers and airlines will face fewer delays;
- Average flight times will be reduced with 4-8 minutes per one-way flight, while average delays decrease from 12 to 8 minutes per flight, in comparison to a ‘do nothing’ scenario;

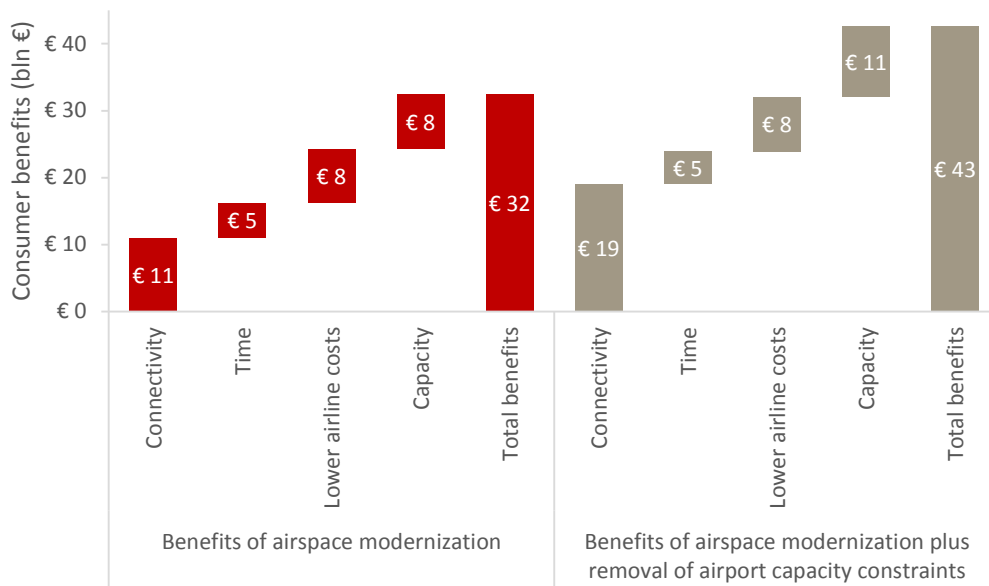
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<sup>3</sup> Total benefits over the 2015-2035 period at present day prices (discounted).

- Connectivity growth (more routes, more frequencies);
- Wider economic benefits caused by agglomeration effects and higher productivity levels;
- Lower CO<sub>2</sub> emissions per flight.

Estimated **consumer benefits** are on average **€43 per passenger in 2035**. Benefits are higher for business (€ 69) than for leisure (€ 36) passengers. To value the magnitude of such benefits: per passenger benefits are 14 percent and 11 percent of the 2014 average return ticket price of business and leisure passengers respectively.

**Figure 1.3** Consumer benefits of airspace modernization and airspace modernization plus removal of remaining airport capacity constraints in 2035

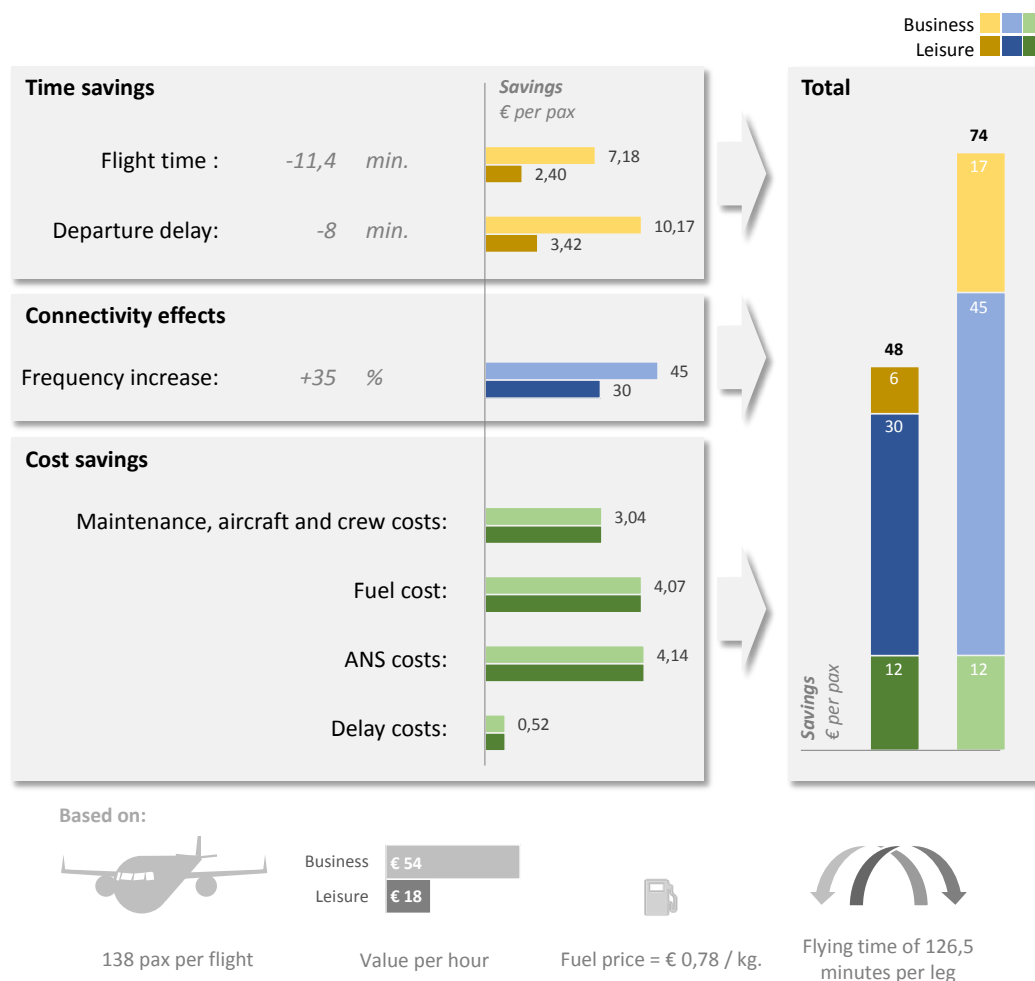


Source: SEO NetCost;  
Note: undiscounted values

Figure 1.4 shows how airspace modernization works out for a representative return trip within Europe, with a flying time of 126.5 minutes and 138 passengers per flight. Airspace modernization results in benefits for both leisure and business passengers. Due to airspace modernization, flying time and delays decrease. Due to lower costs, fares decrease, air travel demand is stimulated and frequency increases. In addition, more flights can be accommodated in European airspace, compared to a ‘do nothing’ scenario.



Figure 1.4 Airspace modernization leads to substantial time and cost savings on a representative intra-European return trip



Source: SEO

### Airport capacity constraints are a further barrier to maximize connectivity benefits

Airport capacity is expected to fall short of forecasted aviation demand growth in Europe in Eurocontrol's 'Regulated Growth' scenario<sup>4</sup>. An additional **174 million European origin-destination passengers** can be served in the European aviation system if airport capacity constraints would be solved and European airspace would be modernized. As a major share of traffic from European airports is within Europe, it is the European airlines that are affected most by airport capacity shortages and that would benefit from reducing these constraints.

The estimations show that solving airport capacity constraints together with airspace modernization increases the **consumer benefits to € 43 billion in the year 2035**. € 19 billion is realized through connectivity gains, € 5 billion through shorter travel times and fewer delays for passengers and € 8 billion because of lower fares due to cost decreases for airlines. Another € 11

<sup>4</sup> Eurocontrol (2013). Challenges of Growth 2013. Task 4: European Air Traffic in 2035. STATFOR, June 2013.

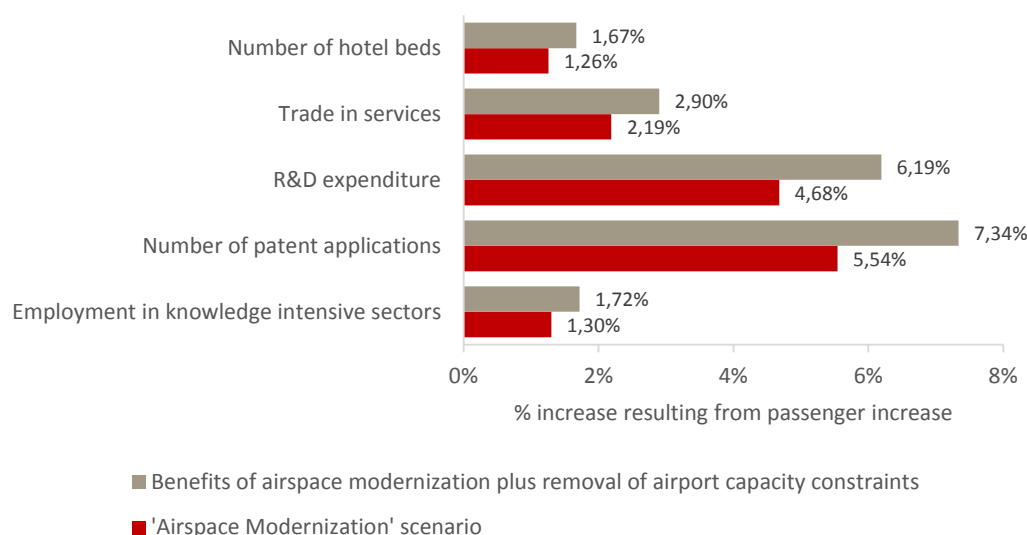
billion of these benefits can be attributed to lower ticket prices as a result of less scarcity in capacity and more competition. The economic gains quickly become larger after 2025, when airport and airspace capacity bottlenecks start to constrain air traffic growth if not addressed. **The total present value is € 153 billion.** Making sure that airports have enough capacity to accommodate future growth leads to a **per passenger benefit of € 54 in 2035.**

### The economic contribution of airspace modernization and airport capacity enhancements

As far as the economic contribution approach of airspace modernization and airport capacity enhancements are concerned, we have calculated the effects of airspace modernization and removal of airport capacity constraints on GDP and employment change. Furthermore, based on econometric analysis, we have estimated the wider catalytic impacts, including the effects on tourism, productivity, innovation and trade.

**Airspace modernization results in € 245 billion of additional GDP by 2035. If also remaining airport infrastructure capacity constraints would be removed, the GDP benefit would be maximized to € 301 billion euro in 2035.** These figures result from a respective increase of 1.6 percent and 2.1 percent of the total GDP in 2035. Total employment increases by 0.4 percent in case of airspace modernization and 0.5 percent if any remaining airport capacity constraints would be removed. Using today's employment figures, this would generate **1.0 and 1.3 million additional jobs** related to aviation respectively. These are additional direct, indirect, induced and catalytic jobs. In addition, **trade, tourism, R&D and innovation would be positively affected.**

**Figure 1.5** Airspace modernization has positive effects on tourism, trade, innovation, employment in knowledge intensive sectors and productivity

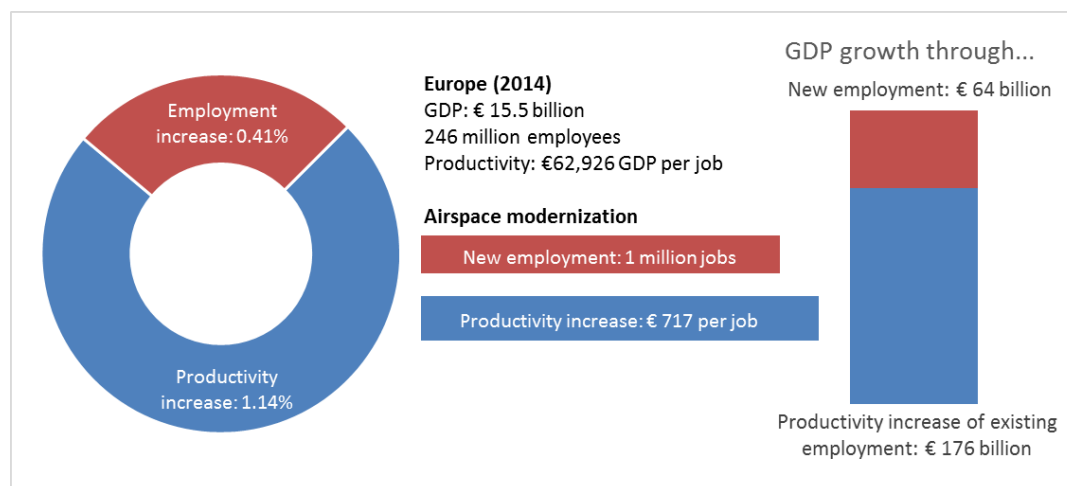


Source: SEO analysis

Total GDP impacts are realized through different channels. Firstly, increased connectivity generates additional employment, leading to additional GDP output. Secondly, productivity of

both existing and new employees increases due to better connectivity, yielding a higher GDP per job. As a result, relatively small productivity increases due to connectivity growth can have substantial effects, as they affect the average productivity of the entire labour force.

**Figure 1.6 GDP growth is realized through new employment as well as through productivity increase of the current labour force**



Source: Eurostat, SEO

Note: Figures are shown for EU28 + Switzerland + Norway + Turkey<sup>5</sup>

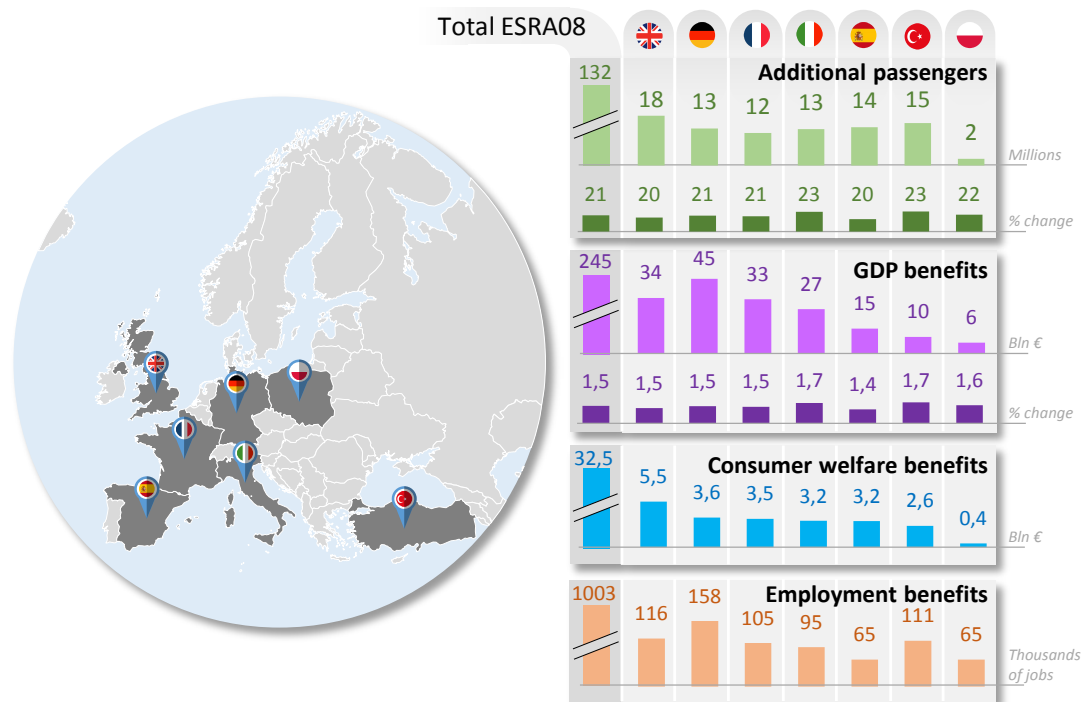
### Substantial economic benefits of airspace modernization at a per country basis

The total welfare impacts and economic contribution of airspace modernization differ between European countries. This is mainly due to differences in the level of passenger demand and to which extent airspace modernization is able to solve capacity bottlenecks.

Figure 1.7 shows the economic impacts for 7 focus countries, that together account for over 70 percent of the total consumer benefits in 2035. To other European countries, airspace modernization brings substantial economic benefits on a per passenger basis as well. Also these countries will benefit from lower ANSP costs, shorter flight trajectories, less delays and more capacity. The fact that their total economic benefit is smaller in absolute terms is largely due to the smaller size of their aviation markets.

<sup>5</sup> Employment data is only consistently available for the EU28 region, Norway, Switzerland and Turkey. Therefore the figure does not include other countries in the ESRA08 region.

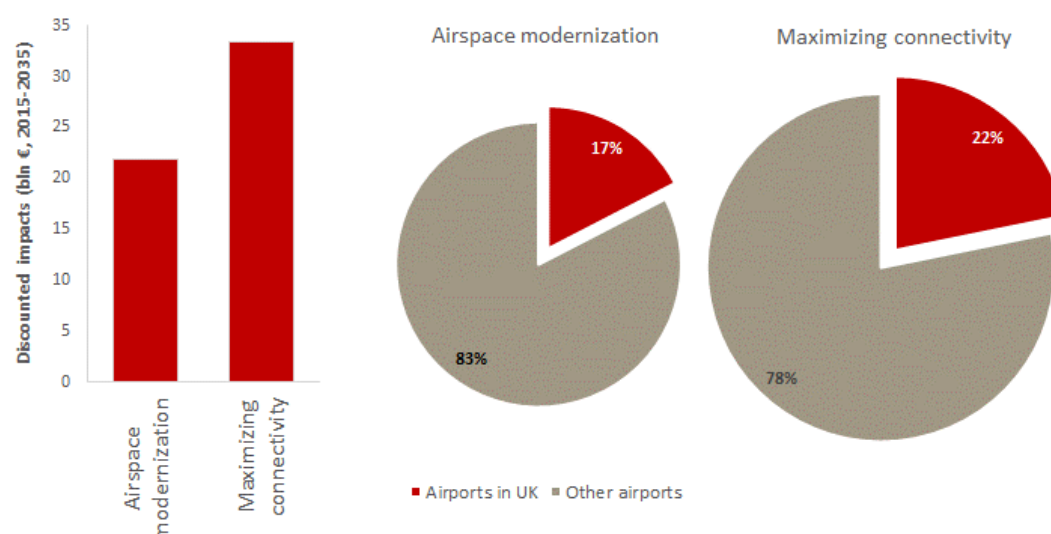
Figure 1.7 Summary of the economic benefits of airspace modernization



Source: SEO

Airspace modernization and action to address airport capacity bottlenecks are key in order to enable air transport to deliver maximum value as an enabler of the European economy. If airspace modernization is not taken forward and airport capacity fails to keep up with demand, the substantial foregone economic benefits will act as a brake on European competitiveness and growth as Europe's air connectivity fails to keep pace with those countries and regions that see air transport as a strategic priority. This would be to the detriment of consumers and businesses alike, with the impacts felt through lower trade, investment, productivity and employment.

**Figure 6.5** The discounted benefits for the UK represent 17-22 percent of the total benefits for Europe



Source: SEO analysis

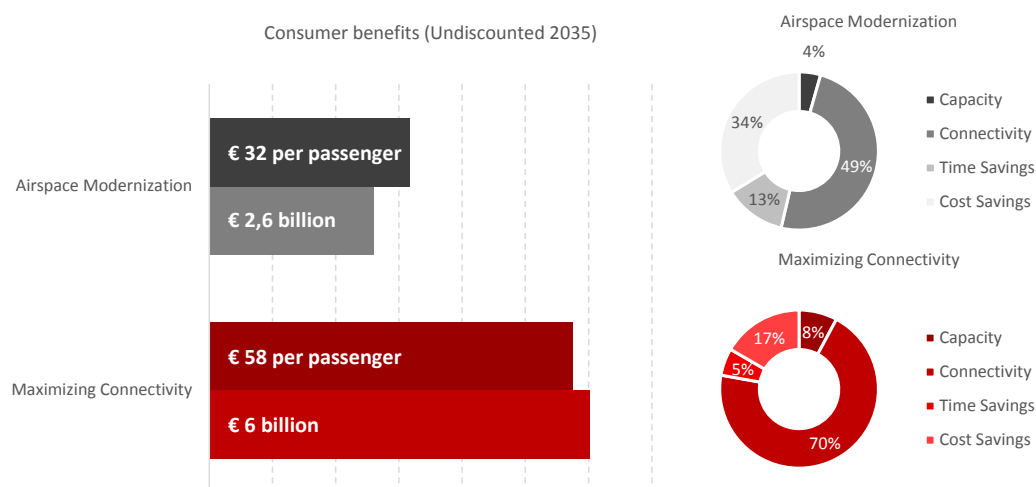
## 6.3 Turkey

The number of Turkish return OD passengers is forecasted at 67 million in 2035 in the 'Baseline' scenario. In the 'Airspace Modernization' scenario and the 'Maximizing Connectivity Benefits' scenario passenger numbers increase to 82 and 105 million respectively. The difference between both scenarios is relatively large because large shortages of airport capacity remain in the 'Airspace Modernization' scenario<sup>26</sup>. In the 'Maximizing Connectivity Benefits' scenario there are no airport capacity restrictions, allowing much more flights to be accommodated, leading to a strong increase in connectivity.

The benefits per Turkish passenger amount to € 32 in the 'Airspace Modernization' scenario in 2035. The per passenger benefits increase substantially in the 'Maximizing Connectivity Benefits' scenario, in which the benefits for Turkish passengers are higher (€ 58 per passenger) than the European average (€ 54 per passenger). This is mainly caused by a large increase in the number of flights, which could not be accommodated in the 'Airspace Modernization' scenario due to airport capacity constraints. This increase in flights leads to a substantial increase in connectivity benefits due to lower fares for consumers.

<sup>26</sup> The airport capacity constraint scenario is derived from Eurocontrol's Challenges of Growth report. This report is not explicit about which airports are subject to capacity constraints. However, it appears clear that the forecast does not take into account the new Istanbul airport. The modelling results highlight the importance of this airport to the Turkish economy. Once the airport is fully operational, airport capacity constraints will no longer be an issue. However, faster traffic growth will mean that airspace constraints bite sooner and harder, meaning that the overall economic impact may be broadly similar to that modelled in this report.

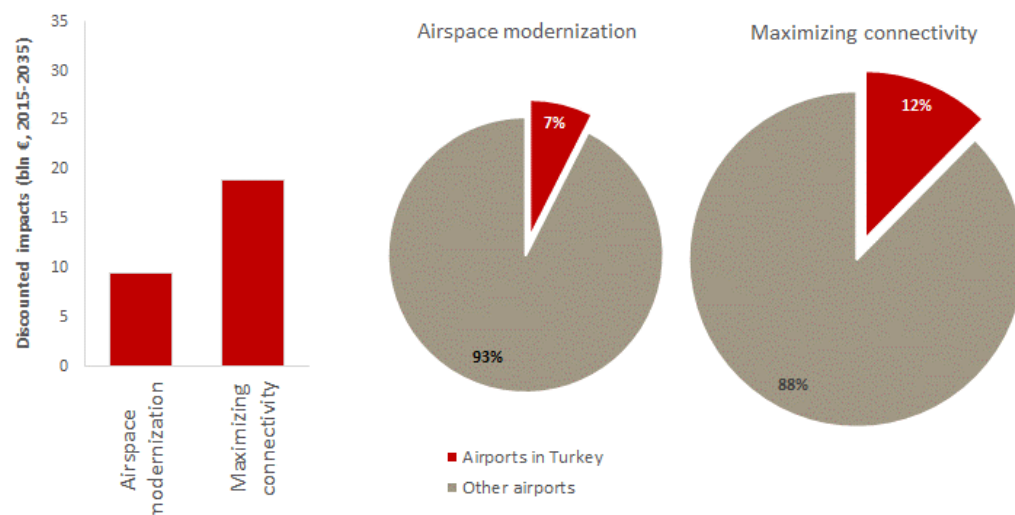
**Figure 6.6** The benefits of airspace modernization for Turkish passengers grow significantly between 2025 and 2035, mainly due to a large increase in connectivity



Source: SEO analysis

The total benefits for Turkey, occurring over the 2015-2035 period, range between € 9.4 billion for the 'Airspace Modernization' scenario and € 19.0 billion in the 'Maximizing Connectivity Benefits' scenario (see Figure 6.7). This represents 7 percent and 12 percent of the total benefits in Europe.

**Figure 6.7** The total discounted welfare benefits for Turkey are almost twice as large in the scenario without airport capacity constraints



Source: SEO analysis

## 6.4 Germany

The number of German OD return passengers is estimated at 63 million in 2035 in the 'Baseline' scenario. In the 'Airspace Modernization' and 'Maximizing Connectivity Benefits' scenarios this increases to 76 and 78 million respectively. Airspace modernization and removal of airport



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