Airport City Stockholm

An assessment of current and future economic contributions

March 2014

pwc

Our work has been based primarily on information which has been provided to us by Airport City Stockholm. We have not carried out an audit nor, except where otherwise stated, have we subjected the financial or other information contained in this report to checking or verification procedures. Accordingly, we assume no responsibility and make no representations with respect to the accuracy or completeness of the information in this document, except where otherwise stated. If further information was to come to light then our findings and conclusions might change.

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Executive summary

Background

Airport City Stockholm (ACS) commissioned PricewaterhouseCoopers AB (PwC) to assess the current and potential future economic contribution of ACS to Sweden's economy. The scope of this exercise is set out in our engagement letter dated 11 February 2014.

Our analysis has drawn on three primary data sources:

- The latest data on businesses in ACS and at Stockholm Arlanda Airport, together with the corresponding financial information and employee numbers from the Swedish business database provider Infotorg;
- The Urban Design Strategy, the Regional Development Plan for Stockholm (RUFS 2010), and various other official publications; and
- Other published reports.

PwC has not undertaken any assurance or audit of the underlying data that have been used.

Airport City Stockholm

ACS is an urban area, covering 800 hectares, that surrounds the largest and busiest airport in Sweden (Stockholm Arlanda Airport). It is part of the Sigtuna municipality of Stockholm. ACS is being developed by Swedavia (which owns and operates Stockholm Arlanda Airport), the Sigtuna municipality and Arlandastad Holding AB.

ACS is currently home to a business cluster with close to 700 businesses. It also hosts one of Sweden's leading centres for transport and technology development. It is served by a high speed rail link and commuter trains to Stockholm and Uppsala[1]. It takes around 20 minutes by ArlandaExpress, the high speed rail link, and 40 minutes by commuter train to travel to ACS from Stockholm and 18 minutes from Uppsala. ACS is located on the E4 highway which connects Stockholm and Uppsala and is 42 km and 36 km respectively from the two cities.

Current economic contribution

Direct contribution

Data provided by ACS show that there are around 700 businesses currently located on the site and these businesses employ around 20,000 people. In 2012, the combined turnover of these approximately 700 businesses was approximately SEK 38 bn (USD 5.8 bn)[2] and we estimate that they generated Gross Value Added (GVA)[3] worth SEK13 bn (USD 2.0 bn). GVA per employee in the transport and storage sector in ACS is broadly similar to the Swedish industry average, and is 15% higher than the industry average in Stockholm. GVA per employee in the hotels and restaurants sector in ACS is 67% higher than the Swedish industry average, and is 54% higher than the industry average in Stockholm.

Indirect and induced economic contribution

In addition to the direct contribution on the economy, ACS also supports GVA and employment in the economy through:

[1] The fourth largest city in Sweden.

[2] Exchange rate of USD 0.15 per 1 SEK based on December 2012 rates from Oanda.

[3] Gross Value Added (GVA) is used widely as a measure of economic contribution by government agencies and in regional contribution assessment studies. It measures the value of goods and services produced via the activity of firms, sectors or whole economies.

- Supply chain expenditure (the *indirect* contribution), and
- ACS and supply chain employees spending their income in other sectors of the economy (the *induced* contribution).

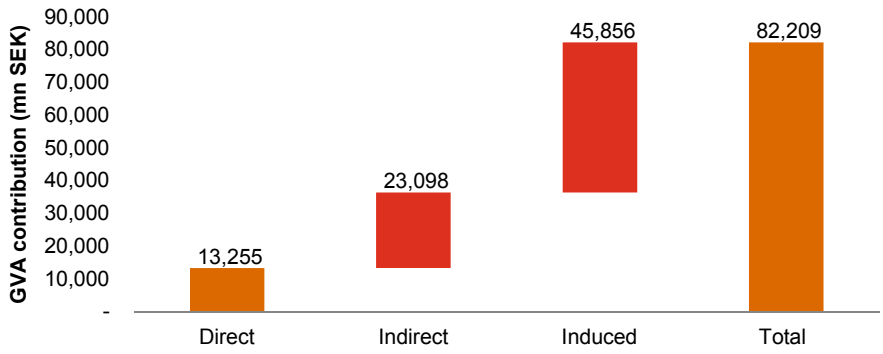
As a result, we estimate that businesses in ACS have a multiplier[4] impact on the Swedish economy through their local supply chains. The scale of these contributions differs significantly between sub-sectors but the average contribution across sectors is close to six times the direct contribution in terms of GVA and five times in terms of employment.

This means that ACS supports a total of SEK 82bn (USD 12.6bn) of GVA in the economy (see Figure 1 below). This consists of:

- SEK 13bn (USD 2.0 bn) of direct GVA through operations of businesses (the direct contribution);
- SEK 23bn (USD 3.5 bn) of indirect GVA through the supply chain spending of businesses (the indirect contribution); and
- SEK 46bn (USD 7.1 bn) of induced GVA through the spending of employees in businesses and their supply chains (the induced contribution).

These multipliers would imply that for every SEK 1 of GVA generated in ACS, there would be a further SEK 5.2 generated in the wider economy.

Figure 1: GVA – direct, indirect and induced contribution (mn SEK)

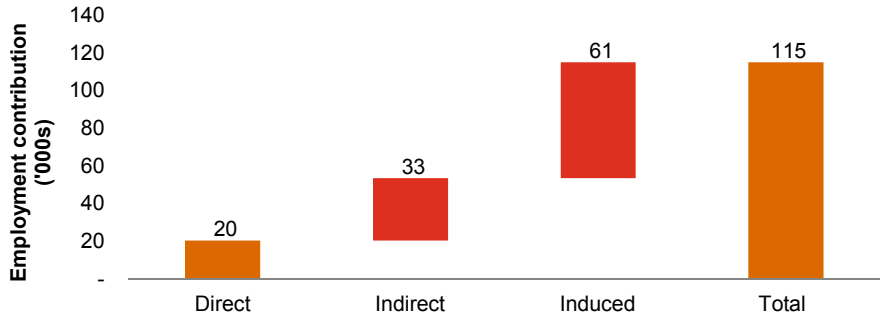


Source: PwC analysis

If we undertake a similar calculation for employment, ACS currently supports 115,000 jobs across Sweden, of which the indirect contribution is close to 33,000 and the induced contribution is approximately 61,000 (see Figure 2).

These multipliers would imply that for every job generated in ACS, there would be a further 4.7 jobs generated in the wider economy.

Figure 2: Employment – direct, indirect and induced contribution (thousands)



Source: PwC analysis

[4] A multiplier is the economic ratio of the total contribution supported in the economy to its direct contribution.

Looking ahead to the future – Plans for ACS expansion

We have also projected the future economic contribution of ACS given its plans for expansion described below.

Our assessment of the projected growth at ACS is based on three key documents that form the basis of a regional urban planning strategy.

1. Vision for the airport city and recent investment

The Urban Design Strategy, created by the three partners behind ACS, sets out a vision for '*a modern airport city with a vibrant city centre and attractive workplaces*'. ACS currently has a large business cluster and the partners are aiming to achieve sustainable growth to transform the city into a major international commercial destination.

There are several significant investment projects that have recently been completed or are being planned in ACS. Among others these include a new commuter rail service to Stockholm Arlanda Airport, a motorway connection to Rosenberg and two test tracks at DriveLAB (automotive R&D facility).

Examples of ongoing and planned projects include a large retail-chain warehouse, recycling plants and a container terminal. Other planned projects include the extension of the Roslagsbanan railway line to Stockholm Arlanda Airport, the developments at Cargo City and at Sky City – an area with offices - adjacent to the terminals.

2. Regional development plan for Stockholm region

The vision set out by ACS is supported by the wider Regional Development Plan for the Stockholm county, the largest, in terms of population, of the 21 counties in Sweden.

This plan seeks to make Stockholm '*one of the most attractive metropolitan regions in the world*', and defines its main objectives "*as making Stockholm open, accessible, with high growth and resource efficiency*".

3. Stockholm Arlanda Airport master plan

Stockholm Arlanda Airport is the largest airport in Sweden. In 2013, more than 20 mn passengers flew via the airport, and passenger numbers increased by nearly 650,000 between 2011 and 2012.[5] By 2040, Swedavia, the airport operator, expects passenger volumes to increase to 35 mn, (i.e. at a rate of about 2% p.a.).[6]

What could these plans achieve? - ACS's potential future economic contribution

Based on our understanding of the targets set in ACS's Urban Design Strategy we have projected forward the current economic contribution for ACS to 2030. Our method is as follows:

1. Our projections are based on ACS's vision of creating 50,000 jobs in the airport city by 2030.

2. We make the assumption that GVA grows in line with ACS's vision for employment and the long run productivity growth rate for the Swedish economy. We take similar steps for turnover and employee income.

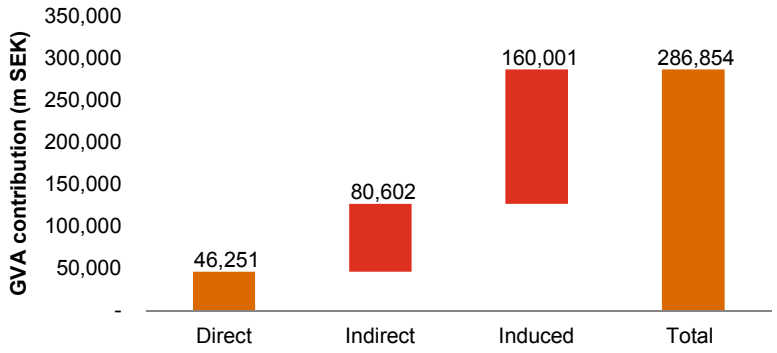
3. We then combine these projections of GVA, employment, employee income and turnover with the respective multipliers, estimated as before, to obtain the indirect and induced contributions.

[5] Swedavia Annual Report 2012
[6] Stockholm Arlanda Airport Master Plan (2010)

If this vision is fulfilled, we estimate ACS would support a total of SEK 286 bn (approx. USD 44 bn) of GVA in the economy (see Figure 3 below). This would consist of:

- SEK 46 bn (approx. USD 7 bn) of direct GVA through operations of businesses (the direct contribution);
- SEK 81 bn (approx. USD 12 bn) of indirect GVA through the supply chain spending of businesses (the indirect contribution); and
- SEK 160 bn (approx. USD 24 bn) of induced GVA through the spending of employees in businesses and their supply chains (the induced contribution).

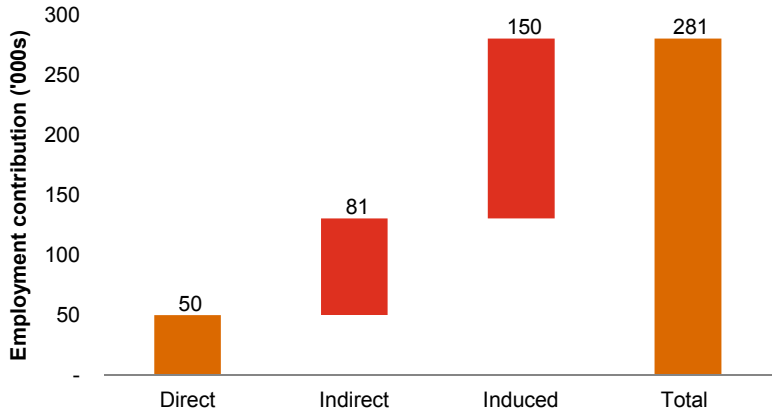
Figure 3: Projected GVA – direct, indirect and induced contribution in 2030 (mn SEK)



Source: PwC analysis

If we undertake a similar calculation for employment, ACS would support 281,000 jobs across Sweden, of which the indirect contribution is close to 81,000 and the induced contribution is around 150,000 (see Figure 4).

Figure 4: Projected employment – direct, indirect and induced contribution in 2030 (thousands)



Source: PwC analysis

If ACS does achieve its target growth in employment by 2030, an increase in direct employment of 2.5 times its current direct employment level, it is projected to increase its gross total GVA contribution by close to 3.5 times its current contribution.

Comparing the contribution of ACS with other airport cities

Table 1 below shows the direct, indirect and induced contribution for three airports; Amsterdam Schiphol, Paris Charles de Gaulle and Frankfurt International, along with those of ACS.

Passenger numbers and the number of commercial flights at Stockholm Arlanda Airport are lower compared to the other three airports. In 2012 19.6 mn passengers used Stockholm Arlanda Airport, while passenger numbers are increasing, the equivalent figure for Amsterdam Schiphol is 51 mn, 61.6 mn for Paris Charles de Gaulle and 57.5 mn for Frankfurt International.

The indirect and induced multipliers for GVA and employment at ACS are higher than those of Amsterdam Schiphol and Frankfurt International. Compared to Paris Charles de Gaulle, ACS also has higher indirect and induced contribution multipliers for employment, but has lower indirect GVA contribution.

The total GVA and employment contribution multipliers for ACS are 5.2 and 4.7 respectively, higher compared to 0.7 and 1.6 respectively for Amsterdam Schiphol, 4.2 and 1.1 respectively for Paris Charles de Gaulle, and 0.7 and 1.1 respectively for Frankfurt International. We do not have enough information to fully explain the differences between these multipliers but they suggest that ACS has at least as large an economic contribution to make as these other airports.

Table 1: Comparison of direct, indirect and induced contributions

		GVA (USD mn, current 2012)	Employment	Multiplier - GVA	Multiplier - employment	Revenue passengers	Commercial flights
Amsterdam Schiphol	Direct	14,397	64,061			51 mn	423,000
	Indirect	4,535	49,196	0.31	0.77	-	-
	Induced	4,897	53,115	0.34	0.83	-	-
	Total	23,829	166,372			-	-
Paris-Charles de Gaulle	Direct	12,548	87,016			61.6 mn	491,000
	Indirect	47,351	47,096	3.77	0.54	-	-
	Induced	5,198	51,704	0.41	0.59	-	-
	Total	65,097	185,816			-	-
Frankfurt International	Direct	9,059	74,589			57.5 mn	476,000
	Indirect	3,159	38,646	0.35	0.52	-	-
	Induced	3,566	43,646	0.39	0.58	-	-
	Total	15,784	157,151			-	-
ACS (Stockholm Arlanda Airport)	Direct	2,121	20,000			19.6 mn	207,000
	Indirect	3,696	33,000	**1.74**	**1.65**	-	-
	Induced	7,337	61,000	**3.46**	**3.05**	-	-
	Total	13,153	114,000			-	-

Source: Ecquants[7]

Note: As far as we understand, the direct, indirect and induced contribution estimates for Amsterdam Schiphol, Paris Charles de Gaulle and Frankfurt International correspond to the airport themselves while the estimates for ACS correspond to the airport and the airport ciy.

We have also conducted case study analysis of the airport cities at Paris Charles de Gaulle, Amsterdam Schiphol, Frankfurt International and Manchester airports. Our case studies suggest that the success of airport cities is borne out of a range of factors, which have varying degrees of influence in each location:

- a joined-up development partnership combining national and municipal governments and private sector backing;
- strong transport infrastructure links (road and rail), and a continued development of these links to support demand and enable growth; and
- growth in the associated airport hub.

The benefits of airport cities are not just economic. Our case studies suggest that airports and airport cities are being proactive in developing skills of potential employees and that this can have important social consequences.

[7] http://www.ecquants.com/2012_CDG.aspx. It has not been possible to verify the data used in these comparisons although documentation provided with the numbers suggests a similar estimation method.

Introduction

Background

Airport City Stockholm (ACS) commissioned PricewaterhouseCoopers AB (PwC Sweden) to assess the current and potential future contribution of ACS to Sweden economy. The scope of this work is set out in our engagement letter dated 11 February 2014.

Scope

The focus of our analysis is on the economic contribution of businesses operating at ACS in terms of their:

1. **Direct economic contribution** – including the direct Gross Value Added (GVA)[8] and employment they generate.

2. **Indirect economic contribution** – the contribution of the GVA and employment generated by their suppliers.

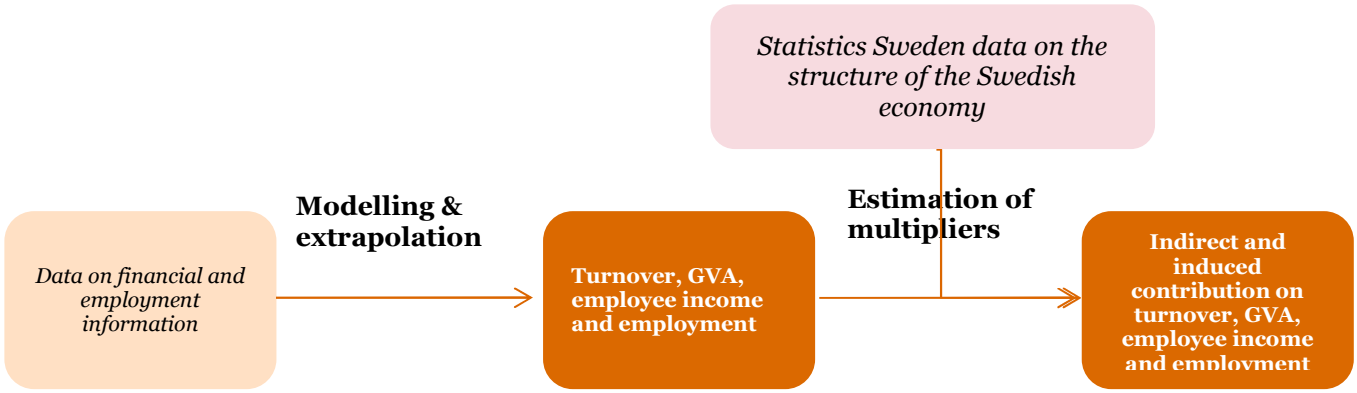
3. **Induced economic contribution** – the contribution of spending on goods and services by employees of businesses located in ACS and their suppliers which can also be measured in terms of GVA and employment.

Methodology

To estimate the direct contribution, we used employment data on businesses obtained from the local municipality records and airport records, combined with financial information on these businesses obtained from the business database, Infotorg.

We then estimated the indirect and induced contributions using multipliers estimated using Swedish Input Output tables for 2010 obtained from Statistics Sweden, the Swedish statistical agency. A multiplier is the ratio of the indirect and/or induced contributions to a given direct contribution.

The sources of data and our methodology are described in greater detail in Appendix A of our report.



[8] Gross Value Added (GVA) measures the value of goods and services produced via the activity of firms, sectors or whole economies

Our analysis assesses the gross rather than the net contribution of a business operating in ACS (i.e. it does not account for the jobs or other economic activity that ACS may displace from other parts of the economy when it grows, or the potential gains to other parts of the economy if it did not exist).

Our estimate of the future economic contribution of ACS is based on the employment targets in ACS's Urban Design Strategy[9], the Regional Development Plan for Stockholm (RUFS 2010) and Swedavia's plan for the airport. Using employment targets, we have then estimated corresponding figures for turnover, GVA and employee income[10] based on ratios of these metrics to employment.

Our projections are then combined with the multipliers estimated using the 2010 Swedish Input Output tables, as described above, to estimate the projected indirect and induced economic contribution.

The economic projections are, therefore, highly dependent on the underlying employment targets in the ACS Urban Design Strategy. PwC has not undertaken assurance or audit of any of the underlying data that have been used or of the employment projections.

We have also reviewed key academic articles and published impact assessments that relate to airport cities around the world. We have researched each of the main airport cities in Europe and other leading airport cities outside of Europe (e.g. Hong Kong, Dubai). Most airport cities publish information on passenger numbers, the area occupied by the associated airports, and set out high level investment plans. However, this data does not describe the economic contribution of the businesses that occupy the airport city - which is the focus of this study.[11]

Report structure

The rest of this report is structured in three further sections as follows:

Section 2 describes ACS, the airport at its centre, and the businesses around the airport;
Section 3 estimates the recent contribution of ACS to Sweden economy;
Section 4 assesses the potential economic contribution of ACS if it is able to realise its vision; and
Section 5 provides case studies of other airports and airport cities.

An appendix provides further supporting detail on the methodology we have used to estimate the economic contribution of ACS.

[9] The strategy document can be found on the ACS website: http://www.airportcitystockholm.com/urbanplan
[10] Employee income refers to the wages and benefits earned by employees
[11] It is also difficult to determine much real meaning from passenger flow data particularly in large international hubs where passengers may not actually leave the aircraft or use the airport as the final destination.

What is Airport City Stockholm?

Summary

Airport City Stockholm (ACS) is located close to Stockholm Arlanda Airport, with transport connections to both Stockholm and Uppsala, and is approximately 20 minutes by ArlandaExpress, the high speed rail link, and 40 minutes by commuter train from Stockholm and 18 minutes by commuter train from Uppsala. It is made up of 6 districts, each with its own particular focus: cargo, logistics, research and development.

Stockholm Arlanda Airport carries more than 20mn passengers a year, around 5mn are overseas passengers and the airport is served by 86 different airlines.

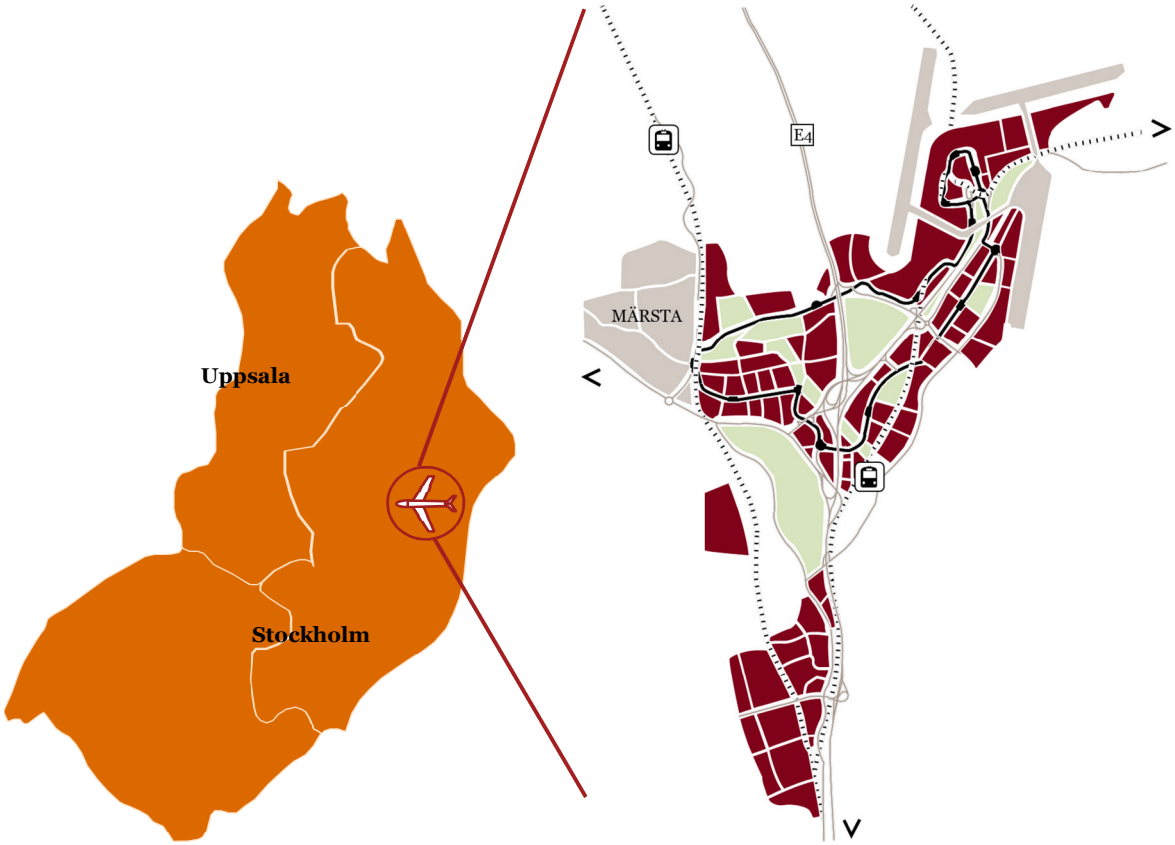
In this section we briefly describe ACS, the Stockholm Arlanda Airport at its centre, and the businesses around the airport.

Airport City Stockholm

ACS, located in the vicinity of Stockholm Arlanda Airport, is located approximately 42km from Stockholm and 36 km from Uppsala, and is approximately 20 minutes by ArlandaExpress, the high speed rail link, and 40 minutes by commuter train from Stockholm.

ACS is being developed by Swedavia, which owns and operates Stockholm Arlanda Airport, Sigtuna Municipality, and Arlandastad Holding AB.[12]

Figure 5: ACS's location and map of local area



Source: ACS Urban Design Strategy

[12] http://www.swedavia.com/our-services/real-estate/real-estate-development/airport-city-stockholm-arlanda/

ACS is built around Stockholm Arlanda Airport and 17,000 of the 20,000 employees who are currently working at ACS provide services to the airport in some way.

Area

The airport city covers an area of approximately 800 hectares. 2012 data show that about 20,000 people work on site. Of the approximately 700 business located at ACS, 200 are located specifically at the airport. Rosersberg also has 1,500 permanent residents. If developments follow Swedavia's long-term forecast, the airport will handle around 35 mn passengers by 2040, compared to 20 mn plus passengers in 2013.

Stockholm Arlanda Airport

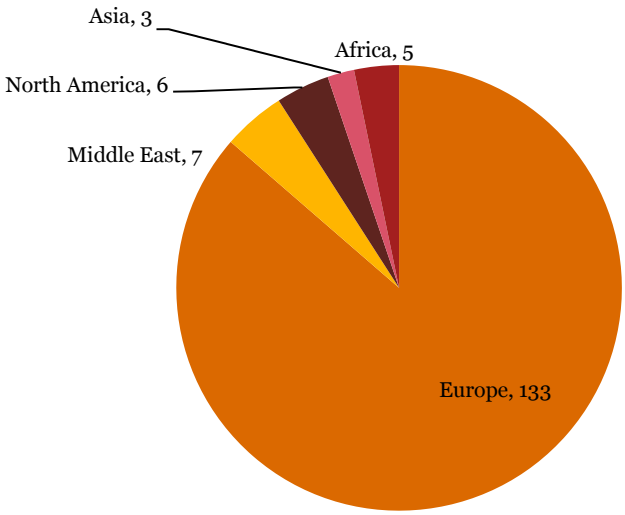
Stockholm Arlanda Airport is Sweden's main air terminal. It connects Sweden to more than 150 destinations across the world. Close to 19.6m passengers flew through the airport in 2012, an increase of approximately 600,000 (3%), over 2011.[13] Figures for take-offs and landings and the number of passengers are given in Table 2 below, and the breakdown of connections by travel destinations is given in Figure 6. Take off and landings declined in 2012, but there was still growth in overall passenger numbers. Recently published data show that the airport carried more than 20mn passengers in 2013.[14]

Table 2: Flights and passengers at Stockholm Arlanda Airport, 2011-2012

	2011	2012	Growth
Take-offs and landings	210,788	207,467	-1.6%
Passengers	19,072,719	19,643,256	3.0%

Source: Swedavia Annual Report 2011

Figure 6: Travel destinations from Stockholm Arlanda Airport, by number of connections (2010-11)



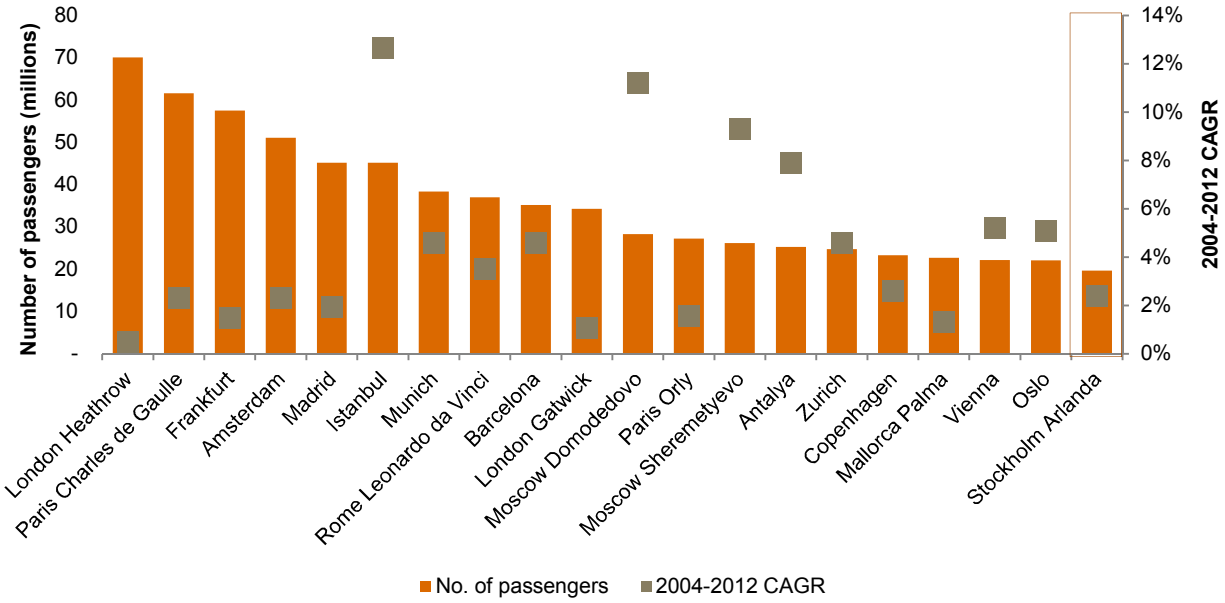
Source: SABRE/ADI database, PwC analysis

As of 2012, Stockholm Arlanda Airport was the 22nd busiest airport in Europe. Figure 7 shows that passenger numbers grew at 2.4% p.a. over the last eight years, which is close to the average growth rate in Europe, but is lower compared to other Scandinavian airports at Copenhagen, and Oslo.

[13] Swedavia Annual Report 2012

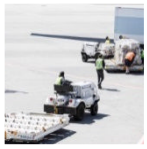
[14] http://www.swedavia.com/about-swedavia/news/record-numbers-are-flying-via-stockholm-arlanda-more-than-20-million-passengers-in-2013/

Figure 7: Top 20 European Airports, by passengers in 2012



Source: SABRE/ADI Database, PwC analysis

Table 3: Key facts about Stockholm Arlanda Airport

	More than 20 million passengers in 2013
207,000 flights, of which Domestic: 70,000 International: 37,000	
	86 airlines, of which International: 64 airlines Domestic: 7 Cargo & mail: 10
146,000 tonnes goods and mail	
	3 take-off and landing runways
163 destinations, of which International: 135 destinations and Domestic: 28 destinations	

Source: PwC analysis

Urban districts in ACS

The ACS comprises six urban districts, each with its own particular focus. These are shown in Figure 8 and described below.

Figure 8: Urban districts in ACS

1	• Sky city: A dense city centre within walking distance of the airport, with offices, and other services for local employees
2	• Park City: To the south east, this district currently houses parking areas, car rental firms and other automotive services.
3	• DriveLAB Stockholm is a hub for automotive research, including educational and training facilities, showrooms and testing tracks.
4	• Marsta Business Area is a well connected and diverse area with companies in sectors from logistics, cargo, manufacturing and construction.
5	• Cargo city, located at the airport, serves as a hub for cargo and logistics companies.
6	• Rosersberg logistics, located on the main E4 highway, has large parking and access areas.

Source: ACS Urban Design Strategy

Recent investment at ACS

There are several investment projects that have recently been completed or are planned at ACS and a selection of them are described as follows. Recently completed projects include a new commuter rail service to Stockholm Arlanda Airport, a motorway connection to Rosenberg and two test tracks at DriveLAB (the automotive R&D facility).

Examples of ongoing and planned projects include a large retail-chain warehouse, recycling plants and a container terminal. Other planned projects include the extension of the Roslagsbanan railway line to Stockholm Arlanda Airport, the developments at Cargo City and at Sky City – an area with offices - adjacent to the terminals.

Current economic contribution of Airport City Stockholm

Summary

There are currently around 700 businesses at ACS employing close to 20,000 people. Together, the turnover of these businesses was close to SEK 38 bn and they generated GVA worth SEK13 bn (USD 2.0 bn). GVA per employee in key sectors in ACS (e.g. transport and logistics and professional and technical services) is higher for some sectors than that of Stockholm county and broadly equivalent to the Swedish national average.

Introduction

In this section we analyse the economic activity associated with by businesses operating at ACS. We describe the current scale and structure of the economic activity at ACS and then assess its economic linkages with the rest of the Swedish economy.

Size of ACS

Our analysis of municipality level company accounting data shows that the combined turnover of the around 700 businesses located at the ACS was close to SEK 38 bn. Together, their GVA was worth SEK13bn (see Table 4).

Table 4: Contribution of ACS to manufacturing and Sweden economy (2012)

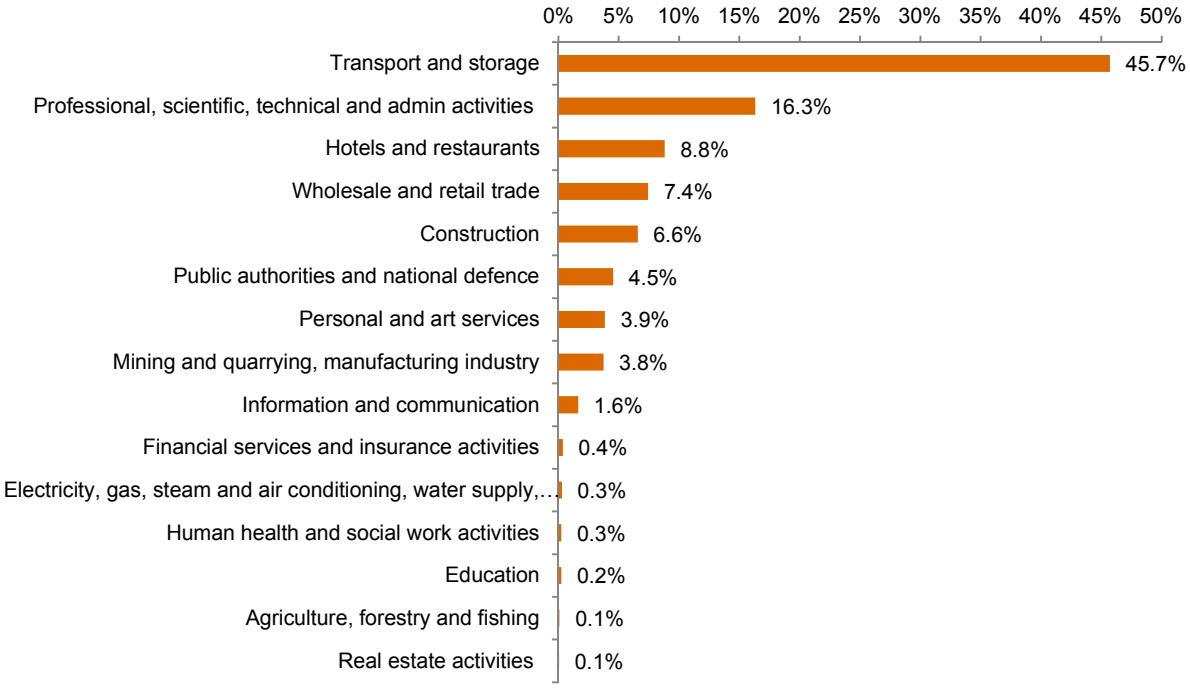
	ACS	***ACS as % of Stockholm region(2011)***
Number of enterprises	approx. 700	approx. 0.72%
Employment	20,466	1.75% of employment
GVA	SEK 13.2 bn	1.44% of GVA

Source: Statistics Sweden, Infotorg, PwC analysis

Industrial structure

Figure 9 shows the proportions of those employed at ACS in 2012 by sector. Transport and storage, professional, scientific and technical activities, hotels and restaurants, wholesale and retail trade and the construction sectors dominate employment. The transport and storage sector accounts for close to half the employment at ACS.

Figure 9: Share of employment by sector (2012)



Source: Municipal and airport records, Infotorg, PwC analysis

Size of businesses

Analysis of businesses in ACS by the number of employees shows that close to 75% of the businesses are micro enterprises (i.e. they have less than 10 employees) with 125 businesses having only one employee. There are nine large companies (i.e. with 250 employees or more). Our analysis of national data suggests that this composition is similar to that of larger regions in Sweden.

Companies with more than 250 employees include Swedavia, the airport operator and one of the partners of ACS. The other large companies in the region are Securitas, DSV Solutions, CWS-boco Sweden, Menzies Aviation AB, NextJet, Nordic Aero, Posten Meddelande, and Scandinavian Service Partner. Table 5 shows the breakdown of businesses in ACS by sector and the number of employees in 2012. More than 20% of the companies operate in the wholesale and retail sector. The other large sectors in ACS are construction (17.4% of companies), transport & storage (14.6%), professional services (13.4%), and manufacturing (12.2%).

The wholesale and retail sector does not, however, contribute the most to employment. The transport and storage sector, with only 14.6% of companies, contributes 38.2% to employment. The wholesale and retail sector with 21.9% of companies contributes 9.5% to employment.

Table 5: Analysis of business size in ACS (% of businesses, 2012)

Sector	Micro (1-9 employees)	Small (10-49 employees)	Medium (50-249 employees)	Large (250 or more employees)	Total
Agriculture, forestry and fishing	4	0	0	0	**4**
Mining and quarrying	1	0	0	0	**1**
Manufacturing	63	15	1	0	**79**
Electricity, gas, steam and air conditioning supply	0	0	0	0	**0**
Water supply; sewerage, waste management and remediation activities	0	1	1	0	**2**
Construction	82	26	5	0	**113**
Wholesale and retail trade; repair of motor vehicles and motorcycles	117	19	6	0	**142**
Transportation and storage	53	29	7	6	**95**
Accommodation and food service activities	14	7	3	1	**25**
Information and communication	14	4	2	0	**20**
Financial and insurance activities	2	2	0	0	**4**
Real estate activities	4	0	0	0	**4**
Professional, scientific and technical activities	82	5	0	0	**87**
Administrative and support service activities	22	18	9	1	**50**
Public administration and defence; compulsory social security	0	0	0	0	**0**
Education	3	1	0	0	**4**
Human health and social work activities	4	1	0	0	**5**
Arts, entertainment and recreation	3	0	0	0	**3**
Other service activities	8	1	0	1	**10**
Total	**476**	**129**	**34**	**9**	**648**

Note: Employee data available only for 648 companies.

Source: Infotorg, PwC analysis

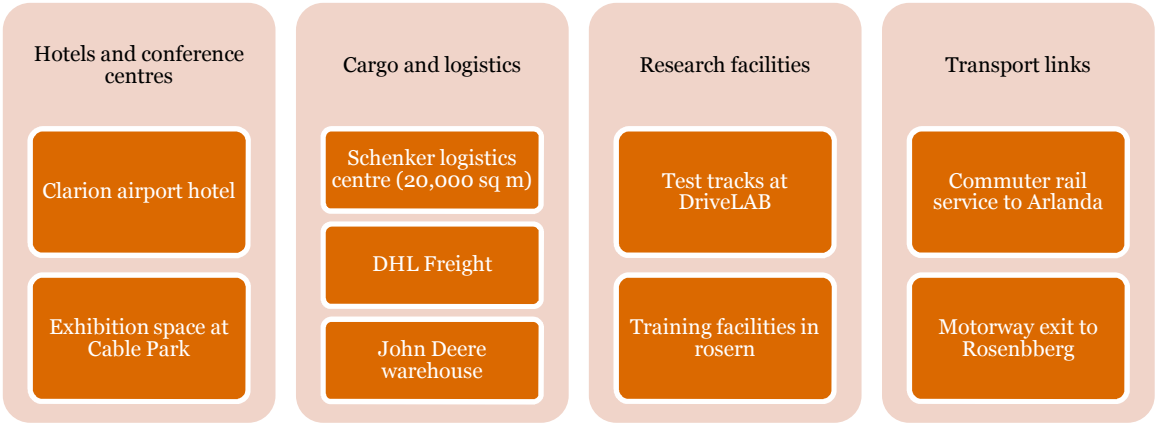
Investment

Several large investments have recently been made in ACS including a new commuter rail service to Stockholm Arlanda Airport, a motorway connection to Rosenberg and two automobile test tracks at DriveLAB (the automotive R&D facility).

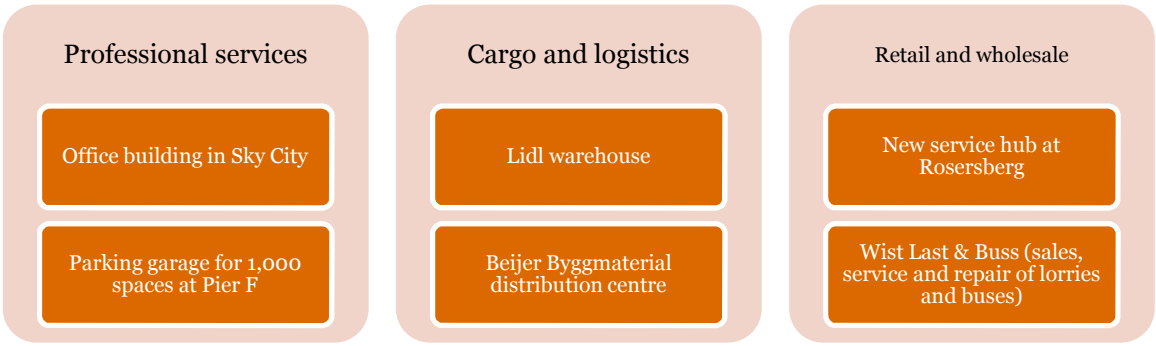
Ongoing and planned projects at ACS include a large retail-chain warehouse, recycling plants, and a container terminal. Other planned projects include the extension of the Roslagsbanan railway line to Stockholm Arlanda Airport, the development of Cargo City and of Sky City adjacent to the terminals.

Table 6: Recently completed projects and ongoing projects at ACS

Recently completed projects



Ongoing projects



Source: ACS Urban Design Strategy

Economic contribution

In this study, we estimate the direct, indirect and induced contributions associated with businesses operating at the ACS. There are three main types of contribution which are usually taken into account in an economic contribution study – direct, indirect and induced contributions. These contributions can be measured in terms of both GVA and employment. The analysis covers the gross rather than the net contribution, i.e. it does not account for the jobs or other economic activity that ACS may displace from other parts of the economy when it grows, or the potential gains to other parts of the economy if it did not exist.

ACS's linkages with other parts of the Swedish economy

The businesses located at ACS have important upstream linkages within the Swedish economy with their suppliers.

Purchases by businesses in ACS have knock-on effects through the Swedish economy. Some indication of the scale of these effects can be gained by looking at the GVA generated by suppliers elsewhere in Sweden economy for every SEK of GVA generated in ACS.

This is reflected in the multipliers which we have estimated based on the most recent input-output tables published by National Statistics for Sweden[15].

[15] Estimated using Swedish Input Output tables for 2010 from Statistics Sweden, the Swedish Statistical agency

Overall, ACS supports 115,000 employees in the economy, generating a turnover of SEK 222bn, a GVA of more than SEK 82bn, and employee income of close to SEK 54 bn.

Direct contribution

The direct contribution is the impact on the economy from the operations of businesses at ACS.

The 20,000 people employed in ACS have a total turnover of around SEK 38 bn. Their direct GVA contribution is around SEK 13 bn while their aggregate employee income is around SEK 13 bn.

Indirect contribution

The indirect contribution of a business operating at ACS is the GVA and employment supported in the economy as a result of the supply chain expenditure of that business.

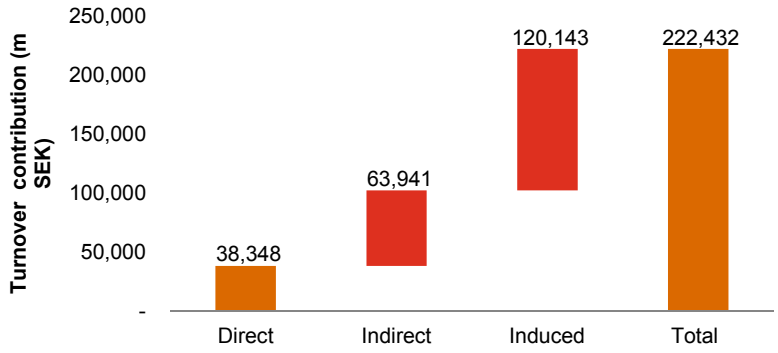
As shown in Figures 10-13 below, the indirect turnover is estimated at around SEK 64 bn, generating GVA of more than SEK 23bn and employee income of close to SEK 16 bn for the employees. The estimated indirect employment generated is estimated at around 33,000 employees.

Induced contribution

The induced contribution is the GVA and employment supported by the spending of employees of businesses operating from ACS and the employees of its suppliers.

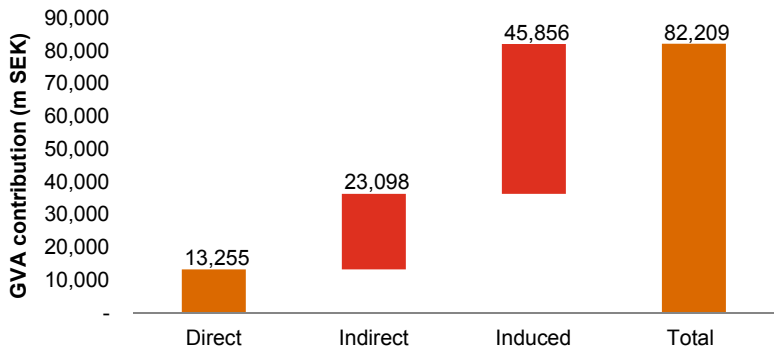
As shown in the Figures 10 -13 below, the induced turnover contribution is estimated at around SEK 120bn, generating GVA of close to SEK 46bn and employee income of more than SEK 29bn for the employees. The estimated induced employment generated is estimated at around 61,000 employees.

Figure 10: Turnover – direct, indirect and induced contribution (mn SEK)



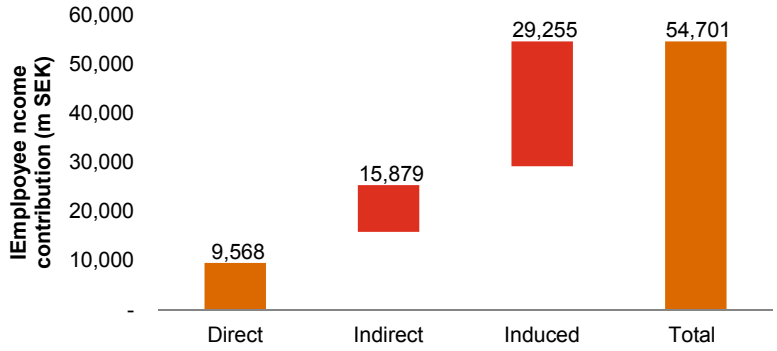
Source: PwC analysis

Figure 11: GVA – direct, indirect and induced contribution (mn SEK)



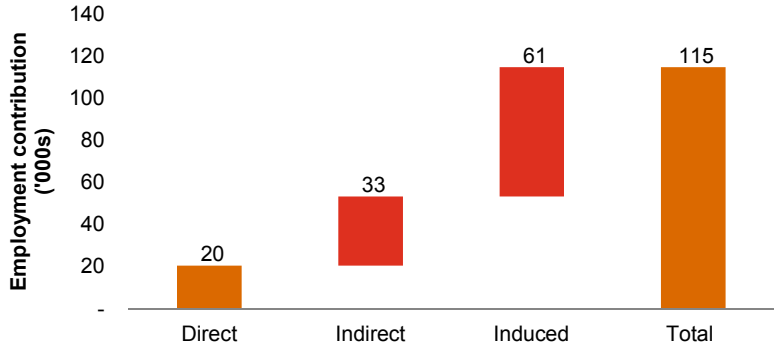
Source: PwC analysis

Figure 12: Employee income – direct, indirect and induced contribution (mn SEK)



Source: PwC analysis

Figure 13: Employment – direct, indirect and induced contribution ('000s)

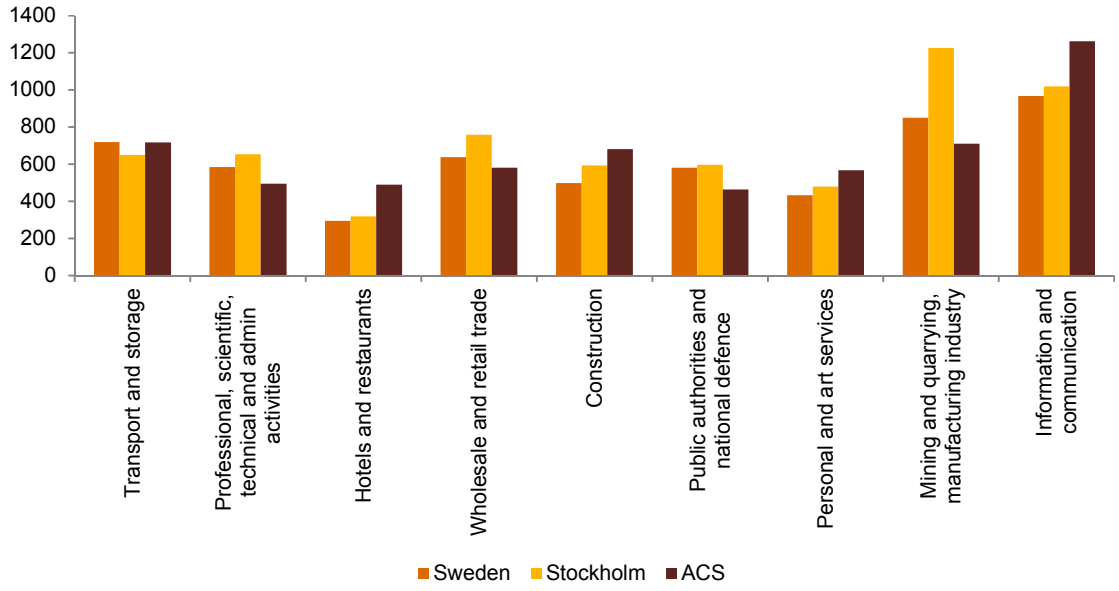


Source: PwC analysis

Direct GVA per employee

Figure 14 below shows the direct GVA per employee for the key sectors in ACS compared to the corresponding figures for Stockholm County and Sweden as a whole in 2011. In sectors such as transport and storage, construction and information and communication, GVA per employee at ACS is at least as high as that of Sweden and Stockholm, indicating that employees in these sectors are productive compared to the rest of the economy.

Figure 14: Direct GVA per employee ('000s SEK)



Source: Sweden Statistics, Infotorg, PwC analysis

Future economic contribution of Airport City Stockholm

Summary

As the Stockholm region grows over the next decade, the partners behind ACS have set out a vision for "*a modern airport city with a vibrant city centre and attractive workplaces*". They envisage that 50,000 jobs will be created at ACS by 2030.

Building on ACS's employment projections, we project the direct, indirect and induced economic contribution of ACS in 2030 assuming its visions is realised. We estimate that ACS's total GVA contribution would rise from SEK 82 bn (USD12.6) in 2012 to SEK 286 bn (USD 43.9) in 2030.

Our approach

Based on our understanding of the employment targets set in ACS Urban Design Strategy[16] we have estimated the potential economic contribution of ACS through to 2030. Our approach is as follows:

4. Our projections are based on ACS's vision of creating 50,000 jobs in the airport city by 2030.

5. We assume that GVA grows in line with ACS's vision for employment and the long-run productivity growth rate for the Swedish economy. We use a similar approach to estimate turnover and employee income.

6. We then combine these projections of GVA, employment, employee income and turnover with the respective multipliers, estimated as before, to obtain the indirect and induced contributions. We assume that the profile of businesses located at ACS does not change.

It is important to note that our projected economic contribution is based on the projected increase in employment in ACS's Urban Design Strategy. We also assume that the economic structure of ACS and the structure of upstream linkages of the businesses do not change.

Plans for ACS expansion

Our estimate of the projected economic contribution of ACS is based on the employment targets set out in ACS's Urban Design Strategy. In addition to the Urban Design Strategy, we have used the Stockholm County Regional Development Plan (RUFS 2010)[17] and the Stockholm Arlanda Airport Master Plan[18] to inform and support our estimates. We summarise the key elements of each below.

1. ACS Urban Design Strategy

The ACS's Urban Design Strategy was created by the three partners behind ACS and establishes the vision to create a "*modern airport city with a vibrant city centre and attractive workplaces*". The city

[16] ACS Urban Design Strategy: a5.mndcdn.com/image/upload/sacgdefk8tre2i7ld2mk.pdf
[17] Stockholm County Regional Development Plan (RUFS 2010): http://www.tmr.sll.se/Global/Dokument/publ/2010/RUFS_2010_eng.pdf
[18] Swedavia's Arlanda Airport Master Plan: http://www.swedavia.com/arlanda/about-stockholm-arlanda-airport-/about-stockholm-arlanda-airport/news/historical-investment-at-stockholm-arlanda/

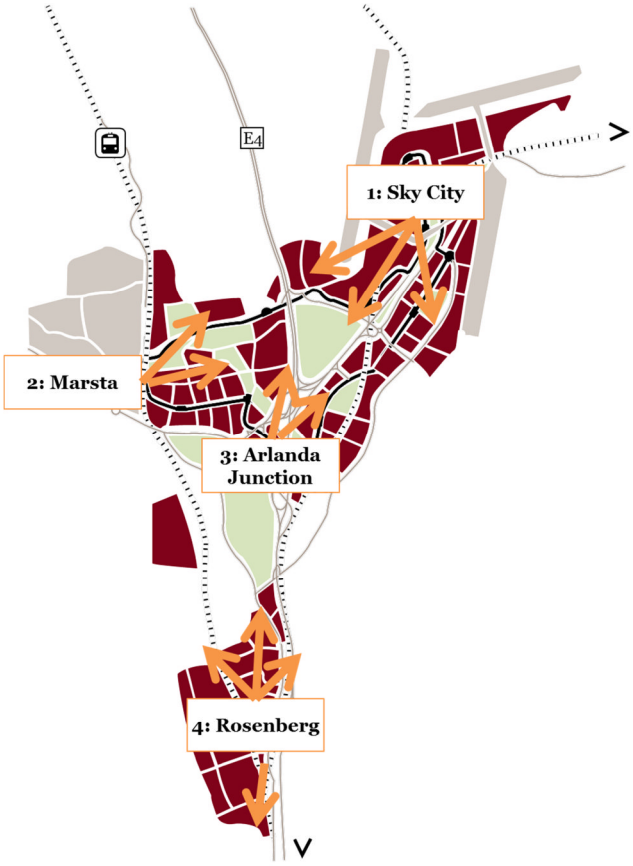
currently has a large business cluster with close to 700 businesses. The Urban Design Strategy sets out five goals for ACS:

- To achieve sustainable growth,
- To be a major international commercial destination,
- To have an effective and safe transport system,
- To provide a lively setting for work and recreation, and
- To be environmentally friendly and resource efficient.

As we have described earlier, there are currently six urban districts and we discuss the plans for these as follows. As a part of its Urban Design Strategy, ACS aims to create a concentration of industry at four nodes (see Figure 15) within the six districts with a view to promoting and facilitating linkages between businesses and creating more favourable conditions for their customers. The six urban districts can be described as follows:

- *Sky City at the airport*: Located close to the airport, Sky City has a concentration of offices, conference centres, hotels, restaurants and travel agencies. With its high intensity of businesses, ACS's strategy envisages that Sky City will act as the main node from which development and investment will move forward across the ACS.
- *Park City*: Park City is currently occupied by companies providing parking services, car rental services and automotive services. ACS's Strategy aims to develop the area to include offices, high-tech industries, retail services and hotels.
- *Marsta Business Area*: ACS's Strategy envisages developing Marsta into an office area for different kinds of businesses. Marsta centre and station will act as the main node of expansion to the west.
- *Cargo City*: Located at the airport, is a hub for cargo and logistics services.
- *DriveLAB*: DriveLAB is the hub for automotive research and includes educational and training facilities. ACS's Strategy aims to develop further the potential for test tracks for automotive research. The third node is at the E4 highway between Vastra Arlanastad and DriveLAB, which will be the centre of expansion to the south of the airport.
- *Rosersberg*: Located on the E4 highway connecting Stockholm, Uppsala and Stockholm Arlanda Airport, Rosersberg currently has a large number of warehouses. ACS's Strategy plans to develop this area into a "*world-leading environmentally smart logistics centre*".

Figure 15: Nodes of growth in ACS



Source: ACS Urban Design Strategy

2. Regional development plan for Stockholm region

The Regional Development Plan for the Stockholm region seeks to make Stockholm "*one of the most attractive metropolitan regions in the world*"[19].

The Plan envisages the local (Stockholm county) population to rise from 2.05 mn in 2010 to 2.3 mn-2.5 mn in 2030. Employment is expected to increase from 1.06 mn in 2010 to 1.08 mn-1.35 mn in 2030. This increase in employment will be supported by higher net immigration in addition to the increase in population.

Table 7: Projected employment and population scenarios

	2010	2030 (low)	2030 (high)
Employment	1,056,000	1,079,000	1,349,000
Population	2,050,000	2,312,000	2,495,000

Source: RUFS 2010

The Plan is for the region to become increasingly focussed on high-skilled, knowledge intensive services. As a consequence of this, average incomes are also expected to rise at a higher rate compared to the rest of Sweden. The Plan also projects a higher rate of investment relative to the rest of Sweden, and therefore, a higher share of national output.

3. Stockholm Arlanda Airport Master Plan

Stockholm Arlanda Airport is the largest airport in Sweden. In 2013, more than 20 million passengers flew via the airport and Swedavia, the airport operator, expects passenger volumes to increase to 35 million by 2040. This implies a growth rate of about 2% p.a.[20]

[19] Stockholm County Regional Development Plan (RUFS 2010)
[20] Stockholm Arlanda Airport Master Plan (2010)

To enable this growth, Swedavia has developed a comprehensive development plan for the airport over the next 30 years which envisages an investment of SEK 13bn in expanding capacity at the airport, improving efficiency of operations and enhancing the customer experience. About SEK 7 bn of investment is expected in the first phase of investment in the 10 years up to 2023.[21]

One of the key risks identified by Swedavia in achieving this target is its ability to secure an environmental permit under the new environment law in Sweden. Without the new permit, Stockholm Arlanda Airport's ability to increase the number of flights to, from and within Sweden will be restricted.

Estimating the future economic contribution

Below, we describe the three steps which underlie our projections of the expected economic contribution of the ACS in more detail.

1. Employment projections

If ACS's vision of creating 50,000 jobs in the airport city by 2030 forms the basis of our projections. It translates into an average addition of more than 1,600 jobs each year and a growth rate of 5.1% per annum.

2. Turnover, GVA and employee income projections

We assume that GVA will grow in line with ACS's employment target and the long run productivity (i.e. GVA per employee) growth rate for the Stockholm County. The historic growth rates for employment, employee income and GVA are shown in Table 8 below.

Table 8: Key economic trends in Sweden and Stockholm (Average annual change, % per annum, 2001-2011)

	Sweden	Stockholm County
Employment	0.6%	0.9%
Compensation (employee income)	2.4%	2.4%
GVA	2.4%	2.9%
Compensation per employee	1.8%	1.5%
GVA per employee	1.7%	2.0%

Source: Sweden Statistics, PwC analysis

We use a similar approach to estimate turnover and employee income. Our results are presented in Table 9 below.

Table 9: Estimated direct economic contribution of ACS (2012 – 2030)

	2012	2030	Average annual growth rate (% per annum)
Employment	20,466	50,000	5.1%
Turnover (mn SEK)	38	135	7.2%
Employee income (mn SEK)	10	31	6.7%
GVA (mn SEK)	13	46	7.2%
Turnover per employee	1,874	2,692	2.0%
Income per employee	467	614	1.5%
GVA per employee	648	923	2.0%

Source: Urban Design Strategy, PwC analysis based on ACS employment projections

[21] Swedavia newsroom (http://www.swedavia.com/about-swedavia/news/historical-investment-plan-to-ensure-swedish-air-travel-connections/)

3. Projected economic contribution

Details of the projected economic contribution can be found in Figure 16-Figure 19 below. We discuss the key findings below.

Direct contribution

Based on the target of 50,000 people employed by businesses located at ACS that has been set out in the ACS's Urban Design Strategy, we estimate that this employment will directly generate turnover of around SEK 135 bn. The projected direct GVA contribution is around SEK 46 bn while the projected aggregate employee income is around SEK 31 bn. We assume that the sector composition of ACS does not change in the period, i.e. the employment growth rate is constant across sectors.

Indirect contribution

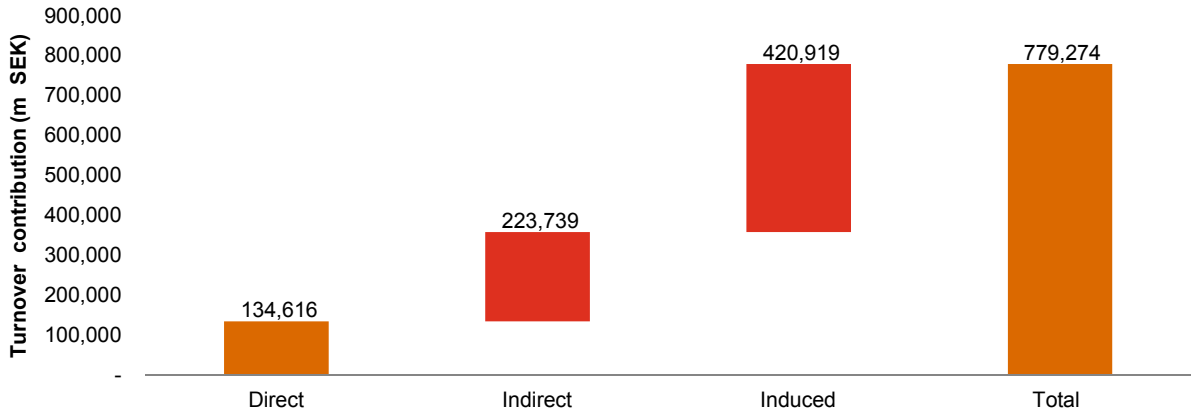
We project the indirect turnover to be around SEK 224 bn and this is expected to generate an estimated GVA of approximately SEK 80 bn and employee income of close to SEK 50 bn. The projected indirect employment generated is estimated to be around 81,000 employees.

Induced contribution

The projected induced turnover is expected to be around SEK 421 bn. This is projected to generate GVA of close to SEK 159 bn and employee income of more than SEK 93 bn. The projected induced employment generated is expected to be around 150,000 employees.

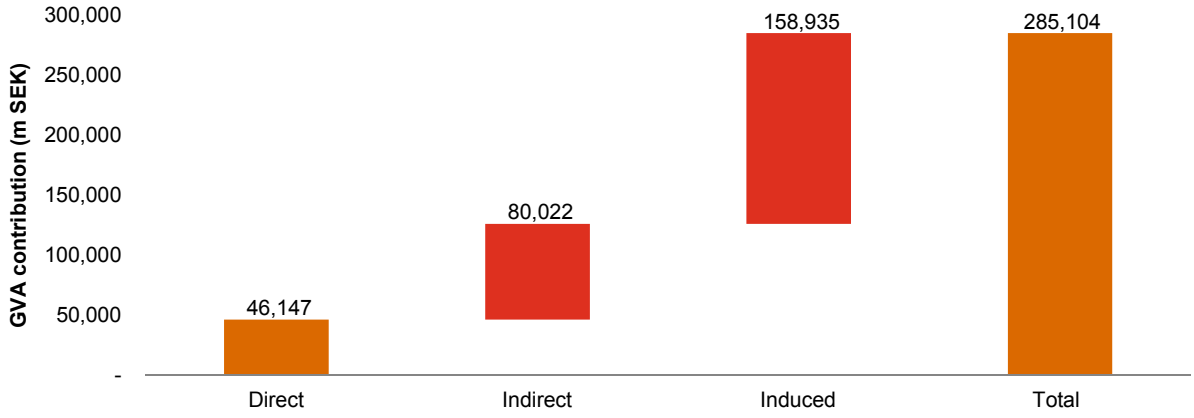
Overall, if ACS's employment growth ambitions are fulfilled, ACS is projected to support 280,000 employees in the Swedish economy and to generate GVA of more than SEK 285 bn. Employee income is estimated to be close to SEK 175 bn.

Figure 16: Projected turnover – direct, indirect and induced contribution (mn SEK)



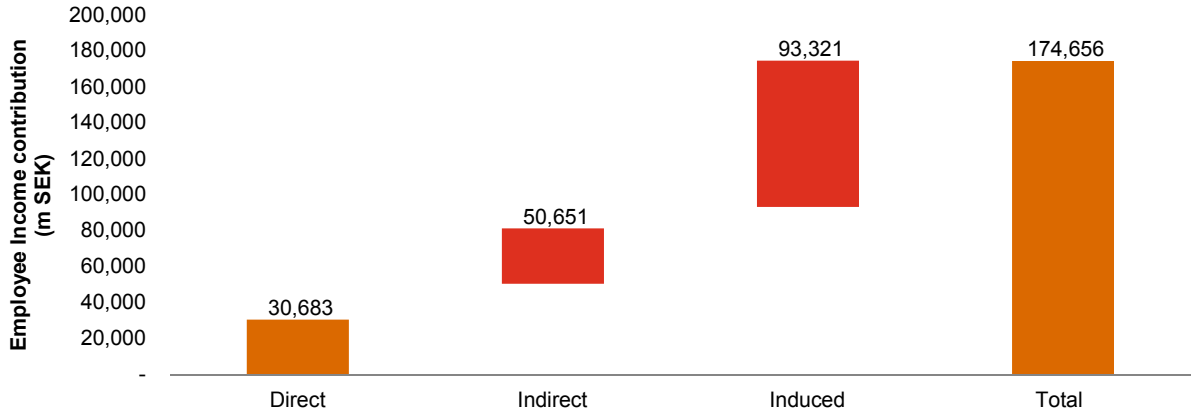
Source: PwC analysis

Figure 17: Projected GVA – direct, indirect and induced contribution (mn SEK)



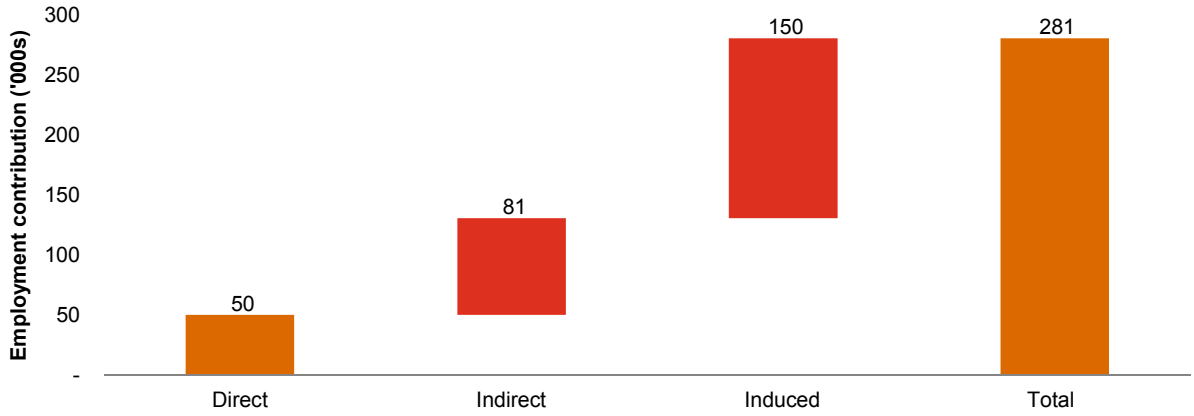
Source: PwC analysis

Figure 18: Projected employee income – direct, indirect and induced contribution (mn SEK)



Source: PwC analysis

Figure 19: Projected employment- direct, indirect and induced contribution



Source: PwC analysis

If ACS achieves its target growth in employment by 2030, it will increase its current employment level by 2½ times whilst its (gross) GVA contribution will be almost 3½ times its current contribution.

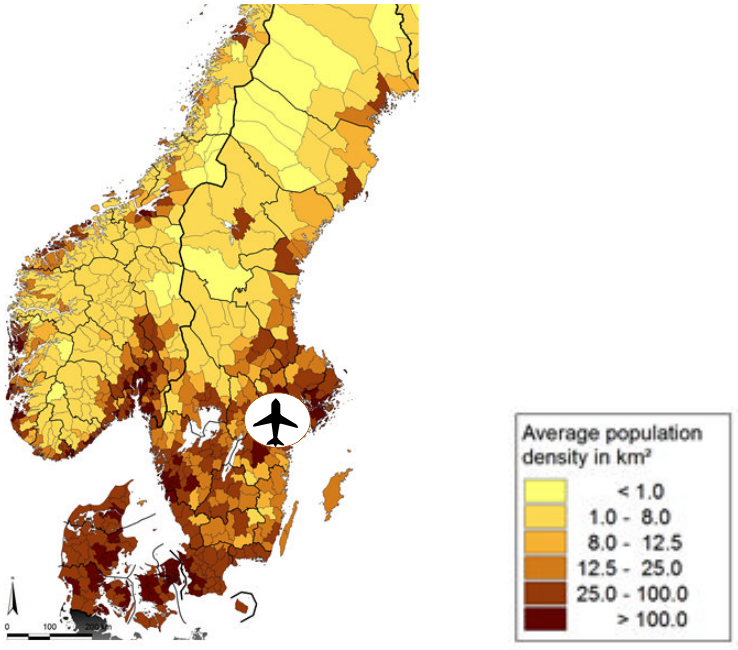
Labour supply around ACS

In conjunction with undertaking this analysis, we have also reviewed commuter data to highlight the area from which businesses located at the ACS might be able to attract workers.

ACS is occupies a large part of the Sigtuna municipality which is a part of Stockholm county. It is located in a densely populated part of Sweden (see Figure 20 below). Our analysis of municipality-level data on commuting distances indicates that a large number of people in the vicinity of ACS commute to the Sigtuna municipality, which is a close proxy for ACS.

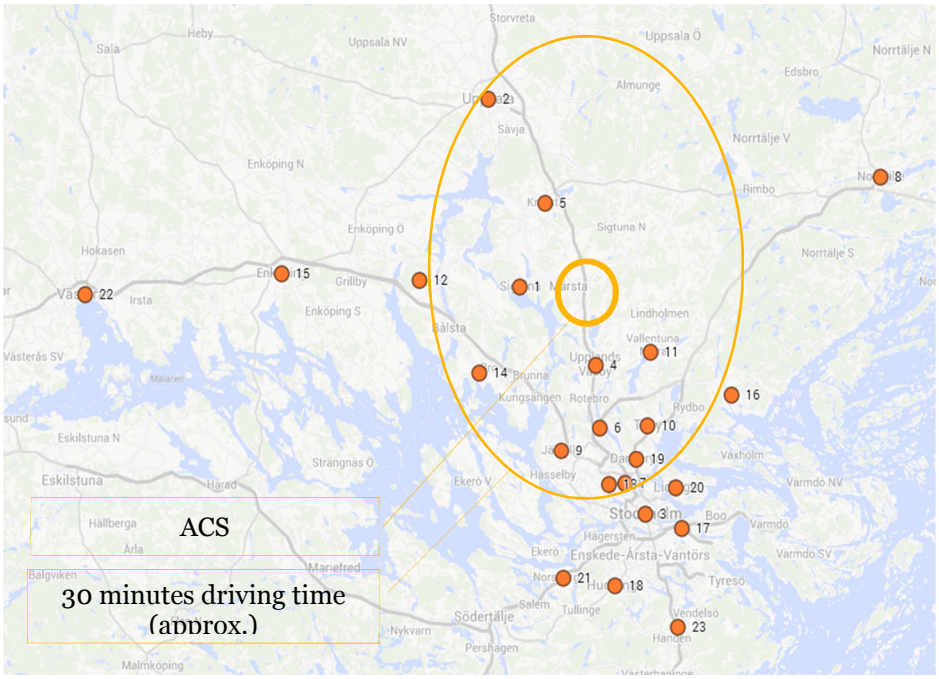
In 2012, there were approximately 28,000 workers commuting across municipality boundaries to get to Sigtuna. We have estimated the average travel times of 26,000, i.e. 92.6%, of the 28,000 of the workers commuting to Sigtuna in 2012. Because of the large number of people already commuting to the local municipality area, the high population density of the area, and the potential migration to the Stockholm region anticipated in the Regional Stockholm Plan (RUFS 2010), we do not envisage any constraints on availability of labour from the neighbouring regions.

Figure 20: Average population density by municipality



Source: Sweden Statistics, PwC analysis

Figure 21: ACS: Areas with more than 100 workers commuting to Sigtuna



Source: Google Maps, Statistics Sweden

Table 10: Number of workers commuting to Sigtuna, distance travelled and average driving times

No.	Region	No. of workers	Distance (km)	Average driving time (mins)[22]
1	Sigtuna	10821	**17**	17
2	Uppsala	3600	38	28
3	Stockholm	3331	43	32
4	Upplands Väsby	1475	18	14
5	Knivsta	1069	22	17
6	Sollentuna	897	29	22
7	Solna	599	37	26
8	Norrtälje	510	54	51
9	Järfälla	451	36	28
10	Täby	416	32	32
11	Vallentuna	394	29	25
12	Håbo	358	39	42
13	Sundbyberg	256	40	30
14	Upplands-Bro	250	44	32
15	Enköping	247	80	53
16	Österåker	243	43	37
17	Nacka	215	50	40
18	Huddinge	183	57	45
19	Danderyd	156	39	28
20	Lidingö	129	46	39
21	Botkyrka	126	61	45
22	Västerås	107	109	71
23	Haninge	104	60	45

Source: Sweden Statistics, PwC analysis

[22] Estimated using Google map directions tool

Figure 21 shows a map of the main commuter areas that feed the Sigtuna municipality area. ACS and Stockholm Arlanda Airport are the main sources of economic activity in this municipality. We define these main commuter areas as cities or towns from which more than 100 people per day commute to Sigtuna.

Our data are sourced from the government statistics agency Statistics Sweden. The data show that 28,000 people commute to Sigtuna on a regular basis, from more than 236 locations. A more detailed breakdown of the distance travelled, average driving times and the number of commuters are given in Table 10. The data show that almost 7,000 commuters travel from Uppsala and Stockholm on a regular basis and that the majority of commuters from these selected regions travel from places where average driving times to ACS are less than 30 minutes.

Comparison with other airports and airport cities

Summary

There are many airport cities around the world. In this section we focus on three existing examples at Schiphol, Frankfurt, Paris and also discuss the implications of the new airport city development in Manchester, UK.

Airport cities are well placed to take advantage of the tourism, international trade and foreign investment opportunities that aviation sector expansion can facilitate.

Defining airport cities and their potential role in economic growth

Increasingly, airports are becoming nodes for urban development rather than just fulfilling their primary role as transportation centres. This is prevalent in the increasing branding of these nodes behind such concepts as Airport Cities, Aerotropolis and Airport Corridors. In Europe, the term 'airport city' has been widely used to describe the growth of aeronautical and non-aeronautical land developments occurring at modern airports worldwide.[23] The concept of an airport city is moving beyond the perception that they are gateways for the transportation of goods and services.

The development of urban centres around airports is dependent on factors such as available space, airport location, infrastructure networks, regional economic structures and the institutional and planning settings

The institutional framework is particularly important. Airports, whether they are state owned or not, rely on revenues from passengers and businesses located at the airport. This has led to the development of the Airport City concept as airport authorities seek to generate maximum value from the land they own by integrating the airport terminal, parking, retail and commercial real estate. The more effectively these activities can be integrated, the more value can be created (Knippenbeger *et al.* 2009).

The definitions of what an airport city is can vary considerably. For instance, in the case of ACS and Schiphol, the terms of reference for the airport city relate to an area of buildings of which are in close proximity to the airport. Whereas, for Frankfurt, there is a similarly clearly defined airport city in the proximity of the airport but statistics published on the airport city's website also draw linkages between the airport city itself and the much broader area of FrankfurtRheinMain.

Regardless of the precise definition of an airport city, the important of the relationship between aviation, airports and airport cities cannot be understated. Airports can facilitate trade which is crucial for business development. While accurate data is sparse, the United Nation's International Civil

[23] Walker, Arron R. and Stevens, Nicholas J. (2008) "*Airport city developments in Australia: land use classification and analyses*". In: 10th TRAIL Congress and Knowledge Market, 14-15 October 2008, Rotterdam, The Netherlands.

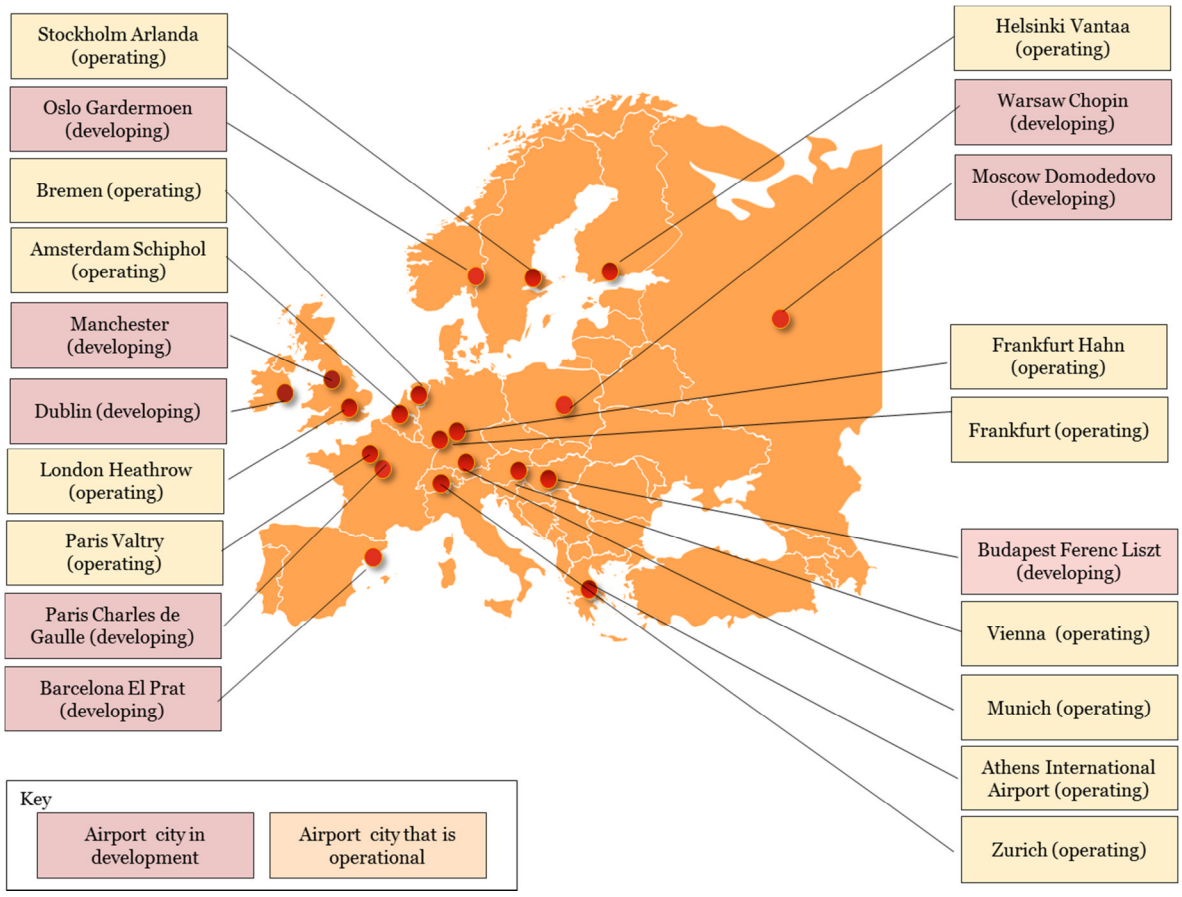
Aviation Organisation (ICAO) has estimated that about 35–40 per cent of world trade by value is moved by air.[24]

Airline capacity is also a key driver of economic growth. PwC UK analysis for the UK Airports Commission suggests that a 10% increase in seat capacity will lead to a 1% increase in short-term economic growth, which would imply an equivalent rise in the overall level of real GDP.[25] While these results do not relate directly to the existence of airport cities, they show the importance of the link between aviation and the economy. With airports being a key facilitator of this growth. Businesses located in an airport city are in a prime position to be able to capitalise on the trade, tourism and foreign investment benefits associated with the aviation industry. Button and Lall (1999)[26] use econometric tests to show that airports are genuine attractors for high technology jobs, leading to the conclusion that hub airports are important catalysts for high technology growth industries.

European Airport cities

Figure 22 below shows the cities in Europe that have, or are developing, an airport city. According to the website, www.globalairportcities.com, 20 airport cities have been identified in Europe. As of August 2013, eight of the 20 cities are not operational and are still in development stages. It is interesting to note that Frankfurt has two operational airport cities, while Paris, which has one operational airport city at Paris Vatry airport, is also developing a second one centred around Paris Charles de Gaulle airport.

Figure 22: European airport cities, by stages of development



Source: www.globalairportcities.com[27]

[24] International Civil Aviation Organisation (2009). Overview of Trends and Developments in International Air Transport, http://www.icao.int/icao/en/atb/epm/Index.html.

25 "Econometric analysis to develop evidence on the links between aviation and the economy: A report by PwC for the Airports Commission", December 2013.

26 Kenneth Button, Somik Lall, The economics of being an airport hub city, Research in Transportation Economics, Volume 5, 1999, Pages 75-105.

27 http://www.globalairportcities.com/page.cfm/action=library/libID=1/libEntryID=1030/listID=8

Schiphol: a key example of airport city expansion

Schiphol airport city is seen as a good example of a successful airport city because of its scale of integration both in terms of its design strategy - the central rail station is within walking distance of the airport terminal, large hotels and commercial real estate (Knippenbeger *et al.* 2009)[28].

In 2012 the airport alone was estimated to make an economic contribution (measured by GVA) of USD 24 bn to the region if direct, indirect and induced effects are taken into account. Equivalent employment figures are 166,000 jobs. [29] This figure is equivalent to 3.5 % of Dutch GDP.

The Dutch Government has been behind further development of the airport city into an airport corridor through the formation of a public-private partnership with the municipal government, the Schiphol area development company and the national investment bank. Schiphol describes itself as a "Mainport" which centres on it being "an international and multi-modal hub that accommodates flows of people, goods, information, knowledge and culture."[30]

The Mainport vision was borne out of the Dutch government's strategy in the late 1980s to develop the areas around Schiphol and the Rotterdam port. The Netherlands has a historic role in terms of being a point of entry for trade into mainland Europe. This strategy has been designed to secure and improve its position. The operation of Schiphol as a global hub is central to this strategy. The Government sees having a high level of transport connectivity as being central to achieving a more internationally competitive economy.[31]

As Schiphol's airport city has developed it has been able to attract international businesses from North America and Japan to establish regional headquarters while shifting the emphasis of development away from the more traditional transport and logistics functions to the broader service sector. This expansion coincides with the development of the Zuidas (or "financial mile") business district by the Amsterdam government just 6km away from Schiphol airport city. Both districts combine the objective of serving business customers. Major infrastructure plans were agreed by the Dutch authorities in 2012 to further develop transport infrastructure in the Zuidas area.[32]

Recent figures show that around 600,000m^2 of office (operational and commercial) and almost one million m2 of industrial real estate have been built at the airport. Around 65,000 people work at the airport itself.[33] A study similar to the one we have undertaken for ACS was undertaken for Schiphol in 2001.[34] The report found that the total multiplier of direct employment on Amsterdam Schiphol Airport is approximately 2: one job on the airport leads to approximately one job in indirect and induced employment in the regional area.

The success of the airport city at Schiphol has led to the establishment of Luchtvaart College Schiphol (Aviation College Schiphol, formerly Schiphol College). This college has been set up to organise "working & learning" activities within the aviation sector. A primary purpose of this college is to train new workers for the businesses located in the airport city.

Frankfurt Airport Center: an airport city with growing connectivity

Frankfurt international is Germany's busiest international airport and the airport employs about 75,000 people. This makes it Germany's largest employer at a single location.[35] Frankfurt has developed along the lines of many large airports. Its terminal buildings include shopping, conference and business

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28 Airports in Cities and Regions: Research and Practise; 1st International Colloquium on Airports and Spatial Development, Karlsruhe, 9th - 10th July 2009 edited by Ute Knippenberger

[29] Source: EC quants 2013, http://www.ecquants.com/2012_CDG.aspx

30 http://www.schiphol.nl/SchipholGroup/Company1/Profile.htm

31 "The economic significant of Mainport Schiphol" Ministry of transport, water and public works, 2000.

32 http://www.amsterdam.nl/zuidas/english/menu/zuidas-development/zuidas-areas/zuidasdok-project/

33 Source: Schiphol Facts and Figures 2012

34 Hakfoort, Jacco , Poot, Tom and Rietveld, Piet(2001) 'The Regional Economic Impact of an Airport: The Case of Amsterdam Schiphol Airport', Regional Studies, 35: 7, 595 — 604.

35 "2012 Facts and Figures on Frankfurt airport", published by Fraport.

facilities and there are a range of hotels on the airport site. Much of the development around Frankfurt Airport Center (FAC) has been undertaken within the last 10 years, during this time the airport has been transformed into an international hub.

A new runway came into operation at Frankfurt airport in October 2011 which has increased its overall capacity. By the end of 2011, the new runway had already positively impacted the air traffic figures – the number of passengers reached 56.4 million, up 6.5 percent from the year before.

Much of Frankfurt's success is borne out of its excellent transport links. More than 180 high speed trains arrive at Frankfurt each day and almost as many passengers arrive by rail as they do by car.[36] Because of these linkages the FAC has attracted business headquarters to locate in its new office developments. Excellent transport links were behind the European Central Bank's decision to locate in Frankfurt.[37] Further high speed rail expansion is one of FAC's main strategic objectives,[38] as it can help free up airport slots, reduce emissions and increase the catchment area of the airport and the airport city. Continued development of the airport itself is also seen as important, with a third terminal at the airport expected to open in 2016/17.

Like Schiphol, Fraport is also taking steps to secure a stable supply of labour as it expands. This includes a detailed analysis of demographic trends and the orientation of jobs to support an ageing population.

A detailed study relating to the economic impact of Frankfurt airport was conducted in 2000.[39] It used a similar multiplier approach to the one used in this study, although the process was refined by the use of a regional input output for Frankfurt. The modelling suggests that for every job created at the airport, then another 1.77 jobs nationwide would depend on it. Local level employment multipliers are also calculated which show than for each airport employee a further 1.19 jobs are created within the municipal area that the airport is located in. More recent analysis suggests that in 2012 the airport alone was estimated to make an economic contribution (measured by GVA) of USD 16 bn to the region if direct, indirect and induced effects are taken into account. Equivalent employment figures are 157,000 jobs. [40] This figure is equivalent to 0.7% of the German GDP.

Paris Aerotropolis: building from a large existing airport

Charles de Gaulle airport is one of the largest air hubs in Europe, but its airport city concept has remained relatively underdeveloped. In 2012 the airport alone was estimated to make an economic contribution (measured by GVA) of USD 23 bn to the region if direct, indirect and induced effects are taken into account. Equivalent employment figures are 185,000 jobs. [41] This figure is equivalent to 1.1% of the country's GDP.

Building on the success of the airport Paris Aerotropolis, the airport city around Paris' Charles de Gaulle airport, was created in 2009 by an association of 12 large companies and local institutions. The founding members are transporters (Air France, Carex, FedEx), the business park and infrastructure owners (Aeroville, Aire de Loisirs et de Sports de Roissy-en-France, A Park, Parc Mail, Paris Nord 2, Sud Roissy and International Trade Center Roissy Paris CDG), and local development agencies (Communaute d'Agglomeration Terres de France and Roissy Development)[42]. According to the Aerotropolis Paris brochure[43], the area currently houses more than 2,000 businesses. We have not found any employment or economic contribution statistics at the airport city level.

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[36] http://www.airportregions.org/wp-content/uploads/Genval-Web-1-11.pdf
[37] "2012 Facts and Figures on Frankfurt airport", published by Fraport.
[38] Dr. Peter Pfragner representing Fraport AG as an intermodal officer at the 2012 conference "Airports as poles of economic development", European conference Brussels.
[39] R. Hujer and S. Kokot (2000) "Frankfurt Airport's Impact on Regional and National Employment and Income - Some New Results Using an Improved Version of the Extended Model for Interregional Input-Output-Analysis", Working paper, Institute for Statistics and Econometrics, University of Frankfurt.
[40] Source: EC quants 2013, http://www.ecquants.com/2012_CDG.aspx
[41] Source: EC quants 2013, http://www.ecquants.com/2012_CDG.aspx
[42] http://www.aerotropolis-europe.com/aerotropolis-europe%E2%84%A2-paris/paris-economic-region.html
[43] http://news.van.fedex.com/files/Aerotropolis%20Europe_eng.pdf

The airport city emphasises its strong infrastructure links to Paris and the rest of Europe as one of the key advantages of locating businesses in the airport city. The airport city is served by strong transport infrastructure. There are highways connecting the airport city to Paris and Brussels, and rail links to Brussels, London, Marseille and Amsterdam. The area is also around 25km to the Port of Gennevilliers. With over EUR 6 bn already invested in the area, the partners aim to invest a further EUR 3 bn over the next four years and develop projects over an area of 1 mn sq m (1 sq km).

Manchester airport city: Enterprise zone

In October 2013, the UK Government announced the development of an airport city at Manchester. [44] The airport city is the UK's largest development project since the Olympics, will provide over 5 mn sq ft (0.5 sq km) of business space, including manufacturing, warehousing, offices, hotels, retail and leisure outlets across a 160 acre regeneration site, and is expected to create over 16,000 jobs at the airport city. The construction of the airport city is expected to take 18 months. The success of the airport city depends on the success of the Manchester airport. 20 mn passengers travelled through Manchester airport in 2012.

According to the Airport City Manchester "Master Plan", the Airport City is designed as a small airport city. All buildings across the site are expected to be a 7 minute walk from the airport's ground transport hub. The airport currently has excellent connections to the rest of the UK with 300 trains per day and 600 buses and coaches per day from the Manchester Airport. A metrolink service is expected to open in 2016.[45]

The £800 mn (USD 1,276 mn[46]) airport city is heralded as "one of the largest ever British-Chinese joint ventures". The project is a collaboration between the Manchester Airport Group (MAG), Beijing Construction Engineering Group (BCEG), Carillion Plc and the Greater Manchester Pension Fund.

According to the Master Plan, it is expected that the airport city is also expected to be a major factor in the development of Manchester Airport as well as to support socio-economic growth in the region. The Master Plan estimates that the airport currently supports 19,000 jobs in local community and the wider region around the airport.

Airport City Manchester will benefit from being located in an Enterprise Zone. This means that its occupants will enjoy the following advantages:[47]

- A business rate discount (up to £275,000 equivalent to USD 460,000) per eligible business over a five year period;
- All business rates growth within the Zone for a period of at least 25 years will be retained by the local area, and shared to support the Partnership's economic priorities and ensure that benefits from Enterprise Zone growth are reinvested locally;
- Government help to develop radically simplified planning approaches for the Zone using, for example, existing local powers to grant automatic planning permission; and
- Government support to ensure that superfast broadband is rolled out throughout the zone, achieved through guaranteeing the most supportive regulatory environment and, if necessary, public funding.

Conclusion

Our case studies suggest that the success of airport cities is borne out of a range of factors, which have varying degrees of influence in each location:

- a joined-up development partnership combining national and municipal governments and private sector backing;

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[44] https://www.gov.uk/government/news/joint-british-chinese-partners-to-construct-new-800-million-manchester-airport-city%20

[45] http://www.airportcity.co.uk/pdf/airport-city-singles.pdf

[46] Exchange rate of USD 1.59 per 1 GBP is based on Oct 2013 rates from Oanda.

[47] Report of Chief Executive to MCC Executive, 6 April 2011

- strong transport infrastructure links (road and rail), and a continued development of these links to support demand and enable growth; and
- growth in the associated airport hub.

The benefits of airport cities are not just economic. Our case studies suggest that airports and airport cities are being proactive in developing skills of potential employees and that this can have important social consequences.

Appendix A

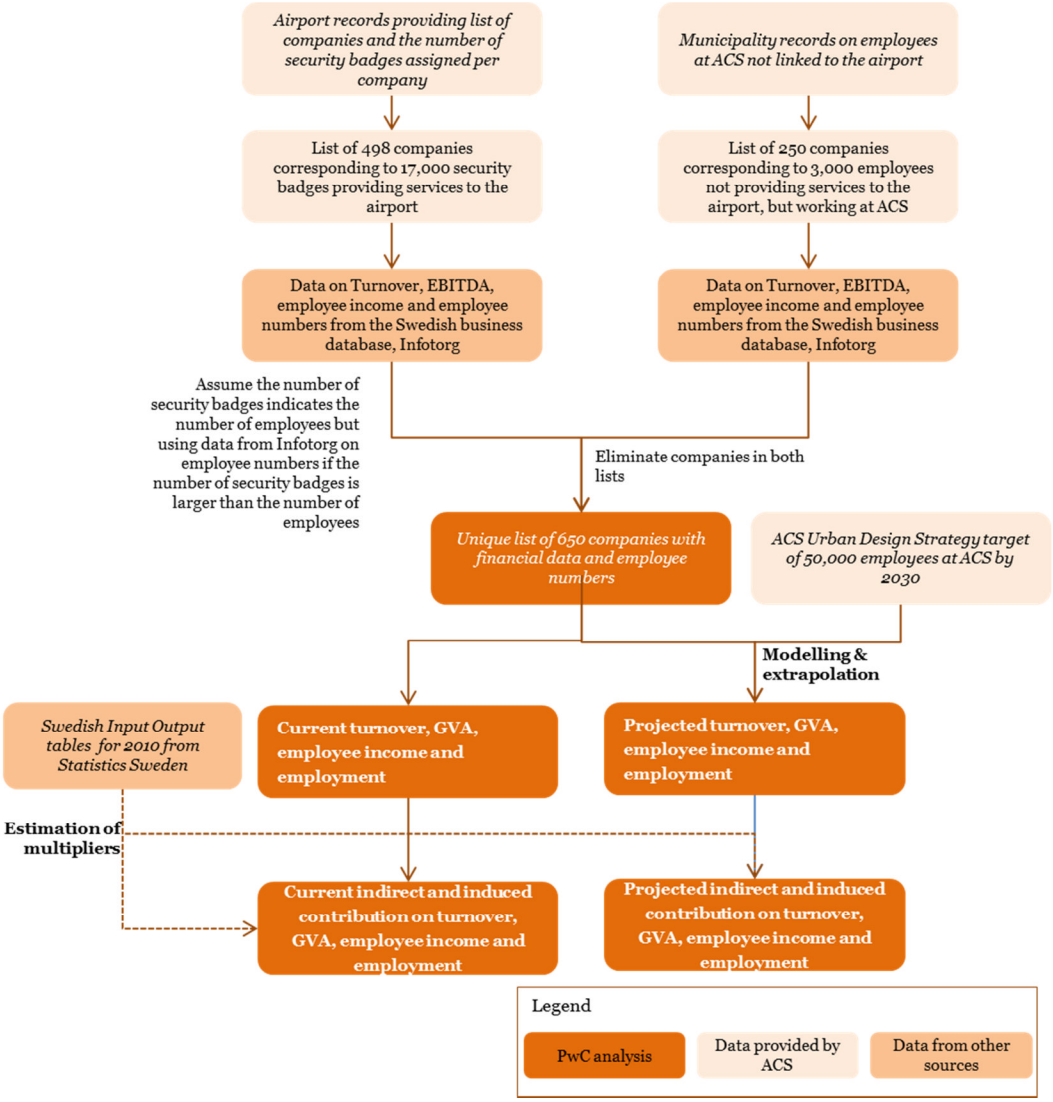
Appendix A: Methodology and data sources

This Appendix explains the evidence based approach we have used to estimate the current and future economic contribution of ACS.

An economic contribution study such as this seeks to estimate the contribution of an organisation or sector to the economy. Three main types of contribution are usually taken into account in an economic contribution study – direct, indirect and induced contributions.

Our analysis covers the gross rather than the net contribution (i.e. it does not account for the jobs or other economic activity that ACS may displace from other parts of the economy when it grows or the potential gains to other parts of the economy if it did not exist).

Figure 23: Our methodology



Data on current economic contribution

Our starting point was to establish how many people are employed at ACS. We used data from two sources to do this:

1. A list of 498 companies corresponding to 17,000 security badges for access to the airport. We assume that these security badges correspond to employees from ACS providing services at the airport.

2. A list of 250 companies corresponding to 3,000 employees not providing services to the airport, but working at ACS from municipality records

For the above, 650 companies, we have obtained financial data (i.e. turnover, earnings before interest, tax, depreciation and amortisation (EBITDA) and employee income) from the Swedish business database, Infotorg.[48]

For 155 companies in the first list above, the number of security badges recorded in the airport records was higher than the registered number of employees in the Infotorg dataset. The employees recorded at the airport may include transitory employees such as airline staff from other countries who visit the airport. We assume these staff contribute in part to the output of the airline sector in the economy as they will support the travel industry in Sweden. We have adjusted the number of employees to account for the excess badges by using employee numbers from the Infotorg database, i.e. the lower of the two numbers.

For close to 200 of the 650 companies above, we could not find financial data (turnover, EBITDA and employee income). Most of these 200 companies were embassies, government departments and international airlines.

We have scaled up the financial aggregates, at the sector level, for the 450 remaining companies assuming that the ratio of the metric per employee is constant within sectors.

For employees corresponding to these companies, we have assumed that their contribution is proportional to the other employees in the sector. For example, for GVA, we have calculated the GVA per employee by sector for companies where data was available. We have then multiplied the GVA per employee with the total number of employees in the sector to obtain the total GVA contribution of the sector.

Employment, turnover, GVA and employee income projections

Based on our understanding of the targets set in ACS's Urban Design Strategy we have projected forward the current economic contribution for ACS to 2030. Our method is as follows:

1. Our projections are based on ACS's vision of creating 50,000 jobs in the airport city by 2030.

1. We make the assumption that GVA grows in line with ACS's vision for employment and the long-run productivity growth rate for the Swedish economy. We take similar steps for turnover and employee income.

Multipliers used to estimate indirect and induced contribution

We have used multipliers to estimate the indirect and induced effects of the ACS. We have estimated the multipliers based on the Swedish Input Output tables for 2010[49]. These cover the 20 sectors listed in Table 11 below. For each sector, two different sets of multipliers for GVA and employment are also shown in Table 11 below.

[48] Infotorg is a provider of online information about private individuals, companies, properties and vehicles, in Sweden.

[49] Statistics Sweden

- The Type 1 multiplier reflects the value added (GVA) or employment created elsewhere in the supply chain in Sweden for every SEK of value added (or jobs); and
- The Type 2 multiplier also takes account of the effect of the spending by all those employed in the supply chain in terms of value added (GVA) and employment.

Table 11: Estimated multipliers for Sweden (2010)

Sector	GVA		Employment	
	Type 1	Type 2	Type 1	Type 2
Agriculture, forestry and fishing	1.5	2.5	1.4	2.2
Mining and quarrying	1.4	2.1	2.6	5.7
Manufacturing	2.0	3.8	1.9	3.7
Electricity, gas, steam and air conditioning supply	1.3	1.9	2.2	4.6
Water supply; sewerage, waste management and remediation activities	2.0	3.6	2.4	4.8
Construction	1.7	3.6	1.4	2.7
Wholesale and retail trade; repair of motor vehicles and motorcycles	1.4	2.8	1.3	2.4
Transportation and storage	1.9	3.6	1.9	3.5
Accommodation and food service activities	1.9	4.0	1.3	2.2
Information and communication	1.7	3.3	1.9	4.1
Financial and insurance activities	1.4	2.5	1.5	3.4
Real estate activities	1.6	2.4	4.2	8.6
Professional, scientific and technical activities	1.6	3.3	1.6	3.4
Administrative and support service activities	1.5	3.0	1.4	2.5
Public administration and defence; compulsory social security	1.5	3.2	1.3	2.3
Education	1.3	3.0	1.1	1.9
Human health and social work activities	1.2	2.8	1.1	2.0
Arts, entertainment and recreation	1.7	3.4	1.4	2.3
Other service activities	1.3	2.9	1.2	2.3

Source: Sweden Statistics, Swedish Input-Output Tables 2010 and PwC analysis

Estimating the direct, indirect and induced contribution

In the final step, we then combine these current of GVA, employment, employee income and turnover with the respective multipliers, estimated as described above, to obtain the current indirect and induced contributions.

Similarly, we then combine ACS's vision of employment in 2030 along with the projected GVA, employee income and turnover with the multipliers, as above, to obtain the projected indirect and induced contributions.