

iGA ISTANBUL AIRPORT
**ECONOMIC
IMPACT ANALYSIS**

2024



ABOUT US

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CONTENT

EXECUTIVE SUMMARY

- 05 What is the Economic Impact?
- 05 Categories of Economic Impact
 - 05 Direct Economic Impact
 - 05 Indirect Economic Impact
 - 05 Induced Economic Impact
- 06 Accelerator Effect in Economic Impact
- 06 iGA Istanbul Airport Economic Impact Analysis:
Trend Analysis

1

ECONOMIC IMPACT ANALYSIS OF İGA ISTANBUL AIRPORT

- 07 A- Methodology
 - 07 1) Base Year Analysis
 - 09 2) Projection
- 10 B- Economic Impact
 - 10 1) Economic Impacts of Air Transportation
 - 10 i) Direct Economic Impact
 - 10 Employment
 - 10 Income
 - 11 Added Value
 - 12 ii) Indirect Economic Impact
 - 12 iii) Induced Economic Impact
 - 13 iv) Taxes
 - 14 2) Economic impact of fixed capital investments
 - 14 i) Direct Impact
 - 14 ii) Indirect Impact
 - 15 iii) Induced Impact

2

İGA ISTANBUL AIRPORT ECONOMIC IMPACT: TREND ANALYSIS

- 16 A- Economic impact through investments
 - 16 i) Direct Impact
- 18 B- Airline transportation – Operational Economic Impact
 - 18 1) Airports Council International Scenario
 - 19 i) Direct Economic Impact
 - 20 ii) Indirect Economic Impact
 - 20 iii) ACI Scenario: Total Impact
 - 20 2) İGA Senario
 - 21 i) Direct Economic Impact
 - 23 ii) Indirect Economic Impact
 - 24 iii) Induced Economic Impact
 - 24 iv) iGA Istanbul Airport Scenario: Total Impact
 - 24 3) Total Results
- 26

EXECUTIVE SUMMARY

iGA Istanbul Airport plays a unique role in Türkiye's international connections. Since its opening, the airport has been noted for its remarkable growth despite the pandemic's negative impact on air transportation, achieving its goal of transforming Istanbul into a global air transport hub. Indeed, by the end of 2022, our country ranked eighth in the world and fourth in Europe in terms of the number of passengers transported on domestic and international flights. According to the 2022 report by the Airports Council International (ACI), iGA Istanbul Airport, which is Türkiye's largest and has the highest passenger volume, has been declared the seventh busiest airport in the world and the busiest airport in Europe with 64.4 million passengers. By 2023, iGA Istanbul Airport had served 76 million passengers. Of these, 58 million were international passengers, while 18 million were domestic passengers. This report includes an economic impact analysis that highlights iGA Istanbul Airport's current and future contributions to Türkiye's national economy. The economic impact analysis is based on the total of direct, indirect and induced economic effects associated with the operation of iGA Istanbul Airport, and includes two separate references: a scenario prepared by the Airports Council International (ACI), and growth projections from the airport operator, iGA.

WHAT IS ECONOMIC IMPACT?

Economic impact measures the effect of employment, income, and similar economic activities related to a sector on the overall economy. In this study, economic impact will be addressed in terms of the contributions of airport-related activities to the national economy. While economic impact measures the effects of final products/services, it also takes into account the activities of all stakeholders contributing to the value chain. Therefore, this study related to the airport will examine not only the economic value added by airlines but also related economic activities such as the supply chain, airport operating personnel, ground services, air traffic control, and retail activities within the terminal.

Employment, income and value added are commonly used variables when calculating economic impact.

CATEGORIES OF ECONOMIC IMPACT

There are four distinct types or categories of economic impact related to airports, as described in the following sections.

DIRECT ECONOMIC IMPACT

Direct economic impact includes employment, income, and value added associated with the operation and management of airport activities, including businesses located at or near the airport. These include the activities of the airport operator, airlines, air traffic controllers, general aviation, ground staff, airport security, immigration and customs authorities, aircraft maintenance companies and other businesses at the airport, such as duty-free shops and retail outlets.

INDIRECT ECONOMIC IMPACT

Indirect economic impact includes employment, income and value added associated with the production of goods and services required to support a passenger flight. Examples of this range of products and services include wholesalers providing food and beverages for in-flight catering, oil refining activities for jet fuel, companies providing accounting and legal services to airlines, travel agencies that book flights, car rental companies serving arriving passengers, and restaurant and retail businesses.

INDUCED ECONOMIC IMPACT

The concept of induced economic impact reflects the economic activity generated by the spending of employees of companies associated with the airport within the national economy. For example, an airline employee creates or contributes to the income of the household to which that individual belongs. Therefore, the income earned by airline employees is also included in the household expenses. Household incomes stimulate consumption in various sectors of the economy and generate employment.

ACCELERATOR ECONOMIC IMPACTS

Indirect, direct, and induced impacts are used to measure the economic activities directly and indirectly related to the airport. However, airport investments also have broader effects on the overall economy. For example, such investments can facilitate foreign trade or lead to increased direct foreign investment in a country or region. These facilitating effects are referred to as accelerator effects. Indeed, air transportation facilitates employment and economic development in the national economy through a variety of mechanisms.

iGA ISTANBUL AIRPORT ECONOMIC IMPACT ANALYSIS: TREND ANALYSIS

First, an economic impact analysis of the current situation has been conducted. According to this analysis, by the end of 2023, the contribution of economic activities directly and indirectly related to air transportation at iGA Istanbul Airport has been calculated to be 24.2 billion dollars. This economic value corresponds to 2.2% of the national income. These calculations also include the effects of public taxes and fixed capital investments.

ECONOMIC IMPACT ANALYSIS FOR 2023

| | Employment | Household Income (\$) | Taxes (\$) | National Income (\$) | GDP (\$) |
|----------|------------|-----------------------|---------------|----------------------|----------|
| Direct | 60,217 | 876,502,469 | 648,760,995 | 12,872,965,566 | 1.17% |
| Indirect | 134,056 | 3,134,938,021 | 498,455,145 | 7,949,226,426 | 0.72% |
| Induced | 135,912 | 1,005,343,616 | 159,849,635 | 3,402,908,769 | 0.31% |
| Total | 330,185 | 5,016,784,106 | 1,307,065,775 | 24,225,100,761 | 2.20% |

In the next phase of the study, an economic impact analysis for the years 2024-2030 was prepared. For this, two different scenarios have been prepared. In this regard, in addition to airline traffic data from the Airports Council International (ACI), actual data for 2022 and 2023 provided by the airport operator iGA and projections for 2030 were used¹.

SCENARIO RESULTS FOR 2030

| | Employment | Household Income (\$) | National Income (\$) | GDP Share |
|-----|------------|-----------------------|----------------------|-----------|
| iGA | 491,377 | 9,024,245,725 | 46,647,286,345 | 3.45% |
| ACI | 472,586 | 8,579,481,121 | 44,001,101,155 | 3.25% |

By the end of this period, that is, in 2030,

- In the Airports Council International (ACI) scenario, employment generated from activities related to iGA Istanbul Airport reaches 472,000, the created value added corresponds to approximately 44 billion dollars, corresponding to 3.25% of the national income, and the additional household income generated by this ecosystem reaches 8.5 billion dollars.

¹ Eurocontrol (2023)

- In the iGA scenario, employment generated from airport-related activities reaches 491,000, the created value added amounts to approximately 46.6 billion dollars, corresponding to 3.45% of the national income, and the additional household income generated by this ecosystem reaches 9 billion dollars.

IV. ECONOMIC IMPACT ANALYSIS OF iGA ISTANBUL AIRPORT

This section will calculate the impacts of iGA Istanbul Airport and the economic activities associated with this critical infrastructure on the Turkish economy. The first part of the study focuses on the years 2022 and 2023. The second part provides a projection up to 2030 based on the estimates from the Airports Council International (ACI) and the operator of Istanbul Airport (iGA).

A - METHODOLOGY

The methodological approach to estimate the total economic impact is as follows. The study will be conducted over two different time periods. First, an economic impact will be calculated for 2022 and 2023 based on historical data. The reason for conducting the calculations for the year 2022 as the base year, is that detailed sectoral data from the Turkish Statistical Institute (TÜİK) necessary for calculating indirect economic effects is available for that year. In the second phase, forecasts will be made for the projection period up to 2030 based on this dataset and different scenarios. In this context, the approach based on the underlying economic impact categories is as follows.

1) BASE YEAR ANALYSIS

i) Direct Impact Analysis

The direct impact analysis begins with employment data, which is used in calculations to assess the employment generated by activities directly related to airport operations. The number of direct employment and its distribution at iGA Istanbul Airport for the years 2022 and 2023 are known. To determine direct household income, the distribution of employment by sectors is examined, and the actual average annual income for those sectors is available. For national income, labor productivity figures calculated annually for the relevant sectors are used. Taxes are calculated separately. Firstly, there are consumption taxes arising from the conversion of household income into consumption. To determine the total tax generated by economic activity, the amount paid by the business to the public as a concession fee, as well as any additional payments due if the annual guaranteed passenger numbers specified in the licensing agreement are exceeded, are calculated.

ii) Indirect Impact Analysis

The analysis of indirect economic impact is based on calculating employment, income, and value added generated by sectors that support activities at the airport. For this analysis, the latest input-output tables for the Turkish economy published by the Turkish Statistical Institute (TÜİK) in 2012, are used.

These tables provide the economic inputs used by the air transportation sector. Accordingly, the share of external inputs in the production value of the air transportation sector is estimated to be 75%. Since the production value of air transportation for the year 2022 is known, the total economic inputs used from other sectors can also be calculated. In the second phase, calculations are made for the demand generated by total air transportation demand in other sectors, along with the related employment and income. To do this, the share of air transportation in total demand for these sectors is calculated, and then this ratio is used to determine the total employment and generated household income in those sectors.

iii) Induced Economic Impact Analysis

This category includes economic activities resulting from the additional consumption in the national economy generated by household income created in business activities directly related to the airport. To calculate this additional economic value, econometric studies conducted for Türkiye found in the academic literature are used. To do this, the marginal propensity to consume or the multiplier specific to Türkiye, which indicates how much additional income each household spends, needs to be estimated. Econometric studies on the Turkish economy indicate that this propensity is quite high, or in other words, the marginal propensity to save is relatively low. According to a recent academic study published by the Central Bank of the Republic of Türkiye, this ratio was found to be 0.73. In other words, households convert 73 percent of their additional income into spending. If the marginal propensity to consume is 0.73, this results in a multiplier effect calculated as $1/(1-0.73)$, which corresponds to 3.7.

In calculating the induced economic impact, the household income created each year in the direct impact category is multiplied by the marginal propensity to consume ratio to estimate its contribution to the national income. Labor productivity measurements are then used to determine the employment corresponding to this level of national income, while the average income ratio in the economy is used as a reference for estimating household income.

As a result of completing all the calculations described above, the total economic impact for the base year is determined.

2) PROJECTION

In the second phase of the study, the analysis of direct, indirect, and induced impacts is repeated for the period extending to 2030 based on different scenarios. This part of the study looking at the future also includes some critical assumptions. Accordingly, it is assumed that the Turkish economy will grow by 3% annually in US dollar terms during the 2024-2030 period, and that labor productivity will increase by 2% during the same period.

It is assumed that the household marginal propensity to consume will remain constant, as will the relationship between airport activities and employment used for the base year calculations.

i) Direct Impact Analysis

Direct employment is being increased in line with the rise in passenger traffic at the airport. For the income calculation, the employment structure related to the activities at the airport is taken into account and the calculations are re-made for three different income categories. For value added calculations, the method explained in the previous section is used, assuming that labor productivity increases in parallel with the growth trend of the national economy.

ii) Indirect Impact Analysis

In this analysis extending to 2030, it is assumed that the inter-sectoral supply relationships in the Turkish economy will remain proportionally constant. In each scenario, indirect employment growth is calculated based on the traffic growth projections included in that scenario. The total income for each year is recalculated by increasing the average labor productivity of employment in the sector-related categories, based on the assumed Turkish average of 2% for the year 2023.

iii) Induced Impact Analysis

For each accounting year, additional consumption in the national economy is derived from the direct economic impact analysis by applying the marginal consumption multiplier to the household income generated at the beginning of the period. Subsequently, to determine the employment corresponding to this level of national income, a labor productivity estimate that increases in proportion to the assumed growth of the Turkish economy is used, while the average income ratio in the economy is taken as reference for estimating household income.

iv) Economic Impact through Investments

Under this category, the direct, indirect, and induced effects arising from planned construction activities in the airport sector related to relevant economic activities are calculated.

B - ECONOMIC IMPACT

1) ECONOMIC IMPACTS OF AIR TRANSPORTATIONⁱ⁾

Direct Economic Impact

The analysis will initially be conducted for the year 2022 to calibrate the methodology, and the economic impact of iGA Istanbul Airport will be calculated accordingly. 64.5 million passengers used iGA Istanbul Airport in 2022². Of these, 48.5 million were international passengers, while 16 million were domestic passengers. Additionally, 2.4 million tons of load (luggage, cargo, mail) were transported in 2022.

Employment

According to the data shared by the airport operator iGA for this study, the direct employment related to iGA Istanbul Airport in 2022 was 53,755 people³. Additionally, the distribution of employees is provided in the table below.

Table 1: Estimated Employment Distribution and Numbers Related to iGA Istanbul Airport Activities (2022)

| | % | Employment |
|----------------------|-------|------------|
| Airlines | April | 8,063 |
| Ground Services | 22 | 11,826 |
| Airport Operation | 23 | 12,364 |
| Retail | 6 | 3,225 |
| Security | 6 | 3,225 |
| Border Police | 5 | 2,688 |
| Ground Transfer | 5 | 2,688 |
| Food & Beverage | 8 | 4,300 |
| Maintenance & Repair | 6 | 3,225 |
| Other | 8 | 4,300 |
| Total | 100 | 53,755 |

In light of these assumptions, total income and value added will be calculated.

Income

To calculate the income flowing to households from the employment table given above, a threefold distinction will be made among employment groups. This is because airline employees (Group A), airport operating staff (Group B) and employees in other jobs (Group C) fall into different fixed income categories. The total number of employees in Group A is 7,850, which corresponds to 15% of the total workforce. The total number of employees in Group B is 24,014, which corresponds to 45% of the total workforce. The total number of employees in Group C is 21,711, which corresponds to 40% of the total workforce.

² DHMİ - General Directorate Of State Airports Authority data

³ This figure represents the number of people employed within the airport terminal. Considering that there are also employees working outside the terminal who are directly related to airport services, it should be noted that this figure represents a lower limit.

According to the 2022 statistical data from the Turkish Statistical Institute (TÜİK), the annual average net income of employees in the employment group with NACE Code 51, which includes air passenger and cargo transportation services, was TRY 625,642 or USD 37,758⁴. The average annual net income for employees in employment group B (NACE Code 52, which includes airport operations personnel) is TRY 153,992 or USD 9,293. The income of employees in employment group C will be taken as TRY 104,503 or USD 6,307, which is the average wage for employees in the national economy for 2022. Accordingly, as a result of the calculations for the three groups, the total household income of the 56,043 individuals employed in airport services reached TRY 11 billion or USD 664 million for 2022.

This calculation will need to be repeated for 2023. According to the data shared by the airport operator iGA for this study, the direct employment related to iGA Istanbul Airport in 2023 is reported to be 60,217 people.

On the other hand, official data on personnel costs by sector for 2023 has not yet been published. This figure needs to be carried over to 2023⁵. Accordingly, the total wage income figure for 2023 is calculated to reach 876 million USD by using the employment growth rate and the assumed increase in salary income.

Added Value

Labor productivity indicators will be used to determine the value added generated by economic activities related to airport services. According to TÜİK's 2022 data, 25.9 million employees, excluding agriculture, contributed to the creation of a GDP valued at TRY 12.4 trillion. Accordingly, the average non-agricultural labor productivity is calculated to be TRY 481,000 or USD 29,000. The labor productivity of salaried employees in Group A and Group B will need to be calculated separately⁶.

The labor productivity of salaried employees in Group A and Group B will need to be calculated separately. Based on the labor productivity of \$450,392 for Group A employees and \$131,930 for Group B employees, the total contribution to the national income from Group A, B, and C salaried employees directly connected to iGA Istanbul Airport is calculated to be \$3.6 billion, \$3.2 billion and \$624 million, respectively, amounting to a total of \$7.45 billion. This figure is estimated to reach \$8.5 billion by 2023⁷.

According to TÜİK's 2023 data, 26 million employees, excluding agriculture, contributed to the creation of a GDP worth TRY 26.5 trillion. Accordingly, the average non-agricultural labor productivity is calculated as TRY 1,020,989 or USD 42,541. The labor productivity of salaried employees in Group A and Group B will need to be calculated separately. Based on labor productivity of \$660,000 for Group A wage earners and \$193,000 for Group B wage earners, iGA Istanbul Airport

⁴ In fact, as of 2022, TÜİK has stopped publishing personnel cost figures for NACE codes 50 and 51. Therefore, this figure had to be estimated. TÜİK has shared the total personnel cost for the "Transportation and Storage" activities as well as the sub-activity codes 49, 52 and 53. As a result, the difference between the total for the sector and the sum of the NACE codes 49, 52 and 53 provides the personnel costs for NACE codes 50 and 51. The total number of salaried employees in these sectors is known. It can also be seen from the 2021 data that the personnel cost per employee in the NACE code 50 (maritime transport) sector is 0.516 times the personnel cost per employee in the sectors under NACE code 51. This data set allows us to estimate the gross personnel cost for NACE Code 51. The gross amount includes a surcharge of 18% for social security contributions, so the net salaries are calculated as gross personnel cost divided by 1.18.

⁵ According to TÜİK data, the annual average household disposable income increased by 70.7% in nominal Turkish Lira in 2023. This figure will be used as the basis for the 2023 household income projection. The average dollar exchange rate difference for 2022-2023 is taken as 45%.

⁶ The methodology is as follows. According to the 2022 TÜİK data, the total contribution of transportation and storage services to the national income is reported as USD 90 billion. Under this general category, the shares of NACE 50 and NACE 51 sectors are reported as 21% and 36%, respectively. Therefore, the total value added created by these sectors can be calculated as \$19.5 billion and \$32.3 billion. When these figures are divided by total employment in these sectors, labor productivity for these categories is obtained.

⁷ The estimate takes into account a 3% annual increase in labor productivity, as well as a rise in direct employment due to increased air traffic.

The total contribution of Group A, B and C employees, who are directly associated with Istanbul Airport (iGA), to the national income is calculated as \$5.9 billion, \$5.2 billion and \$1.02 billion, respectively, amounting to a total of \$12.2 billion.

In summary, the direct economic impact of iGA Istanbul Airport in 2023 is shown in the table below:

Table 2: Estimated employment, income, and value added from activities related to iGA Istanbul Airport (2023)

| | Employment | Household Income (\$) | National Income (\$) | GDP % |
|--------|------------|-----------------------|----------------------|-------|
| Direct | 60,217 | 876,502,469 | 12,224,204,571 | 1.11% |

ii) Indirect Economic Impact

The analysis of indirect economic impact is based on calculating employment, income, and value added generated by sectors that support activities at the airport. For the purposes of this analysis, the input-output tables of the Turkish economy, last published by TÜİK in 2012, will be used. These tables provide the economic inputs used by the air transportation sector. Accordingly, the share of external inputs in the production value of the air transportation sector is calculated to be 75% .

Therefore, assuming that the overall production structure remains the same, it can be estimated that the air transport services used an economic input of TRY 313 billion or USD 18.9 billion from other sectors for a known production value of TRY 416 billion or USD 25 billion at current prices in 2022.

As a result of the calculations, it is seen that this production value generated in other sectors created employment for 325,000 people and a revenue contribution of TRY 107 billion or USD 12 billion⁸. To calculate the value added generated by this employment, the value added per person employed in the sectors supplying inputs to air transportation has been calculated in the first stage. The total value added or contribution to national income has been found by multiplying the number of jobs created by the demand for air transportation in other sectors, by the value added per employee in those sectors. In this context, the total GDP contribution through the indirect impact of the air transportation sector is TRY 254 billion or USD 15.3 billion. The methodology, calculations, and results are provided in Appendix 1. Considering that iGA Istanbul Airport’s share in air transportation is 35%, it is possible to provide the following results for the indirect economic impact analysis⁹.

Table 3: Indirect Economic Impact - Employment, income, and value added estimates from sectors supporting iGA Istanbul Airport activities (2022)

| | Employment | Household Income (\$) | National Income (\$) | GDP % |
|------|------------|-----------------------|----------------------|-------|
| 2022 | 113,766 | 2,257,407,829 | 5,006,227,482 | 0.55% |

⁸ These calculations use the Input-Output Tables related to the Turkish economy. These multi-step calculations include, respectively, the employment and household income generated by the airline industry in the sectors that provide inputs to this industry. To do this, the share of airline transportation in the total demand for these sectors is calculated and then, based on this ratio, the share of total employment and generated household income in those sectors is determined.

⁹ On the other hand, considering that the production value share of Istanbul International Airport is also above the national economic ecosystem, it should be noted that this value represents a lower limit.

To reflect these figures for 2023, taking into account the macroeconomic developments between 2022 and 2023 and the appreciation of the Turkish Lira, there is an observed increase of 18% in household income and average labor productivity based on US dollars. In this context, the following figures emerge for the 2023 calculations¹⁰.

Table 4: Indirect Economic Impact - Employment, income, and value added estimates from sectors supporting iGA Istanbul Airport activities (2023)

| | Employment | Household Income (\$) | National Income (\$) | GDP % |
|------|------------|-----------------------|----------------------|-------|
| 2023 | 134,056 | 3,134,938,021 | 7,450,771,281 | 0.68% |

iii) Induced Economic Impact

This category includes the economic activities arising from the additional consumption in the national economy resulting from the household income generated in business activities directly related to airport-related operations. The direct impact analysis shows that these activities generated a household income of \$664 million 2022. To calculate the induced economic impact, it is necessary to determine the additional employment, income, and value added generated from the consumption of this income.

This calculation will be based on the marginal propensity to consume. The marginal propensity to consume shows how much of each household's additional income is spent. Econometric studies on the Turkish economy indicate that this propensity is quite high, or in other words, the marginal propensity to save is relatively low. According to a recent academic study published by the Central Bank of the Republic of Türkiye, this ratio was found to be 0.73¹¹. In other words, households convert 73 percent of their additional income into expenditure. If the marginal propensity to consume is 0.73, this results in a multiplier effect calculated as $1/(1-0.73)$, which corresponds to 3.7. Therefore, an additional household income of \$664 million would trigger a consumption amount of approximately \$2.45 billion. To calculate the additional employment generated by this consumption, it is necessary to estimate its share within total consumption.

In calculating the induced economic impact, the household income created each year in the direct impact category is multiplied by the marginal propensity to consume ratio to estimate its contribution to the national income. Labor productivity measurements are then used to determine the employment corresponding to this level of national income, while the average income ratio in the economy is used as a reference for estimating household income.

Table 5: Induced Economic Impact - Estimated economic activities resulting from the consumption of individuals employed in businesses directly or indirectly related to activities at iGA Istanbul Airport in the national economy (2022)

| | Employment | Household Income (\$) | National Income (\$) | GDP % |
|------|------------|-----------------------|----------------------|-------|
| 2022 | 133,247 | 836,314,381 | 2,323,486,772 | 0.26% |

¹⁰The projection takes into account the increase in indirect employment, household wages, and value added, as well as changes in air traffic.

¹¹Yigit, M. (2020). "The Course of Marginal Propensity to Consume within the Framework of Absolute Income Hypothesis; 2006Q1 - 2019Q4 Türkiye Example". Journal of Economic and Administrative Approaches, 2 (1), p. 1-16. is divided. Since public consumption expenditure includes payments to employees, subsidies, and various other items, public intermediate consumption has been used.

When these figures are projected to 2023, the following table emerges¹²

Table 6: Induced Economic Impact - Estimation of economic activities resulting from the consumption of individuals employed in businesses directly or indirectly related to activities at Istanbul Airport in the national economy (2022)

| | Employment | Household Income (\$) | National Income (\$) | GDP % |
|------|------------|-----------------------|----------------------|-------|
| 2023 | 135,912 | 1,005,343,616 | 3,243,059,134 | 0.29% |

iv) Taxes

In calculating the economic impacts, it is also necessary to model the tax revenues directly and indirectly associated with the airport operations. Because tax revenues are also a component of national income. It is possible to talk about 3 different tax items related to airport operations. The first is the “concession fee” that the airport operator pays to the treasury in accordance with the licensing agreement made with the public. The second item is the amount that the operating company must pay to the public if the international passenger traffic exceeds the annual passenger guarantee specified in the operating contract. The third item consists of indirect taxes, including VAT, collected by the government due to the transformation of household income generated from economic activities related to the airport into consumption. According to 2022 data, the effective consumption tax rate was found to be 15.9%¹³. For 2023, the amounts of these three different tax items were \$468 million, \$41 million and \$140 million, respectively. On the other hand, the airport operator also generates tax revenue through indirect and induced effects stemming from household consumption. In this regard, the distribution of tax revenues for the year 2023 is as follows.

Table 7: Induced Economic Impact - Estimation of economic activities resulting from the consumption of individuals employed in businesses directly or indirectly related to activities at Istanbul Airport in the national economy (2023)

| | Taxes (\$) |
|----------|---------------|
| Direct | 648,760,995 |
| Indirect | 498,455,145 |
| Induced | 159,849,635 |
| Total | 1,307,065,775 |

2) ECONOMIC IMPACT OF FIXED CAPITAL INVESTMENTS

i) Direct Impact

The fixed capital investment projected by the airport operator iGA for the 2022-2023 period is reported to be EUR 10 million and EUR 63.6 million, respectively. This investment will create employment, income, and added value in the construction sector. In this regard, it is essential to estimate the share of iGA’s investment in the total economic activity of the construction sector. According to TÜİK’s data, the sector’s revenue in 2022 was TRY 1.817 trillion.

¹²The projection assumes a 2% annual labor force growth in the national economy and a 3% increase in wage income, in line with long-term GDP growth forecasts.
¹³To calculate the effective consumption tax, the total consumption taxes including VAT within budget revenues were divided by the sum of household consumption and public intermediate consumption. Since public consumption expenditure includes payments to employees, subsidies, and various other items, public intermediate consumption has been used.

The projected iGA investment corresponds to 0.0096% of the sector's revenue in terms of Turkish Lira. According to iGA Istanbul Airport data, the construction sector employed 1,524,377 paid workers in 2022. In this case, the annual employment estimate resulting from the expenditures of the iGA Istanbul Airport investment program is 152 people¹⁴. Assuming that employees earn household income at the Turkish average level and create added value, the annual household income and GDP contribution can be determined. The economic impact for the fixed capital investment of EUR 63.6 million for 2023 is recalculated in a similar manner, assuming that total employment and employment in the construction sector will increase by 2% annually.

Table 8: Direct economic impact from investments

| | Employment | Household Income (\$) | National Income (\$) |
|------|------------|-----------------------|----------------------|
| 2022 | 152 | 1,123,324 | 6,460,400 |
| 2023 | 985 | 7,432,975 | 42,748,107 |

ii) Indirect Impact

To calculate the indirect effect, it is first necessary to determine the employment generated in other sectors by the investment expenditures at the airport. For this purpose, TÜİK Input-Output tables for the Turkish economy will be used. Accordingly, it is observed that the total demand generated from the construction sector created employment for 870,000 people in other supplier sectors. When compared to the share of iGA investments in the sector's revenue, the indirect employment is calculated to be 83 people. By assuming that employees earn household income at the Turkish average level and create added value, the annual household income and GDP contribution can be found. For the fixed capital investment of EUR 63.6 million in 2023, the total economic impact is recalculated in a similar manner, assuming that total employment and employment in the construction sector will increase by 2% annually.

Table 9: Indirect economic impact from investments

| | Employment | Household Income (\$) | National Income (\$) |
|------|------------|-----------------------|----------------------|
| 2022 | 83 | 616,214 | 3,543,937 |
| 2023 | 540 | 4,077,455 | 23,450,031 |

iii) Induced Impact

In 2022, the induced employment generated by the investment expenditures of iGA Istanbul Airport, using the labor productivity ratio, is found to be 362 people. It is assumed that the employed population receives wage income at the average level in Türkiye. Additionally, from the household income of approximately USD 1 million generated under direct impact calculations, using the marginal consumption multiplier of 3.7, a total value added of USD 3.5 million dollars is observed. For the fixed capital investment of EUR 63.6 million in 2023, the total economic impact is recalculated in a similar manner, assuming that total employment and employment in the construction sector will increase by 2% annually.

¹⁴Since the amount of investment remains constant for each year, the estimated employment also remains constant.

Table 10: Induced economic impact from investments

| | Employment | Household Income (\$) | National Income (\$) |
|------|------------|-----------------------|----------------------|
| 2022 | 362 | 2,269,947 | 4,156,301 |
| 2023 | 1,570 | 11,611,604 | 27,502,009 |

As a result of the calculations made under these three economic impact categories, it can be seen that the total economic impact arising from fixed capital investments at iGA Istanbul Airport for the 2022-2023 period is as follows.

Table 11: Fixed capital investments - economic impact (2022-2023)

| | Employment | Household Income (\$) | National Income (\$) |
|------|------------|-----------------------|----------------------|
| 2022 | 597 | 4,009,486 | 14,160,638 |
| 2023 | 3,095 | 23,122,034 | 93,700,147 |

Based on this methodology and calculations, the total of direct, indirect, and induced economic impacts of iGA Istanbul Airport related to air transportation can be summarized as follows.

Table 12: Total Economic Impact of Istanbul Airport (2023)

| | Employment | Household Income (\$) | Taxes (\$) | National Income | GDP % |
|----------|------------|-----------------------|---------------|-----------------|-------|
| Direct | 60,217 | 876,502,469 | 648,760,995 | 12,872,965,566 | 1.17% |
| Indirect | 134,056 | 3,134,938,021 | 498,455,145 | 7,949,226,426 | 0.72% |
| Induced | 135,912 | 1,005,343,616 | 159,849,635 | 3,402,908,769 | 0.31% |
| Total | 330,185 | 5,016,784,106 | 1,307,065,775 | 24,225,100,761 | 2.20% |

As seen, as of 2023, the total of the direct, indirect, and induced economic impacts of iGA Istanbul Airport reaches 24 billion dollars, which corresponds to 2.20% of the national income. This analysis focuses on the economic impact arising from activities directly or indirectly related to iGA Istanbul Airport. It should not be forgotten that an airport’s connectivity also serves as a facilitating asset for a number of other economic activities. Such a network of connections serves as a facilitator for a number of other activities in the economy as a whole.

These impacts, generally evaluated under the induced impacts category, were not included in our calculations for methodological reasons. Therefore, it should be noted that the listed economic impact table actually represents a lower bound in estimating the total economic impact. The same observation is valid for the economic impact analysis obtained for iGA Istanbul Airport, which is discussed in the next section.

V. iGA ISTANBUL AIRPORT ECONOMIC IMPACT: TREND ANALYSIS

The economic impact of iGA Istanbul Airport for the period 2024-2030 will be analyzed based on the methodology explained above. In the first section, the economic impact associated with investment expenditures in line with iGA's investment plans, independent of air traffic, will be discussed. In the second section, the economic impacts that vary operationally based on various air traffic scenarios are evaluated.

A - ECONOMIC IMPACT THROUGH INVESTMENTS

1) Direct Impact

The table shared by the management of iGA Istanbul Airport regarding the planned fixed capital investment for the 2024-2030 period is as follows.

Table 13: Istanbul Airport Projected Fixed Capital Investments 2024-2030

| Year | Investments (million USD) |
|------|---------------------------|
| 2024 | 665 |
| 2025 | 335 |
| 2026 | 370 |
| 2027 | 170 |
| 2028 | 74 |
| 2029 | 328 |
| 2030 | 335 |

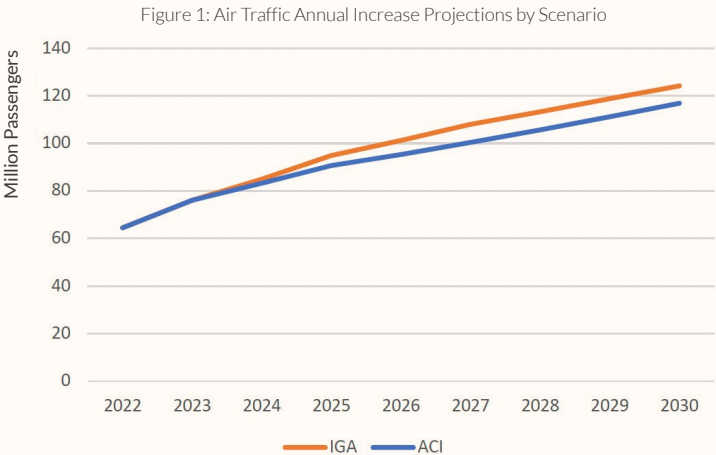
It will be assumed that this investment will create employment, income and added value in the construction sector. In the base year analysis, the following tables are obtained for the 2024-2030 period by applying the methodology used for the 2022-2023 period.

Table 14: Direct economic impact through investments

| | Employment | Household Income (\$) | National Income (\$) |
|------|------------|-----------------------|----------------------|
| 2024 | 29,403 | 150,966,059 | 238,082,414 |
| 2025 | 15,553 | 119,694,772 | 499 521,899 |
| 2026 | 17,189 | 134,926,249 | 573,948,764 |
| 2027 | 7,907 | 63,307,927 | 274,386,125 |
| 2028 | 3,420 | 27,933,995 | 123,309,038 |
| 2029 | 15,276 | 127,249,144 | 571,880,702 |
| 2030 | 15,651 | 132,981,327 | 608,221,138 |

B - AIR TRANSPORTATION - OPERATIONAL ECONOMIC IMPACT

To make these calculations, it is necessary to make some assumptions about the growth trends in air transportation as well as the growth expectations for the Turkish economy. For this purpose, a scenario based on forecasts provided by the airport operator, as well as data from the Airports Council International (ACI) - “World Airport Traffic,” data will be used as a reference. The average annual air traffic increase calculated by ACI for the 2024-2030 period is forecasted as 7.5%. The average annual air traffic increase calculated for iGA Istanbul Airport calculated by iGA for the 2024-2030 period is forecasted as 7%.



On the other hand, when looking at the air transportation data of the last 10 years, it can be seen that the air traffic of Istanbul Airport has increased in line with the Turkish average. The total number of passengers at iGA Istanbul Airport between 2022-2023 has increased by 17.7%, from 182 million to 214 million; while total passenger traffic has increased by 18%, from 64.5 million to 76 million.

On the other hand, in order to conduct an economic analysis extending to the year 2030, an assumption will need to be made about the medium and long-term growth trend of the Turkish economy. In this study, the medium and long-term potential growth of the Turkish economy has been assumed to be 3% in terms of USD¹⁵.

1) AIRPORTS COUNCIL INTERNATIONAL (ACI) SCENARIO

Another sectoral non-governmental organization that closely monitors international airline traffic, shares statistical data, and makes detailed regional and country-based forecasts for future air traffic, is the Airports Council International (ACI). ACI brings together airport operators. Within the scope of this topic, a scenario analysis has been conducted based on data received from ACI. Accordingly, it is assumed that aircraft traffic at the airport will increase by an average of 7.5% per year.

¹⁵ The government’s expectation reflected in the Medium-Term Program for the 2023-2025 period is a growth rate of 4.5%.

The average annual growth rate for freight transport is expected to be 4%. Under these conditions, the traffic expectations for iGA Istanbul Airport can be formulated as follows.

Table 15: ACI Scenario - Air Traffic Forecasts

| | Passenger | Freight (Thousand Tons) | International Flight | Domestic Flight | International Passenger | Domestic Passenger |
|------|-------------|-------------------------|----------------------|-----------------|-------------------------|--------------------|
| 2024 | 86,285,820 | 3,142 | 449,975 | 207,993 | 69,311,886 | 16,973,933 |
| 2025 | 94,624,592 | 3,265 | 488,575 | 225,836 | 76,010,276 | 18,614,316 |
| 2026 | 102,963,364 | 3,392 | 526,367 | 243,305 | 82,708,665 | 20,254,699 |
| 2027 | 108,317,459 | 3,525 | 548,255 | 253,422 | 87,009,516 | 21,307,943 |
| 2028 | 113,949,967 | 3,662 | 571,054 | 263,961 | 91,534,011 | 22,415,956 |
| 2029 | 119,875,365 | 3,805 | 594,801 | 274,937 | 96,293,779 | 23,581,586 |
| 2030 | 126,108,884 | 3,953 | 619,535 | 286,370 | 101,301,056 | 24,807,828 |

According to this scenario, the threshold of 85 million passengers will be reached in 2024. The threshold of 120 million passengers is expected to be reached in 2030. By 2030, total passenger traffic in this scenario is estimated to reach 126 million. In line with this, approximately 905,000 flights are expected to depart from iGA Istanbul Airport. This level corresponds to 2,516 flights per day, 104.9 flights per hour and 1.75 flights per minute.

i) Direct Economic Impact

In this scenario, the methodology used in previous sections for iGA Istanbul Airport will be applied using the traffic expectation dataset provided by ACI.

When these calculations are made, it is possible to summarize the direct economic impact as follows. By the end of this period, the value added generated by the cluster of activities that can be gathered under the iGA Istanbul Airport ecosystem will reach \$23.2 billion or 1.72% of the national income. Total direct employment is expected to rise to over 94,000 people, while direct household incomes are estimated to reach \$1.58 billion.

Table 16: ACI Scenario Direct Economic Impact Analysis

| | Employment | Household Income (\$) | Taxes (\$) | National Income (\$) | GDP% |
|------|------------|-----------------------|---------------|----------------------|-------|
| 2024 | 67,556 | 1,002,997,523 | 1,024,869,342 | 15,013,246,269 | 1.33% |
| 2025 | 73,508 | 1,113,195,262 | 1,169,612,429 | 16,694,870,028 | 1.43% |
| 2026 | 77,330 | 1,194,497,734 | 1,119,396,794 | 17,778,545,142 | 1.48% |
| 2027 | 81,351 | 1,281,738,220 | 1,132,543,726 | 19,008,397,775 | 1.54% |
| 2028 | 85,581 | 1,375,350,415 | 1,151,613,713 | 20,333,036,956 | 1.59% |
| 2029 | 90,031 | 1,475,799,688 | 1,170,060,443 | 21,752,406,681 | 1.66% |
| 2030 | 94,712 | 1,583,585,398 | 1,198,560,840 | 23,284,148,217 | 1.72% |

ii) Indirect Economic Impact

When applying the methodology used in previous sections to calculate the indirect economic impact, it is estimated that by the end of the period, air transport activities centered around iGA Istanbul Airport will use inputs of \$14 billion from other sectors of the national economy. This level of intermediate goods and services consumption creates employment for 206,000 people in other sectors and will generate household income of \$5.5 billion.

Table 17: ACI Scenario Indirect Economic Impact

| | Employment | Household Income (\$) | Taxes (\$) | National Income (\$) | GDP% |
|------|------------|-----------------------|-------------|----------------------|-------|
| 2024 | 147,008 | 3,506,587,202 | 557,547,365 | 8,891,612,996 | 0.78% |
| 2025 | 159,961 | 3,891,850,347 | 618,804,205 | 9,868,520,341 | 0.85% |
| 2026 | 168,278 | 4,176,092,530 | 663,998,712 | 10,589,269,987 | 0.88% |
| 2027 | 177,027 | 4,481,094,651 | 712,494,050 | 11,362,660,372 | 1.92% |
| 2028 | 186,232 | 4,808,372,951 | 764,531,299 | 12,192,536,209 | 0.96% |
| 2029 | 195,915 | 5,159,554,412 | 820,369,152 | 13,083,023,016 | 1.00% |
| 2030 | 206,102 | 5,536,384,846 | 880,285,190 | 14,038,547,629 | 1.04% |

iii) Induced Economic Impact

This category includes the economic activities resulting from the additional consumption in the national economy generated by household income obtained from business activities directly linked to airport-related activities. At the end of this period, a total economic value of \$6 billion, corresponding to 0.45% of GDP, will be reached. The household income associated with the induced economic impact is estimated to be 1.3 billion dollars for 2030, with employment projected at 156,000.

Table 18: ACI Scenario Induced Economic Impact

| | Employment | Household Income (\$) | Taxes (\$) | National Income (\$) | GDP% |
|------|------------|-----------------------|-------------|----------------------|-------|
| 2024 | 138,631 | 1,045,959,498 | 166,307,560 | 3,877,398,397 | 0.34% |
| 2025 | 141,403 | 1,088,216,262 | 173,026,386 | 4,291,848,856 | 0.37% |
| 2026 | 144,231 | 1,132,180,199 | 180,016,652 | 4,599,658,266 | 0.38% |
| 2027 | 147,116 | 1,177,920,279 | 187,289,324 | 4,929,720,737 | 0.40% |
| 2028 | 150,058 | 1,225,508,258 | 194,855,813 | 5,283,652,347 | 0.41% |
| 2029 | 153,059 | 1,275,018,792 | 202,727,988 | 5,663,186,833 | 0.43% |
| 2030 | 156,121 | 1,326,529,551 | 210,918,199 | 6,070,184,171 | 0.45% |

iv) ACI Scenario: Total Impact

When the economic impact analyses calculated in different categories are combined with various flows, including taxes and investments, the total economic impact of iGA Istanbul Airport in 2030 under this scenario can be summarized as follows. At the end of the period, employment generated from activities related to iGA Istanbul Airport will reach 472,000 individuals, the economic value created will amount to approximately \$44 billion, corresponding to 3.25% of the national income, and the additional household income generated by this ecosystem will reach \$8.5 billion. It will be observed that this data closely aligns with the forecasts of the iGA Istanbul Airport scenario summarized in the next section.

Table 19: ACI Scenario - Economic Impact 2030 (Total)

| | Employment | Household Income (\$) | Taxes (\$) | National Income (\$) | GDP % |
|------|------------|-----------------------|---------------|----------------------|-------|
| 2024 | 382,598 | 5,706,510,282 | 1,748,724,267 | 28,020,340,076 | 2.47% |
| 2025 | 390,425 | 6,212 956,643 | 1,961,443,019 | 31,354 761,124 | 2.69% |
| 2026 | 407,028 | 6,637,696,711 | 1,963,412,157 | 33,541,422,158 | 2.79% |
| 2027 | 413,401 | 7,004,061,077 | 2,032,327,100 | 35,575,165,011 | 2.87% |
| 2028 | 425,292 | 7,437,165,619 | 2,111,000,826 | 37,932,534,551 | 2.97% |
| 2029 | 454,281 | 8,037,622,035 | 2,193,157,583 | 41,070,497,232 | 3.13% |
| 2030 | 472,586 | 8,579,481,121 | 2,289,764,229 | 44,001,101,155 | 3.25% |

2) iGA SCENARIO

In addition to the scenario based on ACI forecasts, it is also beneficial to analyze the economic impacts of an additional scenario based on information and expectations specific to iGA Istanbul Airport. There are many reasons for this choice. First of all, there are dynamics in Türkiye that promote the growth of civil aviation beyond expectations, especially in the tourism sector. The analysis on this issue has already been included in the second part of this report which discusses the development of the sector. Furthermore, various structural features specific to iGA Istanbul Airport facilitate its positive differentiation. In this context, it is necessary to discuss, on the one hand, the competitive advantages of iGA Istanbul Airport’s global hub status and, on the other hand, the capacity limitations of major airports in Europe with which it competes.

Hub Effect in Airports

Hub airports play a central role in the civil aviation sector. These airports serve as intersections for flights to many different destinations and often serve as the main hub for one or more airlines. First of all, hub airports benefit significantly from economies of scale. Having a large operating volume allows fixed cost to be spread over more flights and passengers, reducing service costs per unit. Economies of scale also allow airlines to use larger aircraft, thereby achieving cost advantages and keeping ticket prices competitive.

On the other hand, hub airports significantly benefit from network effects. The wider the flight network of an airport, the more attractive it becomes for passengers. This feature is valid for both direct flights and destinations that passengers want to reach by transferring from one point to another. Network effects are a strategy used by airlines and airports to attract more passengers and increase market share. This leads to further growth of hub airports, similar to the positive feedback loop in competitive dynamics. They can also optimize multi-party market dynamics among hub airports, airlines, passengers, ground handling providers, and other suppliers. For example, a hub airport can offer airlines better slot allocations, passengers more flight options and service providers a larger customer base. This multi-sided market structure increases the competitive advantage of hub airports and strengthens their position in the industry.

Capacity Bottlenecks at European Airports

Another structural element that will ensure that the long-term performance of iGA Istanbul Airport exceeds expectations is a layout plan and strategy that will allow for capacity increase in Istanbul. This fact constitutes a significant competitive advantage for Istanbul, especially considering the capacity bottlenecks faced by airports in Europe. Indeed, as highlighted with examples below, capacity problems have arisen at many of Europe's leading airports in terms of traffic density. This situation leads to increased congestion at airports, particularly in major cities, and can result in occasional flight delays. Although many airports have embarked on expansion and modernization projects to solve capacity problems, these projects face various challenges.

London Heathrow is one of the busiest airports in Europe and has long struggled with capacity issues. Heathrow's plans to build a third runway have been met with huge controversy due to environmental concerns and opposition from local residents. Although construction of the third runway would significantly increase the airport's capacity, allowing it to host more international flights, environmental impact assessments, financing issues and legal battles have slowed the project's progress.

Frankfurt Airport is Germany's largest airport and one of Europe's busiest. The airport has started projects to build a new runway and a new terminal to increase capacity. However, this initiative has been criticized for its potential impacts on environmental protection areas and the quality of life of locals. Additionally, increasing construction costs and delays in project schedules have led to a reevaluation of plans.

Amsterdam Schiphol, is known for its high passenger traffic and number of flights. Schiphol's efforts to increase capacity include projects such as a new satellite terminal and the expansion of existing terminals. However, Schiphol also faces strict regulations regarding environmental restrictions and noise pollution. These factors complicate the airport's expansion plans and make it difficult for projects to progress.

Paris Charles de Gaulle Airport has made plans to build a new terminal to increase capacity. However, these projects have also faced various obstacles, including financing difficulties, environmental concerns, and uncertainties due to the pandemic. The COVID-19 pandemic, in particular, has increased uncertainties in air transport demand, forcing airport management to reassess their plans.

iGA Istanbul Airport Scenario

Within the scope of this topic, a scenario analysis was conducted in line with the data received from Istanbul Airport operator iGA. Accordingly, it is assumed that aircraft traffic at the airport will increase by an average of 7% per year. The average annual increase rate for freight transportation is expected to be 4%. Under these conditions, the traffic expectations for iGA Istanbul Airport can be formulated as follows.

Table 20: iGA Scenario - Air Traffic Forecasts

| | Passenger | Freight (Thousand Tons) | International Flight | Domestic Flight | International Passenger | Domestic Passenger |
|------|-------------|-------------------------|----------------------|-----------------|-------------------------|--------------------|
| 2024 | 84,935,743 | 3,190 | 400,831 | 147,356 | 68,968,354 | 15,967,389 |
| 2025 | 94,862,611 | 3,351 | 448,638 | 156,957 | 77,839,544 | 17,023,067 |
| 2026 | 101,296,172 | 3,507 | 475,925 | 164,642 | 83,246,752 | 18,049,421 |
| 2027 | 108,094,047 | 3,663 | 504,023 | 171,569 | 89,095,347 | 18,998,700 |
| 2028 | 113,320,243 | 3,813 | 524,160 | 177,880 | 93,347,772 | 19,972,471 |
| 2029 | 118,754,517 | 3,955 | 545,032 | 184,243 | 97,789,941 | 20,964,576 |
| 2030 | 124,196,692 | 4,088 | 566,807 | 190,179 | 102,466,881 | 21,729,811 |

According to this scenario, the threshold of 85 million passengers is expected to be reached in 2025. The threshold of 120 million passengers is expected to be reached in 2030. By 2030, total passenger traffic is estimated at 124 million in this scenario. In line with this, approximately 757,000 flights are expected to depart from iGA Istanbul Airport. This level corresponds to 2,102 flights per day, 87.6 flights per hour and 1.46 flights per minute.

i) Direct Economic Impact

In this scenario, the methodology used in previous sections for iGA Istanbul Airport will be applied using the traffic expectation dataset provided by iGA. When these calculations are made, it is possible to summarize the direct economic impact as follows. By the end of the period, the value added generated by the set of activities that can be gathered within the iGA Istanbul Airport ecosystem will reach 24.6 billion dollars or 1.82% of the national income. Total direct employment is expected to rise to over 100,000 people, while direct household incomes are estimated to reach \$1.68 billion.

Table 21: iGA Scenario Direct Economic Impact Analysis

| | Employment | Household Income (\$) | Taxes (\$) | National Income (\$) | GDP% |
|------|------------|-----------------------|---------------|----------------------|-------|
| 2024 | 68,823 | 1,021,806,628 | 1,025,540,630 | 15,276,240,085 | 1.35% |
| 2025 | 76,865 | 1,164,020,862 | 1,190,044,004 | 17,424,144,478 | 1.49% |
| 2026 | 82,076 | 1,267,807,302 | 1,131,053,015 | 18,812,618,519 | 1.57% |
| 2027 | 87,583 | 1,379,929,166 | 1,151,265,608 | 20,396,546,738 | 1.65% |
| 2028 | 91,817 | 1,475,569,799 | 1,173,585,561 | 21,752,725,638 | 1.71% |
| 2029 | 96,220 | 1,577,246,776 | 1,196,291,865 | 23,193,477,194 | 1.77% |
| 2030 | 100,629 | 1,682,507,543 | 1,222,160,531 | 24,687,372,709 | 1.82% |

ii) Indirect Economic Impact

When the methodology for calculating the indirect economic impact used in the previous sections is applied, it is calculated that the airline transportation activities centered at iGA Istanbul Airport will use an input of \$15 billion from other sectors of the national economy at the end of the period. This level of intermediate goods and services consumption creates employment for 219,000 people and household income of 5.9 billion dollars, which is related to economic activities in other sectors.

Table 22: Indirect Economic Impact of iGA Scenario

| | Employment | Household Income (\$) | Taxes (\$) | National Income (\$) | GDP% |
|------|------------|-----------------------|-------------|----------------------|-------|
| 2024 | 149,765 | 3,572,345,854 | 568,002,991 | 9,058,356,458 | 0.80% |
| 2025 | 167,264 | 4,069,542,110 | 647,057,195 | 10,319,091,307 | 0.88% |
| 2026 | 178,605 | 4,432,390,664 | 704,750,116 | 11,239,162,230 | 0.94% |
| 2027 | 190,589 | 4,824,380,759 | 767,076,541 | 12,233,127,024 | 0.99% |
| 2028 | 199,802 | 5,158,750,696 | 820,441,361 | 13,080,985,043 | 1.03% |
| 2029 | 209,383 | 5,514,224,341 | 876,761,670 | 13,982,355,992 | 1.06% |
| 2030 | 218,977 | 5,882,227,304 | 935,274,141 | 14,915,496,389 | 1.10% |

iii) Induced Economic Impact

This category includes economic activities resulting from the additional consumption within the national economy of household income generated by business activities directly linked to airport-related activities. At the end of this period, a total economic value of \$6.4 billion, corresponding to 0.48% of GDP, will be reached. The induced economic impact is expected to result in household income of \$1.32 billion and employment of 156,000 by 2030.

Table 23: iGA Scenario Induced Economic Impact

| | Employment | Household Income (\$) | Taxes (\$) | National Income (\$) | GDP% |
|------|------------|-----------------------|-------------|----------------------|-------|
| 2024 | 138,631 | 1,045,959,498 | 166,307,560 | 3,946,992,084 | 0.35% |
| 2025 | 141,403 | 1,088,216,262 | 173,026,386 | 4,479,903,575 | 0.38% |
| 2026 | 144,231 | 1,132,180,199 | 180,016,652 | 4,870,903,668 | 0.41% |
| 2027 | 147,116 | 1,177,920,279 | 187,289,324 | 5,263,027,239 | 0.43% |
| 2028 | 150,058 | 1,225,508,258 | 194,855,813 | 5,654,464,069 | 0.44% |
| 2029 | 153,059 | 1,275,018,792 | 202,227,988 | 6,038,541,058 | 0.46% |
| 2030 | 156,121 | 1,326,529,551 | 210,918,199 | 6,436,196,109 | 0.48% |

iv) iGA Istanbul Airport Scenario: Total Impact

When the different flows of economic impact analyses calculated in different categories above are brought together, the total economic impact of iGA Istanbul Airport in 2030 within this scenario can be summarized as follows.

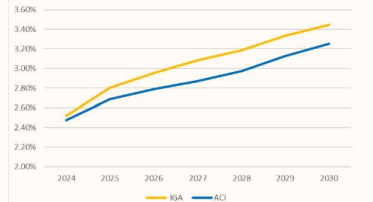
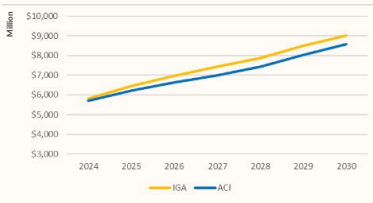
At the end of the period, employment generated from activities related to iGA Istanbul Airport will reach 491,000 people, creating an economic value of approximately \$46.6 billion, corresponding to 3.45% of the national income, and the additional household income generated by this ecosystem will reach \$9 billion.

Table 24: iGA Scenario - Economic Impact 2030 (Total)

| | Employment | Household Income (\$) | Taxes (\$) | National Income (\$) | GDP% |
|------|------------|-----------------------|---------------|----------------------|-------|
| 2024 | 386,621 | 5,791,078,039 | 1,759,851,181 | 28,519,671,040 | 2.52% |
| 2025 | 401,085 | 6,441,474,005 | 2,010,127,585 | 32,722,661,260 | 2.80% |
| 2026 | 422,102 | 6,967,304,414 | 2,015,819,782 | 35,496,633,181 | 2.95% |
| 2027 | 433,195 | 7,445,538,131 | 2,105,631,473 | 38,197,087,127 | 3.09% |
| 2028 | 445,098 | 7,887,762,749 | 2,188,682,735 | 40,611,483,788 | 3.18% |
| 2029 | 473,937 | 8,493,739,052 | 2,275,781,523 | 43,786,254,446 | 3.33% |
| 2030 | 491,377 | 9,024,245,725 | 2,368,382,871 | 46,647,281,345 | 3.45% |

3) TOTAL RESULTS

To summarize, the evolution of employment, household income, national income and GDP share estimates under both scenarios are given below



The 2030 estimates for each scenario are given separately below.

Table 25: Scenario Results for 2030

| | Employment | Household Income (\$) | National Income (\$) | GDP% |
|-----|------------|-----------------------|----------------------|-------|
| ISA | 491,377 | 9,024,245,725 | 46,647,286,345 | 3.45% |
| ACI | 472,586 | 8,579,481,121 | 44,001,101,155 | 3.25% |

The assumptions used in obtaining the scenario results are listed below.

Table 26: Assumptions

| Variable | Value | Period |
|---|-------------------|-----------|
| Increase in domestic passengers per aircraft | 1.0% | 2024-2030 |
| Increase in international passengers per aircraft | 1.0% | 2024-2030 |
| Employment Multiplier by Traffic | 0.81 | 2024-2030 |
| Effective Consumption Tax | 15.90% | 2024-2030 |
| Labor Productivity Increase | 2% | 2024-2030 |
| Employment Increase | 2% | 2024-2030 |
| GNP Increase | 3% | 2024-2030 |
| Marginal Consumption Multiplier | 3.7 | 2022-2030 |
| Total Employment | 30,752,000 | 2022 |
| Employment Increase | 1,817,000,000,000 | 2022 |
| GNP Increase | 16.57 | 2022 |
| Marginal Consumption Multiplier | 17.39 | 2022 |
| Total Employment | 1.05 | 2022 |

APPEX 1

Use Table, 2012
[at current prices]

| | | Sectoral Employment | | Sectoral Income | | Sectoral Production Value | | Share Total Usage Air Transport | | Sectoral Employment Linked to Air Transport | | Sectoral Income Linked to Air Transport | | Production Value Linked to Air Transport | | VA/Worker Total Value Added | |
|----|---------------------|--|--|-----------------|-----------------|---------------------------|-----------|---------------------------------|--------|---|----------------|---|------|--|---------------|-----------------------------|---------|
| | | İktisadi faaliyet kodları (Nace Rev.2) Kind of economic activity codes (Nace Rev.2) | | | | | | | | | | | | | | | |
| No | Ürün kod (CPA 2008) | Ürün tanımı (CPA 2008) | | | | | | | | | | | | | | | 380,877 |
| 1 | A01 | Tarım ve avcılık ürünleri ve ilgili hizmetler Products of agriculture, hunting and related services | | | | | | 0.0000195 | | | | | | | | | |
| 2 | A02 | Orman ürünleri ve ilgili hizmetler Products of forestry, logging and related services | | | | | | 0.0010145 | | | | | | | | | |
| 3 | A03 | Balık ve diğer balıkçılık ürünleri; su ürünleri; balıkçılık için destekleyici hizmetler Fish and other fishing products; aquaculture products; support services to fishing | | | | | | 0.0012422 | | | | | | | | | |
| 4 | B | Madencilik ve Taşocaklığı Mining and quarrying | | | | | | 0.0022317 | | | | | | | | | |
| 5 | C10-C12 | Gıda, içecekler ve tütün ürünleri Food, beverages and tobacco products | | 572.592 | 78.932.175.099 | 1.449.738.088.914 | 0.0032274 | | 414 | | 57.087.608 | 1.048.520.012 | 114% | | 170.153.301 | | |
| 6 | C13-C15 | Tekstil, giyim eşyası, deri ve ilgili ürünler Textiles, wearing apparel, leather and related products | | 1.316.704 | 135.243.985.242 | 1.375.148.881.498 | 0.0096470 | | 2.206 | | 205.995.370 | 2.094.539.656 | 960% | | 7.165.821.171 | | |
| 7 | C16 | Kereste, ağaç ürünleri ve mantar ürünleri (mobilya hariç); hasır ve diğer malzemesinden (baza, saman vb.) ürünler Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials | | | | | | | | | | | | | | | |
| 8 | C17 | Kağıt ve kağıt ürünleri Paper and paper products | | 80.292 | 8.250.409.615 | 151.523.565.738 | 0.0008705 | | 145 | | 14.936.306 | 274.313.941 | 490% | | 257.297.345 | | |
| 9 | C18 | Basım ve kayıt hizmetleri Printing and recording services | | 93.478 | 14.638.498.009 | 31.380.523.180 | 0.0008171 | | 768 | | 120.190.531 | 257.488.538 | 123% | | 341.073.289 | | |
| 10 | C19 | Kok ve rafine petrol ürünleri Coke and refined petroleum products | | 44.438 | 4.820.984.753 | 65.062.817.873 | 0.0003700 | | 15 | | 1.834.938 | 22.064.653 | 174% | | 9.489.823 | | |
| 11 | C20 | Kimyasallar ve kimyasal ürünler Chemicals and chemical products | | 10.290 | 322.127 | 31.380.523.180 | 0.0000242 | | 3 | | 78 | 7.631.506 | 116% | | 1.051.630 | | |
| 12 | C21 | Temel ilaç ürünleri ve ilaç hazırlanları Basic pharmaceutical products and pharmaceutical preparations | | 117.554 | 23.710.851.082 | 625.007.094.707 | 0.0038259 | | 227 | | 45.736.237 | 1.205.586.077 | 171% | | 140.114.830 | | |
| 13 | C22 | Kauçuk ve plastik ürünler Rubber and plastic products | | 47.353 | 12.483.590.293 | 99.041.861.895 | 0.0041808 | | 630 | | 100.050.959 | 1.317.408.155 | 339% | | 770.775.777 | | |
| 14 | C23 | Diğer metalik olmayan mineral ürünleri Other non-metallic mineral products | | 254.750 | 36.340.277.803 | 524.264.272.571 | 0.0023916 | | 366 | | 52.236.611 | 753.638.545 | 110% | | 145.147.827 | | |
| 15 | C24 | Ana metaller Basic metals | | 274.352 | 38.295.020.027 | 526.973.543.340 | 0.0012942 | | 212 | | 29.636.277 | 407.821.533 | 42% | | 32.359.748 | | |
| 16 | C25 | Fabrikasyon metal ürünler, makine ve ekipmanlar hariç Fabricated metal products, except machinery and equipment | | 180.232 | 35.537.944.905 | 1.303.616.270.252 | 0.0007938 | | 35 | | 6.819.267 | 250.148.010 | 49% | | 6.112.079 | | |
| 17 | C26 | Baskı ve ekipmanları kurulumu ve onarımı Computer, electronic and optical products | | 399.797 | 51.400.314.375 | 141.105.058.428 | 0.0037656 | | 733 | | 94.247.777 | 1.189.599.870 | 99% | | 262.738.177 | | |
| 18 | C27 | Elektronik ekipmanlar Electronics equipment | | 62.379 | 17.477.369.435 | 105.547.424.808 | 0.0003499 | | 42 | | 11.821.775 | 110.273.491 | 20% | | 30.808.166 | | |
| 19 | C28 | Diğer elektrik ekipmanları Other electrical equipment | | 212.237 | 37.675.738.240 | 524.749.354.118 | 0.0091988 | | 1.172 | | 208.116.978 | 2.888.862.507 | 77% | | 325.927.304 | | |
| 20 | C29 | Motorlu kara taşıtları, treyler (römork) ve yan treyler (yan römork) Motor vehicles, trailers and semi-trailers | | 299.515 | 48.942.210.561 | 513.277.014.950 | 0.0041810 | | 769 | | 120.460.612 | 1.317.472.289 | 638% | | 1.794.868.522 | | |
| 21 | C30 | Diğer taşıma araçları Other transport equipment | | 225.241 | 47.200.892.882 | 778.454.656.794 | 0.0059455 | | 461 | | 96.649.651 | 1.589.886.694 | 359% | | 592.792.137 | | |
| 22 | C31_C32 | Mobilya ve diğer mamul eşyalar Furniture and other manufactured goods | | 84.252 | 17.332.116.379 | 169.865.754.931 | 0.0011094 | | 132 | | 35.706.022 | 349.578.796 | 235% | | 112.387.840 | | |
| 23 | C33 | Makine ve ekipmanların kurulumu ve onarımı Repair and installation services of machinery and equipment | | 294.674 | 29.710.332.486 | 294.232.713.578 | 0.0016153 | | 478 | | 48.213.536 | 477.479.969 | 130% | | 224.949.881 | | |
| 24 | D35 | Elektrik, gaz, buhar ve iklimlendirme Electricity, gas, steam and air conditioning | | 133.903 | 20.998.530.787 | 141.522.406.188 | 0.0058282 | | 157 | | 24.894.413 | 166.447.151 | 141% | | 80.204.852 | | |
| 25 | E36 | Doğal su, suyun arıtılması ve temini hizmetleri Natural water; water treatment and supply services | | 127.467 | 27.600.801.678 | 2.380.829.855.544 | 0.0008046 | | 14 | | 2.939.138 | 253.530.090 | 332% | | 16.290.121 | | |
| 26 | E37-E39 | Kanalizasyon hizmetleri, kanalizasyon parçaları; atığın toplama, işleme ve bertarafı; atıkların geri kazanımı; atıkların bertarafı; atıkların geri kazanımı; atıkların bertarafı Sewerage services; sewage sludge; waste collection; treatment and disposal services; materials recovery services; remediation services and other waste | | 27.692 | 7.588.167.024 | 48.948.887.821 | 0.0000040 | | 1 | | 194.931 | 1.257.387 | 105% | | 288.771 | | |
| 27 | F | İnşaat ve inşaat işleri Constructions and construction works | | 47.065 | 6.467.528.053 | 81.200.122.822 | 0.0000761 | | 14 | | 1.910.559 | 23.987.157 | 247% | | 12.416.749 | | |
| 28 | G45 | Toplam ve perakende ticaret ile motorlu kara taşıtlarının ve motosikletlerin onarım hizmetleri Wholesale and retail trade and repair services of motor vehicles and motorcycles | | 1.516.104 | 31.598.094.283 | 1.732.358.888.300 | 0.0042757 | | 1.179 | | 102.349.336 | 1.347.327.879 | 146% | | 621.812.671 | | |
| 29 | G46 | Toplam ticaret, motorlu kara taşıtları ve motosikletler hariç Wholesale trade services, except of motor vehicles and motorcycles | | 320.870 | 34.224.627.731 | 272.072.820.153 | 0.0057892 | | 2.152 | | 229.477.362 | 1.824.258.970 | 127% | | 987.820.323 | | |
| 30 | G47 | Perakende ticaret (motorlu kara taşıtları ve motosikletler hariç) Retail trade services, except of motor vehicles and motorcycles | | 1.250.786 | 162.575.162.333 | 1.395.057.705.638 | 0.0405367 | | 11.508 | | 1.488.591.001 | 12.773.601.554 | 200% | | 8.312.794.782 | | |
| 31 | H49 | Kara taşımacılığı ve boro hattı taşımacılığı hizmetleri Land transport services and transport services via pipelines | | 1.710.729 | 167.989.799.418 | 890.778.845.808 | 0.0089730 | | 5.442 | | 534.355.551 | 2.197.285.654 | 288% | | 5.610.372.494 | | |
| 32 | H50 | Su yolu taşımacılığı hizmetleri Water transport services | | 725.751 | 55.158.187.404 | 786.077.820.265 | 0.0403011 | | 14.877 | | 1.000.099.224 | 15.535.369.490 | 55% | | 2.940.975.025 | | |
| 33 | H51 | Hava yolu taşımacılığı hizmetleri Air transport services | | 25.178 | - | 127.043.600.156 | 0.0038789 | | 248 | | 913.548.534 | 1.253.789.147 | 73% | | 65.354.891 | | |
| 34 | H52 | Depolama ve destek hizmetleri, taşımacılık için Warehousing and support services for transportation | | 43.302 | - | 431.602.740.072 | 0.0006511 | | 9.708 | | 84.588.687.348 | 97.660.415.454 | 87% | | 3.063.079.049 | | |
| 35 | H53 | Posta ve kurye hizmetleri Postal and courier services | | 231.240 | 42.018.817.055 | 526.009.244.163 | 0.0056882 | | 788 | | 143.107.000 | 1.791.473.655 | 730% | | 2.074.603.851 | | |
| 36 | I | Konaklama ve yiyecek hizmetleri Accommodation and food services | | 99.810 | 12.870.674.207 | 69.568.961.830 | 0.0340081 | | 15.511 | | 2.000.138.094 | 10.810.900.033 | 122% | | 6.835.825.531 | | |
| 37 | J58 | Yayın ve yayıncılık hizmetleri Publishing services | | 675.832 | 77.293.249.842 | 491.592.359.408 | 0.0007381 | | 320 | | 38.569.828 | 232.587.557 | 66% | | 75.755.821 | | |
| | | | | 23.270 | 4.305.812.639 | 30.386.648.754 | 0.0003067 | | 74 | | 13.694.483 | 96.643.642 | 88% | | 23.462.463 | | |

APPENDIX 1

| Sinema filmi, video ve televizyon programı yapım ve yayıncılık hizmetleri, ses kaydı ve müzik yayıncılığı, programatik ve yayıncılık hizmetleri | | | | | | | | | | | | | |
|---|---------|---|------------|-------------------|-------------------|-----------|---------|-----------------|-----------------|-------|--------------------|----------------------|----------------|
| 38 | J59_R60 | Movie picture, video and television programme production services, sound recording and music publishing; programming and broadcasting services | 44,385 | 6,826,422,568 | 80,560,005,607 | 0.0028922 | 568 | 92,045,686 | 816,844,877 | 78% | 171,688,867 | | |
| 39 | J61 | Telecommunications services | 46,649 | 12,510,336,475 | 150,656,260,672 | 0.0008342 | 81 | 21,827,423 | 262,857,666 | 42% | 12,447,314 | | |
| 40 | J62_J63 | Computer programming, consultancy and related services; information services | 265,066 | 62,214,704,627 | 326,847,620,455 | 0.0031989 | 832 | 191,872,465 | 1,008,010,255 | 98% | 223,967,452 | | |
| 41 | K64 | Financial services (sigorta ve bireysel emeklilik hariç) | 223,392 | 90,566,526,029 | 1,278,073,691,500 | 0.042841 | 2,333 | 945,656,977 | 13,324,244,118 | 38% | 318,639,028 | | |
| 42 | K65 | Insurance, reinsurance and pension funding services, except compulsory social security | 12,192 | 8,751,506,552 | 109,077,843,660 | 0.0012490 | 80 | 31,576,053 | 393,980,463 | 103% | 29,679,419 | | |
| 43 | K66 | Financial services (sigorta hizmetlerine yardımcı hizmetler) | 79,180 | 13,807,906,277 | 63,314,356,669 | 0.0003805 | 142 | 24,781,794 | 113,633,673 | 140% | 71,618,028 | | |
| 44 | L68B | Real estate services excluding imputed rents | 116,678 | 14,222,726,234 | 277,556,294,477 | 0.0021623 | 280 | 35,396,758 | 690,828,765 | 52% | 54,295,197 | | |
| 45 | L68A | Real estate services excluding imputed rents | - | - | - | - | - | - | - | 54% | - | | |
| 46 | M69_M70 | Legal and accounting services; Services of head offices, management consulting services | 284,733 | 41,121,125,900 | 182,117,050,07 | 0.0145319 | 8,043 | 1,161,515,540 | 4,579,190,567 | 320% | 9,542,310,275 | | |
| 47 | M71 | Architectural and engineering services, technical testing and analysis services | 2,5,967 | 24,170,650,490 | 168,177,686,287 | 0.0072470 | 2,929 | 338,204,673 | 2,263,625,031 | 650% | 6,665,628,342 | | |
| 48 | M72 | Scientific research and development services | 2,674 | 4,075,559,073 | 10,628,881,361 | 0.0008326 | 304 | 97,834,555 | 262,349,835 | 201% | 220,576,736 | | |
| 49 | M73 | Advertising and market research services | 68,085 | 8,583,246,008 | 93,255,064,273 | 0.0033412 | 769 | 66,905,814 | 1,052,860,399 | 38% | 106,960,732 | | |
| 50 | M74_M75 | Other professional, scientific and technical services and veterinary services | 69,899 | 5,887,732,044 | 30,554,192,814 | 0.0003868 | 279 | 23,476,585 | 121,830,968 | 101% | 101,621,548 | | |
| 51 | N77 | Rentals and leasing services | 34,989 | 4,127,883,724 | 94,038,281,303 | 0.000197 | 3 | 304,565 | 8,200,532 | 28% | 294,104 | | |
| 52 | N78 | Employment services | 567,609 | 70,188,941,888 | 83,270,253,847 | 0.0001325 | 255 | 35,191,940 | 41,750,762 | 93% | 85,997,655 | | |
| 53 | N79 | Travel agency, tour operator and other reservation services and related services | 64,649 | 6,953,583,301 | 224,179,825,817 | 0.2904680 | 23,669 | 2,545,016,720 | 62,076,048,190 | 101% | 6,862,631,077 | | |
| 54 | N80-N82 | Security and investigation services; services to buildings and landscape; office administrative, office support and other business support services | 7,7,319 | 74,129,802,031 | 199,165,461,228 | 0.0126277 | 14,556 | 1,504,271,475 | 4,042,151,335 | 130% | 6,830,033,227 | | |
| 55 | O64 | Public administration and defence services; compulsory social security services | 2,029,000 | - | 1 | 0.0862338 | 72,939 | 22,627,944,463 | 26,856,159,354 | 263% | 133,932,399,825 | Ortalama memur maaşı | 11000 |
| 56 | P85 | Educator services | 404,724 | 45,378,119,877 | 78,899,140,705 | 0.0083679 | 13,526 | 1,516,546,762 | 2,638,828,662 | 147% | 7,190,654,297 | | |
| 57 | Q86 | Human health services | 332,505 | 37,226,902,781 | 157,566,804,943 | 0.0006055 | 6,568 | 737,363,223 | 3,121,352,498 | 124% | 2,950,521,875 | | |
| 58 | Q87_Q88 | Residential care services; social work services without accommodation | 67,578 | 6,585,622,293 | 12,668,619,564 | 0.0000003 | 1 | 41,859 | 80,959 | 1247% | 2,513,388 | | |
| 59 | R90-R92 | Arts, entertainment, library, archive, museum, other cultural services; gambling and betting services | 8,321 | - | 10,104,163,161 | 0.0006023 | 159 | - | 169,778,423 | 192% | 106,076,670 | | |
| 60 | R93 | Sports services and recreation services | 46,263 | 10,772,494,212 | 23,466,204,653 | 0.0005970 | 5,657 | 1,386,504,301 | 3,024,149,245 | 167% | 3,586,837,739 | | |
| 62 | C95 | Repair services of computers and personal and household goods | 49,354 | 3,867,836,769 | 17,126,206,312 | 0.0002328 | 199 | 15,836,635 | 73,360,803 | 63% | 45,223,594 | | |
| 63 | S96 | Other personal services | 1,7,260 | 7,542,667,101 | 24,872,493,804 | 0.0000206 | 31 | 1,967,732 | 6,468,813 | 109% | 12,000,868 | | |
| 64 | T | Services of households as employers; undifferentiated goods and services produced by households for own use | - | - | - | 0.2965686 | - | - | - | 61% | - | | |
| Toplam Total | | | 17,327,791 | 1,948,272,433,665 | 22,123,862,596,22 | | 826,045 | 106,872,136,367 | 313,172,509,692 | | 254,001,782,195 TL | \$ | 15,329,015,220 |

TÜRK İstatistik Kurumu, 2012

TurkStat, Supply and Use Tables, Input-Output Tables, 2012

First step is to update sectoral prod, emp, income. See RefTab.

Share total usage of air transport derived from ratio of sectoral use of air transport / total sectoral consumption of air transport. See Calcot

Share in production value linked to air transport uses the parameter 0.73 which is ratio of used inputs to total production value in air transport. Derived from 2012 IO Table.

| | | | | |
|---------------|----------------|-----------------|-------|---------------|
| 113,766 | 37,405,247,728 | 106,610,378,378 | Share | 39% |
| 2,257,407,829 | 6,614,988,643 | | \$ | 5,365,155,327 |

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