

Economic Impact Study

of Chhatrapati Shivaji International Airport,
Mumbai





ECONOMIC IMPACT STUDY OF CHHATRAPATI SHIVAJI INTERNATIONAL AIRPORT

**National Council of Applied Economic Research
11 I.P. Estate, New Delhi-110 002 (INDIA)**

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PREFACE

Building and modernizing infrastructure for transportation, power and other services have long been recognized as policy priorities for development. But many countries have seen this as the exclusive preserve of the public sector. In the last two decades, what has changed is the recognition that the greater involvement of the private sector can accelerate infrastructure development by expanding the financial resources available and improving managerial capacity. India's civil aviation sector is one such area where participation of the private sector has made a significant difference to India's transportation infrastructure.

Mumbai is among the two Indian mega city airports, along with Delhi, which have been brought under a public-private partnership model to expand capacity and raise service levels to international standards. Besides these airports, India has also launched green-field airports in Hyderabad and Bangalore, following the development of the Cochin International Airport, the first privately operated Indian airport that began operations in 2002.

Modern airports often emerge as centers of commercial activity, often becoming mini cities in themselves as they attract other infrastructure services besides providing connectivity. The investment in creating airports therefore has many multiplier effects on the local, national and international economies.

This NCAER study provides an assessment of the economic impact of Mumbai's Chhatrapati Shivaji International Airport (CSIA), developed, owned and operated by GVK led Mumbai International Airport Pvt. Ltd (MIAL). MIAL invested Rs 125.8 billion for the construction and renovation of the CSIA airport between 2008 – 09 and 2015 – 16. The study uses an input-output methodology to capture the multiplier effects of this investment and of the operation of the airport. This impact is estimated in terms of (1) the direct impact of the investment expenditures and operations, (2) the indirect impact coming from multiplier effects due to the inter-industry linkages of the aviation sector with other sectors of the economy, and (3) the induced impact due to the economic integration effects that airport infrastructure provides. These induced effects can become quite significant as the creation of airports makes other investments more attractive as well.

The study estimates that the output and employment multipliers for the 'airport construction' activity are 2.61 and 0.90, respectively. And for 'airport operations', the output and employment multipliers are 2.87 and 0.70, respectively. The output multipliers can be interpreted as the value of total output in the economy generated as a result of one unit increase in the demand for output of the relevant airport sector. The employment multiplier captures the employment effect of

an increase in the airport sector's activity as the number of jobs created for an increase of Rs 1 lakh in the value of the output of the airport sector. The study finds that the total annual impact of CSIA, including the direct, indirect and induced impacts, is 0.44 per cent of national GDP and 3.35 per cent of Maharashtra's GSDP. This annual impact recurs over time as long as these investments remain economically viable.

The study was carried out by NCAER at the request of MIAL, which also provided the necessary financial support. We would like to thank MIAL for this opportunity and for their intense involvement in the study in terms of providing relevant information on the economic variables relating to the construction and operation of the airport. We also undertook a sample survey of passengers at CSIA over a one-week period covering both domestic and international departures. These economic impact assessments are complex exercises and the data necessary for such analysis are usually very difficult to compile. The cooperation of a number of agencies is critical to the study and we thank them all. The NCAER study team would like to place on record its sincere thanks to all the officials at MIAL who helped the team understand the functioning of this airport and their support for the data collection effort in undertaking this study.

We believe that the findings of this study will be useful in understanding the multi-faceted economic implications of creating modern airport infrastructure in the country. These studies also add greatly to the sophistication of NCAER's own modelling effort and its ability to more accurately map the impact of different sectors within an increasingly complex and connected Indian economy.

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June 6, 2014

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Disclaimer: The findings, interpretations, and conclusions expressed are those of the authors and do not necessarily reflect the views of the Governing Body of NCAER.

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List of Abbreviations

ATAG	Air Transport Action Group
CSIA	Chhatrapati Shivaji International Airport
ICAO	International Civil Aviation Organization
GDP	Gross Domestic Product
TSC	Transport Storage and Communication
WLU	Work Load Unit
MIAL	Mumbai International Airport Private Limited
I-O	Input-Output
CSO	Central Statistical Office
CAGR	Compounded Annual Growth Rate
GSDP	Gross State Domestic Product
FDI	Foreign Direct Investment
NAS	National Account Statistics
NIC	National Industrial Classification
NSSO	National Sample Survey Organization
AAGR	Average Annual Growth Rate
AAI	Airport Authority of India
ATM	Air Transport Movement
DGCA	Directorate General of Civil Aviation
ATC	Air Traffic Control
CISF	Central Industrial Security Force
IMD	Indian Meteorological Department
APHO	Airport Hospital
WDI	World Development Indicators
PPP	Public Private Partnership
SEBI	Securities Exchange Board of India
T1	Terminal 1
T-2	Terminal 2
INR	Indian Rupee
ACAAI	Air Cargo Agents Association of India
BIM	Building Information Modelling
F&B	Food and Beverage
NSOP	Non-Scheduled Flight Operators
MMRDA	Mumbai Metropolitan Region Development Authority
PSF	Passenger Service Fee
UDF	User Development Fee
IATA	International Air Transport Association

Executive Summary

About the study

- According to IATA (2012), the size of the Indian aviation sector is expected to triple and by year 2020 it is believed that number of passengers travelling through the Indian airport would reach 450 million. This means that the potential to grow is enormous and it is time to act swiftly to realize this potential. The implications of a well developed aviation sector to the overall economy are wide ranging in terms of direct and multiplier effects. Aviation sector is also a critical infrastructure for a modern economy. In this study we provide an assessment of the overall economic impact of Chhatrapati Shivaji International Airport (CSIA), one of the largest airports in the country, on the regional and national economy in terms of output, value addition and employment.

About CSIA Airport

- CSIA, which was formerly known as SAHAR International airport, has been awarded the prestigious 'Golden Peacock National Quality Award' for the year 2014 by Golden Peacock award, Institute of Directors, chaired by Justice P N Bhagwati and Dr Ola Ullsten, former prime minister of Sweden. This brown-field airport is being developed through a public-private partnership. In 2006, Mumbai International Airport Pvt. Ltd. (MIAL) was awarded the mandate by the government to carry out modernization work on the airport. MIAL is a consortium led by GVK.
- CSIA, which is situated in Santa Cruz, a suburb of Mumbai with an operational area of 1,500 acres, comprises of five terminals. With the planned capacity to handle more than 30 million passengers and 635,163 tonnes of cargo in 2012–13, CSIA has become one of the busiest airports in the country.
- The airport handles 52 airlines of which 46 are international and remaining 6 are domestic airlines. These airlines connect Mumbai to 43 international destinations and 47 domestic destinations.
- With respect to economic performance, non-aeronautical revenue turned out to be the largest source of revenue, contributing 53.2 per cent of revenue amongst all the other sources in 2012–13. Non-aeronautical revenue comprises of retail licenses, rent & services and other miscellaneous income. This was followed by aeronautical revenue which contributed 35.2 per cent of total revenue. The remaining revenue was generated from cargo and income from interest and dividends.
- As expected the highest share (72.8 per cent) of MIAL expenditure has been towards operating and administrative cost. Depreciation and amortisation account for 13.3 per cent and personnel cost, 8.5 per cent.

- Total revenue per passenger increased from Rs 406 in 2011–12 to Rs 427 in 2012–13. Similarly, the total cost per passenger increased to Rs 413 in 2012–13 from Rs 339 in 2011–12.

Passenger Profile

A passenger survey was conducted in which 4,637 passengers were surveyed. The main objective was to understand the profile of different passengers who travelled through the CSIA. In the sample, 3,246 (70.1 per cent) were domestic passengers, while 1,391 (29.9 per cent) were international passengers.

- About two third passengers were highly educated as 35 per cent of the passengers were post graduates and 33 per cent were graduates.
- Interestingly 64 per cent passengers turned out to be in the salaried class, while 20 per cent were self-employed in business and trade.
- 41.2 per cent passengers visited Mumbai city for business, 20 per cent of them came on vacation and about 15.7 per cent were here to meet their friends or relatives. About 8 per cent respondents were there for jobs and 5 per cent had come to attend a conference.
- In terms of quality of services at CSIA, 62.2 per cent respondents felt that the check-in process facility was 'good'. When it came to cleanliness and sanitation facilities, about 55.4 per cent passengers felt that the service was 'good' and 4.4 per cent felt it was 'poor'.
- The air travel is important for a wide segment of the population. The top income quintile of Indian residents travelling by international airlines had an average monthly income of Rs 3 lakh, while those in the bottom income quintile had an average monthly income of Rs 17,745. The foreign passengers travelling by international airlines who were in top income quintile had an average monthly income of US \$ 32,000 which is quite high and those in the bottom quintile reported an average monthly income of US \$ 887.9.
- According to the survey, around 45 per cent of passengers across all classes spent up to Rs 5,000 on hotels.

Economic Impact of CSIA

Contribution of CSIA's Operations to the National and Regional Economy

Income contribution

The year 2009–10 is taken as the base year for the operations of the airport because our input-output table, which is used to measure the indirect impact of the airport, belongs to the same base year. In 2009–10, around Rs 286.3 billion or 0.44 per cent was contributed by CSIA's operational activities to India's GDP. Its contribution relative to the regional economy (Maharashtra) was 3.35 per cent of the state's GSDP. The total impact comprises:

- Rs 39.9 billion that was directly contributed through value added mode (air transport and airport services).
- Rs 74.6 billion that was contributed indirectly through supply chain (multiplier impact).
- Rs 171.8 billion in induced impact (through tourism and investment).

Employment Contribution

In terms of employment contribution, CSIA's operations sector has contributed about 1,425 thousand jobs (0.31 per cent of the national employment) in 2009–10 and as a ratio to Maharashtra's employment it contributed 2.90 per cent. The total comprises:

- In terms of direct contribution, around 49 thousand jobs were added.
- Indirect contribution to jobs was 418 through supply chains (multiplier impact).
- With the help of tourism and investment, the induced impact added up to 958 thousand jobs.

Contribution of CSIA's Construction to the National and Regional Economy

In the case of construction activities, the impact is one-time and belongs to the entire construction phase (2008–09 to 2015–16). The economic contribution of CSIA's construction in terms of value added and employment to the national and regional economy is estimated as:

- Direct contribution of Rs 75.5 billion in income and 20,000 jobs to the national economy during the construction period.
- Indirect (multiplier impact) contribution of Rs 122.3 billion in income and 1,078,000 jobs to the national economy.

Contribution of Additional Investment in Airport related Infrastructure (Metro stations and others) to the National and Regional Economy

- Airport related construction activities will directly contribute Rs 14.5 billion in income to the national GDP during the entire construction phase (2014–15 to 2018–19).
- In terms of indirect contribution, airport related construction activities will contribute Rs 23.4 billion in income to the national GDP during the entire construction phase (2014–15 to 2018–19).

Contribution of GVK SkyCity Construction to the National and Regional Economy

The economic impact of construction activities at GVK SkyCity has also been calculated. This is a one-time impact and refers to the construction period (2014–15 to 2021–22). The findings are as follows:

- The GVK SkyCity will contribute 27,000 jobs directly and Rs 66.4 billion in income to the national GDP.
- In terms of indirect economic impact, GVK SkyCity will be able to contribute Rs 171 billion in income and will add 96,000 jobs.

The other important findings from the study are:

- Total passenger traffic at CSIA will reach 49 million by 2022–23.
- By 2022–23, CSIA would make an annual direct contribution to Maharashtra's economy in terms of income, which would turn out to be 0.56 per cent of GDP.
- CSIA's direct plus indirect (multiplier) annual income contribution to Maharashtra's economy annually will be 1.61 per cent of GSDP by 2022–23.
- Thus, CSIA's total income impact (direct plus indirect plus induced) to Maharashtra's economy will be 4.02 per cent of GSDP by 2022–23.

Contribution of tax revenue to the Government's Exchequer

- Development of an airport, not only contributes income and employment to the economy, but also adds tax revenue to the government's exchequer.
- The growing economic activities of CSIA have helped MIAL to generate a substantial amount of revenue and in return, MIAL has paid a chunk of its revenue to the government's exchequer in the form of various taxes.
- MIAL's tax revenue contribution to the government's exchequer in the form of various taxes is 3490 million in 2012–13, which is 23.6 per cent of the total revenue of MIAL.

The aviation sector plays a vital role in facilitating international trade and tourism. It helps connect people across the continents. Keeping this in mind, this study provides an assessment of the economic impact of CSIA on the regional and national economy. The study analyses the direct, indirect and induced impacts of this sector in terms of value addition and employment generation, which will help improve the economy further. This would also contribute to the growth and towards sustainable development of the national economy. We believe that the results of this study will help in understanding and realizing the importance of this sector from regional as well as national perspectives.

Chapter 1

Introduction

Transportation plays a pivotal role in the growth and development of an economy. There are different modes of transportation, such as road, rail, air and water. Like other modes of transport, the aviation industry plays a major role in today's global economy, as it connects a country with other countries and facilitates the growth of business, trade and tourism with significant multiplier effects. It helps the country make its mark on the global economy through its positive impact on productivity, growth and employment generation. By 2030, the aviation industry is expected to support 82.2 million jobs worldwide¹. In a recent study for Asia-Pacific Economic Cooperation (APEC), ATAG (September 2013) found that the aviation industry contributes 26.8 million jobs in the region. Roughly 4 per cent of GDP in the APEC region is generated through aviation activities.

Like many other emerging and advanced countries, India has benefited greatly from the resurgent domestic civil aviation sector. It is the only sector that provides a timely and efficient transportation facility compared to other modes of transportation. Domestically, it acts as a push factor for smaller cities by connecting them with metro cities. It not only facilitates the movement of passengers between cities but also strengthens trade and business. Internationally, it links India with important global markets for trade, business and tourism. The Indian aviation industry has seen a notable transformation in the past two decades, particularly since 2004. Like other sectors, the aviation sector has witnessed significant changes in terms of policies and procedures. The government has allowed private players to directly participate in the development of infrastructure as well as own and operate airports and airlines. The sector has seen a tremendous increase in demand for transport due to an increase in personal disposable income, the rising middle class and urban development in India. Also, the participation of low-cost carriers in the aviation sector has made air transport an affordable means of transport in India.

India is ranked as the 9th largest civil aviation market in the world, which supports the fact that it has been growing at a phenomenal speed². After the US, China and Japan, it is India that commands the 4th position in domestic passenger volume. With an annual growth of 9–10 per cent in passenger volume, India would be able to cover 150–180 million³ passengers by 2020 (Strategic Plan, Ministry of Civil Aviation, 2011). At present, India has 449 airports/airstrips, of which 125 operational airports are managed by the Airports Authority of India⁴, which plans

¹Aviation Benefits Beyond Borders, Air Transport Action Group, March 2012.

²http://civilaviation.gov.in/cs/groups/public/documents/newsandupdates/moca_001377.pdf

³The figures are only for departure and not for arrival.

⁴<http://www.aai.aero>

to double the number of airports by 2030. Most airports in India are owned and operated by the Airports Authority of India, but now private players have begun to actively participate in the market. Two of the private players are GMR and GVK, which have been asked to develop Rajiv Gandhi International Airport, Hyderabad and Kempegowda Airport, Bengaluru and modernise Indira Gandhi International Airport, Delhi and Chhatrapati Shivaji International Airport, Mumbai. In the case of air transport, with the exception of Air India, which is owned by the government, all domestic airlines belong to private players.

Acknowledging the infrastructure deficiency in the aviation sector, particularly the lack of world-class airports, the Planning Commission increased public investment in the airport sector during the 11th and 12th Five-Year Plan periods and also sought more investment from the private sector. Under the 12th Plan, the Planning Commission has proposed to invest US\$ 12.1 billion on airport infrastructure. This would include not only the construction of new airports but also the expansion and improvement of old/existing airports. Of this, US\$ 12.1 billion investment will be contributed by the government and US\$ 9.2 billion will be provided by private players. In the recent Budget of 2013–14, the central government has given some sops to the aviation industry through exemptions for private category aircraft on parts, equipment and accessories required for maintenance, repair and operations.

It has been recognised in the literature that improving infrastructure, particularly in the transport sector, has a large multiplier impact because of its strong direct and indirect linkages with other sectors in the economy. For example, building a new airport or improving the infrastructure at an existing airport requires a huge amount of raw material that is usually supplied by various other sectors. At the macro level, the aviation industry has a direct impact on the tourism industry and an indirect impact on trade, hotels and restaurants and the banking industry. Besides this, the air transport sector delivers a wide range of services to passengers and ships tonnes of high-value products in the shortest time compared to other modes of transportation.

Several studies have assessed the social and economic benefits of airports for national and regional economies. Most of these studies have analysed these benefits in terms of employment and output. We cite the findings of some of these studies below.

Wilbur Smith Associates (2010) conducted an impact study on the aviation sector for North Dakota in the US, using input-output methodology for impact analysis. The study estimated that employment, payroll and output multipliers were 1.64, 1.51 and 1.64, respectively. The annual economic activity of the airports in North Dakota was estimated at US\$ 1.1 billion, which contributed about 3.3 per cent to the estimated GDP of \$31.9 billion. The airport generated 9,792 jobs, of which 5,796 jobs were created through first round or direct and indirect impact, while 3,996 jobs were created through secondary or induced impact. Off-airport industries

added 5,688 jobs along with \$224 million in payroll, which led to \$560 million output from the off-airport industries. This led to a combined benefit of 15,480 jobs with \$1.6 billion in output.

A study conducted by the Port Authority of New York and New Jersey (2005) concluded that the combined impact of aviation investment, operation and tourism created 485,670 jobs, which was 5.5 per cent of the non-farm jobs for that region. Also, it contributed US\$ 20.5 billion in wages and US\$ 57 billion in sales or economic activity. The study used the regional input-output model for 26 counties in New York and New Jersey to calculate the total regional sales, person years of employment and payroll wages. Of the 485,670 jobs created through total impact, including direct, indirect and induced impact, 278,890 jobs were part of the direct impact on the aviation industry. Direct impact contributed US\$ 35.9 billion of economic activity with overall output impact of US\$ 57 billion. The U.S. Department of Transportation, Federal Aviation Administration (2011) conducted a study that examined how the overall health of the aviation industry was intertwined with the U.S. business cycle and how the entire aviation industry responded to changes in the economy. The study found that civil aviation accounted for 5.2 per cent of U.S. GDP in 2009. Also, it helped generate more than 10 million jobs with earnings of US\$ 394.4 billion. In all, it helped raise the total output to US\$ 1.3 trillion in 2009.

Oxford Economics (2012) conducted a study on Heathrow airport, which is an international hub in the UK, to understand the role of the airport both on the local economy and on regions connected to the airport. The study examined three channels through which greater connectivity benefited the UK's counties and regions: greater exports, tourism and inward foreign direct investment (FDI). The study also examined the economic benefits in terms of job creation and economic activities. It found that flights from Heathrow were estimated to generate 4,500 jobs in Scotland, 1,600 jobs in the North West, 900 jobs in Northern Ireland and 700 jobs in the North East.

A report published by Scottish Empire and BAA Edinburgh (2009), called 'The Economic Impact of Edinburgh Airport', estimated that 5,340 jobs were generated through the total economic impact of the airport. Of this, around 3,530 jobs (on-site) and 290 (off-site) jobs were created through direct impact. At the same time, 850 and 680 jobs were created, through indirect and induced impact, respectively. In terms of gross value added, £16.3 million through induced and £20.4 million through indirect impact were generated. The direct impact contributed around £81 million of gross value added (induced).

Airport Council International and York Aviation (2004) was entrusted to study the social and economic impact of airports in Europe, wherein 59 airports were surveyed. The study found that 1.4 million people were directly employed in Europe in 2001. A multiplier value of 1.00 was used to calculate the jobs created by indirect and induced impact as there is variation in

the multiplier value for different airports. The report suggested that for every 1,000 on-site jobs supported by European airports, around 2,100 induced/indirect jobs were supported nationally and 1,100 jobs were supported regionally.

The Idaho airport system plan (2008) estimated the economic impact for Idaho airports in the United States, using the input-output model. Around 23,000 jobs were generated, of which 13,124 jobs were created from the first round and 9,876 jobs were created through secondary impact. At the same time, the total annual payroll at Idaho airports was \$718.5 million, with more than \$310 million contributed by secondary impact on annual payroll and \$408.5 million supported by first round payroll impact. The total output generated from Idaho airports was \$2.1 billion which comprises 4 per cent of Idaho's GDP of \$52.1 billion. The primary impact was estimated at \$1.3 billion, while the secondary output impact contributed \$795.5 million. The multipliers for employment, payroll and output were 2.34, 1.9 and 1.55, respectively.

To sum up, several studies have examined the impact of airports on national and regional economies in terms of output, employment and tax revenue collections. However, very few studies have been done on Indian airports or have examined their contribution to the national and regional economies.

A study by Oxford Economics (2011) on the overall civil aviation sector in India suggested that the aviation sector supported 1.7 million jobs, of which 0.276 million people were directly employed in the sector. A large contribution was attributed to induced impact (tourism and others), where around 7.1 million people were employed due to activities in the aviation sector. The report also indicated that the aviation sector contributed to 0.5 per cent of the national GDP or Rs 330 billion (direct and indirect) and more than 1.5 per cent of GDP or Rs 912 billion if we include catalytic or induced impact; it paid over Rs 87.5 billion in taxes including income receipts from employees, social security contributions and corporation tax levied on profits. The study, however, did not examine the economic impact of a particular airport on the regional and national economies. Further, it did not examine the direct and indirect economic benefits of airport construction.

A recent study by the National Council of Applied Economic Research (NCAER 2012) on Delhi international airport suggested that Delhi airport's aviation sector contributed Rs 120.1 billion (or 0.18 per cent of GDP) to the national economy in 2009–10. After adding the induced impact (tourism and investment), the total contribution of Delhi airport to the national economy was Rs 294.7 billion (or 0.45 per cent of GDP). The study also found that Delhi airport's aviation sector contributed 64,000 direct jobs, 452,000 indirect jobs and 1,061,000 induced jobs to the national economy.

Mumbai International Pvt. Ltd (MIAL) requested the NCAER, New Delhi to study the economic impact of Chhatrapati Shivaji International Airport (CSIA) on the national and regional economies.

1.1 Study Objectives

This study provides an assessment of the CSIA's economic impact on the regional (Maharashtra) and national economies (all-India) in terms of:

- Output
- Value added
- Employment (number of jobs)

These three dimensions of economic impact are captured through various effects catalysed by the airport. They are:

- Direct economic impact: Direct contribution of the airport through construction and operations.
- Indirect economic impact: Indirect contribution of construction and operations of the airport through its supply chain captured through the I-O model.
- Induced economic impact of airport operations: Inflow of foreign capital and tourist arrivals.
- Total impact of the airport's operations = (direct impact) + (indirect impact) + (induced impact).

1.2 Scope of the Study

The study covers the following aspects:

- The study highlights the contribution of the city of Mumbai to the state economy and the infrastructure and facilities in the city compared to other cities.
- The study highlights the contribution of the CSIA in terms of passenger and cargo volumes. The contribution of commercial activities of SkyCity has also been highlighted.
- The study focuses on the CSIA's economic impact (direct, indirect and induced) on the national and regional economies in terms of output and employment.
- A long-term (10-year) assessment is made with respect to passenger traffic at the CSIA. A similar projection is done on revenue and generation of value-added of CSIA's operations over the next 10 years.

1.3 Report Structure

This report is structured as follows:

- Chapter 2 outlines the methodology for the study, using I-O analysis
- Chapter 3 gives details about Mumbai city
- Chapter 4 analyses air traffic and the economic performance of the CSIA
- Chapter 5 examines the direct, indirect and induced impact of the CSIA on the national and regional economy
- Chapter 6 presents traffic and revenue forecasts for the CSIA and MIAL
- Chapter 7 outlines the profile of passengers at the CSIA
- Chapter 8 summarises the key findings of the study

Chapter 2

Study Methodology

2.1 Introduction

Airports serve as the articulation point in the circulatory system of the global economy. They play a significant role in the growth of a country through their political, economic, social and military aspects. They open the door for the outside world to visit the country and explore it. They open a window for both passengers and traders who look for opportunities/ businesses outside the city/ country. They help build and maintain strong relationships between neighbours, communities and industries. They act as a mediator, shortening time and distances between people, and assisting the speedy movement of goods between destinations. They help improve the economy by providing employment opportunities to locals. Availability of an airport enhances the tourism industry. A wide range of services are available at the airport, from retail shops that cater to the needs of passengers to the facility of cargo movement that allows traders/ businessmen to meet their business needs. Also, these services are not limited to the airport premises; they include taxi services and other services.

To understand the complete functioning of the airport, it is important to realise that several agencies and departments work behind the scenes. Estimating the economic benefits of an airport is a herculean task because it includes numerous factors such as direct, indirect and induced impacts that play a key role.

This chapter defines the meaning of an economic impact and the different types of economic impacts of an airport. It also describes the methodology used to assess the economic benefits that an airport renders to the nation as a whole and to a specific region.

2.2 Scope of the Study

An economic impact study measures the contribution of a major private, public or public-private partnership project to the regional or the national economy in a variety of ways. The four key indicators that measure the impact are:

- Employment
- Output
- Value Added (GDP)
- Tax Revenues

This study doesn't include tax revenues and focuses on the three remaining indicators: output, employment and value added (income). In the literature, the impact of these indicators is measured in three ways: direct impact and indirect or flow-on impact and induced or catalytic impact.

Direct impact is the direct contribution of an industry or an airport to the regional or national economy in terms of output and employment. Output can be measured through expenditure that is incurred in the production process or it can be accounted as value of production. All the expenditure that is incurred by agencies within the airport contributes to the total value of output. The services at an airport are divided into two categories: essential services and enabled or support services. For example, at Mumbai airport some services are provided by the government or MIAL (the airport operator); since these are core operations that take place at the airport, it makes them essential services. Services such as airline operations are called enabled services.

Indirect impact, which is the second component of economic impact, is measured by the output and employment generated through inter-industry linkages due to the construction or operation of an airport. Input-Output methodology helps capture the economic impact of such inter-industry linkages.

2.3 Economic Contribution of an Airport

It is not easy to analyse the economic impact of an airport. An airport is a conglomeration of numerous agencies and units that work together to provide services to passengers with the help of operators who work round the clock. All the activities within and outside the airport premises contribute to the regional and national economy. The benefits that accrue from these services are marked as economic contributions to the economy. This definition of economic impact helps one understand the key role played by air transport beyond the lay understanding that it merely assists in passenger and freight movement.

This study places a strong emphasis on qualitative and quantitative evidence to assess the importance of an airport to the regional and national economy.

2.4 Types of Airport Economic Impact

As mentioned earlier, the economic impact of an airport can be studied by segregating it into three categories—direct, indirect and induced impact.

- *Direct Impact* refers to an increase in the production of a sector to meet an increase in demand of that sector; in the process, it creates output and employment. In the case of an airport, direct impact is the employment and output that are directly generated from construction, operations or the use of the services provided by the airport, either on-site or in the surrounding area.
- *Indirect or flow-on impact* refers to the output and employment generated by firms/ industries that are primarily off-airport, but whose activities are accredited to airport activities. It is the employment and output generated in the regional economy (by firms/ industries other than the airport) due to the direct economic activities of the airport.

- *Induced or Catalytic Impact* refers to the multiplier effect caused by successive rounds of spending throughout the economy as a result of an airport's direct and indirect effects. Induced impact is generated by the income and employment generated in the regional economy where the airport is located. It is generated due to the wider role of an airport in attracting other activities such as new investment and tourism.

2.5 Methodology and Approach to Measure Economic Impacts

This study examines the economic impact of CSIA on the regional economy (Maharashtra) and on the national economy (all-India) in terms of employment, income and valued-added accruing to the economy. The key objective of this study is to make an assessment of the benefits that have been received by the local community from the massive investment made in constructing and operating a new airport, upgrading the existing airport and improving the infrastructure in the periphery of the airport. We also conducted a primary survey of passengers and service providers in and around the airport to understand the profile of service users and the contribution made by service providers to the economy.

We need to distinguish between the construction/development and the operations phases of CSIA. The construction or development of the airport includes both the airport infrastructure and the development of facilities around the airport. In the case of CSIA, the domestic terminals have been completely renovated and some parts of it are newly constructed. Part of the existing international terminal has been demolished and a new integrated terminal (T-2) is partly opened for international operations in Feb 2014. Remaining portion of the T-2 will be re-constructed and will be in operations by the end of 2015. Infrastructure such as roads and bridges has also been developed around the airport. The operations phase of CSIA includes aviation activities, namely, passenger, cargo and aircraft movements. We have also considered the impact of airport development on the services enabled by the airport, which is called the induced impact and includes investment flow and tourism activities in local areas.

Construction/Development of the airport: direct and indirect impact

The direct impact of CSIA on the regional and national economy includes output and employment generated by different agencies working at the airport (including the airport operator, MIAL) as well as those who operate outside the airport but are directly linked to the airport business. The expenditure incurred by these businesses for local goods, services and capital improvement are also included and considered as direct economic impact. The development or construction of a new airport or the renovation of an existing one requires a large amount of investment and raw materials, including capital-intensive technologies. Some of these inputs and technologies are produced in the local or national economy, while others are imported. Sectors that supply inputs to the airport sector are likely to increase their production due to an increase in demand from the airport sector. This is called indirect backward linkages from the airport sector to other sectors of

the economy. Therefore, employment and output generated in the regional economy (by firms/ industries other than the airport) due to the direct economic activities of the airport are called indirect impact. Information received from MIAL is used to calculate the economic impact in terms of CSIA's income and employment contribution to the regional and national economy.

According to ICAO (2008), Input-Output methodology is suitable approach to capture the inter-industry linkages or multiplier effects of investment in the airport sector. However, to the extent that demands for the various goods and services that are generated by the airport sector may have to be met by imports, the overall impact on the domestic economy may be lower than the estimates. There may be other economic activities that require imports, offsetting to some extent this overestimation of multiplier effects. In the absence of an adequate assessment of imports, we have not taken into account the impact of imports in the methodology in assessing CSIA's indirect impact. We have also not included environmental factors while calculating the economic impact.

Operation of an airport: direct and indirect impact

This refers to the output and employment generated by CSIA's operational activities. It includes any sector of the local economy that serves users of the airport, or that uses the airport to transport goods, supplies or personnel in order to enhance business opportunities and activities. The operations of an airport require a wide variety of inputs, labour, technology and other services that have to be managed by the airport operator. One of the important economic impacts of the operations of an airport is the generation of income and employment for those who help it function better.

As in the case of airport development or construction, Input-Output methodology has been used to assess the indirect impact of CSIA's operations. The impact of operations is essentially a 'flow effect' that accrues to the economy as long as the airport is operational.

Induced impact of an airport

Induced impact is usually greater than the direct and indirect impacts because of its broad definition and coverage of various activities that operate outside the airport but are linked to airport activities. Spending by airport employees in airport itself has a large multiplier impact on employment and income generation. Further, the availability of air transportation makes it possible for tourists to reach new destinations; the availability of an airport makes it possible for enterprises to be set up that require fast and safe transportation of high-value or perishable commodities; and air transportation makes it possible to set up enterprises that require close global linkages. From an economic perspective, we consider the total value that these services contribute to the national economy as the 'induced impact'. We also consider the employment

effects of these induced activities. The assessment is based on information from a sample survey of service providers and from information available from secondary sources.

In this context, we also examine the profile of users of airport services, mainly passengers and freight operators. A sample survey of passengers was conducted to obtain users' profiles and their travel patterns. The sample size and the results of this survey are discussed in Chapter 8.

2.5.1 Economic modelling: I-O analysis for flow-on impact

I-O methodology has been used in this study to assess the indirect or flow-on impact of the CSIA on the regional as well as the national economy in terms of output and employment generation. Table A1.1 in Appendix A gives a detailed account of different components associated with the I-O table. This flow-on impact in terms of output and employment is captured through estimating multipliers of output and employment for three airport related sectors:

- Airport construction
- Airport Services
- Air transport

In India, the national input-output tables are compiled by the Central Statistical Office (CSO) every five years. These tables have complete coverage of the economy and are consistent with the national accounts. The latest I-O table is available for 2006–07. However, for the present study, we have updated it for 2009–10.

The detailed I-O table consists of 130 sectors. The first two sectors which are part of the aggregate sectors in the 130 sectors I-O table 2009–10 have been constructed as two separate in the study.

This study uses the 35-sector I-O table, which is derived from the 130-sector I-O table used at the national level. Table A1.2 in Appendix A maps the 35-sector I-O table to that of the 130-sector I-O table. Aggregation of the existing 130 sector I-O model into 35 sectors was made keeping in mind the inter-sectoral dependency of three important sectors.

The two new sectors of airport construction and airport services have been derived based on the information available from MIAL and other published sources.

Output and Employment Multipliers

- **Output Multiplier:** An output multiplier of a particular sector (say, airport construction) indicates that if the final demand (comprising consumption, capital formation and net exports) of this sector increases by Re one, then due to the direct and indirect linkages of

this sector with other sectors of the economy, the overall output of all the sectors together will increase by a multiplier amount. For example, if the output multiplier of the airport construction sector is 2.605, it can be interpreted as ‘if the final demand of this sector increases by Re one, then due to the direct and indirect linkages of this sector to other sectors of the economy, overall output in the economy will increase by 2.605’.

- **Employment Multiplier:** Suppose the employment multiplier of the airport construction sector is 0.9. This can be interpreted as the following: Due to an increase of Rs 1 lakh in the final demand for the airport construction sector, 0.9 jobs are generated in this sector taking into account the direct as well as indirect effects.

2.5.2 Data Collection

Three main sources of information have been used in the study.

2.5.2.1 Data from MIAL

MIAL has provided following information that is relevant to our study:

- CSIA’s project cost information for the construction phase.
- Employment data for the construction phase.
- MIAL’s revenue and operational costs.
- MIAL’s revenue, expenditure and value of output for the operations phase.
- Employment data for the operations phase.
- Input cost structure for the operations phase.
- Tax revenue information for the operations phase.
- Physical and throughput data for CSIA.
- Proposed investment and employment figures for different phases of airport city activities.

2.5.2.2 Survey data

- A primary survey of more than 4,000 passengers (domestic and international, arrivals and departures) was carried out to obtain the profiles of users of airport services.
- A primary survey of freight service providers, airlines, retailers/concessionaries and government agencies operating in the airport was also conducted.

2.5.2.3 Data from published sources

Various reports and publications were used including:

- National Accounts Statistics (NAS), Central Statistical Office (CSO), Government of India.
- National Industrial Classification (NIC), Ministry of Statistics and Programme Implementation, Government of India.
- Reports of the National Sample Survey Organisation (NSSO), Ministry of Statistics and Programme Implementation, Government of India.

- State-level GSDP, Central Statistical Office (CSO), and Government of India.
- Indian Tourism Statistics (2011), Ministry of Tourism, Government of India.
- Foreign Direct Investment, Ministry of Commerce and Industry, Government of India.
- Input-Output Table (2006–07), Central Statistical Office (CSO), Government of India.
- Traffic data from the Airports Authority of India (AAI), Government of India.

Chapter 3

Mumbai – City that Never Sleeps

3.1 Introduction

Mumbai was initially a conglomeration of seven islands and is now a cosmopolitan metropolis. It is often referred to as the city that never sleeps due to its pulsating, lively and ‘always on the move’ culture. It is a city of migrants because people from around the country come over and settle in Mumbai, which gives the city its multi-cultural and multi-lingual colour. Geographically, it is located close to the Arabian Sea, which makes it a natural port that offers a range of trading opportunities.

Mumbai, which was called Bombay until 1996, is the capital of Maharashtra. It is the fourth most populous city in the world and tops the Indian charts, followed by Delhi with populations of 12.4 and 11 million in 2012, respectively. Marathi is the official language of Maharashtra. It is also called the financial capital of India as it houses financial institutions such as the Reserve Bank of India, the Bombay Stock Exchange, the National Stock Exchange and the Securities Exchange Board of India (SEBI). In terms of global financial outflows, it is one of the top centres of commerce. The entertainment hub of India is also located in Mumbai, that is, the film (Bollywood) and television industry. Textile mills and the seaport were largely responsible for Mumbai’s growing economy until 1970, but thereafter diamond polishing, information technology and healthcare have made their way into this city.



This booming city and its suburbs contribute a chunk of revenue and income to the state economy. In 2011–12, it contributed a whopping 30 per cent to the state gross domestic product (Economic Survey, Maharashtra, 2012–13). It also contributed a mammoth 60 per cent to Maharashtra’s sales tax receipts in 2009–10, the highest compared to other districts⁵. Mumbai city plays a

⁵<http://www.oirj.org/oirj/may-june2012/11.pdf>

leading role in services sector growth in Maharashtra and, therefore, the state's overall growth. Maharashtra, which recorded 9.3 per cent average GSDP growth rate during 2005–2012, comes third after Delhi and Tamil Nadu, which recorded on average 10.4 and 9.5 per cent GSDP growth rates, respectively, during the same period. The services sector contributes around 60 per cent of Maharashtra's gross domestic product. It is interesting to note that with the exception of Delhi, the state has performed even better than southern states in terms of services sector growth even though most IT companies are located in these states.

In terms of per capita income at constant 2004–05 prices across states, Maharashtra stood third in the ranking with INR 62,729 in 2010–11 after Delhi and Goa with INR 1,08,876 and 1,02,844, respectively⁶. According to estimates by Pricewaterhouse Coopers, Mumbai's GDP per capita was US\$ 1,081 in 2008, which ranked it at 29 in the top-30 urban agglomerations (based on the UN definition) in the world⁷. Other Indian cities did not appear in the top-30 list.

As Mumbai city symbolises the financial gateway of Maharashtra, its connectivity with domestic and international cities is paramount. The city has very good road and railway connectivity to other parts of India. The ongoing Delhi–Mumbai Industrial Corridor (DMIC) project provides an avenue for strengthening the movement of goods and services not only between two states but also among other states in the northern and western parts of India. Maharashtra also has two major ports—Mumbai port and Jawaharlal Nehru Port—and 48 minor ports. Most importantly, the state has three international and five domestic airports. International flights operate from the Chhatrapati Shivaji International Airport (CSIA) in Mumbai, Lohegaon Airport in Pune and Dr Ambedkar International Airport in Nagpur. Of the three international airports, the CSIA ranks first in terms of number of passengers and volume of freight movement. It is the second busiest airport in India in terms of passenger traffic and the first in terms of cargo movement. It plays a key role in enhancing investment and promoting trade in services and tourism in Maharashtra. There are scores of inhabitants of Mumbai city who directly or indirectly depend on activities at the airport. In this context, the present study attempts to assess the economic contribution of the CSIA to the regional and the national economy.

3.2 The Role of CSIA

CSIA is ranked the second busiest airport after Delhi airport based on overall passenger traffic and aircraft movement. It handles more than half the air traffic in South Asia along with Chennai and Delhi airports⁸. Mumbai and Delhi airports are the primary international gateway to India and together they are served by almost 50 international airlines⁹. About 75

⁶<http://pbplanning.gov.in/pdf/Statewise%20GSDP%20PCI%20and%20G.R.pdf>

⁷http://www.pwc.com/en_GX/gx/psrc/pdf/ukeo_largest_city_economies_in_the_world_sectioniii.pdf

⁸http://articles.timesofindia.indiatimes.com/2008-07-10/india/27923943_1_flights-airport-load-factors

⁹<http://pterisglobal.listedcompany.com/misc/ar2010/09highlightProject.pdf>

per cent of the Indian passengers are handled by the airports at Mumbai, Delhi, Chennai, Bengaluru and Kolkata. At present, Mumbai airport can handle 38 flights per hour, which it plans to increase to 48 flights per hour¹⁰. Currently, the airport is under construction for further modernisation and once it is completed it will be able to handle 40 million passengers and one million tonne of cargo annually.

Table 3.1 shows CSIA vis-à-vis other international airports in terms of passenger and freight. Among airports in the 20–40 million passenger category, CSIA has underperformed in terms of number of passengers handled per annum compared to other airports. But, it is well ahead of Delhi international airport in terms of volume of cargo movement and closer to Kuala Lumpur international airport. The compound annual growth rate (CAGR) shows that, both Delhi and Mumbai airports are growing faster than other international airports; may be due to the low base.

Airports	2008	2009	2010	2011	2012	CAGR 2008–2012
Chhatrapati Shivaji International Airport (Mumbai, India)						
Passengers (millions)	24.30	24.80	30.00	30.70	30.04	5.44
Freight ('000 tonnes)	530	566	670	657	654	5.39
Indira Gandhi International Airport (Delhi, India)						
Passengers (millions)	23.20	25.30	35.00	35.90	34.21	10.91
Freight ('000 tonnes)	426	497	600	568	561	7.12
Kuala Lumpur International Airport (Malaysia)						
Passengers (millions)	27.50	29.70	34.10	37.70	39.89	9.74
Freight ('000 tonnes)	667	602	697	694	702	1.28
Miami International Airport (MIA), United States						
Passengers (millions)	34.10	33.90	35.70	38.30	39.48	3.73
Freight ('000 tonnes)	1,807	1,557	1,836	1,842	1,930	1.65
<i>Source:</i> Airport Council International; Airports Authority of India.						

¹⁰http://articles.timesofindia.indiatimes.com/2011-10-03/mumbai/30238094_1_main-runway-secondary-runway-mumbai-airport

The development of world-class airport infrastructure in major cities in India during the past decade has helped improve the country’s overall rank at the global level. **Table 3.2** shows countries by rank in terms of total passenger-kilometres flown (international and domestic). This indicator shows the number of passengers transported by air over one kilometre. Three countries, namely, the United States, China and the United Kingdom have maintained their top three positions from 2008 to 2011. India ranked eleventh in 2011, which is a one-place improvement over its rank in 2008. It is noteworthy that India has performed better than Singapore and emerging countries such as Brazil and South Africa in terms of passenger-kilometres.

Table 3.2 Rank on Passenger-Kilometers Performed on Scheduled Services (International and Domestic)				
Country*	Rank in 2008	Rank in 2009	Rank in 2010	Rank in 2011
United States	1	1	1	1
China	2	2	2	2
United Kingdom	3	3	3	3
India	12	12	11	11
Singapore	13	13	17	12
Russian Federation	14	14	9	7
Brazil	17	17	14	13
South Africa	27	27	26	29
<i>Source:</i> International Civil Aviation Organization (ICAO), various Annual Reports.				
<i>Note:</i> *Countries and groups of countries whose airlines performed more than 100 million passenger-kilometres				

Table 3.3 illustrates how countries around the world have performed in terms of total tonne-kilometres flown (international and domestic). This indicator refers to a tonne of freight or mail that is carried one kilometre. The United States and China have been holding onto their top two positions since 2008. The United Kingdom, on the other hand has slipped from the third rank in 2008 to the fifth rank in 2011. India has performed well compared with other emerging economies, such as South Africa and Brazil, although its position slipped two points from eleventh in 2008 to fourteenth in 2011.

Table 3.3
Rank on Freight–Kilometre Performed on Scheduled Services
(International and Domestic)

Countries*	Ranking 2008	Ranking 2009	Ranking 2010	Ranking 2011
United States	1	1	1	1
China	2	2	2	2
United Kingdom	3	4	5	5
Singapore	13	10	9	10
Russian Federation	14	13	11	9
India	12	14	14	14
Brazil	17	17	15	16
South Africa	27	29	28	29
<i>Source:</i> International Civil Aviation Organization (ICAO), various Annual Reports.				
<i>Note:</i> * Countries and groups of countries whose airlines performed more than 100 million tonne-kilometres.				

The above analysis suggests that Mumbai airport has not only performed better than several other international airports across the globe, but is also the second best airport in India in terms of the number of domestic and international passengers it handles. In India, Mumbai airport leads in terms of the volume of international cargo it handles. In 2010–11 it showed impressive double-digit growth in handling both international and domestic passengers, but passenger traffic slowed thereafter due to a deceleration in economic growth both in the domestic and world economy.

3.2.1 Passenger movement

With regard to passenger traffic, Delhi airport tops the Indian chart, and Mumbai airport comes a close second, followed by Chennai and Kolkata (**Table 3.4**). The share of Mumbai airport in international passenger traffic is 23 per cent compared with Delhi airport's 26.9 per cent in 2012–13. Similarly, in terms of number of domestic passengers, Mumbai airport follows Delhi. In 2012–13, Mumbai airport handled 17.4 per cent of the domestic passengers per day compared to 19.6 per cent by Delhi. The proportion of international and domestic traffic movement at Mumbai airport is 33:67, which is similar to Delhi airport (34:66).

Table 3.4
Passengers Traffic Share in 2012–13 (%)

Airports	International	Domestic	Total
Mumbai	23.10	17.40	19.00
Delhi	26.90	19.60	21.60
Kolkata	3.80	7.20	6.30
Chennai	10.40	7.20	8.00
Other Airports	35.80	48.60	45.10
Total	100.00	100.00	100.00

Source: Calculated using data from Airports Authority of India.

3.2.2 Freight movement

Mumbai airport takes the first rank in India in handling international freight; it handles nearly one-third of international cargo movement. Delhi airport comes second with a share of 25.5 per cent, followed by Chennai at 16.9 per cent. In the case of domestic cargo, Mumbai and Delhi airports handle a nearly equal proportion of traffic (**Table 3.5**).

Table 3.5
Cargo Share in 2012–13 (%)

Airports	International	Domestic	Total
Mumbai	32.20	23.30	29.00
Delhi	25.50	24.00	24.90
Kolkata	3.00	10.30	5.60
Chennai	16.90	10.00	14.40
Other Airports	22.50	32.40	26.00
Total	100.00	100.00	100.00

Source: Computed using data from Airports Authority of India.

3.2.3 Aircraft traffic movement

In terms of the average number of flights per day, during 2012–13 Mumbai airport had the second highest share of 16.5 per cent after Delhi airport (19 per cent) (**Table 3.6**). Mumbai airport's share in international and domestic aircraft movement was 22.7 and 14.9 per cent, respectively, in 2012–13. On both international and domestic aircraft movement, Mumbai airport performs better than other airports in India, except Delhi.

Table 3.6
Aircraft Traffic Movement Share in 2012–13 (%)

Airports	International	Domestic	Total
Mumbai	22.70	14.90	16.50
Delhi	25.60	17.20	19.00
Kolkata	4.40	6.90	6.30
Chennai	10.90	7.10	7.90
Other Airports	36.40	53.90	50.20
Total	100.00	100.00	100.00

Source: Computed using data from Airports Authority of India.

3.2.4 Air routes

Mumbai airport plays a pivotal role in connecting domestic and international destinations.

3.2.4.1 City connectivity (international)

In comparison with other international destinations, Dubai sits comfortably in the first position in terms of the number of passengers, with 1.67 million passengers travelling through Mumbai airport in 2012–13. This is followed by London with 0.85 million passengers and Bangkok with 0.7 million passengers for the year (Table 3.7). In terms of the fastest-growing international destination, Singapore and Bangkok occupy the top two positions with an annual average growth rate of 13.5 and 12.7 per cent, respectively, between 2010–11 and 2012–13.

Table 3.7
Top 10 International Destinations of Passengers (in million) from CSIA in Terms of Origin Destination

Destinations	2009–10	2010–11	2011–12	2012–13	AAGR %
Dubai	1.38	1.43	1.52	1.67	6.60
London	0.88	0.87	0.89	0.85	-1.10
Bangkok	0.50	0.66	0.68	0.70	12.70
Singapore	0.47	0.53	0.63	0.69	13.70
Muscat	0.39	0.51	0.51	0.40	3.10
Hong Kong	0.36	0.34	0.40	0.38	2.40
Riyadh	0.31	0.32	0.39	0.38	7.50
Newark/Brussels	0.26	0.31	0.33	0.38	13.60
Jeddah	0.26	0.30	0.32	0.35	10.50
Bahrain	0.24	0.29	0.29	0.33	11.50

Source: Mumbai International Airport Pvt. Ltd.

3.2.4.2 City connectivity (domestic)

Delhi is the top domestic destination compared with other domestic destinations, with 4.46 million passengers travelling from Mumbai airport (**Table 3.8**). Bangalore, Chennai and Goa come second, third and fourth, respectively. In terms of annual growth rate, domestic traffic from Mumbai airport to the top 10 destinations declined in 2012–13. The average annual growth rate (AAGR) of domestic traffic from Mumbai airport to other airports in the last three two years (2010–11 to 2012-13) shows that Ahmadabad, Chennai, Nagpur and Goa are the fastest-growing destinations.

Destinations in India	2009–10	2010–11	2011–12	2012–13	AAGR%
Delhi	4.15	4.66	4.83	4.46	2.80
Bengaluru	1.81	2.08	2.13	2.04	4.40
Chennai	1.38	1.57	1.63	1.61	5.50
Goa	1.21	1.41	1.53	1.43	6.20
Kolkata	1.20	1.35	1.51	1.30	3.50
Hyderabad	1.15	1.34	1.34	1.28	4.00
Ahmadabad	0.97	1.29	1.33	1.06	5.30
Kochi	0.61	0.75	0.71	0.67	4.00
Jaipur	0.54	0.63	0.62	0.59	3.40
Nagpur	0.48	0.59	0.61	0.55	5.50

Source: Mumbai International Airport Ltd.

3.2.5 Mumbai airport and international trade

Mumbai airport has played a pivotal role in the expansion of international trade. **Table 3.9** shows the trends in air-borne trade for India and Mumbai. It is clear from the table that air-borne exports have continuously increased in absolute terms in both cases. While India’s air-borne exports increased from 568,218 metric tonnes in 2006–07 to 820,394 metric tonnes in 2011–12 with an annual compound growth rate of 7.6 per cent, it increased at 6.8 per cent for Mumbai during the same period. Mumbai airport contributes to one-third of the national air-borne exports. In 2006–07, the contribution of Mumbai airport in national air-borne exports was 32.9 per cent, which increased to 34.3 per cent in 2008–09 but then declined a few percentage points.

Table 3.9**Trends in Air-Borne Exports for India and Mumbai Airport (metric tonnes)**

Years	Total India air-borne	Total Mumbai air-borne	% share of Mumbai in India air-borne
2006–07	5,68,218	1,86,969	32.90
2007–08	6,12,284	2,05,296	33.50
2008–09	6,44,371	2,20,868	34.30
2009–10	7,28,255	2,35,678	32.40
2010–11	8,38,436	2,57,055	30.70
2011–12	8,20,394	2,60,217	31.70
2012-13	8,24,007	2,66,148	32.20

Source: Airports Authority of India.

The pattern for air-borne imports is similar (**Table 3.10**). Air-borne imports for India and Mumbai were low in the years 2008–09 and 2011–12 due to the economic slowdown and economic crisis. Interestingly, Mumbai's share in national air-borne imports increased from 31.1 per cent in 2006–07 to 32 per cent in 2011–12.

Table 3.10**Trends in Air-Borne Imports for India and Mumbai Airport (metric tonnes)**

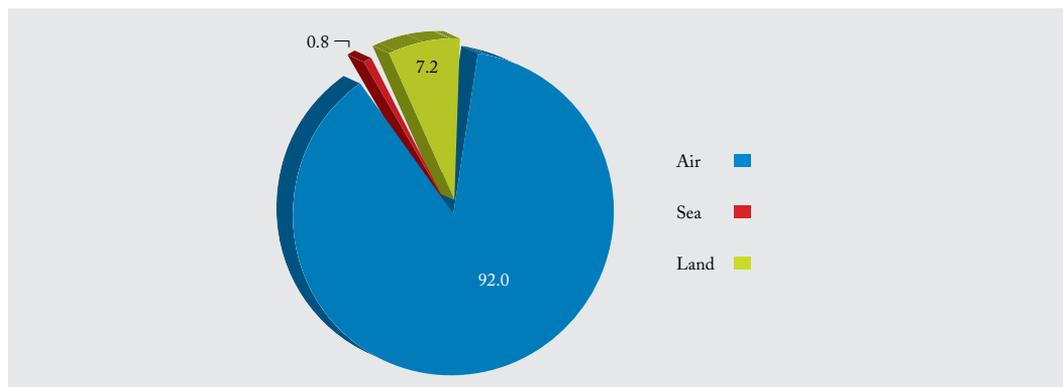
Years	Total India air-borne	Total Mumbai air-borne	% share of Mumbai in India air-borne
2006–07	4,53,045	1,41,053	31.10
2007–08	5,34,461	1,68,474	31.50
2008–09	5,05,552	1,57,742	31.20
2009–10	5,42,457	1,72,774	31.90
2010–11	6,57,803	2,13,347	32.40
2011–12	6,47,502	2,06,965	32.00
2012-13	5,82,327	1,86,593	32.00

Source: Airports Authority of India.

3.2.6 Tourists in Mumbai

Air transport is the preferred mode of transport for international passengers. In 2011, more than 91 per cent of foreign tourists arrived in India through this mode. This is followed by the land mode, which contributed 7.22 per cent of total foreign tourist arrivals. Sea transport contributes the remaining at a minuscule 0.81 per cent (**Figure 3.1**).

Figure 3.1
Foreign Tourist Arrivals by Mode of Transport (%) in 2011



Source: Indian Tourism statistics, 2011.

Mumbai airport plays an important role in driving the tourism industry in Maharashtra. It receives around 19.7 per cent of the foreign tourist arrivals in India as compared to Delhi airport’s 35.8 per cent in 2011. **Table 3.11** shows that 5.12 million foreign tourists visited Maharashtra in 2012, which is around 25 per cent of the total foreign tourist visits to India. Since most of the foreign tourists arrive by air, the contribution of Mumbai airport to the tourism sector of the state may be substantial.

Table 3.11 Foreign Tourist Visits in 2012 (in million)		
States	Foreign tourist visits	Share (%)
Delhi	2.30	11.30
Maharashtra	5.10	24.70
Tamil Nadu	3.60	11.20
Karnataka	0.60	2.90
West Bengal	1.20	5.90
Other	7.90	44.00
Total	20.70	100.00

Source: Indian Tourism statistics, 2013

3.3 Qualitative correlation between Aviation and the Economy

The aviation sector contributes considerably to the process of economic development by creating employment opportunities, both directly and indirectly, besides facilitating higher productivity and efficiency in the transportation of goods and services. It is a key infrastructure sector that enables the growth and development of business, trade and tourism, with significant multiplier effects across the economy. In this section, we attempt to relate the prosperity of the air transport sector with the overall economic growth of the country. The high positive correlation between the two sectors suggests that both sectors move closely in the same direction.

Table 3.12 shows the share of transport by other means (including water, road and air transport) in India's total GDP. The share was 5.7 per cent in 2004–05, dipped to 5.6 per cent in 2007–08 and further to 5.4 per cent in 2010–11. However, it improved in 2011–12, recording 5.6 per cent of GDP. The economic crisis in 2008–09 and 2009–10 dampened the growth prospects of this sector more than it did the overall economy.

Table 3.12
Share of Transport by other Means in Total GDP at Factor Cost (base: 2004–05 prices):
All-India (Rs billion)

Year	GDP at factor cost	Transport by other means	Share (%)
2004–05	29,715	1,700	5.70
2005–06	32,531	1,857	5.70
2006–07	35,644	2,024	5.70
2007–08	38,966	2,200	5.60
2008–09	41,587	2,316	5.60
2009–10	45,076	2,483	5.50
2010–11	49,370	2,686	5.40
2011–12	52,436	2,916	5.60

Source: Based on data from Central Statistical Organisation, Government of India.

While **Table 3.12** discusses share of transport by other means in overall gross domestic product at factor cost in India, **Table 3.13** takes up the same indicators for Maharashtra. In 2004–05, the share of transport by other means in total GSDP was 5.2 per cent, which declined to 4.8 per cent in 2009–10 and further to 4.5 per cent in 2011–12. Compared to the all-India level, the share of transport by other means in total GSDP is low for Maharashtra. However, both cases show a similar pattern.

Table 3.13
Share of Transport by other Means in Total GDP at Factor Cost (base: 2004–05 prices)
– Maharashtra (Rs billion)

Year	GSDP	Transport by other means	Share (%)
2004–05	4,155	217	5.20
2005–06	4,709	232	4.90
2006–07	5,347	253	4.70
2007–08	5,948	261	4.40
2008–09	6,102	264	4.30
2009–10	6,669	317	4.80
2010–11	7,352	334	4.50
2011–12	7,874	354	4.50

Source: Central Statistical Organisation, Government of India.

Table 3.14
GDP Growth Rate of Transport Sector and its Correlation with Overall GDP Growth in India

Year	GDP at factor cost	Transport by other means	Air Transport
2005–06	9.50	9.30	24.50
2006–07	9.60	9.00	26.40
2007–08	9.30	8.70	18.00
2008–09	6.70	5.30	-4.60
2009–10	8.60	7.20	13.60
2010–11	9.30	8.20	15.50
2011–12	6.20	8.60	8.70
Correlation		0.60	0.80

Source: Central Statistical Organisation, Government of India.

Table 3.14 presents the correlation between sectors such as transport by other means and air transport with overall GDP in India. The third column in this table shows that the correlation between transport by other means, which comprises water, road and air transport, and overall GDP growth rate is reasonably high around 0.6. The correlation improves further to 0.8 in the case of air transport and overall GDP. This indicates that air transport is a key sector that drives overall economic growth in India.

Chapter 4

Mumbai Airport: A Snapshot

4.1 Introduction

Chhatrapati Shivaji International Airport (CSIA), Mumbai, is the main international airport in Maharashtra and is named after the 17th century Maratha emperor, Chhatrapati Shivaji. The airport is situated in the suburb of Santacruz and has five operating terminals spreading over an operational area of 1,400 acres. It is one of the busiest airports in India with the capacity to handle more than 30 million passengers and 635,163 tonnes of cargo as recorded in 2012–13. Presently, 42 international airlines and 5 domestic airlines connect CSIA to 43 international destinations and 47 domestic destinations. In addition, 4 international airlines and 1 domestic airline operate exclusive freighter flights from CSIA. In 2011 and 2012, the Airports International Council ranked Mumbai airport the third-best in the world in the 25–40 million passenger category. It has also been awarded the ‘Golden Peacock National Quality Award’ for the year 2012. It has been rated the best airport in terms of cargo upliftment and 3rd best cargo airport for the year 2012 at the 39th convention of the Air Cargo Agents Association of India (ACAAI). It has also received the prestigious Autodesk Hong Kong Building Information Modelling (BIM) Award 2009 for the proposed Air Traffic Control Tower designed by HOK. The state-of-the-art technology, food and beverage (F&B) experience and shopping paradise make the CSIA a world-class airport. This brownfield airport is being developed through a public-private partnership and awarded ‘Best Brown Field Airport in Public-Private Partnership’ by the Air Passengers Association of India and Consumer Association of India Survey 2009; Mumbai International Airport Limited (MIAL) is a consortium led by GVK, which has the largest equity share at 50.5 per cent. Other partners such as Bid Services Division Ltd., ACSA Global and Airport Authority of India (AAI) have the remaining shares of 13.5 per cent, 10 per cent and 26 per cent, respectively. MIAL was appointed to carry out the modernization of CSIA in 2006. Once the modernization work will be completed which includes building a new integrated state-of-the-art terminal (T-2), CSIA will be capable of handling 40 million passengers and 1 million metric tonnes of cargo annually. CSIA was the leading airport in India in terms of number of passengers handled per day until 2008. Since then, Delhi airport has overtaken it, perhaps because the area of Delhi airport is three times that of CSIA and therefore more space is available for aircraft to land and park.

4.2 Scale of the Facility

There are two primary aspects in CSIA’s scale: physical and throughput.

4.2.1 Physical scale

CSIA is built on 1,400 acres of land. Compared with the area of other metro airports such as Delhi and Kolkata, Mumbai airport is miniscule. **Table 4.1** illustrates the land area of metro airports in India. Hyderabad airport tops the list with 5,500 acres of land followed by Kolkata and Delhi airport

with 5,400 and 5,000 acres of land, respectively. While Hyderabad and Delhi airports are being developed through public-private partnership, Kolkata airport is basically a public owned airport. The total area of CSIA is only 1,400 acres, which is about one-third more than the area of Delhi airport. So, although the completion of modernization work on CSIA would boost traffic in the short and medium terms, traffic would be saturated in the longer term due to space constraints.

Table 4.1
Comparison of Land Area of Airports

Airports	Land Area(acres)
Hyderabad	5,500
Kolkata	5,400
Delhi	5,000
Bengaluru	4,000
Mumbai (CSIA)	1,450
Chennai	1,283

Source: Airport websites.

Currently, CSIA has two runways crossed each other. These are 09/27 and 14/32 (**Table 4.2**). The main runway, 09/27, is longer at 3,448 metres than the 14/32 runway, which is slightly shorter at 2,925m. Runway 09/27 has been upgraded to Code F, which means that it can accommodate larger aircraft like the Airbus 380. Runway has three rapid exit taxiways. There are four operational passenger terminals, one cargo terminal and one general aviation terminal at CSIA.

Table 4.2
CSIA's Physical Scale

Facility	Handling Capacity	Size
Runways		Length (m)
09/27	40	3,448
14/32	40	2,925
Passenger Terminal Building	Million per annum	Area (sq.m)
T-2	40 million	4,39,203
Old T-2*	8.9 million	1,05,165
T1A	7.1 million	28,960
T1B	14.2 million	51,739
T1C	Only boarding bridges	27,610

Source: MIAL

Note: *Old T-2 demolished after New T-2 opened in February 2014.

As seen in **Figure 4.1**, the Passenger Operation Terminal is divided into domestic and international terminals. The domestic terminal is further segregated into Terminal 1A, Terminal 1B, and Terminal 1C. The international passenger terminal is Terminal T-2.

Domestic passenger terminals

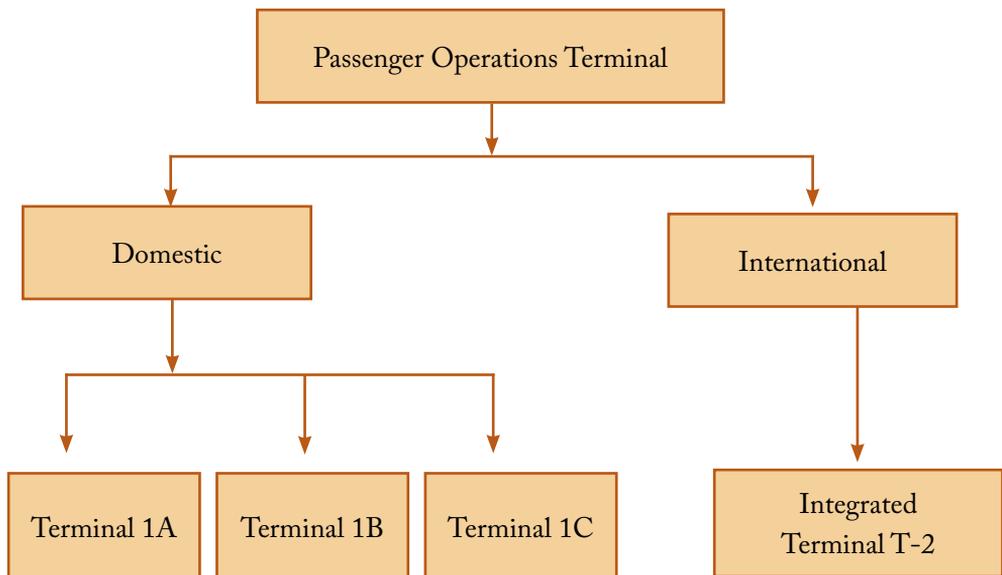
Terminal 1A – This terminal is mainly allocated to Go Air and Air India and has five aerobridges.

Terminal 1B – Jet Airways, Indigo and SpiceJet are exclusively allocated to this terminal.

Terminal 1C – This terminal was opened in April 2010 and serves as the only boarding facility for all four airlines. It has six passenger boarding bridges and allows connectivity between Terminal 1A and Terminal 1B.

Figure 4.1

Passenger Terminals: A Snapshot



Integrated passenger terminal (T-2)

MIAL is currently working on an integrated terminal (known as T-2) at CSIA, aiming to modernize it into one of the best airports in the world. When completed, the terminal will be able to handle 40 million passengers annually. The 4-level integrated terminal with an area of over 4,39,000 sq. m. will include new taxiways and apron areas for aircraft parking. Retail space and

lounges would cover around 700,000 sq. ft. and more than 5,000 cars could be accommodated through travel services and parking space. It has 188 check-in counters, 60 departure immigration counters and 76 arrival immigration counters. There are 124 security check positions, 10 baggage carousels, 25 fixed link bridges, 52 passenger boarding bridges, 44 travelators, 49 escalators, 73 elevators and 6-lane elevated expressway leading to the terminal. Terminal 2 has set new international standards in terms of planning, infrastructure, technology, service and functionality. Part of the integrated terminal (T-2) opened up for international operations in February 2014 and remaining part if T-2 is likely to be completed by the end of 2015. This one roof terminal after completion will be advantageous for the ultimate vision of CSIA as it will eliminates the need for passenger transfer, and improves efficiency in operation by bringing together all the airlines operating international and domestic under a single terminal, as well as achieving better utilization of space and facilities.

Cargo terminal

The cargo terminal has been in operation since 1977 and is located west of the international terminal. The cargo apron is capable of handling five wide-bodied aircrafts. The total coverage area for storage and processing for cargo is 53,809 sq. m. It has a state-of-the-art terminal exclusively for the export of perishable commodities, four cold storage chambers in the exports zone that are exclusively for pharmaceuticals and vaccines and 13 cold storage chambers in the imports zone. There is also an exclusive storage facility for dangerous goods in both the exports and imports zones and an exclusive storage facility for radioactive material in the import zone. The cargo terminal is one-stop shop to meet all the needs of consumers and minimize cargo handling time.

General aviation terminal

The general aviation terminal of CSIA is located on the south-west side of the airfield, at Kalina. The CSIA is the first airport in India to have its own self-contained terminal and it was approved for international operations in April 2011. The terminal is used by private and non-scheduled flight operators (NSOPs). Facilities are provided for passengers who depart and arrive on business jets and private aircrafts. The terminal has two conference halls, two exclusive lounges, two crew rest rooms and a cafe bar.

4.2.1 Facilities at Mumbai Airport

Facilities at the CSIA are designed to help passengers at every step, from parking their vehicle to boarding the aircraft in order to enhance passenger comfort through efficient processes. The CSIA has large numbers of self-check-in kiosks and check-in counters that are spread across the terminals to reduce waiting time. Facility also covers retail outlets, duty free shopping, food and beverage, foreign exchange, fleet taxi, hotel information desk and IT facilities. Other facilities such as free mobile charging station, internet kiosk,

sanitary provisions, newspaper, information kiosk, etc. are also provided to passengers. There are medical inspection rooms at all terminals with doctors and paramedics available 24/7 to handle medical emergencies. The CSIA also has a left luggage facility at all arrival terminals; passengers can collect their luggage from the domestic or international terminals.

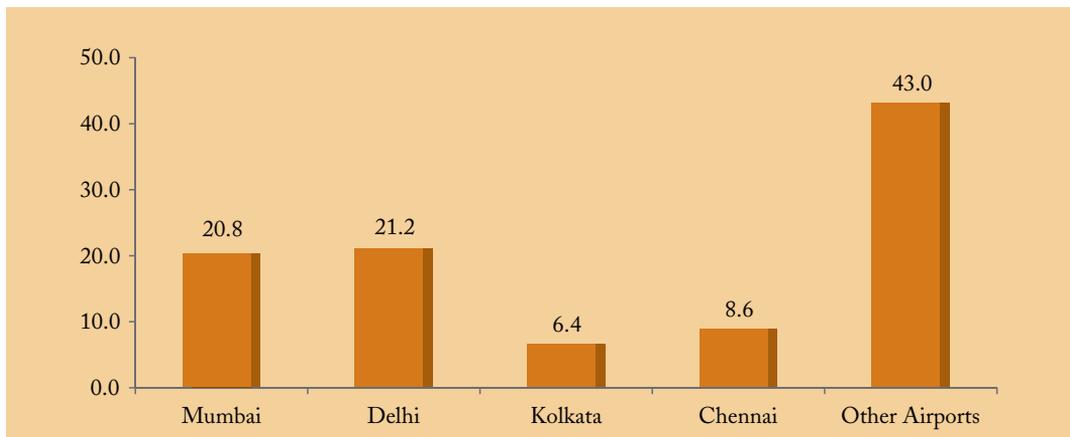
4.2.2 Throughput scale

To measure the throughput of an airport, the following indicators are used: average number of passengers handled per day, the average number of flights handled per day, and the average volume of cargo handled per day. On some of these indicators, the CSIA outstrips other Indian airports.

In terms of average number of passengers and average number of flights handled per day, Mumbai airport is slightly behind Delhi airport. This can be seen in Figures 4.2 and 4.3. As mentioned earlier, until 2008–09, the CSIA handled the highest number of passengers per day at the all-India level, but its share then declined.

Figure 4.2

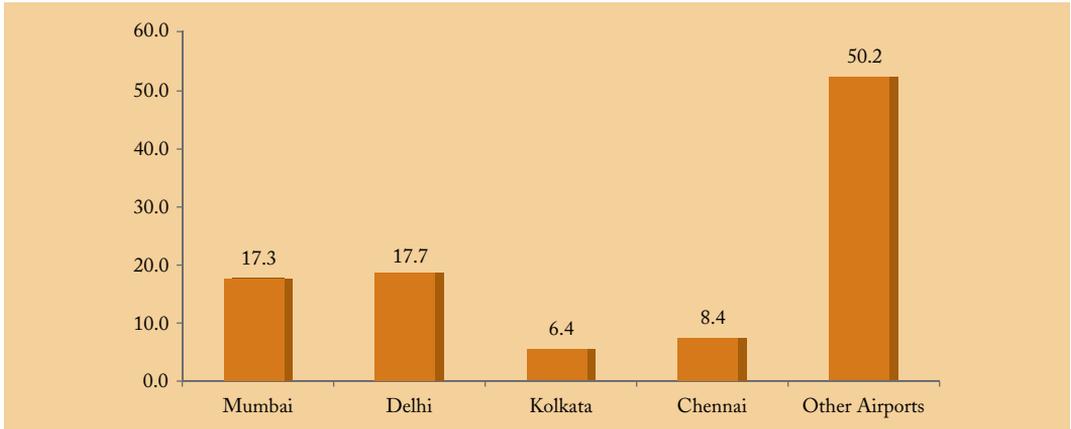
Average no. of passengers handled per day between 2006–07 and 2012–13 (%)



Source: Based on data from AAI.

Figure 4.3

Average no. of Flights Handled between 2006–07 and 2012–13 (%)

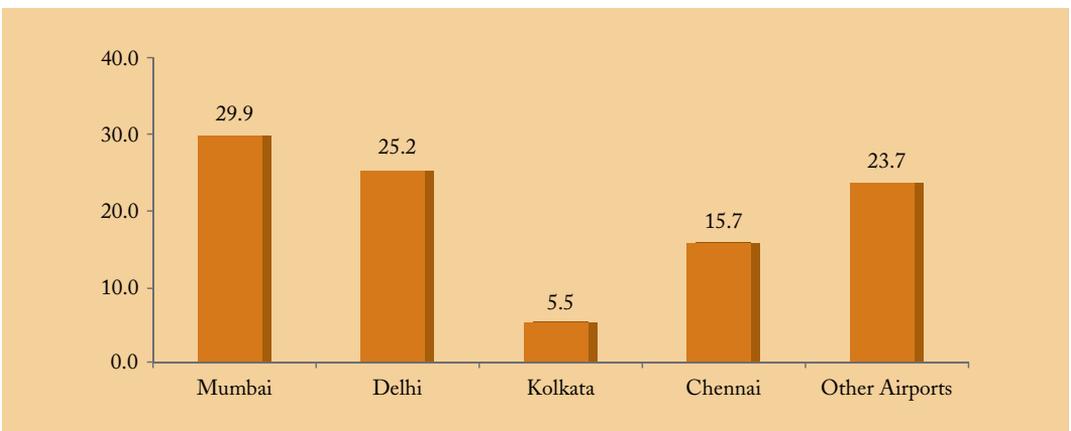


Source: Based on data from AAI.

However, in terms of average volume of cargo handled per day, the CSIA continues to hold the largest market share among all airports in India. The CSIA’s share was 29.9 per cent compared with Delhi’s 25.2 per cent in 2012–13. Kolkata airport has the lowest share among all metro airports (Figure 4.4).

Figure 4.4

Average Cargo Handled (in tonnes) between 2006–07 and 2012–13 (%)



Source: Based on data from AAI

The data above presents a static picture of the three indicators. To obtain a clearer picture, we need to examine how fast these airports are expanding in terms of the indicators. **Table 4.3** shows the average annual growth rate (AAGR) on the performance indicators for Indian airports between 2007–08 and 2012–13.

In terms of the AAGR for the number of flights handled per day, Chennai airport has the lowest growth rate (2.97 per cent), followed by Mumbai (3.42 per cent). Both airports have less land for operations than other metro airports, which suggests that handling capacity partly depends on the availability of land for airport operations. Having more land allows the airport to expand the existing infrastructure and accommodate more traffic.

The AAGR for the number of passengers handled per day is also the lowest for Chennai and Mumbai and is below the national average of 9.21 per cent. In contrast, Delhi and Kolkata airports have performed quite well, despite the slowdown of economic activities during the past two fiscal years.

In terms of cargo handling, the AAGR slowed in the case of Mumbai airport during the past five years, with the exception of 2010–11. On this indicator, Kolkata has performed much better than other metro airports.

Table 4.3
Average Annual Growth Rate of Passengers, Flights and Cargo Handled
(2007–08 to 2012–13)

Average Annual Growth Rate (%)	Mumbai	Delhi	Kolkata	Chennai	Other Airports	Total
Number of flights handled per day	3.42	7.45	6.44	2.97	6.44	5.74
Number of passengers handled per day	5.61	9.52	9.58	6.44	11.45	9.21
Volume of cargo handled per day	5.02	6.29	7.20	5.58	8.41	6.33

Source: Calculated using data from Airports Authority of India.

Note: Includes both domestic and international.

During 2012–13, CSIA handled 30.20 million passengers. **Table 4.4** shows the share of CSIA in passenger traffic. The share of international traffic marginally reduced from 31.2% in 2010–11 to 30.50% in 2012–13 while the share of domestic traffic increased from 68.8% in 2010–11 to 69.5% in 2012–13. The major reason for increase in domestic passengers was mainly due to advent of LCC in domestic sector.

Table 4.4
Passenger Traffic Share in 2012–13 (%)

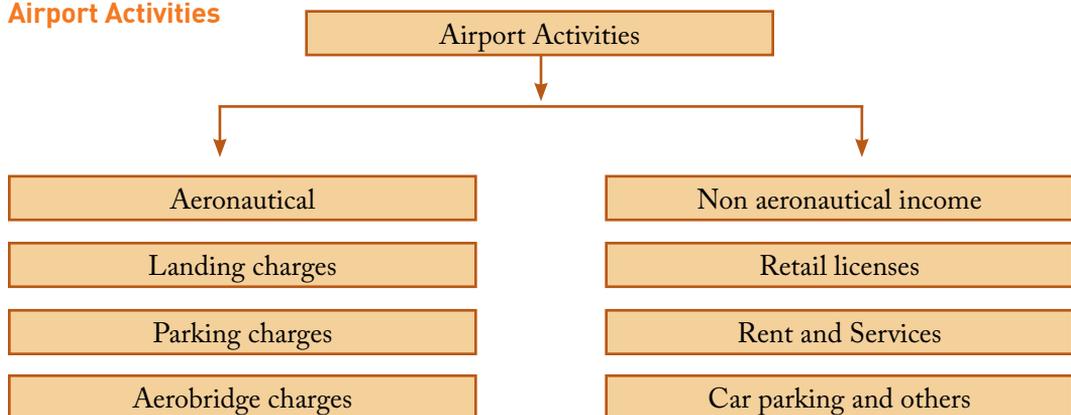
Year	International	Domestic	Total
2010-11	31.20	31.50	30.50
2011-12	68.80	68.40	69.50
2012-13	100.00	100.00	100.00

Source: Calculated using data from Airports Authority of India.

4.3 Scope of Activities

The different economic activities of the CSIA are illustrated in Figure 4.5. The two main activities are aeronautical and non-aeronautical activities. Besides aero and non-aero activities, other important activities are also coming up around the airport which includes commercial development.

Figure 4.5
Airport Activities



4.3.1 Aviation or aeronautical operations

Aeronautical operations include refer to all these services that are related to the movement of an aircraft. These include services like landings, take offs, parking. It also includes navigation, surveillance and supportive communication for air traffic management.



ATC- New tower

4.3.2 Non-aeronautical operations

Non-aeronautical services include duty retail, advertising, food & beverages, trade & concessionaries, car rental concessions, cargo, ground handling and fuelling concessionaries.



T-2 Check in counters

4.3.3 Commercial development

Other than aeronautical and non-aeronautical activities, the airport operator of the CSIA is also involved in commercial businesses related to aviation. Different commercial facilities have been developed in and outside the airport to support both aviation-linked businesses and air travellers. MIAL proposes to develop a 'GVK SkyCity' in and around the Mumbai airport as a part of their concession from AAI for passengers and local populi. Besides the current available road and rail connectivity, the development in GVK SkyCity will be connected to other areas through metro rail with three underground metro stations that will be implemented by the Mumbai Metropolitan Region Development Authority (MMRDA). Other infrastructure services and facilities being developed are a sewage treatment plant, storm water drainage system, rainwater harvesting and solid waste disposal systems. The GVK SkyCity is spread over seven development zones within the development master plan and will be developed in next 6–8 years.

4.4 Economic Performance

According to the International Civil Aviation Organization (ICAO), performance management involves engaging in activities to ensure that objectives are consistently being met in an effective and efficient manner. As airports employ all kinds of resources in their day-to-day activities, a

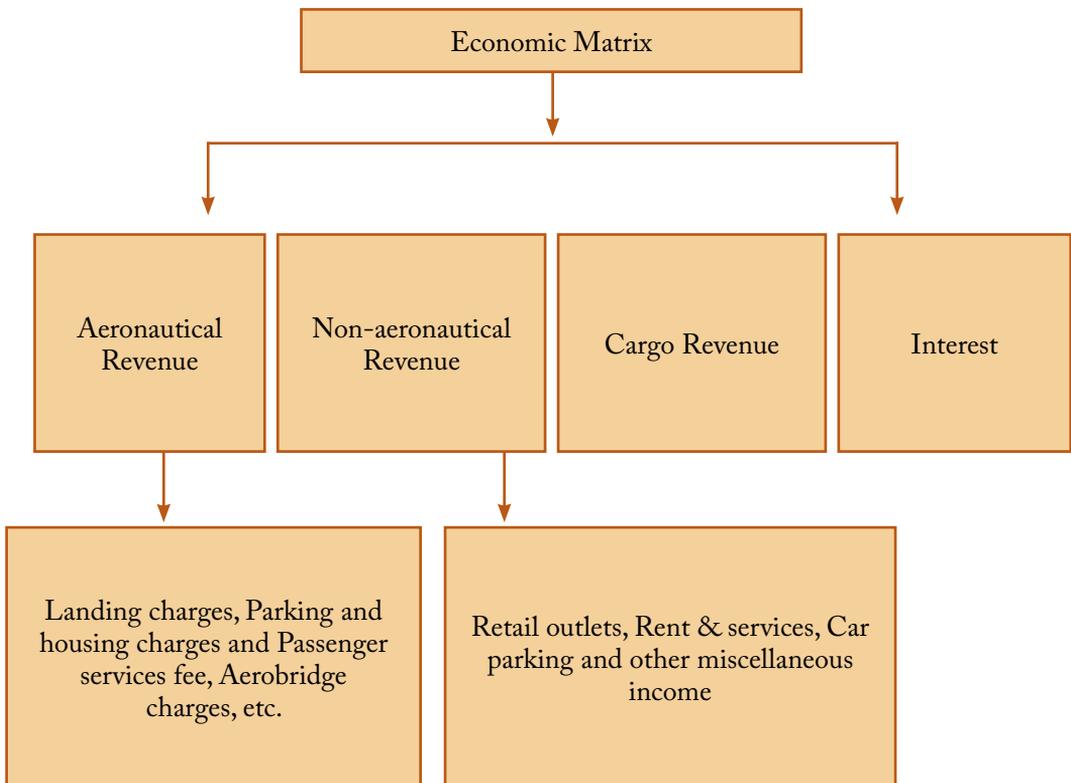
performance shortfall would not lead to full and optimal utilization of its available resources. This would increase costs that would be passed on to members and consumers. On the other hand, if airports perform well, then it would have a positive impact on all members of the aviation community.

4.4.1 Airport economic performance matrix

The airport economic performance matrix consists of a matrix for revenue and cost performance. The economic efficiency of an airport is determined by calculating the difference between these two components. Hence, revenue plays a key role in determining the efficient functioning of an airport, and economic efficiency of an airport can be achieved by eliminating wastage of resources.

The airport economic performance matrix is based on three businesses: aeronautical revenue, non-revenue and cargo revenue. Interest payment is another source of revenue for airport operators (Figure 4.6).

Figure 4.6
Economic Matrix for an Airport



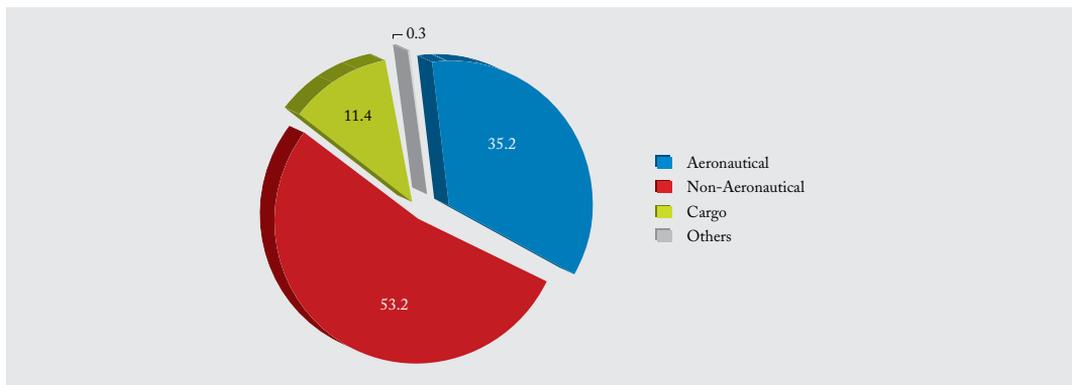
4.4.2 Economic performance of CSIA

4.4.2.1 Sources of Revenue

Since 2010, it has been noticed that non-aeronautical revenue is becoming the prime source of income for MIAL. Figure 4.7 shows the distribution of MIAL's revenue from different sources in 2012–13. With 53.2 per cent, non-aeronautical revenue contributes the largest share. Aeronautical revenue takes second place (35.2 per cent), followed by cargo revenue (11.4 per cent); and the lowest contribution comes from other sources, such as income from interest. The airport provides 37.8 per cent of its revenue to the government in the form of tax.

Figure 4.7

MIAL's Revenue Sources in 2012–13 (%)



The pattern of revenue changes between 2008–2009 and 2012–13 can be seen in **Table 4.5**. Aeronautical revenue recorded 4.4 per cent growth in 2011–12 and a remarkable 22.7 per cent growth in 2012–13 mainly due to hike in aeronautical tariff approved by Regulatory Authority. Non-aeronautical revenue on the other hand showed a remarkable growth of 49.6 per cent in 2011–12 but slowed to 10.1 per cent in 2012–13 due to significant decline (17.5 per cent) of revenue from rent and services. The revenue generated from cargo however has also declined significantly over the years due to slowing demand and business in the past two fiscal years; it registered positive growth in between 2009–10 and 2010–11, but declined sharply in the next two fiscal years. Gross income from all sources has recorded steady growth during the past five years due to the consistent positive growth of aeronautical revenue.

Table 4.5
Sources of Airport Revenue (Rs million)

Year	Aeronautical	Non-Aeronautical	Cargo***	Others*	Gross Income**
2008–09	3,753	3,894	1,811	93	9,551
2009–10	4,033	3,867	2,009	58	9,966
2010–11	4,061	4,773	2,921	38	11,794
2011–12	4,242	7,141	1,702	58	13,143
2012–13	5,204	7,863	1,679	40	14,786
%YoY2011–12	4.40	49.60	-41.70	52.10	11.40
%YoY2012–13	22.70	10.10	-1.40	-31.40	12.50

Source: Mumbai International Airport Ltd.

Note: *Includes interest and dividend.

**Gross excludes electricity and water recoveries and annual fee.

***Cargo including Demurrage Charges.

4.4.2.1.1 Aeronautical revenue

Table 4.6 lists the sources of aeronautical revenue. These include landing and parking charges, and passenger service fee/user development fee. Aerobridge charges are only accounted for the year 2012–13 and passenger X-ray charges are only available for 2008–09 and 2009–10. Over the years, both landing charges and the passenger service fee have registered an increase in revenues. Overall, aeronautical income has surged 1.4 times, from Rs 3,753 million in 2008–09 to Rs 5,204 million in 2012–13.

Table 4.6
Sources of Aeronautical Income (Rs million)

Year	Landing Charges	Parking Charges	PSF/ UDF	Aerobridges Charges	Passenger X-Ray	Total
2008–09	2,699	185	831		38	3,753
2009–10	2,687	162	982		201	4,033
2010–11	2,852	110	1,099			4,061
2011–12	2,981	90	1,171			4,242
2012–13	3,414	114	1,634	42		5,204
%YoY 2011–12	4.50	-18.00	6.50			4.40
%YoY2012–13	14.50	26.30	39.50			22.70

Source: Mumbai International Airport Ltd.

Note: PSF = Passenger Service Fee; UDF = User Development Fee.

4.4.2.1.2 Non-Aeronautical revenue

Non-aeronautical revenue comprises retail licences, rent & services and car parking & other miscellaneous income. Of these, retail licences is the major source of non-aeronautical revenue for MIAL. Revenue from retail licences, which declined to Rs 2,891 million in 2009–10 from Rs 2,860 million in 2008–09, has shown a continuous increase since 2010–11 (**Table 4.7**); it registered substantial growth of 19.2 per cent in 2011–12 and 22.5 per cent in 2012–13. Rent and services, which is the second major source of non-aeronautical revenue for MIAL, shows a fluctuating growth trends since 2009–10. In 2011–12, it recorded a whopping 155.6 growth over the previous fiscal year, but it recorded negative growth of 17.5 per cent in the next fiscal year. Car parking & other miscellaneous revenue shows a continuous decline between 2008–09 and 2010–11 and then the trend reverses. It registered a nominal growth 9 per cent in 2011–12 and a massive 120.9 per cent increase in the next fiscal. The balancing of growth across components has led to a stable rise in non-aeronautical income between 2009–10 and 2012–13.

Table 4.7
Sources of Non-Aeronautical Income (Rs million)

Year	Retail Licenses	Rent & Services	Car Parking & Other Misc. Income	Total
2008–09	2,860	803	231	3,894
2009–10	2,891	753	224	3,867
2010–11	3,490	1,079	204	4,773
2011–12	4,161	2,758	222	7,141
2012–13	5,097	2,276	490	7,863
%YoY2011–12	19.20	155.60	9.00	49.60
%YoY2012–13	22.50	-17.50	120.90	10.10

Source: Mumbai International Airport Ltd.

4.4.2.1.3 Cargo revenue

Cargo revenue is also an important source of income for MIAL. It recorded a phenomenal growth of 45.4 per cent in 2010–11 due to recovery of external and domestic demand during the same year. But in the immediate next two fiscal years (2011–12 and 2012–13), the data shows that there was a significant decline of cargo revenue on an average 21.5 per cent.

4.4.2.1.4 Other income

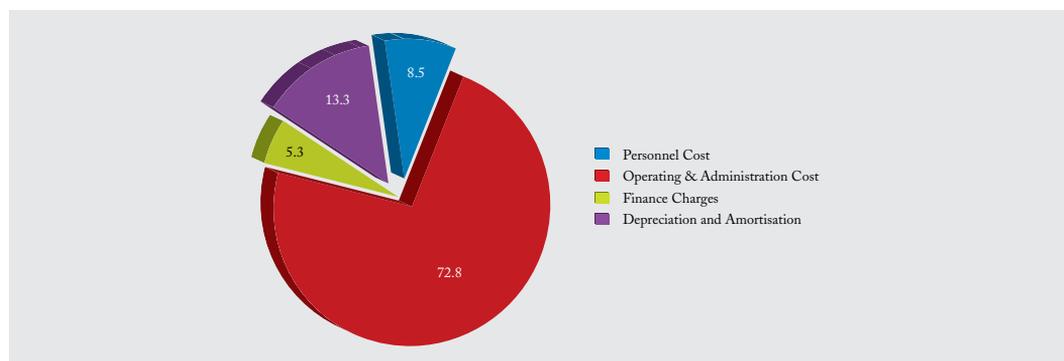
Interest and dividends are another source of revenue for MIAL. The share of this income in total revenue has declined over the years, from 1 per cent in 2008–09 to 0.3 per cent in 2012–13. After registering large positive growth of more than 50 per cent in 2011–12, the growth rate of revenue from other income plunged to 31.4 per cent in 2012–13.

4.4.2.2 Operating expenditure

The sources of the expenditure incurred in operating an airport are personnel cost, operating & administration cost, finance charges, depreciation and amortization and exceptional items. Exceptional items were only accounted for the year 2008. With the exception of personnel cost, all the costs have witnessed an upward trend since 2009–10. In 2011–12, personnel cost saw a positive growth of 28.6 per cent over the previous year, while in 2012–13 it only grew by 8.2 per cent (**Table 4.8**). On the other hand, operating cost rose exponentially, with 15.8 per cent growth in 2011–12 and 23.4 per cent growth in 2012–13. Total expenditure has been rising over the years, from Rs 8,210 million in 2008–09 to Rs 12,483 million in 2012–13. It should be pointed out that operating and administrative cost had the highest share (72.8 per cent) in 2012–13, followed by depreciation and amortization (13.3 per cent) and personnel cost (8.5 per cent) (Figure 4.8).

Year	Personnel Cost	Operating & Administration Cost	Finance Charges	Depreciation and Amortization	Exceptional Items	Total Expenses
2008–09	1,520	5,478	273	400	540	8,210
2009–10	864	5,902	389	793		7,948
2010–11	765	6,358	572	1,138		8,833
2011–12	984	7,363	651	1,421		10,418
2012–13	1,064	9,087	666	1,665		12,483
%YoY 2011–12	28.60	15.80	13.80	24.80		17.90
%YoY 2012–13	8.20	23.40	2.40	17.20		19.80

Figure 4.8
Expenditure Pattern in 2012–13 (%)



4.4.2.3 Contribution of tax revenue to government's exchequer

As mentioned in the previous chapters, development of an airport not only contributes income and employment to the economy, but also tax revenue to the government's exchequer. The growing economic activities of CSIA have helped MIAL to generate a substantial amount of revenue and in return, the agency has paid a chunk of its revenue to government's exchequer in the form of various taxes. The tax revenue contribution of MIAL to government's exchequer in the form of various taxes is reported in **Table 4.9**.

Sr. No.	Item	2008-09	2009-10	2010-11	2011-12	2012-13
1.	TDS-Deducted on Payments	1,623	1,380	1,077	1,267	1,468
2.	WCT-TDS	105	184	207	295	335
3.	MVAT	2	4	3	3	3
4.	TCS	4	4	3	3	4
5.	Service Tax net of CENVAT Credit	566	869	879	947	1,217
6.	Income Tax paid on Income	194	348	589	551	463
Total Taxes		2,494	2,787	2,758	3,066	3,490
Total taxes (% of MIAL's revenue)		26.10	28.00	23.40	23.30	23.60
<i>Note:</i> WCT = Works and Contract Tax, MVAT= Maharashtra Value Added Tax, TCS = Tax Collected at Source, CENVAT = Central VAT						

In addition to the above taxes paid by MIAL to the government exchequer, contribution of custom duty to the Indian economy, collected year wise by custom department at CSIA is given in **Table 4.9a**:

Period	2009-10	2010-11	2011-12	2012-13	2013-14
Amount (in million)	48,854	62,218	69,424	79,148	89,735

4.4.2.4 Unit revenue performance

An airport's revenue performance can be assessed by airport throughput such as aircraft movement, by passenger output and by work load unit (WLU). **Table 4.10** demonstrates the trend of different

revenue indicators and how they fared from 2008–09 to 2012–13. Aeronautical revenue per passenger declined from Rs 160 in 2008–09 to Rs 138 in 2011–12; however, the trend reversed in 2012–13, when it increased by around 25 per cent over the previous fiscal year, due to an increase in user fee charges. On the other hand, non-aeronautical revenue per passenger shows a continuous rise since 2010–11 due to better revenue collection from retail licences.

The aeronautical revenue per air transport movement (ATM) shows a fluctuating trend. It registered an increase in 2009–10 to Rs 17,550 from Rs 16,496 in 2008–09, then declined to Rs 16,736 in 2010–11 and showed an improvement in 2011–12 and 2012–13.

Aeronautical revenue per WLU shows a downward trend from 2008–09 to 2011–12 and then an upward trend. On the other hand, non-aeronautical revenue per WLU showed a decline only in 2009–10 and an increase in the remaining years. A similar trend has been recorded for total revenue per WLU; it declined only in 2009–10 and increased thereafter.

Parameters	2008–09	2009–10	2010–11	2011–12	2012–13
Aero revenue per passenger	160	157	140	138	172
Non-aero revenue per passenger	166	151	164	177	221
Total revenue per passenger	408	389	406	427	489
Aero revenue per ATM	16,496	17,550	16,736	16,867	21,284
Non-aero revenue per ATM	17,115	16,828	19,670	28,395	32,160
Total revenue per ATM	41,980	43,372	48,601	52,260	60,475
Aero revenue per WLU	131	128	114	114	142
Non-aero revenue per WLU	136	123	133	191	215
Total revenue per WLU	332	317	330	352	404
<i>Source:</i> Calculated using data from MIAL					
<i>Note:</i> ATM=Air Transport Movement & WLU = Work Load Unit (= 1 passenger or 100 kg of cargo)					

4.4.3.5 Unit cost performance

Table 4.11 demonstrates the trends of expenditure performance indicators of MIAL between 2008–09 and 2012–13. Overall cost (total expenditure) showed a fluctuating trend over the period. The total cost per passenger declined from Rs 350 in 2008–09 to Rs 304 in 2010–11, but increased thereafter to Rs 339 in 2011–12 and further to Rs 413 in 2012–13. A similar trend is evident in the case of operating and administrative cost per passenger.

In contrast, the operating and administrative cost per air transport movement has continuously increased over the years, from Rs 24,076 in 2008–09 to Rs 26,203 in 2010–11 and further to Rs 37,167 in 2012–13. However, the staff cost per aircraft movement saw a decline from Rs 6,679 in 2008–09 to Rs 3,152 in 2010–11, and recorded a sharp increase to Rs 3,911 in 2011–12. In terms of WLU, staff cost first decreased from Rs 53 in 2008–09 to Rs 21 in 2010–11 and then increased to Rs 26 and Rs 29 in 2011–12 and 2012–13, respectively. Operating and administrative cost per WLU declined rapidly from Rs 191 in 2008–09 to Rs 178 in 2010–11. It is evident from the table that both staff and operating costs have followed a similar pattern over the period.

Table 4.11
Expenditure Indicators (in Rs)

Parameters	2008–09	2009–10	2010–11	2011–12	2012–13
Staff cost per passenger	65	34	26	32	35
Operating and administrative cost per passenger	234	230	219	239	301
Total expenses per passenger	350	310	304	339	413
Staff cost per ATM	6,679	3,761	3,152	3,911	4,353
Operating and administrative cost per ATM	24,076	25,683	26,203	29,275	37,167
Total expenses per ATM	36,085	34,588	36,403	41,423	51,055
Staff cost per WLU	53	27	21	26	29
Operating and administrative cost per WLU	191	188	178	197	249
Total expenses per WLU	286	253	247	279	341

Source: Calculated using data from MIAL.

To sum up, the analysis indicates that CSIA is the second busiest airport in India in terms of number of passengers and aircraft movement per day. In terms of volume of cargo handled per day, it continues to hold the first position among all airports in India. The world economic crisis in 2008–09 followed by the recession in subsequent years in several developed and developing countries has affected the movement of passenger and cargo traffic at the CSIA. Further, the limited area available for the airport has been a major constraint in expanding the infrastructure and accommodating more passengers and aircraft. CSIA has recently undertaken massive infrastructure development to improve the services. The new terminal for international passengers is one of its projects. One portion of this terminal has been completed and recently opened for international passenger's use, and construction work on the second portion of the terminal is in progress. Once the new terminal is ready for operation, it will boost traffic in the short to medium term.

The economic performance of CSIA indicates that both revenue and expenditure per passenger increased in 2012–13. In the case of revenue, both aeronautical and non-aeronautical revenue per passenger increased in 2012–13 despite the decline in passenger traffic. On the other hand, the expenditure data of MIAL shows that operating and administrative costs per passenger increased considerably in 2012–13 over the previous fiscal year.

Chapter 5

Direct, Indirect and Total Economic Impact

5.1 Introduction

This chapter provides CSIA's direct, indirect, induced and total economic contribution to the national economy and the regional (Maharashtra) economy. We also measure the direct, indirect and total economic benefits of various commercial activities that will be carried out by MIAL in the 'GVK SkyCity' between 2013–14 and 2020–21. As reported in Chapter 2, the economic contribution of CSIA in the forms of direct, indirect, induced and total is measured in terms of three broad macro indicators:

- Output
- Value added
- Employment

Measuring the direct impact of an airport is the first step of an economic impact assessment study. Direct impact covers activities that are directly related to the construction or operations of an airport. For example, people employed on regular or contract posts at CSIA for servicing passengers or airlines is a direct impact, but people employed in a restaurant on the outskirts of an airport for servicing airport employees have an indirect impact and expenditure by visitors (who travel by air) in Mumbai or other cities in Maharashtra is induced impact. While indirect impact is quantified using I-O multiplier analysis, induced impact is estimated from: 1) the spending activities of domestic and foreign tourists arriving in Maharashtra via CSIA and 2) foreign capital flows into Maharashtra¹¹.

5.2 Direct Economic Impact

Both primary and secondary information were used to measure CSIA's direct economic impact. For this, we required information on financial and employment aspects from different businesses/stakeholders such as airlines, freight companies, retailers, government agencies and other tenants operating within and around the airport. Given this complex structure, it is difficult to obtain information from official published sources on aspects such as sales, expenditure and value added. Therefore, we used both secondary and survey-based methods to collect the information.

We conducted primary surveys to collect information about the financial and employment performance of some agencies; for other agencies, we derived their operating expenditure at the aggregate level for CSIA by using the per passenger method. The following agencies were covered in the impact analysis:

¹¹It is important to mention here that inflow of foreign capital into Maharashtra is explained by several factors. Therefore, it is not easy to quantify CSIA's impact on foreign investment flows to the state. Nevertheless the availability of a better mode of transport such as an airport plays a lead role in attracting foreign tourists or investment to the city or state in which it is located.

Direct Services

1. Government Agency
 - i. CISF
 - ii. Immigration
 - iii. Custom
 - iv. ATC
 - v. BCAS
 - vi. Post Office
 - vii. Plant Quarantine
 - viii. Airport Hospital
 - ix. Tourism Authority
 - x. IMD
2. Airport Operator (MIAL)

Enabling & Enabled Services

3. Concessionaires
4. Ground Handling Agencies
5. Baggage Handling Agencies
6. Domestic Airlines
7. Foreign Airlines
8. Cargo Handlers

In addition to the primary survey, financial information on some of these agencies was collected from the following published sources:

- Financial performance of Air India from the annual report published by the Directorate General of Civil Aviation (DGCA).
- Financial performance of domestic airlines from the annual reports published by Directorate General of Civil Aviation (DGCA).
- Financial performance of international airlines from Air Transport World.
- Air Traffic Control (ATC) information from the Airports Authority of India (AAI).
- Financial information on the airport operator from MIAL.

Based on information from these sources, we estimated the direct economic impact of CSIA on the national and regional economies. We took 2009–10 as the base year for this exercise for

the operations of the airport because our input-output table belongs to the same base year. For the construction phase of the airport, the impact is not measured for a single year; instead, it is calculated for the entire construction period and this is usually a one-time impact. The quantum of direct contributions of the ‘airport construction’ and ‘airport operations’ sectors to the national and regional economies in terms of output, value added and employment are given in **Tables 5.1 and 5.2**. These can be summarised as follows:

- CSIA’s construction directly contributed Rs 75.5 billion in income to the national GDP during the construction phase of the airport. Construction of the CSIA also directly contributed 20,000 jobs to the national economy during the construction period.
- CSIA’s aviation sector (operations) contributed Rs 37.9 billion directly in income to the national GDP in 2009–10. In terms of percentage, its contribution was 0.058 per cent to the national GDP and around 0.44 per cent to Maharashtra’s GSDP.
- In terms of employment, CSIA’s aviation sector contributed 41,000 jobs directly, which is 0.008 per cent of the national employment and 0.010 per cent of Maharashtra’s employment.

Table 5.1
CSIA’s Direct Impact

Sectors	Gross output (Rs billion)	Value added (Rs billion)	Employment (‘000)
A. Airport construction*	125.80	75.50	20
B. Airport operations (2009–10)	66.50	39.90	49
- Airport transport	48.10	28.90	18
- Airport services	18.40	11.10	31

Note: * For airport construction, the output, value added and employment impact refer to the entire construction/renovation period of the CSIA (2008–09 to 2015–16).

Table 5.2
CSIA’s Direct Contribution to National and Regional Economy

Sector	Contribution to National Economy		Contribution to Maharashtra Economy	
	% of GDP	% of Employment	% of GDP	% of Employment
Airport Operations (2009–10)	0.06	0.01	0.47	0.10

5.3 Indirect Economic Impact

The indirect economic impact (flow-on impact) of the CSIA is measured by using the National I-O Table 2009–10 prepared by Ramesh Kolli (2010). This table is an update of the I-O Table 2006–07 published by the Central Statistical Organisation, Government of India, which contains 130 sectors. The 130-sector I-O Table was first aggregated into a 33-sector I-O Table and two new sectors—‘airport construction’ and ‘airport services’—were added to the I-O Table. The I-O Table used for the present analysis was thus a matrix of 35×35 sectors. In this I-O Table, we have three distinct airport sectors—airport construction, air transport and airport services.

Not many studies, with the exception of the NCAER (2012) study on Delhi airport, have explored the impact of airport construction on local and national economies. Instead, they examine the economic impact of the airport operations sector, which comprises ‘air transport’ and ‘airport services’. In order to capture the economic benefits of the construction sector, the present study created a new sector called ‘airport construction’ in the I-O Table based on information received from MIAL and CSO. The construction of an airport requires a one-time investment for purchasing large quantities of raw material. This activity also absorbs a chunk of the labour force in the local economy. MIAL spent Rs 125.8 billion on the construction of the CSIA and employed 20,000 people during the construction phase. This expenditure had a strong economic impact on the regional and national economies, although the impact was for a one-time change or for the duration of the construction period. CSIA’s construction required a large amount of inputs from other sectors as well, such as:

- Basic Metal & Metal Products
- Non-Metallic Mineral Products
- Trade
- Land Transport
- Mining and Quarrying
- Banking

Under the backward linkages principle, economic activities in each of these sectors also improved due to an increase in demand for their output, and therefore they hired more people or used more capital to produce more output. In other words, construction of CSIA not only generated output and employment directly, but it also indirectly increased the output of other sectors in the economy. Thus, the construction of an airport creates a large impact on the output and employment of the regional and national economies to the extent that such inputs are produced on the boundaries of local or national economies. If a major portion of the raw material is imported, then the impact of airport construction on these sectors will be limited to the extent

of the imports. However, imports of raw material for airport construction will improve business activities in other sectors such as trade, warehousing, transportation and finance. Thus, it is not easy to quantify the net impact of airport construction on the regional economy.

As with airport construction activities, airport operations also use inputs from other sectors of the economy and sell these goods and services to final users such as airlines, ground transport (bus, taxi, car rentals and car parks) and retail shops in the airport.

To measure the CSIA's direct and indirect impact on output and employment we used the 35×35 I-O Table 2009–10 to estimate multiplier impacts. The detailed results on multipliers are given in **Table B1.1** in **Appendix B**. It is worth mentioning that there is small variation in the output multipliers of the airport sectors between I-O Table 2006–07 and 2009–10 because of changes in the input coefficients. In the case of employment multipliers, however, we find large variations in multipliers between two I-O Tables that may be due to the following: (i) output has increased more than proportionate to the increase of employment in this period and (ii) productivity has improved due to better use of advanced technology as a substitute for labour inputs in the production process.

Our estimates give the following multipliers for the airport construction and airport operations sectors:

- Output and employment multipliers of 'airport construction' (Sector 19) are 2.605 and 0.900, respectively.
- Output and employment multipliers of 'airport operations', which includes air transport (Sector 25) and airport services (Sector 26), are 2.869 and 0.703, respectively.

The output multiplier of the airport construction sector is 2.605, which means that 'if the final demand (comprising consumption, capital formation and net exports) of this sector increases by Rs 1 lakh, then due to the direct and indirect linkages of this sector with other sectors of the economy, the overall impact will be an increase in the output of the economy by Rs 2.605 lakh'. The employment multiplier of the airport construction sector is 0.900, which implies that 0.9 jobs are generated in the economy due to an increase of Rs 1 lakh in the final demand (comprising consumption, capital formation and net exports) for the airport construction sector owing to direct as well as indirect effects.

Direct plus Indirect Impact

Estimates of the direct and indirect impact of CSIA's construction and airport operations are given in **Tables 5.3** and **5.4**. The main findings are:

- CSIA's construction activities directly and indirectly contributed Rs 197.8 billion in income to the national GDP during the entire construction phase. In the case of employment, CSIA's construction activities directly and indirectly contributed 1,098,000 jobs to the national economy during the entire construction phase.
- CSIA's operations services contributed Rs 112.7 billion in income both directly and indirectly to the national GDP in 2009–10, of which air transport contributed Rs 63.3 billion and airport services contributed Rs 23.5 billion. In terms of percentage, airport operations contributed 0.174 per cent to the national GDP and relatively 1.32 per cent to Maharashtra's GSDP in 2009–10.
- In terms of contribution to employment, CSIA's operations directly and indirectly generated 460,000 jobs in 2009–10, which is 0.100 per cent of the national employment and relatively 0.94 per cent to Maharashtra's employment.

Table 5.3
CSIA's Direct and Indirect Impact (Flow-on Impact)

Sectors	Gross output (Rs billion)	Value added (Rs billion)	Employment (‘000)
A. Airport construction*	329.60	197.80	1,098
B. Airport operations (2009–10)	190.60	114.50	467
(i) Airport transport	106.00	63.60	146
(ii) Airport services	40.90	24.50	147

Note: *Refer to the note in Table 5.1. Employment and output levels in the case of airport operations are on a per year basis.

Table 5.4
CSIA's Direct and Indirect (Flow-on) Contribution to National and Regional Economy

Sector	Contribution to National Economy		Contribution to Maharashtra Economy	
	% of GDP	% of Employment	% of GDP	% of Employment
Airport Operations (2009–10)	0.18	0.10	1.34	0.95

5.4 Induced and Total Economic Impact

As mentioned earlier, 'induced impact' is the wider impact of airport's operations compared with other types of impact. In the present study, we use 'induced impact' as synonymous with 'catalytic impact' as described in the literature. The literature suggests that the economic impact of an airport's operations on employment and output go beyond its traditional direct and

indirect impacts. Induced impact captures the spill over effects on how the growth in airport operations boosts the performance of other industries (through tourism, trade, investments and productivity). In other words, induced impact reflects the wider impact of airport operations in generating output and employment in the regional and national economies by attracting economic activities such as tourism and investment, promoting exports through airfreight, enhancing the competitiveness of an economy through the provision of efficient passenger and freight services and attracting businesses and leisure activities.

Recent data from Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Government of India shows that Maharashtra, Dadra & Nagar Haveli and Daman & Diu receive the maximum FDI inflows in India compared with other states. In 2012, the region received Rs 429 billion, accounting for 35 per cent of total FDI inflows to India. As reported in the literature, Maharashtra receives the maximum inflows from this total inflow to the region and Mumbai receives around 35 per cent of total FDI inflows to the state. It is obvious that due to the presence of better communication and transport facilities such as an airport, ports, offices, hotels and government departments, Mumbai attracts a large chunk of FDI. Although, it is difficult to say how much of the FDI came into Mumbai city and the state because of the CSIA, a good airport can only improve the attractiveness of the state as an investment destination.

Similarly, better transport facilities have helped attract foreign tourists to the state (Maharashtra). According to the latest report on India Tourism Statistics at a Glance, 2012, Maharashtra tops the table in the case of foreign tourists visiting India, accounting for 5.12 million visitors, and is well ahead of Tamil Nadu, which stands second with 3.56 million visitors. In domestic tourist visitors, Maharashtra stands fifth position with 66.33 million, which is far behind Andhra Pradesh, which tops the table with 206.82 million visitors (India Tourism Statistics at a Glance, 2012). The literature suggests that expenditure incurred by domestic and foreign tourists have different multiplier impacts on the local economy. While the visit of each foreign tourist provides employment to one person, it takes 6.5 domestic tourists to generate one job (GoI, March 2003). Nonetheless, tourism remains the fulcrum of economic development and a source of livelihood for millions of people in India and the development of this sector needs better infrastructure and connectivity. The development of airports in big and small cities will definitely have a positive impact on tourism industries.

Total Impact (Direct plus Indirect plus Induced)

Estimates of the total impact of CSIA's operations are given in **Tables 5.5** and **5.6**. The main findings are:

- The total economic contribution of CSIA operations is Rs 281.8 billion, which is 0.43 per cent of the national GDP and relatively 3.29 per cent to Maharashtra's GSDP in 2009–10.

- In terms of employment, the total contribution of CSIA's operations is 1,403,000 jobs, which is 0.30 per cent of national employment and relatively 2.86 per cent to Maharashtra's employment in 2009–10.

It is important to note here that the results of the multiplier impact in terms of income and employment may not necessarily imply the current contribution of CSIA to the national and regional economies because many of the goods and services are generally procured globally and, hence, are not produced in the domestic economy.

Types	Gross output (Rs billion)	Value added (Rs billion)	Employment ('000)
Direct and indirect impact	190.80	114.50	467
Induced impact	286.30	171.80	958
Total impact	477.10	286.30	1425

Types	Contribution to National Economy		Contribution to Maharashtra Economy	
	% of GDP	% of Employment	% of GDP	% of Employment
Direct and Indirect Impact	0.18	0.10	1.34	0.95
Induced Impact	0.27	0.21	2.01	1.95
Total Impact	0.44	0.31	3.35	2.90

5.5 Economic Impact of Additional Investment in Airport related Infrastructure

Apart from airport development, MIAL has planned to build three metro stations near the Mumbai airport and develop other transport infrastructure to improve the connectivity of airport with the city. The construction activities of these airport related infrastructure is expected to begin in the current fiscal (2014–15) and to be completed by 2018-19. The value added multiplier impact of this additional investment and its contribution to the economy has been calculated using the airport construction sector multiplier. The results are given in **Table 5.7**. The results show that:

- Airport related construction activities will contribute directly Rs 14.5 billion in income to the national GDP during the entire construction phase.
- In the case of direct plus indirect impact, airport related construction activities will contribute Rs 37.9 billion in income to the national GDP during the entire construction phase.

Table 5.7
Direct and Indirect Impact of Additional Investment in Infrastructure Development

Types	Gross output (Rs billion)	Value added (Rs billion)
Direct Impact	24	15
Direct plus Indirect Impact (Flow-on impact)	63	38

Note: Construction period of airport related infrastructure ranges from 2014–15 to 2018–19.

5.6 Direct and Indirect Economic Impact of GVK SkyCity Activities

The vision of GVK SkyCity is to develop a unique world-class destination for passengers and for the local populi of Mumbai in the form of a vibrant urban activity centre, with landmark architecture, well-planned infrastructure, urban design and landscape. The facilities will cover budget various classes of hotels, service apartments, retail/offices, a convention centre, an entertainment centre and hospitals. A Master Plan for the development of GVK SkyCity has been conceptualised and designed by HOK, Hong Kong. Some of the important commercial asset classes of the airport city are:

1. Budget hotel
2. Mid-Market hotel
3. First Class hotel
4. Luxury hotel
5. Service apartments
6. Office/Retail
7. Convention centre
8. Entertainment centre (incl. Club)
9. Hospital (800 beds)

MIAL proposes to invest around Rs 200 billion towards constructing the facilities at GVK SkyCity besides the investments that would be made by the selected developer on construction of various asset classes. It has also estimated that around 27,000 people will be employed during the construction period by MIAL and the selected developers. It is too early to estimate the

proposed investment during the operation phase, thus the economic impact of GVK SkyCity is estimated only for the construction phase. The construction activities generate only a one-time impact. We have not assessed the induced impact of GVK SkyCity because it is not easy to separate its induced impact from that of the airport. Since both are situated in the same location, the induced impact will be credited to the airport because of its larger role. Besides, without the airport, GVK SkyCity's impact will be negligible. Therefore, in this study we only assess the direct and multiplier impacts of GVK SkyCity activities. Estimates of the indirect (multiplier) impact of GVK SkyCity's construction are given in **Table 5.8**. These can be summarised as:

- GVK SkyCity's development activities will contribute directly Rs 66.4 billion in income to the national GDP and also contribute 27,000 jobs during the entire construction phase.
- In the case of direct plus indirect impact, GVK SkyCity's development activities will contribute Rs 171 billion in income to the national GDP and also contribute 96,000 jobs during the entire construction phase.

Table 5.8			
Direct and Indirect Impact of SkyCity Construction			
Types	Gross output (Rs billion)	Value added (Rs billion)	Employment ('000)
Direct Impact	110	66	27
Direct plus Indirect Impact (Flow-on impact)	286	171	96

Note: Construction period of SkyCity ranges from 2013-14 to 2020-21.

Chapter 6

Traffic Forecasting and Growth Prospects

6.1 Introduction

CSIA is the second-best airport in India after Delhi airport in terms of passenger traffic. It handles more than 30 million passengers, of which around 10 million are international passengers and 20 million are domestic passengers. In terms of average volume of cargo handled per day, the CSIA continues to hold the largest market share among all airports in India. CSIA is capable of handling 40 million passengers and 1 million metric tonnes of cargo annually once the modernisation work is completed, which includes building a new integrated state-of-the-art terminal 2 (T-2). Part of the integrated terminal (T-2) opened up for international operations in Feb 2014 and remaining part of T-2 is likely to be completed by end of 2015.

However, traffic trends of CSIA during the past five years show that it has slowed considerably since 2008–09 when the global financial crisis erupted. Before the crisis, passenger traffic grew on average at a whopping 22 per cent between 2006–07 and 2007–08. In 2008–09, the traffic contracted by 9.4 per cent owing to a significant contraction of domestic traffic by 14.3 per cent and meagre growth of international traffic by 1.7 per cent. The traffic volume improved in 2010–11, registering y-o-y 13.5 per cent growth. In 2011–12 and 2012–13, traffic at the CSIA again slowed, registering 5.8 per cent and –1.8 per cent growth, respectively, due to the slowing down of the Indian and Maharashtra economies and the world economy as well.

The GDP growth rate of the Indian and Maharashtra economies declined substantially during the past two years compared with the pre-crisis period (2008–09). The Indian economy registered an astounding GDP growth of 9.5 per cent between 2005–06 and 2007–08, but it recorded merely 5.6 per cent GDP growth between 2011–12 and 2012–13. Similarly, Maharashtra's economy recorded around 13 per cent GDP growth during 2005–06 and 2007–08, but the growth rate faltered to 7 per cent during 2011–12 and 2012–13. It is worth mentioning that the growth performance of the national and regional (Maharashtra) economy is one of the important determining factors of domestic traffic for CSIA. Our calculation shows that the correlation of domestic traffic growth at CSIA with national GDP growth is high (0.9) and even higher (0.97) with Maharashtra's economic growth between 2005–06 and 2012–13.

Since traffic at CSIA depends heavily on the performance of domestic traffic, the economic growth of the domestic economy and government policies related to the aviation sector have a significant influence on its traffic growth. For example, policies related to ATF prices have a significant economic impact on airfares and thus on traffic volume. Unlike Delhi airport, the

other factor that will affect traffic volumes at CSIA in the long run is the limited area available for airport operations. The area of Delhi airport is three times that of CSIA. Besides this factor, external factors such as a global recession, which resurfaced in late 2011–12, will also affect the aviation sector.

Therefore, developing a suitable econometric model to project passenger traffic continues to be challenging, as the aviation industry faces significant uncertainties. Nevertheless, we try and project passenger traffic (both domestic and international) for CSIA for the period from 2013–14 to 2022–23.

6.2 Methodology

In this section we developed a suitable method to estimate and project traffic for CSIA. Literature on the aviation sector suggests that traffic is influenced by several demand influencing factors such as economic growth, rising per capita incomes, industrial development, employment opportunities, tourism development and so on. Prices also play an important role in the volume of traffic. In this study we focus on two important factors in determining the traffic volume at CSIA: economic growth and price (airfares). These two variables explain income and price elasticities. We used the Ordinary Least Squares Regression (OLS) method to estimate the traffic equations. The estimated double-log linear regression equations are:

$$\text{Log (Domestic Pax)}_t = a_0 + b_1 \text{Log (GSDP)}_t + b_2 \text{Log (Air fare)} + u_t \dots \quad (1)$$

$$\text{Log (International Pax)}_t = a_1 + b_2 \text{Log (World GDP)}_t + e_t \dots \quad (2)$$

Where a_0 and a_1 are intercept terms, b_1 and b_2 are coefficients and u_t and e_t are statistical error terms.

Data for these variables were taken from different sources. The Gross State Domestic Product (GSDP) of Maharashtra was taken from the Central Statistical Office (CSO) and world GDP from the World Development Indicator (WDI), World Bank. The airfare price data was taken from www.makemytrip.com. This is the average price per passenger for 1,000–1,500 km. Domestic and international passenger traffic data for CSIA were taken from the Airports Authority of India (AAI).

This is our baseline scenario. In this scenario, we first projected Maharashtra's GDP growth rate based on past trends. For world GDP growth, we assumed a certain growth rate for the next 10 years. On airfare, we assumed a certain rate for future years based on the average price trends of the past two years.

6.3 Traffic Forecast¹²

Our estimates show that the income and price elasticities for domestic traffic with respect to GSDP and airfares are

¹²We have not taken into account the impact of CSIA's GVK SkyCity operations on traffic volume for the projection period. The projection is based on CSIA's existing infrastructure and capacity.

Income elasticity = 1.03

Price elasticity = -0.402

Income elasticity for international traffic with respect to world economic growth is

Income elasticity = 1.8

As mentioned earlier, we have made certain assumptions on explanatory variables such as Maharashtra's economic growth, world economic growth and airfares for the next 10 years (2013–14 to 2022–23) in order to predict the traffic growth for the same period using income and price elasticities. The results are given in **Tables 6.1** and **6.2**.

The results show that domestic traffic growth will improve marginally in 2013–14 after recording negative growth in the previous year and will cross 30 million by 2022–23. International traffic would continue to show positive growth. The total traffic will grow in the range of 4.5–5.7 per cent in the next 10 years and will touch 49 million by 2022–23.

Table 6.1
Passenger Traffic Forecasts for CSIA (in million)

Year*	Domestic	International	Total
2008–09	15.30	8.10	23.40
2009–10	17.40	8.20	25.60
2010–11	20.00	9.10	29.10
2011–12	21.00	9.70	30.70
2012–13	20.30	9.90	30.20
2013–14	21.30	10.30	31.60
2014–15	22.40	10.80	33.20
2015–16	23.60	11.40	35.00
2016–17	25.00	12.00	37.00
2017–18	26.40	12.70	39.20
2018–19	27.50	13.40	40.90
2019–20	28.70	14.20	42.80
2020–21	29.90	14.90	44.80
2021–22	31.10	15.70	46.80
2022–23	32.40	16.60	49.00

Source: NCAER.

Note: * Actual data up to 2012–13 and projections from 2013–14 onward.

Table 6.2
Projections of Passenger Traffic Growth (% per year)

Year*	Domestic	International	Total
2009–10	13.40	1.40	9.30
2010–11	15.10	10.20	13.50
2011–12	5.20	6.90	5.80
2012–13	-3.60	2.30	-1.80
2013–14	4.80	4.10	4.60
2014–15	5.20	4.50	5.00
2015–16	5.70	5.40	5.60
2016–17	5.70	5.80	5.70
2017–18	5.70	5.80	5.70
2018–19	4.20	5.40	4.60
2019–20	4.20	5.40	4.60
2020–21	4.20	5.40	4.60
2021–22	4.20	5.40	4.60
2022–23	4.20	5.40	4.60

Source: NCAER.

Note: * Actual data up to 2012–13 and projections from 2013–14 onward.

6.4 MIAL’s Revenue Forecast

We have also made projections of MIAL’s revenue collection for next 10 years. MIAL’s total revenue has been collected from four sources: aeronautical, non-aeronautical, cargo and other income (comprises income from interest and investment). This forecast is based on the tariff increase by regulatory authority, traffic projection and income from other sources. Total revenue is calculated as the sum of various components. The results of the revenue projections are given in Tables 6.3 and 6.4.

Table 6.3
Revenue Projections for MIAL from 2013–14 to 2022–23 (Rs million)

Year*	Aero	Non-aero	Cargo	Other income**	Total income
2011–12	4,242	7,141	1,702	58	13,143
2012–13	5,204	7,863	1,679	40	14,786
2013–14	11,786	8,112	1,666	127	21,691
2014–15	13,165	8,216	2,140	130	23,652
2015–16	14,760	9,120	2,410	1,540	23,652
2016–17	16,110	10,070	2,640	1,620	30,440
2017–18	17,580	11,010	1,800	1,700	32,090
2018–19	19,190	12,000	1,980	3,020	36,190
2019–20	14,290	13,060	2,170	3,170	32,690
2020–21	15,370	14,080	2,370	3,330	35,150
2021–22	16,240	15,120	2,600	4,930	38,890
2022–23	17,180	16,200	2,840	5,180	41,400

Source: MIAL

Note: *Actual data up to 2013–14 and projections from 2014–15 onward.

**Includes income from interest and dividends and Lease rental income from Real Estate.

Table 6.4
Projections of Revenue Collections from different Sources (% Share)

Year*	Aero	Non-aero	Cargo	Other income
2011–12	32.30	41.50	25.80	0.40
2012–13	35.20	53.20	11.30	0.30
2013–14	54.30	37.40	7.70	0.60
2014–15	55.70	34.70	9.00	0.50
2015–16	62.40	38.60	10.20	6.50
2016–17	52.90	33.10	8.70	5.30
2017–18	54.80	34.30	5.60	5.30
2018–19	53.00	33.20	5.50	8.30
2019–20	43.70	40.00	6.60	9.70
2020–21	43.70	40.10	6.70	9.50
2021–22	41.80	38.90	6.70	12.70
2022–23	41.50	39.10	6.90	12.50

Source: MIAL

Note: *Actual data up to 2013–14 and projections from 2014–15 onward.

6.5 Direct, Indirect and Total Impact of CSIA's Operations

Projection of the CSIA's direct, indirect and induced contribution to the output of the national and regional economies is a difficult proposition due to the multidimensional impacts that the airport generates and also because of the complexity in quantifying those benefits. Nevertheless, here we attempt to project the direct, indirect and induced contribution of the CSIA to the national and regional economies in terms of value added for the next 10 years. In order to make these projections, it is first important to project the output of CSIA's airport operations sector for the next 10 years. For this we used the output per passenger norm for each component of airport operations. As mentioned earlier, we used this as the base year for our analysis. For the next 10 years, we used output per passenger and projected traffic numbers to get the projected value of output. The results of CSIA's contributions from direct and indirect operations to the national GDP and Maharashtra's GDP are reported in Tables 6.5, 6.6 and 6.7.

The important findings of the study are summarised below.

- By 2022–23, CSIA's direct contribution to the regional economy in terms of income will be 0.56 per cent of GDP.
- Its direct plus indirect income contribution to the regional economy will be 1.61 per cent of GDP by 2022–23.
- CSIA's total income impact (direct plus indirect plus induced) to the regional economy will be 4.02 per cent of GDP by 2022–23.

Year	Value added of airport operations (Rs billion)	% of India GDP	% Relative to Maharashtra GSDP
2009–10	39.90	0.06	0.47
2010–11	47.60	0.07	0.51
2011–12	50.30	0.07	0.51
2012–13	50.70	0.06	0.49
2013–14	51.70	0.06	0.49
2014–15	54.30	0.07	0.5
2015–16	57.30	0.07	0.51
2016–17	60.60	0.07	0.52
2017–18	64.10	0.07	0.53

Contd...

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Table 6.5
Projections of Direct Contribution of CSIA's Operations to the National and Relative to Maharashtra's Economy from 2013–14 to 2022–23

Year	Value added of airport operations (Rs billion)	% of India GDP	% Relative to Maharashtra GSDP
2018–19	67.00	0.07	0.54
2019–20	70.10	0.07	0.54
2020–21	73.30	0.07	0.55
2021–22	76.60	0.07	0.55
2022–23	80.20	0.07	0.56

Source: NCAER.

Table 6.6
Projections of Direct and Indirect Contribution of CSIA's Operations to the National and in Relation to Maharashtra's Economy from 2013–14 to 2022–23

Year	Value added of airport operations (Rs billion)	% of India GDP	% Relative to Maharashtra GSDP
2009–10	114.50	0.18	1.34
2010–11	136.50	0.19	1.46
2011–12	144.40	0.19	1.45
2012–13	145.60	0.18	1.40
2013–14	148.30	0.18	1.39
2014–15	155.70	0.19	1.42
2015–16	164.50	0.19	1.46
2016–17	173.90	0.20	1.50
2017–18	183.80	0.20	1.53
2018–19	192.20	0.20	1.54
2019–20	201.00	0.21	1.56
2020–21	210.20	0.21	1.58
2021–22	219.90	0.21	1.59
2022–23	230.00	0.21	1.61

Source: NCAER.

Table 6.7
Projections of Total (Direct, Indirect and Induced) Contribution of CSIA's Operations to the National and Relative to Maharashtra's Economy from 2013–14 to 2022–23

Year	Value added of airport operations (Rs billion)	% of India GDP	% Relative to Maharashtra GSDP
2009–10	286.30	0.44	3.35
2010–11	341.30	0.48	3.65
2011–12	360.90	0.48	3.63
2012–13	363.90	0.46	3.49
2013–14	370.80	0.46	3.49
2014–15	389.30	0.47	3.55
2015–16	411.10	0.48	3.64
2016–17	434.70	0.49	3.74
2017–18	459.60	0.51	3.82
2018–19	480.60	0.51	3.86
2019–20	502.60	0.52	3.90
2020–21	525.60	0.52	3.94
2021–22	549.70	0.53	3.98
2022–23	574.90	0.53	4.02

Source: NCAER.

6.6 Growth Strategies

To sum up, the CSIA will play an important role in developing the city and local economy in terms of offering business and employment opportunities to local residents. It has potential to grow as it connects several Middle East and Southeast Asian countries and is the leading transit hub in the country. The airport may witness a surge in traffic volume in the coming years due to the development of a new world-class integrated terminal building (T-2) that covers 439,000 sq. m. and includes new taxiways and apron areas for aircraft parking, 188 check-in counters, 60 departure immigration counters and 76 arrival immigration counters. CSIA will soon develop a SkyCity in the vicinity of the airport for passengers and this will further increase the volume of traffic at the CSIA. As India has witnessed the rise of the middle class and per capita income especially in metro cities, the demand for air travel will certainly rise. Previous studies (ACI, 2011; CAPA, 2011; IATA, 2011; ICAO, 2011) have also found that air traffic in the Asia-Pacific region is growing significantly and it is projected that the region may surpass the world's largest contributor (the North American region) in terms of air traffic. The important factor that spurs traffic volume in the region is its economic growth. Indian airports will take a leading role in absorbing the major share of air traffic in the South Asian region.

Chapter 7

Passenger Profile

In this chapter we discuss the profile of passengers at CSIA. The profile of passengers covers general information such as age, occupation, gender and educational qualifications. We also discuss the income status of the passengers and their views on quality of services provided in the airport, such as cleanliness and sanitation, immigration, customs and check-in time. This information is useful for airport operators and airlines to understand passenger needs in order to prepare their business plans and future strategies.

We conducted a passenger survey at CSIA that covered more than 4,000 passengers, both domestic and international. Our sample mainly covered departing passengers because we wanted to capture their expenditure on goods and services at the airport and in local areas. Spending by passengers on local products and services adds value to the local economy and has multiplier impacts on output and employment in the local economy. Passengers were also divided into two categories: residents and non-residents. Resident passengers are those who live in their own or a rented house in Maharashtra, while non-resident passengers belong to other states in India or countries who visit Maharashtra for business, tourism, study, jobs, visits to relatives and other activities.

The important findings of the survey are outlined below.

7.1 Profile of Passengers

Passenger profiles are reported in **Table 7.1** to **Table 7.4**. The findings are summarised below.

- Of the 4,637 passengers surveyed, 3,246 (70.1 per cent) were domestic passengers and 1,391 (29.9 per cent) were international passengers.
- In the domestic passenger category, around 84 per cent were male and 16 per cent were female. In the international passenger category, 82.5 per cent were male and 17.5 per cent were female.
- Around 37.6 per cent of the passengers were in the age group of 25–34 and 26.4 per cent were in the 35–44 age group. This indicates that 64 per cent of passengers at CSIA were in the age group of 25–44.
- In terms of educational qualifications, around 35 per cent of passengers were post-graduates and 33 per cent were graduates. Around 11 per cent of the passengers had completed high school and intermediate.
- Passengers by occupation show that the highest percentage (64 per cent) was salaried, followed by about 21 per cent who were self-employed in business and trade. About 7 of the passengers were students.

7.2 Income and Expenditure

Tables 7.5 to 7.10 indicate the income and expenditure pattern of passengers. The main findings are reported below.

- Among Indian resident passengers who use international airlines, the top 20 per cent belong to the rich class with an average monthly income of Rs 3 lakh, while those in the bottom income quintile have an average monthly income of Rs 17,745. The majority of passengers in the bottom quintile work in Saudi Arabia and the Middle East.
- In the case of non-Indian residents who travel by international airlines, the top 20 per cent have an average monthly income of US\$ 32,000, while the bottom quintile reported an average monthly income of around US\$ 888.
- The occupational distribution of Indian residents by income shows that the salaried class contributed 65 per cent to the bottom quintile and 77.8 per cent to the top quintile, while the self-employed group were 18.25 per cent of the bottom quintile and 20.4 per cent of the top quintile. This indicates that of the total passengers, 80–95 per cent were from the salaried and self-employed categories across all income quintiles.
- In the case of occupational distribution of non-Indian residents by income quintile, the salaried class constituted 66 and 64.4 per cent in the bottom and the top income quintiles, respectively. Across all income quintiles, the self-employed group constituted more than 20 per cent—19.1 per cent of the bottom quintile and 33 per cent of the top quintile. Like the pattern for Indian residents, the distribution of non-Indian residents with respect to occupation found that across all the income classes 80–95 per cent of the passengers were from the salaried and self-employed class.
- The spending activity of passengers in Mumbai indicated that more than 62 per cent of them spent up to Rs 5,000 in various activities. This is mainly due to a sizable portion of passengers (more than 76 per cent) reported that they spent up to Rs 5,000 on transportation. Interestingly, maximum number of passengers (around 55 per cent) who came to Mumbai spent more than Rs 5,000 on hotels. Close to 45 per cent of passengers spent Rs 1,000–10,000 on other expenses such as watching movies and shopping.
- The average spending by departure passengers at Mumbai airport is calculated Rs 504.60 for domestic passengers and Rs 1085.12 for international passengers.

7.3 Purpose of Visit and Frequency of Travel by Air

Figures 7.1 and 7.2 illustrate the frequency of air travel by passengers and the purpose of their visit.

- The purpose of visit indicates that the highest percentage (41 per cent) of passengers came to Maharashtra for business followed by 20 per cent for a vacation and 15.71 per cent to meet friends and relatives. While 8 per cent of passengers came for a job, there were only 5 and 2 per cent of passengers who came to attend conferences and for educational purposes, respectively.
- Passengers were asked how frequently they travelled by air. The highest percentage of passengers (29.2 per cent) reported that they travel once in six months, followed by 29.1 per cent who travel once a month, about 16 per cent responded that they travel once a week and around 12.3 per cent rarely travel.

7.4 Quality of airport services

Table 7.11 shows the opinions of passengers on the quality of services at the airport.

- About 62.2 per cent of the passengers said that the check-in process facility was 'good'. Only 13.2 per cent felt it was 'excellent' and 2.7 per cent felt it was 'poor'.
- In terms of cleanliness and sanitation in the airport premises, 55.6 per cent reported it was 'good', while 14.5 per cent responded that the services were 'excellent'. Only 4.4 per cent of passengers felt that these services were 'poor'.
- 67.2 per cent of passengers felt that the boarding facilities were 'good' and a mere 8.2 per cent found them to be 'excellent'. A low 2.5 per cent of passengers felt that the boarding facilities were 'poor'.

Table 7.1
Distribution of Passengers by Category and Gender at CSIA

Sr. No.	Category	In numbers			% share		
		Male	Female	Total	Male	Female	Total
1.	Domestic	2,725	521	3,246	82.50	17.50	100.00
2.	International	1,147	244	1,391	83.90	16.10	100.00
	All	3,872	765	4,637	83.50	16.50	100.00

Source: NCAER.

Table 7.2
Percentage Distribution of Passengers by Age Group (%)

Age group	Male	Female	Total
Under 15	0.30	0.90	0.40
15 to 24	9.10	14.90	10.00
25 to 34	37.00	41.00	37.70
35 to 44	27.40	21.90	26.40
45 to 54	16.80	11.70	16.00
55 to 64	6.80	7.10	6.90
Above 65	2.60	2.50	2.60
Total	100.00	100.00	100.00

Source: NCAER.

Figure 7.1

Distributions of Passengers by Purpose of Visit to Maharashtra (%)

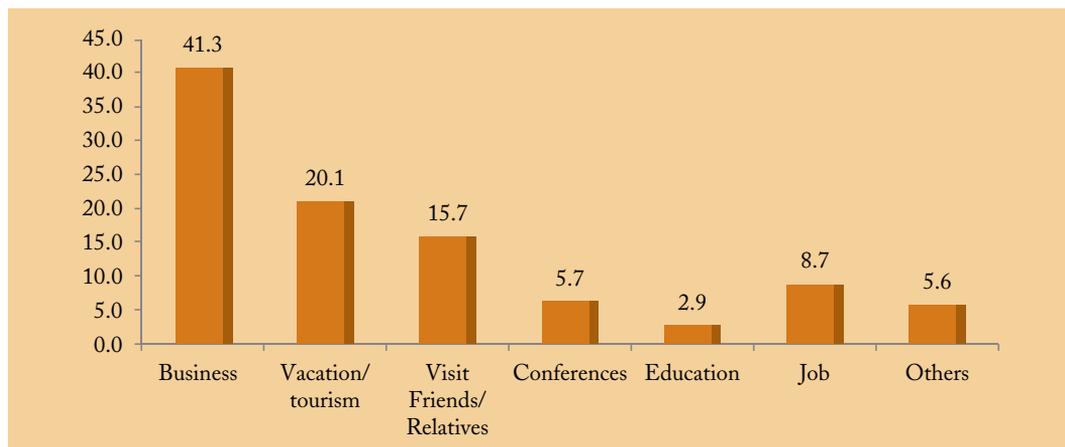
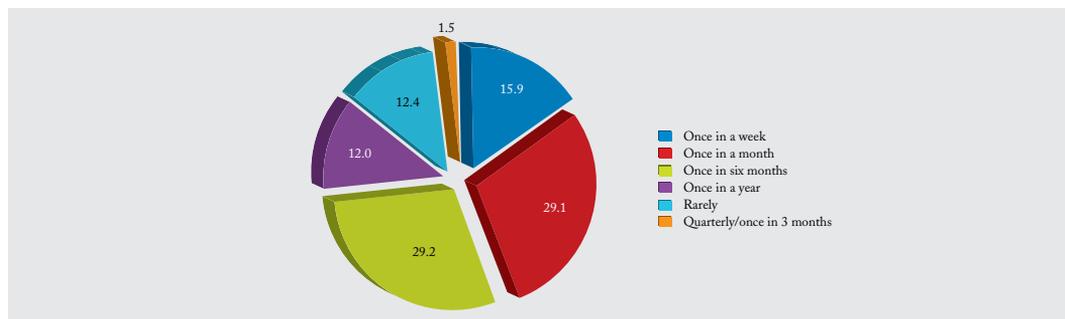


Figure 7.2

Frequency of Travel by Air (%)



Education level	Male	Female	Total
High School or less	5.80	4.10	5.50
Intermediate	5.10	6.30	5.30
Graduate	31.70	39.60	33.00
Post-graduate	35.30	36.30	35.50
Diploma	3.60	2.80	3.50
Doctor	2.80	3.70	2.90

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Table 7.3**Percentage Distribution of Passengers by Qualification and Gender (%)**

Education level	Male	Female	Total
Engineer	13.20	5.40	11.90
Other	2.50	1.80	2.40
Total	100.00	100.00	100.00

Source: NCAER.**Table 7.4****Percentage Distribution of Passengers by Occupation and Gender (%)**

Occupation	Male	Female	Total
Salaried	67.80	46.50	64.20
Self-employed (Business/trade)	22.00	14.90	20.80
Self-employed (artisans and craftsmen)	1.10	1.80	1.20
Retired	2.00	2.00	2.00
Housewife	0.00	20.30	3.50
Student	5.60	11.90	6.70
Other	1.40	2.50	1.60
Total	100.00	100.00	100.00

Source: NCAER.**Table 7.5****Average Personal Monthly Income of Indian Resident Passengers travelling by International Airlines**

Income Quintiles	In INR
First	17,745
Second	40,154
Third	70,835
Fourth	1,10,675
Fifth	3,08,986
Average	1,09,995

Source: NCAER.

Table 7.6
Average Personal Monthly income of Non-Indian Resident Passengers travelling by International Airlines

Income Quintiles	In US \$
First	888
Second	1,913
Third	4,098
Fourth	8,197
Fifth	32,082
Average	9,512

Source: NCAER.

Table 7.7
Occupational Distribution of Indian Resident Passengers by Income Quintiles (%)

Sr. No.	Occupation	Bottom Quintile	2nd Quintile	3rd Quintile	4th Quintile	Top Quintile	Total
1.	Salaried	65.10	68.50	76.80	72.30	77.90	71.90
2.	Self-employed (business/ trade)	18.30	21.30	17.60	22.30	20.50	20.00
3.	Self-employed (artisans and craftsmen)	2.40	4.70	2.40	1.50	0.80	2.40
4.	Retired	4.80	0.00	1.60	2.30	0.00	1.70
5.	Housewife	2.40	0.00	0.00	1.50	0.00	0.80
6.	Student	3.20	1.60	0.00	0.00	0.00	1.10
7.	Other	4.00	3.90	1.60	0.00	0.80	2.10
Total		100.00	100.00	100.00	100.00	100.00	100.00

Source: NCAER.

Table 7.8
Occupational Distribution of Non-Indian Resident Passengers by Income Quintiles (%)

Sr. No	Occupation	First	Second	Third	Fourth	Fifth	Total
1.	Salaried	66.00	69.60	84.40	75.00	64.40	71.80
2.	Self-employed (business/ trade)	19.10	17.40	11.10	20.50	33.30	20.30
3.	Self-employed (artisans and craftsmen)	2.10	0.00	0.00	4.50	0.00	1.30
4.	Retired	4.30	4.30	2.20	0.00	0.00	2.20
5.	Housewife	4.30	0.00	0.00	0.00	0.00	0.90
6.	Student	4.30	2.10	2.10	0.00	0.00	1.80
7.	Other	0.00	6.50	0.00	0.00	2.20	1.80
Total		100.00	100.00	100.00	100.00	100.00	100.00

Source: NCAER.

Table 7.9
Distribution of Passengers on Account of Expenditure Per Trip

Expenditure per trip	Hotel	Transport	Others	Total
Less than 1,000	22.10	37.80	36.80	32.90
1,001-5,000	23.00	38.40	26.20	29.50
5,001-10,000	24.10	13.50	18.60	18.40
10,000 and above	30.80	10.30	18.40	19.20
All	100.00	100.00	100.00	100.00

Table 7.10
Average Money Spent by Passenger at Airport

Categories	Number of Passengers*	Expenditure (Rs)
International	1,124	1,085
Domestic	3,246	505
Total	4,370	654

*Note: *Includes only those have incurred expenditures.*

Table 7.11
Distribution of Passengers by their Comments on Quality of Services Provided at the Airport

Services	Poor	Fair	Average	Good	Excellent	All
Check in Progress	2.70	4.50	17.30	62.20	13.20	100.00
Cleanliness/Sanitation within the airport	4.50	5.60	19.70	55.70	14.50	100.00
Boarding Facilities	2.50	3.40	18.60	67.30	8.20	100.00

Source: NCAER.

Chapter 8

Summary and Conclusions

Civil aviation plays a critical role in the economic growth and development of a country. Like other modes of transport, the aviation industry plays a key role in today's global economy, as it connects a country with other countries and facilitates the growth of business, trade and tourism with significant multiplier effects. It improves the efficacy of the service delivery system and, therefore, has a positive impact on productivity, growth and employment generation and helps the country make its mark on the global economy. Currently, the aviation sector supports 56.6 million jobs and over US\$ 2.2 trillion in global GDP. Existing studies also suggest that the aviation sector contributes to 0.5 per cent of India's GDP and supports 1.7 million jobs.

Like other developed and emerging countries, India's aviation sector has witnessed significant structural transformation during the past decade. The growing size of the middle class and rising per capita incomes in general have engendered greater demand for mobility to meet business and personal needs. To meet this demand and accommodate more traffic volumes, there is a need to improve the existing physical infrastructure in the aviation sector. The government has initiated various policy changes in the aviation sector and has allowed the private sector to invest in both airport construction and operations activities. These policy changes are visible in the airport sector, where several new airports have come up recently based on the public-private partnership (PPP) model. The new green-field airports in Hyderabad and Bangalore and brown-field airports in Delhi and Mumbai have been running successfully. The study would also support in understanding the importance of aviation in the growth and development of the national and regional economies.

Airports play a pivotal role in developing local cities/economies. They complement economic activities, provide a stimulus to business enterprises and generate employment opportunities for local residents. Modern airports not only provide passenger-related services, but they are also actively involved in commercial activities to make airport services viable and sustainable from a long-term perspective. Most importantly, airports provide a more efficient and viable transportation network for global business and tourism.

In this context, the Mumbai International Airport Ltd (MIAL) requested the NCAER, New Delhi to study the economic impact of the CSIA on the national and regional economies. The study assessed the CSIA's impact on the national and regional economies in terms of output, value added (income) and employment. This has been analysed by using the Input-Output model and information from primary and secondary sources. The essence of the study finding is highlighted below:

The economic impact CSIA's *construction activity* on the national and regional economy (Maharashtra) in terms of value added and employment during the construction phase comprises:

- Direct contribution of Rs 75.5 billion in income and 20,000 jobs to the national economy.
- Indirect (multiplier impact) contribution of Rs 122.3 billion in income and 1,078,000 jobs to the national economy.

CSIA's *operations activity* contributed Rs 281.8 billion (0.43 per cent) to the national GDP in 2009–10. As far as its contribution relative to Maharashtra is concerned, it contributed 3.29 per cent to the state's GSDP. This total impact comprises:

- Rs 39.3 billion contributed directly through value added (air transport and airport services).
- Rs 73.4 billion contributed indirectly through supply chain (multiplier impact).
- Rs 169.1 billion in induced impact through tourism and investment.

In terms of employment contribution, CSIA's *operations sector* contributed 1,403,000 jobs (0.30 per cent of the national employment) in 2009–10 and as a ratio to Maharashtra's employment it was 2.86 per cent. The total comprises:

- 45,000 directly contributed jobs.
- 415,000 indirectly contributed jobs through supply chains (multiplier impact).
- 943,000 jobs in induced impact through tourism and investment.

The study also estimates the economic impact of proposed investment in GVK SkyCity construction activities in terms of value added and employment. This is a one-time impact and refers to the construction period (2013–14 to 2020–21). The main findings are:

- GVK SkyCity's development activities will contribute directly Rs 66.4 billion in income to the national GDP and also contribute 27,000 jobs.
- In the case of direct plus indirect impact, GVK SkyCity's development activities will contribute Rs 171 billion in income and 24,000 jobs.

The other important findings of the study are:

- The forecast results show that the CSIA's traffic will reach 49 million by 2022–23.
- CSIA's direct contribution to Maharashtra's economy in terms of income will be 0.56 per cent of GSDP by 2022–23.
- CSIA's direct plus indirect (multiplier) income contribution to Maharashtra's economy will be 1.61 per cent of GSDP by 2022–23.
- CSIA's total income impact (direct plus indirect plus induced) to Maharashtra's economy will be 4.02 per cent of GSDP by 2022–23.

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Appendix A

A. The I-O Table¹³

An Input-Output (I-O) Table provides a comprehensive accounting of the linkages across production sectors and consuming sectors in the economy. A simplified overview of the I-O Table is presented in Table A1.1.

Table A1.1 Overview of the Input-Output Table

	Sectors	Final Demand Sectors	Total
Sectors	Block A Inter-sectoral transactions	Block B Final demand (sales to households, government, investment and net trade)	Total sector output (sales)
Final Payment Sectors	Block C Primary payments (payments for labour, capital, land, subsidies, taxes)		Total payments
Total	Total sector input (purchases)	Total expenditures	
<i>*Source: NCAER, 2006</i>			

¹³Two relevant references to the analysis are: 'Input-Output tables and analysis for Jharkhand, Karnataka and Uttarakhand', NCAER (2006) and B. K. Pradhan, *et al.* (2006).

B. Sectors in the I-O Table

Table A1.2 Mapping of the 35-Sector I-O Model with the 130-Sector I-O Model

Sr. No.	Commodity Sectors in the Aggregate Model	Original I-O Sectors
1.	Agriculture	1-26
2.	Mining and Quarrying	27-37
3.	Food Beverage and Tobacco	38-45
4.	Textiles and R MG	46-54
5.	Wood & W Prod; Furniture & Fix.	55-56
6.	Paper & Paper Products	57
7.	Printing and Publishing	58
8.	Leather & Plastic; and Products	59-62
9.	Petroleum Products	63
10.	Paints, Burnishes, Lacquers	69
11.	Other Chemicals	64-68,70-73
12.	Non-Metallic Mineral Products	74-76
13.	Basic Metal & Metal Products	77-82
14.	Non-Electrical Machinery & Parts	83-87
15.	Electrical Machinery	88-94
16.	Transport Equipment & Parts	95-100
17.	Other Miscellaneous Manufacturing	101-105
18.	Other Construction	Part 106
19.	Airport Construction	Part 106
20.	Electricity	107
21.	Water	108
22.	Railway	109
23.	Land Transport	110
24.	Water Transport	111
25.	Air Transport	112
26.	Airport Services	Part 113
27.	Supporting & Aux. land & wtr tpt activities	Part 113
28.	Storage and Warehousing	114
29.	Communication	115
30.	Trade	116
31.	Hotels & Restaurants	117
32.	Banking	118
33.	Insurance	119
34.	Computer Related	124
35.	Rest of the Services	120-123, 125-130

Source: Original I-O sectors are indicated in the I-O Table 2009-10, CSO, Government of India.

Appendix B

Table B1.1 Direct and Indirect Output and Employment Multipliers

Sr. No.	Sectors	Output Multipliers	Employment Multipliers
1.	Agriculture	1.59	2.36
2.	Mining and Quarrying	1.51	0.25
3.	Food Beverage and Tobacco	2.53	1.56
4.	Textiles and R MG	2.60	1.07
5.	Wood & W Prod; Furniture & Fix.	2.16	1.49
6.	Paper & Paper Products	2.62	0.83
7.	Printing and Publishing	2.69	0.77
8.	Leather & Plastic; and Products	2.83	0.58
9.	Petroleum Products	2.41	0.24
10.	Paints, Barnishes, Lacquers	2.42	0.35
11.	Other Chemicals	2.76	0.45
12.	Non-Metallic Mineral Products	2.28	0.55
13.	Basic Metal & Metal Products	2.70	0.32
14.	Non-Electrical Machinery & Parts	2.98	0.33
15.	Electrical Machinery	2.88	0.37
16.	Transport Equipment & Parts	2.94	0.43
17.	Other Miscellaneous Manufacturing	2.75	0.43
18.	Other Construction	2.35	0.82
19.	Airport Construction	2.61	0.90
20.	Electricity	1.98	0.21
21.	Water	1.24	0.17
22.	Railway	1.92	0.28
23.	Land Transport	2.26	0.65
24.	Water Transport	1.84	0.29
25.	Air Transport*	2.20	0.30
26.	Airport Services*	2.22	0.80
27.	Support & aux. land & wtr tpt activities	1.97	0.34
28.	Storage and Warehousing	1.88	0.48
29.	Communication	1.60	0.25
30.	Trade	1.40	0.46
31.	Hotels & Restaurants	2.18	1.42
32.	Banking	1.29	0.17
33.	Insurance	1.48	0.34
34.	Computer Related	1.44	0.18
35.	Rest of the Services	1.29	0.36

*Note: The total output and employment multipliers of airport operations (which consist of both air transport and airport services) are 2.869 and 0.703, respectively.

Note

A series of horizontal dotted lines for writing notes.

T-2 Arrival corridor



T-2 Baggage carousels



T-2 Diya wall



T-2 Departure concourse



T-2 Musical angels



T-2 Art wall



T-2 Departure lounge





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