

**ECONOMIC VIABILITY OF AVIATION
IN NORTH EASTERN REGION**

A Thesis submitted to
UPES

For the Award of
Doctor of Philosophy
In
Aviation Management

By
RAMESH KUMAR

OCTOBER 2024

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**School of Business (SOB)
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Dehradun – 248007, Uttarakhand, India**

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DECLARATION

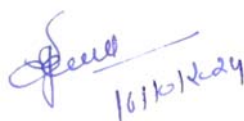
I declare that the thesis entitled “Economic Viability of Aviation in North Eastern Region” has been prepared by me under the guidance of Internal Supervisor, Prof (Dr.) Sumeet Gupta, Professor & Cluster Head- Global Economics and Finance Cluster and External Supervisor, Dr. Banajit Changkakati, Associate Professor, Gauhati University, Assam. No part of this thesis has formed the basis for the award of any degree or fellowship previously.



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CERTIFICATE

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RAMESH KUMAR

ABSTRACT

Air Transportation is the fastest mode of transportation enabling persons and cargo moving from one place to another across the world. Air transportation Industry has been playing key role in the economy of the nation and contributes significantly to GDP of the Nations worldwide. There are several factors affecting the economic viability of Aviation, which needs to be understand and improvise upon to make the Aviation as completely economically viable.

There are two major sources of revenue at particular Airport viz Traffic (Aeronautical) revenue and non-Traffic (Non Aeronautical) revenue. Traffic revenue mainly consists of landing, parking and housing (LPH), RNFC, UDF, Extension of watch hours, Oil throughput charges, ground handling etc. and non-traffic revenue consists of trading concessions, rent and services, admission fees/commercial passes, F&B, Retail services, and miscellaneous services like lounges etc.

Although these kind of factors are almost same at various Airports and may vary in terms of tariff structure. Under this study, focus has been made on economic viability of Aviation of Airports in North Eastern Region. Since the demography as well as topography of North East Region is quite different from rest of the country , therefore Airports in North eastern Region have been chosen to study and analyzing the economics of factors impacting the revenue of the Airports.

There are sixteen Airports in Northeastern Region and except Guwahati Airport all other Airport are running in losses. The economic viability of Airport involves sources of revenue, expenditure and finally profit/loss. The data used in this study is secondary data collected from Airports of varying traffic magnitude i.e. moderate to major Airports.

Quantitative as well as qualitative study have been conducted to suggest the framework stating the factors most contributing to the revenue of the Airport. Regression analysis technique has been used for quantitative analysis and Delphi analysis for qualitative analysis. Results of Regression analysis of all Airports under consideration shows similar trends and accordingly has been helpful in developing the framework say revenue model for particular Airport.

The conclusion and recommendations based on the research study are quite significant and broadly contributes to increase the revenue of Airport to make the Airports economically viable.

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

India is a highly diversified country with an amazing variety of plant and animal species spanning its whole territory. The north-eastern region of India boasts an abundant variety of plant and animal life, as well as breath-taking natural landscapes and a vibrant cultural heritage. The north-eastern region comprises around 7.9% of the total geographical land area. The North-East Region covers around 2.62 lakh square kilometres in terms of area.



Figure 1: Beauty of North-East India

The North Eastern Region consists of eight states, namely Assam, Meghalaya, Tripura, Sikkim, Mizoram, Manipur, Arunachal Pradesh, and Nagaland.

The North-Eastern Region of India has consistently been a captivating destination for tourism and travel, thanks to its rich cultural and spiritual heritage, making it one of the most beloved tourist destinations in the country. The Indian government has prioritized the development of rural tourism and has identified chosen 51 sites/locations in the North East Region for various kinds of development.

Key tourist destinations include Mawlynglong, known as the cleanest village in the Asia region, Parashuram Kund, Tawang, and the scenic hills and stunning waterfalls.

The connectivity of the North-eastern area of India has historically been a challenge. However, with the establishment of airports in each state of the region, travellers now have the advantage of being able to explore and reach every part of the country.

The North-Eastern Region of India has consistently served as a hub for economic development in the country, due to its abundant biodiversity, flourishing tourism industry, and other factors. Furthermore, this area is strategically located in close proximity to and shares important international borders with Bangladesh, China, Bhutan, and Myanmar as shown in Table 1.

The primary economically burgeoning locations in the North Eastern Region include Guwahati, Dibrugarh, Jorhat, Tinsukia, Gangtok, Imphal, Agartala, Shillong, Aizwal, and Itanagar.

Table 1: International Borders of the Northeastern States of India

State	Bangladesh	Bhutan	China	Myanmar	Nepal	Total
	(km)					
Arunachal Pradesh	-	217	1080	520	-	1817
Assam	263	267	-	-	-	530
Manipur	-	-	-	398	-	398
Meghalaya	443	-	-	-	-	443
Mizoram	318	-	-	510	-	828
Nagaland	-	-	-	215	-	215
Sikkim	-	32	220	-	98	350
Tripura	856	-	-	-	-	856
Total	1880	516	1300	1643	98	-

Source: Ministry of Development of North Eastern Region, Government of India.

North East Contribution to India's GDP-

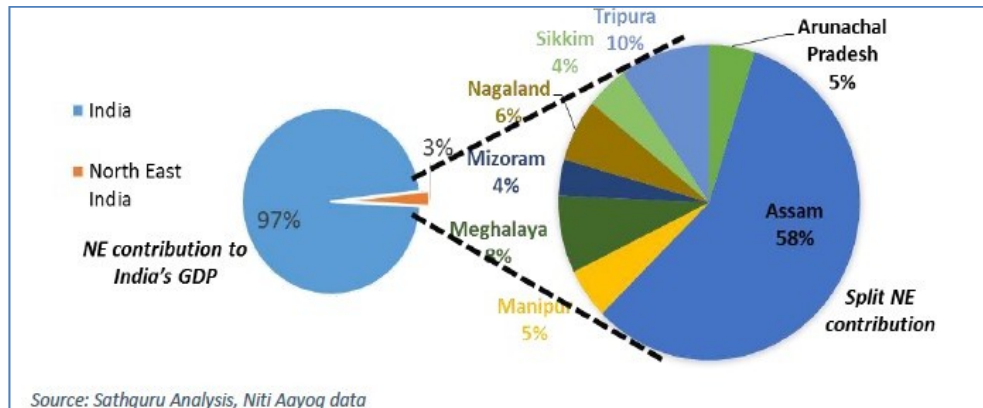


Figure 2: North East Contribution to India's GDP

1.2 OVERVIEW OF CIVIL AVIATION IN INDIA AND IN NORTH EASTERN REGION

Indian Civil Aviation:

India has a total of more than 130 airports, including 22 international airports, 6 joint venture airports, and 102 domestic airports. A total of approximately 32 million passengers were handled from April 2019 to February 2020, consisting of 6.39 million international passengers and 25.95 million domestic passengers. The year-on-year growth rate of passenger traffic from January to November 2019 was 3.86%. The source of this information is the DGCA (Directorate General of Civil Aviation). Contributes around Rs. 33,000 Crore or 0.5% of India's Gross Domestic Product (GDP). India is projected to become the third largest aviation market worldwide by 2024, ranking behind China and the United States. The source of this information is CAPA. The goal of NCAP 2016 is to achieve a domestic traffic of 30 crore by 2022 and 50 crores by 2027, as well as grow international traffic to 20 crores by 2027. The source of this information is the National Capital Area Planning (NCAP).

Air Connectivity Scenario of North Eastern Region in Indian Context

With the exception of Guwahati in the state of Assam, no other state in India has international aircraft connectivity. Guwahati is connected to Dhaka in Bangladesh, Bangkok in Thailand, Paro in Bhutan, and Singapore. Nepal, China, Myanmar, and other ASEAN countries should be thoroughly explored. There were 9.4 million

passengers who travelled via airports in the NORTH EASTERN REGION during the fiscal year 2018-19. The cargo volume for FY 2018-19 was 38,094 metric tons.

1.3 AIRPORTS IN NORTH EASTERN REGION



Figure 3: Airports in North Eastern Region

1.4 LOKPRIYA GOPINATH BORDOLOI INTERNATIONAL AIRPORT



Figure 4: Lokpriya Gopinath Bordoloi International Airport

Lokpriya Gopinath Bordoloi International Airport (Figure 4), located in the state of Assam, is a prominent airport in the Northeastern Region. It is named after a renowned independence warrior and the first Chief Minister of Assam. Often referred to as the Gateway to North-East India, this airport plays a crucial role in connecting the region with the rest of the country. Previously, it was referred to as Borjhar Airport. It ranks as the 10th busiest airport in the country. The Airport operates under a Public-Private Partnership (PPP) model, with Adani Airport Limited as the private company and the Airports Authority of India as the public counterpart.

The Airport, which was established in 1958, has had numerous enhancements over the years.

The passenger traffic at this airport has experienced a significant and exponential growth over time, and in February 2023, it recorded a footfall of 4 million passengers.

Additionally, this airport serves as one of the international airports in the North East Region, offering flights to Singapore, Paro in Bhutan, Dhaka in Bangladesh, and Bangkok in Thailand.

The Air Transport Association (IATA), an international body representing airlines, has designated the IATA code "GAU" for Guwahati Airport.

Furthermore, the International Civil Aviation Organization has designated the ICAO code "VEGT" for Guwahati Airport.

PPP leasing of Airports.

The Government of India (GoI) has recently granted a lease for L.G.B.I. Airport in Guwahati to M/s Adani Airport Ltd. This lease is under the Public Private Partnership (PPP) model and is valid for a duration of 50 years. M/s Adani Airport Limited has assumed control of the airport and is currently managing its operations in accordance with the specified terms and conditions. This is a component of the Government of India's policy to privatize airports through Public-Private Partnerships (PPP).

M/s Adani Airports Limited has taken over the operations of 06 Airports. The airports included in the list are Lucknow, Guwahati, Thiruvananthapuram, Jaipur, Ahmedabad, and Mangalore.

1.5 MAHARAJA BIR BIKRAM AIRPORT (AGARTALA)



Figure 5: Maharaja Bir Bikram Airport (Agartala)

The capital city of Tripura, Agartala, is home to an important airport named after the former monarch of Tripura, Maharaja Bir Bikram Manikya Bahadur. Agartala Airport (Figure 5) is a domestic airport situated in the north-western part of Agartala.

This Airport is managed by the Airports Authority of India, an autonomous organization. It is now ranked 29th among the busiest airports in the country. Agartala Airport is the second largest and most bustling airport in the North Eastern area. The Airport was constructed in 1942.

The Airport had a crucial role during World War II, serving as a significant hub for numerous aircraft movements, including cargo aircraft and the air force.

The International Air Transport Association (IATA) (Table 2) has designated the IATA code "IXA" for Guwahati Airport.

Furthermore, the International Civil Aviation Organization has designated the ICAO (Table 2) code "VEAT" for Guwahati Airport.

The Airports Authority of India aims to construct a cutting-edge airport that will cater to the growing number of passengers and adhere to international standards, as part of its commitment to delivering top-notch airport services and exceptional infrastructure. The Airports Authority of India is undertaking a project of more than Rs. 438 crore to modernize Agartala Airport.

The New Integrated Terminal Building (NITB) at Agartala Airport, created with the assistance of the State Government and the Airports Authority of India, was opened by our esteemed Prime Minister, Shri. Narendra Modi, on January 4th, 2022.

1.6 IMPHAL AIRPORT



Figure 6: Imphal International Airport

The Imphal International Airport (Figure 6) in the capital city of Manipur was established with the aim of delivering top-notch services throughout the whole state of Manipur. This airport is the second international airport in the North-eastern region. Furthermore, it ranks third in terms of busyness among airports in the North-eastern Region, following Guwahati and Agartala Airport.

The Airports Authority of India is accountable for the administration of this airport, and a total of more than Rs. 720 crore was invested in enhancing the amenities at this airport. This project will encompass the construction of a new passenger Terminal Building, Air Traffic Control Tower, parking Bays, and Taxiways.

The Air Transport Association (IATA), an international organization representing airlines, has designated the IATA code "IMF" for Imphal Airport.

Imphal Airport has been assigned the ICAO (Table 2) code "VEIM" by the International Civil Aviation Organization.

1.7 SHILLONG AIRPORT



Figure 7: Shillong Airport

Shillong, the capital city of Meghalaya, is a highly recommended tourism destination in India. The Shillong Airport (Figure 7), located in the capital city, facilitates convenient exploration of the city. This airport is a domestic airport.

The airport was developed in the mid-1960s and became fully operational in the mid-1970s. The airport was built in the mid-1960s and became operational in the mid-1970s.

The Airport Authority of India oversees the management of this airport and has invested more than 30 Crores in the construction of a new terminal building for Shillong Airport. The project initiated by Airports Authority of India in 2009 was successfully concluded in May 2010 and officially launched in June 2011.

The International Air Transport Association (IATA), an international organization that represents airlines, has designated the IATA code "SHL" for Shillong Airport.

The International Civil Aviation Organization has designated the ICAO code "VEBI" for Shillong Airport.

1.8 LILABARI AIRPORT



Figure 8: Lilabari Airport

The airport is situated in the northeastern city of Lakhimpur, which is located in the state of Assam. The Airport (Figure 8) underwent development between 1999 and 2003. The construction of the passenger terminal building was finished in 2003 and was officially opened by the former Union Civil Aviation Minister, Syed Shahnawaz Hussain.

Lilabari Airport is now linked to Kolkata and has the capability to accommodate large aircraft. Additionally, this airport offers night landing facilities.

The Airports Authority of India has identified Lilabari Airport as a strategic location and has requested 25 acres of land for the establishment of an Aviation Training Academy. This academy will serve as a training school for newly recruited trainee pilots.

The Air Transport Association (IATA), which represents international airlines, has designated the IATA code "IXI" for Lilabari Airport.

Similarly, the International Civil Aviation Organization has designated the ICAO code for Lilabari Airport as "VELR".

1.9 DIBRUGARH AIRPORT



Figure 9: Dibrugarh Airport

Dibrugarh Airport (Figure 9) is situated in the captivating region of Dibrugarh, which is part of the magnificent state of Assam. The Airport has the capacity to accommodate aircraft of the Boeing 737 and Airbus 320 models.

The Airport is of great significance due to its proximity to India's major oil reserves, allowing it to serve these regions effectively.

The Airport, originally constructed in the early 1950s, underwent renovations and in February 2009 a new terminal building was completed. This new terminal has the capacity to accommodate up to 500 passengers simultaneously.

The International Air Transport Association (IATA) has designated the IATA code for Dibrugarh Airport as "DIB".

The International Civil Aviation Organization has assigned the ICAO code "VEMN" to Dibrugarh Airport.

1.10 JORHAT AIRPORT



Figure 10: Jorhat Airport

The Jorhat Airport (Figure 10) is situated in the state of Assam, India. Situated in the city of Jorhat in the state of Assam. This area is a civil enclave and is overseen by the Airports Authority of India as the operator of the airport.

The airport was developed in the early 1950s. According to data from February 2019, this airport is the second largest in Assam in terms of passenger and cargo traffic.

Jorhat Air Force Station is unique and holds the distinction of being the inaugural Indian Air Force Base in the Eastern region of the country.

The Air Transport Association (IATA), which represents international airlines, has designated the IATA code "JRH" for Jorhat Airport.

The International Civil Aviation Organization has designated the ICAO code "VEJT" for Jorhat Airport.

1.11 SILCHAR AIRPORT



Figure 11: Silchar Airport

The airport (Figure 11) is situated in Kumbhirgram, which is in the Silchar District of Assam, India.

The airport is a civic enclave that is overseen by the Airports Authority of India. Considering the historical context, this airport was constructed by the British in 1944 and then handed over to the Royal Indian Air Force. This airport ranks fourth in terms of traffic volume in the Northeastern Region.

This airport serves as a crucial hub for the movement of cargo in the region. It has the capacity to accommodate aircrafts like the Boeing 737-800 and Airbus 320. The Airport, with its state-of-the-art infrastructure for aircraft landing and take-off, is a magnet for passengers who are drawn to its diverse range of shops. These shops provide a variety of local handloom products, arts, and culinary delights. This airport spans an area of more than 36.70 acres.

The International Air Transport Association (IATA) has designated the IATA code for Silchar Airport as "IXS".

Similarly, the International Civil Aviation Organization has designated the ICAO code for Silchar Airport as "VEKU".

1.12 PAKYONG AIRPORT



Figure 12: Pakyong Airport

Pakyong Airport (Figure 12) is the sole airport established in the picturesque state of Sikkim. The Airport oversees the flow of traffic in Gangtok and its surrounding areas. The Airport has a land area of 201 acres.

The airport is situated at an elevation of 4,646 feet above mean sea level (AMSL), making it one of the highest-operating airports in India. It is controlled by the Airports Authority of India.

This Greenfield airport, which was opened by the Honourable Prime Minister of India on September 24, 2018, is currently ranked 100th among the operating airports in India.

Recognized as one of the highest airports, the engineers responsible for its building were praised for their exceptional work. The inaugural commercial flight took place on October 4th, 2018.

Operational flights at this Airport have ceased since June 1, 2019, due to low visibility and unfavourable weather conditions. As a result, passengers may now only access Sikkim by using the adjacent Bagdogara Airport in West Bengal, which is around 124 kilometres away.

The Government of India authorized a development plan in October 2008, allocating a budget of Rs. 3 billion. The project encompasses the construction of a runway, taxiway, electrical infrastructure, and airport drainage system. The foundation laying ceremony

for this Greenfield airport was conducted by the former Civil Aviation Minister, Praful Patel, in February 2009.

In July 2015, the Airports Authority of India and the State Government of Sikkim signed a Memorandum of Understanding (MoU) to initiate the development process of the airport. Nevertheless, the progress of these projects was halted due to the vehement opposition from the nearby residents. The AAI (Table 2) undertook this endeavour to offer compensation to the local inhabitants and commenced the development work for the Airport. Nevertheless, the expenses for fulfilling all obligations to the local residents escalated from Rs. 3.5 billion to 6.8 billion.

The airport obtained a commercial operating license from the Directorate General of Civil Aviation (DGCA) on May 5, 2018. Flights to the Kolkata and Guwahati sectors were added under the regional connectivity scheme. The families impacted by the construction of the Airport received their initial payment of compensation, resulting in the conclusion of a prolonged protest by the local villages.

This airport is constructed and operated by the Airports Authority of India (AAI) at a projected expense of Rs. 605 Crores. It has an apron capacity that can accommodate two ATR 72 Aircraft simultaneously, a terminal building capable of handling 100 people, a car parking area, and a modern fire station combined with an Air Traffic Control Tower.

An exceptional, state-of-the-art airport has garnered numerous accolades for the country. It is indeed considered a masterpiece of engineering. Mott MacDonald and Punj Lloyd were awarded the 'International Project of the Year'.

The airport received accolades from global media for its remarkable engineering as it is situated at a high altitude. It offers passengers one of the most spectacular airport approaches in the world. However, the airport's commercial flight operations have been hindered by adverse weather conditions, which have affected visibility during flights.

The IATA code assigned to Pakyong Airport is "PYG", while the ICAO code assigned to Pakyong Airport is "VEPY".

1.13 TEZPUR AIRPORT



Figure 13: Tezpur Airport

The Airport is situated in the picturesque city of Tezpur (Figure 13) in the state of Assam, India.

With a total size of 22 acres, this Airport has the capacity to accommodate one Airbus A320 and two ATR type aircraft simultaneously.

The history of this Airport dates back to 1942 when the runway was constructed by the Royal Indian Air Force during World War II. Following the conclusion of the war, the site was transformed into an air force base in 1959, serving as a strategically significant air force station.

The IATA code for Tezpur Airport is "TEZ" and the ICAO code is "VETZ".

1.14 LENGPUI AIRPORT



Figure 14: Lengpui Airport

The airport is located in Aizwal, Mizoram, India. This domestic airport has excellent connectivity with Kolkata, Guwahati, and Imphal. This airport is the inaugural major airport constructed by the State Government.

The airport was constructed at a cost of 979 crore rupees and was developed over a remarkably short period of time. The building commenced in December 1995 and concluded in February 1998. The airport has a peak hour capability to accommodate 300 passengers.

This airport features a runway that spans a length of 2,500 meters and is distinguished by its distinctive steep topography beneath it. This airport is one of three airports in India that have a tabletop runway, along with Kozhikode and Mangalore. The tabletop runway provides an optical illusion, which necessitates a highly accurate approach from the pilot.

Lengpui Airport (Figure 14) is equipped with a Category - I Instrument Landing System, which aids in the safe landing of aircrafts in situations of low visibility. Indian Oil Corporation offers aircraft fuel services at Lengpui airport.

1.15 DIMAPUR AIRPORT



Figure 15: Dimapur Airport

The airport is a domestic airport located in the state of Nagaland, specifically in Dimapur, Kohima (Figure 15), and the surrounding areas. It is the sole airport serving the state of Nagaland.

The airport's terminal building has a capacity to accommodate 800 people simultaneously. Furthermore, the construction of the airport took place during World War II.

The IATA code for Dimapur Airport is "DMU" and the ICAO code is "VEMR".

1.16 PASIGHAT AIRPORT



Figure 16: Pasighat Airport

The airport is situated in the state of Arunachal Pradesh (Figure 16) and was constructed during the Indo-China War. Following the signing of a Memorandum of Understanding (MoU) between the Indian Air Force and the Government of Arunachal Pradesh in 2009, this airport experienced minimal utilization.

Subsequently, the airstrip underwent further expansion with the construction of an Air Traffic Control Tower and the necessary Airside infrastructures, such as an apron for aircraft parking. Additionally, a perimeter road and security wall were also established. The Airport was officially opened by the esteemed Chief Minister of Arunachal Pradesh, Shri Kiren Rijiju.

The civil enclave in Pasighat is operated by the Airports Authority of India. The terminal building was constructed in 2017. The helicopter service provided by Pawan Hans is currently operational between Pasighat and several regional sites.

The IATA code for Pasighat Airport is "IXT" and the ICAO code is "VEPG".

1.17 RUPSI AIRPORT



Figure 17: Rupsi Airport

The airport is situated in the Kokrajhar district of Assam, India. The location is a mere 15 kilometres from the renowned district of Assam, specifically Dhubri. This airport offers numerous attractions for tourists who are eager to travel via Bhutan. The Airport serves as a gateway to prominent tourist attractions such as the Jaldapara National Park and the Buxa Tiger Reserve.

The Rupsi airfield (Figure 17) was built by the British during World War II to provide weaponry, ammunition, and manpower to the Allied forces.

Vayudoot, a regional air carrier, operated flights to the airport throughout the 1980s but ceased operations in 1984. The state government made numerous endeavours to reinstate aviation services, but unfortunately, they were unable to achieve success. Despite the involvement of the North East council and the Government of India, they were unable to achieve tangible results.

This airport spans across an area of 447 acres and has a runway length of 1,829 meters by 46 meters. The management of this airport is a collaborative effort by the Airports Authority of India and the Indian Air Force, encompassing both civilian and military operations.

At last, the Airport commenced its operations as part of the Government's Regional Connectivity Scheme. The Passenger Terminal Building at this Airport, spanning an area of 3,500 square meters, was fully constructed in the year 2019. The airport has recently undergone development to accommodate the operating of ATR-72 aircraft.

The IATA code assigned to Rupsi Airport is "RUP", while the ICAO code designated for Rupsi Airport is "VERU".

1.18 DONYI POLO AIRPORT, ITANAGAR



Figure 18: Donyi Polo Airport

Itanagar, the capital city of Arunachal Pradesh, has a newly developed domestic airport.

This is also referred to as Hollongi Airport (Figure 18), is under the management of the Airports Authority of India. It covers an area of around 320 hectares. The Airport was constructed expeditiously amidst the challenging circumstances of the Covid-19 pandemic. The development of this airport commenced after the foundation stone was placed on 9 February 2019, and it was officially inaugurated on 19 November 2022.

Indigo Airlines has commenced flights from Kolkata and Mumbai starting from 28th November 2022.

The IATA code assigned to Donyi Polo Airport (Figure 18) is "HIG". The International Civil Aviation Organization (ICAO) code assigned to Donyi Polo Airport is "VEHO".

Table 2: Regulatory/ policy applicable in the context of Civil Aviation:

S. No	Name of the Body	Functions
1.	MoCA (Ministry of Civil Aviation)	GoI to control and regulate Civil Aviation in India, Hqrs New Delhi
2.	ICAO (International Civil Aviation Organization)	Apex body of Civil Aviation, Hqrs. at Montreal Canada. Deals across worldwide in civil aviation related Set of rules/ standards.
3.	DGCA (Director General of Civil Aviation)	Apex body of civil aviation in India, Hqrs New Delhi. Works as per Civil Aviation requirement In line with ICAO.
4.	BCAS (Bureau of Civil Aviation Security)	Deals with security of the airports. Hqrs New Delhi
5.	AERA (Airport Economic Regulatory Authority)	Deals with Airport Charges, Hqrs New Delhi
6.	IATA (International Airport Transport Association)	Deals with International Air Tariff. Hqrs Montreal, Canada.
7.	ACI (Airports Council International)	Deals in Airport Service Quality and Standards. HQRS. Montreal, Canada
8.	AAI (Airports Authority of India)	Deals in ANS including development and management of Airports in India being PSU under Ministry of Civil aviation, New Delhi.
9.	AAICLAS (AAI Cargo Logistics and Allied Services Company Ltd.)	A subsidiary of AAI dealing with Cargo.

All the Government and Private Airport/Airlines are being governed by the above-mentioned Organizations.

1.19 GOVERNMENT OF INDIA INITIATIVES TO ENHANCE AIR CONNECTIVITY ROUTES IN NORTH EASTERN REGION

The Indian government has prioritized the development of air connectivity in the North-eastern Region in order to stimulate the region's economy. This has been achieved through the implementation of a regional connectivity scheme, which aims to connect the whole North-eastern Region as mentioned in Table 3:

Table 3: RCS Routes in North Eastern Region

Guwahati to Tezu	Agartala to Dibrugarh	Tezpur to Aizawl	Guwahati to Passighat
Tezu to Imphal	Dibrugarh to Agartala	Shillong to Imphal	Shillong to Silchar
Tezu to Guwahati	Passighat to Shillong	Imphal to Shillong	Misa(heliport) to Guwahati
Guwahati to Rupsi	Guwahati to Tezpur	Guwahati to Misa(heliport)	Shillong to Dimapur
Rupsi to Guwahati	Tezpur to Guwahati	Shillong to Passighat	Agartala to Shillong
Aizawl to Tezpur	Shillong to Dibrugarh	Silchar to Imphal	Imphal to Silchar
Guwahati to Shillong	Dimapur to Shillong	Passighat to Guwahati	Shillong to Guwahati

A total of 750 routes have been authorized by the Ministry of Civil Aviation to date under the UDAN scheme. Out of them, 75 routes have been awarded under UDAN 4.0, in accordance with the act east policy, since the implementation of the Scheme. The Ministry of Civil Aviation (MoCA) (Table 2) has been consistently striving to optimize the number of routes under the UDAN scheme and is now in the process of linking over 50 airports and 3 heliports.

In addition to facilitating passenger connectivity, the Government of India (GOI) has introduced the KRISHI-UDAN initiative to promote the selling of various products, particularly organic fruits, vegetables, and flowers. The North Eastern region is known for its significant agricultural production, including items such as oranges, lemons, bananas, ginger, pineapples, and cut flowers. Freight services have commenced operations in the North Eastern region.

1.20 AIR CARGO IN NORTH EASTERN REGION

LGBI Airport, Guwahati

The operationalization of the Guwahati domestic cargo port for regular users began on December 29, 2017. This facility handles both outbound and inbound freight, with an annual handling capacity of 52,210 metric tons. The facility covers an area of 1,430

square meters. the airlines that will be mentioned next The following airlines are Air Asia, Air India, Go Air, Blue Dart, Air Vistara, and Spice Jet.

The primary objective of this shared user domestic freight terminal is to facilitate the transportation of local products from the north east region to other states, as well as the importation of commodities from other states to the north east region.

Out-Bound Facility

The area of outbound cargo is 483 square meters. There are two XBIS machines and one estimated time of departure (ETD). The number of weighing scales is 3, each with a capacity of 3 tons. There is a weighing scale for the strong room with a capacity of 60 kg, and a weighing scale for small packages with a capacity of 100 kg. There are 8 cargo trolleys with 4 wheels, each with a capacity of 1000 kg, and 3 cargo trolleys with 2 wheels, each with a capacity of 300 kg. The cold storage area measures 15.90 square meters, the dangerous goods room area measures 8.37 square meters, the strong room area measures 12.30 square meters, the truck-dock area measures 90 square meters, and the airside area measures 33.125 square meters. There are a total of 7 CCTV cameras.

In-Bound Facility

The in-bound cargo area measures 483 square meters. The weighing scale in the strong room has a capacity of 60 kilograms, while the weighing scale facility has a capacity of 100 kilograms. There are a total of 8 cargo trolleys with 4 wheels each. The cargo trolleys have a capacity of 1000 Kg each and there are 3 of them. The cold storage facility covers an area of 15.91 square meters. The dangerous goods room area is 8.37 square meters. The strong room area is 12.30 square meters. The truck dock area is 90 square meters. The air side area is 33.125 square meters. There are 7 CCTV cameras.

Table 4: Domestic Cargo Tonnage LGBI Airport

S. No.	Financial Year	Incoming Cargo (Metric Ton)	Outgoing Cargo (Metric Ton)	Total Cargo (Metric Ton)
1	FY 2018-19	15906	7915	23821
2	FY 2019-20	14312	6829	21141

A new proposal has been made for the Common User Domestic goods Terminal with an annual tonnage handling capacity of 70080 mt (1560 sq.) and the ability to hold international goods in Guwahati.

A new temporary international cargo terminal has been built and started operating on April 4th, 2019. The terminal has an area of around 324 square meters. The previous international warehouse has been transformed into a customs EDI service center and customs office, as well as a CISF facility for security checks.

Table 5: International Cargo Tonnage in MT

S. No.	Financial Year	Import (Metric Ton)	Export (Metric Ton)	Total (Metric Ton)
1.	FY 2018-19	17.60	8.50	26.10
2.	FY 2019-20	1.20	2.66	3.86

A cold storage facility was developed during the 2017-18 fiscal year to support the perishables industry in this area. The capacity of the system is capable of accommodating a maximum of 3 to 4 metric tons each transit.

1.21 NEW CONSTRUCTION OF INTERIM INTERNATIONAL CARGO TERMINAL

The construction of the interim international cargo terminal at Guwahati airport began its operation on April 4th, 2019. The terminal covers an area of approximately 324 square meters. The capacity of the facility is capable of processing up to 12556 metric tons per year.

The Assam Industrial Development Corporation (AIDC) has been granted with a land area of 4050 square meters by the Airports Authority of India (AAI) for the construction of a Center for Perishables Cargo. The construction of this center, which has a capacity of MT yearly, has been successfully completed. (Figure 19, 20)

OTHER CARGO HANDLING FACILITY AND CAPACITY IN NORTH EASTERN REGION PER ANNUM

AGARTALA-**40150** MT, IMPHAL-**58145** MT, LILABARI- **9125** MT, DIBRUGARH- **52414** MT, SILCHAR - **13687** MT, DIMAPUR- **7556** MT, JORHAT- **3285** MT

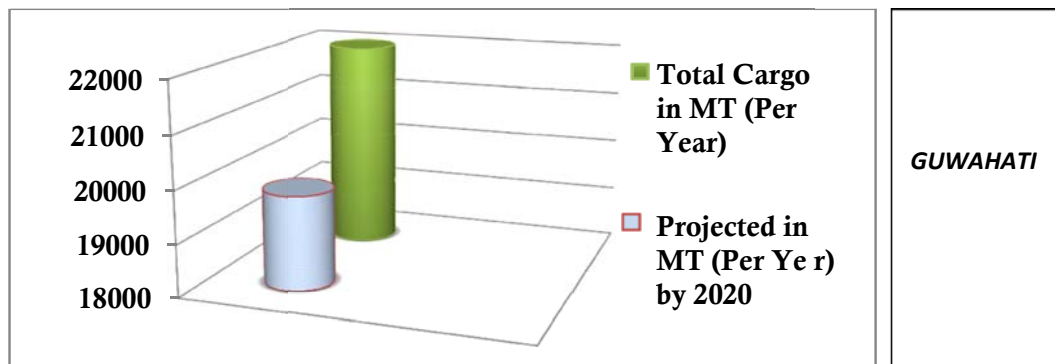


Figure 19: Cargo Growth in North Eastern Region – Guwahati

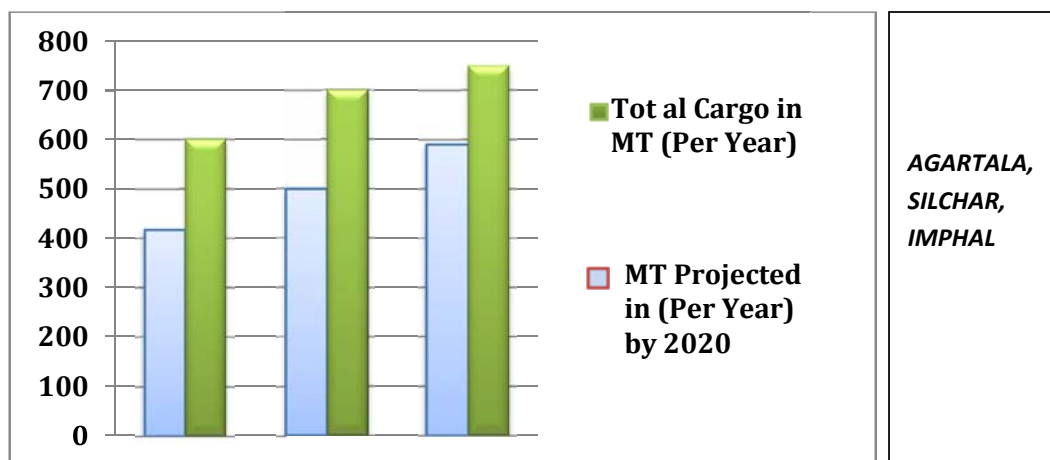


Figure 20: Cargo Growth in North Eastern Region – Agartala, Silchar, Imphal

1.22 AIR CARGO COMMODITIES OF NORTH EASTERN REGION

The North Eastern Region has identified twelve items with the highest export potential. These products include Orange, Lemon, Pineapple, Kiwi, Rice, Banana, Chilly, Cut flowers, Ginger, Jackfruit, Ayurvedic items, Turmeric, and Allied Agri Pro.

1.23 PERISHABLE MARKET POTENTIAL IN NORTH EASTERN REGION

According to a study conducted by PWC, the production of horticulture and floriculture in the North Eastern region is 12 million metric tons. Unfortunately, a significant portion of this, around 1.5-2 million metric tons, is lost owing to the lack of cold storage facilities in the procurement center.

Horticulture: Key fruits included banana, pineapple, oranges.

The wastage of products is caused by insufficient road transit, absence of processing units, poor storage, and lack of packing facilities.

Floriculture: The annual production amounts to approximately 102 thousand metric tons. Flowers in both loose and cut varieties are produced over a period of 1.58 Half long.

1.24 WAY FORWARD STEPS TAKEN AT GUWAHATI AIRPORT

Placing the FSSAI and PQ offices within the Air Cargo premises will enhance trade efficiency by reducing the distance between them and the Guwahati Airport, which is now 30 kilometers distant. AAICLAS (Table 2) may contemplate providing underwriting services for cargo capacity in the lower section of an aircraft, together with a minimum guarantee of cargo, in order to encourage operations at Guwahati Airport. The governments in the North Eastern Region have reduced the sales tax on aviation fuel. Further assistance will facilitate airlines in expanding their operations and promoting overall growth in the North Eastern region.

1.25 STRATEGY AND ACTION PLAN FOR NORTH EASTERN REGION

The main goal for the NORTH EASTERN REGION is to enhance the value chains from producers to consumers in order to increase exports from the region. To achieve this, numerous programs have been developed to educate businesses, farmers, FPOs, and exporters. To improve the effectiveness of the rural supply chain in the North Eastern Region, it is necessary to establish pack houses, cold storages, processing facilities, transportation infrastructure, and marketing linkages. This would help to minimize food losses and promote trade in the region. Exploiting the substantial market surplus and enhancing the quality of products to access the global market by contacting diverse clients from mainland India.

Airports in the North-Eastern Region of the country are experiencing financial losses due to the high maintenance costs exceeding the money collected. There are multiple reasons to elucidate this:

1. The flight activity at minor airports such as Agartala, Tezu, Dimapur, etc. is little, resulting in insufficient revenue for Air Navigation Services (ANS).
2. Airports serve as significant job generators, particularly in the fields of airline operators, airport operators, air traffic controllers, and other essential stakeholders. The salaries of these individuals impose a substantial financial burden on the government.
3. Day-to-day maintenance of airports is a significant expense.
4. At smaller airports, factors such as climatic conditions and lack of infrastructure make the sources of revenue through commercial usage of space, such as taxi services, ATMs, money exchange services, and shops at airports, not profitable.

Airports in the North-Eastern region are not profitable for the reasons stated above.

1.26 BUSINESS PROBLEM

Economic Sustainability Challenge: The aviation industry in the North Eastern Region faces a challenge in achieving economic sustainability due to substantial costs associated with aviation turbine fuel (ATF), operations, maintenance, recruitment of skilled workforce, compliance with regulations, and adoption of technology in accordance with international standards as shown in Tables 6 (a) and 6 (b).

Coordination and Support Requirement: Coordination and support are necessary to achieve efficient and secure air transportation and maximize the economic and social benefits of aviation in the region. This requires the collaboration and assistance of key stakeholders, such as regulatory authorities, financial institutions, airlines, fuel suppliers, airports, local administration, and sectors like trade, travel, tourism, and hospitality.

Cost of Infrastructure Development: The development of infrastructure, including highways, bridges, cargo facilities, and terminals, is crucial for improving aviation infrastructure in the North Eastern Region. Nevertheless, these projects necessitate substantial investment, typically financed by governments and multinational entities.

CHAPTER 2: LITERATURE REVIEW

2.1 REPORTS ON NER AVIATION, POTENTIAL AND ISSUES RELATED

Table 6: a) Literature Review- Reports on NER, Aviation, Potential & Issues related

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
1.	IATA (Economic Performance of the Airlines Industry) Midyear Report 2020	IATA (Economic Performance of the Airlines Industry) Midyear Report 2020.	COVID-19, air connectivity, economic benefits, recovery, air cargo, global supply chains, vaccines, testing, global travel	Ensuring the economic viability of aviation in the North Eastern region requires addressing the challenges posed by COVID-19, restoring air connectivity, supporting air cargo operations, deploying vaccines and testing, managing financial performance, and leveraging government support and aid.
2.	KPMG Aviation 2030 (Disruption and its implications for the aviation sector)	The relative Golden age of the Aviation sector may well continue- the economic recession notwithstanding-through 2030.	KPMG, Aviation 2030, disruption, implications, aviation sector, golden age, economic recession	The specific focus of each discussion may differ, there are likely common themes and insights that can be drawn from both the analysis of the economic viability of aviation in the North Eastern region and the broader outlook presented in the "Aviation 2030" article.
3.	Integration of the North East: the state Formation Process	The issue of formation of States in North East took quite lengthy time and could have been done earlier also by GOI. Further formation of States should not be	Integration, North East, state formation, process	The economic viability of aviation in the North Eastern region is closely linked to the broader process of integration and state formation in the area. Improved

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		considered as the solution of problems in the Region. Central Government has to come out with different approach to address the issues of the Region.		aviation infrastructure and services can enhance connectivity, stimulate economic development, and contribute to the overall integration of the North East into the national mainstream.
4.	A comparative Study of Tourism Industry in North-Eastern States of India: August 2013	The main concerns in the Northeastern Region are non-uniformity of developments and performances in various sectors may be Tourism, inadequate infrastructure, lack of transportation network, improper marketing, statutory permissions etc. Therefore, measures need to be taken to make uniform rules and developments simultaneously to see the economic developments in Region.	India, tourism, infrastructure, Gross State Domestic Product (GSDP), growth rate, tourists' influx, Density of Tourist Population (DTP), Per capita tourist arrival (PCT), infrastructure, effect, permit period, tourism development	Enhancing the economic viability of aviation in the North-eastern region is closely linked to the development of tourism infrastructure, promotion efforts, government support, and addressing various constraints and challenges facing the sector
5.	Development of North Eastern Region, GOI Annual report-2018-19	Development of Greenfield Airport at Pakyong (Sikkim) Inaugurated by Hon'ble Prime Minister on 24.09.2018. Similarly, so many development schemes under the Ministry of MSME and Ministry of Power are the example of developments.	North East Region Development	Ensuring the economic viability of aviation in the North East is not only essential for the efficient movement of people and goods but also for the holistic development of the region. It is closely intertwined with the broader goal of fostering economic growth, improving living standards, and reducing regional disparities

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
6.	Agricultural & Processed Food Products Export Development Authority (APEDA): Comprehensive Master Plan for Tapping the Export Potential of North Eastern States-	The region has an edge in terms of fertile land for agri products, close borders with ASEAN Countries, huge chunk of forest area and climatic conditions. All these are quite favorable to enhance economic activity in the Region. The rich human resource, which is well educated and readily available to strengthen the economy of the Region. Location of Region in close proximity of ASEAN countries is really a boon and can become a gateway for trade and tourism.	Focusing on the agricultural potential, geographical advantages, economic opportunities, particularly in relation to trade and tourism with ASEAN countries.	The economic viability of aviation in the North Eastern region and focusing on its agricultural potential, geographical advantages, economic opportunities, and human resources are interconnected strategies aimed at fostering regional development, enhancing connectivity, and tapping into the economic potential of the region, particularly in relation to trade and tourism with ASEAN countries
7.	Assessing Economic Impacts of Connectivity Corridors: An empirical Investigation: Published in 2018 by Research and Information System for Developing Countries.	Connectivity is one of the important pillar in enhancing the trade, business by way of reducing logistics cost may be transportation, reducing time indirectly enhancing efficiency. Also, better connectivity integrates the supply chain across cross border areas. Rather enhanced economy of the Region due to connectivity helps in poverty eradication and overall economy of common people gets boost. Promotes of job opportunity among various sections of the society.	Connectivity corridors, Logistics cost reduction, Transportation efficiency, Supply chain integration, regional economy, Poverty eradication, Job opportunities,	The economic viability of aviation in the North Eastern region is closely intertwined with the creation of connectivity corridors and the subsequent benefits they bring, including trade enhancement, logistics efficiency, economic growth, and social development.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
8.	Air Transport Action Group (ATAG): The Economic & Social benefits of air transport.	Air transportation is one of the unique Industries leading to advancement of the society. Aviation technology involves advance and sophisticated technical systems makes the world modern and hi-tech.	Air Transport Action Group (ATAG), Economic benefits of air transport, social benefits of air transport, Aviation technology, Advance technical systems, Modernization	The economic viability of aviation in Northeastern regions can benefit from alignment with ATAG's advocacy for the economic, social, and technological advancement of the aviation industry globally. By leveraging ATAG's expertise and networks, initiatives aimed at fostering aviation development in Northeastern regions can access resources, best practices, and support to achieve their objectives effectively
9.	Report of Working Group on Civil Aviation Sector: June 2012	All the advance says Major economies in the world do have great contribution through Air transportation businesses. The contribution in economy is well established and proved with documentation demonstrating the major contributor in economy of the nation. Western world countries are clear example of air infrastructure developments. New and modern kind of infrastructures are being created to enhance the efficiency of air transportation system.	Civil Aviation Sector, Air Transportation, Economy Infrastructure Development, Modern Infrastructure	While the specific connection between the economic viability of aviation in the northeastern region and the Civil Aviation Sector Working Group report from June 2012 isn't explicit, there are several potential areas where the findings or recommendations of the report could inform policies or initiatives aimed at enhancing aviation's economic viability in that region

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
10.	Deloitte Final Report: Promotion of Regional and Remote Area Air Connectivity in India: Ministry of Civil Aviation.	Regional Air connectivity has created historical contribution to the aspirations of common people. GOI has named this UDAN (Ude Desh Ka Aam Nagrik). Airports which are not much operational having less operations and Airports not having any operations at all are getting benefited by this scheme in the form of VGF (viability gap fund). Civil Aviation Policy 2016 which an ambitious policy/scheme of GOI is really proving to be boon for people of far-flung areas linking the small and mini towns.	UDAN (Ude Desh Ka Aam Nagrik), Viability Gap Fund (VGF) Regional Air Connectivity, Common people aspirations, Small and mini towns, Operational airports, less operational airports, Airports with no operations	The economic viability of aviation in the northeastern region and the Deloitte Final Report both revolve around the promotion of regional air connectivity, addressing common people's aspirations for accessible air travel, and leveraging government policies and initiatives like UDAN and the VGF to connect remote and less connected areas, including those in the northeastern region.
11.	India Brand Equity Foundation (IBEF) Aviation Report: Jan,2018	GOI has given a special thrust to boost the connectivity across North Eastern States by developing almost all Airstrips apart from further development of existing Airports in the region. There are plans to develop Guwahati as Hub Airport of North Eastern Airports and making this as gateway of ASEAN countries. Similarly other middle level Airports like Dibrugarh and Agartala, Imphal are being developed.	Connectivity, North Eastern States, Airstrips, ASEAN countries, Middle-level Airports	The connection between the economic viability of aviation in Northeastern regions and the IBEF Aviation Report lies in the analysis of aviation infrastructure development, connectivity enhancement efforts, hub development prospects, and the role of middle-level airports in promoting economic growth in the region.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
12.	India Brand Equity Foundation (IBEF) Aviation Report: Mar,2018	Air cargo is estimated to reach to nearly 40.00 million tones by year 2023 showing annual compounded growth of approximately 7 % between financial years 2016 - 2023. International air cargo is also estimated to grow almost by 7 % compounded annually between financial year 2016-23 and domestic cargo at a rate of 7 %. Annually.	Air cargo, international air cargo, Domestic cargo	The IBEF Aviation Report provides insights into the overall aviation landscape in India, understanding its implications for specific regions like the northeastern states requires considering local factors such as infrastructure, demand dynamics, and government support.
13.	Economic Infrastructure in North East India: An Analysis: January 2007	Connectivity in any form may be through Airways, Railways, Waterways, roadways lead to economic development of any State. In the context of North Eastern Region Except Assam all other States are not well connected among them not even with rest of the country. GOI has been focusing in developing all kinds of connectivity bringing all the States close to each other. This will enhance the social harmony and cross culture developments in the Region.	Economic Infrastructure, Connectivity, Airways, Railways, Waterways, Roadways, Economic development, Cross-cultural developments	The economic viability of aviation in North Eastern regions is intricately linked to broader themes of connectivity, economic infrastructure, government initiatives, social harmony, and the integration of various modes of transportation. A comprehensive approach that considers these interconnections is essential for fostering sustainable development in the North Eastern region of India.
14.	KPMG- FICCI Emerging North East India: Economically and Socially	The efforts and focus of GOI towards connectivity in Northeast by GOI may be visible by 2021 connecting North East to rest of India and the North East to	Emerging North East India, ASEAN countries, Travel infrastructure	Improving the economic viability of aviation in the Northeast is closely linked to broader development goals of promoting inclusive growth, enhancing

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
	inclusive development strategies: Nov, 2015	ASEAN countries. Travel to Thailand from Assam may be a matter of 48 hours and through waterways drive down to Kolkata from Guwahati.		connectivity, and fostering closer ties with neighboring regions and countries
15.	Indian Aviation Industry: An overview International Journal of Academic Research and Development: 6 th Nov, 2017	It has been observed that due to improvement in financial conditions of common people in NER the standard of living has paved the way to afford air connectivity. This has resulted in increase in number of passengers travelling from North East to other part of the country. With the increase in economy in general of a common man and introduction of economy class the passenger preference is being noticed. The number of passengers in 2015-16 for domestic passengers were found approximately 85 million and in 2016-17 105. Million.	North East Region (NER), Air Connectivity, Standard of Living, Economy Class, Domestic Passengers, Passenger Preference, Economic Conditions, Passenger Traffic Growth	The economic viability of aviation in the North Eastern Region is influenced by a complex interplay of factors related to air connectivity, passenger preferences, economic conditions, and traffic dynamics. Enhancing these factors can contribute to the sustainable growth of aviation and economic development in the region.
16.	National Civil Aviation Policy 2016	The Mission of Government of India to make flying interesting and affordable by Countrymen may convert flying numbers by 35 Cr if at least one person from middle class family travels by Air. Comparatively it would be a big jump of approximately from 7 Cr. easy and	Making flying interesting and affordable, connecting tier II and tier III cities, UDAN scheme, Travel to tier two and tier three cities	Initiatives aimed at making flying interesting and affordable, increasing flying numbers, and improving connectivity to tier II and tier III cities are essential for enhancing the economic viability of aviation in northeastern regions and fostering overall regional

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		affordable connecting the tier II and tier iii cities in year 2014-15. UDAN scheme has made it possible to travel to deep down to tier two and tier three cities		development. The UDAN scheme, along with other government policies and industry efforts, plays a crucial role in achieving these objectives.
17.	IATA: India's Air Transport Sector: August 2018	IATA an international body to study the air travel patterns and forecast has estimated travelling by air may increase from 350 Million to 520 Million with incremental increase of average 6 % per annum over the next twenty years. Over the next 20 years say by 2037.	Air travel patterns, Increase in air travel	The forecasted increase in air travel patterns has the potential to positively influence the economic viability of aviation in the northeastern region, provided that the necessary infrastructure, policies, and investments are in place to support this growth
18.	ZVEST: Indian Aviation Sector	Air travel has been witnessing tremendous growth and the average percentage of 26 for domestic travelers and at 7 percentage for international travelers. As per CAPA estimate, the figure is likely to cross to almos130 Million with average increase of 25 percentage to 130 million by year 2017-18.	Air travel, Growth, Domestic travelers, international travelers CAPA estimate	The economic viability of aviation in the North Eastern region is closely intertwined with air travel growth, the number of domestic and international travelers, and estimates provided by industry experts like CAPA. Understanding and addressing these interconnected factors are essential for sustaining and enhancing the aviation sector's contribution to the region's economy.
19.	India's Act East policy and North East India: A critical	India's Act East policy is proving to make the entire North East an economic center by building good relation with	India's Act East Policy, North East India, Economic Center, ASEAN	The economic viability of aviation in Northeast India is intricately linked to India's Act East Policy, as both are aimed

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
	Review: International Journal of Research in Social Sciences: 9 September 2019	neighbor countries especially with ASEAN countries by linking in various ways. Multi model transportation system is key infrastructure is being developed to boost the trade and businesses across the borders.	Countries, Multi-Modal Transportation System, Trade and Business Boost, Infrastructure Development	at enhancing regional connectivity, fostering economic development, and strengthening ties with ASEAN countries. Investing in aviation infrastructure in the region is essential for realizing these objectives and unlocking the full economic potential of Northeast India
20.	PWC: Indian Chamber of Commerce: India's North-East Diversifying Growth Opportunities	The Northeastern Region comprising of eight 8 States- Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and Assam. Occupy almost eight % of India's Geographical area whereas population wise it consists 4 percentage of total population of the country. Assam has the highest share of approximately for 68 percentages of total population. in North East.	Geographical area, Diversifying Growth Opportunities	The economic viability of aviation in northeastern regions like Assam is intricately linked to factors such as geographical challenges, population dynamics, growth opportunities, population distribution, and Assam's share of the northeastern population. Addressing these interrelated aspects is essential for fostering sustainable aviation development and enhancing connectivity in the region.
21.	International Journal of Science and Research (IJSR): Tourism Potentiality in North East India: Vol 2: 10 October,	The NEC (North Eastern Council) is the body to frame the policy for development of the Region by creating Tourism infrastructures, budget Hotels and creating a fund to run people friendly plans/schemes. This body has a significant role in overall development of	International Journal of Science and Research (IJSR), Tourism Tourism infrastructures, Budget hotels, People-friendly plans/schemes	The economic viability of aviation in the Northeastern region and the tourism potential outlined in the IJSR article are closely intertwined, with improvements in one sector often leading to positive outcomes in the other, ultimately

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	2013	region in close coordination with Government of India.	Overall development	contributing to the overall development of the region.
22.	North Eastern Region VISION 2020 North Eastern Council Ministry of DoNER dated 13 May, 2008	Inclusive growth of the Region necessitates to provide the better amenities and infrastructures either Air connectivity, road transportation or Railways and water ways, also other most important areas are communication by creating robust telecommunication network in the Region. GOI has been focusing in all the areas referred above with the purpose to benefit the people of the Region.	Inclusive growth, Amenities, Infrastructure, Air connectivity, Road transportation, Railways, Waterways, Communication, Telecommunication network	The economic viability of aviation in the northeastern region is closely linked to the broader development agenda outlined in the "North Eastern Region VISION 2020" plan. By enhancing air connectivity, investing in infrastructure, promoting inclusive growth, and improving intermodal connectivity and communication networks, the region can unlock its economic potential and achieve sustainable development goals.
23.	FICCI Global Aviation Summit 2019 15 th - 16 th January, 2019 Vision 2040 for the Civil Aviation Industry in India By KPMG	With increase in economy of India, Aviation infrastructure is also increasing multifold and it is expected that India may see almost 200 plus Airports in next decade. Huge investment to the tune of 4-0-50 Billion is expected to create infrastructure and land acquisition etc. shall be big task for State Govts. Few major cities like Delhi and Mumbai are going to have three Airports where as other Metropolitan cities may have two Airport like GOA, Hyderabad etc.	Economy, aviation infrastructure, airports, investment land acquisition, metropolitan cities	The economic viability of aviation in India's North Eastern region is intricately linked to broader economic factors, investments in aviation infrastructure, the involvement of state governments, and efforts to improve connectivity. Ensuring adequate support and investment in aviation infrastructure in the North Eastern region is essential for promoting economic development and regional connectivity.

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24.	Sociological Constraints to Industrial Development in North East India	The economy of NORTH EASTERN REGION is still is predominantly agrarian. Since the beginning of the planning era, considerable amounts of investments have been made for the development of Social sector (Health, Education and Culture) and Physical infrastructure. Constitutional reorganization effected in the region has led to the dismemberment of Assam and declaration of new states such as Meghalaya, Mizoram, Nagaland and Arunachal Pradesh.	Sociological constraints, Industrial development, Agrarian economy, Education, Culture, Physical infrastructure, Constitutional reorganization, Dismemberment of Assam	The economic viability of aviation in the North Eastern region is influenced by a complex interplay of sociological factors, historical events, and development priorities spanning various sectors such as agriculture, industry, healthcare, education, and infrastructure. Addressing these interconnected challenges requires a comprehensive approach that considers the diverse needs and aspirations of the region's population.
25.	White paper on National Green Aviation Policy 2019 Ministry of Civil Aviation, GoI dated 19.02.2019	Safety of Aircraft operations directly related to clear approaches free from bird habitats dumping grounds, slaughters house etc. One incident at the time of landing or take off of the Aircraft may lead to major accident and lives on board may be in danger. Therefore there is urgent need to clear the all-around area of an Airport by having robust system of waste management and, maintaining the clean environment all around the Airport, Waste management by municipal bodies, village panchayat around the airports is	Safety of Aircraft Operations, Bird Habitats, Dumping Grounds, Slaughterhouses, Waste Management by Municipal Bodies, Village Panchayat, Suitable Measures	Achieving economic viability in aviation in northeastern regions requires a holistic approach that integrates safety, environmental stewardship, and community engagement to ensure sustainable growth while mitigating risks and preserving the well-being of all stakeholders

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		also one of the concerned areas. GOI through DGCA have directed all state Govts, to take suitable measures of waste management around the Airports.		
26.	Sustainability's role in enhancing airport capacity 2018	Airport capacity upgradation is a continuous process and creating new routes, creating new Airport Terminals, parking bays and other statutory regulations are big challenges to deal the Aviation constraints arising out of increased traffic. This increase is multi fold since 1970 until today and will continue to increase further globally.	Sustainability, Airport capacity, Airport terminals, Parking bays Statutory regulations, Aviation constraints, Airport development	The economic viability of aviation in North Eastern regions is closely linked to various factors such as sustainability, infrastructure, regulatory compliance, demand trends, and strategic planning. Addressing these factors holistically is essential for ensuring the long-term success and growth of aviation in the region.
27.	Airport Sustainability Practices Drivers and Outcomes for Small Commercial and General Aviation Airports (2016)	Increase in infrastructure, and traffic leads to consumption of power, water etc., therefore there is need to optimize the resource utilization. Also include innovative measures to reduce carbon foot print and reduce the consumption. This will save cost towards maintaining the assets /infrastructure s etc.	Airport sustainability Small commercial airports General aviation airports Infrastructure development Traffic growth Resource optimization Carbon footprint reduction Cost savings Asset management Innovative measures	

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28.	Lessons Learned from Airport Sustainability Plans (2015)	Sustainability is a major challenge especially for smaller airports, regardless of the existence of a formal sustainable plan included the following: Lighting upgrades i/c LED lights, Solar and Geo thermal energy, Recycling of Municipal and construction waste, planting tree and native plants, community and stakeholders' outreach, employee program, funding from nontraditional sources.	Airport sustainability, Smaller airports, Sustainable plans Solar energy, Geothermal energy, Recycling (municipal and construction waste) Tree planting and native plants, Community outreach	Integrating sustainable practices into airport operations not only aligns with environmental goals but also plays a significant role in enhancing the economic viability of aviation in Northeastern regions by reducing costs, attracting investment, improving community relations, and fostering employee satisfaction.
29.	Transportation Network Companies: Challenges and Opportunities for Airport Operators (2017)	Vehicular traffic within Airport is governed as per airport regulations for that additional feature are required to be mounted and SOP are to be followed which may be different to regulations of State Govt. and Transportation Network companies. This also affects the payment regulations which is also different than the State Tariff structures. These are few challenges in transportation management especially in Airports.	Transportation Network Companies, Challenges, Opportunities, Airport Operators, Vehicular Traffic, Airport Regulations, Standard Operating Procedures (SOP), State Government Regulations, Payment Regulations, Tariff Structures, Transportation Management, Airports	The economic viability of aviation in the North Eastern region is closely intertwined with various factors, including the operations of transportation network companies, airport management practices, regulatory frameworks, and transportation infrastructure. Addressing challenges and leveraging opportunities in these areas can contribute to the development of a robust and sustainable transportation network that benefits both passengers and the regional economy.
30.	Improving the Airport Customer	Airport orientations are especially helpful to engage airport employee at	Airport Orientations, Employee Engagement,	The economic viability of aviation in the North Eastern region is closely

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	Experience (2016)	large airports where the employee may never get the opportunity to see the entire airport first hand or understand.	Airport Operations Employee Training, Customer Service, Airport Infrastructure, Airport Efficiency	intertwined with various aspects of airport operations, employee engagement, and customer experience. A robust economy can lead to investments in infrastructure, efficient operations, employee training, and improved customer service, ultimately contributing to the overall success of airports in the region.
31	NextGen for Airports, Volume 4: Leveraging NextGen Spatial Data to Benefit Airports: Guidebook (2016)	Year 2003 was the year to start with Next Gen by integrating the ground based navigational systems with air based say satellite-based navigation, communication and surveillances. This technological integration is to streamline the air space management and to provide seamless air traffic across the globe. This was the need of the hour to manage the increased traffic to speed up the air traffic and use maximum technological advancement in managing the air. Traffic.	NextGen Airports Spatial Data Ground-based Navigational Systems Satellite-based Navigation Communication Surveillance Airspace Management Seamless Air Traffic Technological Integration Increased Traffic Air Traffic Management Technological Advancement	The adoption and integration of these technological advancements can greatly contribute to the economic viability of aviation in the North Eastern region by enhancing safety, efficiency, and capacity while reducing operational costs and environmental impact
32.	Practices to Develop Effective Stakeholder Relationships at	A key to good stakeholder relationship is the proactive development of a	Smaller Airports, Positive Relationship, Open	The economic viability of aviation in the northeastern region is intricately linked to the ability of smaller airports to develop and maintain effective

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	Smaller Airports (2015)	positive relationship based on open communication, trust and transparency.	Communication Transparency	stakeholder relationships. By prioritizing collaboration, communication, trust, and transparency, airports can enhance their competitiveness, resilience, and contribution to regional development goals.
33.	Effects of Airline Industry Changes on Small- and Non-Hub Airports (2015)	The objective of study to see the impact on Medium Size and non-hub Airports by changing commercial Airlines by quantifying. Also, to identify the factors affecting the Airports due to change in Airlines operating. Small Airports as well as non-hub Airports have limited airlines services and their revenue cycle gets impacts due to change of Airlines.	Airline Industry Changes, Small Airports, Non-hub Airports Medium Size Airports, Revenue Cycle, Airlines Operating	The economic viability of aviation in Northeastern regions is closely linked to changes in the airline industry, particularly regarding airport operations, revenue generation, and factors affecting airport performance. Understanding these interconnections is crucial for policymakers, airport operators, airlines, and other stakeholders to navigate challenges and seize opportunities for sustainable development in the aviation sector
34.	A Guidebook for Increasing Diverse and Small Business Participation in Airport Business Opportunities (2015)	This is a guidebook for airport operator and business to promote commercial interest of Airlines as well as business by Concessionaires at Airport. This book has focused on the business models, which are disadvantageous and non-disadvantageous to Airport and airlines operators. In addition, businesses	Airport business opportunities, Small business participation, Diverse businesses, Concessionaires, Business models, Women-owned businesses	The economic viability of aviation in the Northeastern region creates a fertile ground for various business opportunities within airports. These opportunities encompass a wide range of sectors and stakeholders, including small businesses, concessionaires, airlines, and women-owned enterprises, all of which

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		oriented to women and small nature of businesses.		contribute to the overall success and sustainability of the aviation industry in the region.
35.	Optimizing Airport Building Operations and Maintenance Through Retro commissioning: A Whole-Systems Approach (2015)	Guidebook on the Airport operations and maintenance includes an introduction to retro commissioning and a discussion of building O&M best practices	Airport operations and maintenance, Retro-commissioning, Whole-systems approach, Building O&M best practices	The connection lies in the fact that adopting efficient O&M practices, including retro-commissioning and a whole-systems approach, can directly impact the economic viability of aviation in the northeastern region by improving the efficiency, sustainability, and attractiveness of airport facilities to airlines, passengers, and other stakeholders
36.	Guidebook on General Aviation Facility Planning (2014)	The type of General Aviation facilities covered in this guidebook include airside and city side infrastructures like Aprons & Tie downs, Hangars, Terminal Building, fixed based operations, Fueling facilities, Aircraft wash facilities, Security, Helicopter parking.	Airside Infrastructure, City side Infrastructure Aprons & Tie Downs, Hangars, Terminal Building, Fixed Based Operations Fueling Facilities, Aircraft Wash Facilities	The guidelines outlined in the guidebook and developing appropriate infrastructure, the northeastern region can enhance its aviation capabilities, which in turn can contribute to its economic viability. For instance, having well-equipped terminals and hangars can attract more general aviation traffic, support business aviation needs, and promote tourism, all of which can positively impact the local economy. Additionally, efficient fueling facilities and security measures are essential for

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				ensuring safe and smooth operations, further bolstering the economic potential of aviation in the region
37.	Addressing Uncertainty about Future Airport Activity Levels in Airport Decision Making (2012)	Aviation Industry is no less than other Industry and has problems/issues that are more complex. Uncertainties faced by airports starts from being part of the larger aviation industry, full of risk and uncertainty. Some arises from the specific characteristics and circumstances at particular airports.	Airport Decision Making, Specific Characteristics, Future Airport Activity Levels	The economic viability of aviation in the North Eastern region and airport decision-making are interconnected through their reliance on understanding industry dynamics, managing uncertainty and risk, considering specific characteristics and circumstances, and forecasting future activity levels to ensure sustainable outcomes.
38.	Evaluating Airfield Capacity (2012)	The airfield capacity say airside capacity is the capacity in terms of an airport's throughput say landing/takeoff per hour i.e. as a measure of the how many number of aircraft operations took place including landing and takeoff in a hour.	Evaluating Airfield Capacity (2012) The airfield capacity say airside capacity is the capacity in terms of an airport's throughput say landing/takeoff per hour i.e., as a measure of the how many numbers of aircraft operations took place including landing and takeoff in an hour	Evaluating airfield capacity is crucial for understanding the operational dynamics of airports, assessing infrastructure needs, improving accessibility and connectivity, and enhancing the overall economic viability of aviation in the northeastern region

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39.	Airport Insurance Coverage and Risk Management Practices (2011)	Risk is always there in any Industry and risk management function at small airports is part time and depends on services, such as risk assessments provided by different type of resources within and outside the organization which includes other employees and insurance brokers as well.	Airport Insurance Coverage, Risk Management Practices Small Airports, Resource Dependency, Organizational Risk Management Industry Risks, Part-time Risk Management	The economic viability of aviation in the North Eastern region is closely linked to effective risk management practices, including airport insurance coverage, resource management, and organizational preparedness. By addressing industry risks and implementing robust risk management strategies, stakeholders can enhance the resilience and sustainability of aviation operations in the region.
40.	Airline and Airline Airport Consortiums to Manage Terminals and Equipment (2011)	Airports and airlines both are vital partner to run the Air services and needs to have hand holding always to deliver best to the customers. Airport operator and Airline operators need to work together to deliver effective and qualitative services to customers. As such, they try to evolve new and innovative ways, strategies to better manage airport services, equipment's, systems etc.	Airport Consortiums, Terminal Management, Equipment Air Services, Customer Service, Service Quality	The connection between the economic viability of aviation in the Northeastern region and the concept of airline and airport consortiums lies in the need for collaborative efforts and innovative strategies to optimize airport operations, enhance service quality, and ensure the sustainability of air travel in the region.
41.	Airport Self-Inspection Practices (2011)	Self-inspection program is integral for airports in: Maintaining regulatory	Airport Self-Inspection, Inspection Practices, Regulatory Compliance,	The implementation of effective self-inspection programs is not only essential for ensuring aviation safety but also plays

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		compliance; Ensuring various standards are met; Contributing to aviation safety.	Standards Compliance, Aviation Safety, Self-Inspection Program, Airport Maintenance	a crucial role in supporting the economic viability of aviation in the northeastern region. By prioritizing safety, efficiency, and compliance, airports can contribute to a sustainable and thriving aviation sector in the region
42.	Enhancing Airport Land Use Compatibility, Volume 2: Land Use Survey and Case Study Summaries (2010)	Based on study undertaken on land use in Civilian and Military Airfields it is found that acceptability of land use restrictions is more in Military Airfields in comparison to Civilian Airfields.	Airport Land Use Compatibility, Civilian Airfields, Military Land Use Restrictions, Acceptability, Land Use Survey	Civilian airports in the northeastern region face challenges in land use compatibility and restrictions, it could hinder their ability to cater to the demands of the aviation industry effectively. This, in turn, could impact their economic viability compared to military airfields, which might have more stringent controls but potentially more stable operations due to their specialized nature and government support. Addressing these land use issues and finding ways to enhance compatibility could be crucial for ensuring the sustainable growth of aviation in the region.
43.	Airport Terminal Facility Activation Techniques (2010)	This is a technique to bring new processes to enhance the operational efficiency of Airport terminal facilities The activities which are static can be	Airport Terminal Facility, Activation Techniques, Operational Efficiency, Facility Activation, Static	The implementation of airport terminal facility activation techniques can contribute to the economic viability of aviation in the northeastern region by

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		driven fast by using this technique and activating the process to bring a new or rejuvenated facility from the state of static completion to normal ongoing operations. In nuts shell this happens before and culminates on airport terminal facility opening day (AOD)	Activities, Process Activation, Rejuvenated Facility, Terminal Opening	improving the efficiency and functionality of airport terminals, thus supporting the growth and sustainability of air travel in the area.
44.	Airport energy Efficiency and Cost Reduction (2010)	According to the study, Airport terminals in USA use large amounts of energy towards lighting, HVAC (heating, ventilation, air conditioning) and conveyance system within building accounts for almost 40% of all electrical energy consumed.	Airport Energy Efficiency, Cost Reduction, Airport Terminals Energy Consumption, HVAC (Heating, Ventilation, Air Conditioning) Conveyance Systems, Electrical Energy, Energy Usage	The connection between the economic viability of aviation in the northeastern region and airport energy efficiency and cost reduction underscores the importance of adopting sustainable practices to support the long-term growth and resilience of the aviation sector
45.	Airport Revenue Diversification (2010)	Earlier airports use to function purely for Airport operations like basic passengers amenities i/c landing/taking off operations. Today the concept has changed and passengers are being served with all kinds of commercial shopping's including food and beverages of world	Airport Revenue Diversification, Airport Operations Passenger Amenities, Commercial Shopping, Food and Beverages, Infrastructure	The evolution of airport revenue diversification aligns with efforts to enhance the economic viability of aviation in North Eastern regions by creating additional revenue streams, attracting airlines and passengers,

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		class. Provide basic infrastructure for airlines and other aeronautical users. Airports have become a business center and look like small cities.		stimulating the local economy, and improving air connectivity.
46.	Airport System Planning Practices (2009)	Airport Master Plans have layout plans of all strategic facilities for operations like Runway/Taxiway/apron and other Airside infrastructures and are being reviewed/revised time to time on need basis. The airport master plans vary from one airport to another and do follow strictly guidelines as ICAO standards and guidelines. However, for commercial facilities Airports do make changers and alterations time to time on need basis.	Airport System Planning Practices, Layout plans Strategic facilities, Airside infrastructures	The economic viability of aviation in the northeastern region influences the planning and development of airport infrastructure, while airport system planning practices play a critical role in supporting and sustaining the growth of aviation by ensuring that airports are equipped to meet the needs of passengers, airlines, and other stakeholders. Both factors are interconnected and essential for the overall success of air transportation in the region.
47.	48 Months of Transforming Aviation in India 2014-2018	Various developments took place in India in Civil aviation sector in India between 2014-18 1. Like declaration of National Civil Aviation policy 2016, Launch of Airsewa, UDAN 4, NABH Nirman, Cargo & logistics, Air India Turnaround, Robust Security 8. Ease of doing business,. Enhanced skill developments programs, Advance technology systems	Airsewa, UDAN, NABH Nirman, Cargo & Logistics, Air India Turnaround, Robust Security, Ease of Doing Business, Skill Development Programs,	The developments in the Indian civil aviation sector between 2014-2018, such as policy initiatives, infrastructure improvements, and connectivity enhancements, likely contributed to improving the economic viability of aviation in the North Eastern region by

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		etc. all these are really have proven to be catalyst to improve overall health and efficiency of Civil aviation in India.	Advanced Technology Systems	increasing accessibility, reducing costs, and stimulating economic activity
48.	World Conference on Transport Research - WCTR 2016 Shanghai. July 10-15, 2016	To access the impact of hospitality on air passengers various kinds of studies / deliberations is being conducted time to time on similar lines as enhanced information and technology has eased the life of a common person that gives true satisfaction and users feel delighted and comfortable. This applies to enhance the skill of aircrews and other Airport, Airlines staff to upgrade their skills to serve the passengers better.	Hospitality, Information technology, Passenger satisfaction Skill enhancement, Passenger service	The connection between the conference and the discussion on hospitality in air travel likely revolves around the exchange of ideas, research findings, and best practices among academics, industry professionals, and policymakers present at the event. Conferences like WCTR provide opportunities for networking, collaboration, and knowledge-sharing, which can contribute to advancements in various aspects of transportation, including passenger experience and hospitality.
49.	NORTH EAST INDIA: A BRIEF PROFILE Research Methodology	North Eastern part of India is sharing land borders with neighboring countries such as Bangladesh, Myanmar, Bhutan and China which may prove to be great source of improving economy of the Region by way of trade and commerce with these nations, especially at a time when nations of south East Asian region are liberalizing their economies. The areas of cooperation, trade and commerce	North East India, Land borders, Liberalizing economies Cooperation, Energy, Cement, Food processing, Social exchange, Culture Tourism	The research methodology likely aims to explore how leveraging the geographical proximity and potential trade partnerships with neighboring countries can contribute to the economic growth and overall development of North East India.

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		may be such as energy, cement, food processing etc. Further this may get further widened to social exchange of culture and tourism etc.		
50.	Integration of the North East: The State Formation Process.	North Eastern Region having multi-ethnic and multi linguistic character is somehow becoming the major concern also for Govt. of India due to increasing demands for autonomy or statehood because of individual ethnic identities. Because of this ethnic division local developments are not been and there seems to be no end to this. May be over a period thus may get subside when the economy of a common person gets elevated.	Multi-ethnic, Multi-linguistic, Autonomy, Statehood, Ethnic identities, Local developments, Ethnic division	The economic viability of aviation in the North Eastern region is intertwined with the broader challenges of integration and development, particularly in the context of its multi-ethnic character. Economic growth and infrastructure development can play a crucial role in mitigating ethnic tensions and fostering greater cohesion and integration within the region.
51	Annual Analyses of the EU Air Transport Market 2016	The report has focused on issues of regulatory framework, State legislations, on Air traffic infrastructures, capacity and financial strategies of Airlines and Airports including Aircraft manufacturing, Air traffic control. Also focused on environmental issues pertaining to Airfield environment and	EU Air Transport Market, Annual Analysis, Regulatory Framework, State Legislations, Air Traffic Infrastructures, Financial Strategies	The EU Air Transport Market analyses may not directly address the specific context of the North Eastern region, they offer valuable insights and perspectives that can inform discussions and decisions related to the economic viability of aviation in that region, particularly regarding regulatory frameworks, infrastructure development, financial

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		demand of the consumers of different fields.		strategies, manufacturing, environmental considerations, and consumer demand.
52	Air transport statistics: Data extracted in December 2019. Planned article update: December 2020.	Asia pacific airlines registered a decline of approximately 76 % annual fall in passenger's numbers of all regions. Industry witnessed dip in revenue passenger –kilometer (RPKs) by almost 86% compared with a 90 % in the month of June contraction in May. The turnaround continued to be dominated by increase in demand in domestic sector.	Asia-Pacific airlines, Decline in passenger numbers, Annual fall, Revenue passenger-kilometer (RPKs)	Interconnected factors, policymakers, industry stakeholders, and researchers can gain insights into the economic dynamics of aviation in the northeastern region and the EU air transport market, identifying opportunities for growth and addressing challenges to ensure sustainable development.
53	ICAO JOURNAL: VOL 61 November 5, 2006 Annual Review of Civil Aviation 2005	The annual review reports year 2005 highlighted major factors. 1. There was rise in traffic in year 2005 over 2004 by almost 6 % despite increase in ATF (Aviation turbine fuel) to the tune of 49 %. Consequently, the burden on Airlines passed on to the passengers by increasing the fares. GDP also declined during this period both in European countries as well as in USA. This situation was controlled or managed through effective controlling of process and capacities utilization.	Aviation turbine fuel (ATF), Fare increases, GDP decline	The information from the ICAO Journal provides insight into the economic challenges faced by the aviation industry globally during that time, which can be extrapolated to understand the economic viability of aviation in specific regions like the northeastern region. This connection underscores the importance of considering broader economic factors when assessing the viability of aviation in any given region

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54	The Impacts of Globalization on International Air Transport Activity November 2008	Air transport Industry is a major Industry among other Industry contributing to the GDP of any Nation across the Globe. The statistics shows. 1,600million passengers a year, almost 4.0 million jobs, with worth of almost \$260 billion turnover. Fleet of more than 18000 Aircrafts, world over network of almost 15-million-kilometers, more than 10,000 Airports, uand huge cargo to the tune of around 30 million tons..	Globalization, International air transport, Air transport industry , Job creation, Fleet size, Network lent	The economic viability of aviation in the northeastern region is intertwined with the broader impacts of globalization on international air transport activity. As globalization fosters economic growth, market expansion, and infrastructure development, it creates opportunities for the aviation sector to thrive, benefiting regions like the northeastern part of a country by enhancing connectivity and stimulating economic development.
55.	ICAO- Global Air Navigation Plan: 2013–2028	The 2013-28 ICAO global Air Navigation Capacity & efficiency plan gives a road map to all member Nations/States with a structured plan/programs for harmonized global Air Navigation system. This is need to handle increased air traffic for Smooth Air travel worldwide to have seamless travel more depending on the technology. This will create investment opportunity by potential technologist to consider this as challenge to pave the way for next generation to come. All member states have to plan to implement their own	Satellite-based Navigation System, Investment Opportunity Harmonized System, Capacity and Efficiency Plan, Human-controlled Systems	The alignment of the North Eastern region's aviation sector with the goals outlined in the ICAO Global Air Navigation Plan can contribute to its economic viability by improving air travel efficiency, connectivity, safety, and technological innovation.

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		satellite based air navigation system and minimize the human controlled systems.		
56.	Global Report on Aviation: World Tourism Organization 2012	In a report by United Nations World Tourism Organization, a long-term projection has been forecasted. There will be on and average 3.3% increase year over year of International tourists worldwide and may touch to approximately 43 Million more tourists by 2030. This will give boost to Industry in all field and boost the economy of the Nations. It is estimated that this increase in International tourists may add to the tine of almost 180 billion USD.	Long-term projection, International tourists	The economic viability of aviation in the northeastern region is closely linked to the projected growth in international tourism as outlined in the UNWTO report. By capitalizing on this growth potential and making the necessary investments in infrastructure and connectivity, the region can harness the economic benefits of tourism and foster sustainable development.
57.	Powering global economic growth, employment, trade links, tourism and support for sustainable AVIATION development through air transport: April 2014	Air transportation is a major contributor to GDP of any Nation especially when we talk about More the International travel between the countries more the trade and transportation of supply chain to boost production and add on to the economy of the particular Nation. This gives an opportunity to access to International market. It is estimated that International Air travel. Contributes global economic prosperity. It helps countries to contribute to almost close to	Sustainable aviation development, GDP contribution, International travel, International trade, Supply chain	The economic viability of aviation in the northeastern region is closely linked to its contribution to global economic growth, employment generation, trade facilitation, tourism promotion, and sustainable development through air transport. By investing in the development of aviation infrastructure and fostering a conducive regulatory environment, policymakers can harness the full potential of air transport to drive

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		\$ 6 trillion and represents 34-35% of all international trade and businesses. Air Connectivity contributes to productivity by encouraging investment and new ways, improving efficiency of businesses. On the other hand, this encourages exchange of technologies and expertise among the Nations.		economic prosperity in the region and beyond.
58.	Powering global economic growth, employment, trade links, tourism and support for sustainable development through air transport, October, 2018	Air connectivity among between any two countries is certainly gives an opportunity for trade, tourism and businesses and even exchange to culture and technologies. Employees come across high quality training, systems and gives them access to enhance to the efficiency of the system.	Sustainable development, Air transport, Air connectivity Exchange of culture, Exchange of technologies, High-quality training	Fostering economic viability in the aviation sector in the North Eastern region can contribute to broader goals of global economic growth, employment generation, trade expansion, tourism promotion, and sustainable development through air transport. However, it requires collaboration between governments, industry stakeholders, and local communities to address challenges and maximize the potential benefits of enhanced air connectivity.
59.	African Civil Aviation Policy (AFCAP): 21 – 25 november 2011	The African civil aviation organization is responsible to manage Civil aviation among African countries and taking decisions to accelerate the growth of Aviation in the Region. Further African union a n association representing almost	Social development, Policy development, Social integration	The connection between the economic viability of aviation in the North Eastern region and AFCAP lies in their shared goals of promoting regional development, enhancing connectivity, and supporting the broader objectives of

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		54 African countries for social development, trade and culture among African Countries and defend the interest of the people of African countries. Further African Union also makes policy for development and social integration among participating countries. Union, Human rights is critical subject to address by African Union representing the countries with poor and social backward conditions.		the African Union regarding economic growth, social integration, and human rights.
60.	Aviation Risk 2020 Safety and the State of the Nation	Aircraft classification- for fix wing Aircraft, the main distinction is between Jets and turboprops type of aircrafts. Aircraft Weighing for both Jets and Turboprops 5700kg is commonly used as a lower limit for inclusion in statistical database. Domicile of Aircraft Design is the distinction of manufacturing countries like By western or Eastern Countries. There is perception that Aircraft made in China is not reliable as per history of operations available in comparison to European countries or USA.	Aircraft classification, Fixed-wing Aircraft, Domicile of Aircraft Design	The economic viability of aviation in the North Eastern region may influence decisions regarding aircraft procurement and operation. Factors such as safety considerations, including aircraft classification, weight, and the reputation of manufacturing countries, are crucial in ensuring safe and sustainable aviation operations in the region. Additionally, government policies and regulatory frameworks play a significant role in addressing safety concerns and promoting the economic viability of aviation.

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61.	Report of the twelfth meeting of the Asia Pacific Regional Aviation Safety team (APRAST/12): 28 May to 1st June, 2018	Meeting of the Asia Pacific Regional Aviation Safety Team (APRAST/12) was held at the ICAO Asia and Pacific office in Bangkok, Thailand on June 1 2018. There were 108 participants from 23 States/Administrations and 9 International Organizations including Industries in the Aviation field.	Asia Pacific Regional Aviation Safety Team, States/Administrations, International Organizations	The direct link between the economic viability of aviation in the northeastern region and the APRAST/12 meeting may not be immediately apparent, the meeting's outcomes and initiatives can contribute to creating a safer, more efficient, and economically viable aviation sector, benefiting the region and its stakeholders in the long run.
62.	ASEAN-India Air Connectivity Report: 28 September 2015	ASEAN countries group of 16 countries, which provides a platform to prepare a policy of exchanging the views/opinion on development of Aviation among the countries. Discussions held in the year 2015 and prepared a draft, which was finalized and adopted by the member countries. Connectivity which is the mainstay of economy of any Nation needs continuous review and upgradation to perform better.	Policy exchange, Aviation development, Upgradation	Continuous review and upgrading of connectivity infrastructure are essential to ensure that these benefits are sustained and that the aviation sector remains responsive to evolving economic and social needs. Therefore, ongoing collaboration and dialogue among member countries are crucial for identifying areas of improvement and implementing effective policies to enhance aviation connectivity.
63.	The Asia-Pacific Airline Industry: Economic Boom and Political conflict: October 1995	Increased demand for air travels has created a situation to review the pricing and flag carrier privatization. There is pressure in domestic travelling as well as International travelling, therefore there is	Asia-Pacific Airline Industry, Economic Boom, Political Conflict, Increased Demand for Air Travel, Pricing Review,	The economic viability of aviation in the northeastern region is intertwined with broader trends and challenges in the Asia-Pacific airline industry, including privatization efforts, policy frameworks,

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		challenge to handle the situation and ease the policy framework to make it conducive / favorable towards privatizations. In India Air India, a flag Career is the best example for which Govt. of India making efforts for the last several years to privates and improve the financial health of the career. Similar is the situation other countries like US, Australia and Pakistan are facing. They do have direct impact on International Markets therefore such measures have become need of the hour to review the ;policies. International Air Markets. Firms that have reduced cost to compete effectively in the domestic market also become more effective.	Flag Carrier Privatization, Domestic Travel, International Travel, Policy Framework, Privatization Efforts, Air India, Government of India, Financial Health, United States, Australia, Pakistan, International Markets, Cost Reduction, Competition, Policy Review	international market dynamics, and cost competitiveness. Addressing these challenges requires coordinated efforts by governments, airlines, and industry stakeholders to foster a conducive environment for sustainable growth and competitiveness in the aviation sector.
64.	Aviation 2050 The future of UK aviation	UK being the largest also holding the position of third largest Aviation market We know that Aviation directly contributes to the tune of almost Ponds 22 billion to the economy of UK and supports around half a million employments. UK Government would continue to supports the growth of Aviation and deliver, benefits to its	Future of UK aviation, UK aviation market, UK aviation employment, Sustainable aviation growth, Environmental impacts mitigation Passenger demand	The economic viability of aviation in the North East is closely intertwined with the broader future of UK aviation as outlined in Aviation 2050. Addressing common challenges such as environmental sustainability, market dynamics, and technological advancements will be essential for ensuring the continued

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		citizens if growth takes place in a sustainable way. There are crucial issues to be dealt with actions to mitigate the environmental impacts; Challenges include global change and shifting markets. Further increase in demand of passengers, impact on competition on business models, expectations of passengers, climate change including technological advancement.		growth and prosperity of aviation in both the region and the country as a whole.
65.	Report to the United States Congress AVIATION AND THE ENVIRONMENT A National Vision Statement, Framework for Goals and Recommended Actions December 2004	Clean environment in air space is badly needed; similarly, noise level reduction is also to be addressed. As committed by world community significant reduction to be done in both the factors affecting human health by 2025. The carbon emission, particulate are to be reduced which are a hazardous pollutants and badly affects the health of human being. US aerospace Agency is working on this to evolve the technology and share with all Nations worldwide to address the issues of emission and noise level. Improvement in quality of Aviation turbine Fuel, developing Clean air and noise level have become quite significant	Noise level reduction, Human health, Carbon emission Particulate pollutants, Hazardous pollutants, US aerospace Agency, Technology development	The report's focus on addressing environmental issues through technological innovation aligns with the broader goal of ensuring the economic viability of aviation in the northeastern region and beyond. By developing cleaner and more efficient technologies, the aviation industry can mitigate its environmental impact while also maintaining its economic sustainability in the long term.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		in today's time keeping in view the growing traffic exponentially. Climate change is quite burning issue and all member nations are equally responsible and need to reduce carbon footprint as per the mandate from World forum on climate change.		
66.	Aviation Benefits Report 2019	Aviation we know is key contributor to the economy of any country worldwide and plays significant role in enhancing GDP of the Nation. Further Aviation benefits the variety of people like transportations, Food and Beverages, Cargo industry, tourism, sports, and many more near the Airport. In 2018, airlines worldwide transported approximately 4.0 billion passengers annually with 8.0 trillion revenue passengers. Fifty-eight million tons of freight were lifted through air cargo, touching almost 230 billion tones. According to projections by Air transport action group (ATAG) the total economic impact (direct, indirect, induced and tourism connected) of the global Aviation Industry surpassed USD 2.7	Passenger transportation, Cargo industry, Tourism impact Air transport action group (ATAG), Economic impact	The economic viability of aviation in the North Eastern region is intricately linked to the broader economic benefits highlighted in reports like the Aviation Benefits Report 2019. By understanding and leveraging the economic contributions of aviation, stakeholders can foster regional development and prosperity.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		trillion which amounts to 3.6% of the world's GDP in 2016		
67.	Introduction to Safety Management Systems for Air Operators 2006	SMS (safety management systems) is quite significant in Aviation and ICAO has special focus on strict compliance of regulations and standards to minimize incidents with in airfield as well as onboard. Major hazards like bird menace which may prove to be most hazardous and may lead to loss of lives as well as aircraft. Therefore, special care is taken while landing and taking off. Mitigation procedures like clearing the approach path of slaughters houses, dumping ground, waste management, bird control, wild growth, water body management etc. ICAO member state need their operators to implement safety management system to comply with ICAO standards. An effective safety management system may result in reduction of incidents and accidents, reducing direct and indirect costs. Reducing insurance premium, an improvement of staff productivity. Apart from this safety recognition by the air	Safety Management Systems (SMS), Aviation Safety, ICAO Compliance, Bird Menace, Hazard Mitigation, Approach Path Clearance, Slaughterhouses, Dumping Grounds, Waste Management, Bird Control, Wild Growth, Water Body Management, Incident Reduction, Accident Reduction, Cost Reduction, Insurance Premium Reduction,	The introduction of Safety Management Systems in aviation, particularly in the northeastern region, not only ensures compliance with regulatory standards but also plays a crucial role in enhancing safety, reducing costs, and fostering confidence among stakeholders, thereby contributing to the economic viability of aviation operations.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		travelers as well as proof of procedures/SOPs in the event of legal or regulatory safety investigations at any point of time. SMS built upon(ICAO, 2009, PP.4-1)		
68.	The European and Southeast Asian Single Aviation Markets: July 2015	Uniform rules and regulation by European Union for Aviation In Europe has proven boon with uniform policy in Aviation market. EU member Nations can fly on any route and to any member Nation without seeking separate approval or regulations. It is nondiscriminatory and Airlines friendly a big step towards liberalization. A European airline establishing its base of operations within the EU can take benefit without any glitch. in air carrier licensing, full market access with no capacity restrictions.	Liberalization of aviation market, Non-discriminatory policy Airline-friendly regulations, Full market access, Capacity restrictions Air carrier licensing	The connection lies in the potential for uniform regulations and liberalization measures to enhance the economic viability of aviation by facilitating market access, promoting competition, and fostering growth opportunities for airlines and related industries
69.	Contribution of the Global Aviation Sector to Achieving Paris Agreement Climate Objectives	The world aviation sector is among top ten globally emitting carbon and add on approximately 4.9% of the warming affect on the earth demand (for air travel). Carbon emissions continue to grow at a rate so fast that not mitigating may pose a threat to the Paris declaration. Emissions since 1990 and are expected to	Paris Agreement climate objectives, Carbon emissions, Warming effect, air travel demand, Mitigation	addressing the climate impact of the global aviation sector is essential for achieving the objectives of the Paris Agreement. However, measures to reduce emissions should be implemented in a way that ensures the economic viability of aviation in regions like the North Eastern region. This requires a

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		grow exponentially by midcentury. International aviation emissions rose to close to 50% from 1990 to 2015 and projected to increase as much as 4-5 % annually over the next 20 years. In addition to being a major source of emission, the aviation sector is exposed to climate impacts presently and increasingly in the future.		balance between environmental sustainability and economic development.
70.	Annual Report & Accounts 2017/18 Civil Aviation Authority	Civil Aviation sector is a delicate sector and requires highly skilled man power with handsome salary packages and other employee benefits. Therefore always there is challenge to keep balance to achieve higher rate of return and on another hand to satisfy the workforce to get more productivity. Civil Aviation Authority have set the target of return of 3.5 % on average cost of employment or breakeven even after charging interest and tax. Further new projects to be launched from the reserve plus. Main befitting scheme is the pension scheme to be continued which is lifelong burden and to be born out of as by the employer. Due to in, sufficient budget provisions	Skilled manpower, Salary packages, Employee benefits Rate of return, Workforce satisfaction, Productivity	The context of the northeastern region, these financial considerations are crucial for sustaining and developing aviation infrastructure and services. Ensuring economic viability and efficient resource allocation is essential for the growth and stability of the aviation sector in this region.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		such schemes are facing closures and may attract down fall in productivity. Therefore, always this has been a challenging task for the Govt. to continue with pension scheme. Costs towards employment reflects the majority of total expenditure therefore if we are to improve upon and increase efficiencies it is important that we focus on these costs. It is found that average Pension costs has shown a downward trend in the last few years. This gives an inclination towards the closure of our defined benefit scheme to new members and lower down the cost towards defined contribution scheme. This kind of approach depends on to fund certain project related expenditure in the current year from the surplus reserves in the previous year.		
71.	Civil Aviation in India	The analysis on Aviation in India shows that there has been drastic change/shift in civil aviation. Policy and demand of the time from future perspective. The role of public sector companies in civil aviation has declined while the role of private has significantly increased. There has been	Infrastructure Development, Air Travel Growth, Women and Girls Travelers, Childcare Facilities, Special Care Services, Gender Concerns	The economic viability of aviation in the northeastern region is closely intertwined with broader trends and developments in civil aviation across India, including policy shifts, infrastructure development, and service provision. By addressing specific challenges and meeting the

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		enormous growth in infrastructure at the major airports besides tremendous growth of air travelers. A large numbers of travelers comprises of women and girls travel alone or with their small kids. They need special facilities like childcare at the airport. Most of the airports are not prepared about the special care and services of women travelers. Airline have not introduced any scheme for addressing the issues of women travelers. Even gender concerns have related guidelines not been incorporated/implemented in the service manuals. Thus, it becomes quite significant to restructure/overhaul the services and facilities at the airport. Also airlines to cater the needs and requirements of women passengers.	Service Manuals	evolving needs of passengers, especially women travelers, the aviation sector can contribute significantly to regional development and economic growth in the northeastern region and beyond
72.	China's Reform of Aviation: A Signal of the Significance of Competition Under Law	This is evident from public pronouncements by Chinese Govt. and recent trends. 1. They strongly support the arrangement that China is keen in developing its domestic civilian aircraft manufacturing industry. 2. So keen are Chinese people that they are willing to engage the military to aid in this	aviation reform, competition under law, domestic civilian aircraft manufacturing industry, military involvement, demilitarization, civilianization, Ministry of Aviation Industry,	The reforms in China's aviation sector reflect a deliberate policy shift towards prioritizing civilian aviation development, which can have positive implications for the economic viability of aviation in the northeastern region and contribute to broader economic growth and development.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		endeavor. 3. They think that China may be considering reducing the size and expense of the military establishment as indicated by drastically decreasing the armed forces numbering almost a million personnel. It is very difficult to understand that Chinese establishment will continue to pursue a policy of demilitarization and civilianization of industrial production. Developments in the aviation sector indicates that the policy is more than mere depiction/portray publically. Thus, the Ministry of Aviation Industry is gradually reducing the strength of personnel of having 60/40 ratio of all personnel involved in civil projects and in military programs. Also planning to diversify into non-aerospace civilian products. The products may be such as heavy machinery etc.	diversification, heavy machinery.	

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73.	Grievance Analysis and Systemic Reforms Recommendations 2017 (Ministry of Civil Aviation GoI)	Table 3: Focus services for root cause analysis <table><tr><th>S.No</th><th>Grievance Causing Issues</th><th>Impact*</th><th>Details</th></tr><tr><td>1</td><td> Air India Services</td><td>31%</td><td> • Poor customer service and unprofessional behavior from the staff • Delay in flights causing missing of connecting flights • Misplaced baggage and poor response from the staff • No intimation of flight delay or cancellation • No refund on cancelled flights </td></tr><tr><td>2</td><td> Airport Infrastructure</td><td>18%</td><td> • Poor capacity of International/ Domestic airports Ex: Ahmedabad, Vadodara • Poor quality of existing infrastructure Ex: Chennai Airport reported 39 incidents • Congestion in check-in, security check, immigration counters </td></tr><tr><td>3</td><td> Employment & Relevant Education</td><td>10%</td><td> • DGCA program is not recognized as a degree or equivalent • Employment selection criteria and processes are skewed </td></tr><tr><td>4</td><td> Travel Rules</td><td>9%</td><td> • Baggage allowance issues in domestic and international connected flights • No standardization in convenience fee charged • No regulation of price of tickets and airport services </td></tr><tr><td>5</td><td> Malpractices</td><td>8%</td><td> • No refund on cancellation and repeated cancellations in certain routes. Ex: Spicejet • Theft in baggage. Ex: Delhi Airport </td></tr></table> *Grievances Sample Analysed: 450 Ministry of civil Aviation has been focusing on mainly two main issues 1. Most recurring issue measuring to 31% of grievances that of Air India related services. 2. Airport infrastructure, which measured to 18% of the grievance. Further, these were followed by employment and education in Civil Aviation Industry. Travel rules and mal practices accounts for an average of 10% in each areas.	S.No	Grievance Causing Issues	Impact*	Details	1	 Air India Services	31%	• Poor customer service and unprofessional behavior from the staff • Delay in flights causing missing of connecting flights • Misplaced baggage and poor response from the staff • No intimation of flight delay or cancellation • No refund on cancelled flights	2	 Airport Infrastructure	18%	• Poor capacity of International/ Domestic airports Ex: Ahmedabad, Vadodara • Poor quality of existing infrastructure Ex: Chennai Airport reported 39 incidents • Congestion in check-in, security check, immigration counters	3	 Employment & Relevant Education	10%	• DGCA program is not recognized as a degree or equivalent • Employment selection criteria and processes are skewed	4	 Travel Rules	9%	• Baggage allowance issues in domestic and international connected flights • No standardization in convenience fee charged • No regulation of price of tickets and airport services	5	 Malpractices	8%	• No refund on cancellation and repeated cancellations in certain routes. Ex: Spicejet • Theft in baggage. Ex: Delhi Airport	Employment in Civil Aviation Industry, Education in Civil Aviation Industry, Travel rules, Mal practices	By addressing grievances and implementing systemic reforms, the Ministry of Civil Aviation aims to create an enabling environment for the sustainable growth of aviation in the northeastern region, which, in turn, can contribute to its economic viability and development.
S.No	Grievance Causing Issues	Impact*	Details																									
1	 Air India Services	31%	• Poor customer service and unprofessional behavior from the staff • Delay in flights causing missing of connecting flights • Misplaced baggage and poor response from the staff • No intimation of flight delay or cancellation • No refund on cancelled flights																									
2	 Airport Infrastructure	18%	• Poor capacity of International/ Domestic airports Ex: Ahmedabad, Vadodara • Poor quality of existing infrastructure Ex: Chennai Airport reported 39 incidents • Congestion in check-in, security check, immigration counters																									
3	 Employment & Relevant Education	10%	• DGCA program is not recognized as a degree or equivalent • Employment selection criteria and processes are skewed																									
4	 Travel Rules	9%	• Baggage allowance issues in domestic and international connected flights • No standardization in convenience fee charged • No regulation of price of tickets and airport services																									
5	 Malpractices	8%	• No refund on cancellation and repeated cancellations in certain routes. Ex: Spicejet • Theft in baggage. Ex: Delhi Airport																									

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74.	Research Study of the Civil Aviation Sector in India January 24, 2012	The research report gives an outlook set forth by the Ministry of Corporate Affairs of the Government of India, inhibiting provisions of statutory rules, policies and practices found within the regulatory framework of India 's civil aviation sector. This report broadly focuses on India's civil aviation industry, while emphasizing the necessity that deeper assessments of each sub-sector of India's civil aviation must be undertaken individually. Based on the analysis of the preceding sections of this report we recommend creation of one single civil aviation policy. This civil aviation policy should aim to reduce artificial barriers to entry such as fleet and equity requirements. It should have clear delineation between regulatory authorities that oversee activities in this sector, which would result in clear and predictable regulatory outcomes. Furthermore, it should include a framework for monitoring anticompetitive pricing behavior within the sector. Additionally, this policy should aim to create a more level	Fleet Requirements, Equity Requirements, Regulatory Authorities Anticompetitive Pricing Behavior, Private, National, and Foreign Carriers Market Mechanisms	The recommendations provided in the research study, such as reducing barriers to entry, improving regulatory clarity, and attracting private investment, can also be applied to address the challenges faced by the aviation sector in the northeastern region. A cohesive civil aviation policy that addresses these issues would not only benefit the aviation industry at a national level but also contribute to enhancing the economic viability of aviation in the northeastern region by improving connectivity, accessibility, and overall infrastructure.

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		competitive field between India's private, national and foreign carriers. It should also aim to introduce market mechanisms and incentives into the distribution of slots and dispersion of routes. Lastly, this policy should aim to attract greater private investment into India's airports and improve the competitiveness of the government procurement process within this sector.		
75.	Report of the Committee Constituted for examination of the recommendations made in the Study Report on Competitive Framework of Civil Aviation Sector in India: June,2012	Critical findings of the research report are - Ensure competitive neutrality between private carriers and the national carrier by - Removing regulations ensuring preferential treatment of Air India with regards to recapitalization; - Removing regulations ensuring preferential treatment of Air India with regards to flying rights';- Consider reducing fleet and equity requirements for passenger air carriers by looking at how India's regulators reduced requirements for cargo carriers; - Consider introducing an incentive-based route program of servicing all India's airports; - Consider introducing market-based tools in	Recapitalization, Flying rights, Fleet requirements Equity requirements, Passenger air carriers, Cargo carriers, Incentive-based route program, Civil aviation policy	Implementing the recommendations from the Committee's report can contribute to the economic viability of aviation in the North Eastern region by fostering competition, reducing regulatory barriers, incentivizing airlines to serve the region, and promoting efficient allocation of resources. This aligns with the broader goal of ensuring inclusive growth and connectivity across India's civil aviation sector.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		distribution of slots. The reports recommended that formulation of a single civil aviation policy considering the aforementioned recommendations would be a major step towards ensuring competition in India's civil aviation sector.		
76.	The opportunities and challenges of civil aviation in India, Part 1: Airport sector liberalization Received (in revised form): 3rd July, 2008	The traffic growth and the Government's decision to accelerate the development of aviation infrastructure, prior to the Commonwealth Games (to be held in New Delhi in 2010) have accelerated the reform process. Equity ownership is likely to be further relaxed to facilitate new investments in the sector. Limited equity share ownership of foreign direct investment may be relaxed from its present 49 per cent ceiling to 74 per cent for airline and airport investments in the near future. Following these developments, air cargo too may receive permission to allow 100 per cent foreign equity. At present, foreign direct investment in cargo airlines stands at 74 per cent and these airlines are still attracting foreign investors. Like in	Airport development, ATM modernisation, investments in civil aviation, public-private partnerships	The reforms and developments outlined in the passage suggest a conducive environment for the growth of civil aviation in India, which could have positive implications for the economic viability of aviation in the North Eastern region as well. Improved infrastructure, increased investment, and liberalization policies could potentially address some of the challenges faced by the region in terms of connectivity and accessibility.

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		commercial scheduled airlines, the air cargo market is also experiencing steady and concentrated growth. For example, the top six metropolitan areas account for 90 per cent of total air freight.		
77.	North-East INDIA, THE GEOGRAPHICAL GATEWAY OF INDIA'S PHYTODIVERSITY June 2014	The Indian council of Agricultural research has identified the North Eastern Region as the center of Rice Germ Plasm while the region is recognized as rich in wild relatives of crop plants by National Bureau of Plant genetic resources. It is the Centre of origin of citrus fruits and some of the important gene pulls of banana and mango and also reported to have originated in this region as maximum diversity of mango and banana are found here. Sikkim primitive 1 and 2 maize varieties have also been reported from Sikkim by Dhawan (1964). The region's traditional system of agriculture popularly known as Jhum cultivation is primarily is an agricultural economic activity of the local tribes involving 35 varieties of crops though the practice is considered as one of the major reasons	North East India, phylodiversity, forest genetic resources, conservation	The economic viability of aviation in the North Eastern region can be enhanced by leveraging its rich phylodiversity to promote agro-tourism, stimulate agri-business development, and support agricultural research and development initiatives.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		for the loss of forest cover in the North eastern States.		
78.	Aviation and the Global Atmosphere: A Special Report of IPCC Working Groups I and III: January 1999	Ozone is a greenhouse gas. It also shields the surface of the earth from harmful ultraviolet (UV) radiation, and is a common air pollutant. Aircraft-emitted NOx participates in ozone chemistry. Subsonic aircraft fly in the upper troposphere and lower stratosphere (at altitudes of about 9 to 13 km), whereas supersonic aircraft cruise several kilometers higher (at about 17 to 20 km) in the stratosphere. Ozone in the upper troposphere and lower stratosphere is expected to increase in response to NOx increases and methane is expected to decrease. At higher altitudes, increases in NOx lead to decreases in the stratospheric ozone layer. Ozone precursor (NOx) residence times in these regions increase with altitude, and hence perturbations to ozone by aircraft depend on the altitude of NOx injection and vary from regional in scale in the troposphere to global in scale in the stratosphere.	Ozone, Greenhouse Gas, Ultraviolet (UV) Radiation, Air Pollutant Aircraft-emitted NOx (Nitrogen Oxides)	The economic viability of aviation in the northeastern region and the findings from the IPCC report on Aviation and the Global Atmosphere lies in the environmental impact of aircraft emissions, particularly the role of nitrogen oxides (NOx) in ozone chemistry.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
79.	General Aviation Unfolding Horizons	India's aspirations and potential for sitting on the high table of global economies necessitate a robust civil (including general) aviation sector. The development of airport infrastructure and reforms in order to create a favourable operating environment needs to be the key ingredients of the reform's agenda. With the current traffic load of scheduled flights at metro airports, GA aircraft inevitably get lower priority as compared to scheduled operators. Delays in take-off and landing clearances may defeat the purpose of investments in GA aircraft. A joint review committee needs to be formed by the Ministry of Civil Aviation (MoCA) and the DGCA with representation from non-scheduled and GA operators to review the existing regulatory and operational framework.	General Aviation, Civil Aviation Sector, Airport Infrastructure Development, Reform Agenda, Scheduled Flights, Metro Airports	The economic viability of aviation in the northeastern region and the unfolding horizons of General Aviation (GA) in India is multifaceted and crucial for the overall growth and development of the aviation sector in the country.
80	Global fleet & Mro market forecast commentary 2019–2029	Growth in aviation will be more concentrated in Asia and the developing world, particularly China and India. By 2035, the Civil Aviation Administration of China projects, the number of airports in the nation will almost double,	Infrastructure, Global market for air travel, Asia as the new center of global aviation activity	The growth projections for the global aviation market, particularly in Asia, including China and India, suggest opportunities for various segments of the industry, including fleet expansion and MRO services. These trends could have

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		reflecting this spike in demand and the government's big push to fund the necessary infrastructure. By the end of the decade, China will become the biggest global market for air travel and Asia will be the new center of global aviation activity.		implications for the economic viability of aviation in the northeastern region, potentially leading to increased activity and investment in the sector.
81	Global Network Forecast, Global Networks, Global Citizens 2018-2037	In India, Ude Desh ka Aam Nagrik regional connectivity scheme or UDAN-RCS is a Government initiative design to make domestic flying more accessible to the Indian population by making it more affordable and convenient, whilst at the same time stimulating economic growth. In the first round RCS- 1 a total of 128 routes was awarded to five players. The government awarded more than 300 routes to airlines and helicopters operators under RCX-2 on January 24th 2018. Whilst being largely regional in focus greater connectivity will also feel additional passengers to the larger aviation centres creating a need for larger aircraft type. With a number of these new routes is also expected to grow and in time needing for eg. Single- aisle	Regional focus, Connectivity, Aviation centers, Larger aircraft	The economic viability of aviation in the northeastern region of India is intricately linked to initiatives like UDAN-RCS, which aim to improve regional connectivity and stimulate economic growth. This regional focus, coupled with insights from global network forecasts, can inform strategic decisions to optimize route planning, enhance operational efficiency, and capitalize on emerging opportunities in the aviation sector.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
82	History, religion and Culture of North East India 2006	There are about 220 languages spoken in these states, belonging mainly to three language families namely, Indo-Ariyan, Sino- Tibetan and Austric. The Indo-Ariyan represented mainly by Asamiya and bangle. The Austro-Asiatic represented mainly by Kashi and the Sino-Tibetan family languages is represented by the Tibeto- Barman and the Siamese- Chinese sub families also there are languages of the tea tribes. However, the majority of the languages spoken here belong to the former and latter is represented by a few Thai languages like Khamyang, Khamti, Aiton, Phakyal and Turung. It is worthwhile to mention here that Ahom a language belong to this Thai group has over the years merged with Asamiya	History of Arunachal Pradesh, Culture of Arunachal Pradesh, Religion, Festival, Assam, Manipur, Meghalaya, Mizoram, Sikkim.	The economic viability of aviation in the northeastern region of India and the region's history, religion, and culture lies in the intricate interplay between infrastructure development, socio-cultural factors, and economic growth.
83	FUTURE OF THE AIRLINE INDUSTRY 2035	Drivers of change assessed to have higher than average impact and uncertainty. Alternate fuels and energy sources, Level of integration along air-industry supply chain, cyber security, new modes of consumption, Environmental Activism, price of oil, Extreme weather conditions,	Cybersecurity, New modes of consumption, Environmental activism, Price of oil, Extreme weather conditions, Strength and volatility of	The economic viability of aviation in the North Eastern region is influenced by a complex interplay of factors ranging from technological advancements and environmental concerns to geopolitical dynamics and regulatory frameworks. Airlines must adapt to these changes

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		strength and volatility of global economy, geo-political instability, tensions between data privacy and surveillance, infectious disease and pandemics, terrorism, International regulations of emissions and noise pollutions.	the global economy, Geo-political instability	proactively to remain competitive and sustainable in the future.
84.	ICAO Uniting Aviation: Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis Montréal, Canada 2 September 2020 Air Transport Bureau	The latest estimates indicate that the possible COVID-19 impact on world scheduled passenger traffic compared to Baseline (business as usual, originally-planned) would be: Full year 2020 (Jan – Dec) Overall reduction ranging from 47% to 50% of seats offered by airlines Overall reduction of 2,713 to 2,884 million passengers Approx. USD 366 to 389 billion potential loss of gross passenger operating revenues of airlines Q1 2021 (Jan – Mar) –Overall reduction ranging from 19% to 40% of seats offered by airlines –Overall reduction of 331 to 598 million passengers – Approx. USD 49 to 85 billion potential loss of gross passenger operating revenues of airlines The actual impacts will depend on	Civil Aviation, Economic Impact Analysis, Montréal, Canada, Air Transport Bureau, Scheduled Passenger Traffic, Reduction in Seats, Reduction in Passengers	The economic viability of aviation in the North Eastern region is closely tied to the global trends and impacts outlined in the ICAO report on the effects of COVID-19 on civil aviation. The region may face significant challenges due to reduced passenger traffic, loss of revenue for airlines, and uncertainty regarding the duration and magnitude of the outbreak and containment measures. Adaptation strategies, government support, and collaboration among stakeholders are essential for mitigating the impacts and ensuring the long-term resilience of aviation in the North Eastern region.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		duration and magnitude of the outbreak and containment measures, the degree of consumer confidence for air travel, and economic conditions, etc.		
85.	State of Global Aviation ICAO Safety Report 2019 edition	It is often mentioned that air traffic is expected to double in the next 15 years. That growth combined with rapid technological changes, the increasing complexity of the aviation system and innovative approaches proposed by the aviation industry present challenges to the traditional regulatory approach which is mostly based on the establishment of prescriptive requirements. If we are to enable the rapid evolution of the global air transportation system, the traditional prescriptive approach must be complemented by a performance-based approach as reflected in the provisions of Annex 19 – Safety Management. To determine whether we are achieving effective safety management implementation, we need to focus on the activities, processes and tools related to safety performance management as well as State safety programme (SSP) and	Air Traffic Growth, Technological Changes, Aviation System Complexity, Innovative Approaches	The economic viability of aviation in the northeastern region, as well as in global aviation, depends on effective safety management practices. The principles outlined in the ICAO Safety Report underscore the importance of adopting a performance-based approach to safety management to address the challenges posed by growth, technological advancements, and increasing complexity in the aviation sector

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		safety management system (SMS) evaluation.		
86.	CO2 emissions from commercial aviation, 2018	Nearly 39 million flights from 2018 were analyzed, and 38 million of these were flown by passenger aircraft. Total CO2 emissions from all commercial operations, including passenger movement, belly freight, and dedicated freight, totaled 918 million metric tons (MMT) in 2018. That is 2.4% of global CO2 emissions from fossil fuel use and a 32% increase over the past five years. Further, this emissions growth rate is 70% higher than assumed under current ICAO projections.	Aviation; aircraft; fuel efficiency; carbon dioxide	While aviation contributes significantly to the economic development of the northeastern region, it also generates substantial CO2 emissions, necessitating efforts to mitigate its environmental impact while ensuring continued economic viability.
87.	India-ASEAN Cooperation in Aviation Sector: September 2008	Though the Indian civil aviation sector has shown an outstanding growth rate during the last few years, maintaining and realizing its economic potential would be difficult due to the following challenges. First, the idea of fifth freedom of air agreement between India and ASEAN is akin to day dreaming, especially in the backdrop of the slow pace of evolution of an Open Sky Agreement among the ASEAN members.	India-ASEAN Cooperation, Aviation Sector, Fifth Freedom of Air Agreement, Open Sky Agreement	The passage suggests that while there's potential for cooperation between India and ASEAN in the aviation sector, challenges such as differing preferences among ASEAN members and slow progress in establishing a common Open Sky Agreement may hinder the realization of this potential.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		It is evident that ASEAN members prefer bilateral arrangements over a common Open Sky policy, despite having air transport liberalization as one of the three priority areas on the roadmap to ASEAN service trade liberalization.		
88	ISAS Insights No. 510 – 27 August 2018 India-ASEAN Air Connectivity: Prospects for Growing Trade and Tourism	As per statistics available from the Directorate of Civil Aviation in India, the Southeast Asian cities which have seen the highest number of passengers from Indian airports are Bangkok, Kuala Lumpur, Ho Chi Minh City, Yangon and Singapore. The Indian cities which have flights connecting to the Southeast Asian cities are New Delhi, Mumbai, Kolkata, Chennai, Ahmedabad, Bengaluru, Coimbatore, Hyderabad, Kochi, Jaipur, Amritsar, Lucknow, Madurai, Tiruchirapally, Trivandrum, Gaya, Varanasi and Visakhapatnam. For the Southeast Asian airlines, Singapore has the best connections to Indian cities and is connected to most of the cities except Gaya and Varanasi which are connected to Bangkok and Yangon respectively. After Singapore, Kuala Lumpur and	Trade, Tourism, Directorate of Civil Aviation, Southeast Asian cities, Indian airports	The insights provided in ISAS Insights highlight the importance of air connectivity between India and ASEAN countries for trade and tourism. Extending these connections to the North Eastern Region of India can unlock significant economic opportunities, promote regional development, and strengthen ties between neighboring countries.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		Bangkok have the best aviation connections to Indian cities.		
89.	Report of the Committee on A ROAD MAP FOR THE CIVIL AVIATION SECTOR: November 2003	The Airports Authority of India (AAI) manages 122 airports, of which 94 are civil airports (including 11 international airports 6) and 28 are civil enclaves at defense airfields. These airports handled over 4.4 crore (cr.) passengers in 2002-03 (1.5 cr. international and 2.9 cr. domestic). Domestic passenger traffic had increased 8% in 2002 to 1.3 cr., despite adverse operating conditions, viz., low load factors, high fuel and insurance costs, etc. International passenger traffic carried by Air India (AI) and Indian Airlines (IA) also increased 8% to 0.4 cr. in this period. Indian airports handled close to a million tons (MTs) of cargo (0.65 MT of international and 0.33 MT of domestic) in 2003, -4 15% increase over the previous year., Traffic and cargo growth over 2002-03 to 2006-07 is forecast to be between 5-7.5% per annum for domestic and international traffic.	International airports, Domestic airports, Civil enclaves Passenger traffic, Domestic passenger traffic, International passenger traffic Cargo handling, Load factors	The Committee's report on the civil aviation sector provides insights into the challenges and opportunities for improving the aviation industry's performance and economic viability. By addressing key issues such as infrastructure development, regulatory reforms, and market demand, stakeholders can work towards enhancing the sustainability and growth of aviation in the North Eastern Region.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
90	Compendium of Central Government Services and Regulations for Greenfield Airport: December 2011	1. AAI Airports Greenfield airports to be set up by AAI would be preferably constructed through public private partnerships (PPP); such airports would be financed substantially through PPP concessions. However, the land for such airports would have to be provided by AAI. Further, financing gaps, if any, can be bridged through the Viability Gap Funding scheme, which provides for a capital grant of up to 20% of the project cost. Concessions for the development of greenfield airports would be awarded through open competitive bidding, based on model bidding documents. In north-eastern areas of India, where it may not be feasible to follow the PPP route, AAI could set up greenfield airports on its own, with approval from the Government on a case-to-case basis. Land for setting up Greenfield airports would preferably be provided by the beneficiary government/local government, free of cost and free from all encumbrances to AAI.	Greenfield airport, Capital for projects, land acquirement Connection:	

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		2. Other Airports Financing and development of any other airport would be the responsibility of the airport company seeking the license. Land for this purpose may be acquired by the airport company, either through direct purchase or through acquisition by the state government as per the extant policy.		
91.	Strategic Plan Ministry of Civil Aviation 2010- 15	Between 2000 and 2010 air operations Air India have expanded by 160% in terms of domestic passenger volume India now ranks 4th after US, China and Japan. It is expected to grow at a rate of 9-10% annually to reach the level of 150 to 180 million passengers by 2020. Today India has 14 scheduled airlines operating exclusive of cargo airlines. In 1990, there were only 2 airlines in operation. In 1990 there were only 100 aircrafts operating in the country which have now risen to 413. As against 39 nonscheduled operators in 2000, the figure has now swollen to 123. The total number of aircrafts in the country too have shown a rapid rise from 225 in 2000 to 735 in 2010.	Domestic passenger volume, Growth rate, Scheduled airlines, Cargo airlines, Scheduled operators, Non-scheduled operators	The economic viability of aviation in the North Eastern Region is closely intertwined with the objectives outlined in the Strategic Plan of the Ministry of Civil Aviation from 2010-15. By prioritizing infrastructure development, fostering economic growth, promoting tourism, and addressing strategic imperatives, the Strategic Plan aimed to enhance the economic viability of aviation in NER and facilitate its integration into the broader national and global economy.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
92.	Economic Development Mar 2020: Air Transport Monthly Monitor	In terms of passengers , the Top 15 airports reported a decline of - 1.8% YoY. Over half of the Top 15 airports posted YoY decrease. Abrupt decline was observed in major hubs in Asia/Pacific, mostly in China, heavily impacted by the travel bans and falling demand. Beijing, Hong Kong and Shanghai , contracted by -15.4% , -11.7% and -5.4% , respectively	Air Transport, Asia/Pacific, Falling demand	Understanding and monitoring global aviation trends, particularly in major hubs, can provide insights into potential challenges and opportunities for economic development in the North Eastern Region. It's crucial for stakeholders to adapt to changing market dynamics and implement strategies to enhance resilience and sustainability in the aviation sector
93.	Global Aviation and Our Sustainable Future International Civil Aviation Organization Briefing for RIO+20	The aviation sector plays a vital role in many of the Rio+20 critical issues including sustainable cities, disaster readiness, jobs, poverty eradication, finance and energy. In all of these areas, ICAO's contribution to international governance aiding in the development of Green economy is paramount.	Sustainable cities, Disaster readiness, Poverty eradication Finance, Energy	In essence, by promoting sustainable practices within the aviation sector, including in the North Eastern Region, we can not only safeguard the environment but also foster economic growth and improve livelihoods in communities around the world.
94.	Section 601 Youth in Aviation Student outreach Report: Response to U.S. Congress FAA Reauthorization Bill of 2018	Economic projections show that the need for qualified aviation and aeronautical professionals will continue to grow over the next twenty years. ¹⁴ Fewer employees enter the industry pipeline, exacerbating the shortage of airline pilots, maintenance technicians, and	Economic Projections, Aviation Workforce Shortage, Youth in Aviation.	The economic viability of aviation in the North Eastern Region is closely linked to the availability of skilled aviation professionals, as highlighted in the Section 601 Youth in Aviation Student Outreach Report. Addressing projected workforce shortages is crucial for

S. No	Publication Ref Title and Theme	Inference			Key points	Connection
		UAS professionals. Projected Aviation Workforce Shortages over the Next 20 Years				sustaining the region's aviation sector and supporting its contribution to regional economic development.
		Industry	Job Function	Employee Shortage ¹⁵		
		Aviation and Aeronautics	Commercial Airline Pilots	637,000		
		Aviation and Aeronautics	Maintenance Technicians	648,000		
		Aviation and Government	Unmanned Aircraft Systems (UAS)	300,000		
95.	Taking Flight: Analysis of Timor-Leste Civil Aviation and Recommendations	The conclusion is that Timor-Leste would be better served in more fully utilizing its current aviation capacity and in developing basic capacity for future development, as these are the more relevant challenges currently facing the aviation sector. Regarding connectivity, the solutions are mainly related to policy and attracting foreign investment, both of which are heavily dependent on increased governmental capacity.			Aviation Capacity, Connectivity, Policy, Foreign Investment	While the specific challenges and opportunities may vary between the North Eastern Region and Timor-Leste, there is a shared emphasis on maximizing current capacity, investing in basic capacity-building efforts, implementing conducive policies, and enhancing governmental capacity to drive economic viability in the aviation sector.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
96.	Convention on International CIVIL AVIATION DONE AT CHICAGO ON THE 7TH DAY OF DECEMBER 1944	CONVENTION ON INTERNATIONAL CIVIL AVIATION PREAMBLE WHEREAS the future development of international civil aviation can greatly help to create and preserve friendship and understanding among the nations and peoples of the world, yet its abuse can become a threat to the general security; and WHEREAS it is desirable to avoid friction and to promote that cooperation between nations and peoples upon which the peace of the world depends; THEREFORE, the undersigned governments having agreed on certain principles and arrangements in order that international civil aviation may be developed in a safe and orderly manner and that international air transport services may be established on the basis of equality of opportunity and operated soundly and economically I Have accordingly concluded this Convention to that end.	General security, Cooperation between nations, Principles and arrangements, Safe and orderly development, Equality of opportunity Sound and economical operation	The Chicago Convention provides a foundation for the economic viability of aviation in the North Eastern Region by promoting cooperation, safety, and equality of opportunity in international civil aviation.
97.	Understanding North East India Cultural	Assam became a part of east India company in early 19th century precisely	Ahom's rule, Cultural Diversities, Insurgency,	The economic viability of aviation in the North Eastern region of India is

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
	Diversities, Insurgency and Identities	in 1826 but 10 years down the century there was a decline of Ahom's rule in Assam. For 10 years there was Burmese occupation and this was one of the darkest periods in the history of Assam. There was untold devastation and misery of the people because of perpetuation of cruelty and injustice in general. With the British came the exploitation of Oil, Tea and forest products. English literature and Christianity spread. They build rail which we still use in north east. With independence someone has remarked that the partition of Bangal made north east even more remote. Earlier the farthest capital of North East was Agartala and it was linked with Kolkata by road which was 300 Km long. After the partition the distance became 1700 Km. North East became surrounded by 5 neighboring countries. India has international boundaries with 6 nations out of which 5 bound north eastern territory while it is connected only 10% of the land of India. This what partition did to North east and problem came after that.	Burmese occupation, British exploitation, Oil, Tea, Forest products, Christianity	influenced by a complex interplay of historical, geographical, cultural, and socio-political factors. Understanding these dynamics is essential for addressing the region's connectivity challenges and promoting its economic development.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
98.	Sustainable Flight Management and Aviation July, 2016	Performance-based navigation (PBN) is a great tool in improving the efficiency of air traffic management. However, PBN suffers from various difficulties including a long and difficult implementation process; a lack of global expertise; difficulty understanding the PBN Manual due to technical incompetence and language barriers; shortcomings in co-ordination between stakeholders; lack of standardization; few older aircraft equipped for PBN; lack of PBN procedures at some airports; and difficulty of PBN-capable aircraft to fit in with non-PBN capable aircraft on same flight tracks.	Performance-based navigation (PBN), Air traffic management efficiency, Implementation process challenges, Global expertise	The economic viability of aviation in the North Eastern Region is closely linked to the adoption of sustainable flight management practices such as PBN. Addressing the challenges associated with PBN implementation requires a coordinated effort involving government agencies, aviation industry stakeholders, and regulatory bodies to unlock the full potential of aviation as a driver of economic growth and connectivity in the region.
99	Hydrocarbon VISION 2030 For Northeast India	Develop North East Region as a dominant hydrocarbon hub at the forefront of India's energy economy- Double the production of Oil and Natural Gas (O+OEG in MMTOE) by 2030; Access to clean fuel for 100% households at affordable price in the region (LPG/PNG); Bolster development through creation of service provider hubs; Ensure availability to support	Develop natural gas grid, CGD networks, and CNG Highways Generate employment opportunities through industrial and skill development	The success of the Hydrocarbon VISION 2030 for Northeast India can contribute to the economic viability of aviation in the North Eastern Region by improving fuel supply, infrastructure, air quality, employment opportunities, and trade prospects

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		growth in per capita petroleum product consumption; Provide pipeline connectivity by installing new POL and LPG Pipeline; Develop natural gas grid, CGD networks and CNG Highways; Generate employment opportunities through Industrial and skill development; Promote manufacturing industry related to oil and gas in the region; Incentivize production of bio fuel in the region for providing access to clean fuels and to boost rural economy; Promote trade between North East Region of India and neighboring SAARC countries		
100	WATS World Air Transport Statistics 2019	In 2018, the demand for air passenger services remained solid, with industry-wide revenue passenger kilometers (RPKs) increasing by 7.4% over the year as a whole. Although this represents a slowdown from the decade-high pace recorded in 2017 (around 8%) it still exceeded the long-run industry average growth rate by around 2 percentage points. Air passenger demand was supported by a generally solid global economic backdrop, especially earlier in	Revenue passenger kilometers (RPKs), Industry-wide growth rate Global economic backdrop, Jobs, incomes, and business activity	The economic viability of aviation in the North Eastern Region is closely intertwined with global economic conditions, industry-wide trends, regional characteristics, and the affordability of air travel. Understanding these factors and their interplay is essential for assessing the growth prospects and sustainability of aviation in the region

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		the year, which in turn supports jobs, incomes and business activity, as well as the strong competition in the industry which helps to ensure airfares remain affordable to travelers.		
101	The impact of the financial crisis on labour in the civil aviation industry	The global financial crisis has impacted severely on airlines and airline labour around the world. The crisis has resulted in job reduction programmes and alterations to work. Between May 2008 and May 2009, jobs were cut at several of the major US airlines; for example, at United Airlines (6,600), American Airlines (4,900), Northwest Airlines (4,300), Delta Airlines (3,300), US Airways (1,900), and Continental Airlines (1,500). In Europe, UK-based airline XL Airways (employing around 1,700 staff) and Russian carrier Dalavia (employing around 2,800 staff) ceased trading. Other carriers such as Aer Lingus, AirFrance-KLM and Scandinavian Air Services have announced job reduction programmes (of 1,500, 3,000 and 9,000, respectively). In Asia Pacific, the Australian airlines	Continental Airlines, Civil aviation industry, Job reduction programs,	The economic viability of aviation in the North Eastern Region is susceptible to broader economic trends, including financial crises, which can impact labor in the civil aviation industry through job reductions and alterations to work. The interconnectedness between these factors underscores the importance of understanding both local economic dynamics and global economic conditions in analyzing the aviation sector's performance and labor market dynamics.

S. No	Publication Ref Title and Theme	Inference	Key points	Connection
		Qantas and Virgin Blue have announced 1,750 and 400 job losses, respectively, while Air New Zealand plans to retrench 200 jobs.		
102	Civil aviation and its changing world of work 2013	Civil aviation has become a major industry in our time. Without air travel, mass international tourism would not exist, nor could global supply chains function. Some 40 per cent of high-tech sales depend on good quality air transport, and there is no alternative mode of transport for perishable commodities such as fresh food or cut flowers. Air transport systems are interdependent, involving airlines, all service providers and authorities on the ground. 3 This issues paper covers civil aviation in the air and on the ground; 4 aircraft maintenance and manufacturing are not discussed in detail. Figure 1 shows the different actors in the air transport industry.	Service providers, Ground authorities, Aircraft maintenance Aircraft manufacturing, Interdependence	The economic viability of aviation in the North Eastern Region is intertwined with the broader dynamics of civil aviation, including its role in economic development, dependency on air transport, interdependence of aviation systems, and the evolving nature of aviation workforce dynamics. Addressing challenges and leveraging opportunities within this context can contribute to the sustainable development of the aviation sector and the region's economy.

2.2 LITERATURE REVIEW OF RESEARCH PAPERS ON AVIATION INDUSTRY IN INDIA

Table 6: b) Literature Review of Research papers on Aviation Industry in India:

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
1	Indian Aviation Sector: As a Growing Service Sector in Indian Economy	International Journal of Science and Research (IJSR), 2014	Anuradha Yadav	a. Airlines has superior and better services than all other sectors in India	Aviation industry is one of the largest and most widespread sectors of the country providing its services not only in India as well as outside India also.
2	Indian Aviation: Flying Through Turbulence	International Journal of Engineering Research & Management Technology, 2014	Dr. Manjula Shastri	a. If rupee value depreciates by 1-rupee, net losses will further increase by 395.97 rupees. b. As crude oil prices increase the net losses suffered by the companies also increases. c. As rupee depreciates the net losses suffered by the companies also increases.	Financial ratios reveal that all the leading players are facing losses. International as well as domestic passenger traffic is growing at a fast rate. Government is aggressively taking interest in modernizing the non-metro airports such that their capacity will increase.
3	Indian aviation industry- business growth & innovations	International Journal of Interdisciplinary Research, 2015	Jitendra singh	b. Foreign visitors who travel by air spend approximately INR 488 billion. c. Compared to other modes of transport, air freight is fast and reliable over great distances.	Aviation industry provides significant economic benefits to the Indian economy and its citizens, some of which are unique and essential to the operation of modern economies.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
4	Issues & challenge of Indian aviation industry: a case study	Pezzottaite Journals, 2015	Shipra Choudhuri, Ruchi Dixit, Rajesh Tiwar	a. The maintenance repair and overhaul (MRO) charges are high, so airlines prefer to go to Abu Dhabi, Jordan, Singapore for MRO. The increased MRO charge is passed on to passengers. b. The successive governments have failed to frame a policy with a long-term vision for airline industry. The airline industry has been left to fend for itself and serve the elite class in select metros. c. The industry does not provided level playing field for a new comer due to poor regulation. The monopoly of public sector companies has now been replaced by cartel formation of private companies. d. The government has not allowed competition in airports. Many international destinations have followed policy of more than one airport. e. Financial stress may affect the safety of passengers, as airlines lower their maintenance budgets.	Allow private oil companies to supply fuel to airline companies. The competition will benefit the airline industry and the operational cost will come down. Adopting financial discipline and treating employees with dignity and adopting proactive measures for improving cost efficiency and enhancing equity base will go a long way to make the airlines profitable. The government must take progressive stand, rationalize the tax structure, and play supportive role to strengthen the competitiveness of the private players.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				f. ATF prices in India are highest globally and 60-70% higher than neighboring hub like Kuala Lumpur, Bangkok, Hong Kong and Singapore (Sinha, 2014). g. The pricing of ATF does not reflect the international crude oil prices. The public sector oil companies seem to have made a cartel to fix the rates for airline companies, by abusing their monopoly.	
5	A study of Current Scenario of Aviation Sector in India.	International Journal of Innovative Knowledge Concepts, 2016	Anubhav Singh	a. Rising private participation and Investments b. Greater use of nonscheduled airlines c. User development fees	Low-cost carriers in India have mushroomed in both the markets because of their effective marketing strategies.
6	A study of mergers & acquisitions in aviation industry in India and their impact on the operating performance and shareholder wealth.	International Journal of Development Research, 2016	Dr. Jay Desai and Nisarg A Joshi	a. Jet Airways has been able to post positive operating margins post mergers however Kingfisher Airlines have failed to do that. b. Kingfisher Airlines also has a negative return on capital employed compared to Jet Airways. c. On other parameters like EPS, Return on Net Worth and Net Profit	External factors like slowdown in the Indian aviation market because of recession have contributed to the failure of the merger. Shareholders wealth of Kingfisher airlines has deteriorated significantly post-merger with Air Deccan.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				Margin have been negative for both the companies d. Mergers and acquisitions have not created enough shareholder wealth post-merger	
7	The Indian Aviation Sector.	Legal and Tax Consulting, 2016 Worldwide	Nishit Desai Associates	a. Pursuant to Press Note 6 of 2012 issued by the Ministry of Commerce and Industry,⁸¹ the Government opened the segment to FDI by foreign airlines. b. The expected 300% increase in passenger numbers over the next decade will require a significant investment in airport infrastructure. AAI itself has neither the capital nor the expertise to grow at such scale hence, the Government has adopted the Public-Private Partnership (“PPP”) model for several airport projects. c. While fuel hedging seems like an ideal way to combat losses incurred due to high ATF costs, it is interesting to note how few India airlines actually hedge ATF prices due to regulations.	The AAI is actively promoting regional interconnectivity by developing airports in non-metro cities, and State Governments are also contributing by donating land and forming PPPs with private investors like GVK. The IATA projects that India will have the world’s third largest civil aviation sector in the next 15 years. The Indian Government’s emphasis on infrastructure and the tourism industry are bound to contribute to the growth of the aviation sector. The Indian Government’s emphasis on infrastructure and the tourism industry are bound to contribute to the growth of the aviation sector.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				d. In India, the concept of fractional ownership has yet to take off. Only a few Indian company, like JetSetGo, actually offer the service. e. Instead of entering into full-fledged mergers or acquisitions, airlines choose to achieve joint synergies by entering into mutual exchange contracts. f. Regulations forcing the private airlines to outsource their ground handling operations to third parties would have cash implications in terms of increased costs, service tax payouts, profit margins and airport royalty charges.	
8	Emerging scenario of Indian aviation sector facing issues and challenges in economy	International Journal of Recent Scientific Research, 2017	Anuradha Yadav	a. Indian aviation Industry has high growth rate as disposable income of the people is growing and most of the people tending to upgrade their lifestyle. b. There are very few people who are loyal customers of the airlines. c. The monopoly of public sector oil companies should be curtailed and	Another way to simplify operations is modifying the hub-and-spoke model, which uses designated headquarter airports for transfer. Improving energy efficiency of engines, developing infrastructure, increasing regional connectivity will definitely have a positive impact on the industry.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				private players should be allowed to supply fuel to airlines.	
9	Indian aviation industry: An overview	International Journal of Academic Research and Development, 2017	Dr. Ipseeta Satpathy, Dr. BCM Patnaik, Sharad Kumar	a. Due to significant improvement in the passenger demand the airlines also increased the capacity of available seats. b. Since, air travel is becoming cheaper, a section of the consumers has become the target consumers for the airline service providers. c. As most of the part of the country has been connected by air transport, the tendency of the travel pattern among the domestic flyers also increased. d. Indigo is leading the Indian domestic market with 38% of market share followed by 83.6% of passenger load factor. e. Air India, which was number one player in the Indian market, now stands fourth in terms of market.	Earlier airlines being used by class people only. Now a days the trends changed and now the mass people also able to travel in airlines.
10	Indian civil aviation industry	International Journal of Multidisciplinary Research and Development, 2017	Dr. N Vijayakumar, Dr. C Vijai	a. India is among the five fastest growing aviation markets globally with 275 million new passengers travelling and will displace the	With the right policies and a relentless focus on quality, cost and passenger interest, India would be well placed to achieve its vision of becoming the third

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				United Kingdom as the third largest in 2026. b. ASEAN constituted about 16 per cent of international passenger flow from and to India in 2015. c. India's airlines such as Air India, Air India Express, Jet Airways, Indigo and Spice Jet carry on average 37 per cent of the total international passenger flows from and to India. d. Airlines having direct flights between Bangkok, Kuala Lumpur and Singapore and Indian metro cities have reasonably higher frequencies, compare to Tier I cities. e. It is in our interest to ensure that air connectivity between ASEAN and India keep up with soaring traveller demand.	largest aviation market by 2020 and the largest by 2030.
11	Application of operations research in the Indian Aviation Industry	International Journal of Advance Research, Ideas and Innovations in Technology, 2018	Advaiit Chaturvedi, Aaditya Aher, Aahan Tulshan, Aanchal Saini, Abhir Mehra	a. Problems like discomforting seats, less legroom, wrong posture, and constantly irritating noise are the major reasons for the lack of in-flight comfort.	Costumer centric solutions are the need of the hour and they must be devised by all companies in the sector. If it's implemented correctly it will help the industry grow by leaps and bounds.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				b. In an airplane where congestion has become a big issue, the seating arrangement, especially in the economy class, can be designed in a manner where a person won't feel claustrophobic and congested. c. In India, there exists the problem of unoccupied counters which leads to concentration of passengers and increased workload for officials.	
12.	Udan- A New Paradigm Shift In the Tourism Industry With Reference To North East India	IOSR Journal of Applied Chemistry (IOSR-JAC), 2018	Krishna Kumar Thakur, Dr. Gour Gour Banik	a. Under UDAN, Shillong has been made as hub and it will connect to nearby destination such as Agartala, Aizawl and Imphal. b. It is expected that the flow of tourists from different parts of the country and the world at large will increase with the introduction of flights under this scheme. c. Under UDAN scheme there is a plan to develop and make functional 08 airports in North East.	UDAN scheme will also create a huge job market for both skilled and unskilled. This scheme will also help to cut the travel time; thus, one can go out for work and fly back to their cities after work on the same day.
13	Factors Affecting the Sales of Airlines in India with Special	International Journal of Engineering and Advanced	Chetanya Singh	a. By increasing timeliness of Air India aircrafts its sales can be significantly improved. This can be done by making sure the staff and	The merger of the former Indian airlines and Air India, took place despite the fact that both carriers are completely opposite each other and

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
	Reference to Air India, 2019	Technology (IJEAT), 2019		crew is punctual, flights take-off at right time and on-ground staff is quick. b. Price, safety and staff do not significantly impact airline choice hence they can be ignored when the objective is to increase bottom and top line.	hence the merger has not worked out favorably.
14	Indian Aviation Sector: The Parallel Rise & Fall	International Journal of Scientific & Engineering Research, 2019	Aishani Singh, Shounak Sengupta	a. Due to UDAN scheme (“Ude Desh ka Aam Nagrik”), the airfare of an average passenger would be about Rs.2500 for a one-hour flight. This will be implemented by: (a) Reviving airstrips / airports as No-Frills Airports at an indicative cost of Rs.50 crores to Rs100 crores. (b) Selecting specific airports/airstrips for revival; in consultation with State Governments and airlines. b. Government of India will enter into 'Open Sky' ASA on a reciprocal basis with SAARC countries and countries located beyond 5000 km from Delhi.	Indian Aviation sector can be declared as one of the booming industries in the country. The Open sky policy with SAARC countries is a good measure. However, the one with countries beyond 5000km radius will fail to have much impact as India already has unused flying rights to EU, open sky policy with US and UK 100% FDI being allowed, securing a scheduled operator permit still requires an airline’s chairman and at least two thirds of its directors to be Indian citizens, and substantial ownership and effective control to be vested in Indian nationals. Hence Foreign players are scarce.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				c. All domestic scheduled airline operators including helicopter operators will be free to carry out self-handling at all airports through their regular employees. d. Future tariffs at all airports will be calculated on a 'hybrid till' basis, unless specified otherwise in concession agreements. e. MoCA will provide full support to the Aviation Sector Skill Council and other similar organizations/agencies for imparting skills for the growing aviation industry.	
15	Travelers' Perception with Reference to Indian Domestic Airlines.	International Journal of Recent Technology and Engineering (IJRTE), 2019	Anupama Tadamarla, Mallika Srivastava, Sandip Solanki.	a. Individual factors such as empathy and responsiveness are significant towards travelers' perception. b. A substantial distinction exists between buying or traveling intentions and service quality parameters i.e., tangibility, responsiveness, reliability, empathy, and assurance c. Airlines have visually appealing material associated with service helps make the strongest	Further study could include the connection between price, customer loyalty, quality of service and job performance with the utilization of all five SERVQUAL measurements at once to determine whether airline employees' satisfaction is recognized and linked to their services or potential traveler satisfaction.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				contributor towards tangibility dimension. d. The domestic carriers need to audit their service methodology to build consumer loyalty and in this way customer satisfaction. e. Another critical factor is the efficiency in Check in and Check out for the customer because that's where the most time of a customer is spent. f. Additional Factors which can be Pre-Flight services such as email and SMS reminders and in-flight entertainment must also be taken care of for better customer satisfaction and customer delight.	
16	Aviation During and Post Pandemic COVID-19 - Impact and Strategies	SF Journal of Aviation and Aeronautical Science, 2020	Mehta P	a. Losses incurring due to the pandemic is even higher than the combined effect of crisis of 9/11. b. New norms for promoting sanitised travel has raised the turnaround time of airlines which has created an urgency to develop a new and fast technology for sanitization and cleaning purpose, such as, self-	Changed perception of passengers towards travelling and unavailable cash reserves has become a threat for its long- term subsistence. Currently, recovery speed of aviation is very slow but for future it has been estimated that it will bounce back with more strength.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				sanitizing toilets, robots and artificial intelligence. c. many airports are found to be unprepared and have raised a situation of dilemma among passengers due to the presence of various quarantine protocols, medical certifications and declaration forms	
17	Aviation Industry in India during Covid-19 and Post Covid	International Journal of Creative Research Thoughts (IJCRT), 2020	Aniket Joshi, Gayatri Matade, Simran Kaur Chhabda	a. Post COVID-19, flying is going to be the safest mode of travel mainly because air flow in planes is from top to bottom and installation of very high-quality HEPA filter in the aircraft. b. Indian Government has resumed domestic flights from 25th May after nearly two months of deferral due to the coronavirus outbreak but placed lower and upper limits on airfares depending upon the flight duration.	Turnaround times for aircraft will significantly increase. Smaller planes will be used for international travel. Until complete revival from Covid-19 is done, every airline will have to make its own strategy to overcome from the negative effects from the pandemic attack.
18	Financial Distress in Indian Aviation Industry: Investigation	Eurasian Journal of Business and Economics, 2020	Samik shome, Sushma Verma	a. Indigo is found to be the only stable and consistent air carrier in the Indian aviation industry among the four major airlines.	The existence of financial distress does not always lead to a situation of bankruptcy.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
	Using Bankruptcy Prediction Models			b. Spice Jet has shown continuous improvement in its financial performance over the period of the study. c. The operations of Jet Airways are being suspended since the middle of April 2019 due to mounting financial burdens. d. With a laidback attitude and poor operational efficiency, Air India is surviving only because of government packages.	Further studies can focus on identifying various variables leading to the financial distress and in identifying variables critical in improving the financial performance of airlines on a case to case basis.
19	Sustainability of airlines in India with Covid-19: Challenges ahead and possible way-outs	Journal of Revenue and Pricing Management, 2020	Anshu Agrawal1	a. The cash burn rate indicates the number of days for which a company can sustain its operations with the available cash reserves. Airlines in India suffers from weak liquidity. b. In the backdrop of tight liquidity, thin margins and high burn rate, the airlines have always been fragile to withstand the normal demand shocks, oil price fluctuation, depreciating currency, etc. Industry has vouched the devastating impact of these events ranging deep losses to airlines bankruptcy.	Sustainability of airlines warrants of turnaround changes in their revenue strategies and operating models. Focus on minimizing losses rather than profit maximization possibly can help the airlines to combat current situation.

S. No	Title of the paper and Journal Name	Name of Journal and Year of publication	Name of Authors	Major findings	Conclusions and scope
				c. Covid-19 pandemic has proven highly disruptive. Airline industry is worst hit sector, which is expected to lose USD 84.3 billion in 2020, the highest loss the sector has ever witnessed (IATA). d. Social distancing practices initiated by regulatory authorities and airlines to prevent infection outbreak will be financial hit on airlines pocket (IATA Economics 2020). e. In present scenario, where a severe decline in passenger traffic as well as restricted destinations is expected amid infection paranoia, cargo business perhaps can be used a rescue boat to safeguard the airlines from expected losses.	

2.3 THEMATIC LITERATURE REVIEW

Since there exists a lot of studies related to aviation industry in India, the various studies identified so far as listed above have been classified as per the following themes:

Table 7: Theme based literature review

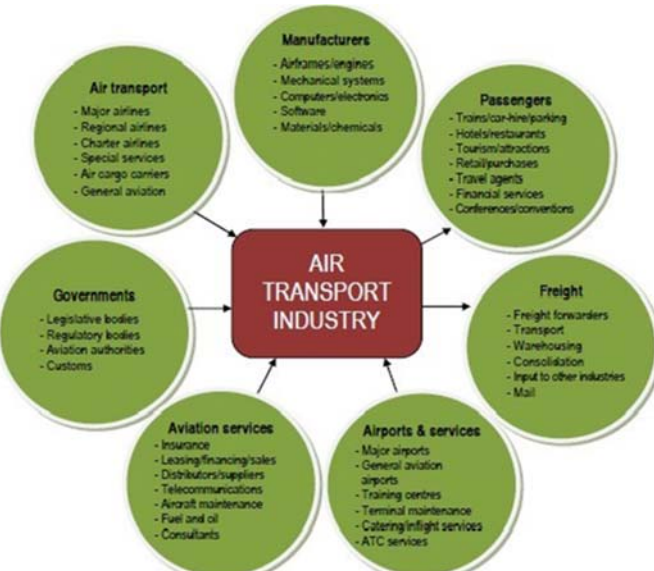
Themes	Justifications/Search Outlook
The scope of aviation industry in India based on macro-economic factors	There are many macro-economic factors such as recession, slowdown, international oil prices etc. which influences the growth and viability of Indian aviation sector.
The scope of aviation industry in India based on micro economic factors	In a county like India micro economic factors such as mergers acquisition, pricing policy, maintenance expenses etc. in the aviation sector have been instrumental in determining the viability of the aviation industry.
The scope of aviation industry in India due to management decisions and service improvements	The management decisions such as infrastructure improvement, aircraft improvement, user development fees, fractional ownership, enhancing service delivery and customer delight etc. also influences the viability of the aviation industry at large.
The scope of aviation industry in India based on Government plans and policies	The role of the government in India is vital in determining the future and viability of aviation Industry in India. Policies such Public Private Partnership (PPP), privatization of airports, schemes such as UDAN, are very instrumental in giving the aviation industry a boost and ensuring its viability in the future.
The viability of aviation in North East India based on overall factors identified in the Indian context	Studies related to aviation sector specific to the North East India are very few and hence all studies related to this are included in this sub theme.
The effect of COVID - 19 pandemic on the current and future viability of airlines in India.	This sub theme assesses the impact of COVID – 19 pandemic and its immediate and future implications on the viability of aviation sector in India.

2.4 THEME WISE DISTRIBUTION OF LITERATURE REVIEWED

Table 8: Theme wise distribution of literature reviewed

Theme	Reviewed Literature
The scope of aviation industry in India based on macro-economic factors	KPMG Aviation 2030, Assessing Economic Impacts of Connectivity Corridors: An empirical Investigation (2018), Report of Working Group on Civil Aviation Sector: June 2012, Aviation Industry in India: An overview, A Study on Indian Airlines Industry 2013-15: Technical report July,2014, Economic Infrastructure in North East India: An Analysis: January 2007, Indian Aviation Industry : An overview, 2017, IATA: India's Air Transport Sector: August 2018, ZVEST: Indian Aviation Sector, FICCI Global Aviation Summit, White paper on National Green Aviation Policy 2019 Ministry of Civil Aviation, GoI, Research Study of the Civil Aviation Sector in India, 2012, Report of the Committee Constituted for examination of the recommendations made in the Study Report on Competitive Framework of Civil Aviation Sector in India: June,2012, Report of the Committee on A road map for the civil aviation sector: November 2003, Indian Aviation Sector: As a Growing Service Sector in Indian Economy, 2014, Indian Aviation: Flying Through Turbulence, 2014, Indian aviation industry- business growth & innovations, 2015, Issues and challenges of indian aviation industry: a case study, 2015, A study of Current Scenario of Aviation Sector in India, 2016, The Indian Aviation Sector, 2016, Emerging scenario of Indian aviation sector facing issues and challenges in economy, 2017, Indian aviation industry: An overview, 2017, Indian civil aviation industry, 2017,
The scope of aviation industry in India based on micro economic factors	Air Transport Action Group (ATAG): The Economic & Social benefits of air Transport, Sustainability's role in enhancing airport capacity 2018, Transportation Network Companies: Challenges and Opportunities for Airport Operators (2017), NextGen for Airports, Volume 4: Leveraging NextGen Spatial Data to Benefit Airports: Guidebook (2016), Addressing Uncertainty about Future Airport Activity Levels in Airport Decision Making (2012), Evaluating Airfield Capacity (2012), Enhancing Airport Land Use Compatibility, Volume 2: Land Use Survey and Case Study Summaries (2010), Airport Revenue Diversification (2010), Factors Affecting the Sales of Airlines in India with Special Reference to Air India, 2019, Indian Aviation Sector: The Parallel Rise & Fall, 2019, Financial Distress in Indian Aviation Industry: Investigation Using Bankruptcy Prediction Models, 2020,
The scope of aviation industry in India due to airport authority decisions and service improvements	India Brand Equity Foundation (IBEF) Aviation Report: Jan,2018, Airport Sustainability Practices Drivers and Outcomes for Small Commercial and General Aviation Airports (2016), Lessons Learned from Airport sustainability Plans (2015), Improving the Airport Customer Experience (2016), Practices to Develop Effective Stakeholder Relationships at Smaller Airports (2015), Effects of Airline Industry Changes on Small- and Non-Hub Airports (2015), A Guidebook for Increasing Diverse and Small Business Participation in Airport Business Opportunities (2015), Optimizing Airport Building Operations and Maintenance Through Retro commissioning: A Whole-Systems Approach (2015), Guidebook on General Aviation Facility Planning (2014), Airport Insurance Coverage and Risk Management

Theme	Reviewed Literature
	Practices (2011), Airline and Airline Airport Consortiums to Manage Terminals and Equipment (2011), Airport Self- Inspection Practices (2011), Airport Terminal Facility Activation Techniques (2010), Airport System Planning Practices (2009), Civil Aviation in India, A study of mergers & acquisitions in aviation industry in India and their impact on the operating performance and shareholder wealth, 2016, Application of operations research in the Indian Aviation Industry, 2017, Travelers' Perception with Reference to Indian Domestic Airlines, 2019,
The scope of aviation industry in India based on Government plans and policies	Deloitte Final Report: Promotion of Regional and Remote Area Air Connectivity in India: Ministry of Civil Aviation, National Civil Aviation Policy 2016, 48 Months of Transforming Aviation in India 2014-2018, The opportunities and challenges of civil aviation in India, Part 1: Airport sector liberalization, 2008, General Aviation Unfolding Horizons, Compendium of Central Government Services and Regulations for Greenfield Airport: December 2011, Strategic Plan Ministry of Civil Aviation 2010-15,
The viability of aviation in North East India based on overall factors identified in the Indian context	Integration of the North East: the state Formation Process, A comparative Study of Tourism Industry in North-Eastern States of India : August 2013, Development of North Eastern Region, GOI Annual report-2018-19, ADB- Working Paper Series on Regional Economic Integration. Promoting Trade and Investment in India's Northeastern Region: May 2009, India's Act East policy and North East India: A critical Review, 2019, Report on Air Connectivity: August 2011, Udan- A New Paradigm Shift In the Tourism Industry With Reference To North East India, 2018
The affect of COVID - 19 pandemic on the current and future viability of airlines in India.	IATA (Economic Performance of the Airlines Industry) Midyear Report, 2020, Aviation During and Post Pandemic COVID-19 - Impact and Strategies, 2020, Aviation Industry in India during Covid-19 and Post Covid, 2020, Sustainability of airlines in India with Covid-19: Challenges ahead and possible way-outs, 2020
Aspects of aviation industry globally	Annual Analyses of the EU Air Transport Market 2016, Air transport statistics: Data extracted in December 2019, Annual Review of Civil Aviation 2005, The Impacts of Globalisation on International Air Transport Activity November 2008, ICAO- Global Air Navigation Plan: 2013–2028, Global Report on Aviation: World Tourism Organization 2012, Powering global economic growth, employment, trade links, tourism and support for sustainable AVIATION development through air transport: April 2014, Powering global economic growth, employment, trade links, tourism and support for sustainable development through air transport, October, 2018, African civil aviation policy (afcap): 21 – 25 November 2011, Aviation Risk 2020 Safety and the State of the Nation, Report of the twelfth meeting of the Asia Pacific Regional Aviation Safety team (APRAST/12), ASEAN-India Air Connectivity Report: 28 September 2015, The Asia-Pacific Airline Industry: Economic Boom and Political conflict: October 1995, Aviation 2050 The future of UK aviation , Report to the United States Congress aviation and the Environment A National Vision Statement, Framework for Goals and Recommended Actions

Theme	Reviewed Literature
	December 2004, Aviation Benefits Report 2019, Introduction to Safety Management Systems for Air Operators 2006, The European and Southeast Asian Single Aviation Markets: July 2015, Airline Pilot Demand, 10-year outlook at a glance, Contribution of the global aviation sector to achieving paris agreement climate objectives, Annual Report & Accounts 2017/18 Civil Aviation Authority, China's Reform of Aviation: A Signal of the Significance of Competition Under Law, Aviation and the Global Atmosphere: A Special Report of IPCC Working Groups I and III :January 1999, General Aviation Unfolding Horizons, Global fleet & Mro market forecast commentary 2019–2029, Global Network Forecast, Global Networks, Global Citizens 2018-2037, FUTURE OF THE AIRLINE INDUSTRY 2035, ICAO Uniting Aviation: Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis Montréal, Canada, 2020, State of Global Aviation ICAO Safety Report 2019 edition, CO2 emissions from commercial aviation, 2018, India-ASEAN Cooperation in Aviation Sector: September 2008, India-ASEAN Air Connectivity: Prospects for Growing Trade and Tourism, Report of the Committee on a road map for the civil aviation sector: November 2003, Economic Development Mar 2020: Air Transport Monthly Monitor, ICAO : World Civil Aviation Report Vol. 3 — 75th Anniversary Edition, Center for Advanced Aviation system development: October 2014, Global Aviation and Our Sustainable Future International Civil Aviation Organization Briefing for RIO+20, Section 601 Youth in Aviation Student outreach Report: Response to U.S. Congress FAA Reauthorization Bill of 2018, Taking Flight: Analysis of Timor- Leste Civil Aviation and Recommendations, Convention on International Civil aviation done at chicago on the 7th day of December 1944, Sustainable Flight Management and Aviation July, 2016, WATS World Air Transport Statistics 2019, The impact of the financial crisis on labour in the civil aviation industry, Civil aviation and its changing world of work 2013.  <pre> graph TD A((AIR TRANSPORT INDUSTRY)) A --- B((Air transport)) A --- C((Manufacturers)) A --- D((Passengers)) A --- E((Freight)) A --- F((Airports & services)) A --- G((Aviation services)) A --- H((Governments)) B --- B1[Major airlines] B --- B2[Regional airlines] B --- B3[Charter airlines] B --- B4[Special services] B --- B5[Air cargo carriers] B --- B6[General aviation] C --- C1[Airframes/engines] C --- C2[Mechanical systems] C --- C3[Computers/electronics] C --- C4[Software] C --- C5[Materials/chemicals] D --- D1[Trains/car-hire/parking] D --- D2[Hotels/restaurants] D --- D3[Tourism/attractions] D --- D4[Retail/purchases] D --- D5[Travel agents] D --- D6[Financial services] D --- D7[Conferences/conventions] E --- E1[Freight forwarders] E --- E2[Transport] E --- E3[Warehousing] E --- E4[Consolidation] E --- E5[Input to other industries] E --- E6[Mail] F --- F1[Major airports] F --- F2[General aviation airports] F --- F3[Training centres] F --- F4[Terminal maintenance] F --- F5[Catering/inflight services] F --- F6[ATC services] G --- G1[Insurance] G --- G2[Leasing/financing/sales] G --- G3[Distributors/suppliers] G --- G4[Telecommunications] G --- G5[Aircraft maintenance] G --- G6[Fuel and oil] G --- G7[Consultants] H --- H1[Legislative bodies] H --- H2[Regulatory bodies] H --- H3[Aviation authorities] H --- H4[Customs] </pre>

2.5 THEMATIC UNDERPINNING OF LITERATURE GAP LINKED TO ECONOMIC VIABILITY

The study under consideration covers the various aspects of Economic viability of aviation of North Eastern Region, therefore, the topic mentioned below Shown in Table 9 have been chosen pertaining to various study reports/papers on fields/areas: North Eastern Region.

Table 9: Literature Gap

S. No.	Publication Ref Title and Theme	Authors	Inference	Gap
1.	A comparative Study of Tourism Industry in North Eastern States of India: August 2013	Praveen Rizal Independent R. Asokan Annamalai University Date Written: July 1, 2013	The major constraints of NORTH EASTERN REGION tourism development and uneven performance among states are insufficient funds, lack of infrastructure, transportation, marketing, terror effects and permit period etc. steps should be development to wipe out the constraints for tourism development	The study report covers various aspects of infrastructure, marketing, transportation, terror effects and permit period etc. but, no focus on Air connectivity and development of aviation is available.
2	ADB-Working Paper Series on Regional Economic Integration.	Principal Economist Regional Cooperation and Operations Coordination Division (CWRC) Central and West Asia Department Asian Development Bank, Dec 2014	The economic fortunes in NORTH EASTERN REGION are inextricably intertwine with expansion of trade and investment of the reason with neighboring Countries therefore improving relations with these countries is not a choice but an imperative.	The key focus is on promoting trade and investment in
3	Promoting Trade and Investment in India's Northeastern Region: Agricultural & Processed Food Products Export Development	(APEDA): Comprehensive Master Plan for Tapping the Export Potential of North Eastern States May 2009	The region possesses several comparative advantages like fertile soils, favorable climatic conditions, rich bio diversity, forest wealth, educated manpower as well a geographically strategic location acting	The stud report has focused mainly on economic impacts of connectivity corridors but no such modal/ scheme suggested to connect North Eastern Aviation to boost the overall economy of the area.

S. No.	Publication Ref Title and Theme	Authors	Inference	Gap
4.	Assessing Economic Impacts of Connectivity Corridors: An empirical Investigation: Research and Information System for Developing Countries.	Prabir De Sunetra Ghatak Durairaj Kumarasamy Published in 2018	Enhanced connectivity is also important to lower trade costs, reduced trade time, enhanced supply change efficiency and agglomeration. This, in turn, enables a country to be better integrated into cross border value change, enhance competitiveness and productivity, generate jobs and reduced poverty.	The study report has focused mainly on economic impacts of connectivity corridors but no such modal/ scheme suggested to connect North Eastern Aviation to boost the overall economy of the area.
5.	Deloitte Final Report: Promotion of Regional and Remote Area Air Connectivity in India: Ministry of Civil Aviation.	Deloitte Final Report: Promotion of Regional and Remote Area Air Connectivity in India: 2013.	Region Air Connectivity- Provision of air transport services to underserved and un- served markets (Towns/Cities) with potential, providing connectivity both with a region and between regions.	Economic impacts of connectivity corridors but no such modal/ scheme Suggested to connect North Eastern Aviation to boost the overall economy of the area. Solution towards how to develop and connect the aviation in North Eastern Region
6.	KPMG- FICCI Emerging North East India: Economically and Socially inclusive development strategies: November 2015	FICCI_ North east Advisory Council report, Nov.2015.	By 2021, the region is expected to smoothly connected, with the rest of India, neighboring countries and ASEAN. It seems possible to drive down to Bangkok from Guwahati in a little over 48 hours. River navigation can enable ships from the Kolkata harbor to come directly to Pandu and Badarpur.	The report has widely Covered the economic and Social Developments but not focused on Economic parameters of aviation to make it viable especially in the context of North Eastern Region.
7.	India's Act East policy and North East India: A critical Review: International Journal of Research in Social Sciences: 9 th September 2019	International Journal of Research in Social Sciences: 9 th September 2019	The policy is described as a multi façade and multi-pronged approach to establish strategic links with many individual countries and build good relations with association of South East Asian Nations (ASEAN)	The policy has stated about relations with ASEAN countries but, lacking in addressing the Air linkage Connections From North Eastern Region.

S. No.	Publication Ref Title and Theme	Authors	Inference	Gap
8.	ASEAN-India Air Connectivity Report: 28 September 2015	Prabir De ASEAN India Centre, Research and Information System for (RIS) Developing Countries	The connectivity Agenda for an Integrated ASEAN community, which provided a platform for discussion and exchange of views in identifying the best framework in preparing a post 2015 ASEAN connectivity and looked forward to its adoption in 2016 and subsequent implementation.	The report has well focused on-Air connectivity to enhance the exchange of social and economic Relations however not much focused on aviation developments and connections from North Eastern Region.
9.	North-East India, the Geographical Gateway of India's Phytodiversity June 2014	Gopal Shukla	The Indian council of Agricultural research has identified the North Eastern Region as the center of Rice Germ Plasm while the region is recognized as rich in wild relatives of crop plants by National Bureau of Plant genetic resources. It is the center of origin of citrus fruits and some of the important gene pulls of banana and mango and also reported to have originated in this region as maximum diversity of mango and banana are found here. Sikkim primitive 1 and 2 maize varieties have also been reported from Sikkim by Dhawan (1964). The region's traditional system of agriculture popularly known as Jhum cultivation is primarily is an agricultural economic activity of the local tribes involving 35 varieties of crops though the practice is considered as one of the major reasons for the loss of forest cover in the North eastern States.	The report has well covered various aspects of North Eastern Region geographical and Phylodiversity about natural and biological resources in various forms. How to process and market the North Eastern Region produce has not been addressed.
10.	History, Religion and Culture of North East India 2006	T. Raatan	There are about 220 languages spoken in these states, belonging mainly to three language families namely, Indo-Ariyan, Sino-Tibetan and Austric. The Indo-Ariyan represented mainly by Asamiya and bangle. The Austro-Asiatic represented mainly by Kashi and the Sino-Tibetan family languages is represented by the Tibeto- Barman and the Siamese- Chinese sub families	So much of information has been made available in regard to history, religion and culture of North Eastern Region in India but has not addressed the concrete plans/ solutions to maintain harmony and peace being such a complexity of various religions and cultures.

S. No.	Publication Ref Title and Theme	Authors	Inference	Gap
			also there are languages of the tea tribes. However, the majority of the languages spoken here belong to the former and latter is represented by a few Thai languages like Khamyang, Khamti, Aiton, Phakyal and Turung. It is worthwhile to mention here that Ahom a language belong to this Thai group has over the years merged with Asamiya	
11.	India-ASEAN Cooperation in Aviation Sector: September 2008	Yogendra Singh	Though the Indian civil aviation sector has shown an outstanding growth rate during the last few years, maintaining and realizing its economic potential would be difficult due to the following challenges. First, the idea of fifth freedom of air agreement between India and ASEAN is akin to day dreaming, especially in the backdrop of the slow pace of evolution of an Open Sky Agreement among the ASEAN members. It is evident that ASEAN members prefer bilateral arrangements over a common Open Sky policy, despite having air transport liberalization as one of the three priority areas on the roadmap to ASEAN service trade liberalization.	Air Connectivity to ASEAN countries from North Eastern Region is still to take off to boost the trade and tourism for which not much literature is available in the said report.
12	Report on Air Connectivity: August 2011	MoCA (Ministry of Civil Aviation)	Most of the places in the North- Eastern states are inaccessible due to inadequate road/rail facilities. Only viable means of transportation in the region is by air. In 1980s, Vayudoot used to operate air services to/from 18 airports in North- Eastern Region including those in Arunachal Pradesh. With the closure of Vayudoot, air services got discontinued due to non-availability of suitable type of aircraft for operations in these states. At present, air services are available to/from 11 airports in the North-Eastern Region as per the details given below:	The report is pretty clear and has reminded the days of Vayudoot operations which needs to be replicated again for which GoI and North Eastern State have to come forward to increase the air connectivity. The issues regarding economic viability/ sustainability are not available in the said report.

S. No.	Publication Ref Title and Theme	Authors	Inference	Gap																																
			<table><tr><th>States</th><th>Airports</th><th>Flights/Week</th></tr><tr><td rowspan="5">Assam</td><td>Dibrugarh</td><td>19</td></tr><tr><td>Guwahati</td><td>228</td></tr><tr><td>Jorhat</td><td>13</td></tr><tr><td>Lilabari</td><td>06</td></tr><tr><td>Silchar</td><td>37</td></tr><tr><td></td><td>Tezpur</td><td>06</td></tr><tr><td>Manipur</td><td>Imphal</td><td>72</td></tr><tr><td>Meghalaya</td><td>Shillong</td><td>06</td></tr><tr><td>Mizoram</td><td>Aizwal</td><td>29</td></tr><tr><td>Nagaland</td><td>Dimapur</td><td>12</td></tr><tr><td>Tripura</td><td>Agartala</td><td></td></tr></table>	States	Airports	Flights/Week	Assam	Dibrugarh	19	Guwahati	228	Jorhat	13	Lilabari	06	Silchar	37		Tezpur	06	Manipur	Imphal	72	Meghalaya	Shillong	06	Mizoram	Aizwal	29	Nagaland	Dimapur	12	Tripura	Agartala		
States	Airports	Flights/Week																																		
Assam	Dibrugarh	19																																		
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Nagaland	Dimapur	12																																		
Tripura	Agartala																																			
13.	India Emergence of global leader-knowledge report of Indian aviation industry.	Ministry of civil aviation. Govt. of India. March 10,2022	Indian aviation sector has reached several key milestones and has recently become one of the largest civil aviation markets in the world in terms of domestic traffic. Due to its growing significance in the world economy and the presence of varied resources, India’s civil aviation sector is set to grow and become a global hub for aviation. Traffic share from other categories of airports viz. non-metro tier 1, tier 2 and tier 3 airports are anticipated to increase from 48% to 53% in the same period (2020-2033).	Enhanced connectivity with smaller towns, future growth is expected to be co-driven by other airports in smaller towns and cities. The increase in traffic at smaller Airports in North-eastern region shall play a vital role in developing the overall economics of Aviation. More focus to be given on regional connectivity.																																
14.	Techno economic feasibility report of - Noida international airport Jewar .(Uttar Pradesh)	PricewaterhouseCoopers Private Limited for Yamuna Expressway Industrial Development Authority, Jan. 2018	1. The project appears to be self-sustainable and generate adequate equity returns of around 16% for the equity investors 2. The project appears to be bankable with all the coverage ratios above the desired threshold along the concession period	The economic output with a multiplier of 1.6 due to investment at Airport, it is estimated to be INR 63000 Cr. Tax revenue to the Govt. from economic output, income from revenue share from the Airport and lease rentals etc , all are																																

S. No.	Publication Ref Title and Theme	Authors	Inference	Gap
			3. The UDF and yield expected for the project is within the reasonable range based on the revised Tariff card assessment. Accordingly, in spite of Jewar Airport being the second airport in the NCR region, the issues of competitive pricing pressure appears to be limited 4. The sensitivity assessment reflects limited impact on the IRR due to change in critical assumptions of the base case 5. Overall, the project appears to be financially viable under the assumptions made in the base	vital economic indicators to make the Airport economically viable.
15.	Connectivity-led development of Northeast India through BBIN corridor	Ranjit Barthakur Chairman, FICCI North East Advisory Council, 2016.	The development of the Bangladesh–Bhutan–India–Nepal corridor can have a strong impact on Trade, transshipment, and passenger movement within the region. India must make swift interventions to improve infrastructure, both at land ports trading with BBIN nations and for each mode of transport (Road, Rail, Air, and water) within this region.	Connectivity across the border countries through railways, roadways and airways needs to be strengthened to increase overall economy of the region.
16.	Impact of regional Air connectivity on regional economic growth in India	Brajesh Mishra, Management Development Institute, Gurugram and Fateh Singh Career Point University. Oct.2021	Study has established the justification of increased policy and regulatory interventions to promote regional and remote area air connectivity since 2014. These policy and regulatory measures are intended to enhance economic activities in regional and remote areas and thereby alleviate poverty and bring improvement in the living standards of the common populace	Policy framework and implementation thereafter needs to be strengthened to give momentum to increased regional air connectivity, which in turn will add to regional economy.
17.	The future of Indian aviation from the perspective of	Himanshu Rathore, Shirsendu Nandi, Suresh Kumar Jakhar Nov. 2020	The focus of this work is on the network strategies of the Indian aviation industry and the effect that a prospective carbon tax regime can have on them. We find that the prospective carbon tax, in the context of the existing	Low cost airlines carbon emission is less comparatively full service Airlines, however to contribute towards minimising carbon footprint more efficient and

S. No.	Publication Ref Title and Theme	Authors	Inference	Gap
	environment-centric regulations and policies		aviation infrastructure would marginally favour low cost carriers over full service airlines	advance technology to be used. No major focus on Aviation economy overall remained untouched.
18.	Economy of the North East India	Shalu Yadav M.Com, (Sydenham college of commerce and economics), Mumbai university, April 2018.	The framework for Development of the any region can be broadly based upon four crucial components. The first component of any region's development plan should be for social empowerment, which needs to empower rural communities, create sustainable institutions which, helps them to manage common activities around microfinance, livelihoods and natural resource management. The second component of development is economic empowerment. The objective of this component should be ideally to develop or improve the capacity of rural communities which helps them to plan and manage funds for various economic initiatives and common activities for the development of the region. The third component of region's development plan will be partnership development. The objective of this component should be to make partnership plan with various service providers, resource institutions and public and private sector organizations to bring all resources together such as finance, technology, and marketing into the project so that the north east community groups are able to improve their Livelihoods, which helps in the development of the region. The fourth and final component will be project Management. The objective of this component facilitates various help like governance coordination, learning and quality enhancement of project.	Social empowerment, economic empowerment, public private participation, project management, effective coordination, learning, are the basics to increase overall socio economic condition of North Eastern .Aviation related economy measures are found missing rather not addressed.

A significant investment of 5,000 Cr. is being made towards infrastructure development in various airports in the North Eastern Region. The State of Assam will receive 1,250 Cr. for the Guwahati airport, while a greenfield airport is proposed for Silchar. The State of Manipur will receive 750 Cr. for the Imphal airport, and the State of Tripura will receive 450 Cr. for the Agartala airport. Additionally, a greenfield airport at Holangi in the State of Arunachal will receive 650 Cr., and the Dimapur airport in the State of Nagaland will also be developed. The State of Meghalaya will receive funds for the Shillong/Barapani airport, and there will also be development of heliports and water aerodromes.

- The CAPEX allocated for the development of airports, heliports, and water aerodromes will be offset by identifying methods to generate other sources of income. This can be achieved through enhancing air connectivity, increasing cargo operations, establishing flying colleges, and promoting city-side development to generate supplementary revenue.
- To identify cost optimization strategies by implementing measures such as MRO (Maintenance, Repair, and Operations), training, and skill development.
- To determine and propose strategies for retaining airline customers in alignment with state policies.
- The proposed study aims to address the gap and establish a practical framework for achieving economic sustainability in the aviation industry in the North Eastern Region.

Literature Gap identified on the basis of the literature review of Research papers:

Based on a literature study of 19 research publications on the Aviation sector in India, several significant areas of concern can be highlighted for further research about the potential of the aviation sector in the North Eastern region as follows:

- The viability of the aviation industry in the North Eastern region is determined by the function of aviation turbine fuel.
- The objective is to enhance the appeal and boost the number of international tourists visiting the North Eastern region by means of air travel.
- The management of expenses associated with the maintenance and repair of aircraft.

- Discouraging the creation of cartels by private entities in this industry.
- The implementation of user development fees to increase revenue in the aviation business in this region.
- The establishment of a Public Private Partnership (PPP) or complete privatization of the aviation sector in the North Eastern region is proposed to ensure its financial sustainability.
- Implementing a strategy of hedging for Aviation Turbine Fuel in order to reduce operational expenses.
- The implementation of fractional ownership for a regional fleet of aircrafts will provide connectivity between all main destinations in the North Eastern region. Fractional ownership is acquiring a portion, usually a multiple of 1/16th, which grants a specific number of hours for using a fractional aircraft per year, along with a small amount of time for taxing.
- Permitting private fuel suppliers to offer fuel at competitive pricing in the area.
- Enhancing the airplane interiors to attract both domestic and international travelers to the region.
- An effective customer management system is implemented in all airports in this region, resulting in increased customer satisfaction. This is particularly beneficial as most airports in the area are smaller and have less congestion.
- Capitalizing on the UDAN scheme initiated by the Government of India to enhance the viability and affordability of the aviation sector for the local population.
- Expanding the use of unmanned counters, such as self-check-in and other services, due to the technological proficiency and high literacy rate of the people in this region.

Given that the research areas mentioned above have not been thoroughly investigated in relation to the aviation industry in the North Eastern region, the literature review of these research papers offers significant potential for conducting pertinent research on the chosen topic within the context of the North Eastern region.

CHAPTER 3: THEORETICAL PREMISES

The study titled “**Economic Viability of Aviation in North-Eastern Region of India**” can only be possible to understand all stakeholders of Aviation Industry who play crucial role in air travel.

Significant stakeholders are:

1. Airport Operators
2. Airlines
3. State Govt.
4. Security Agencies VIZ. CISF, State Police
5. MoCA (Ministry of Civil Aviation)
6. DGCA
7. BCAS
8. AERA
9. Cargo Handling, GHA,
10. Local population/catchment Area
11. Refueling Agencies.
12. Metrological Services
13. Taxi operators
14. Concessionaires.
15. Local Fire Services
16. Local forest/ environmental Dept.
17. Local health Services.
18. Local Hoteliers/Tour and Travel services

3.1 STAKEHOLDER THEORY

Stakeholder theory is a managerial concept that emphasizes the connections between an organization and its stakeholders, encompassing both those within the company and those outside of it. It implies that corporations should take into account the concerns

and requirements of all stakeholders, rather than solely focusing on shareholders, while making decisions. Organizations can achieve long-term success and sustainability by giving priority to stakeholder involvement and effectively addressing their issues.

The economic viability of aviation in the North Eastern Region is impacted by several players, such as airport operators, airlines, government agencies, security forces, regulatory authorities, and local communities. This research acknowledges the intricate nature of these interactions and their influence on the industry's performance, and therefore utilizes stakeholder theory as a guiding framework. Stakeholder theory is a methodical framework for comprehending the interests, expectations, and interactions of stakeholders. This enables a thorough examination of their influence on the economic sustainability of the industry. Furthermore, stakeholder theory highlights the significance of actively involving stakeholders, coordinating strategies to meet their requirements, giving priority to their concerns, and immediately addressing their input.

Comprehending Relationships: Stakeholder theory aids in understanding the connections among different stakeholders in the aviation sector, both within and external to the firm. Having a clear grasp of this is essential for evaluating the economic feasibility of aviation in the North Eastern Region. It enables a thorough examination of how the interests and actions of many stakeholders affect the industry's performance.

Improving Performance: Stakeholder theory proposes that firms that prioritize good management of stakeholder interactions are more likely to prosper and achieve long-term success. Within the scope of your research, this theory suggests that by addressing the requirements and concerns of crucial stakeholders such as airport operators, airlines, government agencies, and local communities, the economic feasibility of aviation in the North Eastern Region can be enhanced.

Stakeholder competences: Stakeholder theory emphasizes the significance of cultivating distinct competences to efficiently oversee stakeholder relationships. The competences encompassed in this scope are the surveillance of stakeholder interests, formulation of strategies to tackle issues, division of interests into manageable parts, and guaranteeing that organizational functions fulfil stakeholder requirements. By utilizing these skills, your research can discover ways and actions to improve the

economic sustainability of aviation in the North Eastern Region by enhancing stakeholder involvement and contentment.

Justification in Management Literature: The justification of stakeholder theory in management literature is based on its descriptive accuracy, instrumental power, and normative validity. These factors further demonstrate its relevance to your research issue. This theory offers a strong and comprehensive structure for comprehending the dynamics of the aviation industry and directing decisions and actions to enhance economic sustainability in the North Eastern Region.

The stakeholder theory offers a thorough and methodical method for examining the connections, concerns, and interactions of stakeholders in the aviation industry, ultimately leading to a better knowledge and improvement of economic sustainability in the North Eastern Region.

3.2 ROLES AND RESPONSIBILITIES OF VARIOUS STAKEHOLDER

1. **Airport Operators:** Airport Operators in India can be broadly characterized into 2 major parts:

Govt. Operators: Govt. Operators include Airports Authority of India (AAI) which is India's largest Airport Operator. It manages over 140 airports across the country, and all the airports across North-Eastern India are managed by AAI except Guwahati Airport.

- a. **Private Operators:** Private Operators also include many operators which include Adani Airport Limited, GMR Groups, GVK Groups etc. Guwahati Airport is the only Airport in North Eastern India that is managed by a private Airport operator which is Adani Airport Limited.

Airports Operators ensure the design, development and management of Airports.

2. **Airlines:** Airport Operators in India can also be broadly characterized into 2 major parts:

Govt. Operators

Currently Pawan Hans helicopters is the government airline operated across India.

Private Airline Operators

There are many private airlines across India and in the North Eastern Region of India as well which are Indigo, Vistara, Air India, Air Asia, Spice jet, true jet etc. The role of airlines is essential to enhance economic viability of the North Eastern region.

3. **Ministry of Civil Aviation (MoCA):** It looks after all the matters related to aviation industry across the length and breadth of the country. All the stakeholders of the aviation industry report to the MoCA hence it is responsible for all policy related decisions for aviation industry in India and north eastern-region as well.
4. **Directorate General of Civil Aviation (DGCA):** They are responsible for safety and security of Aircraft and is an essential stakeholder to ensure safety of the Aviation Industry. Any industry as such can only bloom when they are in safe hands and DGCA ensures complete safety of the aviation industry.
5. **Bureau of Civil Aviation Security (BCAS):** They ensure security of the Airports and the passengers. They make sure there is no external harm from external sources to this industry be it kind of terrorist attack, bomb threat etc. Central Industrial Security forces (CISF) comes under BCAS and BCAS define the rules and regulations and provision for security of an Airport.
6. **Airport Economic Regulatory Authority (AERA):** They ensure the charges charged by Airlines, Airports and other aviation stakeholders from the passengers are in-check to ensure safe and economical air travel of the passengers.
7. **Cargo Handling:** Many Airlines handle the cargo for movement of goods from one place to other. This is an essential need to bloom and bloom up the economic aspect of any region. North-Eastern Region particularly have rich flora and fauna is the major source for Cargo goods and supplies and plays a vital role in economic stability of north eastern region and India as a whole.

Apart from above role and responsibility of stakeholders plays an important role and any organisational goal is only possible through active participation of all stakeholders. All the stakeholders are benefited from the ultimate result /outcome of the Organisation.

In case of Civil Aviation, it is to benefit the common man by providing safe and affordable Air travel services by creating environment friendly Aerodrome with all essential services in accordance to ICAO/DGCA standards.

Here it is worth mentioning that one single passengers Aircraft operation gives businesses to all relevant Stakeholders may be ATF re-fullers, Metrological dept., Taxi operators, Hoteliers, concessionaires, Tourism, taxation dept. down to fruit vendors and road side car garages etc. Therefore, more the Airlines operations more the business. Hence Stakeholders participation/involvements may improve the system can contribute towards value addition to the business.

Above that GOI. has entrusted the responsibility to elected Member of Parliament/ local Legislators in the form of Airport Advisory committee which meets twice in a years and give their suggestions, recommendations to improve/add the facilities to make the services passengers friendly in terms of security arrangements, waste management, health services, PWD passengers, transportation services etc.

It is concluded that the Stakeholders Theory is the most relevant theory in study being undertaken to achieve the organizational goal.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 INTRODUCTION

The **Delphi method** shall be used as a research methodology, a **process of forecasting** framework based on the outcome of multiple rounds of questionnaires sent to a panel of experts. Several rounds of questionnaires are put up to the group of experts, and the anonymous responses are aggregated and shared with the group after each round. The proposed study will be based broadly on opinion collection from aviation industry leaders, experts, passenger survey and the major stake holders to the airports selected for the study.

Stakeholders may be from Airlines, oil companies, cargo, customs, immigration, security, concessionaires, taxi association, Manufacturers, suppliers, Advisory bodies, State Govt. and including populations nearby i.e catchment area.

Moreover, analytical tools such as multiple regressions, correlation analysis could also be used to determine the relationship between variables may be dependent or independent variables that will throw a lot of light as regards the objectives of the proposed research. These tools will also be used to validate the research hypotheses formed in the context of this research.

a. Sample size → or Scope

Based on the categorization of the airports 06 years sample data collected on various parameters on traffic & non traffic revenues & expenditures.

b. Expected Contribution

- The proposed study will contribute towards enhancing the economic viability of aviation in North Eastern Region.
- The proposed study will also contribute to airport operators/planners to optimize existing infrastructure with maximizing operational efficiency leading to economic viability.

4.2 RESEARCH PROBLEM

Despite the volatility and the uncertainties involved in the business survival of the airlines and airports globally and the phenomenal forecast towards 2030 it is high time the respective roles of interplaying and complementing factors among the main players of aviation in the context of North Eastern Region are identified and a methodology is formulated on:

How to achieve and improvise the economic condition of the aviation in North Eastern Region by formulating a framework for growth of economy of Aviation in North East Region.

4.3 RESEARCH QUESTION

In view of the identified research gap the following are the research questions have been formulated

1. How to transform the Aviation in North Eastern Region to make it economically viable so that it may add on to State Economy without dependence on external finance/capital?
2. How to optimize the operational cost and neutralize the huge CAPEX committed and being implemented at various airports in North Eastern Region in a phased manner to achieve economic viability?

Connection between research gap and research questions

For research question one, it becomes clear that there are various areas where the current body of literature is lacking. Although there is extensive coverage of infrastructure, marketing, and transportation, there is a noticeable absence of attention given to air connectivity and the advancement of aviation in the North Eastern Region. Although the economic effects of connectivity corridors are being talked about, there is a noticeable lack of practical recommendations for strengthening aviation in order to improve the regional economy as a whole. Furthermore, despite the presence of debates regarding remote connectivity, there is a noticeable absence of concrete solutions for the development and connection of aviation infrastructure in the North Eastern Region. Furthermore, the economic aspects that are unique to aviation have not been sufficiently considered in relation to the region's economic and social progress, which includes the

establishment of air linkages with ASEAN nations. In addition, although there is a focus on the importance of air connectivity in improving social and economic interactions, there has been insufficient consideration given to the progress and links in aviation from the North Eastern Region. In addition, important factors such as the handling and promotion of local agricultural products, as well as specific strategies for preserving unity within the region's varied cultural environment, have been disregarded.

For research question two, various areas of research deficiency become apparent. While there are conversations about economic metrics such as output and tax income, there is a noticeable lack of conversation regarding the economic feasibility and long-term survival of airports in the region. Furthermore, although there is acknowledgment of the necessity to boost connectivity between neighboring nations through different methods, there is a lack of clearly defined ways to accomplish this, which might greatly improve the overall economy of the region. Moreover, it is recognized that enhancing regulatory frameworks and effectively implementing them are crucial for improving regional air connectivity and achieving economic benefits. However, the particular strategies to accomplish this goal are still unclear. Furthermore, the existing literature has not extensively addressed the larger aviation economy, which encompasses the influence of low-cost airlines on carbon emissions and potential approaches to reduce environmental externalities. Furthermore, although the significance of social and economic empowerment, public-private engagement, and effective coordination in the region is acknowledged, there is a noticeable absence of debates regarding particular policies and strategies pertaining to the aviation-related economy.

4.4 RESEARCH OBJECTIVES

Considering the research gap identified from literature review the objective of the study shall be based on:

1. To evaluate the economic viability of aviation infrastructure in the North Eastern Region.
2. To formulate a framework for optimizing operational costs and mitigating the significant capital expenditure committed to various airports in the North Eastern Region, aiming for economic viability.

CHAPTER 5: HYPOTHESIS AND RESEARCH FRAMEWORK

5.1 HYPOTHESIS

After going through the literature review in details and identifying the research gaps, a few research hypotheses have been framed with the purpose of deriving meaningful insights from the proposed research.

1. Hypotheses framed on the factors related to costs

H1A: Aviation Safety affects the viability of aviation industry in the North Eastern region.

H1B: User development fees have a direct impact on the viability of aviation industry in the North Eastern region.

H1C: Operating costs such as maintenance repair and overhaul (MRO) impact the viability of aviation sector in the North Eastern region.

Research Approach: The aforementioned three hypotheses will be examined using quantitative methodologies, with one of them being correlation. The proposed methodology involves collecting data from secondary sources over a period of six years. This data will be used to examine the impact of the identified variable on the dependent variable.

2. Hypotheses formed on the basis of Traffic Revenue

H2A: Landing and parking Charges will have a positive impact on the viability of the aviation industry in the North Eastern region.

H2B: RNFC Charges will have a positive impact on the viability of the aviation industry in the North Eastern region.

H2C: PSF and watch extension will impact the viability of the aviation industry in the North Eastern region.

Research Approach: The three hypotheses described earlier will be analyzed using quantitative approaches, one of which involves correlation. The proposed methodology entails gathering data from secondary sources for a duration of six years. This data will be utilized to analyze the influence of the identified variable on the dependent variable.

3. Hypotheses formed on the basis of Airport Management decisions

H3A: Customer Facilitation Charges will increase the viability of aviation industry in this region.

H3B: Money Services will have a positive impact on the viability of the aviation industry in the North Eastern region.

H3C: Passenger Support System at all the region's airports will increase passenger volume at the airports.

Research Approach: The three hypotheses described earlier will be analyzed using quantitative approaches, one of which involves studying correlation. The proposed methodology entails gathering data from secondary sources for a duration of six years. The data will be utilized to analyze the influence of the identified variable on the dependent variable.

Variables: The primary focus of our study is to examine the economic feasibility of aviation in the North Eastern Region (NER). It is important to note that Aviation is subject to specific rules. Therefore, in order to enhance the efficiency of Aviation and comply with these restrictions, balance is necessary. This can be achieved by a deep understanding of the aviation industry and effectively leveraging various avenues for generating revenue.

Aviation is subject to numerous internal and external elements that significantly impact the operations of the industry. External influences are influenced by international aviation laws, such as those set by ICAO/IATA/ACI, which include policy changes and fluctuations in international crude oil prices. The high cost of ATF (Aviation Turbine Fuel) might impose a financial hardship on the airline, leading to the possibility of passing on these costs to consumers. This might potentially decrease the number of passengers, amount of cargo, and volume of mail. The cascading influence of the aviation industry extends to

airlines, airports, passengers, and all related services. All of these factors are highly relevant and require ongoing monitoring in order to make necessary adjustments to costs across different areas. Internal factors, often known as domestic factors, might include State Government taxation policy, law and order, and environmental circumstances.

The factors stated above directly impacts the variables related to Airport/Airlines.

- 1. Dependent variables-** Passengers/cargo/mails. - All three variables are contingent upon the aforementioned elements and determine the economic state of the specific Airport/Airlines. If the elements influencing the business are aligned with each other, the aviation industry as a whole will experience significant growth. However, if these factors are not in sync, the industry may face a collapse. Airlines may choose to suspend their operations, while airport operators may be forced to reduce costs by reviewing various services and tariff rates.
- 2. Independent/constant variables-** This study will focus on a specific group of factors associated with the North Eastern region, taking into account the several elements that influence the future of the aviation sector in this area.
 - Route Navigation Facilities Charges RNFC
 - Landing, Parking & Housing (LPH)
 - PSF
 - UDF: Domestic PAX
 - Oil Throughput Revenue
 - Ground Handling
 - Extension of Service Hours
 - Royalty on CUTE Charges
 - Trading Concessions
 - Rent & Services
 - Car Parking
 - Restrooms

- Admission Fees/Commercial Passes
- Miscellaneous Non-Aeronautical Apt Serv.
- Cargo Revenue
- Others Revenue
- Employee Benefit Exp.
- Operating Expenses
- Administrative & Other Expenses
- Depreciation, Amortization & Impairment
- Security Expenses

The independent/constant variables have been selected based on their pivotal role as the primary sources of income and expenditure in the aviation sector of North East India. These variables remain unchanged for 6 years to ensure consistency and comparability across different airports and time periods during the study. Altering these variables would compromise the integrity of our analysis, hindering our ability to accurately compare economic conditions among various airports and over different durations.

5.2 RESEARCH FRAMEWORK

A framework is a fundamental structure that provides a strong and cohesive foundation for a model to stand on effectively. Thus, a framework is a collection of reusable tools and modules that may be utilized for multiple projects. (Figure 21, 22)

Revenue Parameters

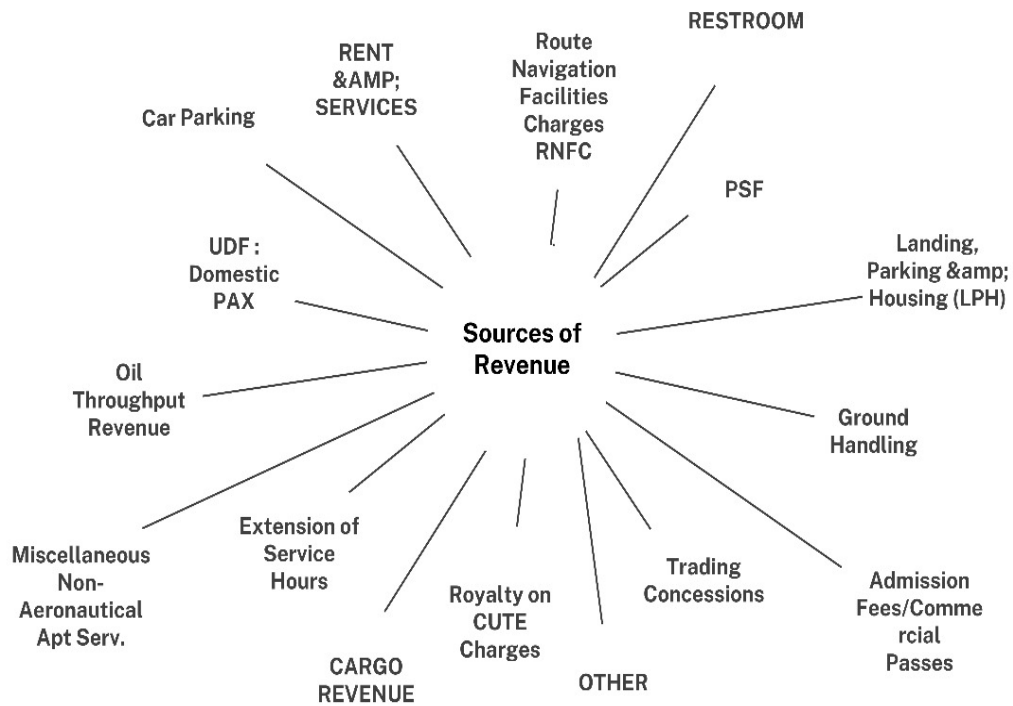


Figure 21: Revenue Parameters

Expenditure Parameters

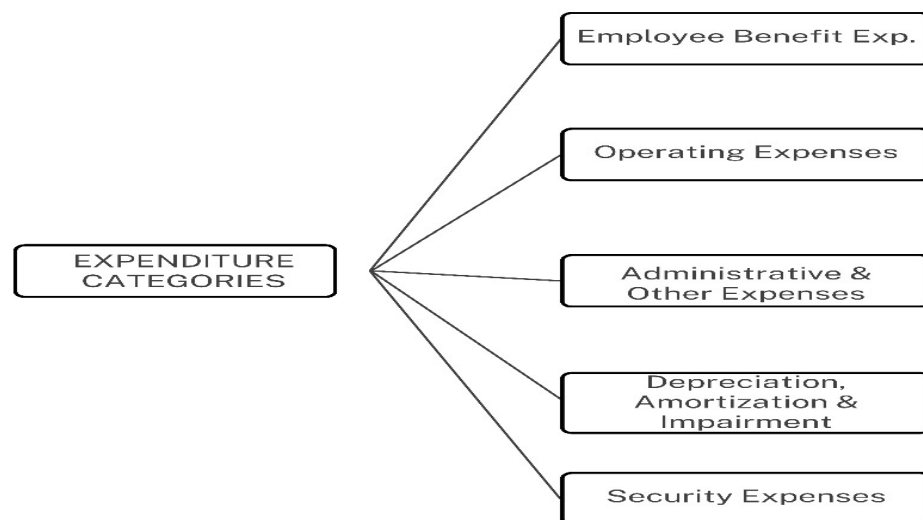


Figure 22: Expenditure Parameters

Economic Viability.

In the research environment, a framework refers to the set of parameters used to apply the study hypothesis. These parameters are used to create a model or formula, which reacts in a specific way when the parameters are applied, while keeping all other factors constant. Through regression analysis of revenue and expenditure, we identify variables that exert a substantial influence on profitability. As profitability, or economic viability, can be assessed by synthesizing revenue and expenditure, we integrate these components to formulate a framework for evaluating economic viability. (Figure 23)

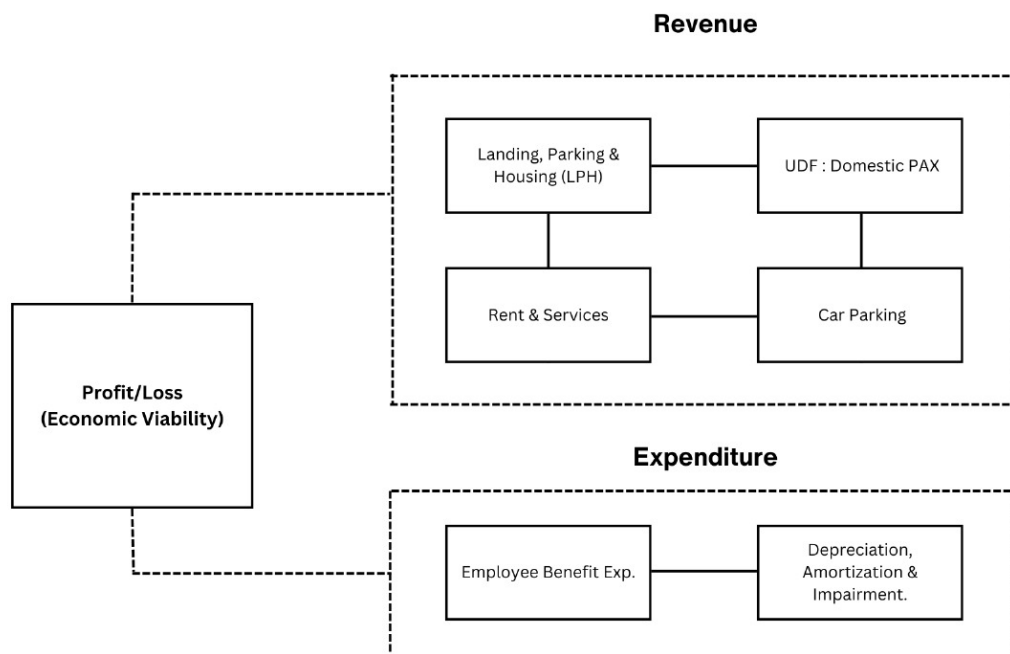


Figure 23: Profitability Flow Chart / Research Framework

CHAPTER 6: DATA ANALYSIS AND INTERPRETATION

6.1 INTRODUCTION

The present study undertakes an in-depth exploration of the revenue streams, expenditure patterns, and overall profitability of airports situated in the North East states of India. This geographical region presents a unique set of challenges due to its remote and hilly terrain, necessitating a comprehensive investigation into the operational dynamics of its airports. Leveraging secondary data spanning a six-year period, this research endeavors to derive substantial insights through rigorous analysis.

The distinctiveness of these airports, stemming from their geographical context, warrants meticulous scrutiny to discern their operational nuances and managerial imperatives. The geographical isolation of the North East region amplifies the significance of air travel as a vital conduit for promoting tourism and economic development. Against the backdrop of formidable terrain and limited accessibility via road networks, air transport emerges as a lifeline for fostering regional connectivity and socioeconomic growth.

Moreover, the scarcity of scholarly attention dedicated to this specific domain underscores the novelty and scholarly merit of this study. By shedding light on the operational intricacies of airports in the North East, this research contributes to the existing body of knowledge while addressing a notable research gap. Thus, the comprehensive nature of this investigation, encompassing multifaceted dimensions of airport management within a challenging geographic context, underscores its scholarly depth and breadth.

6.2 DATA ON REVENUE, EXPENDITURE, AND PROFITABILITY

In this study, we gathered secondary data pertaining to revenue, expenditure, and profitability from six distinct airports in the North East India region. Specifically, data were collected for Agartala, Dibrugarh, Dimapur, Guwahati, Imphal, and Silchar Airports spanning a period of six years, from 2015 to 2020. Separate tables presenting

the collected data for each airport have been provided, accompanied by graphical representations. The utilization of this comprehensive dataset enables us to conduct an in-depth analysis aligned with the study's objectives and hypotheses.

Table 10: Guwahati Revenue Non-Traffic

FY	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Trading Concessions	105383000	105820000	73069000	169230000	328900000	93685000
Rent & Services	87954000	153622000	49153000	101884000	129734000	109538000
Car Parking	2873000	4657000	39531000	50241000	52670000	7901000
Restrooms	252822	288917	249984	310853.7	431533.6	299283.6
Admission Fees/Commercial Passes	2640000	3194000	5930000	3327000	1602000	833000
Miscellaneous Non-Aeronautical Apt Serv.	2611000	1749000	95000	314000	413000	573000
Cargo	4635070	10112095	3214080	14506506	21037263	7346052
Others	4336108	9473988	7317936	5579640.3	4629203.4	51900664.4
Total non-traffic	210685000	288917000	178560000	345393000	539417000	272076000

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 11: Guwahati Revenue -Traffic

FY	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Route Navigation Facilities Charges RNFC	134023000	187649000	220387000	259395817.5	248438858.1	134324271.7
Landing, Parking & Housing (LPH)	250336000	310232000	372448000	418196676.6	390752655.4	212909834.9
PSF	175180000	234350000	293771000	355154105.3	91687921.29	60089701.95
UDF: Domestic PAX	445738000	596813000	752428000	1067742275	1075015532	406759927.2
Oil Throughput Revenue	7663000	11704000	14240000	18807165.9	12238706.9	7886060.48
Ground Handling	9964000	20816000	16025000	18890091.68	15346077.92	7418765.633
Extension of Service Hours	959000	1052000	1876000	1952252.559	2195436.037	2118464.632
Royalty on CUTE Charges	17022000	22890000	22303000	42883615.33	46398812.66	16829973.47
TOTAL TRAFFIC REVENUE	1040885000	1385506000	1693478000	2183022000	1882074000	848337000

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 12: Guwahati Expenditure

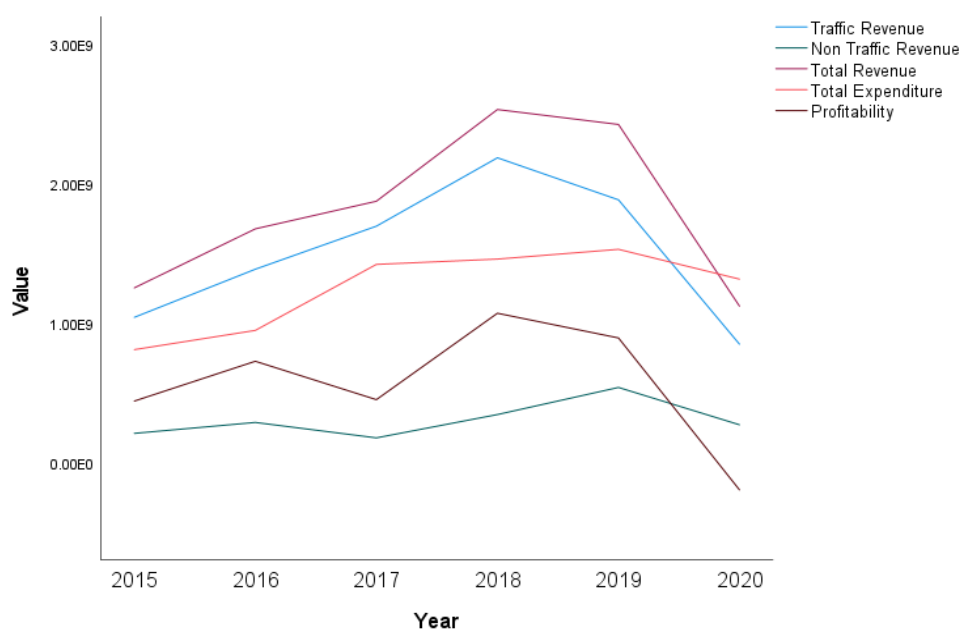
Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Employee Benefit	259140160	331679600	476574505.6	556309920	611144400	473231160
Operational Expenses	170060730	208484320	296146298.2	270304820	229179150	197179650
Administrative and other expenses	210551380	208484320	235536822.8	113102017	305572200	223470270
Depreciation	80981300	85289040	148223172.6	172203071	122228880	157743720
Security Exp	89079430	113718720	263541200.9	346106172	259736370	262906200
Total Exp	809813000	947656000	14198000	14580000	1527861000	1314531000

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 13: Guwahati Profitability

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Traffic Revenue	1040885000	1385506000	1693478000	2183022000	1882074000	848337000
Non-Traffic Revenue	210685000	288917000	178560000	345393000	539417000	272076000
Total Revenue	1251570000	1674423000	1872038000	2528415000	2421491000	1120413000
Expenditure	809813000	947656000	1420022000	1458026000	1527861000	1314531000
Profit /Loss(-)	441757000	726767000	452016000	1070389000	893630000	-194118000

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Guwahati Line Graph of Revenue Expenditure and Profit**Figure 24: Guwahati Line Graph of Revenue Expenditure and Profit****Table 14: Agartala Revenue-Traffic**

FY	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Route Navigation Facilities Charges RNFC	14,536,643.00	18,131,571.00	21,946,300.26	24,197,231.19	31,420,753.00	18,474,635.00
Landing, Parking & Housing (LPH)	35,224,329.00	42,427,112.00	52,442,717.88	51,708,750.52	59,254,742.00	29,648,554.00
PSF	101462996	123946316	145783792.9	148152791.5	78705761	27803854
UDF: Domestic PAX	20,044,555.00	21,544,555.00	21,044,555.00	20,844,555.00	21,844,555.00	22,953,700.00
Oil Throughput Revenue	608,528.00	465,146.00	1,261,690.96	1,970,664.18	1,654,667.51	1,684,667.51
Ground Handling	1,008,106.00	1,553,527.00	1,859,480.42	1,923,736.36	881,405.46	63,700.00
Extension of Service Hours	1,908,483.00	2,510,953.00	2,902,258.02	1,475,865.90	1,193,955.00	75,540.00
Royalty on CUTE Charges	9,306,185.11	10,586,382.00	12,392,820.37	12,798,384.16	13,135,969.36	4,205,371.36
Total	184,099,825.11	221,165,562.00	259,633,615.79	263,071,978.81	208,091,808.33	104,910,021.87

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 15: Agartala Revenue Non-Traffic

FY	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Trading Concessions	6,218,798.00	7,764,242.00	9,963,072.79	13,240,099.45	13,794,404.95	2,934,021.06
Rent & Services	22,472,266.68	13,832,259.13	23,128,857.48	21,933,675.47	22,326,629.95	22,814,776.70
Car Parking	605,334.00	1,265,583.00	1,327,500.00	1,460,250.00	1,610,385.29	374,114.15
Restrooms	1,599.00	50,347.00	63,767.00	89,226.40	62,274.00	40,232.00
Admission Fees/ Commercial Passes	2,531,108.00	707,321.00	4,363,466.08	3,022,120.34	1,745,396.10	189,444.78
Miscellaneous Non- Aeronautical Apt Serv.	889,952.00	9,773.00	110.17	221.11	400.00	220.00
Cargo Revenue	545,361.00	645,472.00	654,742.00	664,742.00	658,742.00	672,742.00
Others	1462459.63	3047781.86	3656735.75	4402700.65	4396344.77	13660063.39
Total non-traffic	34726878.31	27322778.99	43158251.27	44813035.42	44594577.06	40685614.08

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 16: Agartala Expenditure

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Employee Benefit	131,493,000.40	139,342,052.74	163,257,331.58	186,705,712.20	251,994,701.78	218,883,589.43
Operational Expenses	89,045,949.12	73,992,686.11	83,647,068.83	86,922,937.13	89,015,142.70	248,710,160.17
Administrative and other expenses	14318210.35	6185704.05	89030287.99	32281110.75	63841411.09	131618311.1
Depreciation	80,102,990.35	69,146,120.05	67,648,023.45	54,460,103.99	80,054,825.90	190,065,496.91
Security Exp	145371212.1	160257010.7	176562121.4	199463600.4	63667267.75	110295559.1
Total Exp	460331362.4	448923573.7	580144833.3	559833464.4	548573349.2	899573116.7

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 17: Agartala Profitability

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
TRAFFIC REVENUE	184099825.1	221165562	259633615.8	263071978.8	208091808.3	104910021.9
NON-TRAFFIC REVENUE	34726878.31	27322778.99	43158251.27	44813035.42	44594577.06	40685614.08
TOTAL REVENUE	218826703.4	248488341	302791867.1	307885014.2	252686385.4	145595636
EXPENDITURE	460331362.4	448923573.7	580144833.3	559833464.4	548573349.2	899573116.7
PROFIT /LOSS(-)	-241504658.9	-200435232.7	-277352966.2	-251948450.2	-295886963.8	-753977480.8

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Agartala Line Graph of Revenue Expenditure and Profit

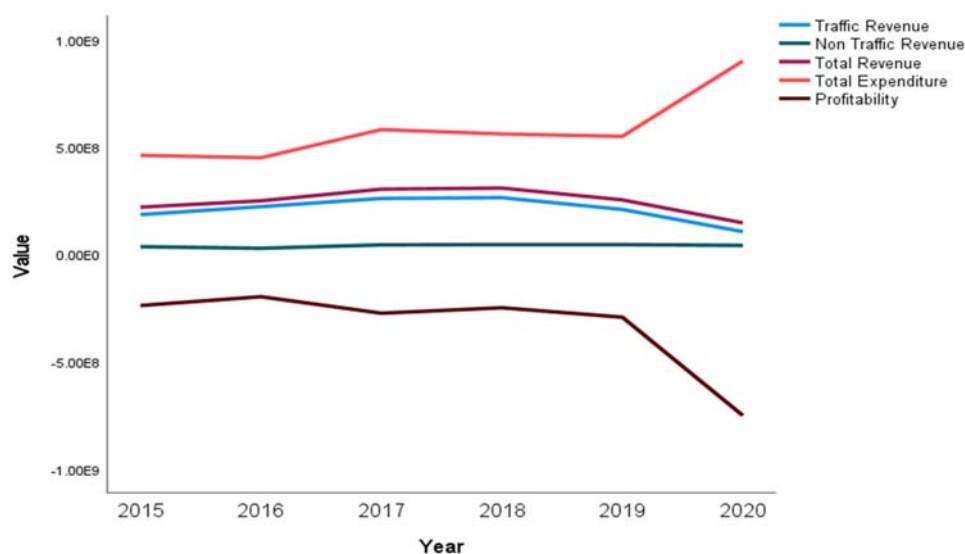


Figure 25: Agartala Line Graph of Revenue Expenditure and Profit

Table 18: Imphal Revenue - Traffic

FY	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
RNFC	19,289,455.82	20,207,947.49	24,703,402.35	41,512,650.07	37,825,182.67	20,779,960.25
LPH	28,872,232.66	29,131,076.61	35,921,173.22	47,676,490.85	44,730,226.68	23,350,842.21
PSF	75,304,839.24	82,240,253.99	99,950,764.89	122,738,223.95	64,768,658.31	2,750,709.97
UDF	15098444.02	17369535.57	18510656.66	20514679.7	16639743.47	6000753.461
Oil Throughput Revenue	382,798.86	503,796.03	837,883.21	1,796,628.99	1,632,016.86	18,660,651.12
Ground Handling Revenue	1,232,672.96	1,300,485.96	1,575,560.16	1,926,137.74	1,455,691.68	2,313,245.07
Extn. of Service Hours	680,878.96	850,570.25	3,034,011.66	7,539,923.43	2,086,955.00	1,291,568.86
Royalty on CUTE Charges	6,156,421.49	7,808,981.09	7,410,145.29	11,297,805.51	10,321,957.45	6,109,617.91
Total	147,017,744.00	159,412,647.00	191,943,597.44	255,002,540.23	179,460,432.13	81,257,348.85

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 19: Imphal Revenue Non- Traffic

FY	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Trading Concessions	2,261,297.89	2,301,761.84	2,980,769.53	4,799,157.89	8,141,845.56	4,753,833.66
Rent & Services	7,879,701.77	8,177,925.74	9,845,207.41	16,160,468.89	5,208,863.43	6,795,444.61
Car Parking	4,921,626.78	4,963,566.25	6,335,544.32	6,244,993.73	5,893,986.55	1,429,185.46
Restrooms	18,227.14	17,360.21	14,893.51	11,479.48	32,703.93	10,432.17
Admission Fees/ Commercial Passes	1,097,911.72	547,228.53	454,233.58	377,234.24	89,968.45	15,166.63
Miscellaneous Non-Aeronautical Apt Serv.	324,059.33	295,561.3278	57,893.53	773,194.5892	385,249.943	5,660.87
Cargo Revenue	1,164,156.46	674,472.45	824,638.8193	635,003.1361	599,805.191	724,025.618
Others	206,181.418	188,606.531	339,974.96	246,373.568	293,293.197	175,967.73
Total Non traffic	19,728,795.50	18,866,482.87	23,912,925.65	37,180,295.75	32,150,858.26	37,846,756.32

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 20: Imphal Expenditure

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Employee Benefit	99,222,753.55	98,780,412.25	137,919,042.20	154,587,658.91	193,806,999.81	170,183,537.78
Operational expenses	53,134,378.82	82,304,807.29	143,801,337.27	236,649,640.29	228,366,643.25	88,726,083.77
Administrative and other expenses	14,788,710.19	56,154,347.40	72,421,434.76	60,624,999.43	107,508,840.95	68,194,650.89
Depreciation	50,800,107.94	61,272,608.16	77,916,785.28	99,863,834.37	153,498,306.23	166,143,148.63
Security Exp	135,533,075.00	181,785,436.00	194,129,155.83	218,897,988.53	44,569,077.91	180462734
Total Exp	323901605.1	480297611.1	626187755.3	770624121.5	728272984.2	493662919.2

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 21: Imphal Profitability

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Traffic Revenue	147017744	159412647	191943597.4	255002540.2	179460432.1	81257348.85
Non-Traffic Revenue	19728795.5	18866482.87	23912925.65	37180295.75	32150858.26	37846756.32
Total revenue	166746539.5	178279129.9	215856523.1	292182836	211611290.4	119104105.2
Expenditure	323901605.1	480297611.1	626187755.3	770624121.5	728272984.2	493662919.2
Profit /Loss(-)	-157155065.6	-302018481.2	-410331232.3	-478441285.6	-516661693.8	-374558814

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

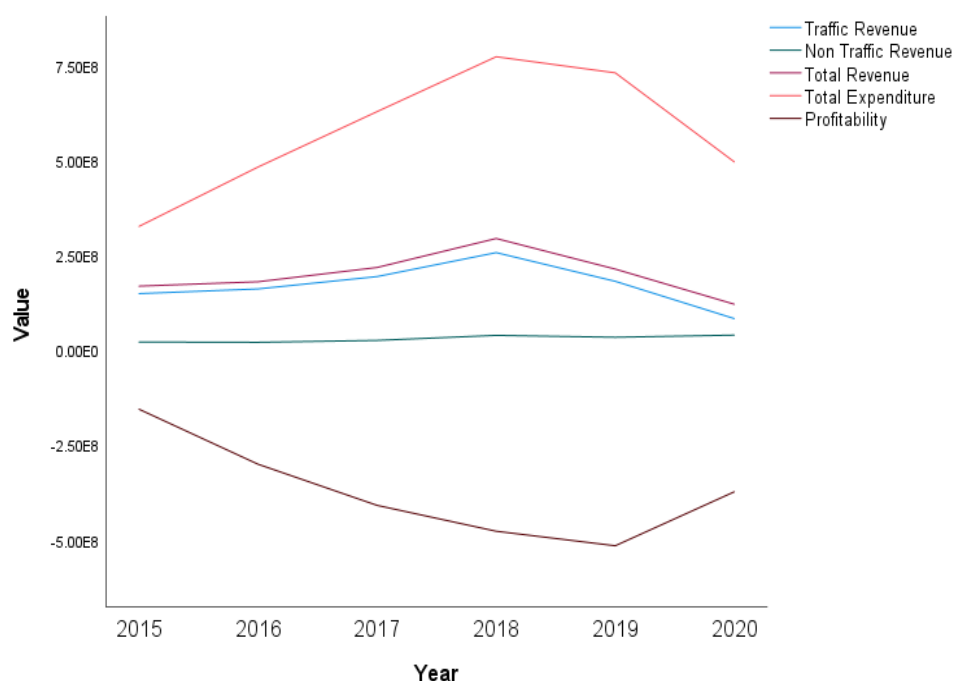
Imphal Line Graph of Revenue Expenditure and Profit**Figure 26: Imphal Line Graph of Revenue Expenditure and Profit**

Table 22: Dibrugarh Revenue Traffic

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
RNFC	15,950,173.00	15,208,447.00	16,762,235.13	18,314,294.30	28,956,849.00	27043079.83
LPH	14,449,674.00	9,903,756.00	8,980,118.10	8,578,005.83	13,158,139.00	15267116.49
PSF	32,078,050.00	32,207,385.00	37,038,790.32	37,423,532.14	27,132,391.00	3361525.545
UDF	8,000.00	9,000.00	10,000.00	6,000.00	2,000.00	15847324.51
OIL Throughput Revenue	738,757.00	666,113.74	327,412.34	714,723.46	619,326.95	34592.46213
Ground Handling Revenue	738,855.00	1,210,199.00	853,238.44	1,107,051.83	1,988,207.40	1342450.548
Extn. of Service Hours	2,059,192.00	1,081,307.00	1,079,219.32	1,953,308.24	4,525,425.00	1315326.398
Royalty on Cute Charges	2,510,688.00	2,918,214.60	2,999,089.60	3,235,485.00	4,535,605.00	3583927.901
Total	68,533,389.00	63,204,422.34	68,050,103.25	71,332,400.80	80,917,943.35	67795343.68

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 23: Dibrugarh Revenue Non-Traffic

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Trading Concessions	4,845,331.00	4,860,667.00	5,926,733.24	9,353,147.75	9,101,870.39	4831108.015
Rent & Services	20,455,457.73	20,483,883.36	15,078,892.75	22,771,588.84	25,579,951.40	23826236.83
Car Parking	1,154,120.00	1,139,973.00	1,217,568.26	1,200,038.83	1,048,099.82	469880.9879
Restrooms	26,529.00	5,217.00	134,326.86	105,073.41	42,089.41	6,257.70
Admission Fees/ Commercial Passes	845,070.00	861,227.00	908,822.98	875,033.81	756,677.44	181937.2014
Miscellaneous Non-Aeronautical Apt Serv.	434,520.00	1,071.00	103,123.48	40,122.26	93,974.37	66,202.23
Cargo	105,972.00	230,615.00	253,096.63	277,613.87	257,948.00	215,712.03
Others	1630032.89	8149224.91	19643334.9	6557423.596	6207863.096	5327539.029
Total Non traffic	29,497,032.62	35,731,878.27	43,265,899.11	41,180,042.36	43,088,473.92	34924874.01

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 24: Dibrugarh Expenditure

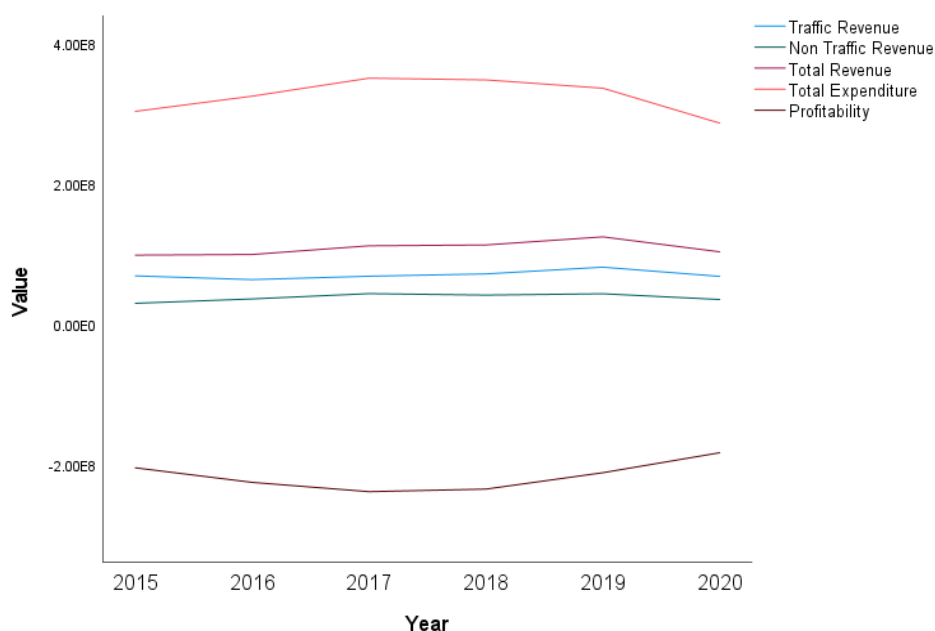
Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Employee Benefit	90301052.59	96497732.69	125583216	129191188.6	177884203.7	138357663.1
Operational expenses	59780060.6	56088060.3	57896951.69	69494227.88	75636403.03	65706698.49
Administrative and other expenses	13066015.85	13214084.8	26936606	2041793.71	11624019.41	24040070.81
Depreciation	70328254.77	74856669	49940339.96	89383155.23	47446879.7	57673226.49
Security Exp	69019407	83464526	89383155.23	108981707.8	22894187.46	116372531
Total Exp	302,494,790.81	324,121,072.79	349,740,268.89	347,304,959.64	335,485,693.30	285,777,658.87

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 25: Dibrugarh Profitability

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Traffic Revenue	68,525,389.00	63,195,422.34	68,040,103.25	71,326,400.80	80,917,943.35	67795343.68
Non-Traffic Revenue	29,497,032.62	35,731,878.27	43,265,899.11	41,180,042.36	43,088,473.92	34924874.01
Total Revenue	98,022,421.62	98,927,300.61	111,306,002.36	112,506,443.16	124,006,417.27	102,720,217.69
Expenditure	302,494,790.81	324,121,072.79	349,740,268.89	347,304,959.64	335,485,693.30	285,777,658.87
Profit / Loss(-)	-204,472,369.19	-225,193,772.18	-238,434,266.53	-234,798,516.48	-211,479,276.03	-183057441.2

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Dibrugarh Line Graph of Revenue Expenditure and Profit**Figure 27: Dibrugarh Line Graph of Revenue Expenditure and Profit****Table 26: Dimapur Revenue - Traffic**

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Route Navigation Facilities Charges RNFC	5,544,045.13	6,196,582.85	7,447,114.61	6,819,176.90	6,552,584.73	5,301,842.00
Landing, Parking & Housing (LPH)	6,070,785.74	6,382,231.78	7,044,177.64	6,875,082.86	6,217,362.48	4,645,114.00
PSF	11,199,980.45	14,266,864.73	19,220,084.26	19,907,242.40	9,053,165.69	682,528.00
UDF : Domestic PAX	1,935,857.88	2,642,109.81	3,027,789.92	2,155,123.96	3,231,767.71	4,086,100.00
Oil Throughput Revenue	471,673.38	514,162.75	405,653.44	624,582.70	391,772.93	22,252.00
Ground Handling	344,619.08	344,373.26	266,362.15	386,635.70	105,808.15	116,428.00
Extension of Service Hours	1,311,744.39	906,184.80	1,112,237.06	861,910.90	671,774.75	3,134,915.00
Royalty on CUTE Charges	528.9482739	357.0294945	451.4826271	820.1556553	587.4187804	580.43
Total	26,879,235.00	31,252,867.00	38,523,870.55	37,630,575.57	26,224,823.85	17,989,759.43

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 27: Dimapur Revenue -Non-Traffic

Year	2015	2016	2017	2018	2019	2020
Trading Concessions	789,513.41	777,386.75	956,184.55	2,226,485.94	994,255.19	2,617,756.23
Rent & Services	2,942,666.45	3,528,238.56	4,886,747.86	17,378,285.51	14,580,370.79	12,499,144.11
Car Parking	375,705.47	315,710.02	530,425.55	413,540.62	508,378.46	309,501.48
Restrooms	29,288.85	70,237.27	27,696.22	83,276.69	49,022.36	9,436.60
Admission Fees/ Commercial Passes	350,415.52	289,332.61	255,983.56	416,027.86	186,118.71	31,489.60
Miscellaneous Non- Aeronautical Apt Serv.	567,583.52	489,683.95	552,686.91	598,022.15	608,672.71	617,843.70
Cargo	83567.46024	147133.4047	268837.4452	547735.7294	590712.9087	328713.5037
Others	1825214.33	1070159.474	2122775.234	1158947.555	1537723.984	886825.4995
Total Non traffic	6,963,955.02	6,687,882.03	9,601,337.33	22,822,322.06	19,055,255.12	17,300,710.72

Source: Data on Revenue, Expenditure, and Profitability of the six Airports.

Annexure-II

Table 28: Dimapur Expenditure

Year	15-16	16-17	17-18	18-19	19-20	20-21
Employee Benefit	58,267,949.51	62,311,313.68	87,579,889.19	91,693,127.95	127,010,546.55	107,276,445.32
Operational expenses	29,464,066.31	57,562,918.11	35,413,402.02	34,916,464.96	96,070,925.92	50,386,123.05
Administrative and other expenses	6,107,184.63	8,963,627.55	38,947,900.54	40,127,780.80	15,670,812.80	15,247,527.27
Depreciation	51,709,475.97	48,040,182.07	46,392,277.23	44,373,722.10	63,589,470.44	69,778,708.72
Security Exp	55,893,167.00	73,189,520.22	75,415,678.57	80,586,421.95	26,020,377.49	70352664
Total Exp	201441843.4	250067561.6	283749147.6	291697517.8	328913202.9	243135309.8

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 29: Dimapur Profitability

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Traffic Revenue	26879235	31252867	38523870.55	37630575.57	26224823.85	17989179.43
Non-Traffic Revenue	6963955.02	6687882.03	9601337.33	22822322.06	19055255.12	17300710.72
Total Revenue	33843190.02	37940749.03	48125207.88	60452897.63	45280078.97	35289890.15
Expenditure	201441843.4	250067561.6	283749147.6	291697517.8	328913202.9	243135309.8
Profit /Loss(-)	-167598653.4	-212126812.6	-235623939.7	-231244620.1	-283633123.9	-207845419.6

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Dimapur Line Graph of Revenue Expenditure and Profit



Figure 28: Dimapur Line Graph of Revenue Expenditure and Profit

Table 30: Silchar Revenue - Traffic

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Route Navigation Facilities Charges RNFC	111,171.55	560,840.26	3,560,646.34	8,502,561.28	4,587,214.99	3,446,755.47
Landing, Parking & Housing (LPH)	11,659,081.79	14,629,422.15	17,828,997.96	13,707,802.98	7,214,903.53	5,463,245.13
PSF	8,158,777.36	11,051,069.08	14,062,725.09	11,641,376.93	1,692,930.70	8,305,027.70
UDF: Domestic PAX	26,839,068.01	27,646,387.78	20,453,348.70	18,413,830.37	19,849,230.81	10437458.10
Oil Throughput Revenue	117,697.65	551,922.11	681,679.06	616,479.09	225,968	84,316.09
Ground Handling	431,612.84	981,587.41	767,135.07	619,193.27	283,351.82	190,355.76
Extension of Service Hours	44,678.38	49,614.92	89,830.47	64,111.17	41,967.28	54,366.32
Royalty on CUTE Charges	705,616.88	1,079,396.81	1,067,637.31	1,405,644.91	337,432.52	431,865.43
Total	48,067,704.46	56,550,240.54	58,512,000.00	54,971,000.00	34,233,000.00	28,413,390.00

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 31: Silchar Revenue Non-Traffic

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Trading Concessions	1,465,861.51	8,955,600.10	2,177,949.37	8,133,545.95	7,806,938.89	866,325.17
Rent & Services	813,231.80	12,932,636.32	1,465,084.89	4,896,770.65	3,079,429.61	1,012,924.00
Car Parking	10,574.87	200,743.28	1,178,278.03	2,414,690.96	1,250,207.14	73,064.08
Restrooms	5,548.21	24,241.67	5,915.22	7,440.24	9,260.42	5,294.49
Admission Fees/ Commercial Passes	56,177.54	270,334.64	176,771.79	159,884.23	38,015.15	7,705.43
Miscellaneous Non- Aeronautical Apt Serv.	58,035.25	148,046.29	2,822.19	7,622.62	537.92	1,660.28
Cargo	142,939.01	349,732.58	196,441.00	234,549.00	202,120.00	90,073.26
Others	108775.4751	1515180.856	184179.4147	816653.9223	458346.1452	483000.3029
Total Non traffic	6,497,227.54	9,992,359.46	10,339,000.00	8,687,000.00	6,520,000.00	5,004,070.00

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 32: Silchar Expenditure

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Employee Benefit	30951925.63	48023993.29	45967740.71	40421509.6	31928065.65	22837559.93
Operational expenses	36409558.24	37677099.44	38664261.61	39647068.36	21542286.96	18339740.44
Administrative and other expenses	9197716.772	8876548.49	17988580.59	1164861.274	3310680.462	9531517.262
Depreciation	31072571.8	40373918.2	27666013.22	41008916.38	13513523.34	22866544.7
Security Exp	34171593.09	33031079.58	59204403.87	44173644.38	23384443.6	22824037.67
Total Exp	141803365.5	167982639	189491000	166416000	93679000	96399400

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Table 33: Silchar Profitability

Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Traffic Revenue	48067704.46	56550240.54	58512000	54,971,000.00	34,233,000.00	28413390
Non-Traffic Revenue	6497227.544	9992359.463	10339000	8,687,000.00	6520000	5004070
Total Revenue	54564932	66542600	68851000	65,966,000.00	40,753,000.00	33417460
Expenditure	141803365.5	167982639	189491000	166416000	93679000	96399400
Profit /Loss(-)	-87238433.54	-101440039	-120640000	-100450000	-52926000	-62981940

Source: Data on Revenue, Expenditure, and Profitability of the six Airports. Annexure-II

Silchar Line Graph of Revenue Expenditure and Profit

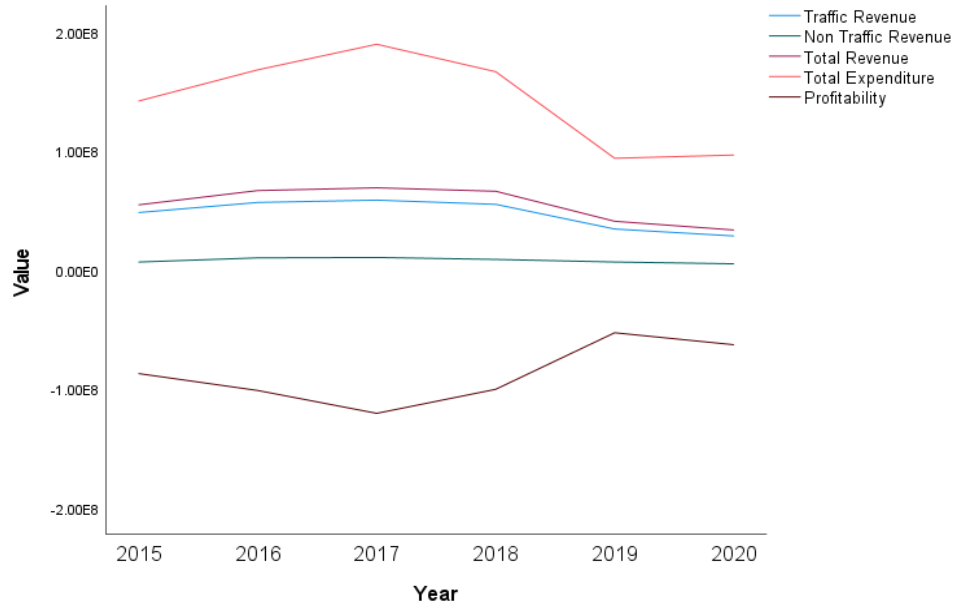


Figure 29: Silchar Line Graph of Revenue Expenditure and Profit

6.3 DATA ANALYSIS

Sources of Data: Secondary data was utilized for this study. Traffic revenue (Table no. 11, 14, 18, 22, 26, 30), non-traffic revenue (Table no. 10, 15, 19, 23, 27, 31) and expenditure data (Table no. 12, 16, 20, 24, 28, 32) from the past six years (2015 to 2020) were employed. This data was acquired through direct engagement with the relevant authorities at each airport. It should be noted that this dataset is not publicly available on the internet or any other public platform.

Statistical Tools Utilized: Analysis of Variance (ANOVA) was employed to compare the revenue, expenditure, and profitability of six airports, namely Agartala, Dibrugarh, Dimapur, Guwahati, Imphal, and Silchar. Correlation analysis was conducted to examine the relationship between various factors including Aviation Safety, User Development Fees, Operating Costs such as Maintenance, Repair, and Overhaul (MRO), Landing and Parking Charges, RNFC Charges, PSF and Watch Extension, Customer Facilitation Charges, Money Services, and Passenger Support System, with the viability and profitability of the airports. Linear regression analysis was employed to establish regression equations for both the sources of revenues and expenditures.

Software Used: The Statistical Package for the Social Sciences (SPSS), version 25, was employed for the statistical analysis.

RELIABILITY TEST Reliability testing is a crucial step in research methodology aimed at assessing the consistency and stability of the data collected for a study. It provides researchers with insights into the dependability and accuracy of their measurements or instruments. Reliability testing is essential as it ensures that the data used for analysis are trustworthy and can be confidently interpreted to draw meaningful conclusions.

In the context of this study on the economic viability of airports in North East India, reliability testing was conducted to evaluate the consistency and reliability of the secondary data collected from various sources. By subjecting the data to reliability analysis, researchers can ascertain the extent to which the measurements or variables under investigation yield consistent results over time or across different conditions.

The application of reliability testing in this study serves several purposes. Firstly, it helps to identify any potential sources of error or inconsistencies in the data collection process. Secondly, it allows researchers to gauge the reliability of the data and determine the extent to which they can rely on it to make informed decisions and conclusions. Lastly, reliability testing enhances the overall validity and credibility of the research findings by ensuring that the data used for analysis are robust and dependable.

Table 34: Cronbach's Alpha Reliability

Reliability Statistics	
Cronbach's Alpha	N of Items
0.901	26

Since the Cronbach's Alpha value (Table 34) is above 0.9, all the data in this study are Excellent reliable and we can use them for data analysis.

To ensure the robustness and credibility of the data used in this study, a reliability test was conducted employing Cronbach's Alpha. The reliability test results revealed a Cronbach's Alpha value exceeding 0.9, indicating excellent reliability. This high level of reliability assures the integrity and consistency of the data, thereby affirming its

suitability for thorough and accurate data analysis. The reliability test serves as a strong foundation for the subsequent exploration of revenue and expenditure patterns at the selected airports, facilitating a more confident and precise evaluation of the economic viability of aviation in the North Eastern region.

Table 35: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
Traffic Revenue	36	17989179.43	2183022000.00	337983822.5075	568118172.22634
Non-Traffic Revenue	36	5004070.00	539417000.00	72144293.5849	117333326.65108
Total Revenue	36	33417460.00	2528415000.00	410192227.2108	677439870.87643
Expenditure	36	93679000.00	1527861000.00	522164892.4444	393222696.82508
Profit	36	-753977480.80	1070389000.00	-111972665.2375	374601357.28127
Valid N (listwise)	36				

Comparison of Traffic Revenue, Non-Traffic Revenue, Total Revenue, Expenditure, and Profitability of the six Airports:

The Analysis of Variance (ANOVA) test is a fundamental statistical technique used to compare the means of three or more groups and determine whether there are significant differences among them. In the context of this study on the economic viability of airports in North East India, ANOVA testing serves as a valuable tool for examining the variations in revenue, expenditure, and profitability across multiple airports over a six-year period.

The primary objective of employing ANOVA in this study is to assess the differences in financial performance among the airports of Agartala, Dibrugarh, Dimapur, Guwahati, Imphal, and Silchar. By analyzing the revenue, expenditure, and profitability data (Table 36) collected from these airports, researchers can identify any significant disparities that may exist and gain insights into the economic dynamics of the region's aviation infrastructure.

ANOVA testing is particularly relevant in this study due to its ability to simultaneously compare multiple groups while controlling for potential sources of variation. This statistical technique enables researchers to determine whether any observed differences in financial performance are statistically significant or merely due to random

fluctuations. Additionally, ANOVA provides valuable information about the relative contributions of different factors to the overall variance in financial outcomes, thereby aiding in the identification of key drivers of airport profitability.

The application of ANOVA in this study contributes to a comprehensive understanding of the economic landscape of North East India's airports and facilitates informed decision-making by policymakers, airport authorities, and other stakeholders. By elucidating the variations in revenue, expenditure, and profitability across different airports, ANOVA testing helps to identify areas for improvement and optimization in the region's aviation sector, ultimately fostering sustainable growth and development.

Table 36: Descriptive Statistics for different Airports

		N	Mean	Std. Deviation	Std. Error
Traffic Revenue	Agartala	6	206828801.9833	58417164.08251	23848707.37043
	Dibrugarh	6	69966767.0700	5968796.51190	2436750.97211
	Dimapur	6	29750091.9000	7750199.27441	3164005.60453
	Guwahati	6	1505550333.3333	509570136.10951	208031136.93815
	Imphal	6	169015718.2583	57107222.81300	23313926.08655
	Silchar	6	46791222.5000	12622257.35921	5153014.98869
	Total	36	337983822.5075	568118172.22634	94686362.03772
Non-Traffic Revenue	Agartala	6	39216855.8550	6921819.44937	2825820.95711
	Dibrugarh	6	37948033.3817	5488532.71481	2240684.09798
	Dimapur	6	13738577.0467	6873061.06193	2805915.42879
	Guwahati	6	305841333.3333	128688556.42778	52536883.16390
	Imphal	6	28281019.0583	8561896.63448	3495379.66416
	Silchar	6	7839942.8345	2153276.48349	879071.44328
	Total	36	72144293.5849	117333326.65108	19555554.44185
Total Revenue	Agartala	6	246045657.8500	59875508.50291	24444073.98697
	Dibrugarh	6	107914800.4517	9971374.70355	4070796.67630
	Dimapur	6	43488668.9467	10035201.55110	4096853.87770
	Guwahati	6	1811391666.6667	583032394.76573	238021978.44816
	Imphal	6	197296737.3500	58243996.25278	23778011.89998
	Silchar	6	55015832.0000	14928535.05112	6094548.91375
	Total	36	410192227.2108	677439870.87643	112906645.14607

		N	Mean	Std. Deviation	Std. Error
Expenditure	Agartala	6	582896616.6167	164300086.09999	67075229.27339
	Dibrugarh	6	324154074.0500	25537804.70769	10425765.11411
	Dimapur	6	266500763.8500	44444017.39052	18144194.12103
	Guwahati	6	1246318166.6667	296191977.05773	120919868.28293
	Imphal	6	570491166.0667	169052820.43671	69015524.94138
	Silchar	6	142628567.4167	39846293.45600	16267181.18473
	Total	36	522164892.4444	393222696.82508	65537116.13751
Profit	Agartala	6	-336850958.7667	206940183.90066	84482976.30572
	Dibrugarh	6	-216239273.6017	20877729.13869	8523297.22964
	Dimapur	6	-223012094.8833	38264629.01095	15621469.37895
	Guwahati	6	565073500.0000	445824765.42370	182007198.33068
	Imphal	6	-373194428.7500	130215039.59424	53160067.30703
	Silchar	6	-87612735.4233	25521660.17658	10419174.13689
	Total	36	-111972665.2375	374601357.28127	62433559.54688

Table 37: ANOVA

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Traffic Revenue	Between Groups	9963586331117970000.000	5	1992717266223590000.000	44.849	0.000
	Within Groups	1332952685364790000.000	30	44431756178826500.000		
	Total	11296539016482800000.000	35			
Non-Traffic Revenue	Between Groups	398029025138954000.000	5	79605805027790900.000	28.492	0.000
	Within Groups	83819808866364300.000	30	2793993628878810.000		
	Total	481848834005319000.000	35			
Total Revenue	Between Groups	14325731214324400000.000	5	2865146242864880000.000	49.495	0.000
	Within Groups	1736636038533320000.000	30	57887867951110600.000		
	Total	16062367252857700000.000	35			
Expenditure	Between Groups	4674251930860150000.000	5	934850386172029000.000	38.023	0.000
	Within Groups	737591194583581000.000	30	24586373152786000.000		
	Total	5411843125443730000.000	35			
Profit	Between Groups	3605959519394190000.000	5	721191903878837000.000	16.573	0.000
	Within Groups	1305456671299860000.000	30	43515222376661800.000		
	Total	4911416190694040000.000	35			

An ANOVA as shown in Table 37, was conducted to compare the six airports on Traffic Revenue, Non-Traffic Revenue, Total Revenue, Expenditure, and Profit. Since p value of all the variables are less than 0.05, we may reject the null hypothesis i.e., there is a significant difference in sources of revenues, expenditure, and profit among the six airports.

An analysis was conducted to assess the economic viability of six airports in the North Eastern Region of India, namely Guwahati, Agartala, Dibrugarh, Dimapur, Imphal, and Silchar, spanning the period from 2015 to 2020. The focus of the investigation was on various sources of revenue and expenditure, encompassing key financial indicators such as Route Navigation Facilities Charges (RNFC), Landing, Parking & Housing (LPH), Passenger Service Fee (PSF), User Development Fee (UDF), Oil Throughput Revenue, Ground Handling, Extension of Service Hours, Royalty on CUTE Charges, Trading Concessions, Rent & Services, Car Parking, Restrooms, Admission Fees/Commercial Passes, Miscellaneous Non-Aeronautical Airport Services, Cargo Revenue, Others Revenue, Employee Benefit Expenses, Operating Expenses, Administrative & Other Expenses, Depreciation, Amortization & Impairment, and Security Expenses.

The statistical analysis employed ANOVA tests to compare the six airports across five key financial categories: Traffic Revenue, Non-Traffic Revenue, Total Revenue, Expenditure, and Profit. The results revealed that all p-values associated with these variables were found to be less than the conventional significance level of 0.05. As a consequence, **the null hypothesis was rejected, signifying a statistically significant difference in sources of revenues, expenditures, and profitability among the six airports.**

This outcome suggests that there are discernible variations in the financial performance of the airports within the North Eastern Region. **Airport stakeholders, policymakers, and industry players may find these findings instrumental in understanding the distinct economic dynamics at play in each airport.** Further research and targeted interventions may be warranted to optimize financial sustainability and enhance economic viability within the aviation sector in this region.

Table 38: Homogeneous Subsets of Traffic Revenue

Traffic Revenue			
Tukey HSD _a			
Name of Airport	N	Subset for alpha = 0.05	
		1	2
Dimapur	6	29750091.9000	
Silchar	6	46791222.5000	
Dibrugarh	6	69966767.0700	
Imphal	6	169015718.2583	
Agartala	6	206828801.9833	
Guwahati	6		1505550333.3333
Sig.		0.694	1.000

Table 38 provides an overview of the results of the Homogeneous Subsets Tukey HSD analysis for traffic revenue among the airports reveal distinct subsets based on their revenue levels. The analysis, conducted with a significance level of $\alpha = 0.05$, categorizes the airports into statistically homogeneous groups. Among the six airports considered, Dimapur exhibited the lowest traffic revenue, with an average of Rs. 29,750,091.90. Following closely, Silchar and Dibrugarh airports reported average traffic revenues of Rs. 46,791,222.50 and Rs. 69,966,767.07, respectively. Imphal and Agartala airports displayed significantly higher traffic revenues, with averages of Rs. 169,015,718.26 and Rs. 206,828,801.98, respectively. Notably, Guwahati airport emerged as the airport with the highest traffic revenue, reporting an average of Rs. 1,505,550,333.33.

Upon conducting the Tukey HSD test, the statistical analysis yielded a p-value of 0.694 for the comparison between Dimapur, Silchar, Dibrugarh, Imphal, and Agartala, suggesting no significant difference in traffic revenue between these airports. These findings highlight the diversity in traffic revenue among airports in the Northeast region, with Guwahati standing out as a significant revenue contributor compared to other airports in the subset.

Table 39: Homogeneous Subsets of Non Traffic Revenue

Non-Traffic Revenue			
Tukey HSD _a			
Name of Airport	N	Subset for alpha = 0.05	
		1	2
Silchar	6	7839942.8345	
Dimapur	6	13738577.0467	
Imphal	6	28281019.0583	
Dibrugarh	6	37948033.3817	
Agartala	6	39216855.8550	
Guwahati	6		305841333.3333
Sig.		0.905	1.000

The results shown in Table 39, of the Homogeneous Subsets Tukey Honestly Significant Difference (HSD) test for non-traffic revenue among airports in the Northeast region are presented below. The Tukey HSD test is conducted to determine statistically significant differences in non-traffic revenue between airports. The significance level is set at $\alpha = 0.05$.

Based on the Tukey HSD test, the airports are grouped into two homogeneous subsets. The statistical analysis yielded a p-value of 0.905 for the comparison between Silchar, Dimapur, Imphal, Dibrugarh, and Agartala, suggesting no significant difference in traffic revenue between these airports. These findings highlight the diversity in non-traffic revenue among airports in the Northeast region, with Guwahati standing out as a significant no traffic revenue contributor compared to other airports in the subset.

The non-traffic revenue, measured in Rs. (Indian Rupees), varies across the airports, with Guwahati Airport reporting the highest non-traffic revenue of Rs. 305,841,333.33, followed by Dibrugarh Airport with Rs. 37,948,033.38. Meanwhile, Silchar Airport has the lowest non-traffic revenue among the airports, with Rs. 7,839,942.83.

Table 40: Homogeneous Subsets of Total Revenue

Total Revenue			
Tukey HSD _a			
Name of Airport	N	Subset for alpha = 0.05	
		1	2
Dimapur	6	43488668.9467	
Silchar	6	55015832.0000	
Dibrugarh	6	107914800.4517	
Imphal	6	197296737.3500	
Agartala	6	246045657.8500	
Guwahati	6		1811391666.6667
Sig.		0.692	1.000

As shown in Table 40, The Homogeneous Subsets Tukey HSD test was conducted to compare the total revenue generated by different airports in Northeast India. The total revenue data for the six airports included in the analysis are as follows: Dimapur generated Rs. 43,488,668.95, Silchar generated Rs. 55,015,832.00, Dibrugarh generated Rs. 107,914,800.45, Imphal generated Rs. 197,296,737.35, Agartala generated Rs. 246,045,657.85, and Guwahati generated Rs. 1,811,391,666.67.

Based on Table 40, the Tukey HSD test, the airports are grouped into two homogeneous subsets. The statistical analysis yielded a p-value of 0.692 for the comparison between Dimapur, Silchar, Dibrugarh, Imphal, and Agartala suggesting no significant difference in traffic revenue between these airports. These findings highlight the diversity in total revenue among airports in the Northeast region, with Guwahati standing out as a significant total revenue contributor compared to other airports in the subset.

Table 41: Homogeneous Subsets of Total Expenditure

Total Expenditure				
Tukey HSD _a				
Name of Airport	N	Subset for alpha = 0.05		
		1	2	3
Silchar	6	142628567.4167		
Dimapur	6	266500763.8500		
Dibrugarh	6	324154074.0500	324154074.0500	
Imphal	6		570491166.0667	
Agartala	6		582896616.6167	
Guwahati	6			1246318166.6667
Sig.		0.363	0.075	1.000

Table 41 Illustrates, Tukey HSD test was conducted to determine if there are statistically significant differences in total expenditure among the airports. The significance level was set at $\alpha = 0.05$. Upon analysis, it was found that there are three distinct subsets of airports based on their total expenditure at a significance level of 0.05.

Subset 1 (Silchar, Dimapur, Dibrugarh): $p = 0.363$

Subset 2 (Dibrugarh, Imphal, Agartala): $p = 0.075$

Subset 3 (Guwahati): $p = 1.000$

These results suggest that while there are some airports whose total expenditure values are not significantly different from each other, there are also airports with significantly different total expenditure values. Further analysis may be needed to understand the underlying factors contributing to these differences in expenditure among the airports.

Table 42: Homogeneous Subsets of Profitability

Profitability			
Tukey HSD _a			
Name of Airport	N	Subset for alpha = 0.05	
		1	2
Imphal	6	-373194428.7500	
Agartala	6	-336850958.7667	
Dimapur	6	-223012094.8833	
Dibrugarh	6	-216239273.6017	
Silchar	6	-87612735.4233	
Guwahati	6		565073500.0000
Sig.		0.199	1.000

Based on Table 42 results of the Tukey Honestly Significant Difference (HSD) test, it appears that Guwahati airport forms a separate group in terms of profitability compared to the other airports included in the analysis. The profitability of Guwahati airport (Rs 565,073,500.00) is notably higher than that of the other airports, which have negative profitability values ranging from approximately Rs -373,194,429.00 to Rs -87,612,735.00.

This suggests that Guwahati airport stands out in terms of profitability and may exhibit distinct economic performance compared to the remaining airports. The statistical analysis indicates a significant difference in profitability between Guwahati airport and the other airports, warranting further investigation into the factors contributing to Guwahati's higher profitability.

The remaining airports, including Imphal, Agartala, Dimapur, Dibrugarh, and Silchar, appear to form a homogeneous group in terms of profitability, as their profitability values do not significantly differ from each other based on the specified alpha level of 0.05.

These findings provide valuable insights into the economic dynamics of the airports in Northeast India, highlighting Guwahati airport's potential as a leading contributor to regional economic development and underscoring the need for targeted strategies to enhance the profitability and competitiveness of the other airports in the region.

Research Objective -1

This research aims to assess the economic viability of aviation infrastructure in North East India through correlation analysis. By examining relationships between factors like revenue sources, operational costs, and passenger traffic, the study seeks to provide insights for optimizing resource allocation and fostering regional development. Through this analysis, stakeholders can make informed decisions to enhance connectivity and economic growth in the North Eastern Region.

Correlation analysis is a statistical method used to explore the relationships between variables. In this study on the economic viability of North East India's airports, correlation analysis is employed to investigate how various factors such as aviation safety measures, user development fees, operating costs, and revenue components relate to airport profitability. By quantifying these relationships, correlation analysis provides insights into the factors influencing airport financial performance and guides strategic decision-making for enhancing economic viability.

1. Hypotheses framed on the factors related to costs

H1A: Aviation Safety affects the viability of aviation industry in the North Eastern region.

Table 43: Correlation between Security Expenses and Profitability

Correlations			
		Profitability	Security Expenses
Profitability	Pearson Correlation	1	.407*
	Sig. (2-tailed)		.014
	N	36	36
Security Expenses	Pearson Correlation	.407*	1
	Sig. (2-tailed)	.014	
	N	36	36

The correlation analysis (Table 43), reveals a moderate positive correlation between profitability and security expenses, with a correlation coefficient of 0.407 and a p-value below the significance threshold of 0.05. This suggests that there exists a statistically

significant relationship between profitability and security expenses, indicating that investments in aviation safety positively impact the industry's economic viability within the North Eastern region.

H1B: User development fees have a direct impact on the viability of aviation industry in the North Eastern region

Table 44: Correlation between UDF: Domestic PAX and Profitability

Correlations			
		Profitability	UDF: Domestic PAX
Profitability	Pearson Correlation	1	.897**
	Sig. (2-tailed)		.000
	N	36	36
UDF: Domestic PAX	Pearson Correlation	.897**	1
	Sig. (2-tailed)	.000	
	N	36	36

The correlation analysis (Table 44), revealed a strong positive correlation between profitability and UDF, with a correlation coefficient of 0.897 and a statistically significant p-value of less than 0.0001. This suggests that UDF indeed plays a significant role in impacting the profitability of the aviation industry in the region.

H1C: Operating costs such as maintenance repair and overhaul (MRO) impact the viability of aviation sector in the North Eastern region.

Table 45: Correlation between Operating Expenses and Profitability

Correlations			
		Profitability	Operating Expenses
Profitability	Pearson Correlation	1	.391*
	Sig. (2-tailed)		.018
	N	36	36
Operating Expenses	Pearson Correlation	.391*	1
	Sig. (2-tailed)	.018	
	N	36	36

As shown in Table 45, Analysis reveals a correlation coefficient of 0.39 between profitability and operational expenses, with a corresponding p-value below the threshold of 0.05. This indicates a statistically significant small positive correlation between operational expenses and profitability.

2. Hypotheses formed on the basis of Traffic Revenue

H2A: Landing and parking Charges will have a positive impact on the viability of the aviation industry in the North Eastern region.

Table 46: Correlation between Landing, Parking & Housing (LPH) and Profitability

Correlations			
		Profitability	Landing, Parking & Housing (LPH)
Profitability	Pearson Correlation	1	.862**
	Sig. (2-tailed)		.000
	N	36	36
Landing, Parking & Housing (LPH)	Pearson Correlation	.862**	1
	Sig. (2-tailed)	.000	
	N	36	36

The correlation analysis (Table 46), reveals a robust correlation coefficient of 0.862 between profitability and landing, parking, and housing (LPH). Furthermore, the p-value, which is less than 0.0001, underscores the statistical significance of this correlation. Consequently, it can be inferred that landing, parking, and housing charges exhibit a strong positive correlation with profitability, thereby supporting the Hypothesis.

H2B: RNFC Charges will have a positive impact on the viability of the aviation industry in the North Eastern region.

Table 47: Correlation between Route Navigation Facilities Charges RNFC and Profitability

Correlations			
		Profitability	Route Navigation Facilities Charges RNFC
Profitability	Pearson Correlation	1	.853**
	Sig. (2-tailed)		.000
	N	36	36
Route Navigation Facilities Charges RNFC	Pearson Correlation	.853**	1
	Sig. (2-tailed)	.000	
	N	36	36

The correlation analysis Table 47, revealed a strong positive correlation of 0.853 between Profitability and RNFC, with a p-value of less than 0.0001, indicating statistical significance. Therefore, the results support the hypothesis, suggesting that RNFC Charges indeed have a significant positive impact on the profitability of the aviation industry in the North Eastern region.

H2C: PSF and watch extension will impact the viability of the aviation industry in the North Eastern region.

Table 48: Correlation between PSF and Profitability

Correlations			
		Profitability	PSF
Profitability	Pearson Correlation	1	.648**
	Sig. (2-tailed)		.000
	N	36	36
PSF	Pearson Correlation	.648**	1
	Sig. (2-tailed)	.000	
	N	36	36

In Table 48, the analysis reveals a strong positive correlation of 0.648 between profitability and PSF, with a p-value below 0.0001. Hence, PSF exhibits a significant positive association with profitability, supporting the hypothesis that PSF and watch extension impact the economic viability of the aviation industry in the North Eastern region.

3. Hypotheses formed on the basis of Airport Management decisions

H3A: Customer Facilitation Charges will increase the viability of aviation industry in this region

Table 49: Correlation between Customer Facilitation Charges and Profitability

Correlations			
		Profitability	Car Parking / Customer Facilitation Charges
Profitability	Pearson Correlation	1	.758**
	Sig. (2-tailed)		0
	N	36	36
Car Parking / Customer Facilitation Charges	Pearson Correlation	.758**	1
	Sig. (2-tailed)	0	
	N	36	36

Table 49 provides an overview of correlation between Profitability and Car Parking / Customer Facilitation Charges is 0.758, and p value is less than 0.0001, Car Parking / Customer Facilitation Charges has a strong positive correlation with profitability.

H3B: Money Services will have a positive impact on the viability of the aviation industry in the North Eastern region.

Table 50: Correlation between Money Services and Profitability

Correlations			
		Profitability	Rent & Services / Money Services
Profitability	Pearson Correlation	1	.765**
	Sig. (2-tailed)		0
	N	36	36
Rent & Services / Money Services	Pearson Correlation	.765**	1
	Sig. (2-tailed)	0	
	N	36	36

Table 50 provides an overview of correlation between Profitability and Rent & Services /Money Services is 0.765, and p value is less than 0.0001, Rent & Services /Money Services has a strong positive correlation with profitability.

H3C: Passenger Support System at all the region's airports will increase passenger volume at the airports.

Table 51: Correlation between Passenger Support System and Profitability

Correlations			
		Profitability	Restrooms / Passenger Support System
Profitability	Pearson Correlation	1	.792**
	Sig. (2-tailed)		0
	N	36	36
Restrooms / Passenger Support System	Pearson Correlation	.792**	1
	Sig. (2-tailed)	0	
	N	36	36

As shown in Table 51, correlation between Profitability and Restrooms / Passenger Support System is 0.792, and p value is less than 0.0001, Restrooms / Passenger Support System has a strong positive correlation with profitability.

Research Objective -2

This research aims to develop a framework for enhancing the economic viability of airports in North East India by optimizing operational costs and managing capital expenditure efficiently. By analyzing regression equations on revenue and expenditure, the study seeks to identify key determinants of airport profitability. The proposed framework will offer actionable insights tailored to the region's unique context, helping stakeholders improve financial resilience and contribute to the economic development of the North Eastern Region.

Regression Equation for Source of Revenues

In the endeavor to evaluate the economic viability of aviation infrastructure in the North Eastern Region, this research delves into the intricate relationship between various revenue streams and profitability through regression analysis. The regression equation under scrutiny examines profitability as the dependent variable, while a diverse array of revenue sources constitutes the independent variables. These encompass both aeronautical and non-aeronautical revenue streams, encapsulating the multifaceted financial landscape of airports in the region. From Route Navigation Facilities Charges (RNFC) to Cargo Revenue, each revenue source plays a pivotal role in shaping the financial performance of airports. By dissecting these relationships, the analysis aims to pinpoint the revenue streams that exert the most substantial influence on airport profitability. This insight is invaluable for stakeholders, offering a roadmap for optimizing revenue generation and enhancing financial sustainability. Through rigorous regression analysis, this research seeks to provide evidence-based strategies for bolstering the economic viability of aviation infrastructure in the North Eastern Region, thus fostering regional development and connectivity.

Table 52: Model Summary for Regression 1

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.979	0.958	0.922	104704901.29631

The value of Multiple correlation coefficient (R) is 0.979. Since R square value is 0.958, 95.8% of dependent variable (profit) is explain by the independent variables (Revenue).

Table 53: Regression 1-ANOVA

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4703116979940130000.000	16	293944811246258000.000	26.812	.000
	Residual	208299210753909000.000	19	10963116355468900.000		
	Total	4911416190694040000.000	35			

Interpretation

In Table 53, the p-value is less than 0.05, this model is fit for regression

Table 54: Coefficients table for Regression 1

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-114922922.538	44583948.782		-2.578	0.018
	Route Navigation Facilities Charges RNFC	2.481	5.741	0.479	0.432	0.671
	Landing, Parking & Housing (LPH)	-7.122	2.768	-2.280	-2.573	0.019
	PSF	0.205	1.468	0.046	0.139	0.891
	UDF: Domestic PAX	4.131	1.076	3.212	3.838	0.001
	Oil Throughput Revenue	-3.629	11.761	-0.051	-0.309	0.761
	Ground Handling	64.722	32.928	0.966	1.966	0.064
	Extension of Service Hours	6.588	22.746	0.026	0.290	0.775
	Royalty on CUTE Charges	9.030	16.250	0.264	0.556	0.585
	Trading Concessions	2.728	3.094	0.469	0.882	0.389
	Rent & Services	-8.512	3.973	-0.868	-2.143	0.045
	Car Parking	-37.002	14.062	-1.287	-2.631	0.016
	Restrooms	18.133	824.979	0.005	0.022	0.983
	Admission Fees/Commercial Passes	18.807	36.967	0.070	0.509	0.617
	Miscellaneous Non-Aeronautical Apt Serv.	-11.693	45.753	-0.025	-0.256	0.801
	Cargo Revenue	-23.332	28.913	-0.287	-0.807	0.430
	Others	-3.217	5.146	-0.079	-0.625	0.539

The required regression equation is

Profit/Loss = -114922922.538 + 2.481Route Navigation Facilities Charges RNFC - 7.122 Landing, Parking & Housing (LPH) + 0.205 PSF + 4.131 UDF: Domestic PAX -3.629 Oil Throughput Revenue + 64.722 Ground Handling + 6.588 Extension of Service Hours + 9.030 Royalty on CUTE Charges + 2.728 Trading Concessions -8.512 Rent & Services -37.002 Car Parking 18.133 Restrooms + 18.807 Admission Fees/Commercial Passes -11.693 Miscellaneous Non-Aeronautical Apt Serv. -23.332 Cargo Revenue -3.217 Others

Since the p values of these variables are less than 0.05, they have significant effect on profit

i) Landing, Parking & Housing (LPH) ii) UDF : Domestic PAX, iii) Rent & Services, iv) Car Parking

The source of revenue with large positive Beta confidents are i) Ground Handling (64.72168506), ii) Admission Fees/Commercial Passes (18.80747857), iii) Restrooms (18.13334049), iv) Royalty on CUTE Charges (9.030273231), v) Extension of Service Hours (6.588310352), vi) UDF: Domestic PAX (4.130549525). For one unit increase in Ground Handling, the dependent variable (profit) is expected to increase by 64.72 units on average.

The source of revenue with large negative Beta confidents are i) Landing, Parking & Housing (LPH) (-7.122125869), ii) Rent & Services (-8.511692404), iii) Miscellaneous Non-Aeronautical Apt Serv. (-11.69323368), iv) Cargo Revenue (-23.33169918), v) Car Parking (-37.00160715). For one unit decrease in Car Parking, the dependent variable (profit) is expected to increase by 37.001 units on average.

Explanation:

Table 54 provide the overview of The research on the Economic Viability of Aviation in the North Eastern Region, focusing on six airports (Guwahati, Agartala, Dibrugarh, Dimapur, Imphal, and Silchar) from 2015 to 2020, reveals a robust regression model. The Multiple correlation coefficient (R) of 0.979 indicates a strong relationship between the dependent variable (profit) and independent variables (revenue sources).

With an R square value of 0.958, approximately 95.8% of the variation in profit can be explained by the considered revenue sources.

The regression equation $\text{Profit} = -114,922,922.538 + 2.481\text{RNFC} - 7.122\text{LPH} + 0.205\text{PSF} + 4.131\text{UDF} + \text{Domestic PAX} - 3.629\text{Oil Throughput Revenue} + 64.722\text{Ground Handling} + 6.588\text{Extension of Service Hours} + 9.030\text{Royalty on CUTE Charges} + 2.728\text{Trading Concessions} - 8.512\text{Rent \& Services} - 37.002\text{Car Parking} + 18.133\text{Restrooms} + 18.807\text{Admission Fees/Commercial Passes} - 11.693\text{Miscellaneous Non-Aeronautical Apt Serv.} - 23.332\text{Cargo Revenue} - 3.217\text{Others}$ signifies the impact of each revenue source on profit.

The model is statistically significant ($p < 0.05$), indicating its fitness for regression. Notably, Landing, Parking & Housing (LPH), UDF: Domestic PAX, Rent & Services, and Car Parking are identified as significant contributors to profit, with p-values less than 0.05.

Examining the Beta coefficients, Ground Handling emerges as a major positive contributor (Beta = 64.7217), followed by Admission Fees/Commercial Passes (Beta = 18.8075), Restrooms (Beta = 18.1333), Royalty on CUTE Charges (Beta = 9.0303), Extension of Service Hours (Beta = 6.5883), and UDF: Domestic PAX (Beta = 4.1305). An increase in Ground Handling by one unit is associated with an average profit increase of 64.72 units.

Conversely, Landing, Parking & Housing (LPH), Rent & Services, Miscellaneous Non-Aeronautical Apt Serv., Cargo Revenue, and Car Parking exhibit substantial negative Beta coefficients. For instance, a decrease in Car Parking by one unit is associated with an average profit increase of 37.001 units.

In conclusion, the study provides valuable insights into the economic viability of aviation in the North Eastern Region, highlighting key revenue sources that significantly impact profit/loss. These findings can inform strategic decisions and policies aimed at enhancing the economic viability of airports in the region.

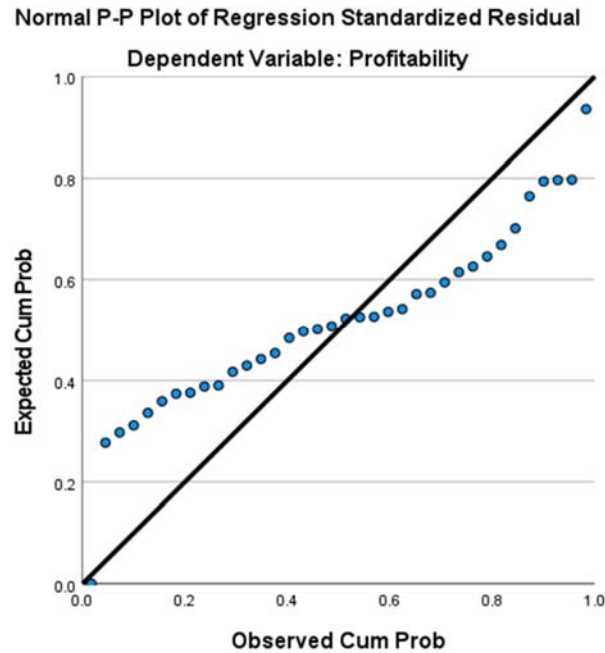


Figure 30: Normal PP Plot of Regression I

Regression Equation for Expenditure

Regression analysis is a statistical technique used to model the relationship between a dependent variable and one or more independent variables. In this study focusing on the economic viability of airports in North East India, regression analysis is employed to develop regression equations that predict profitability based on various expenditure categories.

The dependent variable in this analysis is profitability, which serves as a crucial indicator of the financial health and sustainability of airports. Profitability is influenced by a range of factors, including employee benefit expenditure, operating expenses, administrative and other expenses, depreciation, amortization, impairment, and security expenses. These expenditure categories represent significant components of the overall financial framework of airports and can impact their ability to generate revenue and manage costs effectively.

By utilizing regression analysis, researchers aim to establish equations that quantitatively describe the relationship between profitability and the independent variables mentioned above. These equations provide valuable insights into the extent

to which different expenditure categories contribute to or detract from airport profitability. Moreover, regression analysis enables researchers to identify which expenditure areas have the most significant impact on profitability, thus guiding strategic decision-making and resource allocation for optimizing financial performance.

The application of regression analysis in this study enhances our understanding of the complex interplay between expenditure factors and airport profitability in North East India. By providing quantitative estimates of the effects of various expenditure categories on profitability, regression analysis facilitates evidence-based decision-making and supports efforts to enhance the economic viability of the region's airports.

Table 55: Model Summary for Regression II

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.814	0.662	0.606	235254581.74720

Interpretation

As shown in Table 55, The value of Multiple correlation coefficient (R) is 0.814. Since R square value is 0.662, 66.2% of dependent variable (profit) is explain by the independent variables (Expenditure)

Table 56: Regression II - ANOVA

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3251074643702560000.000	5	650214928740513000.000	11.748	.000
	Residual	1660341546991480000.000	30	55344718233049200.000		
	Total	4911416190694040000.000	35			

Interpretation

Table 56 presents the p-value is less than 0.05, this model is fit for regression.

Table 57: Coefficient table for Regression II

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-165021130.868	84261736.307		-1.958	0.060
	Employee Benefit Exp.	3.024	0.709	1.185	4.266	0.000
	Operating Expenses	0.320	1.180	0.069	0.272	0.788
	Administrative & Other Expenses	-0.120	1.111	-0.026	-0.108	0.915
	Depreciation, Amortization & Impairment	-5.767	1.626	-0.696	-3.547	0.001
	Security Expenses	-0.350	0.781	-0.076	-0.448	0.657

Profit = -165021130.868 + 3.024 Employee Benefit Exp. + 0.320 Operating Expenses - 0.120 Administrative & Other Expenses - 5.767 Depreciation, Amortization & Impairment - 0.350 Security Expenses.

Table 57 illustrates that the p values of these variables are less than 0.05, they have significant effect on profit

i) Employee Benefit Exp., ii) Depreciation, Amortization & Impairment.

The expense categories with large positive Beta confident is Employee Benefit Exp. (3.024). For one unit increase in Employee Benefit Exp., the dependent variable (profit) is expected to increase by 3.024 units on average.

The expense categories with large negative Beta confident is Depreciation, Amortization & Impairment (-5.767). For one unit decrease in Depreciation, Amortization & Impairment, the dependent variable (profit) is expected to increase by 5.768 units on average.

Explanation:

This research delves into the economic viability of aviation in the North Eastern region, focusing on six airports—Guwahati, Agartala, Dibrugarh, Dimapur, Imphal, and Silchar—over a six-year period from 2015 to 2020. The study explores various revenue and expenditure factors to understand their impact on airport profitability.

Data from diverse sources, including Route Navigation Facilities Charges (RNFC), Landing, Parking & Housing (LPH), Passenger Service Fee (PSF), User Development Fee (UDF), and more, were analyzed. A regression model was developed to establish relationships between profit and different expenditure categories.

The regression model yielded a Multiple Correlation Coefficient (R) of 0.814, indicating a strong relationship between the dependent variable (profit) and the independent variables (expenditure). The R-squared value of 66.2% implies that 66.2% of the variation in profit is explained by the selected expenditure factors.

The regression equation is Profit = -165,021,130.868 + 3.024 Employee Benefit Exp. + 0.320 Operating Expenses - 0.120 Administrative & Other Expenses - 5.767 Depreciation, Amortization & Impairment - 0.350 Security Expenses.

With a p-value less than 0.05, the model is deemed fit for regression analysis, indicating statistical significance. The chosen variables, Employee Benefit Exp. and Depreciation, Amortization & Impairment, are particularly noteworthy.

The p-values of the two significant variables, Employee Benefit Exp. ($p < 0.05$) and Depreciation, Amortization & Impairment ($p < 0.05$), affirm their substantial impact on profit.

Employee Benefit Exp.: A positive Beta coefficient of 3.024 suggests that a one-unit increase in Employee Benefit Exp. leads to an average profit increase of 3.024 units.

Depreciation, Amortization & Impairment: A negative Beta coefficient of -5.767 implies that a one-unit decrease in Depreciation, Amortization & Impairment results in an average profit increase of 5.767 units.

This analysis provides valuable insights into the economic dynamics of the North Eastern region's aviation sector. It identifies key expenditure categories, specifically emphasizing the positive influence of Employee Benefit Exp. and the negative impact of Depreciation, Amortization & Impairment on airport profitability. Policymakers and stakeholders can use these findings to formulate strategies aimed at enhancing the economic sustainability of the aviation industry in the region.

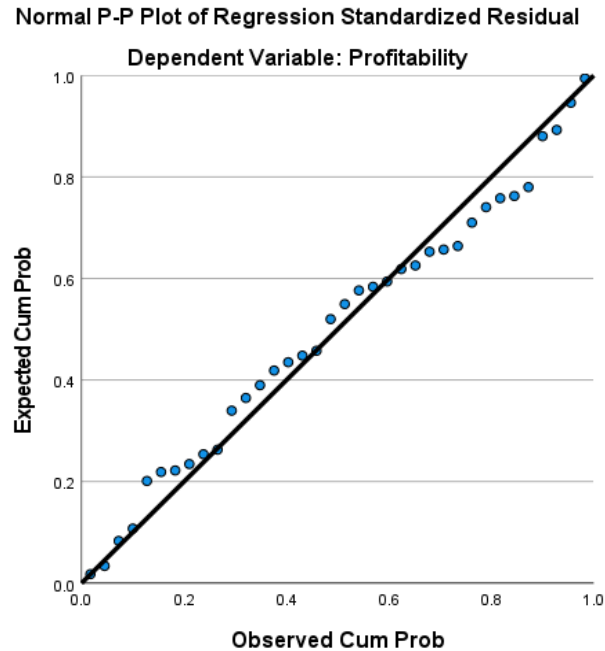


Figure 31: Normal PP Plot of Regression II

Comparison of the two regressions:

Since the Multiple correlation coefficient of Regression model for Revenue (0.979) is larger/ greater than Regression model for Expenditure (0.814), Revenue has more significant association with profit and can explain 95.8% of changes in dependent variable (profit). While Expenditure can explain 66.2% of changes in dependent variable (profit).

6.4 DELPHI ANALYSIS

The Delphi method is **a process used to arrive at a group opinion or decision by surveying a panel of experts**. Experts respond to several rounds of questionnaires, and the responses are aggregated and shared with the group after each round.

The problem statement/ question was circulated to panel of Industry experts from various fields viz. Airlines, Airports, Public relations, Airport In- charges, persons from operations, Engineering etc.

Problem Statement. - How Aviation Sector in North Eastern States of India can be made economically viable.

The problem statement/ question was circulated to panel of Industry experts from various fields VIZ Airlines, Airports, Public relations, Airport In- charges, persons from operations, Engineering etc. The problem statement was sent on their mobile through WhatsApp message. Total 16 nos. of responses received from expert group. Majority of the experts have advocated to increase interstate air connectivity, as the entire terrain of North East states is hilly and spread over a large area. Availability of Road network is limited and takes huge time to travel from one state to another. Air travel seems to be most viable source of travel but should be affordable for common person. Few experts stressed upon reduction in duties and taxes. Promotion of agri cargo is also recommended to develop cargo centers to send fresh vegetables, medicinal plants, fruits, to other part of the country. Further, some experts have recommended making direct international to neighboring countries to promote tourism and cultural exchanges.

Enhancing Economic Viability of Aviation in North Eastern India: A Delphi Analysis

Introduction:

The economic viability of the aviation sector in the North Eastern region of India is a critical aspect that requires careful consideration and strategic planning. To address this, a Delphi analysis was conducted to gather insights and recommendations from experts and stakeholders in the aviation industry. The responses highlighted key challenges and proposed solutions, providing a comprehensive understanding of the factors influencing the economic viability of the aviation sector in the North Eastern states.

Key Findings and Recommendations:

Tax Reforms for ATF:

Participants identified the high cost of Aviation Turbine Fuel (ATF) in India, especially in the North Eastern states, as a significant impediment to airline margins. The recommendation emerged for bringing ATF under the Goods and Services Tax (GST) ambit with a flat rate of 5% or lower. This move is expected to attract more airlines by offering economical airfares, thereby fostering rapid growth in air traffic in the region.

Withholding Taxes on Aircraft Lease Rentals:

The analysis pointed out the impact of withholding taxes (WHT) on aircraft lease rentals, which contribute to increased costs for Indian carriers. The consensus was to consider a waiver of WHT on lease payments, incorporating a sunset clause. This measure is expected to provide immediate financial relief to airlines, encouraging more connectivity with economical fares and contributing to the growth of air traffic in the North East.

Tourism and UDAN Scheme Support:

Recognizing the North Eastern states as tourism hubs, participants emphasized the role of state and central tourism departments in supporting airport developers and airlines. Promoting schemes like UDAN and providing financial assistance were seen as crucial steps in enhancing air connectivity, making air travel more accessible and boosting the tourism sector.

Incentives for Investment and Infrastructure:

To attract investments, participants suggested offering tax incentives and reducing duties for businesses operating in the North Eastern states. Additionally, the provision of free or low-cost electricity, given the states' abundance of hydel power, was proposed to support airport developers and airlines.

Inter-State Connectivity and Frequency:

Improving inter-state connectivity was highlighted as a key driver for revenue generation, cultural exchange, and enhanced infrastructure. The success of the UDAN scheme was acknowledged, with recommendations to further develop new airports and increase flight frequency to make the aviation sector economically viable for travelers.

Cargo Development and Economic Boost:

Participants stressed the importance of developing cargo facilities to boost the economy. By promoting indigenous agri-cargo from the North Eastern states, airlines could find it economically viable to continue services on less feasible routes. This approach aligns with the goal of limiting fare burdens on passengers while increasing the feasibility of air travel.

Addressing Defense Airfield Challenges:

The Delphi analysis identified defense airfields as critical bottlenecks hindering airport development and traffic growth. The difficulty in acquiring land at defense airfields and prioritization of watch hours for military aircraft movements were recognized as challenges that need to be addressed to optimize commercial utilization and develop passengers' facilities.

Groups	Suggestions related to
Top Management Group	Overall revenue, PSF, Route Navigation Facilities Charges RNFC, and Landing, Parking & Housing (LPH)
Senior Management Group:	Overall revenue, and Cargo Revenue
Management Group	Administrative & Other Expenses, and Overall revenue

Explanation:

The Delphi analysis provides valuable insights into the multifaceted challenges facing the economic viability of the aviation sector in North Eastern India. The recommendations emphasize a holistic approach, combining tax reforms, infrastructure development, tourism support, and cargo initiatives to create a conducive environment for sustainable growth. Implementation of these recommendations could pave the way for a thriving aviation sector that not only enhances economic viability but also contributes to the overall development of the North Eastern states.

Linkage between the Delphi and the Regression

The findings from the regression analysis and Delphi analysis offer complementary insights that can be leveraged to formulate comprehensive strategies for enhancing the economic viability of aviation infrastructure in the North Eastern Region.

a. Landing, Parking & Housing (LPH) Income Category:

Regression Finding: The UDF related to Car Parking, particularly concerning passenger volume, rental, and services, has the most significant influence on the Profit & Loss statement within the LPH income category.

Delphi Analysis: Top Management Group suggests focusing on overall revenue, Passenger Service Fee (PSF), Route Navigation Facilities Charges (RNFC), and LPH-related factors.

Linkage: The regression finding aligns with the Delphi analysis recommendation to prioritize factors related to overall revenue and LPH, indicating the importance of optimizing revenue streams from LPH services such as Car Parking to enhance overall profitability.

b. Expenditure Employee Benefits Category:

Regression Finding: Depreciation, amortization, and impairment have the most significant effect on the profit and loss in the category of Expenditure Employee Benefits.

Delphi Analysis: Management Group suggests focusing on Administrative & Other Expenses.

Linkage: Although the Delphi analysis does not directly address expenditure related to Employee Benefits, the regression finding underscores the importance of effectively managing expenses such as Depreciation, amortization, and impairment, which are crucial components of Employee Benefits expenditure. Optimizing these expenses can contribute to overall cost efficiency and profitability.

Overall, the linkage between the regression and Delphi analysis findings underscores the importance of integrating quantitative insights from regression with qualitative strategic recommendations from Delphi analysis to develop holistic strategies for optimizing the economic viability of aviation infrastructure in the North Eastern Region.

CHAPTER 7: FUTURE SCOPE AND CONTRIBUTION

7.1 SCOPE OF STUDY

The study shall be carried out at all airports in the North Eastern Region. The airports shall be categorized in three categories based on capacity in terms of Passenger and facilities available.

- i) Large size Airports- passenger traffic more than 5 million passenger per annum (Guwahati)
- ii) Medium size Airports- Passenger traffic above 1.5 million passenger per annum (Agartala, Imphal, and Dibrugarh)
- iii) Small size airports- Passenger traffic below 1.5 million. (Dimapur and Silchar)

7.2 DATA REQUIREMENT

Sources of data- both primary and secondary data will be used.

- The Primary data has been collected to meet the expectations of the subject under consideration from various participants from the industry and stakeholders, travelers, airports, airlines etc.
- The Secondary data shall be compiled/collected from ACRP/TRB/Indian publications/AAI etc.
- Secondary data in terms of traffic statistics financial performance and service standards shall be collected from AAI Airports, annual reports and monthly reports, ministry reports, business related books and international journals and other publications etc.

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

1. **Traffic Revenue Variability:** Traffic revenue among airports in Northeast India varies significantly, with Guwahati Airport standing out as the highest revenue generator, followed by Imphal and Agartala airports. Dimapur airport reported the lowest traffic revenue.
2. **Non-Traffic Revenue Differences:** Guwahati Airport also leads in non-traffic revenue, with substantial contributions compared to other airports. Dibrugarh Airport follows with significant non-traffic revenue, while Silchar Airport reports the lowest.
3. **Total Revenue Comparison:** Guwahati Airport consistently demonstrates the highest total revenue among all airports analyzed, indicating its pivotal economic role in the region. However, statistical analysis shows no significant difference in total revenue among the remaining airports.
4. **Expenditure Analysis:** Expenditure analysis categorizes airports into three subsets, indicating differences in spending patterns. Guwahati Airport forms a distinct group with no significant difference in expenditure compared to the other airports.
5. **Profitability Assessment:** Guwahati Airport emerges as the most profitable airport, exhibiting a significant difference in profitability compared to others. The remaining airports form a homogeneous group in terms of profitability, suggesting similar economic viability levels.
6. **Performed an extensive examination of a dataset spanning 6 years, which included statistics on income, spending, and profit/loss. Identified crucial variables in many categories that have a substantial impact on the Profit & Loss statement.**

7. Within the income category of Landing, Parking & Housing (LPH), the UDF (User Defined Field) that has the most influence on the Profit & Loss statement is Car Parking, specifically in terms of PAX (passengers), Rent, and Services. Depreciation, amortization, and impairment have the most significant effect on the profit and loss in the category of Expenditure Employee Benefits.
8. Delphi Analysis - Improving the connectivity of air travel between states and promoting direct international connections with adjacent nations.
9. Delphi Analysis - Enact a decrease in the duties and taxes imposed on Aviation Turbine Fuel (ATF) and establish a consistent taxation system throughout the North Eastern States.
10. Delphi Analysis - The North East region is abundant in natural scenic beauty and hosts a variety of multi-cultural festivals and fairs from different states. Therefore, it is necessary to offer incentives to tourists and passengers in order to encourage and inspire travelers.

Groups	Suggestions related to
Top Management Group	Overall revenue, PSF, Route Navigation Facilities Charges RNFC, and Landing, Parking & Housing (LPH)
Senior Management Group:	Overall revenue, and Cargo Revenue
Management Group	Administrative & Other Expenses, and Overall revenue

11. The analysis revealed significant disparities in the revenue generation of six airports, including traffic and non-traffic sources, total revenue, expenditure, and profit. These variances were determined to be statistically significant, suggesting that the financial performance of each airport varied from that of the others.
12. Revenue has a greater influence on profitability than expenditure, as it accounts for a substantial 95.8% of changes in profit, compared to expenditure's 66.2%.
13. Employee perks have a beneficial impact on profitability, while a decrease in Depreciation, Amortization & Impairment leads to increased profits in the aviation business.

14. The implementation of User Development Fee (UDF) has a substantial and beneficial effect on the sustainability of the aviation business in the North Eastern region. Conversely, Operational Expenses have a minor and statistically insignificant affect.
15. The variables RNFC and PSF have a strong positive relationship with profitability, but only UDF has a substantial impact on the viability of the aviation business in the North Eastern region.

Exclusion of comparative study of other small regional airports in India and other countries:

Uniform Parameters Across Small Airports: The parameters for studying small airports, such as revenue generation, expenditure, and profitability, are likely to be similar across all small airports, regardless of their location. Therefore, conducting a comparative study may not yield significantly different insights beyond what can be gleaned from analyzing Northeast Indian airports alone.

Unique Challenges of Northeast Indian Airports: Northeast Indian airports face distinct challenges due to geographical factors such as remote locations, low population density, and poor road connectivity. These factors significantly impact their economic viability and operational dynamics. For example, the results of our study show that except for Guwahati airport, all other airports in the region are running at a loss and depend on government subsidies.

Contextual Differences Across Regions and Countries: While small airports in other regions and countries may face similar operational challenges, the specific context of Northeast India, including its demographic, geographical, and economic conditions, sets it apart. Comparing Northeast Indian airports with those in other regions or countries may not provide actionable insights due to these contextual differences.

Policy Alternatives Tailored to Northeast Indian Context: Instead of comparing Northeast Indian airports with those in other regions or countries, it would be more beneficial to focus on analyzing policy alternatives and best practices specifically tailored to the unique challenges of Northeast Indian airports. This approach would allow for the development of targeted strategies to improve the economic viability and operational efficiency of airports in the region.

In summary, while comparative studies may have their merits in certain contexts, the unique challenges and contextual differences faced by Northeast Indian airports justify a focused analysis on this region alone. By addressing these challenges and exploring region-specific policy alternatives, policymakers can better support the sustainable development of the aviation sector in Northeast India.

Specific contribution

The research work on the economic viability of aviation infrastructure in the North Eastern Region makes several specific contributions:

Identification of Key Variables: The research identifies crucial variables across income and expenditure categories that significantly impact the Profit & Loss statement of airports. This provides valuable insights for stakeholders to focus on optimizing revenue streams and managing expenses effectively.

Insights from Regression Analysis: Through regression analysis, the research identifies specific factors within income and expenditure categories that have the most significant influence on profitability. This enables stakeholders to prioritize efforts and resources towards areas that have the greatest potential for improving financial performance.

Recommendations from Delphi Analysis: The Delphi analysis provides strategic recommendations for enhancing air travel connectivity, reducing taxation on aviation fuel, and incentivizing tourism. These recommendations offer actionable insights for policymakers and airport authorities to implement measures that can stimulate economic growth and improve the viability of aviation infrastructure.

Statistical Significance: The research establishes statistically significant findings regarding the impact of revenue sources, operational expenses, and other factors on airport profitability. This enhances the credibility and reliability of the research findings, providing a robust foundation for decision-making and policy formulation.

Holistic Approach: By integrating quantitative analysis from regression with qualitative insights from Delphi analysis, the research adopts a holistic approach to addressing the economic viability of aviation infrastructure. This comprehensive approach ensures that strategies are informed by both empirical evidence and expert opinion, leading to more effective and sustainable solutions.

Overall, the specific contributions of this research work lie in its ability to provide actionable insights, strategic recommendations, and statistically significant findings that can inform decision-making and policy formulation aimed at enhancing the economic viability of aviation infrastructure in the North Eastern Region.

8.2 RECOMMENDATIONS

Strategy and Action Plan for North Eastern Region

Strengthening of value chains from producer till consumers is the need of the hour in NORTH EASTERN REGION for boosting exports from the region for that en-number of programmers organized to educate entrepreneurs, farmers, FPOs & Exporters. Enhance efficiency of rural supply chain by launching pack houses, cold storages, processing facilities, transportation infrastructure and marketing linkages will reduce the food losses of NORTH EASTERN REGION and to develop the trade. Tapping to utilize huge market surplus and by improving quality of produce to reach the international market by calling various buyers from mainland of India.

The above recommendations shall promote social connections and increase footfalls which in turn increase economy of Aviation and give boost to local businesses as well.

Practical Contribution

The study of Economic viability of Aviation in North East Region of India has numerous practical contributions to aviation industry across the globe. The study helps to analyze and understand the key areas and parameters (both traffic and non-traffic) which contribute towards the profitability of an Airport. This can practically help engineers, officers and other stakeholders to keep an eye on key areas and ensure the maximum utilization of essential parameter to make their Airport profitable.

Theoretical Contribution

The study on the Economic Viability of Aviation in the North East Region of India presents a thorough theoretical foundation for comprehending the aviation sector in its entirety. This emphasizes the importance of smaller airports and defines specific goals to optimize their use based on rational criteria. The study utilizes a thorough analysis to develop a profitability equation for airports, which acts as a helpful resource for aviation stakeholders when evaluating new developments in the industry. This research

seeks to utilize stakeholder theory to reveal valuable insights regarding successful ways for managing stakeholders. These strategies are intended to promote growth, resilience, and long-term success within the aviation sector in the North Eastern Region.

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TENTATIVE TIME LINE

Table 59: Tentative Time Line

Activity	Period
Data Collection	3 months
Data Analysis	2 months
Report Writing and Presentation	3 months
Thesis Correction and Submission	2 months

ANNEXURES

ANNEXURE – I

Table 59: Response Received by Aviation Experts during Delphi Analysis

	Profile	Response/ solution
1	Dhanjay Tiwari – Dy. General Manager (Air Traffic control). Aviation Experience of 31 years, remain posted at LGBI Airport, Guwahati. (Assam) for 03 years. Responsible for Air traffic management, search and rescue operations and Automation etc. M-0430114376	Rationalizing of ATF (Aviation Turbine Fuel)- - ATF in India costs 30-35 % more than neighboring countries reducing Airline margins, which are quite sensitive to fuel prices. VAT on ATF varies from 0% to 29 % across various States in India. This is over and above Excise duties, marketing and logistics cost on production and distribution of fuel. Air carriers may be benefited if ATF is brought under GST ambit with a flat rate of 5 % or lower in the North Eastern Sectors of India, which may attract more Airlines with economical Airfare, which leads to fast growth of Air Traffic in North East States. Withholding Taxes (WHT) on Aircraft Lease Rentals-India's commercial Aircraft fleets is almost leased from overseas companies. Foreign lessors pass on domestic taxes, including WHT on Aircraft lease payments to the Indian Carriers, increasing the cost burden. WHT can range from 0-11 % on lease rentals subject to availability of double tax avoidance treaties. Waiver of WHT on lease payments with a sun set clause would enable Airlines cash in the pockets and help expedite recoveries in a situation where the Government is unable to provide direct financial relief. This may also attract more connectivity with economical fares and lead to growth of Air traffic in North East States.
2.	Amitabh Rungta – Assistant General Manger Engineering (Electrical)- 15 years' experience in Aviation. M-7709647116	North Eastern states being a hub for tourism depends directly on Aviation sector. The state/center tourism department may assist the Airport developer/Airlines in promoting more schemes like UDAN to provide necessary financial support to the Airlines.

	Profile	Response/ solution
		Incentives must be given in taxes and duties to attract more investments in North Eastern States being Hydel power enriched states have low cost of electricity, hence state Govt. may provide free electricity or at a bare minimum rate to support Airport developer and Airlines at the Airport.
3.	Nihit Ranjan Srivastava- Assistant Manager (IT) - Has 05 years' experience in Aviation Industry and remain posted at LGBI Airport Guwahati. (Assam) for four years. He has managed information technology aspect of Airport related to WI-FI, LAN, IT projects for generating revenue at Airport. M-8840439609	Increase in Inter State connectivity between north Eastern States will increase in revenue generation with enhanced cultural sharing and more robust infrastructure. UDAN scheme (Ude Desh Ka Aam Nagrik) has made air travel more feasible for normal passengers.
4..	Ram Achyuth Kumar- Duty Manager Terminal (LGBI Airport Guwahati)- Managing Airport terminal operations. Having 05 years of Experience in Aviation Industry. M-9493429151	Developing new Airports and increasing interstate connectivity and frequency of flights among the Airports sector economically viable and feasible for travelers.
5.	Mrs. Jabira Begam- Jt. General Manager (ATC) - Having more than 33 years' experience in Aviation Industry. Worked at LGBI Airport for a period of 03 years. M-7558824448	The terrain in North eastern States is not very friendly for travel at many places so Air travel is better option for this which can lead to the development of these states. When demand is more and supply is less, its bleads to increase in price. In Aviation also this holds good. So, by improving inter connectivity the number of flights are increased and therefore the fare will reduce and air travel becomes affordable for a common man and indirectly leads to the developments of NE states. When inter connectivity is improved, movement between states improves which in turn leads to development of NE states. The RCS Airports and UDAN schemes have helped these states to develop.

	Profile	Response/ solution
		By improving connectivity, the tourism sector will also improve. The NE states are very beautiful with greenery, hills and waterbodies all around. This will attract tourists. So for more tourists to visit these states interconnectivity has to improve which in turn will develop these states by tourism. Also sending local vegetables, fruits etc. in other states by developing cargo facility will boost the economy. All, this will happen when Air connectivity between North eastern states increase.
6.	Vimarsh Yadav- Senior Manager (CNS) - Have an experience of 24 years in Aviation Industry. remain posted at LGBI Airport for 05 years, managing communication and navigational and surveillance systems for safe and efficient Indian air space. M-7002100700	In order to make air travel economically viable, it is necessary to increase the number of flights through incentives in taxes band duties, as well as to bring cargo to a level that limits the fare burden on the passengers. For this to increase feasibility for passengers, the work of increasing air connectivity has already been started through UDAN scheme. Promotion of indigenous Agri cargo from North Eastern States will enable airlines to continue their services on these less feasible routes as well.
7.	A.N. Sharma JT.GM(CNS) - Having more than 20 years of experience in Aviation Industry. M-9410150066	• One of most critical bottlenecks in developments of Airports and traffic growth is that most Airports in North East India is civil /defense common use Airports. Defense airfields have some inherent characteristics which sometime may not support the optimal commercial utilization. As it is difficult to acquire land at defense airfields, passengers' facilities cannot be developed. • Watch hour are also prioritized in favor of military aircraft movements.
8.	M.P. Tiwari- Dy. General Manager Engineering (Electrical) , Regional office Guwahati. - 25 years' experience in Aviation Industry. M-8239999227	As we know NER has huge tourism potential, this potential has to be harnessed with inclusion of local people, state/ Center Govt. and business communities etc. The attraction and volume of tourists will force to Aviation sector for multidimensional growth. This would demand more number of Airports/ Airlines etc. and significant capacity utilization of

	Profile	Response/ solution
		Airports, load factor of airlines etc. The profit of Airlines – Airports- local business communities- local public etc. will come on wheel of growth of Aviation sector in NER.
9.	P. Hira. Station Manager Air Asia, LGBI Airport, Guwahati (Assam). Having more than 10 years in Airline Industry M-0435341604.	• ATF price should be minimized by reducing VAT and other State taxes. • Airport charges to be minimized so that all small, medium enterprises can run their Airport business. • PSF/ASF charges to be minimized. • All airport should have ILS/Night landing facility for ease of Operations at any hours or during irop. • Subsidized tkt rates from Govt. to make the affordability of Air travel. • State Govt. tourism dept. should join hands airport/ airlines for better promotion to attract tourists to target families and groups. • Airport premises should be very easy process to follow. • International routes and connections should be very viable and affordable and should run consistently.
10.	Ishwar Dayal –Duty Manager Terminal operations- LGBI Airport Guwahati- (05 years of Experience in operations, passenger's facilitations, executing protocol duties etc. M-9873803268	In India Aviation Turbine fuel (ATF) accounts for 40 % of operational costs of an Airline. Therefore, reduction in VAT on ATF in North Eastern States will bring down the Airfare ultimately making the air travel economically viable and feasible for travelers and boost up aviation sector in North Eastern part of Country.
11.	Nilesh Kumar – Assistant General Manager (Civil). - working with Airports Authority of India for the last 20 years. M-9501067092	For economic viability can only be possible with inclusion of mass traveler called volume-based model. The topographical conditions of North Eastern following steps required for mass volume travelling. • Tourism-promotion of tourism with uniqueness of area.

	Profile	Response/ solution
		• Industry- plane area with major industry and hilly region with herbal bases agro industry art and craft. • Connectivity- Airports need to be connected with roads and other mode of transport like ropeways if not by road for easy accessibility o to each corner. • Hospitality industry- mass of people not travelling to remote area due to non-availability of hospitable and fearful condition, inclusion with hospitality education like hotels with eco-tourism can improve the growth pattern. • Education-condition and standard- maximum north eastern state people travelling to other part of India for their education from basic to technical education this need to be improved, which certainly fruitful in long run. • As air travel is related with economic development, for inclusion of volume of air traveler underprivileged class must be made with improved financial stature.
12.	Tilak Raj- Duty manager operations – more than 05 years of experience Guwahati and Amritsar Airports. Executed MESS, ESS and other Airport Contracts. Handled many VVIP and VIPs movements, HAZ movements, Nodal officer of KIYG FROM Guwahati Airport and COVID times contributed b hugely in resolving passengers queries to make their journey hassle free and fruitful via Guwahati Airport. M-7011160338	Increase in Inter State connectivity between North Eastern States will increase in revenue generation with enhanced cultural sharing and more robust infrastructure. Along with this opening of MRO's and flying clubs in North East will increase the economy and easy access to Northeast. More flights specially ATRs need to be introduced to connect 7 sisters and last but not the least, flying tourism of unexplored places will definitely boost the attraction in North East.
13.	Arun Kumar Senior Manager Engineering (Electrical)- more than 15	Promotion of Indigenous Agri- cargo from North Eastern States will increase revenue generation since there is abundance of

	Profile	Response/ solution
	years of Aviation Industry experience. Remained posted at LGBI Airport Guwahati. M-9446157718	availability of vegetables and medicinal plants, fruits at North East which will boost economy and enhance cultural sharing.
14.	Vineet Hooda – Electrical Engineer- 05 years of experience at Airport. M- 9643733217	North Eastern States have great tourism potential. In most of the State's annual music/ cultural festivals are organized which attract tourists from around the world. ZIRO music festival of Arunachal Pradesh, hornbill festival of Nagaland, shiur lily festival of Manipur to name a few. Besides the North Eastern states have many scenic attractions and religious places. Being hilly terrain, the North East is not easily accessible with railways and roadways. The Aviation sector can fill up this gap by providing helipads and airstrips targeting these very tourist attractions. This will also bring business and commerce for the region and make the air travel economic viable for common people. Also, the Aviation sector has the potential to revolutionize the movements of perishable cargo from North East as the produce take long time to reach different parts of the country via other means. The Government has taken the initiatives to subsidize the air travel to remote stations through UDAN . On our part we can help by providing improved landing facilities at these stations so that movement of passengers and cargo is not hampered due to weather conditions.
15.	Ajay Verma, Assistant Manager Operations- have 05 YEARS OF EXPERIENCE AT Guwahati and Lucknow Airports. Managing Airport operations ensuring seamless functioning of Airport, passengers' amenities, VIP movements etc. M-7007961552	By increasing Air connectivity between states in UDAN Scheme i.e. (Ude Desh Ka Aam Nagrik) and introduction of new direct International ATS routes from Airports of North Eastern States can help in making Aviation sector economically viable and feasible for travelers.
16.	Inder Mohan, Manager Corporate Communications,	Introduction of New Direct International routes from NE States. North East part of India is still considered an unexpected paradise

	Profile	Response/ solution
	Regional office AAI, Guwahati. - Having very good experience in corporate communication since of more than 05 years, including Journalism and D. D News, ZEE News. etc. M-8800286273	in the country with clean, green environment and to extent organic food products. New International air connectivity will attract tourism, generate employment and will bring valuable foreign exchange. An airport is considered to be hot cake for job especially for youth and related professionals. Youth from NER still moves out for employment, depends on other city's resources for livelihood, but bringing aviation on International map will provide opportunities for young entrepreneurs and existing business. It will prosper local population. Dependency on metro cities will reduce. Cultural exchange will prosper the social interaction. An estimated 55% of tourists prefer to travel by air and this potential should be utilized. Govt. and agencies should bring supportive schemes for its viability.

ANNEXURE – II

Table 60: Secondary data on Data on Revenue, Expenditure, and Profitability of the six Airports.

Guwahati	Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Non Traffic Revenue	Trading Concessions	105383000	105820000	73069000	169230000	328900000	93685000
	Rent & Services	87954000	153622000	49153000	101884000	129734000	109538000
	Car Parking	2873000	4657000	39531000	50241000	52670000	7901000
	Restrooms	252822	288917	249984	310853.7	431533.6	299283.6
	Admission Fees/Commercial Passes	2640000	3194000	5930000	3327000	1602000	833000
	Miscellaneous Non-Aeronautical Apt Serv.	2611000	1749000	95000	314000	413000	573000
	Cargo	4635070	10112095	3214080	14506506	21037263	7346052
	Others	4336108	9473988	7317936	5579640.3	4629203.4	51900664.4
Traffic Revenue	Route Navigation Facilities Charges RNFC	134023000	187649000	220387000	259395817.5	248438858	134324271.7
	Landing, Parking & Housing (LPH)	250336000	310232000	372448000	418196676.6	390752655	212909834.9
	PSF	175180000	234350000	293771000	355154105.3	91687921.3	60089701.95
	UDF: Domestic PAX	445738000	596813000	752428000	1067742275	1075015532	406759927.2
	Oil Throughput Revenue	7663000	11704000	14240000	18807165.9	12238706.9	7886060.48
	Ground Handling	9964000	20816000	16025000	18890091.68	15346077.9	7418765.633
	Extension of Service Hours	959000	1052000	1876000	1952252.559	2195436.04	2118464.632
	Royalty on CUTE Charges	17022000	22890000	22303000	42883615.33	46398812.7	16829973.47

Expenditure	Employee Benefit	259140160	331679600	476574505.6	556309920	611144400	473231160
	Operational Expenses	170060730	208484320	296146298.2	270304820	229179150	197179650
	Administrative and other expenses	210551380	208484320	235536822.8	113102017	305572200	223470270
	Depreciation	80981300	85289040	148223172.6	172203071	122228880	157743720
	Security Exp	89079430	113718720	263541200.9	346106172	259736370	262906200
Agartala	FY	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Non Traffic Revenue	Trading Concessions	6,218,798.00	7,764,242.00	9,963,072.79	13,240,099.45	13,794,404.95	2,934,021.06
	Rent & Services	22,472,266.68	13,832,259.13	23,128,857.48	21,933,675.47	22,326,629.95	22,814,776.70
	Car Parking	605,334.00	1,265,583.00	1,327,500.00	1,460,250.00	1,610,385.29	374,114.15
	Restrooms	1,599.00	50,347.00	63,767.00	89,226.40	62,274.00	40,232.00
	Admission Fees/Commercial Passes	2,531,108.00	707,321.00	4,363,466.08	3,022,120.34	1,745,396.10	189,444.78
	Miscellaneous Non-Aeronautical Apt Serv.	889,952.00	9,773.00	110.17	221.11	400	220
	Cargo Revenue	545,361.00	645,472.00	654,742.00	664,742.00	658,742.00	672,742.00
	Others	1462459.63	3047781.86	3656735.75	4402700.65	4396344.77	13660063.39
Traffic Revenue	Route Navigation Facilities Charges RNFC	14,536,643.00	18,131,571.00	21,946,300.26	24,197,231.19	31,420,753.00	18,474,635.00
	Landing, Parking & Housing (LPH)	35,224,329.00	42,427,112.00	52,442,717.88	51,708,750.52	59,254,742.00	29,648,554.00
	PSF	101462996	123946316	145783792.9	148152791.5	78705761	27803854
	UDF: Domestic PAX	20,044,555.00	21,544,555.00	21,044,555.00	20,844,555.00	21,844,555.00	22,953,700.00
	Oil Throughput Revenue	608,528.00	465,146.00	1,261,690.96	1,970,664.18	1,654,667.51	1,684,667.51
	Ground Handling	1,008,106.00	1,553,527.00	1,859,480.42	1,923,736.36	881,405.46	63,700.00

	Extension of Service Hours	1,908,483.00	2,510,953.00	2,902,258.02	1,475,865.90	1,193,955.00	75,540.00
	Royalty on CUTE Charges	9,306,185.11	10,586,382.00	12,392,820.37	12,798,384.16	13,135,969.36	4,205,371.36
Expenditure	Employee Benefit	131,493,000.40	139,342,052.74	163,257,331.58	186,705,712.20	251,994,701.78	218,883,589.43
	Operational Expenses	89,045,949.12	73,992,686.11	83,647,068.83	86,922,937.13	89,015,142.70	248,710,160.17
	Administrative and other expenses	14318210.35	6185704.05	89030287.99	32281110.75	63841411.09	131618311.1
	Depreciation	80,102,990.35	69,146,120.05	67,648,023.45	54,460,103.99	80,054,825.90	190,065,496.91
	Security Exp	145371212.1	160257010.7	176562121.4	199463600.4	63667267.75	110295559.1
Imphal	Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Non Traffic Revenue	Trading Concessions	2,261,297.89	2,301,761.84	2,980,769.53	4,799,157.89	8,141,845.56	4,753,833.66
	Rent & Services	7,879,701.77	8,177,925.74	9,845,207.41	16,160,468.89	5,208,863.43	6,795,444.61
	Car Parking	4,921,626.78	4,963,566.25	6,335,544.32	6,244,993.73	5,893,986.55	1,429,185.46
	Restrooms	18,227.14	17,360.21	14,893.51	11,479.48	32,703.93	10,432.17
	Admission Fees/Commercial Passes	1,097,911.72	547,228.53	454,233.58	377,234.24	89,968.45	15,166.63
	Miscellaneous Non-Aeronautical Apt Serv.	324,059.33	295561.3278	57,893.53	773194.5892	3852498.943	5,660.87
	Cargo Revenue	1,164,156.46	674,472.45	824638.8193	6350031.361	5998052.191	7240259.618
	Others	2061814.418	1888606.531	3399744.96	2463735.568	2932939.197	17596773.3
Traffic Revenue	RNFC	19,289,455.82	20,207,947.49	24,703,402.35	41,512,650.07	37,825,182.67	20,779,960.25
	LPH	28,872,232.66	29,131,076.61	35,921,173.22	47,676,490.85	44,730,226.68	23,350,842.21
	PSF	75,304,839.24	82,240,253.99	99,950,764.89	122,738,223.95	64,768,658.31	2,750,709.97
	UDF	15098444.02	17369535.57	18510656.66	20514679.7	16639743.47	6000753.461

	Oil Throughput Revenue	382,798.86	503,796.03	837,883.21	1,796,628.99	1,632,016.86	18,660,651.12
	Ground Handling Revenue	1,232,672.96	1,300,485.96	1,575,560.16	1,926,137.74	1,455,691.68	2,313,245.07
	Extn. of Service Hours	680,878.96	850,570.25	3,034,011.66	7,539,923.43	2,086,955.00	1,291,568.86
	Royalty on Cute Charges	6,156,421.49	7,808,981.09	7,410,145.29	11,297,805.51	10,321,957.45	6,109,617.91
Expenditure	Employee Benefit	99,222,753.55	98,780,412.25	137,919,042.20	154,587,658.91	193,806,999.81	170,183,537.78
	Operational expenses	53,134,378.82	82,304,807.29	143,801,337.27	236,649,640.29	228,366,643.25	88,726,083.77
	Administrative and other expenses	14,788,710.19	56,154,347.40	72,421,434.76	60,624,999.43	107,508,840.95	68,194,650.89
	Depreciation	50,800,107.94	61,272,608.16	77,916,785.28	99,863,834.37	153,498,306.23	166,143,148.63
	Security Exp	135,533,075.00	181,785,436.00	194,129,155.83	218,897,988.53	44,569,077.91	180462734
Dirbrugarh	Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Non Traffic Revenue	Trading Concessions	4,845,331.00	4,860,667.00	5,926,733.24	9,353,147.75	9,101,870.39	4831108.015
	Rent & Services	20,455,457.73	20,483,883.36	15,078,892.75	22,771,588.84	25,579,951.40	23826236.83
	Car Parking	1,154,120.00	1,139,973.00	1,217,568.26	1,200,038.83	1,048,099.82	469880.9879
	Restrooms	26,529.00	5,217.00	134,326.86	105,073.41	42,089.41	6,257.70
	Admission Fees/Commercial Passes	845,070.00	861,227.00	908,822.98	875,033.81	756,677.44	181937.2014
	Miscellaneous Non-Aeronautical Apt Serv.	434,520.00	1,071.00	103,123.48	40,122.26	93,974.37	66,202.23
	Cargo	105,972.00	230,615.00	253,096.63	277,613.87	257,948.00	215,712.03
	Others	1630032.89	8149224.91	19643334.9	6557423.596	6207863.096	5327539.029
Traffic Revenue	RNFC	15,950,173.00	15,208,447.00	16,762,235.13	18,314,294.30	28,956,849.00	27043079.83
	LPH	14,449,674.00	9,903,756.00	8,980,118.10	8,578,005.83	13,158,139.00	15267116.49

	PSF	32,078,050.00	32,207,385.00	37,038,790.32	37,423,532.14	27,132,391.00	3361525.545
	UDF	8,000.00	9,000.00	10,000.00	6,000.00	2,000.00	15847324.51
	OIL Throughput Revenue	738,757.00	666,113.74	327,412.34	714,723.46	619,326.95	34592.46213
	Ground Handling Revenue	738,855.00	1,210,199.00	853,238.44	1,107,051.83	1,988,207.40	1342450.548
	Extn. of Service Hours	2,059,192.00	1,081,307.00	1,079,219.32	1,953,308.24	4,525,425.00	1315326.398
	Royalty on Cute Charges	2,510,688.00	2,918,214.60	2,999,089.60	3,235,485.00	4,535,605.00	3583927.901
Expenditure	Employee Benefit	90301052.59	96497732.69	125583216	129191188.6	177884203.7	138357663.1
	Operational expenses	59780060.6	56088060.3	57896951.69	69494227.88	75636403.03	65706698.49
	Administrative and other expenses	13066015.85	13214084.8	26936606	2041793.71	11624019.41	24040070.81
	Depreciation	70328254.77	74856669	49940339.96	89383155.23	47446879.7	57673226.49
	Security Exp	69019407	83464526	89383155.23	108981707.8	22894187.46	116372531
Dimapur	Year	2015	2016	2017	2018	2019	2020
Non Traffic Revenue	Trading Concessions	789,513.41	777,386.75	956,184.55	2,226,485.94	994,255.19	2,617,756.23
	Rent & Services	2,942,666.45	3,528,238.56	4,886,747.86	17,378,285.51	14,580,370.79	12,499,144.11
	Car Parking	375,705.47	315,710.02	530,425.55	413,540.62	508,378.46	309,501.48
	Restrooms	29,288.85	70,237.27	27,696.22	83,276.69	49,022.36	9,436.60
	Admission Fees/Commercial Passes	350,415.52	289,332.61	255,983.56	416,027.86	186,118.71	31,489.60
	Miscellaneous Non-Aeronautical Apt Serv.	567,583.52	489,683.95	552,686.91	598,022.15	608,672.71	617,843.70
	Cargo	83567.46024	147133.4047	268837.4452	547735.7294	590712.9087	328713.5037
	Others	1825214.33	1070159.474	2122775.234	1158947.555	1537723.984	886825.4995

Traffic Revenue	Route Navigation Facilities Charges RNFC	5,544,045.13	6,196,582.85	7,447,114.61	6,819,176.90	6,552,584.73	5,301,842.00
	Landing, Parking & Housing (LPH)	6,070,785.74	6,382,231.78	7,044,177.64	6,875,082.86	6,217,362.48	4,645,114.00
	PSF	11,199,980.45	14,266,864.73	19,220,084.26	19,907,242.40	9,053,165.69	682,528.00
	UDF : Domestic PAX	1,935,857.88	2,642,109.81	3,027,789.92	2,155,123.96	3,231,767.71	4,086,100.00
	Oil Throughput Revenue	471,673.38	514,162.75	405,653.44	624,582.70	391,772.93	22,252.00
	Ground Handling	344,619.08	344,373.26	266,362.15	386,635.70	105,808.15	116,428.00
	Extension of Service Hours	1,311,744.39	906,184.80	1,112,237.06	861,910.90	671,774.75	3,134,915.00
	Royalty on CUTE Charges	528.9482739	357.0294945	451.4826271	820.1556553	587.4187804	580.43
Expenditure	Employee Benefit	58,267,949.51	62,311,313.68	87,579,889.19	91,693,127.95	127,010,546.55	107,276,445.32
	Operational expenses	29,464,066.31	57,562,918.11	35,413,402.02	34,916,464.96	96,070,925.92	50,386,123.05
	Administrative and other expenses	6,107,184.63	8,963,627.55	38,947,900.54	40,127,780.80	15,670,812.80	15,247,527.27
	Depreciation	51,709,475.97	48,040,182.07	46,392,277.23	44,373,722.10	63,589,470.44	69,778,708.72
	Security Exp	55,893,167.00	73,189,520.22	75,415,678.57	80,586,421.95	26,020,377.49	70352664
Silchar	Year	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Non Traffic Revenue	Trading Concessions	1,465,861.51	8,955,600.10	2,177,949.37	8,133,545.95	7,806,938.89	866,325.17
	Rent & Services	813,231.80	12,932,636.32	1,465,084.89	4,896,770.65	3,079,429.61	1,012,924.00
	Car Parking	10,574.87	200,743.28	1,178,278.03	2,414,690.96	1,250,207.14	73,064.08
	Restrooms	5,548.21	24,241.67	5,915.22	7,440.24	9,260.42	5,294.49
	Admission Fees/Commercial Passes	56,177.54	270,334.64	176,771.79	159,884.23	38,015.15	7,705.43
	Miscellaneous Non-Aeronautical Apt Serv.	58,035.25	148,046.29	2,822.19	7,622.62	537.92	1,660.28

	Cargo	142,939.01	349,732.58	196,441.00	234,549.00	202,120.00	90,073.26
	Others	108775.4751	1515180.856	184179.4147	816653.9223	458346.1452	483000.3029
Traffic Revenue	Route Navigation Facilities Charges RNFC	111,171.55	560,840.26	3,560,646.34	8,502,561.28	4,587,214.99	3,446,755.47
	Landing, Parking & Housing (LPH)	11,659,081.79	14,629,422.15	17,828,997.96	13,707,802.98	7,214,903.53	5,463,245.13
	PSF	8,158,777.36	11,051,069.08	14,062,725.09	11,641,376.93	1,692,930.70	8,305,027.70
	UDF: Domestic PAX	26,839,068.01	27,646,387.78	20,453,348.70	18,413,830.37	19,849,230.81	10437458.1
	Oil Throughput Revenue	117,697.65	551,922.11	681,679.06	616,479.09	225,968	84,316.09
	Ground Handling	431,612.84	981,587.41	767,135.07	619,193.27	283,351.82	190,355.76
	Extension of Service Hours	44,678.38	49,614.92	89,830.47	64,111.17	41,967.28	54,366.32
	Royalty on CUTE Charges	705,616.88	1,079,396.81	1,067,637.31	1,405,644.91	337,432.52	431,865.43
Expenditure	Employee Benefit	30951925.63	48023993.29	45967740.71	40421509.6	31928065.65	22837559.93
	Operational expenses	36409558.24	37677099.44	38664261.61	39647068.36	21542286.96	18339740.44
	Administrative and other expenses	9197716.772	8876548.49	17988580.59	1164861.274	3310680.462	9531517.262
	Depreciation	31072571.8	40373918.2	27666013.22	41008916.38	13513523.34	22866544.7
	Security Exp	34171593.09	33031079.58	59204403.87	44173644.38	23384443.6	22824037.67

PROFILE OF THE AUTHOR

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International Airport Professional (IAP) serving Aviation Industry for the last 35 years. Passed BSc. Engineering (Elect.) from Dayal Bag Educational Institute, Faculty of Engineering, Dayalbagh, Agra (UP) in the Year 1987. Prior to this had graduated in Science from Chaudhary Charan Singh University, Meerut (UP) in the Year 1983. Having experience in Airport Planning and Engineering, Airport operations, Airport commercial, Airport security including Airport administrations. Working with Airports Authority of India serving in various capacity at various locations across the country viz. Lucknow (UP), Bhopal (MP), Srinagar (J&K), Amritsar (Punjab), Dehradun (Uttarakhand), Kullu (Himachal Pradesh), Jammu(J&K), CHQ, New Delhi, Guwahati (Assam) and Indore(MP). Presently working as General Manager Engineering(Elect.) at Airports Authority of India, Corporate Headquarters, New Delhi. Also having MBA in HR & Finance and PG Diploma (Pers. Management & Industrial Relations). Persuaded PHD in Aviation Management from UPES (University of Petroleum & Energy Studies), Dehradun on the topic titled “Economic Viability of Aviation in North Eastern Region”.

CAREER OBJECTIVE:

Serving the Nation to the best of ability & capacity by adopting best practices prevailing in corporates. Aim is to educate and elevate the common people through knowledge sharing and skill upgradation.

AWARDS & RECOGNITIONS:

Certificate course on Internal Quality Audit (ISO certification) from 07.10.2004-09.10.2004 at Amritsar Airport.

Certificate course in ISO certification at Airports Authority of India Ahmedabad 25th. Nov. 2005.

Commendation letter from Regional Executive Director, Northern Region Airports Authority of India on completion of New Runway, New Apron, Taxiway and associated works in time bound manner. dt. May 15, 2008

Commendation letter from Regional Executive Director, Northern Region Airports Authority of India in conducting Regional Vigilance workshop at Dehradun dt. 19th May 2008.

Certificate on Orientation program for Airport Controllers/Airport Directors at National Institute of Aviation Management and Research, New Delhi. 25-29 August 2008.

Commendation letter from Regional Executive Director, Northern Region on successful operationalization of New Airport Terminal building and Technical block cum control Tower year at Dehradun Airport dt. July 14, 2010

Commendation letter from Regional Executive Director, Northern Region, towards organizing inter region Table Tennis Tournament at Dehradun under the control of Regional sports control Board, Northern Region dt. May 10, 2011

Airport Service Quality improvement training at National Institute of Aviation Management and Research, New Delhi. 23-24 May 2011.

Commendation letter from on Regional Executive Director, Airports Authority of India, Northern Region on successful conduct of Hindi Parliamentary Committee dt. 22 August 2012 at Kullu (Himachal Pradesh).

Appreciation letter from Regional Executive Director, Airports Authority of India, Northern Region on achieving position in top 10 Airports in Customer Satisfaction Index as Airport Director for Jammu Airport. Year 2013-14

International Airport professional certification (Post Graduate Diploma Certificate) from Global ACI-ICAO (Airport Council International – International Civil Aviation Organization) Airport Management Professional Accreditation Programme (AMPAP) dt. June 10, 2013.

Appreciation letter from Regional Executive Director, Airports Authority of India, Northern Region on Excellent work in Hindi dt. 2nd Feb 2015 at Jammu Airport.

Certificate course on Safety Management Systems from Executive Director (Aviation Safety), Corporate Head quarter, New Delhi. dt. May 24, 2019.

Commendation letter from Regional Executive Director, Airports Authority of India, Northern Eastern Region, Guwahati (Assam) on management of Airport Operations during CAA (Citizen Amendment act) at LGBI Airport Guwahati dt. 8th Jan. 2020.

Commendation letter from Chairman Airports Authority of India on successful possession of 15 Acres of land from Army Authorities, at Guwahati, (Assam). dt.Feb.7, 2020

Appreciation letter from Chairman, Airport Advisory Committee, Member of Parliament, Guwahati, Madam Queen Oja, on better management of Covid 19 Protocol at LGBI Airport, Guwahati dt. 27.09.2021.

Appreciation letter dt. 27.09.2021 from Chairman, Airport Advisory Committee, Member of Parliament, Guwahati, Madam Queen Oja, on achieving Airport Service Quality rating 4.86 out of 5 and becoming second among Indian Airports managed by Airports Authority of India.

Appreciation letter dt. 27.09.2021 from Chairman, Airport Advisory Committee, Member of Parliament, Guwahati, Madam Queen Oja, on overall functioning/operations of LGBI Airport, Guwahati.

Appreciation letter dt. 13.10.2021 from Sh. Srinivasulu Gunda, Director (Parliament) towards Airport Inspection by Parliamentary Committee on Passenger facilities , safety standards, infrastructure, growth and over all development of LGBI Airport, Guwahati.

Appreciation letter by Member of Parliament, Lok Sabha, Madam Prof. Rita Bahuguna Joshi (Convener Second Sub Committee of Parliament on Official Language) towards inspection of DABH Airport, Indore dt. 02.03.2022.

Appreciation letter from Executive Director (Administration) Airports Authority of India, Corporate head Quarter, New Delhi dt.9 Jan, 2023.

RESEARCH PAPER PUBLICATIONS:

“Unlocking the Economic Viability and Potential of North Eastern Airports: An analytic study with opportunity and challenges” published in the Journal of Law and Sustainable Development: ISSN: 2764-4170

”Profitability and Future Viability of LGBI Airport Guwahati with respect to both Traffic and Non-Traffic Sources of Revenue” published in <http://eelet.org.uk> : ISSN 2323-5233.

FDPS/SEMINARS/CONFERENCES:

Faculty Development Program on “Research Methodology” from June 7th -11th, 2021 organized by School of Business, UPES, Dehradun.

Unlocking Financial Growth After Lockdown: Issues and Challenges Post Pandemic Covid-19 on 22May 2021 by Prestige Institute of Management, Gwalior.

PROFESSIONAL EXPERIENCE:

- Manager Engg (Elect) with Airports Authority of India from 17.10.1994-31.10.2000 at Bhopal, Srinagar, Amritsar.
- Sr. Manager Engg (Elect) with Airports Authority of India from 01.11.2000-02.06.2002 at Amritsar.
- Sr. Manager Engg (Elect) with Airports Authority of India from 03.06.2002-02.06.2005 at Gaya, Amritsar.
- Asst. Gen. Manager Engg (Elect) with Airports Authority of India from 03.06.2005-18.06.2006 at Amritsar.
- Airport Director with Airports Authority of India from 19.06.2006 -29.06.2011 at Dehradun.
- Jt. Gen. Manager Engg (Elect) with Airports Authority of India from 30.06.2011-28.08.2011 at CHQ, Delhi.
- Airport Director with Airports Authority of India from 29.08.2011-31.03.2013 at Kull (Bhuntar)
- Airport Director with Airports Authority of India from 01.04.2013-01.06.2015 at Jammu.
- Jt. Gen. Manager Engg (Elect) with Airports Authority of India from 02.06.2015-17.09.2018 at CHQ, Delhi.
- Airport Director with Airports Authority of India from 18.09.2018-16.01.2022 at Guwahati.
- Airport Director with Airports Authority of India from 17.01.2022-19.04.2022 at Indore.
- Presently working as General Manager Engg. (Elect.) from 20.04.2022 at CHQ, Delhi.

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PLAGIARISM CERTIFICATE

1. We, Professor (Dr.) Sumeet Gupta (Internal Guide) and Associate Professor Dr. Banajit Changkakati (External Guide) certify that the Thesis titled **“Economic Viability of Aviation in North Eastern Region”** submitted by Mr. Ramesh Kumar having SAP ID 500072266 has been run through a Plagiarism Check software and the Plagiarism Percentage is reported to be 9%.

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A handwritten signature in blue ink, appearing to read 'Sumeet', with the date '10/10/2024' written below it.

Prof. (Dr.) Sumeet Gupta
Changkakati

A handwritten signature in blue ink, appearing to read 'Banajit', with a small mark below it.

Associate Prof. (Dr.) Banajit
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