

**“Analysis of seasonal aircraft in the off-season and peak season” at  
Airports Authority of India, Goa International Airport**

An Internship Report for

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by

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Date: 28/04/2023

Examined by:




Seal of the School

## DECLARATION

I hereby declare that the data presented in this Dissertation / Internship report entitled, **“Analysis of seasonal aircraft in the off-season and peak season”** at **Airports Authority of India, Goa International Airport** is based on the results of investigations carried out by me in the (Management Studies) at Goa Business School, Goa University under the Supervision/Mentorship of Prof. Purva Hegde Dessai and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities will not be responsible for the correctness of observations / experimental or other findings given the dissertation.

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## COMPLETION CERTIFICATE

This is to certify that the dissertation / internship report “**Analysis of seasonal aircraft in the off-season and peak season**” at **Airports Authority of India, Goa International Airport** is a bonafide work carried out by **Mr. Joel S Nadar** under my supervision/mentorship in partial fulfillment of the requirements for the award of the degree of **Master in Business Administration** in the Discipline of **Management Studies** at the **Goa Business School, Goa University**.



Prof. Purva Hegde  
Management Studies

Date: 28/04/2023



School Stamp



Dr. Jyoti Pawar  
Dean,  
Goa Business School  
Date: 28<sup>th</sup> April 2023  
Place: Goa University



## INTERNSHIP CERTIFICATE



भारतीय विमानपत्तन प्राधिकरण  
AIRPORTS AUTHORITY OF INDIA

No:- AAI/GOA/HR/APPT/JN/2023/257

Date: 11.05.2023

### To Whom It May Concern

This is to certify that Mr. Joel S Nadar is appointed as Apprentice (Finance) at Airports Authority of India, Goa International Airport, Dabolim, Goa-403801 for the period from 14<sup>th</sup> March 2023 to 13<sup>th</sup> March 2024.

This letter is issued on his request vide application dated 10<sup>th</sup> May 2023 for submitting in Goa business School, Goa University as a part of project submission.

For, Airports Authority of India

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## INTRODUCTION

The growth rate and the increase in revenue will depend on how well the transportation of aviation infrastructure is build. The air transport helps in reducing travel time. And the growth of the aviation industry enables other sectors to grow and has a positive impact on trade and commerce and tourism simultaneously. It creates a large employment opportunity and increases the standard of living of people. It helps in increasing productivity and growth. This sector is referred to as the timeefficient sector, as trade and commerce require business trips and this makes it very efficient.

The planning and running of infrastructure and services can be difficultfor airport management due to seasonal concentrations of demand. Dueto the challenges faced by the management they may therefore seek to develop counter-seasonal strategies to allocate the demand more efficiently throughout the year.

One strategy being used is to target a high concentration market and tryto reduce the growth rate in seasonal concentration and minimize growth in seasonal concentration.

There were three analytical tools used to find out the state of Airports authority of India. The three tools used were comparative and commonsize statement and ratio analysis for analysis the annual report for financial year 2020-2021 and 2021-2022.

After analysis the balance sheet, profit and loss and cash flows these were some of the differences noticed

The capital work in progress has reduced by -118% compared to last year as the construction and other civil works has reduced or being completed.



Trade receivables there was a 31% decrease compared to the previous FY, the unsecured trade receivables have reduced by 55%, this has caused the trade receivables to also decrease.

Cash and cash equivalents there is a decrease in C&C equivalents as the bank deposit was increased from 868cr to 1198cr in the previous year and now it is reduced.

Lease liability has reduced by -122% due to a decrease in lease liability.

Other noncurrent liability increased by 65% due to the deferred fair valuation gain- security deposits which increased to 454.72crs from 156.16crs.

In the Profit and loss statement it can be seen that there is a increase of 33.29% in the income of airports navigation system due to an increase in route navigation facility charges for AAI

Admin and other expenses were in -138% as provisions for bad and doubtful debts was in a negative as these have been recovered due to that the admin expenses have reduced.

#### Revenue from operations

Revenue has increased to pre pandemic levels and this has increased revenue by 38% as compared to last FY.

#### Employee expenses

There is an increase in expense of employees due to the payment of gratuity and pension and various other services the expenses have increased by 44%

Finance cost increased for the year due to the increase in payment of interest for this FY.

## LITERATURE REVIEW

**A study by Oxford Economics (2012)** on Heathrow airport concluded that it benefitted UK economy in bringing more FDI, export, and tourism beside employment generation. Total 8,000 jobs were created by flights from Heathrow.

**A study by Wilbur Smith Associates (2010)** carried out an input- output analysis of the impact of the aviation sector for North Dakota in the US. It concluded that the airport generated 9,792 jobs, with 5,796 jobs through direct and indirect impact and 3,996 jobs through secondary or induced impact. It further generated economic activity of US\$ 1.1 billion value adding 3.3 per cent to the estimated GDP.

The first significant privatization occurred in the UK in 1987. Since then, several other countries, both in developed and developing regions, have seen it become a powerful political force. In a global study of 459 airports in 2007, it was found that 24% of airports had complete or partial private ownership (**Anne, 2011**).

A similar situation existed specifically within Europe in 2008, where public-private shareholders owned 13% of the airports and 9% were fully privatized. However, these partial or total privately-owned airports handled more European passenger traffic (48%) since private operators are predominantly found at larger airports (**Anne, 2011**).

Such developments have transformed the structure of the global airport industry and have led to the emergence of multi-airport international companies (**Forsyth et al., 2011**).

**(Port Authority of New York and New Jersey 2005)** emphasized on creation of 5.5 per cent non-farm jobs in the area, totaling approximately 485, 670 jobs due to the pooled effect of aviation investment, operation, tourism.

## Research Gaps and Questions

In the past government run airports were generating high revenue, but in recent years due to the seasonality and the lack of capacity of airports there has been a decrease in flow of passengers during the peak season and there is also an effort done to study and try to implement strategies to attract passengers during the low season.

## Project Objectives

- ❖ The study how to retain the existing clients by giving them some benefits
- ❖ To study how the time gaps can be used more efficiently
- ❖ The study How to increase the revenue growth of Goa international airport
- ❖ The study to generate other sources of non-traffic income
- ❖ To study the frequency of flights
- ❖ A study of Debtors creditors analysis
- ❖ To study the capacity utilization of airlines in the airport.

## Project Methodology

The various analytical tools used for studying the financial position of the company was comparative statement, common size statement and Ratio analysis. Ranking of the variables. T test is also used to see if there is a significant difference on the aircrafts and passenger flow Pre and Post Covid.

Null hypothesis

H<sub>01</sub>: There is no significant impact on the flow of Domestic Passengers Post covid

H<sub>02</sub>: There is no significant impact on the flow of International Passengers Post covid

H<sub>03</sub>: There is no significant impact on the arrival of Domestic Aircrafts Post covid

H<sub>04</sub>: There is no significant impact on the arrival of International Aircrafts Post covid

Have been used to analyse the financial reports of the company.

## SOURCES OF DATA

### SECONDARY DATA

The secondary data is collected from the following:

- Internet
- Research papers
- AAI website
- Annual reports of AAI

The data was collected from the Airports Authority of India official website

This data comprises of all the flights arriving in India, between 2018 to 2021 period this data was derived from the AAI website, the data than was organized to form a yearly time series and some monthly time series.

## Data Analysis And Discussion

### Absolute Ranking of Domestic Passengers

DOMESTIC PAX							
DELHI (DIAL)	513387 22	DELHI (DIAL)	498168 79	DELHI (DIAL)	226378 85	DELHI (DIAL)	316482 70
MUMBAI (MIAL)	356187 22	MUMBAI (MIAL)	337678 78	MUMBAI (MIAL)	129426 25	MUMBAI (MIAL)	173584 45
BANGALORE (BIAL)	280579 01	BANGALORE (BIAL)	287855 16	BANGALORE (BIAL)	123936 30	BANGALORE (BIAL)	151254 60
KOLKATA	189398 45	KOLKATA	194332 54	HYDERABAD (GHIAL)	844333 0	HYDERABAD (GHIAL)	107955 65
HYDERABAD (GHIAL)	169420 44	HYDERABAD (GHIAL)	182421 21	CHENNAI	806814 3	CHENNAI	984428 7
CHENNAI	165729 04	CHENNAI	167729 74	KOLKATA	713803 0	KOLKATA	878232 2
PUNE	874160 7	AHMEDABAD	931175 9	PUNE	365624 9	AHMEDABAD	490114 1
AHMEDABAD	858558 4	PUNE	824493 5	AHMEDABAD	328866 5	GOA	404479 8
GOA	745558 2	GOA	788921 7	GOA	284927 1	PATNA	334288 0
JAIPUR	541351 3	JAIPUR	549853 1	PATNA	231411 3	PUNE	306124 0

DOMESTIC PAX	2019	2020	2021
DELHI	-3.05487	-120.06	28.47039
MUMBAI (MIAL)	-5.48108	-160.904	25.43903
BANGALORE (BIAL)	2.527712	-132.261	18.06114
KOLKATA	2.538993	-130.161	21.7889
HYDERABAD (GHIAL)	7.126786	-126.101	18.04238
CHENNAI	1.192812	-134.98	18.72275
PUNE	6.122925	-154.681	25.40004
AHMEDABAD	-4.13162	-150.708	18.69396
GOA	5.496553	-176.885	14.76598
JAIPUR	1.546195	-137.609	24.40603

With the help of this data, we can determine how there is a percentage change in the flow of domestic passengers to various states in India.



Delhi experienced a negative flow of - 3.054% in comparison to 2018, and in the following year, it further decreased to -120.06% before increasing to 28.47%, which is a good recovery given the recent financial crisis.

Mumbai experienced a negative passenger flow of -5.48% in the year 2019, a negative 160% flow the following year, and a recovery of 25.43% in the year 2021

Bangalore had a positive passenger flow of 2.52% in the year 2019, but that figure fell dramatically to -133.26% in 2020 before rising to a positive 18.06% in 2021.

Kolkata had an increase in passenger flow of 2.53% as well. The following year, due to covid, the passenger flow decreased to -130%, and in the year 2021, it increased to a positive 21.72%.

Prior to the passenger flow decreasing from positive 7.12% to negative 126.10% the next year, Hyderabad experienced a tremendous growth rate of 18.04%.in 2021

Chennai's slow growth rate was 1.19%, and it reached a negative 134.98% value during the pandemic period before rising to a positive 18.72% value the next year.

Pune currently had a constant growth rate of 6.12%, but several financial crises caused it to decline to 154.68% in the year 2020. The following year, it rose to 25% in the year 2021

Ahmedabad experienced a negative growth of 4.13, which decreased to -150.708% the following year in 2020, and then increased to 18.69% the year 2021.

Goa experienced positive growth in the year 2019 of 5.49%, but the covid crisis caused it to fall to negative 176.88; it has since recovered to positive 14.76% in the year 2021.

Jaipur saw positive growth of 1.54%, but it fell to minus 137.60 in 2020 before rising relatively favourably to 24.40%.

#### Absolute Ranking of International Passengers

DELHI (DIAL)	185282 72	DELHI (DIAL)	186738 52	DELHI (DIAL)	58626 60	DELHI (DIAL)	54916 87
MUMBAI (MIAL)	142580 47	MUMBAI (MIAL)	132878 62	MUMBAI (MIAL)	34472 45	MUMBAI (MIAL)	24280 77
CHENNAI	591379 4	CHENNAI	604674 5	COCHIN(CI AL)	14724 56	COCHIN(CI AL)	18448 98
COCHIN(CI AL)	509852 1	COCHIN(CI AL)	492367 3	CHENNAI	12643 81	HYDERABA D (GHIAL)	12074 78
BANGALORE (BIAL)	427367 1	BANGALORE (BIAL)	487005 0	BANGALORE (BIAL)	11205 53	KOLKATA	10851 72
HYDERABAD (GHIAL)	396188 6	HYDERABAD (GHIAL)	408692 9	HYDERABAD (GHIAL)	11080 36	GUWAHATI	96690 3
KOLKATA	272361 8	KOLKATA	306941 4	KOLKATA	89999 1	BANGALORE (BIAL)	94754 9
CALICUT	268462 4	CALICUT	282956 6	CALICUT	61951 0	PUNE	64803 5
TRIVANDRUM	256402 1	AHMEDABAD	240160 3	TRIVANDRUM	55537 0	CHENNAI	48984 0

AHMEDAB AD	206968 0	TRIVANDR UM	233973 0	AHMEDAB AD	52742 4	KANNUR(KI AL)	48034 1
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INTERNATIONAL AIRPORTS PAX	2019	2020	2021
DELHI (DIAL)	0.779593	-218.522	-6.75517
MUMBAI (MIAL)	-7.30129	-285.463	-41.9743
CHENNAI	2.19872	-310.657	20.18767
COCHIN(CIAL)	-3.55117	-289.414	-4.71255
BANGALORE (BIAL)	12.24585	-334.611	-3.2604
HYDERABAD (GHIAL)	3.059583	-268.844	-14.5964
KOLKATA	11.26586	-241.049	5.019054
CALICUT	5.122411	-356.743	4.401768
TRIVANDRUM	-6.7629	-332.433	-13.3778
AHMEDABAD	11.54193	-343.615	-9.80199

With the help of this data, we can determine how there is a percentage change in the flow of international passengers to various states in India.

The number of foreign travellers arriving in Delhi has not increased much, only by 0.77%, and in 2019 it drastically decreased as a result of the country's covid restrictions, which caused the flow of travellers to be negative 218.52%. The effect did not completely disappear the following year, as the growth rate was at negative 6.75%.

Mumbai likewise had a negative growth rate in 2019 of -7.30%, which due to covid decreased to -285.46% in 2020 and then recovered to -41.97 in the year after.

In the year 2019, Chennai saw a growth of 2.198%, but in the year 2020, it experienced one of the biggest negative passenger flows, with a negative 310.65% flow.

In the year 2020, Cochin's international passenger flow was negative by 3.55%; it climbed to -4.71% in the next year. In the year 2020, it was as low as minus 289%.

Due to the covid pandemic, Bangalore had a negative growth rate of 334.611 in the year 2019 but an aggressive improvement the next year to a negative 4.71%. Bangalore had an aggressive growth rate of 12.24% in the year 2019.

As of 2019, Hyderabad had a growth of 3.05% and a negative growth of 268.044, but it greatly improved to a negative 14.59%.

Kolkata experienced an incredible growth in 2019 of 11.26%, but it experienced a negative growth rate in 2020 of 241.04% before returning to growth in the following year with 5.01%.

Calicut experienced a growth of 5.12% in 2019 and a major negative growth of 356.74% in 2020, but it recovered and experienced a positive growth of 4.401% in 2021.

Trivandrum had a negative growth of 6.76% in the previous year, but once everything was restricted, that growth increased to 332.43% in the following year, and to negative 13.37% in the following year.

Ahmedabad's growth rate in 2019 was strong at 11.54%, however it had a negative growth rate because of covid.

The flow of international passengers to Delhi has not improved very well but only by 0.77 % in the year 2019 it reduced drastically due to the covid restriction enforced in the country this caused the flow of the passengers to negative 218.52 % the impact didn't go away completely as the following year the growth rate was at negative 6.75 %

Mumbai also had a negative growth rate in the year 2019 of negative 7.30 and due to covid it reduced to negative 285.46 % in the year 2020 and recovered to negative 41.97 in the following year.

Chennai had a positive increase of 2.198 % in the year 2019 but in the year 2020 it had one of the most negative flow of passengers of negative 310.65 % and the following year it increased to 20.18 %

Cochin had a negative flow of international passengers of 3.55 % it reduced to as low as negative 289% in the year 2020 and increased to – 4.71 % in the year 2021

Bangalore has an aggressive growth rate of 12.24 % in the year 2019 but due to the covid pandemic it lost a lot of the passengers and had a negative growth of 334.611 and the following year it improves quite aggressively to negative 4.71 %

Hyderabad had a positive growth of 3.05 % as on 2019 and it had a negative growth of 268.844 but it improved quite significantly to negative 14.59 %

Kolkata had an amazing growth of 11.26 % in the year 2019 but it had a negative growth rate in the year 2020 of 241.04 % and it reached to positive growth in the following year with 5.01 %

Calicut had a positive impact of 5.12% in the year 2019 and had a major negative growth of 356.74% in the year 2020 but in the year 2021 it recovered and has a growth of 4.401 %

Trivandrum had a negative growth of 6.76 % but in the year 2020 has everything was restricted it had a negative growth of 332.43 % and the year 2021 improved to negative 13.37 %

Ahmedabad had an impressive growth rate of 11.54 % in the year 2019 but due to covid it had a negative growth of 343.615 % and the following year it improved to negative 9.80%

## Absolute Ranking of Domestic Aircrafts

Airports	2018	Airports	2019	Airports	2020	Airports	2021
DELHI (DIAL)	34766 3	DELHI (DIAL)	33913 4	DELHI (DIAL)	20060 0	DELHI (DIAL)	23732 1
MUMBAI (MIAL)	24910 2	MUMBAI (MIAL)	22685 6	MUMBAI (MIAL)	12371 9	MUMBAI (MIAL)	13569 8
BANGALORE (BIAL)	20774 9	BANGALORE (BIAL)	20229 7	BANGALORE (BIAL)	12065 6	BANGALORE (BIAL)	12586 0
HYDERABAD (GHIAL)	15377 4	HYDERABAD (GHIAL)	15971 0	HYDERABAD (GHIAL)	87486	HYDERABAD (GHIAL)	95335
CHENNAI	13737 0	KOLKATA	14217 0	CHENNAI	71182	CHENNAI	88948
KOLKATA	13690 6	CHENNAI	13164 4	KOLKATA	64701	KOLKATA	79457
AHMEDABAD	59653	AHMEDABAD	69058	PUNE	45868	AHMEDABAD	42085
PUNE	57318	GOA	54529	PATNA	30635	GOA	30623
GOA	50727	PUNE	53990	COCHIN(CIAL)	27013	PATNA	27338
COCHIN(CIAL)	50230	JAIPUR	45361	AHMEDABAD	26890	PUNE	25290

DOMESTIC AIRCRAFTS	2019	2020	2021
DELHI (DIAL)	-2.51494	-69.0598	15.47314
MUMBAI (MIAL)	-9.80622	-83.3639	8.827691
BANGALORE (BIAL)	-2.69505	-67.6643	4.134753
HYDERABAD (GHIAL)	3.716737	-82.5549	8.233073
CHENNAI	3.37624	-99.7275	19.97347
KOLKATA	-3.99714	-103.465	18.57105
AHMEDABAD	13.61899	-50.5581	-8.98895
PUNE	-5.11471	-77.9958	-0.03919
GOA	6.043712	-99.8667	1.188821
COCHIN(CIAL)	-10.7339	-68.691	-6.32661

With the help of this data, we can determine what is a percentage change in the flow of domestic aircrafts to various states in India

Delhi is the highest in receiving the domestic aircrafts in the country.

Delhi experienced a negative flow of domestic aircrafts in the state in 2019, which decreased to a negative 2.51%, further decreased to a negative 69.05%, and then recovered to a positive 15.47% the following year.

Despite being the second-largest airport for receiving domestic flights, Mumbai nonetheless saw a decline in the number of domestic flights, with a negative 9.80% flow in 2019, a negative 83.36% flow in 2020, and a positive 8.82% flow in 2021.

Bangalore's minus 2.69 in 2019 was made worse by a sharp decline in aircraft flow, which was negative 67.66%; however, the following year, it increased to 4.13%.

Hyderabad was one of only a few states to see domestic aircraft growth that was positive in 2019 (3.71%), negative in 2020 (82.55%), and increasing in 2021 (8.82%).

Chennai had positive growth of 3.71% in the year 2019, a negative impact of 99.72% in the year 2020, and a positive growth of 19.97% in the year 2021.

Kolkata had a negative growth in domestic flights of 3.99% in the year 2019, a more severe impact of 103.46% in the year 2020, and an increase to 18.57% in the year 2021.

In the year 2019, Ahmedabad saw an incredible increase in domestic aircrafts of 13.61 % in the following year, it experienced a decline of negative 50.55% and from that point until 2021, it experienced a decline of 8.98%.

Pune experienced a negative growth of 5.11%, a negative growth of 77.99% in 2020, and a negative growth of 0.03% the following year.

Goa saw an increase in domestic travellers in the year 2019, however in the next year, it saw an increase of 1.18 percent after falling by 99.86% the year before.

In 2019, Cochin had a negative impact of 10.73, and the two years after that had negative growth of 68.69% and 6.32%.

#### Absolute Ranking of International Airports

DELHI (DIAL)	185282 72	DELHI (DIAL)	186738 52	DELHI (DIAL)	586266 0	DELHI (DIAL)	549168 7
MUMBAI (MIAL)	142580 47	MUMBAI (MIAL)	132878 62	MUMBAI (MIAL)	344724 5	MUMBAI (MIAL)	242807 7
CHENNAI	591379 4	CHENNAI	604674 5	COCHIN(CIAL)	147245 6	COCHIN(CIAL)	184489 8
COCHIN(CIAL)	509852 1	COCHIN(CIAL)	492367 3	CHENNAI	126438 1	HYDERABAD (GHIAL)	120747 8
BANGALORE (BIAL)	427367 1	BANGALORE (BIAL)	487005 0	BANGALORE (BIAL)	112055 3	KOLKATA	108517 2
HYDERABAD (GHIAL)	396188 6	HYDERABAD (GHIAL)	408692 9	HYDERABAD (GHIAL)	110803 6	GUWAHATI	966903
KOLKATA	272361 8	KOLKATA	306941 4	KOLKATA	899991	BANGALORE (BIAL)	947549
CALICUT	268462 4	CALICUT	282956 6	CALICUT	619510	PUNE	648035
TRIVANDRUM	256402 1	AHMEDABAD	240160 3	TRIVANDRUM	555370	CHENNAI	489840
AHMEDABAD	206968 0	TRIVANDRUM	233973 0	AHMEDABAD	527424	KANNUR(KIAL)	480341



INTERNATIONAL	2019	2020	2021
DELHI	-21.5395	-92.1996	8.805207
MUMBAI	-48.684	-69.0959	-10.5167
CHENNAI	28.65825	-247.948	10.7694
COCHIN	25.9898	-161.97	1.903194
BANGALORE	3.961471	-166.944	26.62592
HYDERABAD	6.789205	-156.784	2.396592
KOLKATA	8.771716	-166.064	4.437778
GUWAHTI	18.93297	-153.607	2.1927
JAIPUR	8.560015	-173.755	-51.247
AHMEDABAD	11.46137	-197.023	-102.056

With the help of this data, we can determine what is a percentage change in the flow of international aircrafts to various states in India

Delhi is the highest in receiving the international aircrafts in the country. Delhi's international aircraft flow was negative in the state in 2019, falling to a negative 21.53% level, then to a negative 92.19% level, before recovering the following year to reach a positive 8.805% level.

Even though Mumbai is the second-largest airport for receiving domestic flights, the flow of domestic flights decreased to a negative 48.64% in the year 2016, decreased to a negative 69.09% in the following year, and improved to a negative 10.51% in the following year.

Bangalore's positive 3.96% in 2019 was further negatively impacted by a 166.944% drop in aircraft flow, but the following year, it improved to 26.65%.

Hyderabad was one of the only states to see a growth in foreign aircrafts of 6.78% in the year 2019, negative 156.78% in the following year, and positive 2.39% in the following year.

Chennai experienced a growth rate of 28.65%% in 2019, a negative impact of 247.93% in 2020, and a positive increase of 10.76% in 2021.

Kolkata saw an increase in foreign flights of 8.77% in the year 2019, a reduction in flights of 166.46% in the following year, and an increase to 4.43% in the following year for Kolkata.

Ahmedabad experienced a remarkable increase in domestic aircrafts of 11.48 in the year 2019, a negative growth of negative 197.023 in 2020, and a negative growth of 102.64% up until 2021.

In 2019, Cochin had a positive impact of 25.98, and the two years after that likewise had negative and positive growth, respectively, of 161.97% and 1.90%.

## Population Study of all the States in India on Domestic and international Passengers and Aircrafts.

Domestic passengers	PER UNIT OF POPULATION DOM PAX						
AIRPORTS	2018	AIRPORTS	2019	AIRPORTS	2020	AIRPORTS	2021
GOA	5.110063	GOA	5.053951	GOA	1.814822	GOA	2.563243
BANGALORE (BIAL)	2.452614	BANGALORE (BIAL)	2.422412	BANGALORE (BIAL)	1.005405	PATNA	1.372282
CHENNAI	1.867136	HYDERABAD (GHIAL)	1.872715	PATNA	0.967034	BANGALORE (BIAL)	1.184917
DELHI (DIAL)	1.800474	CHENNAI	1.83942	CHENNAI	0.856731	HYDERABAD (GHIAL)	1.051277
HYDERABAD (GHIAL)	1.786758	DELHI (DIAL)	1.694509	HYDERABAD (GHIAL)	0.843995	DELHI (DIAL)	1.014986
MUMBAI (MIAL)	1.782719	MUMBAI (MIAL)	1.672919	DELHI (DIAL)	0.747347	CHENNAI	1.012477
JAIPUR	1.45642	JAIPUR	1.442427	MUMBAI (MIAL)	0.6341	MUMBAI (MIAL)	0.839871
PUNE	1.394799	KOLKATA	1.317062	PUNE	0.550504	AHMEDABAD	0.593845
KOLKATA	1.290092	PUNE	1.279942	KOLKATA	0.480675	KOLKATA	0.586505
AHMEDABAD	1.149737	AHMEDABAD	1.204726	AHMEDABAD	0.411531	PUNE	0.446692

In this study we have taken the population of each of the state and done a study on how many passengers are coming per unit of population in the given state, which state is attracting more Domestic passengers to their state.

In the absolute study goa ranks 9<sup>th</sup> position but with the help of this study

Goa has 5.11 times the flow of domestic passengers in the year 2018 as compared to the population in the year 2019 it reduces to 5.05 times, in the year 2020 it reduces quite sharply to 1.81 times and the following year it increases to 2.56 times

The 2<sup>nd</sup> most passengers flow compared to its population goes to Bangalore with 2.45 times in the year 2018 and it reduced slightly to 2.42 times in the year 2019 and in the year 2020 it reduced to 1.005 times where it was at par with the population of the city and in the year 2020 it was ranked 3<sup>rd</sup> as PATNA had a higher per unit of population passengers at 1.37 times as compared to 1.18 times

The 3<sup>rd</sup> rank goes to Chennai in the year 2018 with 1.86 times of domestic passengers are to its population in the year 2019 Hyderabad overtook Chennai with 1.87 times the passenger traffic

in the year 2020 Patna came 3<sup>rd</sup> with 0.96 times the flow of passengers and the year 2021 Bangalore was in this spot with 1.18 times the flow of domestic passengers

The 4<sup>th</sup> rank in the year 2018 was taken by Delhi with 1.800 times the flow of passengers and the year 2019 was taken by Chennai with 1.83 times the flow of domestic passengers as to the per unit of population the following year also Chennai was ranked 4<sup>th</sup> and the year 2021 Hyderabad was ranked 4<sup>th</sup> with 1.05 times the flow of domestic passengers as to the per unit of population.

International pax	PER UNIT OF POPULATION						
AIRPORTS	2018	AIRPORTS	2019	AIRPORTS	2020	AIRPORTS	2021
COCHIN(CIAL)	1.783947	COCHIN(CIAL)	1.657802	COCHIN(CIAL)	0.47776	GUWAHATI	0.851897
TRIVANDRUM	1.082322	TRIVANDRUM	0.944582	TRIVANDRUM	0.214843	COCHIN(CIAL)	0.577795
CALICUT	0.845551	CALICUT	0.840881	DELHI (DIAL)	0.193545	KANNUR(KIAL)	0.21569
MUMBAI (MIAL)	0.67626	CHENNAI	0.66312	CALICUT	0.174264	DELHI (DIAL)	0.176123
CHENNAI	0.66626	MUMBAI (MIAL)	0.658304	MUMBAI (MIAL)	0.168892	PUNE	0.166512
DELHI (DIAL)	0.649796	DELHI (DIAL)	0.635187	CHENNAI	0.134261	HYDERABAD (GHIAL)	0.117585
HYDERABAD (GHIAL)	0.417832	HYDERABAD (GHIAL)	0.419559	HYDERABAD (GHIAL)	0.110759	MUMBAI (MIAL)	0.11748
BANGALORE (BIAL)	0.373573	BANGALORE (BIAL)	0.409833	BANGALORE (BIAL)	0.090902	BANGALORE (BIAL)	0.07423
AHMEDABAD	0.277161	AHMEDABAD	0.310712	AHMEDABAD	0.066	KOLKATA	0.07247
KOLKATA	0.18552	KOLKATA	0.208025	KOLKATA	0.060605	CHENNAI	0.05038

In this study we have taken the population of each of the state and done a study on how many passengers are coming per unit of population in the given state, which state is attracting more INTERNATIONAL passengers to their state.

In the absolute ranking study Delhi is ranked the highest but with the help of this study we can determine which state gets the most amount of footfall per unit of population in their respected states.

After doing the tests we can see that the cochin has 1.78 times the flow of international passengers as compared to Delhi at 0.64 times in the year 2018. The following year 2019 cochin is ranked 1<sup>st</sup> with 1.65 times the flow of international passengers it has reduced slightly as

compared to the previous year in the year 2020 it reduced drastically to 0.47 times in the year 2021 it lost its rank to Guwahati at 0.85 and cochin was ranked 2<sup>nd</sup> with 0.57 times

The 2<sup>nd</sup> rank in the year 2018 was taken by Trivandrum with 1.08 times the flow of international passengers as to its per unit of population in the year 2019 it reduced to 0.94 times and in the year 2020 it reduced to 0.21 times but the following year cochin took the 2<sup>nd</sup> rank with 0.57 times.

The 3<sup>rd</sup> rank was taken by Calicut with 0.84 times international passengers as to its population, the year 2019 also it was stable with 0.84 times flow of passengers in the year 2020 Delhi was ranked 3<sup>rd</sup> with 0.19 times the passenger flow and the year 2021 Kannur was ranked 3<sup>rd</sup> with 0.21 times the flow of international passengers.

The 4<sup>th</sup> rank was taken by Mumbai with 0.6762 times the flow of international passengers in the year 2018 Chennai was ranked 4<sup>th</sup> in the year 2019 with 0.66312 times the flow of passengers it was taken over by Calicut the following year with 0.17 times the flow of international passengers as to the per unit of population and the year 2021 Delhi was ranked 4<sup>th</sup>

DOMESTIC AIRCRAFTS	PER UNIT POPULATION							Rank
AIRPORTS	2018	AIRPORTS	2019	AIRPORTS	2020	AIRPORTS	2021	1
GOA	0.034768334	GOA	0.034932	PATNA	0.012802	GOA	0.019406	2
BANGALORE (BIAL)	0.018159878	BANGALORE (BIAL)	0.017024	BANGALORE (BIAL)	0.009788	PATNA	0.011222	3
COCHIN (GIAL)	0.017575227	HYDERABAD (GHIAL)	0.016396	COCHIN (GIAL)	0.008765	BANGALORE (BIAL)	0.00986	4
HYDERABAD (GHIAL)	0.016217465	CHENNAI	0.014437	HYDERABAD (GHIAL)	0.008745	HYDERABAD (GHIAL)	0.009284	
CHENNAI	0.015476371	JAIPUR	0.0119	CHENNAI	0.007559	CHENNAI	0.009148	
MUMBAI (MIAL)	0.012467568	DELHI (DIAL)	0.011536	PUNE	0.006906	DELHI (DIAL)	0.007611	
DELHI (DIAL)	0.012192712	MUMBAI (MIAL)	0.011239	DELHI (DIAL)	0.006622	MUMBAI (MIAL)	0.006566	
KOLKATA	0.009325387	KOLKATA	0.009635	MUMBAI (MIAL)	0.006061	KOLKATA	0.005306	
PUNE	0.009145581	AHMEDABAD	0.008935	KOLKATA	0.004357	AHMEDABAD	0.005099	
AHMEDABAD	0.007988424	PUNE	0.008381	AHMEDABAD	0.003365	PUNE	0.00369	

In this study we have taken the population of each of the state and done a study on how many Aircrafts are coming per unit of population in the given state, which state is attracting more Domestic Aircrafts to their state. And on this basis, they are given a rank

In the absolute ranking study of domestic aircrafts Delhi is ranked as 1

In this study we try to see how many aircrafts have come in the state in a year as to the population of the state and rank it accordingly

Goa is ranked 1<sup>st</sup> in the year 2018 with 0.034 times the flow of domestic aircrafts in the state as to the per unit of population the following year it had 0.034 times the flow of domestic aircrafts, but the following year it was replaced by Patna with 0.01 times the flow of aircrafts and the year 2021 goa was ranked 1<sup>st</sup> 0.019 times as compared to 0.011 times that of Patna ranked at 2<sup>nd</sup> in the year 2021

Bangalore was ranked 2<sup>nd</sup> with 0.018 times the flow of domestic aircrafts in the year 2018, in 2019 also the results were stable at 0.017 times. In 2020 due to covid the flow reduced sharply to 0.009 times per unit of population and it outranked by Patna in 2021

Cochin was ranked 3<sup>rd</sup> in the year 2018 with 0.0175 times the flow of domestic aircrafts to that of per unit of population the following year 2019 it was outranked by Hyderabad with 0.016 times the flow of domestic aircrafts cochin was ranked 3<sup>rd</sup> again in the year 2020 with 0.0087 times flow of domestic aircrafts in the year 2021 Bangalore was ranked 3<sup>rd</sup> with 0.0098 times flow of domestic aircrafts as to per unit of population.

Hyderabad was ranked 4<sup>th</sup> in the year 2018 at 0.01621 times flow of domestic aircrafts, Chennai ranked 4<sup>th</sup> the flowing year with 0.0144 times flow of domestic aircrafts to that of per unit of population. During the covid crisis Hyderabad was ranked 4<sup>th</sup> with 0.008765 times and in 2021 also Hyderabad was ranked 4<sup>th</sup> with 0.0092 times.

International aircrafts	Per unit of population							
AIRPORTS	2018	AIRPORTS	2019	AIRPORTS	2020	AIRPORTS	2021	
GUWAHTI	0.014395199	KANNUR	0.028202	KANNUR	0.022563	KANNUR	0.024327	RANK 1
COCHIN	0.010105318	GUWAHTI	0.014337	GUWAHTI	0.005158	LUCKNOW	0.002568	RANK 2
CHENNAI	0.004430431	JAIPUR	0.005045	JAIPUR	0.00194	TRICHY	0.002223	RANK 3
MUMBAI	0.004421972	CHENNAI	0.004279	CHENNAI	0.001682	HYDERABAD	0.001466	RANK 4

In this study we have taken the population of each of the state and done a study on how many Aircrafts are coming per unit of population in the given state, which state is attracting more international Aircrafts to their state. And on this basis, they are given a rank

In the absolute ranking study of domestic aircrafts Delhi and Kannur is ranked as 1

In this study we try to see how many international aircrafts have come in the state in a year as to the population of the state and rank it accordingly



In the year 2018 Guwahati is ranked 1<sup>st</sup> with 0.014 times the flow of international aircrafts in the state as to the per unit of population. In 2019 it was taken over by Kannur with 0.028 times the flow of international aircrafts in the state. During the financial crisis also, Kannur had a stable flow of international flights at 0.02 times to that of per unit of population. 2021 also Kannur was stable at 0.024 times

The 2<sup>nd</sup> rank was given to cochin in the year 2018 at 0.1010 times flow of international aircrafts in the state, in 2019 Guwahati was ranked 2<sup>nd</sup> with 0.014 times the flow of international aircrafts, during covid in the year 2020 Guwahati was at 0.005158 times the flow of international aircrafts in the state. In 2021 Lucknow was ranked as 2<sup>nd</sup> with 0.002568 times flow of international aircrafts to that of per unit of population.

Chennai had the 3<sup>rd</sup> rank in the year 2018 with 0.004430 times flow of international aircrafts as to that of the population, in 2019 Jaipur was ranked as 3<sup>rd</sup> with 0.005045 times flow of international aircrafts. In 2020 also Jaipur was ranked 3<sup>rd</sup> with 0.00194 times and in 2021 it was overthrown by Trichy at 0.00222 times the flow of international aircrafts.

Mumbai was ranked 4<sup>th</sup> in the flow of international aircrafts as compared to the population of the state at 0.004421 times, in 2019 Chennai took the 4<sup>th</sup> place with 0.004279 times, 2020 also Chennai was ranked 4<sup>th</sup> with 0.0016 times and in 2021 Hyderabad was ranked 4<sup>th</sup> 0.001466 and Chennai was 0.00079

### Area of the state study on domestic and international passengers and aircrafts

DOMESTI C PAX	AREA SQ KM							
AIRPORTS domestic pax	2018	AIRPORTS	2019	AIRPORTS	2020	AIRPOR TS	2021	
KOLKATA	91941	KOLKATA	94336. 18	KOLKATA	34650. 63	KOLKAT A	42632. 63	RANK1
MUMBAI (MIAL)	58971. 39	MUMBAI (MIAL)	55907. 08	MUMBAI (MIAL)	21428. 19	MUMB AI (MIAL)	28739. 15	RANK2
CHENNAI	38903. 53	CHENNAI	39373. 18	CHENNAI	18939. 3	CHENN AI	23108. 65	RANK3
BANGALO RE (BIAL)	37864. 91	BANGALO RE (BIAL)	38846. 85	BANGALO RE (BIAL)	16725. 55	DELHI (DIAL)	21340. 71	RANK4

In this study we have taken the AREA in SQ KM of each of the state and done a study on how many Domestic passengers are coming in the given state, which state is attracting more domestic passengers to their state. And on this basis, they are given a rank

Kolkata is ranked as 1<sup>st</sup> in the year 2018 with 91941 domestic passengers for each sq. km of area, over the years even though Kolkata holds the 1<sup>st</sup> rank in domestic passengers the flow had reduced in the year 2020 during covid to 34650 per sq. km and now it has recovered to 42632 passengers per sq. km

Mumbai is ranked 2<sup>nd</sup>, in the year 2018 it had domestic passenger flow of 58971 and in 2019 it reduced to 55907 passengers during covid it reduced significantly to 21428 but after covid it has recovered to 28739 domestic passengers per sq. km

Chennai was ranked 3<sup>rd</sup> in all 4 years from 2018 to 2021 it was stable during 2018 and 2019 at 38903 and 39373 respectively but during 2020 it reduced by 50% to 18393 and it recovered the following year 2021 to 23108 domestic passengers per Sq. km

Bangalore was ranked 4<sup>th</sup> for 3 years in a row from 2018 to 2020, during which the domestic passenger flow was 37864,38846 and 18939 respectfully in 2020 Delhi was ranked 4<sup>th</sup> with 21340 domestic passengers as compared to Bangalore 20412 domestic passengers

International pax	Area pax							
	2018	AIRPORTS	2019	AIRPORTS	2020	AIRPORTS	2021	
COCHIN(CIAL)	53668.64	COCHIN(CIAL)	51828.14	CHENNAI	13309.27	KANNUR(KIAL)	6158.218	RANK 1
MUMBAI (MIAL)	23606.04	MUMBAI (MIAL)	21999.77	MUMBAI (MIAL)	5707.359	KOLKATA	5267.825	RANK 2
CALICUT	14997.9	CALICUT	15807.63	KOLKATA	4368.88	GUWAHATI	4476.403	RANK 3
CHENNAI	13882.15	KOLKATA	14900.07	DELHI (DIAL)	3953.243	COCHIN(CIAL)	4330.746	RANK 4

In this study we have taken the AREA in SQ KM of each of the state and done a study on how many international passengers are coming in the given state, which state is attracting more international passengers to their state. And on this basis, they are given a rank

Cochin was ranked 1<sup>st</sup> in 2018 with 53668 international passengers for each sq km of area, in 2019 cochin had 51828 but in 2020 it was replaced by Chennai as the international passengers increased to 13309 as compared to cochin 3456 the following year 2021 Kannur was ranked 1<sup>st</sup> with 6158 international passengers per sq. km

Mumbai was ranked 2<sup>nd</sup> in international passengers per sq. km during 2018 to 2020 with 23606,21999,5707 international passengers respectfully but in 2021 Kolkata overtook the 2<sup>nd</sup> rank with 5267 international passengers as compared to Mumbai 4019 passengers

The 3<sup>rd</sup> rank was given to Calicut in 2018 for having 14997 international passengers per sq km and in 2019 also for 15807 international passengers in 2020 Kolkata took the 3<sup>rd</sup> rank with 4368 international passengers per sq. km and in 2021 Guwahati took the 3<sup>rd</sup> rank with 4476 international passengers

Chennai was ranked 4<sup>th</sup> with 13882 passengers per sq. km and in 2019 Kolkata was ranked 4<sup>th</sup> 14900 international passengers in 2020 Delhi was ranked 4<sup>th</sup> with 3953 passengers and cochin was ranked 4<sup>th</sup> in 2021 with 4330 international passengers

Domestic aircrafts	Area sq km							
AIRPORTS domestic pax	2018	AIRPORTS	2019	AIRPORTS	2020	AIRPORTS	2021	
KOLKATA	664.59 22	KOLKATA	690.14 56	KOLKATA	314.08 25	KOLKATA	385.71 36	RANK 1
MUMBAI (MIAL)	412.42 05	MUMBAI (MIAL)	375.58 94	MUMBAI (MIAL)	204.83 28	MUMBAI (MIAL)	224.66 56	RANK 2
CHENNAI	322.46 48	CHENNAI	309.02 35	CHENNAI	167.09 39	CHENNAI	208.79 81	RANK 3
BANGALORE (BIAL)	280.36 3	BANGALORE (BIAL)	273.00 54	BANGALORE (BIAL)	162.82 86	BANGALORE (BIAL)	169.85 16	RANK 4

In this study we have taken the AREA in SQ KM of each of the state and done a study on how many Domestic aircrafts are coming in the given state, which state is attracting more domestic aircrafts to their state. And on this basis, they are given a rank

Kolkata is ranked as 1<sup>st</sup> in the year 2018 with 664 domestic aircrafts coming in the state for each sq. km, in 2019 it increased to 690 domestic aircrafts per sq. km, in 2020 it reduced drastically to 314 domestic aircrafts it recovered slightly to 385 in the year 2021

Mumbai was ranked as 2<sup>nd</sup> from 2018 to 2021 with 412,375,204,224 domestic aircrafts in the state each year per sq. km respectfully in 2020 it reduced significantly due to the covid crisis and other financial crisis

Chennai was ranked as 3<sup>rd</sup> from 2018 to 2021 with 322,309,167,208 domestic aircrafts in the state each year per sq. km respectfully in 2020 it reduced significantly due to the covid crisis and other financial crisis

Bangalore was ranked as 4<sup>th</sup> of 2018 to 2021 with 280,272,162,169 domestic aircrafts in the state each year per sq. km respectfully in 2020 it reduced significantly due to the covid crisis and other financial crisis

International aircrafts	Area in sq km							
AIRPORTS domestic pax	2018	AIRPORTS	2019	AIRPORTS	2020	AIRPORTS	2021	
MUMBAI	146.27 65	KANNUR	761.82 05	KANNUR	626.85 9	KANNUR	687.38 46	RANK 1
KOLKATA	108.84 95	KOLKATA	119.31 55	KOLKATA	44.844 66	KOLKATA	86.184 47	RANK 2

CHENNAI	92.312 21	CHENNAI	91.603 29	CHENNAI	37.187 79	MUMBAI	25.140 73	RANK 3
DELHI	77.018 21	MUMBAI	91.261 59	GUWAHATI	26.671 3	HYDERABAD	23.158 46	RANK 4

In this study we have taken the AREA in SQ KM of each of the state and done a study on how many international aircrafts are coming in the given state, which state is attracting more international aircrafts to their state. And on this basis, they are given a rank

Kolkata is ranked as 1<sup>st</sup> in the year 2018 with 664 domestic aircrafts coming in the state for each sq km, in 2019 it increased to 690 domestic aircrafts per sq. km, in 2020 it reduced drastically to 314 domestic aircrafts it recovered slightly to 385 in the year 2021

Mumbai is ranked as 2<sup>nd</sup> in the year 2018 with 146 international aircrafts coming in the state for each sq. km, in 2019 Kannur was ranked as 1<sup>st</sup> with 761 international flights for each sq. km, in 2020 Kannur was ranked 1<sup>st</sup> but the per sq. km aircrafts reduced to 626 to various crisis in 2020 in 2021 it recovered to 687 international flights per sq. km.

Kolkata is ranked as 3<sup>rd</sup> in the year 2018 with 108 international aircrafts coming in the state for each sq. km, in 2019 Kolkata was ranked as 1<sup>st</sup> with 119 international flights for each sq. km, in 2020 Kolkata was ranked 1<sup>st</sup> but the per sq. km aircrafts reduced to 44 to various crisis in 2020 in 2021 it recovered to 86 international flights per sq. km

Chennai is ranked as 4<sup>th</sup> in the year 2018 with 92 international aircrafts coming in the state for each sq. km, in 2019 Chennai was ranked as 1<sup>st</sup> with 91 international flights for each sq. km, in 2020 Chennai was ranked 1<sup>st</sup> but the per sq. km aircrafts reduced to 26 to various crisis in 2020 in 2021 Mumbai took the 4<sup>th</sup> rank with 25 international aircrafts.

### Growth Rate of Passengers

Domestic pax							
AIRPORT	JULY-DEC 2018	AIRPORT	JAN-JUNE 2019	AIRPORT	JULY-DEC 2019	AIRPORT	JAN-JUNE 2020
PUNE	11.992674 9	AHMEDABAD	3.55030 9	PATNA	12.0549 4	HYDERABAD (GHIAL)	- 104.96 8
KOLKATA	11.346893 75	JAIPUR	3.46812 9	PUNE	11.4542 4	MUMBAI (MIAL)	- 107.15
BANGALORE (BIAL)	7.8267684 19	PUNE	1.47580 9	KOLKATA	10.0942 6	GOA	- 107.90 1

AIRPORT	JULY-DEC 2020	AIRPORT	JAN-JUNE 2021	AIRPORT	JULY-DEC 2021
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PATNA	2.573332	HYDERABAD (GHIAL)	58.91975	GOA	41.75261	RANK 1
CHENNAI	-5.15658	PATNA	44.16819	DELHI (DIAL)	40.31918	RANK 2
AHMEDABAD	-6.96849	CHENNAI	42.92436	CHENNAI	39.73943	RANK 3

In this study with the data provided in half yearly, we will try to understand the growth rate of various domestic passengers from various states in the country

#### Rank 1

Pune has a growth rate of 11.99 %, Ahmedabad has a positive growth rate of 3.550%, Patna has a positive growth rate of 12.05%, Hyderabad has a negative growth rate of 104.96%, Patna has a positive growth rate of 2.57%, Hyderabad has a positive growth rate of 58.919%, goa has a positive growth rate of 41.75%

#### Rank 2

Kolkata has a positive growth rate of 11.34%, Jaipur has a positive growth rate of 3.46%, pune has a positive growth rate of 11.45%, Mumbai has a negative growth rate of 107.15%, Chennai has a negative growth rate of 5.15%, Patna has a positive growth rate of 44.168%, Delhi has a positive growth rate of 40.319 %

#### Rank 3

Bangalore has a positive growth rate of 7.826%, pune has a positive growth of 1.47%, Kolkata has a positive growth of 10.09%, goa has a negative growth rate of 107.90%, Ahmedabad has a negative growth rate of 6.96%, Chennai has a positive growth rate of 42.92 %, Chennai has a positive growth rate of 39.739%

International pax							
AIRPORT	JULY-DEC 2018	AIRPORT	JAN-JUNE 2019	AIRPORT	JULY-DEC 2019	AIRPORT	JAN-JUNE 2020
PUNE	8.234408993	CHENNAI	32.90198	GOA	6.697844	KOLKATA	-18.4446
MUMBAI (MIAL)	6.900386093	DELHI (DIAL)	7.969712	PUNE	4.567067	CHENNAI	-140.216
GOA	4.383178329	MUMBAI (MIAL)	6.021275	JAIPUR	3.826724	BANGALORE (BIAL)	-153.363

AIRPORT	JULY-DEC 2020	AIRPORT	JAN-JUNE 2021	AIRPORT	JULY-DEC 2021	
GOA	-129.343	MUMBAI (MIAL)	89.03681	CHENNAI	70.66474	RANK 1



<b>PUNE</b>	-2229.68	<b>KOLKATA</b>	87.04584	<b>JAIPUR</b>	-47.7819	<b>RANK</b> 2
<b>AHMEDABAD</b>	-3125.71	<b>JAIPUR</b>	84.08345	<b>AHMEDABAD</b>	-100.716	<b>RANK</b> 3

In this study with the data provided in half yearly, we will try to understand the growth rate of various international passengers from various states in the country

The growth rate of international passengers will be explained with the help of the table mentioned above

#### Rank 1

Pune has a growth rate of 8.24% as on July dec 2018, Chennai has a growth rate of 32.90% as on January to June 2019, goa has a growth rate of 6.69 as on July to December 2019, Kolkata has a negative growth rate of 18.46 as on January to June 2020, goa has a negative growth rate of 129.34 % as on July to dec 2020, Mumbai has a positive growth rate of 89.03 %, Chennai has a positive growth rate of 70.64%

#### Rank 2

Mumbai has a growth rate of 6.900%, Delhi has a growth rate of 7.96%, pune has a growth rate of 4.56%, Chennai has a growth rate of negative 140.21 %, pune as on July to December 2020 has a negative 2229.67% growth rate , Kolkata has a positive growth rate of 87.05%, Jaipur has a negative growth rate of 47.78%

#### Rank 3

Goa has a growth rate of 4.38%, Mumbai has a positive growth rate of 6.02%, Jaipur has a positive growth rate of 3.82%, Bangalore has a negative growth rate of 153.36%, Ahmedabad has a negative 3125.70 growth rate as on July to December 2020, Jaipur has a positive growth rate of 84.08%, Ahmedabad has a negative 100.716% growth rate

#### GROWTH RATE OF AIRCRAFTS

DOMESTIC AIRCRAFTS								
AIRPORTS	JULY-DEC 2018	JAN-JUNE 2019	AIRPORTS	JULY-DEC 2019	AIRPORTS	JAN-JUNE 2020		
JAIPUR	27.2993	KOLKATA	3.446830174	COCHIN(CIAL)	16.14132104	GOA	-55.22546466	
KOLKATA	14.98356	CHENNAI	2.836254087	BANGALORE (BIAL)	12.94083694	PATNA	-56.71763475	

MUMBAI (MIAL)	14.1373	PUNE	-2.264189555	GOA	8.367472637	HYDERABAD (GHIAL)	-61.714001
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AIRPORTS	JULY-DEC 2020	AIRPORTS	JAN-JUNE 2021	AIRPORTS	JULY-DEC 2021	RANK
COCHIN(CIAL)	59.58841	CHENNAI	58.74735	COCHIN(CIAL)	34.00327889	RANK 1
AHMEDABAD	55.7111	KOLKATA	54.10044	DELHI (DIAL)	26.23610541	RANK 2
JAIPUR	25.42975	MUMBAI (MIAL)	39.44664	KOLKATA	11.54001164	RANK 3

In this study with the data provided in half yearly, we will try to understand the growth rate of various domestic passengers from various states in the country

#### RANK 1

Jaipur has had a growth rate of 27.29% in July December 2018, Kolkata had a growth rate of 3.4468, cochin has had a significant growth of 16.14%. during the covid period goa has had a negative growth rate of 55.225 %, cochin in the next half year had a tremendous growth of 59.58%, in July December 2021 cochin had a 34.003% growth rate

#### Rank 2

Kolkata has a significant growth compared to the last 6 months of 14.9836 %, Chennai had a growth rate of 2.836%, Bangalore has had a growth rate of 12.94 %, during the covid period Patna had a negative growth rate of 56.71 %, Ahmedabad had a positive growth rate of 55.7111%, Kolkata had a significant improvement compared to its last year's performance, Delhi also had a 26.25% increase in growth.

#### Rank 3

Mumbai has had a growth rate of 14.13%, pune in the next half had a negative growth rate of 2.264%, Goa had a positive growth of 8.36%, Hyderabad had a negative growth of 61.714001%, Jaipur has a positive growth rate of 25.42%, Mumbai had a positive growth of 39.44%, Kolkata had a growth rate of 11.54%.

#### Growth rate of international aircrafts

International aircrafts							
AIRPORTS	JULY-DEC 2018	JAN-JUNE 2019	AIRPORTS	JULY-DEC 2019	AIRPORTS	JAN-JUNE 2020	
HYDERABAD	34.76938	JAIPUR	51.68157976	LUCKNOW	80.07322176	GOA	-35.44749824

DELHI	10.11079	LUCKNOW	41.73228346	TRICHY	37.7721519	AMRITSAR	-83.38391502
GOA	6.339623	GUWAHTI	39.4438723	BANGALORE	14.00483376	KANNUR	-90.752557

AIRPORTS	JULY-DEC 2020	AIRPORTS	JAN-JUNE 2021	AIRPORTS	JULY-DEC 2021	RANK
HYDERABAD	63.12849	LUCKNOW	83.90601	GOA	100	RANK 1
DELHI	-16.7952	KOLKATA	61.93776	TRICHY	59.7437266 4	RANK 2
LUCKNOW	-40.9733	TRICHY	30.23873	HYDERABAD	59.0909090 9	RANK 3

### Rank 1

Hyderabad had a growth rate of 34.76%, in the following half Jaipur growth rate increased to 51.68% from negative 101.66%, Lucknow also had a good growth rate of 80.073%, in the following half year goa had a negative growth rate of 35.44 % as to last negative 5.09%, Hyderabad growth increased to 63.128% as compared to last half years negative 156.06%, Lucknow had a growth rate of 83.906% as compared to negative 40.97% last half year, goa had a 100% growth rate from last half yearly.

### Rank 2

Delhi had a stable growth rate of 10.11%, Lucknow had a positive growth rate of 41.73% as compared to last half yearly negative 765.76%, Trichy had a significant positive in growth rate 37.77% as compared to last year's negative 19.28%, Amritsar had a negative growth rate of 83.38%, Delhi has a negative growth rate of 16.79%, Kolkata had a significant growth rate of 61.93%, Trichy has a positive growth rate of 59.74%.

### Rank 3

Goa has a noticeable growth rate of 6.339%, Guwahati has a positive growth rate of 39.44%, Bangalore has a positive growth rate of 14.004%, Kannur has a negative growth rate of 90.75%, Lucknow has a negative 40.97%, Trichy has a significant growth rate of 30.2387%, Hyderabad has a significant growth rate of 59.09%

## COVID MONTHLY GROWTH RATE PAX

The growth rate of all the states where good only in certain months there was a negative growth of up to negative 10%, there was a major decline in the passengers in 1 month for the domestic and international passengers in the month of APRIL 2020 there was also a decline during the months of September, October, November, and December of 2020. There was a major decline

in growth rate during July, August, September, October, November, and December in the year 2021 for the domestic and international passengers.

### COVID MONTHLY GROWTH RATE AIRCRAFTS

There was a normal decline in various states which ranges from up to 10 % negative, there was a huge negative growth in the month of March 2019 which ranges from negative 430 and goes up to negative 649%, there is a similar situation in the domestic passenger traffic in the month of December 2020 from which ranges from negative 512 and goes up to negative 5000 for the month.

### T TEST RESULTS ON PASSENGERS (DOMESTIC AND INTERNATIONAL)

domestic	<i>Pre covid</i>	<i>Post covid</i>
Mean	37050334	17929909.9
Variance	9.21729E+14	2.4932E+14
Observations	10	10
Hypothesized Mean Difference	0	
df	14	
t Stat	1.76689202	
P(T<=t) one-tail	0.049514558	
t Critical one-tail	1.761310136	
P(T<=t) two-tail	0.099029115	
t Critical two-tail	2.144786688	

As the P value is  $> 0.05$  we fail to reject the null hypothesis as the P value is 0.09 and we can say that there was no significant impact on domestic passenger's pre-post Covid.

International	<i>Pre covid</i>	<i>Post covid</i>
Mean	9458823	2559423
Variance	1.61429E+14	1.25E+13
Observations	10	10
Hypothesized Mean Difference	0	
df	10	
t Stat	1.65426309	
P(T<=t) one-tail	0.064538336	
t Critical one-tail	1.812461123	
P(T<=t) two-tail	0.129076673	
t Critical two-tail	2.228138852	

As the P value is  $> 0.05$  we fail to reject the null hypothesis as the P value is 0.12 and we can say that there is no significant impact on the international passengers Pre-Post Covid

## T TEST RESULTS ON AIRCRAFTS (DOMESTIC AND INTERNATIONAL)

<i>domestic</i>	<i>Pre covid</i>	<i>Post covid</i>
<i>Mean</i>	406372.75	274750.9
<i>Variance</i>	97835554097	4.68E+10
<i>Observations</i>	12	12
<i>Hypothesized Mean Difference</i>	0	
<i>df</i>	20	
<i>t Stat</i>	1.198965784	
<i>P(T&lt;=t) one-tail</i>	0.122277282	
<i>t Critical one-tail</i>	1.724718243	
<i>P(T&lt;=t) two-tail</i>	0.244554563	
<i>t Critical two-tail</i>	2.085963447	

As the P value is  $> 0.05$  we fail to reject the null hypothesis as the P value is 0.24 and we can say that there is no significant impact on the domestic aircrafts Pre-Post Covid.

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	57159.41667	17946
Variance	3819499706	3.71E+08
Observations	12	12
Hypothesized Mean Difference	0	
df	13	
t Stat	2.098522197	
P(T<=t) one-tail	0.027981246	
t Critical one-tail	1.770933396	
P(T<=t) two-tail	0.055962492	
t Critical two-tail	2.160368656	

As the P value is  $> 0.05$  we reject the null hypothesis as the P value is 0.05 and we can say that there is a significant impact on the international aircrafts Pre-Post Covid.

### Bottom 5 aircrafts destination

Airports domestic	2017-2018	2018-2019	2019-2020	2020-2021
KOLHAPUR	190	630	382	807
ADAMPUR (JALANDHAR)	227	518	362	760
PAKYONG	189	493	164	607
JAGDALPUR	104	215	85	261
MUNDRA	262	278	371	226

These are the bottom 5 aircrafts destination for the past 4 years it has improved over the years but it can still be made more attractive to visit.

AIRPORTS international	2017-2018	2018-2019	2019-2020	2020-2021
COIMBATORE	3939	288	21	678
VARANASI	2925	2	76	29
IMPHAL	1	6	35	5
TIRUPATI	0	0	1	2
PUNE	2238	1564	2	33

There international flight to some states have been so low which are as low as 1 or 2 or even zero in some instances this makes it a priority for the AAI to look into the matter and find solutions in order to attract more aircrafts from foreign destinations to these places be it as a tourist destination, or business havens so they can increase the economy of those states.

### Bottom 5 Passenger destination

INTERNATIONAL AIRPORTS PAX	2017-2018	2018-2019	2019-2020	2020-2021
PORTBLAIR	10	1	368	16
IMPHAL	2	102	86523	285726
TIRUPATI	0	0	23	0
INDORE	0	0	0	0
PATNA	0	0	3111	310706

These are the bottom 5 states in which international passengers have come the AAI needs to find some way to attract more clients maybe by giving some benefits for international clients coming to this destination

AIRPORTS Domestic pax	2018	2019	2020	2021
JALGAON	8764	12192	8785	8852
KISHANGARH	6910	14048	1991	41314
SHOLAPUR	5219	2463	11601	42926
KOLHAPUR	3455	18754	3169	4210
ADAMPUR (JALANDHAR)	1302	32291	5744	59773

These are the bottom 5 states in which domestic passengers have come the AAI needs to find some way to attract more clients maybe by giving some benefits for international clients coming to this destination

## Project Findings And Conclusion

After doing all the required data analysis there were some notable data which was discovered.

That the most number of domestic passengers travelled to Delhi as it has a huge business opportunity and has tourism destination and followed by Mumbai. The most number of international passengers came to Delhi followed by Mumbai. The most number of aircrafts also came to Delhi and Mumbai respectfully.

The growth rate of other states is much more aggressive than Delhi and Mumbai such as the domestic passenger growth rate Pune has increased by 11.99% as compared to Delhi and Mumbai which is 0.10% and 1.81% respectfully for the year 2018. During the pandemic the domestic passenger growth rate was in high negative figures during January to December 2020.

The growth rate of international passenger is also by Pune at 8.23%. During the covid period the international passenger growth was in negative from the month of July to December 2020.

The growth rate of domestic aircrafts the growth rate of other states like Jaipur, Kolkata and Cochin has more aggressive growth.

By taking Area sq. Km. as a element to test the impact it has on the number of domestic Passengers and international passengers it was noticed that in the domestic passenger section in the year 2018 Kolkata has the most amount of football by domestic tourist. And in the international passengers most of them go to Cochin and Kannur and Calicut.

As using per unit of population as a variable it was noticed that in the domestic passenger goa was receiving 5.11 passenger for every one GOAN in the state, which was a very high figure compared to other states which have an average of 2 to 1 per unit of population

And as for international passengers there was a high amount of tourist for every local in Cochin 1.78:1, Followed by Trivandrum 1.08:1 and the least amount in Kolkata at 0.066:1.

With per unit of population to see the impact on aircrafts in the state it was noticed that Goa has a high flow of aircrafts as the population is low and for every passenger there was 0.034:1 aircraft, this is related to domestic aircrafts.

But there is a high per unit of population for aircrafts in Guwahati, Kannur with 0.014:1 and 0.028:1 for international aircrafts.

The other findings were pre covid and post covid analysis to under it better please refer to (covid monthly growth rate PAX and Aircrafts) in the given excel spreadsheet.

It was noticed that before the covid there was a slow decline in some months in growth which went to negative growth which ranged up to negative 10 to 12% but after the covid pandemic there was high decline in domestic passengers in the month of March which ranged up to negative 73%, in April there were some airports which were not allowed to function and the government restriction which was imposed caused a high negative decline of 4500 above in certain states. In the following months it recovered quite well by positive 100%.

The international passenger decline started from April 2020 and went up to December 2020

## Recommendation To the Company

The Airports Authority of India should concentrate on infrastructure development in those states where the passenger flow exceeds the airport's capacity. With the development of technology and progress in many areas, AAI should incorporate intelligent systems for air traffic control, security screening, and passenger information. This automation can greatly reduce human error.

In order to operate airports efficiently, share resources, and provide better services, AAI should work more closely with private players.

By building smaller airports and enhancing air links to outlying locations, AAI should improve regional connectivity and encourage economic growth and tourism as well as the region's overall development.

By showcasing the distinctive attractions and experiences on offer, AAI can work with tourism boards and local authorities in locations where there aren't many flights or passengers. This will draw both domestic and foreign travellers.

Goa International Airport may boost investment in the aviation industry by extending tax incentives, lowering import duties on products and aircraft equipment, and offering subsidies to airlines to promote rural and remote locations.

AAI may support renewable energy by investing in solar and wind power plants, which will aid in fostering sustainable development and opening up employment opportunities.



AAI can invest in consulting services to offer these services to airports, airlines, and other aviation-related enterprises. They will be able to capitalise on their expertise and open up new revenue opportunities for the company.

### Work Done And Learning Derived

I worked in two different sections in finance that is in the expenditure and revenue department. In the expenditure department I had to do SAP entries, bank entry, check the running bills see for any corrections that needed to be done.

Calculation of penalty in case of delay in payments.

Payment entries, calculation of GST, TDS, security deposits.

In the revenue department I learned about realization of payment, reconciliation of all the bills and port them into SAP.

TDS reconciliation

Monitoring of dues (traffic and nontraffic)

Bank reconciliation statement

Payment of collection charges

Dues for notice certificate

Compilation of all the accounts on quarterly bases for closing activity

GST filing

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