Examination and Assessment of the Viability of Providing Air Transport in Himmatnagar

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Abstract: - Since air travel is the fastest form of transportation, its popularity has grown. People from the area leave in search of better employment opportunities, and they travel frequently for social and other reasons. When there isn't a suitable, quick, and comfortable way to get around, people opt to use private transportation. Finding out how satisfied customers are with various aspects of the airline, such as travel time, cost, and security, is the primary goal of the study. A major means of attaining and offering an international scope is air transportation. It facilitates trade, encourages travel, and generates jobs for generals. Travelers from the Himmatnagar region have a strong desire to visit cities like Mumbai, Delhi, Chennai, and Kolkata regularly. They have to spend an average of 120 kilometers traveling by bus or private car to reach Ahmedabad because there are no nearby train or air transportation options. Thus, the purpose of this study is to ascertain whether it would be feasible to establish air transportation in Himmatnagar for the benefit of those who travel there frequently.

Keywords: airline, coding, passenger, travel time

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I. INTRODUCTION

Airport construction and expansion are large, expensive undertakings. That said, governments have recently poured vast sums of money into developing and growing airports in response to the increasing demand for both passenger and freight travel. Long-term projections of air travel demand, financial resources, the standard of the nation's transportation infrastructure, and the extent of environmental protection should all be considered in plans for airport development. One kind of transportation that aims to make previously inaccessible places more accessible is air travel. In order to minimize overall costs, shorten travel times, and bridge gaps in road networks, domestic air transport services link states and regions. There's another reason for the dire circumstances.

Air travel has additional benefits since it contributes to the development of the country's tourism infrastructure, which can produce desperately needed foreign exchange. The airport is a crucial part of the air transportation system because it is the actual location where passengers transfer from air to ground transportation. It needs to have enough infrastructure, space, and amenities to handle the change in transportation options. The paved runways at the airport are utilized for taking off, landing, taxiing, loading and unloading passengers and cargo, and receiving maintenance. Therefore, in order to ensure a seamless modal shift, airport design must take into account aircraft landing and departure, landside access via surface transport modes, and passenger and cargo management.

A. *Problem Statement*

- There aren't enough airports or air links in India to meet the country's increasing demand for long-distance travel.
- Remote travelers frequently take the costly and time-consuming rail or road route.
- To assist, the Indian government intends to construct reasonably priced domestic airports in key locations.
- The purpose of this study is to evaluate the viability of flying to Sabarkantha.

B. *Objectives of the research*

- To compile information on the current mode choice behavior and O-D characteristics of long-distance drivers in the Sabarkantha Region.

- To conduct a survey with in-person interviews to determine whether travelers are willing to switch to air travel.
- To compare, for a number of significant parameters, the modes of air travel with those currently in use.

II.   LITERATURE REVIEW

According to a research paper published in 2021 by Laurie A. Garrow, Brian J. German, and Caroline E. Leonard, it is unclear how unmanned aerial vehicles (UAM) will affect urban transportation. The authors recommend that high-fidelity simulation models be developed by UAM researchers to take into consideration variables such as adoption rates, population shifts, and rival technologies. They anticipate that this paper will facilitate interdisciplinary research and facilitate discussions about UAM research directions within the air and ground transportation communities. To address the growing number of air vehicles in cities, the aerospace community needs to collaborate.

2019 saw the modeling of an aircraft routing and scheduling problem for on-demand transportation providers by Pedro Munari and Aldair Alvarez. To increase decision-making flexibility, they employed a mixed-integer programming framework to forecast or postpone the start of maintenance and flight. It was discovered that cases could be handled swiftly by open-source optimization software, which also reduced repositioning times and operating costs. Subsequent research endeavors will incorporate crew-related constraints and devise precise methodologies.

The Air Transportation Freight Forwarder Service Problem (ATFFSP), a mathematical technique for transferring cargo at the lowest cost utilizing a variety of services, was investigated in 2020 by Enrico Angelelli, Claudia Archetti, and Lorenzo Peirano. Practical size problems can be solved effectively with the metaheuristic method. The study adds to the body of knowledge of pertinent scientific research by highlighting the increasing significance of international air freight transportation as a result of e-commerce and the demand for ad hoc solutions.

III. STUDY AREA

The study area taken for research work is Sabarkantha traditionally referred to as Himatnagar and one of the top fastest developing districts of Gujarat. Himatnagar is situated at 23°35"56""N and 72°57"57""E in western India at a height of 44 meters (128ft). According to the census 2011, the population of the Sabarkantha region is 26 lakh people. The city sits on the banks of the Hathmati River, in focal Gujarat. The climate of the district is marked by large variations in temperature from 8°c to 48°c with an average rainfall for 690 mm in the Sabarkantha district.

IV. DATA COLLECTION AND ANALYSIS

In order to ascertain how travelers behave with regard to different socio-economic and travel-related factors that influence their decision to select a particular mode, the following data sets from the disclosed and in-person interview surveys were used to create the figures and charts for each district.

A. *Out of Total No. of Observation of Sabarkantha Region*

Mode	Observation
GSRTC	1090
Luxury	415
Industrial trip	70

TABLE I:
TRIP LENGTH DISTRIBUTION

Sr.No	T' 'Length (K)	GSRTC Bus	Lux.Bus	Industrial Trips
1	150-200	415	39	36
2	200-300	159	24	4
3	300-400	101	53	45
4	400-500	44	67	36
5	500-600	14	75	39
6	600-1000		140	70
7	1000-2000	-	7	29

TABLE II:
COST-OF-TRAVEL DISTRIBUTION

Sr. No	Total Travel Cost	Lux Bus	GSRTC Bus	Industrial Trips
1	0-100	10	471	142
2	100-200	30	494	57
3	200-300	2	51	62
4	300-400	32	42	9
5	400-500	58	15	31
6	500-600	44	1	39
7	600-700	35		
8	700-800	103	-	19
9	800-900	22	-	13
10	900-1000	22	-	i
11	1000-2000	36	-	37
12	2000-3000	5	-	23
13	3000-4000	-		19
14	4000-5000	-		14
15	5000-7000	-		

TABLE III:
TRAVEL TIME DISTRIBUTION

Sr No	Travel Time(hr)	GSRTC Bus	BUS	Industrial
1	0-1	58		79
2	1-2.	213	7	122
3	2-3.	322		64
4	3-4.	83	3	15
5	4-5.	104	13	37
6	5-6.	35	8	16
7	6-7.	88	13	10
8	7-8.	47	25	8
9	8-9.	73	13	15
10	9-10.	30	32	15
11	10-11.		10	13
12	11-12.	26	24	34
13	12-15.			12
14	15-24			30

B. No of passenger trips maximum out toward destination

In Sample Data Airport Feasibility to check the connecting between to airport destination so in data collection to choose main airport location and find the maximum outgoing trips for Sabarkantha region.

TABLE IV:
NO OF TRIPS OUT TOWARD DESTINATION

Sr.No	Name of Destination	Total no of daily Passenger Trips
1	Mumbai	121
2	Surat	54
3	Bhuj	71
4	Baroda	26
5	Delhi	56
6	Jaipur	46
7	Bangalor	8
8	Rajkot	34
9	Pune	47
10	Channai	11
11	Haryana	23
12	Haydabad	4
13	Punjab	7
14	Udepur	8
15	Jamnagar	5

C. Proposal routes Airline network out toward the destination

TABLE V:
DAILY TRIPS FROM SABARKANTHA

Sr. No	Origin	Destination 1	Destination 2	Routes Name	No of daily trip
1	Himatnagar	Delhi		Himatnagar To Delhi	36
2	Himatnagar	Udaipur	Jaipur/Punjab	Hlmatnagar To Punjab	28
3	Himatnagar	Mumbai	-	Himatnagar To Mumbai	J
4	Himatnagar	Bhuj	-	Himatnagar To Bhuj	47
5	Himatnagar	Pune	-	Himatnagar To Pune	36
7	Himatnagar	Vadodara	Surat	HimatnagarTo Surat	37
8	Himatnagar	Benglor	Chennai	HiITlatnagar To Chennai	6
9	Himatnagar	Hydrabad		Himatnagar To Hydrabad	4

TABLE VI:
COMPARISON BETWEEN TRAVEL TIME PARAMETER

Origin	Destination	GSRTC	TRAVE	TRAIN	AIRLINE (PROPOSE D)
Himatnagar	Mumbai		9.5		1.5
Himatnagar	Surat			7.5	
Himatnagar	Bhuj		6.5	13	
Himatnagar	Vadodara	3.5			
Himatnagar	delhi		13	20	
Himatnagar	Jaipur			16	
Himatnagar	Banglor		23	22	2.5
Himatnagar	Rajkot			10	
Himatnagar	Pune		12		
Himatnagar	chainnai			23	2.5
Himatnagar	Hariyana			16	
Himatnagar	Punjab			14	
Himatnagar	Udaipur				
Himatnagar	Jamnagar		6.5	12	

TABLE VII :
COMPARISON BETWEEN TRAVEL COST PARAMETER

Origin	Destination	GSRTC	TRAVEL	TRAIN	AIRLINE (PROPOSED)
Himatnagar	Mumbai	-	746	550	2500
Himatnagar	Surat	192	420	300	2000
Himatnagar	Bhuj	255	492	850	1500
Himatnagar	Vadodara	168	215	250	2000
Himatnagar	Delhi	-	1014	1150	2500
Himatnagar	Jaipur	-	690	900	2000
Himatnagar	Banglor	-	1879	1900	4000
Himatnagar	Rajkot	200	390	500	1500
Himatnagar	Pune	-	912	700	3000

Himatnagar	chainnai	-	-	1950	4500
Himatnagar	Haryana	-	-	1150	4000
Himatnagar	Punjab	-	-	1200	3500
Himatnagar	Udaipur	-	216	400	1500
Himatnagar	Jamnagar	-	506	750	1500

TABLE VIII:
COMPARISON BETWEEN TRAVEL DISTANCE PARAMETER

Origin	Destination	TRAVEL	TRAIN	AIRLINE (PROPOSED)
Himatnagar	Mumbai	622	592	600
Himatnagar	Surat	350	350	350
Himatnagar	Bhuj	410	410	400
Himatnagar	Vadodara	179	195	180
Himatnagar	Delhi	845	850	900
Himatnagar	Jaipur	575	600	470
Himatnagar	Banglor	1566	1500	1450
Himatnagar	Rajkot	325	300	250
Himatnagar	pune	760	750	650
Himatnagar	Udaipur	180	180	200
Himatnagar	Jamnagar	422	450	500

In Binary Logit Model Using Coding System in Four Modes

TABLE IX:
MODE CODING

Sr.No	Name of Mode	Coding
1	GSRTC	1
2	TRAVEL	2
3	PRIVATECAR	3
4	AIRLINE	4

TABLE X:
CODING SHEET OF TRAVEL TIME FOR GSRTC, LUX, BUSES & PVT. CARS, AIRLINE TRAVEL TIME
(GSRTC, LUX, BUSES &PVT. CARS)

Range in Hr	Code
1to8	1
8to16	2
16to24	3

Travel time (Airline)(Hr)	
1	0 to 2
2	2 to 4
3	4 to 6

TABLE XI:
CODING SHEET OF TRAVEL COST FOR GSRTC AND LUX., BUSES.

Range in Rs.	Code
0to650	1
650to1300	2
1300to1950	3

TRAVEL COST(Rs) (Airline)	
1	2000 TO 3500
2	3500 TO 5000
3	5000 TO 6500

Overall Travel Cost(For Pvt. Cars)	
Range in Rs.	Code
0 to 2500	I
2500 to 5000	2
5000 to 7500	3

TABLE XII:
CODING SHEET OF COMFORT LEVEL FOR GSRTC, LUX. BUSES & PVT. CARS.

Comfort Level		Mode
Description	Code	
Very Good	4	Airline
Good	3	Private Car
Average	2	Travel Bus
Not Good	L	GSRTC

V. RESULTS

The study examines long-trip behavior in the Himatnagar and Sabarkantha regions, focusing on GSRTC buses, luxury travel buses, and private cars. It found that major long-distance destinations can be easily connected via air transport services from Himatnagar.

The study found that air travel is more advantageous for trips ending outside of Gujarat. 22% of respondents are willing to switch to GSRTC, 75% from Luxury travel, and 63% from industrial private trips. Air travel is affordable for trip makers with a monthly income of over Rs. 25,000/- for distances over 200km.

VI. CONCLUSION

The study highlights a notable shift in travel preferences in the Himatnagar and Sabarkantha regions, revealing that air travel presents a significant advantage for long-distance journeys, particularly to destinations outside Gujarat. Despite the existing options of GSRTC buses, luxury travel buses, and private cars, a considerable percentage of travelers are inclined to switch to air travel, especially those with higher incomes. Specifically, air travel becomes a viable and attractive option for individuals with a monthly income above Rs. 25,000, for distances greater than 200 km. The findings suggest that enhancing air connectivity and affordability could further influence travel behaviors and preferences in the region.

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