"Spatial Analysis Of Transportation And Ground Accessibility Of Purandar Airport Using G.I.S. Software"

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ABSTRACT - Geographic Information System (GIS) are now recognized broadly as a valuable tool for managing, analyzing and displaying large set of data relevant to many local and regional planning and analyzing activities. The Spatial analysis of transportati1on network for Town Planning task is performed. The arc GIS 10 is used to perform the extraction of region from primary data and for road generalization, like selection, merging, elimination, symbolization. Total road length and total area is calculated using arc map software, using population data, population density, and road density is calculated. Network data set is created in arc catalog 10 which provide the number of transport lines and number of junctions. As air transport serves a time sensitive market, the surface access to airports should be efficient and the airport link requirements be persistently updated. The result and conclusion were used in estimating cost and time savings per person per hour for the city of Pune.

Keywords- Network Analysis, Chhatrapati Sambhaji Raje Airport, Feasibility, GIS, Accessibility

I. INTRODUCTION

Government of India has initiated a new project in Maharashtra, in the field of transportation which is to construct a new airport in Pune. So for this the government of Maharashtra has allocated Purandar area for the construction of airport (Chhatrapati Sambhaji Raje Airport) which is located 40 km from Saswad. In urban planning, transportation network analysis plays an important role to make better decision. GIS can be used to monitor transport network condition of network, shortest or best route to reach station and services. The benefit of GIS is not only user-friendly access and display, but provides a spatial analysis. This Spatial analysis can be used to identify more data to discover new relationship. This analyzed data can be displayed in the form of maps, graphs or summary statistics. The implementation provides GIS functionalities like, extraction of feature, network analysis, designing thematic maps, access to several layers of data at a time. To identify the spatial link between Transport Network and Town planning, existing data base is useful. The total travelled time required for an air trip i.e. from door to door comprises of non travelled time, on airport time, in-flight time and again the non travelled time. Non-travelled time signifies the time required reaching the airport and it is flexible due to various conditions. On airport time comprises the time required by an air passenger to complete the required formalities. In-flight time is the actual travelled time almost the three on airport time and in flight time both are non flexible. This study only deals with the non travelled time and the departing passengers.

II. PROBLEM STATMENT

- Connectivity is the most important aspect for the Airport. Connectivity for the airport should be fast, smooth and non tedious. For the connectivity network we would be using GIS software for showing the connectivity from the major parts of the cities to the airport.
- As transportation cost and time differ from vehicle to vehicle we will be showing the cost and time required for travelling from major parts of the cities to the Purandar Airport for different types of vehicle and mode of transportation available in the city.

III. OBJECTIVE OF THE WORK

• Calculate Network connectivity indices for Transportation Analysis.
A GIS can be used to monitor transport network, conditions of a network, shortest or best route to reach destination and closest services. The benefit of GIS is not only user-friendly access and display, but provides spatial analysis. The Implementation provides GIS functionalities like, extraction of features, Network analysis, designing thematic maps, access to several layers of data at a time.
• Ground accessibility to Purandar Airport.

In India, it is observed that for small distance journeys the Non-travel Time (NTT) is more than In-flight Time (IFT). Therefore the primary objective of the study is to suggest solutions to reduce the Non Travel Time (NTT) in context of air travel.

• Feasibility Check For Purandar Airport

IV. SCOPE OF THE WORK

1. Connectivity by means of road from airport to the nearby cities and also the shortest route from ever places near by the airport.
2. Showing the connectivity with the help of GIS from airport.
3. Decrease the Non-travel Time.
4. Cost and time analysis with different modes of transport available.

V. RESEARCH METHODOLOGY:

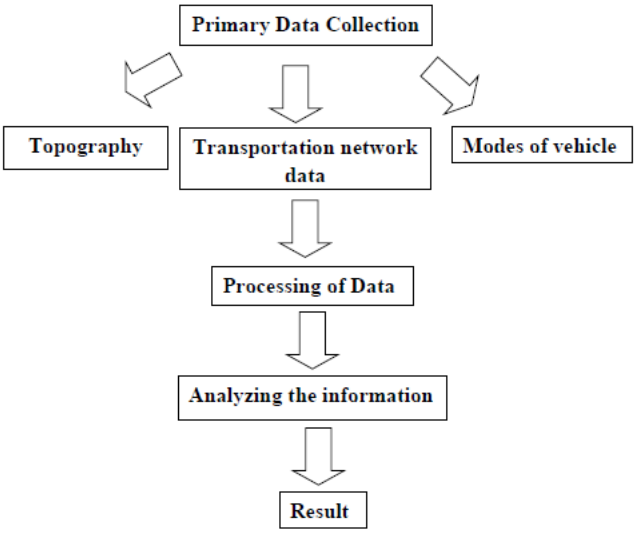

Fig.1 Methodology

As the data was not available for the Purandar Airport we collected the all the data required from the Pune Muncipal Corporation and From PCMC the time and the distances was taken from them and it was processed and transferred in .KMZ format with the help of Google Earth and Accordingly all the data was calculated.

Similarly the time, cost, and distances was taken from PMC, PCMC, Airport Authority of India and from respective Authority, and all the comparison was done.

VI. STUDY AREA:

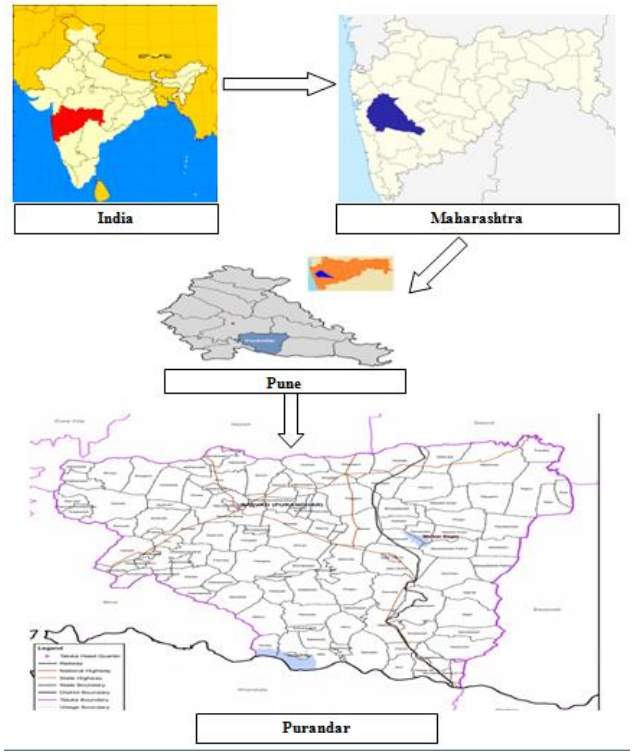

Fig.2 Area Of Interest

Area of study is Purandar which is near Saswad, i.e. 40 km from Pune city. The Airport is to be constructed in Purandar region which is Proposed by Govt. of Maharashtra.

VII. CONNECTIVITY:

In urban planning, transportation network analysis plays an important role to make better decision. GIS can be used to monitor transport network condition of network, shortest or best route to reach station and services as shown in fig.3. The benefit of GIS is not only user-friendly access and display, but provides a spatial analysis. This Spatial analysis can be used to identify more data to discover new relationship. This analyzed data can be displayed in the form of maps, graphs or summary statistics. The implementation provides GIS functionalities like, extraction of feature, network analysis, designing thematic maps, access to several layers of data at a time. To identify the spatial link between Transport Network and Town planning, existing data base is useful as shown in fig. 4.

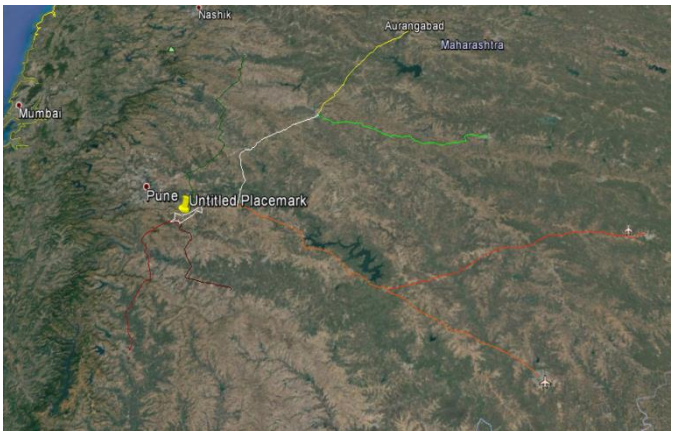

Fig.3 Connectivity from Purandar to Major Cities.

Fig.4 Suggested Location Of Airport

VIII. FEASIBILITY.

The total travelled time required for an air trip i.e. from door to door comprises of non travelled time, on airport time, in-flight time and again the non travelled time. Non-travelled time signifies the time required reaching the airport and it is flexible due to various conditions. On airport time comprises the time required by an air passenger to complete the required formalities. In-flight time is the actual travelled time almost the three on airport time and in flight time both are non flexible this study only deals with the non travelled time and the departing passengers.

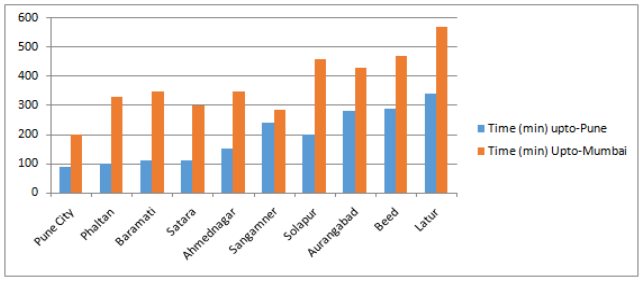

Fig.5 Time Comparison

The above graph shows the time comparison for Purandar Airport to major parts of Maharashtra and also from Mumbai Airport to Major parts of Maharashtra, and it is seen that the graph representing the time from major parts of Maharashtra to Mumbai Airport is high and so we can say passenger travelling from Pune, Phalthan, Baramati, Satara, Ahmednagar, Sangamner, Solapur, Aurangabad, Beed and Latur are feasible to travel from these cities to Purandar Airport and can reach their destination faster that Mumbai Airport.

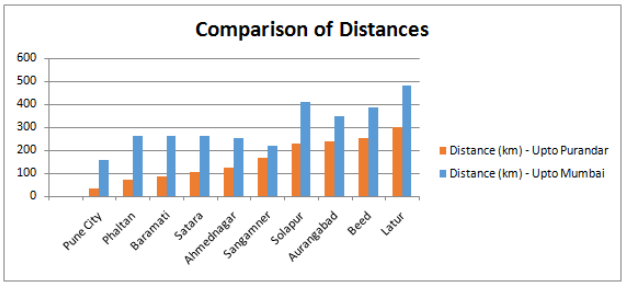

Fig.6 Comparison of Distances.

As the above graph shows the comparison of Distances from Purandar Airport to major parts of cities of Maharashtra and from Mumbai Airport to major parts of Maharashtra and as it is seen that the distance is more as compared to Purandar Airport and thus it is feasible for the passenger to travel Purandar Airport as the Distance is less as compared to Mumbai Airport.

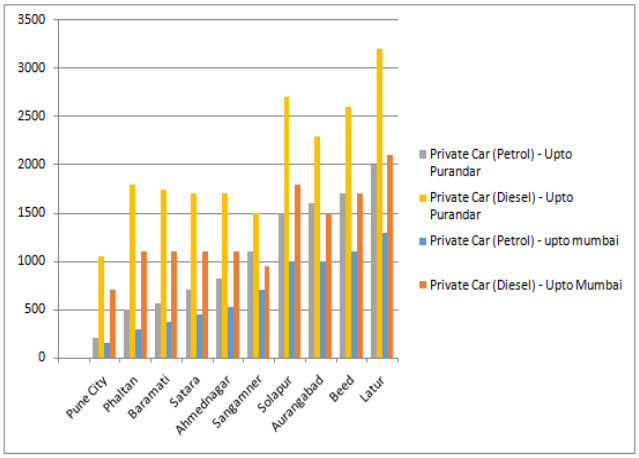

Fig.7 Comparison Of Cost By Cars.

The above graph represent the comparison for the cost by private vehicle with Petrol and Diesel from major parts of cities to Purandar Airport and from major parts of cities of Maharashtra to Mumbai Airport and it is compared that the cost required to travel for the passengers travelling to Purandar Airport to major parts of cities of Maharashtra is less as compared to Mumbai airport.

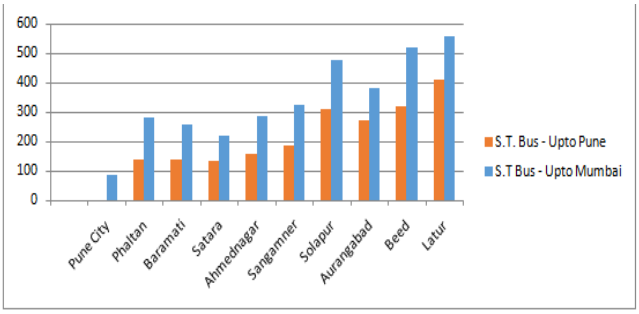

Fig.8 Comparison Of Cost By S.T. Buses

The above Fig.8, shows the difference between the cost required for S.T. Buses to travel to Purandar Airport and to Mumbai Airport by means of cost and by the figure we can say that the cost to travel to mumbai airport is more as compared to Purandar Airport.

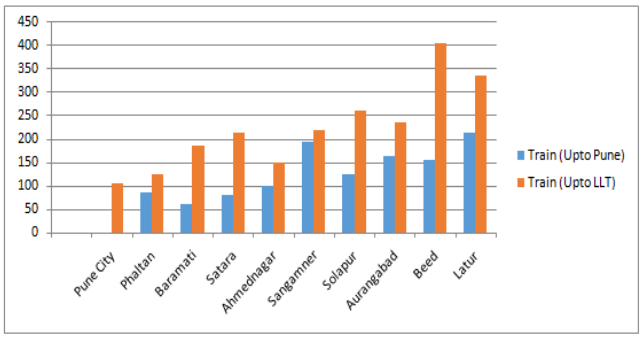

Fig.9 Comparison Of Cost By Train.

By the above comparison shown between the cost for train from major parts of Maharashtra to the Purandar Airport and to Mumbai Airport is compared and it is seen that the cost required for passenger to travel Purandar Airport is less as compared to Mumbai Airport.

IX. SCOPE OF PROJECT:

1. Showing the connectivity with the help of GIS from airport.
2. Decrease the Non-travel Time.
3. Cost and time analysis with different modes of transport available.
4. Showing the connectivity with the help of GIS from airport.
5. Cost and time analysis with different modes of transport available.

X. CONCLUSION:

We can say that the connectivity shown above is the shortest route possible and it is most suitable for the user to come to the Purandar Airport by the fastest route to avoid the traffic congestion and delay. The internal routes shown in the figure are the most simple and the easiest mode to reach the Purandar Airport and it will be connected through the METRO for the speedy and convenient mode of transport to reach the Purandar Airport as metro will be reducing the on road time and helps us to reduce the time. Therefore it is the simplest and the fastest routes to travel to the Airport. As the comparison shown between the Mumbai and Purandar for all the modes of transport i.e. car, S.T. buses, train with respect to time and distance, we can say that the cities selected are feasible to come to Purandar Airport instead of going to Mumbai airport. So we can conclude that Purandar airport is Feasible for travel from many cities of Maharashtra.

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