

# CORE INFRASTRUCTURE ANALYSIS OF FUTURASTIC TWIN CITY DEVELOPMENT: A CASE STUDY OF ANAND – NADIAD

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## Abstract

The density of population in urban areas increases because of the migration of people from less industrialized regions to more industrialized areas. In 1985, 45% of the world population stayed in cities. Scientists estimate that 60% of the world population will be city-dwellers by 2025. Global Infrastructure Investment Index 2016 ranked India at the 23rd spot [1]. To accelerate the pace of economic growth and race to the top, the most critical need today is to expand and modernize our inadequate and strained infrastructure, and speedily bring it to the world standards. The Government has been increasing the share of infrastructure spending every year. There are many projects which contributing in Infrastructure development for enhancing the growth of cities like Smart city, Smart village, Delhi-Mumbai Industrial Corridor, Special Investment Region (SIR), Dedicated Freight Corridor, Industrial Parks, Twin city Project, Special Economic zone. Among these Twin city project is one the project in which two cities can be developed parallely where two cities population get benefitted so that migration rate can be reduced. In India there are so many examples of Twin cities like Hyderabad & Secunderabad, Kolkata & Howrah, Mumbai & Thane, Delhi & Noida, Bhubaneswar & Cuttack. In Gujarat cities like Ahmedabad & Gandhinagar, Surat & Navsari, Anand & Nadiad, Bharuch - Ankaleshwar Gujarat is the one of the place where huge scope of infrastructure development can happen. Anand – Nadiad Twin city of Gujarat is taken as a case study for this research. Anand and Nadiad have a huge potential to develop as a Twin city. In this paper, an approach has been made to check the potentiality of both cities developed as Twin city and some inter linkages which enhance the both city development in terms of Twin city.

**Key words:** Feasibility, Infrastructure development, Population, Twin city, Urbanization

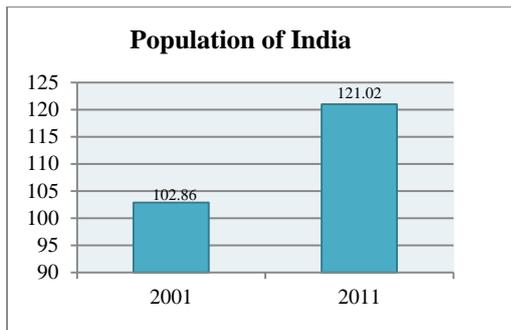
## INTRODUCTION

The term ‘urbanization’ means the increasing share of a nation’s population living in urban areas and thus a declining share living in rural areas. The growth of urbanization in India has basically through two ways, one is through increase in the urban population, which can be natural and the second one is through migration, which has result of people migrating from rural to urban areas and also from small towns/cities to big metros[2]. Gujarat believes that development of infrastructure is pivotal to industrial and economic growth. To facilitate the development of infrastructure there is an elaborate legal and organisational framework. The Study focuses on the existing urban agglomeration areas (census 2011) of Anand and Nadiad include all potential areas likely to come under the influence of the development and which would propagate the two urban centres as prosperous and complementing Twin-cities(Anand and Nadiad).

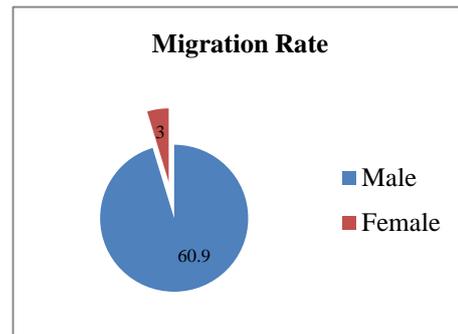
As shown in Figure 1 The total population of India was increased from 2001 to 2011 increase in population rate is about 17.65%. In Figure 2 migration rate for male and female from rural to urban shown that migration rate is higher in male as compare to female.

## OBJECTIVES:

- To study the city profile in context with Twin city development.
- To identify linkage/inter dependency between cities.



*Fig. 1 Population of India*



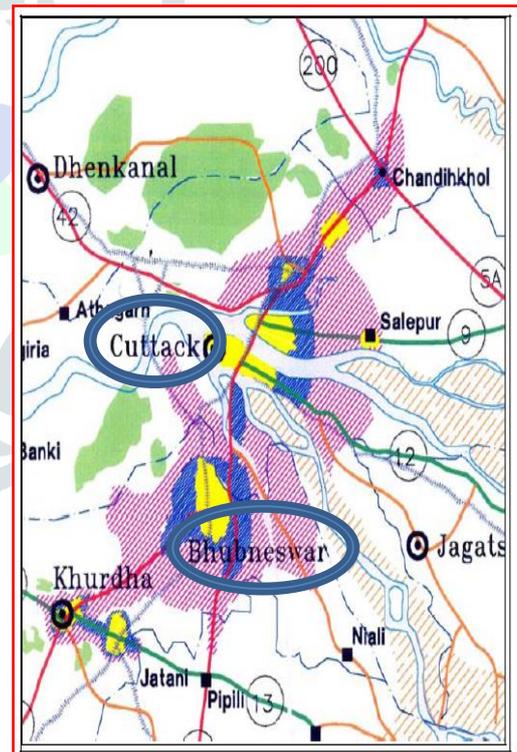
*Fig.2 Migration Rate*

### WHY TWIN CITY?

To radically transform existing cities and develop a new genre of satellite/ theme townships and interconnected twin cities which are safe, efficient, clean and green and offer a high quality of life. The excellent Infrastructure provisioning would also include advanced and well developed urban transport systems which address several areas of public transportation. With the excellent transport connectivity in place regional centres around mega cities would cater to residential need and mega cities would provide employment opportunity. Cities are located in close proximity and are interdependent on economic, functional, and urban infrastructure needs. Twin cities in true sense complement their existence in close proximity and do not compete.

### A CASE STUDY OF BHUBANESWAR & CUTTACK:

In India Odisha is the 3rd most populous state of India in terms of tribal population. Bhubaneswar is the capital of Odisha. Bhubaneswar is a modern new town planned based on Neighbourhood Concept. The total area is 332 sq.km. Cuttack was the erstwhile capital of Odisha. The total area is 195 sq.km. It had been the nerve centres for trade and commerce for the state. The port of Paradeep, located 70 km away from the city of Cuttack provides an excellent opportunity as industrial development in Cuttack. The emergence of new academic and other institutional activities, corporate functions will further add to this growth momentum. Development of Bhubaneswar –Cuttack Urban Complex will trigger collateral development of its adjoining hinterland. The anticipated growth in the coming years with their physical manifestation and growing urban population are likely to exert tremendous pressure on the existing resources, necessitating planned interventions in the region. The Bhubaneswar - Cuttack urban agglomeration is merging into a single urban region as a result of proximity between these two cities and high transport connectivity. Bhubaneswar is growing largely for administrative and institutional development whereas Cuttack is growing due to trade and commerce and industrial development.



*Fig. 3 Bhubaneswar & Cuttack*

### THE CONCEPT OF TWIN CITY FOR ANAND-NADIAD

Anand and Nadiad twin cities present such a potential as these cities are located only 21 Km apart and influencing urban growth in the region. Being Anand and Nadiad as district headquarter of Anand and Kheda respectively act as administrative city with all government district head office's on the other hand both the cities are function as Industrial or employment city. Figure 4 reflects the closer geospatial relation. Gujarat's 8th largest city is Nadiad which is known as "Saksarbhoomi". Nadiad is

well known for the house hold industries. Santaram Temple is a popular pilgrimage site in Gujarat dedicated to Saint Santaram Maharaj which is situated at Nadiad. Anand is milk capital of India. Agriculture activities are more sound in Anand and education hub like Vallabh Vidyanagar is the part of Anand . Both the cities have good educational facilities.

Area of Anand =21.3 sq.km Area of Nadiad=45.16 sq.km



Fig. 4 Location of Anand and Nadiad

**(1) COMPARATIVE ASSESSMENT OF URBANIZATION IN ANAND AND NADIAD**

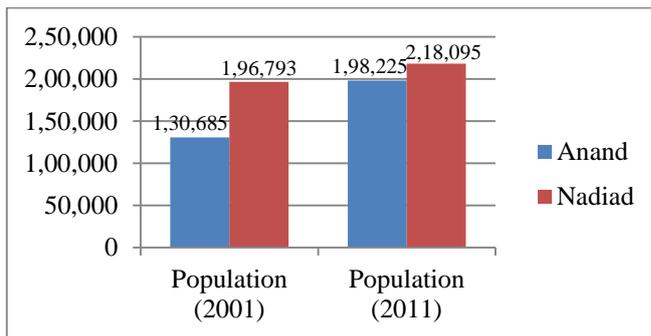


Fig. 3 Demographic profile

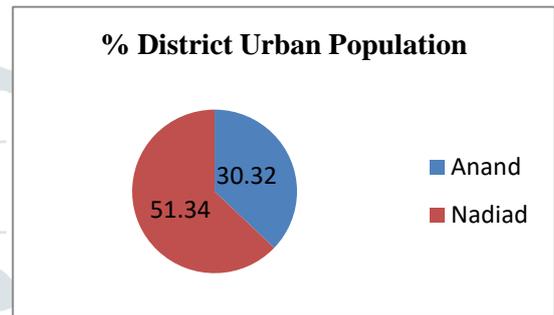


Fig. 4 % District Urban Population

In figure 5 shown that comparison of both cities population in census year 2001 and 2011[3]. Nadiad has the higher population as compare to Anand. Population growth is higher in Anand city as compare to Nadiad city. Increase of population is approximately 50 % in Anand.

As shown Figure 6 % district urban population in Nadiad and Anand[3]. Urban population going to increases in both the cities. In Nadiad city more population lives is urban area as compare to Anand and difference between these two cities is approximately 21%.

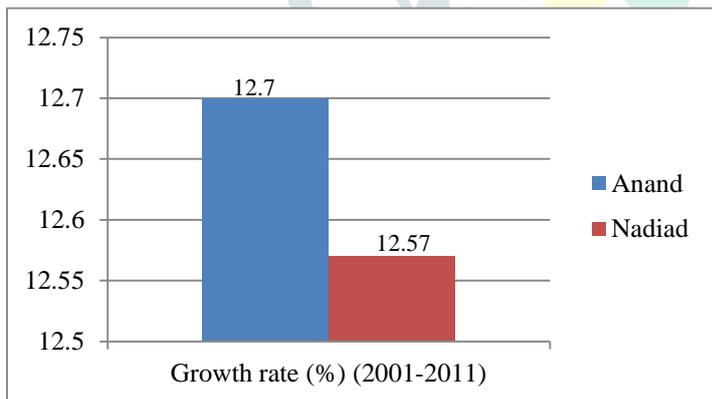


Fig. 7 Demographic detail

As shown figure 7 that Growth rate (2001-2011) in Anand and Nadiad in both the cities have approximately same Growth rate.

**(2) ECONOMICAL CHARACTERISTICS**

There were multiple industries and businesses going on in Nadiad and Anand. The specialization of Nadiad is kite making and umbrella making. Nadiad is famous across the state and in foreign countries for Farshan products with two leading brand name Navinchandra Bhavasar and Garbadas Bapuji. Nadiad is famous for medical tourism across the country and globe. Nadiad GIDC have many industries which give Employment opportunities.

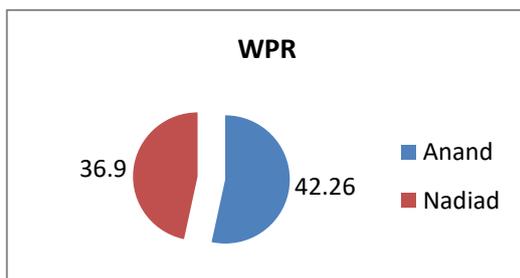
Anand is famous across the globe as milk capital of India. A well-known AMUL Dairy situated at Anand. Vallabh Vidyanagar is leading place in Gujarat for Educational Services. Charotar area is

famous for agricultural products. At Vitthal Udyognar where so many industrial units are in operation producing so many products and giving direct and indirect employment opportunities to many people of both the districts.

**Table 1: Registered Enterprises**

Type of Enterprises	Anand	Nadiad
Micro	500	889
Small	218	369
Medium	17	272

Number of registered enterprises are shown in Table 1[5][6]. Micro based enterprises are more as compare to small and medium.



Work Participation Ratio (WRR) have been high in Anand as compare to Nadiad difference between this two cities WPR is 5.36% as shown in Figure 8[3][4].

**Fig.5 Work Participation Ratio**

## INFRASTRUCTURE SCENARIO IN TWIN CITY ANAND – NADIAD

### (3) TRANSPORTATION CONNECTIVITY

Both the cities are connected by rail and road network. Nadiad is connected with Anand as well as with Ahmedabad and Vadodara by broad gauge railway line. Connecting links between Anand and Nadiad are National Highway (NH8 and NH228), Railway, State Highway (SH60 and SH139) and National Expressway (NE1).

- The 18740 Daily passenger trips between Anand and Nadiad by Road and Rail.
- Nadiad Anand Road is main connectivity link between Anand and Nadiad which handles 10809 trips in three wheelers and bus composition is maximum.
- National Expressway is also another connecting link but due far off distance it is marginally used.

### (4) WATER SUPPLY CONDITION

At present average daily water supply is 25 MLD in Nadiad municipality from ground water source. The distribution network per km road length is 350. In Anand average daily water supply is 20 MLD from ground water source and distribution network per km road length is 200. There are total 48 and 60 tube well are presently working as source in Nadiad and Anand. Required supply of water is 27 and 29 for Anand and Nadiad respectively.

### (5) DRAINAGE

In Anand city total drainage line network is 200km with Six pumping station and in Nadiad it is about 350 km with 11 pumping station. There is no treatment of drainage water so drainage water treatment is required for drainage water treatment and hygienic condition. In both the cities the drainage line coverage is 80 % and 85 % for Anand and Nadiad respectively.

## (6) EDUCATION

Social Infrastructure is one of the important measures of development, it is imperative to look into the kind of facilities available in both the cities. Here focus is on core infrastructure needs of the people like education is being catered to.

*Table 2: Existing Education facilities details*

Education Facilities	Anand	Nadiad
Primary school (Ganted)	28	23
Primary school ( Non Ganted)	29	45
Secondary School	30	84
ITI	6	1
College	17	8
University	3	1

From education point of view Anand city has more educational facilities as compare to Nadiad.. There are institutions which take care of school level education. The primary and secondary level education facilities are satisfactory at present and there is need to further develop additional educational institutions, both at primary and secondary level, to meet the future requirement arising out of increased population and increased literacy.

## (7) HEALTH

Social Infrastructure is one of the important measures of development, it is imperative to look into the kind of facilities available in both the cities. Here focus is on core infrastructure needs of the people like healthcare is being catered to.

*Table 3: Existing health facilities details*

Health Facilities	Anand	Nadiad
Public Hospital	1	1
Private Hospital	29	17
PHC	52	8
CHC	13	1

Both cities have the social infrastructure in terms of healthcare progressing at moderate rate. Healthcare facilities are being provided by the municipal and private institutions. In both the cities, there is only one Government hospital and more private hospital facilities.

## KEY FINDINGS

- Transportation connectivity is good but Pick hour Bus and Train Facility is lacking.
- Present water supply condition is not as per requirement. There is gap in supply of water around 2 and 4 MLD.
- Present Drainage line is not cover 100% of both cities.
- Proper outfall is not maintained in both cities as concern with treating the sewage.
- Health facility is good in both the cities but private sectors or more involved as compare to government sectors.
- Education facilities are more in Anand as compare to Nadiad.

## FUTURISTIC APPROACH

- Improve connectivity within cities and in between the both cities.
- To support the new industrial region with well-planned marketing centres, basic public services with good connectivity.

- To integrate the land use pattern with well needing of residential areas with non-residential urban activities areas.
- To develop strategy for efficient public transportation system with improvement in main junctions.
- To develop the policy frame work for stage wise infrastructure development to cater the desired demand with the growth and development in the area. Infrastructure covers physical, environmental, social and financial sectors.
- To develop strategy for formation of Anand Nadiad Development authority for define planned growth development.
- To enhance the scope of Private Public Partnership (PPP model) in realization of the Twin City Project.

## CONCLUSION

The paper aims to feasibility study for the development of both the cities as Twin city and necessity of their identification for development. Anand and Nadiad have been taken as a case study of development model and final outcomes has been revelled in the forms of social and physical Infrastructure development. So it is very necessary to understand the cities potential and advance preparation of development.

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