CHAPTER 1

INTRODUCTION

1.1 BANGALORE - A PROFILE

Founded by the feudal Chief KEMPE GOWDA under the great Vijay Nagar Kingdom in 1537 A.D., Bangalore the Capital of Karnataka State in the South Western Peninsular India, has since grown into an important urban centre recognised as the Garden City of India, Silicon Valley of India, Technical capital of India and as the Centre for Advanced Sciences, Higher Education, Research and Development. Bangalore has been acknowledged as the most cosmopolitan city in India, one among the top ten High-Tech cities of the world, one of the Futuristic Cities of the world and as one of the very successful commercial and industrial hubs of the Indian Sub-Continent. The Bangalore Cantonment is a part of Bangalore city.

Bangalore is situated on the Deccan Plateau at an average elevation of 900 m above mean sea level. The terrain is undulating in many parts of the city. The city has salubrious climate with a maximum temperature of about 34^0 C and a minimum of about 14^0 C with an average rain fall of about 760 mm.

Bangalore is the fifth largest metropolis in India. It is not only the Administrative and Commercial capital of the State but also the IT capital of India. The Bangalore Metropolitan Area spreads over 531 Sq.Kms.

Bangalore has traditionally grown as an industrial city and has become the seat of IT(Information Technology). More than 500 heavy industries and software companies are situated in Bangalore. It has a number of major public sector units including BEL, ITI, HAL, BEML, etc.

Bangalore is famous for its excellent educational facilities, especially in the fields of professional and higher technical education. Indian Institute of Science is situated here, attracting a large number of students from other parts of the country and abroad.

Bangalore is the ideal starting point for an exciting exploration of the fascinating, architecturally-rich heritage of Karnataka; every important tourist attraction in Karnataka is within a day's journey. While Bangalore has its share of ancient forts and temples, it is also the perfect spot for soaking in the sun and local flavour at the finest and friendliest of hotels. And it is a shopper's paradise where Karnataka's fabulous traditional silks, coffee, jewellery and handicrafts can be bought at well-stocked, reliable shops.

The present population of Bangalore is over 6 million. The main forms of transport in the city presently are two-wheelers, cars and the Public Transport, which comprise mainly of buses and three wheelers.

1.2 POPULATION GROWTH

The population of Bangalore city has increased form 0.16 million in 1901 to 0.41 million in 1941. Thereafter the growth rate has increased and the city had a comparatively high growth of population in the past three decades. During the decade 1971 – 81, the City recorded an increase of 76 % in its resident population from 1.7 million to 2.92 million and had the distinction of being the city with the highest population growth in the Asian sub-continent. But this growth was not persisting in the decade 1981 – 91. During this period a 41 % growth occurred pushing the population to 4.1 million in 1991 and 5.67 million by 2001, the present density of population being over 11,000 persons per sqkm. The current estimates put the population of Bangalore at 6.0 million. Projecting the past trends, Bangalore is expected to have a population of about 7.3 million and 9.0 million in the year 2011 and 2021 respectively. Besides, there is a floating population of the order of a million a day. The growth of population of Bangalore city is presented in **Figure 1.1**.

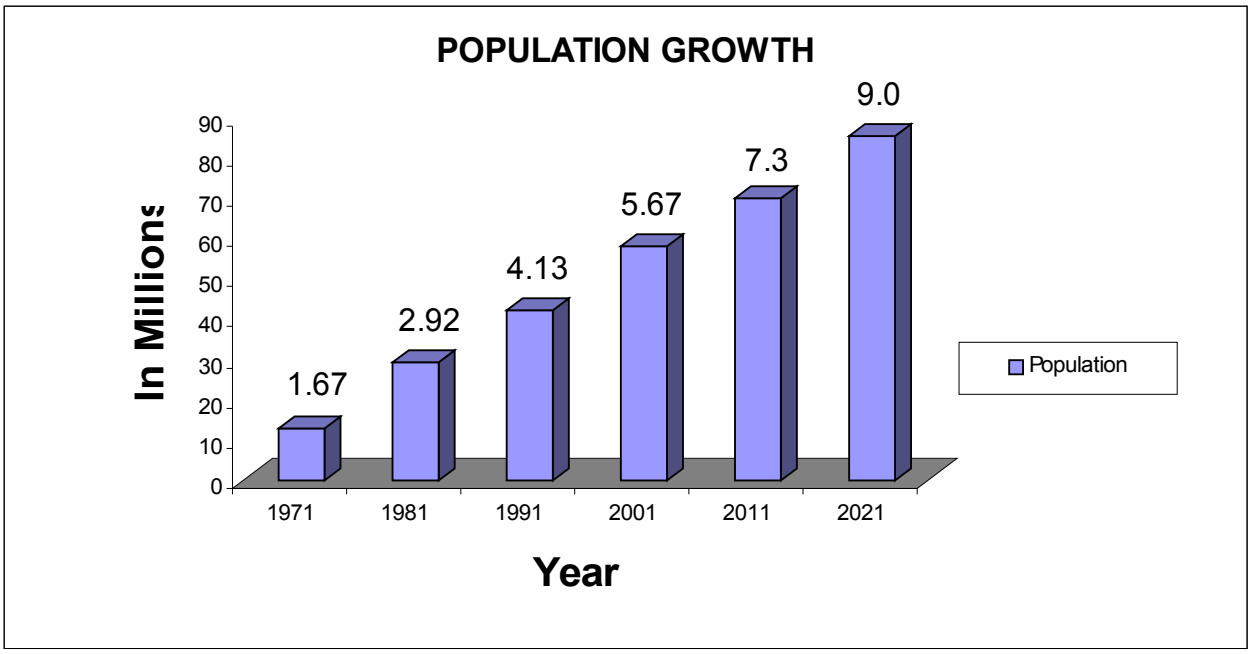

Figure 1.1

1.3 TRAFFIC AND TRANSPORTATION SCENARIO

1.3.1 Vehicle growth

The main modes of transport in the city presently are two-wheelers, cars and Public Transport which comprise mainly of buses and three wheelers. The growth of registered motor vehicles has crossed 1.6 million with a growth rate of 10% per annum. There has been a 10 fold increase in the number of vehicles in the last 20 years. The share of two wheelers out of the total registered vehicles is over 70%. This is due to the inadequate supply of Public Transport along with its inadequate

level of service. The bus fleet in the last 10 years has grown at less than 7.5 % per annum.

The growth of registered number of motor vehicles is shown in **Figure 1.2**.

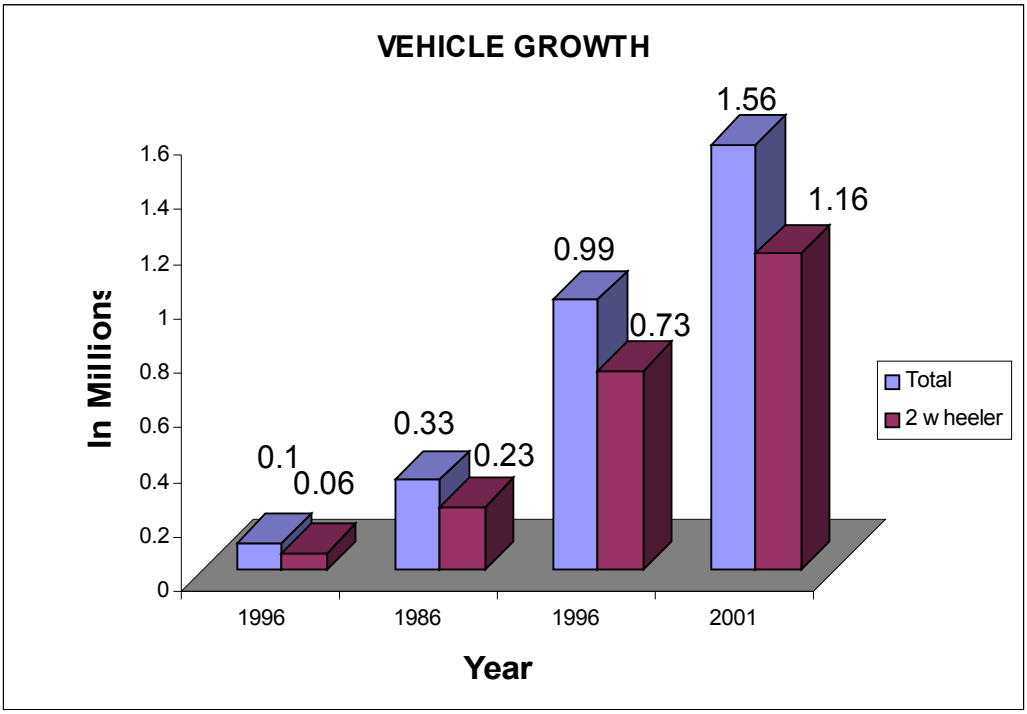

Figure 1.2

1.3.2 Transport Network

The transport network of Bangalore is a ring-radial network. Ten intercity roads cut across Bangalore City. There are about 3000 Km of urban roads (about 500 – 600 Km of arterial and major roads). The major arterial roads have right of way (ROW) less than 25 m (except on outer ring road) without any possibility of expansion as the sides are heavily built up. Recently an outer ring road has been taken up, 90 % of which is now complete. Unfortunately the entire length of outer ring road has residential land use with no destinations / work places along this road. Thus it is serving only as a truck bye pass and the entire traffic is shifted back to radial arterials. The road intersections are major hurdles to traffic with an average intersection spacing of about 200m.

Railway lines, all Broad Gauge, converge into the city from five different directions, viz. Mysore, Salem, Chennai, Guntakal and Hubli. Important Railway Stations serving the city are Bangalore city, Bangalore Cantonment, Yeshwantapur and Krishnarajapuram. Total route Kms within the City account for 62 Km.

1.3.3 Public Transport Scenario

Buses, three wheelers and taxis are the only mode of public transport available in the city. BMTC operates the buses with a fleet of about 2450 buses. Since the city is expanding in all directions, and roads already congested, buses alone are not

able to cope up with the heavy commuter demand. Buses (including factory buses) carry about 2.4 million passengers per day i.e., modal share of about 45%. But bus service is not adequate and it is over crowded and not fully reliable for commuters. The Railway network carries hardly 1 % of the commuters for want of adequate number of services and their frequency.

1.3.4 Transport Problems

Various factors described above have led to the following transport problems.

- Narrow roads heavily congested with a mixed type of traffic and little possibility of widening of these roads or laying new roads due to heavily built-up area.
- Frequent traffic jams at road intersections
- 75% of composition of traffic consisting of low occupancy vehicles.
- Two-wheelers and three wheelers causing heavy noise pollution.
- High parking demand due to proliferation of personalized vehicles
- Over crowded buses with long routes.
- Slow average speed 10-12 Km/hour on roads.
- High atmospheric pollution levels.
- High rate of road accidents of the order of an average of 2 persons killed and 18 persons injured per day.

1.3.5 Bangalore city is having a fairly good rail network - about 62 kms, but its potential for commuter rail development has not been tapped. There are a few diesel operated passenger trains run to Bangalore City from Tumkur, Mysore and Kuppam on the Chennai line in the morning and as return train in the evening, mostly for commuters coming from suburban areas and satellite towns. They are well patronized and in the recent past the patronage has shown good growth rate. But their frequency and availability are not adequate to attract intra-urban passengers. Of late, it is seen that a sizeable number of commuters take these trains from stations like Nayandahalli and Kengeri and on enquiries, it was learnt that these trains would be more patronized if the services go through Bangalore City Station towards Whitefield. Inadequate train services on these lines have also resulted in poor growth of areas around the rail corridor, except within the city area.

Recently a feasibility study was carried out by RITES for a commuter rail system for Bangalore city. But the scheme is yet to take off. However, the recommendations of the report have been considered while planning the metro network. It is proposed to have passenger integration between the proposed commuter system and the Metro system at Baiyappanhalli, Yeshwantapur and Bangalore city stations.

1.3.6 Previous Studies

A number of studies were done for providing an efficient public transport system for Bangalore city - the oldest being the study carried out by the Central Road Research Institute in 1963. However this study generally concentrated on the road network and traffic management system. A Rail network of 26 km was also

recommended. Later based on the data collected during 1977 to 1979 a study group nominated by the Karnataka Government gave a report in 1982 for improvement of transport system in the city. The study, though recommended a metro system, concentrated on road improvements and provision of grade separators. In 1983, the Metropolitan Transport Project, a team of Southern Railway prepared a feasibility report for introducing suburban services on existing lines, a ring railway and a rapid rail transit system on two corridors. The total cost of the project at 1983 prices was Rs. 650 crores. But, this report was not followed up.

In the year 1988 a World Bank aided study for Bangalore Urban Transport Project was carried out by RITES. The recommendations were for improvement of road transport system though provision of suburban services on the existing rail network was also recommended.

The first Mass Rapid Transport System was recommended in Jan'1993, based on the 1983 report by an Official Committee nominated by the State Government. The work was to be carried out in two phases:

Phase I

- MRTS from Rajaji Nagar to Jaya Nagar (12.9 km - partly underground)
- suburban corridor on existing rail network

Phase II

- MRTS from Hudson Circle to Krishnarajapuram (11.2 km)
- Circular railway for 57.9 km

In 1994, the State Government incorporated a company under the name Bangalore Mass Rapid Transit Limited (BMRTL) under the Companies Act, 1956 to implement the Mass Rapid Transit System. BMRTL in turn asked IL&FS to carry out a feasibility study for a Rapid Transit system on Public - Private Partnership basis. The main recommendations of the study were:

- An elevated LRT system on 6 routes viz ;

- Yeshwantapur to Kanakpura via Rajaji Nagar and Jayanagar,
- Hudson junction to Indira Nagar via M G Road and Airport,
- Yeshwantapur to Mayo Hall via Mekhri junction,
- Jayanagar to Mayo Hall via Koramangala,
- Chord road to Kanakpura via Banashankari, and
- Ulsoor to Mekhri Circle and Hebbal.

- Legal cover under Tram-ways Act.
- The traffic forecast were made for the year 2001 and 2011.
- Recommended a fare of Rs. 0.55 per pkm (1994 prices). Indicative fares in July'2000 was Rs. 2.25 per Km.
- Capacity of the system as 24850 phpdt

- Train headway varying from 5.45 mts to 30 mts on various sections
- Special rolling stock with 750 volt dc traction system
- Total construction period 7.5 years from 1st April 1999

- Total cost of the project as Rs. 2025 crores (excluding land) at 1994 prices. Indicative cost in July'2000 was Rs. 80 to Rs. 100 Crores per route Km.
- IRR projected as 12.9% (upto 2030)

However the project could not take off for various reasons, despite fixing up a private partner for implementation of the project.

During August - October 2002 the Karnataka government started discussions with DMRC for preparation of a detailed project report for a Metro system for Bangalore and the work started in Oct 2002.

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