

## **GLOBALISATION AND URBAN RESTRUCTURING OF BANGALORE, INDIA :**

### **Growth of the IT Industry, its spatial dynamics and local planning responses**

#### **The Information Technology (IT) Industry in Bangalore**

In its foray into the global economy through policy led liberalization in the 1990s, the Indian economy has been able to capitalize on the opportunities for production in the Information Technology sector. Within this sector, much of the growth has been in the export oriented software and back office services production (Heeks, 1996, 1998). As estimated in 2001 -02 the share of software exports from India is still only 1.41% of the global market (NASSCOM, 2002) but the share of the industry in the GDP has risen from 0.59% in 1994-95 to 2.87% in 2001-02 (ibid, 2002). What is significant about the growth of the Software and Services sector has been its buoyancy with respect to the other sectors of the economy. The Software Industry in India grew by a CAGR of over 40% from 1990 –99 as compared to only 6.6% for the economy as a whole and is higher than the growth rate of the US industry during the same period (Saxenian, 2000; Arora et al, 2001, D'Costa, 2003). Exports form almost 75% of the total production that is attributed to the global outsourcing demand for software development in locations that have a sufficient pool of low cost skilled labour. In the last two decades the reputation of the software programmers from India have been firmly established in the global market making them very much a part of the international division of labour in the software industry.

At the center of attention in India's globalisation have been its metropolitan cities such as Delhi, Mumbai (Bombay), Kolkata (Calcutta), Chennai (Madras) and Bangalore. However, in terms of the IT industry, the southern city of Bangalore has attained much of the attention as the 'Silicon Valley of India'. Texas Instruments was the first multinational software company to set up operations in Bangalore in 1984. The Karnataka Government<sup>i</sup> announced its IT policy in 1997 to bolster this growth, transforming the city from a retirement destination to a silicon powerhouse that is arguably the leading IT centre in Asia; with over 130 multinational IT companies and 928 software export oriented companies located here (STPI, 2001). Only 34 firms in the world that have been certified with the prestigious Carnegie Mellon SEI CMM Level 5 rating (the world's highest rating for software systems and process). Of these, 26 are in India and 13 have set up operations in Bangalore. The city with a cumulative investment in technology to the tune of about \$1 billion had a turnover of about \$ 1.59 billion from software exports in 2000-01 from over 928 companies registered with the Software Technology Parks of India (STP). Most of the companies in Bangalore develop Application Software (293 firms) and System Software (166 firms), followed by IT Enabled Services companies (303 firms), Communications Software (108 firms) and Integrated Circuit Design (46 firms). The largest IT firms in India such as Infosys, Wipro, Satyam and TCS were all small start ups in the city and became large global conglomerates.

The city has attained great visibility in the world economy owing to the phenomenal growth of the IT sector in a single location in the context of a developing country. It is being heralded as the 'fastest growing technology hub' (HDR, 2001), which represents a model that could be replicated in other cities in developing countries. Unlike popular belief, Information Technology industry is not a remarkable shift for the city. From the early 1950s the city was developed as a centre for scientific innovation, research in aeronautics and electronics and public sector industries that were linked to the research facilities. In addition to this, technical

education institutions were located here even before Independence by visionary Maharajas of Mysore (princely state which the city was a part of). The already established scientific milieu, research tradition and skilled manpower from the educational institutions are cited as the factors of advantage for the city which facilitated its shift from a centre of public sector research and production to the global economy (Parthasarathy, 2000).

The boost in urban economy has meant accelerated growth for the city. As the capital city of the state of Karnataka, Bangalore Urban District has the highest population among all the districts in the State. According to the provisional estimates from the 2001 census the population of the state has grown from 44.97 million in 1991 to 52.73 million in 2001 which is a 17.25% decadal rate of growth. The population of the city (Bangalore Urban Agglomeration) on the other hand has grown from 4.09 million in 1991 to 5.69 million in 2001 showing a 39.04% growth rate over the last decade. In comparison with the other cities in India, Bangalore was the 5<sup>th</sup> largest city in 1981, slipped to 6<sup>th</sup> position in 1991 and has now again attained the 5<sup>th</sup> position in 2001. In the past decade the city was the fastest growing city in Asia.

### **Significance of the IT industry in Bangalore's urban economy**

The significance of the Software firms to Bangalore and the State's economy is apparent. The main workers (total workers who had full time employment) in the Bangalore Urban Agglomeration as per the Census of 2001 are 2.1 million, which forms 36.4% of the total population. This is an increase from 33.4% (1.37 million) of the population in 1991. Of these main workers, 97.3% (2.04 million) were employed in the secondary (excluding household industries) and tertiary sectors in 2001. It is estimated that the IT Industry in India directly employs 4100,000 workers in beginning of 2001 (NASSCOM, 2001). A reasonable estimate of 25% of all IT labour being located in Bangalore is a conservative estimate suggested by industry sources. These would constitute about 100,000 workers i.e. 4.7% of total main workers in the city. These 100,000 workers produced an export revenue of \$1590 million in 2000-01 which was 3% of the entire exports from India<sup>ii</sup>. The export revenue from Bangalore was 9% of the Net State Domestic Product for Karnataka in the same period and was the sector with the highest annual growth rate of 50% (Economic Survey, 2001-02). In conclusion it could be said that these 100,000 workers in Bangalore (which is 3.5% of the total population of the UA) contributed 12% of the State Domestic Product, 37% of the District Domestic Product and 3% of the total exports from India in 2000-01. That these 'knowledge workers' and the 'knowledge industry' are a focus of attention and significant part of the cities' economy is obvious.

But apart from these 100,000 workers are 2 million workers who are not directly involved in the IT Industry. It is estimated that in addition to the 100,000 workers there must be almost another 100,000 workers who provide support and ancillary services to the IT firms. This still leaves 1.9 million workers who are employed in the 'other' sectors of the urban economy. Being a city in a developing nation, Bangalore already had large differences between economic classes and introduction of another sector, which is an exclusive domain of the highly skilled labour force, has further exacerbated the situation.

In a situation where the literacy level of the Bangalore, which is the largest city in the state, was only 76% in 2000-01, the access to this clique of high skills and productivity is restricted to those who can afford specialized technical education. Though there does exist an opportunity to be part of the support services and the spin off economic activity which responds to the demands of this sector. As has been observed in the socio economic studies of the global cities by scholars, the IT Industry in Bangalore creates employment at the two extremes of the spectrum of skill - the high skilled and high value added level and at the low skilled support services level (Sassen, 2000). This is the employment that is directly related to the production process. In addition to this there is a growth of the service sectors such as

Banking, Insurance, Finance, Real Estate, Construction, Marketing, Legal, Hotelling, and Entertainment which again have a split between the high skilled and low skilled workers. There is an absence of any official statistics or studies that document the increase of employment or size of the advanced services from 1991 to 2001 <sup>iii</sup>.

It is however possible to say that the milieu of global production and service firms exclude from direct employment a large proportion of population who have no access to the means of specialised higher education. However, the potential of employment opportunities in the buoyancy of demand created in the local urban market as result of increased wealth certainly exists for a larger range of population. Researchers on the urban poverty in Bangalore contend that there is a divide between the 'local' and 'global' economies. The urban poor and majority of the population are still involved in local economic activities that fall out of the purview of the 'formal' sectors (Benjamin, 2000 p 35).

The spatial manifestations of the industry in the city are most telling of the inequality that it represents in the local urban economy. In absence of detailed information on changes in income and standard of living in the city for an econometric spatial analysis, the divisions in the urban form can be taken as representative. The stark contrasts between these citadels of power and wealth and the rapidly collapsing and overstrained urban system are apparent to any visitor to Bangalore. Many authors talk of this paradox which characterises the 'Globalisation' of Bangalore:

'Like all major Indian cities, Bangalore - a metropolis of about 5 million people on southern India's Deccan Plateau - is a sprawl of decaying single-story houses and shops, Soviet-style apartment buildings, crumbling colonial offices, and abominable shantytowns that extend miles into the countryside. The potholed roads look like they've been hit by an air strike. Poverty is everywhere, too. ...But keep looking and you start to see a very different Bangalore - a nouveau-riche **parallel universe**. There's a Mercedes or two stuck in traffic with us; on the sidewalks, men in Armani suits have cell phones pressed against their jaws. When the traffic lets up, Singh turns onto Mahatma Gandhi Road, and suddenly you'd swear you were on Rodeo Drive, with row after row of designer boutiques catering to a new class of Bangalorean yuppies - some of whom made more money in the '90s than their families earned in 500 generations.' (Wetzler, 2000 pp1: emphasis is mine)

Bumping along Bangalore's Sarjapur Road in a spanking new 1950s-styled Hindustan Ambassador sedan, a visitor is hard-pressed to convince himself he's in the epicentre of India's Silicon Valley. A few glass office buildings emblazoned with This Technologies or That Software whiz by, as do a few luxury-housing complexes - the Villa del Mar, Prestige Acropolis. But they're just an occasional interruption in this *mise en scene*. The road is hemmed for miles by jerry-build and decaying stalls selling food and other items. Cows are grazing amid the trash and dirt on the roadside. Bullock carts, identical to the ones depicted on the stone carvings displayed at the local museum, fight for room on the crowded and potholed road with swarms of motorised rickshaws and motorcycle. It's all the standard trappings of a vibrant but distinctly poor and underdeveloped economy. (Rosenberg, 2002, pp 123)

### Urban transformation in the city

The factors of local and global change have modelled the trajectory of growth of the IT industry in Bangalore. Observers of the industry (NASSCOM, 2001, 2002, Heeks, 1986; Lateef, 1997 etc) as well as researchers (Parthasarthy, 2000, Benjamin, 2000 etc.) have documented its transformation from a body shopping on site production to an off site software and service production centre with a predominant export orientation. The phenomenal growth of the number of firms in this sector from the mid 1980s to the present has created a demand for good quality office space with advanced telecommunication and

other infrastructure. The industry which initially accommodated into the already existing multipurpose commercial space in the city has become the major demand factor for the production of new commercial space. Its role in the real estate and construction industry of Bangalore has become that of a principal determinant creating expansions, distortions and imbalances. Spatially the agglomeration of the firms in the city have produced distinct patterns of urban form depending on the various factors such as firm typology, size, production type, technological limitations etc.

The physical pattern of the city has undergone phases of growth and transformation based on a lot of factors such as technological infrastructure, planning efforts, industrial policy and supply factors. These phases of change can be divided into 4 phases each of which have registered a shift in the growth of the IT sector and consequently a change in the physical pattern: Mid 1980s to 1991, 1991 to 1996, 1996 to 1999, 1999 till the present (Refer Fig 1 for locational references in this section).

**Phase of Start Ups and location of MNC subsidiaries (mid 1980s to 1991)** - First phase of location which was a combination of small domestic startups involved mainly on site production and large multinational firms setting up to make use of cheap skilled labour available. The communication infrastructure was limited till 1993 so the work was physically disconnected from the clients. Texas Instruments, which was the first MNC to locate in India, had direct links with the university (Indian Institute of Science) and Public Sector Enterprises (Indian Telephone Industries) and got most of their labour from head hunting these established research institutions. The only option for commercial space available at that time was in the CBD and the secondary CBDs. Most of the MNCs who could afford it were located in the Central Business District (CBD) and secondary CBDs and the start up domestic firms in need of an image and establishment of their credibility were also located near the CBD. This was the time of the expansion of the CBD i.e. area around M.G. Road with growth in retail, commercial and entertainment facilities in the CBD.

**Phase of establishment of brand capability (1991 to 1996)** - This was the period of establishment of the credibility of Indian programming and software talent in the global market. Bangalore began to be synonymous with software development and large numbers of multinationals flocked to it. The year 1991-1992 was significant for the taking over of the satellite station owned by TI by the Central Government and the first public owned communication network established in India in Bangalore. The government worked closely with the firms investing in Bangalore and the STPI scheme for giving incentives as well as communication linkups to the industry was announced. In 1991 the initiation of the STPI scheme gave the institutional backing for IT growth. The first satellite link up was based on wireless technology and a clear sight path had to be available to transmit signals to the receiving station. This was the reason that the industry started to shift from the CBD towards the south of the city to be able to establish a clear sight path to the Electronics City in the south where the first Earth Station was located. This was a period of a large number of startups of domestic firms as well as alliances, subsidiaries and franchises with global firms. The real estate prices in the CBD reached a peak in 1995 and there was an acute shortage of quality space. However, mid 1995-96 was a period of overcrowding in the city and a collapse of city infrastructure. The government realised the importance of upgrading living conditions in the city as investment had already started to move to competing cities especially Hyderabad which was gunning to be the second Silicon City in India. The competition with Hyderabad thereafter formed an important element of policies in Bangalore thereafter.

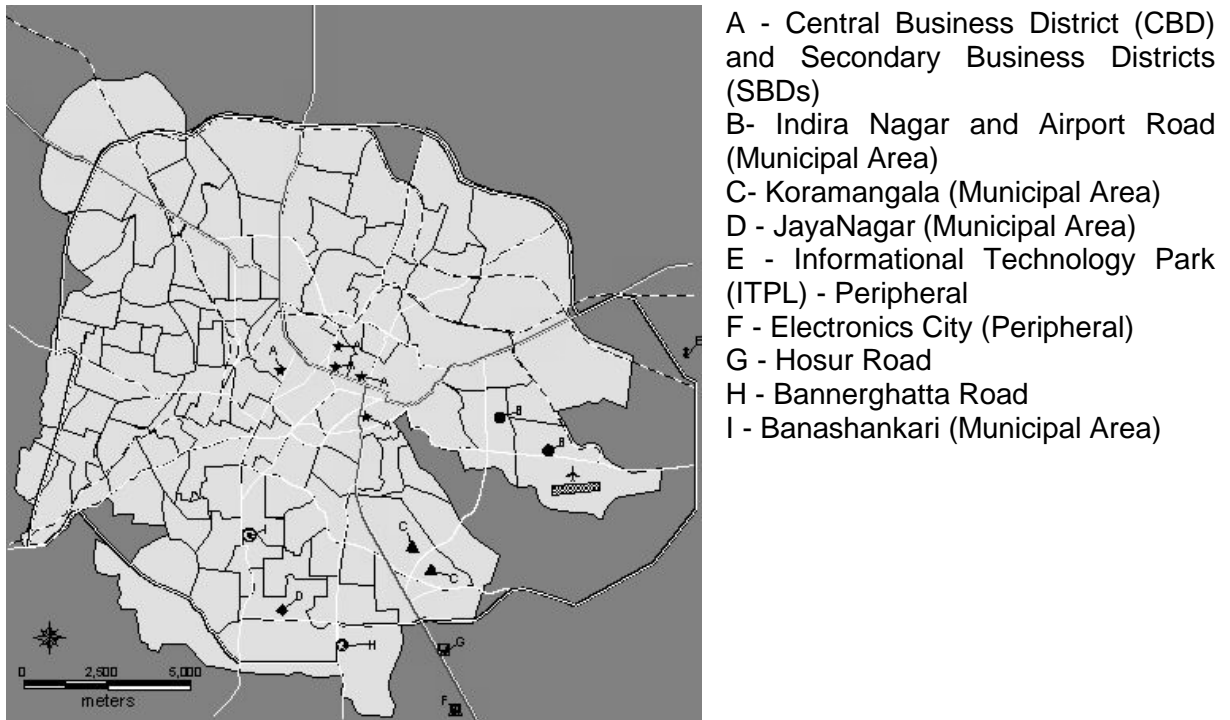
**Phase of Y2K related boom and Dot Com bust (1996 – 99):** Having established its reputation in the Offshore Development Centers market for software development, the city attracted a major increase in business of the Y2K related projects. This was a turbulent period of increased outsourcing of work to India and a crash in the global 'dot com' industry.

The government offered tax rebates to the firms registering before 31st march 2000 which caused a flurry of registrations and start ups in Bangalore which subsequently went bust in a short time. This period saw the development of negative economies in the city and the real estate market crashed. Excess supply of space was created in the city which could not be absorbed until the end of 2001. The real estate prices were falling sharply after the peak in 1995. There was a growing sentiment of Bangalore becoming over crowded and the city services being over stressed. There was a perceptible rise in the price of labour as the increase in agglomeration led to the increase in demand for the skilled and experienced professionals who not only had options to move between firms in Bangalore but they were now part of the international labour pool and could get employment in firms abroad. Smaller firms were being priced out of the market both in terms of labour and real estate so to keep overheads under control they moved to low rent housing areas. 1997 -1998 was a period of concentration of small and start ups firms in the residential areas. 1995-96 marked the initiation of the Information Technology Parks Limited project which was completed by end 1998. The project was a Joint Venture between the Tata group, Singapore consortium and the State Industrial Areas Development Board. With the encouragement that private investment in Software Technology Parks by government policy and the planned developments in the ITPL and Electronics City, the peripheral growth and location of IT firms was initiated. Even though large firms had already been located in the Electronics City (State owned Industrial Area in the South), the movement of firms to the periphery really took momentum after the commissioning of the ITPL and the completion of the Outer Ring Road in 1999.

**Phase of business recovery and peripheral spatial growth (1999 – present):** The period after 1999 has been of speculation about the future and growth of the sector. The Y2K projects made an impact in the establishment of the reputation of a few large firms and the others had to compete to stay afloat. But the recession in the world economy is not the only reason, there have been growing diseconomies in the city and a slow down of expansion and new locations in the city. All firms begin to realise the eroding of cost advantages by being in Bangalore as well as the rising cost of labour. In terms of physical development this period was marked by consolidation of space and movement outwards from the city by the large firms. There has been a slow down in the startups as well hence no further growth has occurred in the rentals in residential areas. The rents of commercial space have been falling since the peak in 1995 -96 but they show signs of stabilising.

Through the phases discussed above, transformation of the IT industry in Bangalore has shifted from being concentrated in the CBD and the Secondary CBDs to peripheral locations. Results from my PhD. study show that the distribution of firms located in the CBD, Secondary Business Districts (SBD) and the Peripheral Locations is almost the same (15%-18%). The highest concentration of firms however is not in the CBD or even the SBDs but in the Municipal Areas in the South and South East of Bangalore (total of about 50% of all firms). The following two Figures 4 and 5 show the dispersal patterns in the city.

**Fig 1 : Locations of concentration of IT firms in Bangalore Municipal Area, 2001 end**



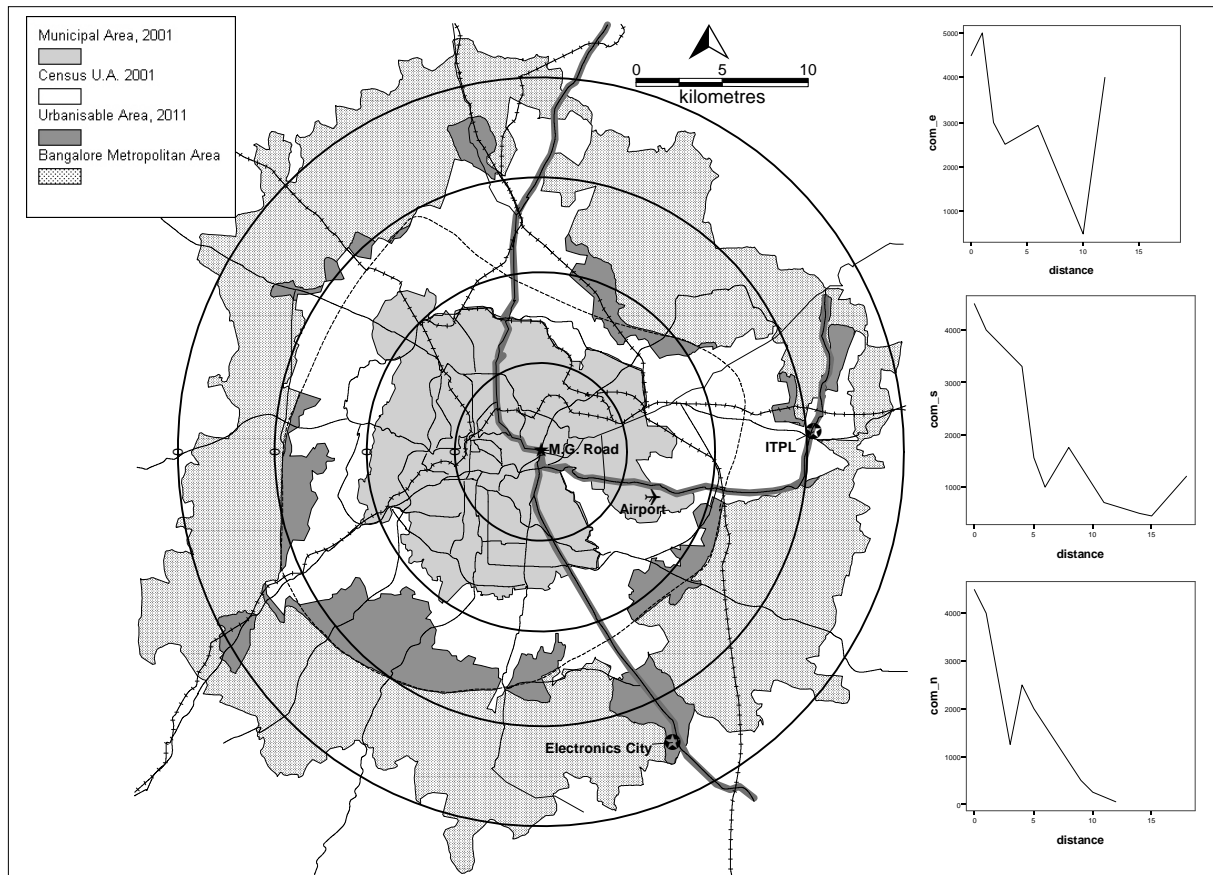
**Fig 2: Ward wise concentration of IT firms in Bangalore Municipal Area, 2001 end**



Source: Results from authors unpublished Ph.D. Research, 2002

The most direct impact of the office-based industry has been the expansion in demand for networked and well-serviced commercial space. The dematerialised nature of the production of software and services in this export oriented industry makes labour and access to networks (physical services, business services and communication) the only locational determinants. As demand for commercial space increased with the growth of the industry, the access to space in CBD got constrained and rentals peaked in 1995, the firms started to disperse to newer commercial areas. In addition to this the location of the Satellite Earth Station being located in the Electronics City which is 18 kms. from the CBD and the then available technology for communication requiring a clear sight to enable wireless link up prompted the movement of firms outwards to the South and East of the city. Agglomeration patterns show mainly four locational patterns - CBD and Secondary CBDs, Municipal Areas in the South and East of the CBD, Along transport corridors leading outwards from the city and in Special Economic Zones in the Periphery. Along with the shifting of the commercial spaces, residential neighbourhoods that had been developed by the Bangalore Development Authority in the 1970s and 80s became the preferred residential location for the executives working in the firms. The highest level of management and technical personnel had access to the high value housing around the CBD but new developments for the majority of the high skilled labour were created in the municipal areas of the south and the east. The combined effect of the movement of commercial offices and residential location were the development of retail cores outside the CBD which offer competing and sometimes higher services to local areas of agglomeration of firms and residences. The new cores of retail and commercial space are the locations where the maximum expansion of space is taking place with virtually no new space being available in the CBD. The importance of these new cores has not necessarily overtaken the locational benefits of the CBD where advanced service firms still tend to agglomerate but production firms are dispersed here to take advantage of lower rents, capital values, newer construction and better access to infrastructure. Similarly, retail establishments for functions other than products of daily needs which tended to agglomerate in the CBD are locating in these new cores and peripheral locations to be closer to the population which aspires to a global lifestyle and has the paying capacity. The realisation of the overcrowding and congestion in the CBD deters the centralised mononuclear pattern that existed till the last decade. The CBD has acquired an additional function of being the entertainment and leisure centre with a large number of pubs and restaurants having sprung up here. The city has earned the sobriquet of 'city of the thousand pubs' owing to this agglomeration in and around the CBD. No detailed studies have been undertaken but movement patterns are being altered with the decentralisation of work places, retail facilities and new high-income residential zones. These new cores have mostly been extensions of existing commercial and retail areas which were meant to serve neighbourhood functions. The area of influence of these centres extends much beyond the neighbourhood level and retail/commercial establishments of all scales are located here. Large scale retail facilities such as shopping malls, speciality restaurants, entertainment centres etc. choose to locate first in these cores before entering the CBD which is perceived as having too high rentals and overcrowded. The analysis of the land value trends along three corridors (North, South and East) leading outwards from the city illustrate how secondary peaks of commercial value have formed in the periphery of the city (Ref. Fig. 3). These peaks are locations of high quality commercial development that I have discussed earlier. In the current phase of growth, firms in the city are consolidating their scattered offices in the city and require large commercial spaces for location. Lower rents in the corridors leading to the Software Technology Parks, good access and the availability of space has prompted the development of single firm occupied campuses along these corridors.

**Fig 3: Land Values along transport corridors in Bangalore, 2002**



## Physical Representations of a growing economic disparity

### Peripheralisation and formation of enclaves

Planned developments of specialised facilities in the periphery of the city at a distance of 15 - 18 kms. in the South (along Hosur Road) and East (along Airport Road) have initiated the movement of firms to the corridors leading to the Export Promotion Zones. The recent development of communication technology makes access to the fibre optic networks relatively location free making it possible for firms to locate outside the confines of the urban fabric. The need for consolidation of dispersed offices in the city is visible in the more and more opting for exclusive campuses in the periphery. The opening of agricultural land and favourable industrial policy permits the location of firms without any locational restrictions in the metropolitan area. The firms negotiate extension of basic services to peripheral locations with the civic bodies and high vehicle ownership of the employees makes the shift feasible. The shifting outward of firms is a natural process of succession as space becomes limited and expansion needs warrant large consolidated space available in the periphery. However, the location of prime commercial developments such as the ITPL and other privately owned software parks if followed by the shifting of retail, leisure, entertainment and other services. Gradual integration of high quality commercial space with luxury housing in peripheral locations might be a precursor to development of secondary cores as a part of suburbanisation such as those evidenced in 'edge cities' in the more developed global cities



though the scale is not comparable. The peripheral development of Technology Parks and Retail/ Leisure facilities in Bangalore is in no way comparable to the scale of Edge Cities in the Boston Region or Santa Clara Valley. The divorced nature of production where the market is almost completely external to local urban surroundings is creating enclaves of physical agglomeration which form nodes of attraction for labour. The nodes and export promotion zones bear remarkable resemblance to the decentralised work centres on the periphery of large U.S. cities. The labour, which until now was mainly located in the municipal residential areas, travels to and from these centres. In my interviews with the CEO of Infosys, the second largest IT firm in India, was echoed an industry sentiment that location in Bangalore is simply a function of the urban environment that it has to offer for the labour. Other than the investment location has very limited linkages with the city. The movement outwards and formation of enclaves and exclusive campus complexes of several domestic and MNC firms is evidence of this growing disassociation.

The high skill requirements of the IT industry make it the exclusive domain of a select few in the society. The limitation of the domestic market further restricts its innovativeness and the filter down for larger development. The industry thus creates employment only at the two spectrums of high skills and low skilled support services. Unlike the manufacturing sector in Bangalore, the IT industry has not created and significant ancillary industry demand either. However, the agglomeration of firms does lead to creation of new start-ups as informal alliances forms among individuals (Parthasarathy, 2000; Wetzler, 2001). As suggested by previous research unless the government makes efforts to internalise the market and create domestic demand the disassociation of the industry with local environments and economy will continue. The demands for space and consumer products generated by the excess wealth created in the economy will continue to exist but skills and educational levels limit the access to the industry.

The physical manifestation of this excluding and limiting nature of the firms and the residential areas of the rich professionals is apparent in Bangalore. The physical agglomeration of the firms in a limited area of the city is attributed to the availability of space, infrastructure and technological limitations of the communications network but the enclaves and exclusive campuses are representative of the divide that exist between the global economy and the local one. The contrasts of affluence and poverty is even more apparent in the context of a city in the developing economy where the glass and steel structures are incongruent with the collapsing urban infrastructure and the impoverished millions. The filtering down of economic benefits to the population which is not directly associated with this sector is a distant vision. The enclosed apartment blocks, highly controlled access to offices, towering modern buildings are symbolic of the polarisation which already existed in the city but has been further intensified. The 'knowledge professionals', majority of who are migrants from other parts of the country form a parallel universe in the city where the lifestyle that they have access to coexists with the existing urban fabric which had a cosmopolitan yet very southern Indian identity.

### **Real Estate market dynamics**

The last 20 years of the Real Estate and Construction industry in Bangalore have been dominated by the production of space for the IT Industry either directly in terms of office space or indirectly in the form of residences, retail and entertainment space for the upwardly mobile executives who work in this industry. It is estimated that of all the commercial space being constructed in the city since 1985, almost 80% has been taken up by the IT firms and other service sector corporate that have moved to the city (Jones Lang LaSalle, 2001). The close association of the fortunes of the Real Estate sector with the IT industry is therefore no great surprise.

The production of space for the new Industry in the city had been the predominant domain of the private market until 1997 when the State Government announced its IT Policy and the

Single Window Clearance Scheme (SWA). Under this incentive package to the IT industry the State Government would acquire land for a firm if it so required. Apart from this incentive linked space was made available in the Export Promotion Zones established by the Industrial Development Board. However, only the very large firms who already were well established in the city and some large MNCs have opted for this option to locate in the city (Interview with Chairman of SWA, June 2001). Other firms still rely on the market supply of developed commercial space or land.

The most significant factor of change in the private market for real estate in Bangalore has been the value of land and constructed space since the mid 1980s. Bangalore which represented cost advantage for location of firms as compared to the large cities such as Mumbai (Bombay) and Delhi has seen a phenomenal rise in rentals and capital values (value at which land/ constructed space can be purchased per unit area) which have pushed up the costs of location in the city to almost the same level as the large cities. The real estate prices in the city have followed a speculative pattern of sharp rise in prices from the mid 80s to 1995-96. In this period the rentals for high quality office space in the CBD rose from Rs. 10/ sq. ft to about Rs. 80/ sq.ft. Thereafter, there was a crash in real estate prices and the same rentals fell to Rs. 57/ sq.ft. in 1999. The period after 2000 has seen a re stabilising of the market but the same peak of 1995 will probably never be reached. The same trends have also been observed in the Retail and Luxury Housing real estate sectors.

The geographical focus of the market has also shifted in succession from the CBD, to secondary CBDs, to Municipal Areas in the South and East and most recently to the periphery. Though the market has been extremely speculative, the city hasn't seen the levels of institutional and corporate investment in real estate as in the large global cities. This has been due to the restrictions on ownership of immovable assets and entry of multinational investment firms. However, with the second phase of economic liberalisation at the national level the institutional investment in real estate is expected to change the ownership profile of cities such as Bangalore. As of now, the ownership in commercial real estate is mainly based on rental agreements. Only large Indian owned firms prefer to purchase permanent fixed assets. The decline in the demand and over production has created conditions of a buyers market where the builders and landowners have become more flexible and new forms of contractual agreements are becoming common. Build to suit developments for single firms are one of the more recent characteristics of the production of new space. With the increasing reliance and focus of the market on demand from the corporate sector and IT industry, distortions have crept into the supply patterns. As the government withdraws itself from public housing, and the market only responds to demand at the highest levels, the demand for housing and space for especially the low income groups is becoming a grave issue. Affordability is the key factor which is pricing out low income uses from receiving market attention and response.

Public policy has similarly been focused on the creation of high quality space for the attraction of investment. The government which has a dual task of creating an image for the city which offers a competitive destination for investment both with respect to in a global context and within the country. The limited public resources to provide quality space and infrastructure have prompted the supportive role public policy has played to the market provision of these facilities. The Infrastructure Policy and the amendment of various State legislation have made it easier public agencies to undertake public private partnerships for urban real estate projects. A special incentive project which including FAR concessions and Stamp Duty relaxations were announced for construction of Information Technology Parks by private builders. The flagship project in this regard was the Information Technology Park which was initiated by the State Government and completed with investment from a large national business conglomerate and consortium of firms from Singapore. As a combined effect of all supportive policy of the local and State government, since 1995 the largest proportion of approved investment in the city has been in the IT infrastructure and built space.

## Local autonomy in spatial decision making

The formulation and implementation of urban spatial policies in Bangalore are plagued by the problems of multiplicity of authorities and political conflicts (Benjamin, 2000; Ravindra, 2001). For the purpose of simplicity I will restrict myself to three organisations which have in been instrumental in directly shaping the physical structure of the city. These are:

- Ministry of Information Technology and the Karnataka Industrial Area Development Board (Central and State level Government Departments)
- Bangalore Development Authority- BDA (Statutory Authority setup by State Legislation)
- Bangalore City Corporation - BCC (Urban local body with elected representatives)

The Constitution of India has empowered the State to be the sole authority of making policies with regards to Industries, Land and Municipal Governance without any interference from the Central Government. This might not always be true in practice and invisible controls do exist but in essence it is the prerogative of the State to make its own Industrial and Land Policies. Therefore the power to shape urban development in terms of economy, physical structure and local urban governance lies with the State. The powers that it devolutes to local bodies and administration in cities is dependent on the specific policy in that sector. However, it always retains a vetoing power in most cases. A long debate on this form of centralisation of power prompted an amendment of the constitution (74th amendment) enacted at the Centre in 1992. Under this amendment, the power of physical planning was shifted to the Municipalities and they were given additional financial control over taxes from property and buildings. The functions of planning in the urban and regional context which is currently the mandate of the Development Authorities set up under State legislation was to be taken over by a Metropolitan Planning Committee. Even though the Amendment has been adopted by Karnataka State the Metropolitan Planning Committee has not been formulated and the elected representative of the sub city wards have not started functioning. The control of spatial planning still lies with the Bangalore Development Authority and the City Corporation is reduced to the role of a service provider and maintenance agency for civic amenities. Other specialised agencies such as the Bangalore Water Supply and Sewerage Board (BWSSB), Karnataka Slum Clearance Board, Bangalore Metropolitan Transport Corporation, Housing Board, State Electricity Board (KEB) etc. perform functions for specific civic amenities further eroding the power of the City Corporation.

The State Government and its various departments make a single Industrial Policy which is modified from time to time as per the changing focus of the economic plans in the State. These policies are valid in the particular State and vary across States. Since IT has become a priority sector for the Central and the State Government, a separate Department has been set up at both levels to make policies and promote investment.

The tools for available to the BDA for influencing the spatial structure of the city are - Land Use Plans, Zoning Regulations and Building Permission, Building Bye Laws all of which come under the purview of the Comprehensive Development Plan. In an ideal system of physical planning, the BDA prepares the CDP every 10 years and undertakes planned expansion of the city in terms of residential layouts. The layouts are then developed by the BDA during the plan period and then handed over to the Municipal Corporation for maintenance and service provision. However, the complexity of the planning structure is increased as a result and strong linkages established between the formal planning body at the city level and the state industrial development departments. The land-use decisions are influenced by the Industrial Policies of the state and the incentives that it wants to provide for the industries.

To illustrate the example of Industrial Policy dictating the spatial planning in the city, a large project has been announced by the State Government as a part of its Millennium IT policy. The project called the 'IT corridor' will be planned in and around Bangalore.

'This corridor will be planned with active assistance and consultation with reputed international agencies that have complete experience in IT Parks. The corridor will provide for the best quality Parks. Exclusive parks for international companies/ countries will be encouraged with schools of international standards, housing, water, electricity as well as facilities for amusement and leisure activities. The corridor will be self contained with state of the art facilities' (IT Policy, Department of Information Technology, GOK, 2001)

The delineation of the corridor has already been initiated at the Development Authority and the project of planning the corridor has been given to JTC Consultants which is a Singapore based firm, also previously engaged to design the ITPL. The corridor is the largest industrial/ commercial development project of its kind in India so far and would cover area of approximately 37,000 hectares. It has many firsts - extension of the industrial/ technology park concept to extensive areas in and around the city, exclusive development for the high technology sector covering all aspects of housing, recreation, education, office space etc., the largest real estate based incentive project for attracting investment and so on.

The impact of just the planning of this corridor on the land values and conversion of agricultural land to urban use is visible already. With much speculation in the market regarding its actual limits in the final plan, land ownership is rapidly changing in the periphery and land values increasing. In terms of the social implications of his project, it is very likely that with the high quality of infrastructure and facilities planned in this corridor, most uses not associated with the high income economy of the IT sector will be priced out. Only very high income luxury housing, commercial space and leisure activities will be able to afford location in this zone. The expanse of this area would possible create a further segregation between the high productivity and other comparatively lower productivity and socially significant uses. The corridor is an attempt to spread out the location of the high tech firms to the west and north of the city to get a more even pattern but its bias to the already existing zones of concentration in the East and South is apparent in the larger area being demarcated here. The implications of such large planned suburban growth on movement patterns and sprawl doesn't seem to be a priority for the industrial planners.

This project like the others industrial infrastructure projects before this is almost entirely under the supervision of the State Government. The autonomy of the State exercised through the Development Authority in terms of local spatial decisions is only growing with the attention the city gets globally. The erosion of the powers of the elected representatives of the local municipal corporation shows the tendency towards exceeding centralisation of power rather than local autonomy. The industrial policy and locational decisions have always been the domain of the State Government. Through its powers of eminent domain the Industrial Area Development Board has had the power to acquire land anywhere in the State and to develop it as Industrial Estates and for Infrastructure. These decisions have had spatial implications for the periphery and suburban areas of the city and the civic bodies have had to support the ever expanding city. What is unprecedented is the scale which commercial/ office space development has transcended from enclosed and confined estates to large areas of the city. The integrated planning that the Department of Industries is undertaking in the 'Infotech Corridor' through international consultants would have a status overriding the Comprehensive Development Plan (CDP) in effect under the Town Planning law of the State. As the city becomes a saleable commodity to an international market, the stakes of planning become higher. The Human Settlement Report of the UNCHS recognises this change in the nature of governance of cities which are more attuned to a global market.

'In many places, there has been a shift in the attitudes of urban government from a managerial approach to entrepreneurialism. This entrepreneurial stance views the city as a product that needs to be marketed. This marketing approach, and the emphasis on restructuring the city so that it appeals to global business, has led to the dominance of economic interests in the decision - making process of urban planning.' (UNCHS, 2001, p26)

In the case of Bangalore, not only is there a shift from managerialism to entrepreneurial urban planning but there is almost a marginalisation of local planning and elected bodies in the spatial decisions for the city. A study conducted at the University of Birmingham University of Birmingham, funded by the Department of International Development (2000) illustrates that the Municipal Government is more linked to the local interests rather than the state controlled Development Authority. Marginalisation of the Municipal Bodies thus represents a more serious shifting of power from the elected body to the para-statal appointed authority of the state. The economic orientation of the State is no secret and this is reflected in the larger spatial policies being implemented in the city.

### **Privatisation of Infrastructure and Networks**

The Structural Readjustment Programme (SAP) which brought about the economic liberalisation process in India stressed on the shift of the role of the government as a 'provider' to that of a 'facilitator' causing a shrinkage in subsidies and expenditure in 'non-productive' areas such as public housing and infrastructure. This has been reflected especially in the local urban scenario as a realisation of the limitations of the government to provide infrastructure in the cities. The involvement of the private sector in such civic services such as roads, bridges, electricity, water supply, industrial zones etc. in the form of public-private partnerships is the *mantra* of the day in the urban local bodies of mega-cities where such investment is financially feasible and profitable for the private agencies. The State of Karnataka was a forerunner in this regard with the Infrastructure Policy of 1997. The State opened up its urban and regional infrastructure to international investment realising the global attention Bangalore and its region already had from the IT Industry.

The need for augmentation of the infrastructure networks was felt around 1995 when the industry and investment sources started to reconsider their locational decisions in Bangalore and opted for Hyderabad which was the city's closest rival in the South. The rising pressure on the infrastructure which could not cope with the rapid increase in demand and population was causing a decline in the living conditions that was the prime selling point of the city. The media along with the existing firms in the city mounted the pressure on the State Government to improve infrastructure or lose out to competing cities. Civic resistance to the incoming investment and the consequent pressure on the urban environment has also been visible in the conflicts in the city. Some examples of these expressions of discontent are:

'In addition the inexpensive rents, the orderly traffic and well-developed civic sense of the people attracted other entrepreneurs. Wipro Systems, part of the Wipro Information Technology Group which exported software worth Rs 85 crore last year, started out well here. So did Delphi, a General Motors subsidiary which planned to enter India's automobile component market through Bangalore. But the halcyon days are over. Infosys, with a market capitalisation of Rs 320 crore, is planning to relocate some of its business to Pune and Mangalore. And TISL, which according to Dataquest is India's seventh largest infotech company, is looking as far afield as Kochi and Thiruvananthapuram to expand. Even the electronics giant BPL is shifting investment worth Rs 600 crore to a site near Pune. "At this point of time, I think Bangalore is worse than Bombay or Delhi in terms of roads, power and water," says N.R. Narayana Murthy, CMD of Infosys.' (Rajesh, Y.P. Outlook Magazine, Nov 22, 1995)

'It is raining in Bangalore. For a few hours at least, the normally poisonous air clears in this south-central, high-plains Indian town of 5 million. The capital of Karnataka state, Bangalore long enjoyed renown as the garden spot of India - an affable, leisurely place celebrated for sweet breezes, cool summers, tree-lined boulevards, honeymooners, and retirees. No more. Over the last quarter century, as hundreds of corporations have moved in to take advantage of Bangalore's temperate and dust-free climate, cheap housing, and work force educated in information technology (or IT, the popular shorthand here), economic growth has bred a new set of woes. In that time, the city has quadrupled in size, real estate prices have quintupled, and a once gracious metropolis has begun to choke on its own pollution and gridlock.' (Rapaport, Wired Magazine, Feb, 1996)

But the infrastructural limitations and urban stress is characteristic of all mega cities in the developing world. The importance of addressing these issues in the case of Bangalore become more significant because of the competitive position that the city has to maintain in a global market. Unless the living conditions in the city are favourable, investment will not be attracted. Aspiration to the global image of an efficient and attractive city weighs heavy on the State Government who's representative current Chief Minister S.M.Krishna has been quoted often to say that the city would be the new 'Singapore of the South'. The government is aiming to provide a laundry list of items which constitutes a world city - an international airport, an elevated rail system, dedicated power facility, entertainment theme park and new IT corridors. Unable to make this an all-pervading picture of affluence the state is now striving for localising this development within identified corridors in the city.

However certain very significant developments in the Infrastructure and Networks of the city should be highlighted. The biggest change in this sector has been the entry of private entrepreneurs into civic infrastructure which was earlier a very monopolistic public domain. Almost all public agencies in Bangalore which were the infrastructure agencies of the State have entered into contracts with private service providers. Large projects such as the Bangalore Mysore Expressway, International Airport at Devanahalli, Fibre Optic Networking, GIS systems at the BWSSB, Privatisation of Electricity Distribution are all examples where the government unable to fund these projects has invited international private interests. Innovative contracts such as the Build Operate and Transfer (BOT), BOOT, Build Operate Own (BOO) etc. are ways in which the creation of public infrastructure in a resource constrained system is becoming more and more prevalent. The UNCHS also recognises the increasing privatisation of urban infrastructure as a spin off of the globalisation of cities. The exposure of cities to an international market generates attention in the circles of multinational infrastructure firms and consultants who become actors in local urban dynamics. In the case of Bangalore, the interest generated by the Global Tender for the Devanahalli Airport is illustrative. In the final run for the project global firms such as Siemens, L and T, Zurich Airport, ABB, Schiphol Asia, Hochtief Group etc. were competing with domestic giants such as the Tatas and the National Airports Authority.

The next important development in this sector has been the exclusive nature of the projects being taken up. When infrastructure was a public domain then public facilities such as Highways, Airports, Bridges were available to all sections of the society. To make these projects economically feasible to the private sector increasing number of projects are becoming specialised and priced at levels which limits their accessibility to a larger population.

The third area of change is the involvement of international and bilateral agencies in the urban infrastructure provision and the capacity building of local authorities to make them more efficient. In Bangalore, the Asian Development Bank and the World Bank, having identified the city as an emerging 'Mega City', are working with the urban local bodies in the Bangalore Sub Region for development of water supply, sanitation, solid waste management, road improvement, slum upgrading, sites and services as well as institutional strengthening.

The actors making decisions on infrastructure in the city have consequently multiplied. All projects in the city ranging from small garbage collection contracts to large infrastructural projects such as Technology Parks involve political mediations among a plethora of actors at all levels i.e. the local, state and national governments, bilateral funding agencies, corporate bodies etc.

### **Concluding Remarks**

Information Technology has been a key sector of growth in the integration of the economies in the Asia Pacific as well as India. While the NICs have followed a wide based strategy of overall IT diffusion into all sectors of the economy, the Indian experience has been of accelerated growth of the Software and Services sector only. Even though, the sector has propelled city economies into a global network of production and made a small niche of skilled labour a part of the international division of labour, the wider developmental impacts of such a narrow strategy for growth are questionable. This basic difference in the nature of globalisation and the consequent internalisation of the technological change to influence the overall human development is what separates the large prosperous city regions of the Asia Pacific from the 'globalising' mega cities of South Asia.

Set in a developing country context of an unsophisticated economy, the scope of domestic growth of the high technology sector is limited. The predominant export orientation is creating an 'enclave' in the economy which has a higher growth rate than any other sector but still involves only a very small percentage of the work force. The spatial inequalities represented in the urban economy, which I have discussed in this paper, is only a precursor of larger macro economic issues.

Bangalore, as a city, has become part of global network of dispersed production of software yet most of the population of the city is excluded from the advantages. Public policy as well as the market is geared towards retaining the competitive edge of the city to attract investment. In the competition for scarce resources the losers are the not so productive sectors of the economy and the poor and marginalized groups. The influence of the corporate firms in spatial decision making is exercised through influences on the Departments of the State Government. The income and lifestyle disparities between the enclaves of the highly paid labour of the global industry and the townships of public sector workers is extremely stark in the physical environment. Contradictions of prosperity in the enclosed campuses of the IT firms and the collapsing city infrastructure are very apparent.

However, the picture is not completely gloomy and the industry definitely represents an opportunity for a larger population as has been illustrated in the urban economies of the Asia Pacific. The diffusion of technology and widespread education might be they key for a sustained development in the future without large inequalities.

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<sup>i</sup> Karnataka is the south Indian State the city is located in. The IT Industry is concentrated mainly in 4 States i.e. Karnataka (Bangalore), Andhra Pradesh (Hyderabad), Tamil Nadu (Chennai) and Maharashtra (Bombay)

<sup>ii</sup> The total exports from the Software and Services sector in India was 14% of the country exports in 2000-01. Bangalore had a 25% share in this export. The total export of software and services from India was around 4 billion \$ which is still a small percentage of the global market estimated at 300 – 500 billion \$ (NASSCOM, 2001; Business Line, April 22, 2001)

<sup>iii</sup> Census information for occupational change in 2001 is still awaited which could be the best resource of information but would still be indicative because of the broad occupational classification which does not capture the variations within the service sector.