Impact of Globalization on Employment Distribution and Urban Mobility in Delhi

Kirti Bhandari*  John Black**  Yoshitsugu Hayashi***

Delhi has been identified as one of the fastest growing cities of the world. With an estimated 13.8 million people in Delhi in 2001, an overwhelming 93% was urban. The forces of globalization are playing a dominant role in shaping the urban form where the city limits are expanding to accommodate increasing job opportunities. The “Special Economic Zone” policy may be considered the government’s response to globalization. Rapidly urbanizing towns at the periphery of the National Capital Territory (NCT) are Gurgaon, Faridabad and NOIDA (New Okhla Industrial Development Authority). Supported by quality infrastructure, these zones attract a large Foreign Direct Investment (FDI). Master plans have proposed the integration of these townships, which are a part of the National Capital region (NCR) to the NCT. However strict non-adherence to these plans has led to haphazard growth within the NCT and NCR. The significance of this paper is to show results from a combination of institutional analyses together with empirical investigations of spatial data to assess urban development outcomes in Delhi. The study tries to assess the changes in the urban form, commuting patterns and accessibility which have resulted due to the forces of globalization in Delhi. Results indicate that the people working in the satellite towns prefer to choose to live there, thereby resulting in shorter trips in these zones. Whereas the gravity type land use accessibility indices indicate that the city centre produces the highest accessibility which decreases towards the periphery for office stock, which subsequently increases in the satellite townships. However, due to the policies of relocation of industries to the periphery, these towns exhibit high accessibility for industrial locations.

Keywords: non-monocentric, employment distribution, accessibility, satellite cities, Delhi

*Doctoral student, Graduate School of Environmental Studies, Nagoya University; E-mail: kirti@urban.env.nagoya-u.ac.jp
**Professor, Planning Research Centre, Faculty of Architecture, Design and Planning, University of Sydney; E-mail: john.black@arch.usyd.edu.au
***Professor, Graduate School of Environmental Studies, Nagoya University; E-mail: yhayashi@genv.nagoya-u.c.jp
1. INTRODUCTION

In contrast to the forces of globalization that are shaping many western cities, where there is a concentration of new economic activities in and around the established CBDs, the Indian city of Delhi is an especially interesting case study because much of the new “global economy” is being located in the outer parts of the metropolitan region. Urban restructuring is underway in Indian cities due to economic liberalization and global forces that have been playing a significant role in shaping the built environment. This has been further influenced by the “Special Economic Zone” (SEZ) policy in India which was announced in April 2000. Supported by quality local infrastructure, these zones serve as an engine of economic growth and attract large Foreign Direct Investment (FDI). We are unaware of any study that has quantified these changes in urban form, accessibility and journey-to-work travel in Indian cities which have resulted due to these globalization forces.

Various viewpoints on Asian cities are found in the literature, but they lack analytical rigor. For example, Sassen (1995, p. 71) asserts that the spatial correlate of the western metropolitan central business district (CBD or node of intensive business activity) is “a pattern not evident in developing countries.” On the other hand, Dogan and Kasarda (1988, p. 8) suggest the western sequential stage models of economic transformation of urban areas is a process being followed in Tokyo and Delhi. Shatkin (2006) suggests a suitable framework for studying globalization and cities is to understand the actors, institutions and interests that are driving the change - an approach similar to that of Nas (2005) based on “directors” of urban change. There is an apt quote from Sivaramakrishnan and Green (1986, p. 23) - still of contemporary relevance - that sums this situation up nicely:

“Decisions on metropolitan goals and priorities ultimately resolve themselves into exercises in leadership, will, judgement, and intuition in which contemporary political and societal values become the final arbiters of choice.”

The significance of this paper is to show results from a combination of institutional analyses together with empirical investigations of spatial data to assess urban development outcomes in Delhi. Section 2 presents a brief summary of the literatures related to globalization. Section 3 describes the study area, summarizing the urban and transport planning in Delhi. The technique of rank size distribution is employed to understand the employment dynamics and is elaborated in section 4. Commuting profiles for zones within the National Capital Territory and those in the Delhi Metropolitan Area towns are analyzed using a novel technique called employment zone specific preference functions (Masuya, et al, In Press) and interpreted in section 5. Accessibility to work activities is elaborated in section 6. The paper concludes in section 7.

2. PROCESSES OF GLOBALIZATION

The term “world city” was first coined by Patrick Geddes in 1915 to define these expanding cities as “new and vaster groupings or conurbations.” The term was reintroduced in 1966 by Sir Peter Hall, when he identified New York, London, Tokyo, Paris and Moscow as prime “world cities” (Clark, 1996). The world city hypothesis postulated by Friedmann (1986) argued that cities transformed from spatially limited single function entities to complex global centers due to dynamic ongoing processes with two crucial elements of increasing spatial reach and increasing functional complexity. According to Sassen (1991) the concept of the global city emerged because of two inter-related factors - the
globalization of economic activity and the organizational structure of the producer service and the finance industry itself.

Short (et al, 1996) identified eight types of functions associated with world city status. They are finance, transnational corporate headquarters functions, global services, transport, information, political/ideological ('correctness' of state-economy-society relations), and culture and spectacular world events. Dick and Rimmer (1998; 2003) demonstrated that different phases of globalization have led to urban expansion in South-East Asian cities, which were slowly converging to the form of western cities and the different phases of globalization were defined by the intensity of technology transfer. However, this viewpoint has been criticized by Shatkin (2006). According to the author, three important factors are the formation of public-private partnerships in urban governance, the spatial implications of privatization of planning, and the flexibilization of labor. The key issues identified in emerging global cities have been categorized into five main categories: governance, livable cities and environmental management, sustaining economies, social justice and urban poverty and uneven spatial development and rural neglect (Douglass, 2000).

Urban restructuring is underway in Indian cities due to the economic liberalization and global forces that have been playing a significant role in shaping the built environment. The pace of change is fairly rapid in the gateway cities of Bangalore, Chennai, Delhi-Gurgaon and Mumbai (Shaw and Satish, 2007). Beaverstock (1999) identified 55 world cities and another 68 cities, ranked as 'prime', 'major' and 'minor' showing evidence of world city formation based on four key services: accounting, advertising, banking and law. New Delhi has been listed as minor in accountancy, advertising and banking sectors. The GaWC (Globalization and World Cities - study group and network) inventory of 122 world cities, classifies cities for world city-ness with values ranging from 1 to 12. Two south Asian cities identified on the world global map are Mumbai and Delhi (score 3; evidence of world city formation).

The Special Economic Zone (SEZ) policy in India was announced in April 2000 as the government’s response to the globalization process. Supported by quality infrastructure, these zones serve as an engine of economic growth and attract large Foreign Direct Investment (FDI). The response to the schemes has been overwhelming - evident by the inflow of investment and the creation of additional employment in the country. The policies towards the promotion of special economic zones have led to the decentralization of people, jobs and services from the inner dense core cities to the less densely developed suburbs. As a consequence of such spatial restructuring, agglomerations tend to be located in places in the regions outside of the NCT of Delhi - in the metropolitan towns as earmarked in the land use planning documents for Delhi. Delhi provides a good case study of the globalization process as they impact the location of employment centers, etc. and on commuting patterns.

### 3. CHARACTERISTICS OF STUDY AREA

The population of Delhi (2005) stands at almost 15 million with a population density of 10,360 persons/km². It is the third most populous city in India, after Mumbai and Kolkata and ranked 10th amongst the most populous cities of the world. Between 1991 and 2001 the population grew by 4.1%, making it the fastest growing city in India. Delhi has the largest vehicle population in the country with close to 4.5 million vehicles in 2004-05: more than the total number of vehicles
registered in the three other metropolitan cities of Mumbai, Kolkata and Chennai. Delhi contains 1.4% of the Indian population, but accounts for nearly 7% of the total vehicles in India. It is also one of the most polluted cities of the world (ADB/UNESCAP, 2000). It has 23% of the land area allocated for roads (as compared to a usual 10-15% for developing countries). The estimated GDP for Delhi stood at US $11 billion and had an annual per capita income of US $869 in 2005, which is two and a half times the national average. The annual economic growth rate stands at 9.9%. 78% of Delhi’s State Domestic Product (SDP) comes from a strong and growing service sector comprised of trade, hotels and restaurants, transport, communications, financial and insurance services, real estate and public administration (Government of NCT Delhi, 2006). Of these, banking and finance, real estate and insurance account for 30% of Delhi’s SDP. Both primary and secondary sectors have been shrinking over the past decade with a contribution of 20 and 1%, respectively.

The national capital territory, Delhi (NCTD) consists of three sub-areas (Figure 1). New Delhi Municipal Corporation (NDMC) area is at the core. This is the imperial Delhi spread over an area of 42.74 sq. km. which was established in 1911. The Municipal Corporation of Delhi includes a total area of 1397 sq. km. (599.6 sq. km. of urban area and 797.7 sq. km. of rural area). It consists of the rather larger spread of Delhi. The Delhi Cantonment between the airport and the NDMC area is spread over an area of 42.97 sq. km. The Master Plan for Delhi (MPD-1962) for the horizon year 1981 recognized the need for planning Delhi in a regional context. It defined the Delhi Metropolitan area comprised of the Union Territory of Delhi and six ring towns - viz., Ghaziabad (including Loni) in the state of Uttar Pradesh, Faridabad, Ballabgarh, Bahadurgarh and Gurgaon in the neighboring state of Punjab (now Harayana) and Kundli in the Union Territory of Delhi (Figure 2).

3.1 Urban Planning

Created in 1957, the Delhi Development Authority (DDA) was meant to promote and secure the development of Delhi by formulating a master plan for Delhi. DDA has the power to acquire, hold, manage and dispose of land and other property to execute its works. It has formulated three master plans for Delhi: in 1962 with the horizon year of 1981; in 1990 with the horizon year of 2001; and the latest draft master plan formulated in 2005 with a horizon year of 2021 (Delhi Development Authority, 2006).
The first master plan (1962-80) sought to decongest the city centre by relocating the industries and the slum settlements (informal settlements) from the core to the peripheral regions. However, no serious attempt was made to ensure compliance with the master plan provisions. In the absence of strict regulations, new industrial units proliferated within the residential and commercial areas. Subsequently the following master plan (1980-2000) also contained proposals to decongest the central city by relocating the industrial activities within the Delhi Metropolitan Area (DMA) and the National Capital Region (NCR). The guidelines proposed in the master plans were not strictly followed which resulted in haphazard growth of industrial units within the NCT. The failure can also be attributed to the fact that the master plan failed to shift the focus from NCT to DMA and NCR. The policies to shift the units from NCT to NCR regions also lacked appropriate provisions for infrastructural facilities beyond the NCT.

3.2 Transport Planning

Delhi is the converging point for five rail lines and five national highways. Growth of Delhi over the years has been on a ring and radial pattern, with reliance on a road based public transportation system. The draft master plan 2021 emphasizes the need for a multimodal transportation system, with an optimal mix of rail and road based systems. The development envisaged by the Master Plans was poly-nodal with a hierarchy of commercial centers located on either the ring or the radial roads. The proposed MRTS network is thought to have a sizeable impact on the urban form and the related commuting patterns. The concept of the master plan 2021 is based on a poly-nodal, polycentric distribution of work centers, largely based on road transport nodes. This essentially implies that development should take place according to new corridors of mass movement, especially along major transport corridors and the mass rapid transit system. Phase 1 of the metro network constituting 62.16 kms is fully operational and construction of Phase 2 (56.76 km) is underway which is expected to be completed by 2010, in time for the Commonwealth Games in Delhi (see, also, Short, et al, 1996). The metro rail network for the entire city has been identified in various phases, which is comprised of a network of underground, elevated and surface corridors aggregating to approximately 250 km (Figure 3).
Delhi’s transport problems are not limited to the NCT. They are closely linked to its linkages to DMA towns and the NCR region in general. The suburban rail network connecting Delhi to its neighboring towns is considered largely inadequate and unreliable. The ring rail within NCT is highly underutilized and accounts for less than 1% of commuter load. The absence of efficient rail based systems has led to a considerable loads on the road based the public transport system. The city bus system has also significantly declined over the years. This has resulted in the phenomenal growth of personal vehicles in Delhi. The NCRPB has also proposed several expressways (Figure 4) to connect the NCT and NCR, although none have been successfully implemented or completed.

Passenger mobility in Delhi is mostly road based, with rail constituting less than 1% of the total share in 2001 (Table 1). However with the completion of Phase 1 and partial completion of Phase 2 of the metro network in Delhi, a sizable number of trips have been attracted to the metro. Figure 5 and 6 shows the trip purposes, trip frequencies, the shift from different modes to metro and the reason for the shift. A commuter survey was carried out at 14 stations with a total of 6771 respondents to assess the benefits of the metro rail system in Delhi. Evidently, at a sizeable number of trips, 49% of the trips are performed on a daily basis and 34% of the respondents are using the metro occasionally. For trip purposes, work trips cover 59% of the total trips made by metro (Figure 5a). Analysis shows that 82% of the commuters have shifted from public modes which include, bus, charted bus, RTVs, minibus, taxi and auto rickshaw. Remaining is the shift from private vehicle owners, which includes two wheelers (scooters and motor cycles) and cars also shifted to metro. The respondents were also asked to rank the reasons why they shifted to metro. Out of the seven main reasons of comfort, time saving, economic, accessible, reliable, safe, and environmentally friendly, the three main reasons leading to the shift were comfort, time saving and safety (Figure 6b). It was also observed that about 77% of trips originated within 2 km of the metro stations and 82% of trips terminated within 2 km of metro stations.

Earlier research by Pivo (1993) and Cervero and Wu (1997) relate the mobility patterns with sub center formation. Pivo (1993) showed that Toronto
Sub centers generated 12% less car trips when located near subway stations. However, Cervero and Wu (1997) emphasized that the outlaying and low density sub centers attract more car trips. Figure 7 shows the trip attraction rates to the different stations in Phase 1 of the metro network. It may be noted that the percentage of trips attracted to the new CBD stations (Rajiv Chowk), old CBD station (Chandini Chowk) and the secondary CBD stations (Karol Bagh and Shadhara) are relatively high. However, the trip attraction rates to the outlaying sub centers are relatively low. This indicates that the high density work zones in the centre of NCT which are also the transport nodes defined by the metro stations, tend to attract a larger share of trips by public transport. However the trip attraction rates for the zones with relatively lower densities attract a lower number of metro trips.

### Table 1: Percent Mode Shares in 2001

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Mode</th>
<th>Percent share in 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cycle</td>
<td>4.42</td>
</tr>
<tr>
<td>2</td>
<td>Rickshaw</td>
<td>2.52</td>
</tr>
<tr>
<td>3</td>
<td>Walk</td>
<td>31.20</td>
</tr>
<tr>
<td>4</td>
<td>Car-Jeep</td>
<td>5.14</td>
</tr>
<tr>
<td>5</td>
<td>Scooter-Motorcycle</td>
<td>12.41</td>
</tr>
<tr>
<td>6</td>
<td>Auto rickshaw</td>
<td>2.00</td>
</tr>
<tr>
<td>7</td>
<td>Taxi</td>
<td>0.04</td>
</tr>
<tr>
<td>8</td>
<td>Bus</td>
<td>36.00</td>
</tr>
<tr>
<td>9</td>
<td>Charted Bus</td>
<td>5.96</td>
</tr>
<tr>
<td>10</td>
<td>Train</td>
<td>0.24</td>
</tr>
<tr>
<td>11</td>
<td>Other</td>
<td>0.06</td>
</tr>
<tr>
<td>12</td>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

In order to study the distribution of employment over NCT Delhi, and to assess the spatial outcomes of policies outlined for Delhi in the sections above, certain specific metrics are defined. These include the rank-size distribution and the zonal employment specific preference functions. The first step is to identify the employment clusters in the study area. The methodology followed is a simple way of clustering the employment locations based on the Traffic Analysis Zones (TAZ) for Delhi (Alpkokin et al, 2007). The total number of TAZ for Delhi is 208. On the basis of the work trip matrix, employment density is calculated for individual traffic zones. In order to identify the employment clusters, the logarithmic employment density is plotted against rank size of the zones. The next step is to identify the number of major employment clusters or tiers and their classification through breaks of gradient (Figure 8). The number of clusters depends on the size of the city, the degree of detail aimed at in the analysis and also the sizes of zones. Here the 208 zones are grouped into clusters based upon the visual inspection of the curve. The method adopted...
(a) Trip Frequency

(b) Trip Purpose

(Figure 5) Delhimetro User Profile Survey Results for Trip Frequencies and Trip Purposes

(a) Shift from private and public transport modes

(b) Reasons for modal shift

(Figure 6) Delhi Metro User Modal Shift Shares and Reasons

(Figure 7) Percentage of Trips Attracted to the Selected Stations
for demarcating the zones is as follows. We first identify the rather steep line and mark that as Tier 1. On the other end, a tapering curve is identified and marked as Tier 4. The remaining curve is divided into two parts. Thus, we divide the curve into 4 tiers. Four tiers of clusters can also be identified using the Spearman Rank correlation to find out the cut-offs for clustering.

Possible definitions of the four clusters are given below:

Tier 1 zone as: mature old centers
Tier 2 zones as rather developed sub-centers
Tier 3 zones as emerging as a sub-center
Tier 4 zones as not necessarily now, but likely to be a sub-center in the long term.

Figure 8 shows the zones based on rank size distribution. It may be noted that the number of zones in Tier 2 is the largest. Table 2 enumerates the details of the employment stock tiers. It is evident that Tier 2 has the largest share of employment (49%) as compared to Tier 1 (26%). It may be inferred that the share of CBD in total employment in the case of Delhi is decreasing. This may also be attributed to the policies which plan to decongest the city centre by relocation of employment centers and policies which restrict the establishment of new employment centers in the core city. Employment stock cluster distribution drawn by Figure 9 also demonstrates the circular decentralization pattern of jobs to the surrounding zones of the CBD and to some of the obvious outer sub-centers, belonging to zones in Tier 2 and 3.

<table>
<thead>
<tr>
<th>Tier</th>
<th>Employment</th>
<th>Share over total (%)</th>
<th>No. of zones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>563855</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>Tier 2</td>
<td>1058360</td>
<td>49</td>
<td>70</td>
</tr>
<tr>
<td>Tier 3</td>
<td>339133</td>
<td>16</td>
<td>64</td>
</tr>
<tr>
<td>Tier 4</td>
<td>186186</td>
<td>9</td>
<td>50</td>
</tr>
</tbody>
</table>
5. COMMUTING PATTERNS

Conventional analyses of commuting patterns include mapping desire lines from home to work, or calculating the overall mean trip length (or travel time) in the region (or disaggregating this by residential or employment zone). However, for comparisons in the same city over time when the level of employment will be different, or for comparisons across cities with different populations and employment bases, a different approach is required. Preference functions (Black, et al, 1993) allow such comparisons to be made quantitatively. A journey-to-work preference function is the relationship between the proportions of travelers from a designated origin zone who reach their workplace destination zone given that they have passed a certain proportion of total metropolitan jobs.

Employment specific preference functions are calculated from the journey from work to home (Cheung and Black, 2005; Masuya, et al, in press). For understanding the linkage between an emerging sub-center and associated residential location choices, one analytical way is to plot the destination specific employment preference function based on a form of the intervening opportunity model (Stouffer’s hypothesis). For each employment zone, residential zones are ranked according to increasing distance, or transportation travel time, by car or public transportation, or a weighted combination of the two. The number of residential workers living in each zone is a proxy for housing opportunities. By plotting the cumulative distribution of residential workers reached, a “housing” opportunity surface around that employment zone is constructed. Steep gradients imply a nearby choice of residential location; shallow gradients imply a broader, metropolitan wide spatial labor market.

5.1 Sub-Centers and Commuting Patterns within NCT Delhi

The existing CBDs, are the traditional old CBD

1. Chandni Chowk
2. Connaught Place
3. Shadara
4. Okhla
5. Nehru Place
6. Preet Vihar
7. Janak Puri
8. Tri Nagar

(Figure 10) Map Showing the Location of the Old, New and Secondary CBDs along with the Selected Sub-centers Selected for Analysis
(Chandini Chowk), the new CBD (Connaught Place), and the Secondary CBD (Shadara). The sub centers considered are Okhla, Nehru Place, Preet Vihar, Janak Puri and Tri Nagar (Figure 10). These District centers already developed or in an advanced stage of development, have been designated in the master plans or developed otherwise.

Figure 11 shows the employment preference function plot for selected zones in Delhi. The zones selected for the analysis are important employment locations within NCT. These zones have been designated as sub center zones in the master plans or have developed otherwise. The graph shows that the CBD and nearby zones have wider catchments areas, meaning that people tend to make longer trips to this area. This implies that these zones have the largest spatial housing markets with very few workers living in that employment zone or relatively nearby. On the other hand, the zones located in the outlaying zones, tend to attract shorter trips. This is thought to reflect that the people are showing more tendency to take advantage of choosing residential locations closer to where they work in case they commute to the suburban sub-center to lessen the cross commuting. In order to understand the commuting patterns within NCT to the CBD zones and sub-centers, the employment specific preference function plots to the selected zones are drawn (Figure 11). The figure clearly shows that the CBD zones attract longer trips as compared to the sub center zones.

(Figure 11) Plot of Employment Location Specific Preference Function for Selected Zones
5.2 Commuting Patterns within NCR

The Satellite cities selected are Ghaziabad and NOIDA (shown as 1, in Figure 12), Faridabad (shown as 2 in Figure 12) and Gurgaon (shown as 3 in Figure 12). In order to understand the commuting profiles of workers within the Central NCR region, the travel preference functions of the zones in the satellite cities (DMA towns) are plotted (Figure 13). These towns are emerging as major work centers around Delhi due to the special emphasis given to them under the Special Economic Zones Policy and are driven by the globalization process.

![Satellite Cities (DMA towns) with Work Center Locations](image)

The plot shows that the NCT Delhi attracts the longest trips, whereas the satellite townships of Ghaziabad and NOIDA, Faridabad and Gurgaon tend to attract shorter trips. This also implies that these towns attract workers from nearby areas of residence.

Although still dominant, the traditional CBDs (old and new) over the years have been loosing their share of employment to certain other job agglomerations within the city which have been examined here as sub centers. Two types of sub center formations have been considered in the study. One is within the NCT, which includes the traditional and the new CBDs and the second is the satellite townships that have been growing steadily to accommodate the large workforce and the increasing job opportunities being created here. The empirical analysis of employment agglomerations and related commuting trip patterns shows that the urban form has an effect on the commuting profiles within an area. The CBD continues to attract trips from across the city, whereas the satellite townships show a tendency towards attracting shorter trips, meaning that people who choose to work also live there or nearby. Through the analysis it seems that policies that encourage such spatial development are beneficial unless supported with complementary transport policies, which would otherwise lead to longer commuting times and resulting in environmental pollution. It also highlights the
importance of a balanced “work live play” policy for the promotion of the satellite cities or the suburban sub centers.

6. ACCESSIBILITY TO WORK LOCATIONS WITHIN NCT AND DMA TOWNSHIPS

Accessibility is measured by time or distance to reach desired destinations. In order to discuss the compatibility between the accessibility of different tiers of zones with the non mono-centric urban formation in Delhi gravity type accessibility indices have been computed as the measures indicating the efficiency of reaching opportunities. The basic form of gravity based accessibility function is given by equation 1 (Cervero, et al, 1999). Where, $A_i =$ Accessibility of origin zone i by the destination zones j; L is the number of opportunities in zone j; $f(t_{ij})$ is impedance function in terms of $C_{ij}$ as travel time between zones i and j for all type of trips.

$$A_i = \sum_j L \exp^{-\beta t_{ij}} \quad (1)$$

Accessibility for different types of work activities within the National Capital Territory (NCT) of Delhi and the satellite cities are shown in Figure 14. Notably, It shows that the business centers which
7. CONCLUSIONS

This study attempts to examine the impacts of globalization in Delhi which has been regarded as one of the emerging "global cities" amongst South Asian cities. The forces of globalization have not only led to economic, social and spatial restructuring, but also impacted the mobility and commuting patterns in Delhi, which have been examined in this paper for the first time. The most prominent feature of economic restructuring is the relocation of industries from the inner city to peripheral areas earmarked under the regional plans of the National Capital Region Planning Board (NCRPB) for such use. Economic and spatial restructuring are parallel, since spatial restructuring follows economic restructuring. Promoted by the "Special Economic Zone" policy of the Government of India, certain zones at the periphery of NCT have been growing recently in terms of the preferred job locations for many multinational companies. Policies also aim to decongest the city centre by relocating jobs to the periphery, within the NCT and beyond. Thus, there is a clear decentralization of jobs from the centre to the periphery. However, the CBD (old, new and secondary) along with other sub centers, continue to function as important employment nodes within the NCT and remain the source of much traffic congestion and atmospheric pollution.

Rapidly urbanizing towns at the periphery of NCT are Gurgaon, Faridabad and NOIDA (New Okhla
Industrial Development Authority). Supported by policy initiatives, these agglomerations have grown considerably over the passage of time, providing an impetus to rapid urbanization and industrialization of these zones. Close proximity to Indira Gandhi International Airport, and an ideal location on the national highway of Delhi-Jaipur road, Gurgaon has become the choicest location for hi-tech industries and projects involving foreign collaborations. The category of industries that have shown tremendous growth in this district are high fashion ready-made garments, IT and IT enabled services and automobile companies. Set up in 1976, NOIDA is one of the largest industrial townships of Asia. Supported with state-of-the-art infrastructure, the NOIDA software technology park, the NOIDA export processing zone and the Infotech Park all generate a large-scale employment and export turnover. Faridabad, another important rapidly developing satellite township of Delhi, lies at a distance of approximately 25 km from Delhi and is connected to Delhi through National Highway Number 2. A large number of small scale, medium scale and large scale industries operate in this region. We have shown that their spatial labor markets are much smaller than some of the traditional employment centers of Delhi.

The new MRTS network is believed to have a sizable impact on the mobility patterns of the commuters in the city. The important nodes of employment are also located at metro stations, attracting substantial work trips. This also indicates the fact that the integration of the NCT and the satellite cities with the metro network by 2010 will have a substantial effect on the commuting patterns within this region. Analysis of the commuting patterns reveals that the NCT draws the longest trips, whereas sub centers within the NCT and the suburban sub-centers attract shorter trips. The satellite towns are also shown to attract shorter trips implying that people working in these zones prefer to live there. This suggests a better job housing location and balance under globalization.

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