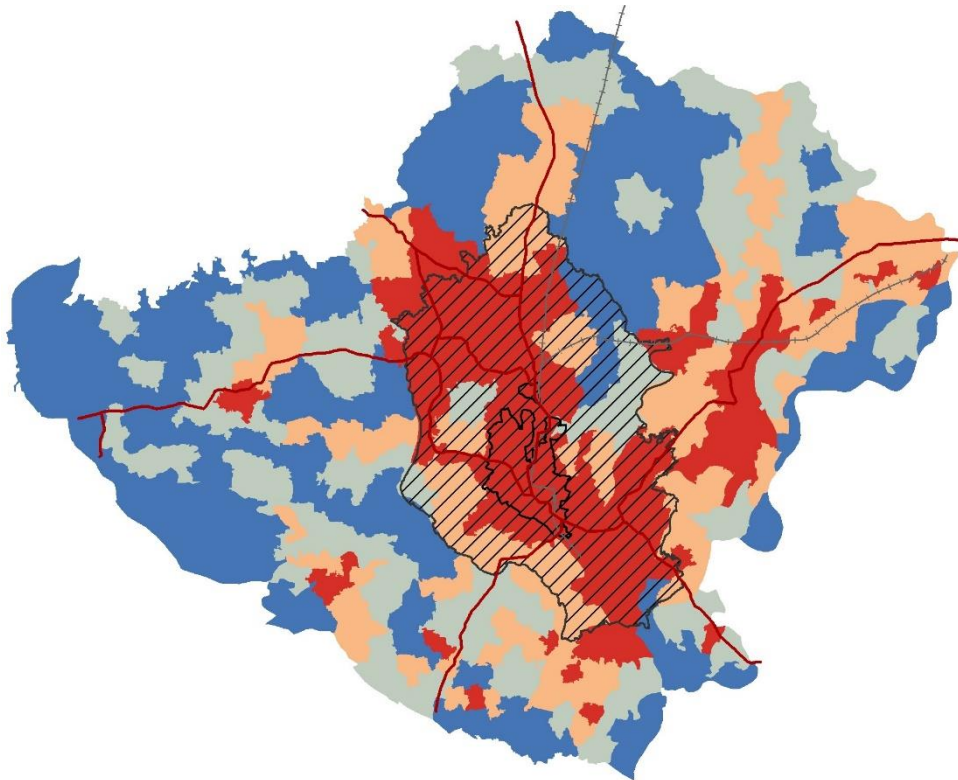


The Impact of Industrialisation on the Suburban Growth Process

The Case of the Greater Dhaka Region, Bangladesh



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I declare that this work has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree. This dissertation is the result of my independent investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references.

MD ANWAR HOSSAIN

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to my wife

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Abstract

This study has been undertaken to understand the role of manufacturing industrialisation on the suburban growth process in the Global South. The Greater Dhaka Urban Region (GDR) of Bangladesh has been studied as the case. The study followed a mix-method approach. The study found that Dhaka city is extending towards its periphery, and not only the proximity factors (distance from the core city and national highways) determine the urban growth distribution, but also there is a significant impact of the localisation of manufacturing job growth, particularly in strategic sectors. In the GDR, the suburban growth is migration induced, and garment sector plays a crucial role to attract the migrants to be localised in the suburban areas. Low skilled and low productive industry-driven growth produce a mix-use development dominated by the poor quality low-class residential and industrial uses. The impact of growth on the suburban land, livelihoods, infrastructure and environment found to be significant. It can be argued from the study that the negative externalities are intense in the suburban areas compared to the core city as they are having severe lack of infrastructures and services. Moreover, a lack of planning authority and land use regulations make the situation even critical.

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Acronyms and Definitions

Acronyms

ADB	Asian Development Bank
BANBEIS	Bangladesh Bureau of Education Information and Statistics
BBS	Bangladesh Bureau of Statistics
BSCIC	Bangladesh Small and Cottage Industries Corporation
BSIC	Bangladesh Standard Industry Classification
CBD	Central Business District
DCC	Dhaka City Corporation
dIND	Industrial employment density per sq.km
DIST_Dhk	Distance from DCC boundary
DIST_NH	Distance from nearest National Highway
DMA	Dhaka Metropolitan Area
dMAN	Manufacturing employment density per sq.km
dMAN_CH	Manufacturing employment density change between 2000 and 2010
DMDP	Dhaka Metropolitan Development Plan
dGAR	Garment sector employment density per sq.km
dGAR_CH	Garment sector employment density change between 2000 and 2010
GDP	Gross Domestic Product
GDR	Greater Dhaka Region
RMG	Ready-made Garments
UN	United Nations

Definitions

Garment sector	In this dissertation, the term ‘Garment sector’ represents both textile (BSIC 2-digit code is 13) and wearing apparel (BSIC 2-digit code is 14) sectors together.
DCC	The DCC means Dhaka City Corporation according to former definition, currently divided into two separate City Corporation: Dhaka North City Corporation (DNCC) and Dhaka South City Corporation (DSCC). In this dissertation, the term ‘DCC’ represents the core city area of Greater Dhaka Region (GDR) that comprises both DNCC and DSCC.

1. Introduction

1.1. Trickle-down effects of industrialisation induced urbanisation

Industrialisation transfers the labour from agriculture to the industrial sector (Lewis, 1954) through the process of the urbanisation of economy (Song, Thisse, & Zhu, 2012). It was observed that labour migrates to those places where economic opportunities are higher (J. R. Harris & Todaro, 1970; Todaro, 1969; Zhang, 2002). Such migration along with specialisation of labour and evolution of markets has significant implications for urbanisation (Locay, 1990; Yang, 1990). The urbanisation process also leads to economic growth, population transition and structural changes of the city region (Zhang, 2002).

Contemporary literature reveals that the economic growth in developing countries is shaped by globalisation forces (Choe & Roberts, 2011; Duranton, 2009; Edwards, 1998). Developing country cities have been experiencing rapid manufacturing industry growth (Deng, Huang, Rozelle, & Uchida, 2008) due to trade openness (Dollar, 1992; Edwards, 1998; Frankel & Romer, 1999; Greenaway, Morgan, & Wright, 1998; Sachs, Warner, Åslund, & Fischer, 1995; Vamvakidis, 1999). Such growth offers economic prosperity to the cities as well as the respective countries. However, the literature suggests that industrialisation has trickle-down effects on the city region and city population.

Manufacturing industry growth contributes to aggregated urban and economic growth (Kaldor, 1966; Rodrik, 2009; Szirmai, 2012; Szirmai & Verspagen, 2015). It is assumed to offer opportunities for capital accumulation (Szirmai & Verspagen, 2015) and economies of scale (Kaldor, 1966). Manufacturing industries generate a significant number of jobs which play a key role in reducing unemployment (Nazem, Chowdhury, & Hossain, 2014b). Those sectors demand both skilled and unskilled labours, and thus it is considered as an effective way to include a large number of unskilled and uneducated people in the formal labour force. Moreover, manufacturing sectors have significant linkages and spillover effects (Cornwall, 1977; Guerrieri & Meliciani, 2005; A O Hirschman, 1958; Park & Chan, 1989; Szirmai & Verspagen, 2015). Many other related and supporting activities have been establishing to maintain efficient and creative business environment. Thus, it appears that industrialisation, particularly in the manufacturing sectors, leads to rapid growth of city economy and its population. Increase in activities and

population create demand for more spaces to continue the growth, but there is always a threshold capacity of space. When a city reaches the saturated stage of densification, it starts to expand spatially towards suburban or fringe areas (Smith & Scarpaci, 2000). This process includes suburban areas in the dynamic urban domain and transforms them into a new economic hub dominated by industrial activities. Most of the large urban agglomerations in developing countries have been experiencing such urban growth and suburban transformation in recent time.

During the growth dispersion phase, the transformation of suburban lands, livelihoods and environment is found to be certain in many studies (Dewan, Yamaguchi, & Rahman, 2012; Jiang, Deng, & Seto, 2013; Lichtenberg & Ding, 2008; Wijaya, Kurniawati, & Hutama, 2018). Growth towards suburban areas induced by industrialisation and labour mobilisation offers opportunities to the local space and the people who live there. Most of the local people participate in the process by offering their inherent resources especially the land and others participate in offering services. However, those who do not have land or capital resources can involve themselves in the industry sector as a worker. Thus, industrialisation makes the city and its suburban areas economically more vibrant and prosperous through continuous expansion process which eventually leads to transformation of the liveable environment and livelihood strategies in the suburban areas.

There is a growing concern about the industrialisation induced urban development. The negative consequences are sometimes ignored in the city's strategy as economic prosperity remains as a primary concern. Most of the key industries in the developing countries are export-oriented, create low-value-added jobs, exploit on low wages in those economies (Checkland, 1981; J. W. Henderson, 1989; Myint, Rasiah, & Singaravelloo, 2015; Wallerstein, 1979) to compete in the global market. Moreover, most of these jobs are temporary (Jomo, 2016; Warr, 1987, 1989). Thus, despite creating jobs, such growth contributes very little to improve the poverty condition, living standards of the workers and urban quality of life. The major concerns of industrialisation process are mostly related to environmental degradation and natural habitat loss (Grimm et al., 2008; Kaza, 2013; Kuang, Liu, Dong, Chi, & Zhang, 2016; Montgomery, 2008; Pickett et al., 2011; Seto, Güneralp, & Hutyra, 2012; Wu, 2014). Risk of urban flood and waterlogging increases due to loss of agricultural lands, natural drainage system and wetlands (Dewan & Yamaguchi, 2008). Moreover, urbanisation process in the suburban areas creates pressure on the existing infrastructure and utility services. Probably housing is the sector where the impact of growth is significantly identical. Industry workers demand low-cost housing close to their work-place due to their low affordability (Sultana, 2013). To meets such demand, poor quality housing especially slums have been developing in the suburban areas. These kinds of settlements are always overcrowded and unhealthy (Islam, Angeles, Mahbub, Lance, & Nazem, 2006).

To sum-up, industrialisation in the developing countries are generating economic prosperity and reducing unemployment but embraces the land, environments and even the labours where the growth take places. Thus, to provide a sustainable and efficient urban development strategy, it is needed to understand the growth factors and their nature of the impact on the growth process. However, to date, scant attention has been paid to understand the nature of growth and its impact on the suburban growth process in the developing countries under the influence of globalisation.

1.2. Statement of the research problem

Empirical studies make a clear notion that the globalisation forces shape the growth in developing country cities and population accumulation in the large urban centres are influenced by the increased externalities created through agglomeration of economies. A substantial number of studies reveal that market-oriented growth in the developing countries creates specialisation (Choe & Roberts, 2011), and forms clusters of manufacturing sectors (Choe, Nazem, Roberts, Samarappuli, & Singh, 2011; J. V. Henderson, 1991; Scott & Storper, 2003). In many cases, the growth is driven by few specialised sectors that localised in primate city. Although a considerable body of research has focused on the growth process, less attention has been paid to investigate the impact of globalisation induced sectoral specialisation, specialisation induced agglomeration and externalities, and primate city favouritism on the cities spatial growth dynamics and evolution of urban ecology in the developing countries. Moreover, it can be assumed that the spatial implications on suburban areas driven by specialised economic concentration are not similar to all cities as the specialised economy demands specific labour pool and economic environment. Thus, there is a reasonable gap in the existing knowledge on the impact of market-oriented economic growth on the localisation of population growth, the evolution of urban ecology, and suburban growth process in the Global South cities. This study focuses on this gap and attempts to make a bridge between the globalisation induced industrialisation and suburban transformation process in the developing countries.

1.3. Research objectives and questions

The study attempts to establish the connection between the market-oriented manufacturing growth and urbanisation process in developing countries' cities. The objectives of the study are to:

1. Explore the nature of the manufacturing industrialisation-urbanisation nexus and model the population localisation under the influence of industrialisation.
2. Evaluate the role of manufacturing industrialisation on the suburban growth process and to assess the impact of industrialisation induced growth on the suburban land, livelihoods, and environment.

3. Identify the role of planning on the suburban growth process and the potential challenges to deliver a plan for sustainable suburban growth.

Based on the objectives, this study was devoted to exploring the answers to the following questions:

1. Is there any relationship exists between manufacturing industrialisation and urban growth pattern? If yes, how significantly manufacturing industrialisation influences the population growth localisation?
2. What are the impacts of manufacturing industrialisation on the suburban growth process and how industrialisation induced population growth affects the suburban land, livelihoods and environment?
3. How the planning and regulatory controls affect the suburban growth pattern and what are the potential planning challenges emerge through unplanned growth?

1.4. Research methodology

The Greater Dhaka Region (GDR) of Bangladesh has been taken as the case for this study. This study followed a deductive approach and used a mix-method strategy to investigate the relationship between the industrialisation and urbanisation process in the GDR. The assessment of the significance of industrialisation on the urbanisation process and pattern (Objective 1) was done with quantitative methods. To study the suburban growth process, impacts of growth and role of planning on growth (Objective 2 and 3), a combination of qualitative and quantitative tools and techniques were employed. The qualitative strategy focuses on the assessment of the growth process, impacts of growth, and the role of planning while the quantitative strategy was used to assess the findings of the qualitative assessment and supplement the qualitative findings. Sixteen key informant interviews were conducted to collect qualitative data and a questionnaire survey was conducted on the 359 households to gather quantitative data.

1.5. The significance of the research

Influential theories of development emphasise on the structural transformation involving the rural-urban migration as the dominant contributor to the urban growth in the developing countries (Farrell, 2017; Rostow, 1959). Many of the conceptual understanding of the urban transition today has been derived from the experience of the industrialised world (Easterlin, 2009; Fox, 2011). There is a common conception that the urban transition in the developing countries has been following the similar process, and pattern to that the developed countries experienced a century earlier (World Bank, 2009). However, this argument can be challenged as the growth of cities in developed and developing countries were motivated by different drivers (K. Davis, 1965; Farrell, 2017), and the context of the growth is also different (Farrell, 2017). Thus, the evolution of urban ecology and implication of growth on suburban areas might be different due to contextual differences. As the focus of the study is to investigate the impact of

globalisation forces (such as; industrialisation and specialisation externalities) on the urban expansion process, thus it has a potential to make a bridge between the market-oriented growth and its spatial implications in Global South cities.

The Global South cities which are generating growth in their respective countries are facing severe challenges to manage the growth due to limited infrastructure provisions, lack of economic, urban and regional planning, and poor governance (Choe & Roberts, 2011). As the cities' economic base and growth induced externalities are found to be different in different countries, downloading growth and management policies from other success cases might not be appropriate. This study shows how a market-oriented specialised economic growth accumulates the labours and embraces the natural resources during the urban expansion phase. Moreover, such growth generates specific externalities, create different impacts and thus demands special measures in the policies and plans. This study demonstrates that to deliver an efficient and sustainable suburban growth, it is needed to address the drivers of economic growth, and it is essential to incorporate the growth issues in the regional strategic and spatial plans.

This study can be found valuable from the cooperation and collaboration perspective between developing and developed world. Many of the developed countries, development organisations (i.e. World Bank, JICA etc.) and supranational union (i.e. European Union, International Monetary Fund etc.) are working to improve the economy, infrastructures and livelihoods in the developing countries through financial and technical support. As the study explores the nexus between growth and its implications at the micro level, this will help those organisations to formulate an appropriate strategy for the collaborative development initiatives to ensure sustainable development and the liveable environment in the city. Thus, in case of cooperation, they can demand the long-term strategic visions and a regional development plan that accommodates the SDGs from the developing countries.

1.6. Structure of the dissertation

The dissertation starts with **Chapter 1**, demonstrating the research problem, objectives and significance. **Chapter 2** presents a thorough review of the literature on the growth localisation process and the spatial implications of growth. A brief discussion is presented at the end to show how the growth of the Global South cities are framed in the contemporary studies and what are the potential gaps in existing knowledge. **Chapter 3** presents the context of selecting Dhaka as the case for this study and the methodological frameworks the study followed. The **Chapter 4** and **5** present the findings of the study. In **Chapter 6**, a discussion has been made to evaluate the findings by using existing literature. This chapter also presents concluding remarks and recommendations emphasising further research potentialities.

2. Localisation and Spatial Implications of Growth

2.1. Introduction

This chapter starts by presenting some evidence on spatiality of growth to show how people, economy and activities are unequally distributed over spaces. Then an attempt has been made to answer the questions emerged upon the distribution of growth: *why a region (or city) grows? why certain region grows faster than others? how regions grow?* from the theoretical perspectives and based on empirical evidence. Then, Section 2.4 illustrates the spatial implications of growth within city region by focusing on the urban ecology (descriptive framework of urban land use) and land allocation parameters (explanatory framework). A critical evaluation has been made in Section 2.5 on the urban growth and its spatial implications in the context of the developing economy. Moreover, an attempt has also been made to address potentialities and limitations of the growth and land allocation theories in explaining the urban growth in the developing countries.

2.2. The spatiality of growth: evidence

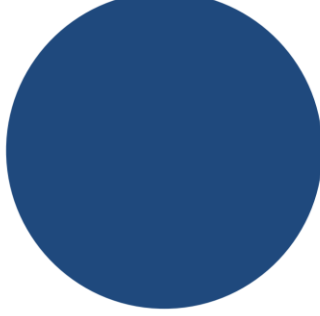
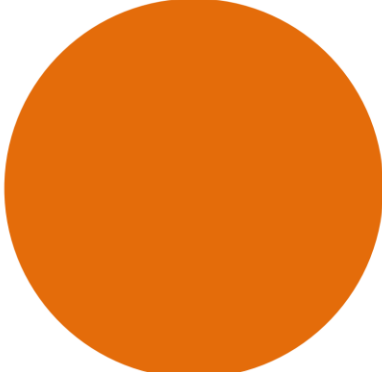
Growth is happening over time and does not take place uniformly over space rather than localising in certain places (Duranton & Puga, 2014; Perroux, 1950). Growth is seen as the increased concentration of population, along with activities and economy and it leads to increasing inequality across the regions (Friedmann, 1967; Kaldor, 1970; Myrdal, 1957; Perroux, 1950).

Spatial distribution of the population shows that people concentrate in large urban agglomerations and cities. In 2014, about 54 percent of the world population was living in urban areas (UN DESA, 2015) which was only 14 percent regarding physical land of the world (World Bank, 2018b, 2018a). Urban population growth rate was 2.21 percent per year in between 1990 and 2014, while the global population growth rate was only 1.29 percent per year (UN DESA, 2015). There are more than 1,700 cities of more than 300,000 inhabitants, and among them, only top 31 cities' (population over 10 million) share is about 12.5 percent to the global urban population (UN Habitat, 2016). Such pattern indicates that there is a significant inequality

between the distribution of the population in urban and rural areas. Moreover, significant inequality of concentration of population also exists across the cities.

Figure 2.1. Distribution of population and economy at the different spatial level

(Area and population of top 30 cities is calculated based on top 30 cities according to population size, and GDP of top 30 cities is calculated based on top 30 cities according to GDP)

	World	Urban areas	Top 30 cities
Area (World = 100)	 100.0	 14.0	 0.06
Population (World = 100)	 100.0	 54.0	 12.5
GDP (World = 100)	 100.0	 70.0	 18.0
Population Density (World = 1)	 1.0	 3.86	 208
Density of GDP (World = 1)	 1.0	 5.0	 300

Source: Prepared by the author based on Cox (2017); Hawksworth, Hoehn and Tiwari (2009); UN DESA (2015); UN Habitat (2018); World Bank (2018a, 2018b).

A significant number of literature argue that people are attracted by the cities' dynamic economy and economic opportunity, and they co-exist together (Duranton & Puga, 2014). Distribution of the economies shows that urban areas are generating more than 70 percent of the world's GDP

while they are accommodating just over half of the world's population in only 14% of the land (UN Habitat, 2018). Thus, more than two-thirds of the world's GDP is generated on only one-seventh of the world's lands. Similar to population concentration, extreme inequality in the concentration of economy exists across cities as world's 30 largest cities contribute more than 18 percent to the Global GDP (Hawksworth et al., 2009).

Severe inequality can be found if we transform the actual figure into density (Figure 2.1). Population density in urban areas is about 3.8 times than the global average and about 208 times in the 30 largest cities (in terms of population). Similarly, the density of GDP in urban areas is about five times than the world's average density of GDP. In the top 30 cities (in terms of GDP), the density of GDP is about 300 times higher than the global average.

This pattern can also be found in the distribution of population and economy within countries. Japan's three metropolitan areas account only 5.2 percent area of Japan, but accommodates 33 percent of the population, 31 percent of manufacturing employment, and generate about 40 percent of Japan's GDP (Fujita & Thisse, 2013). In France, the metropolitan area of Paris accounts for only 2.2 percent of the land of the country but accommodates 18 percent of the population and generates more than 30 percent of GDP. The contrast is more extreme as only 12 percent of the area of Paris is built-up (Fujita & Thisse, 2013). Similarly, the Greater London area accounts only 4.1 percent of the UK's total land but accommodates about 13 percent of the population and generates about 20 percent of the UK's GDP (European Commission, 2017; Office for National Statistics, 2017).

From the above figures, it can be argued that people, activities and economy are not uniformly distributed over spaces. They are concentrating in the urban areas especially in large cities which supports the claim that cities are engines of growth (Duranton, 2009; Solé-Ollé & Viladecans-Marsal, 2004; UN Habitat, 2013).

2.3. Why and how a city (or region) grows?

There is clear evidence that growth is concentrated or localised in certain places, more specifically in urban areas. Such distribution and pattern of growth raise several questions on – *why growth occurs or why certain places experience higher growth than others? how is the growth taking place? and what is the impact of growth on spaces?* Considering the first question, it can be argued that some forces attract economic activities and people to be concentrated in cities to produce more scale of economies. The second question focuses on the process of growth: how a region or city is utilising the growth forces to generate population and economic growth, and how the growth patterns differ in the presence of different factors. Finally, the third question focuses on the impact of both population and economic growth of the space where it takes place.

2.3.1. Factors that initiate and affect the growth: why region or city grows? why certain regions grow faster than others?

City or regional growth is a complex system that is shaped by an infinite range of factors (Storper, 2017). In broad terms, the factors of growth are classified into two categories: endogenous factors and exogenous factors. However, traditionally in growth theories, some key factors determine the comparative advantages of a region and localisation of growth.

2.3.1.1. Traditional factors of comparative advantage

Traditionally physical, human and production capital are considered as the critical forces of economic as well as regional growth (Despotović & Cvetanović, 2017). These three forces provide a comparative advantage to a particular region(s). A significant number of growth theories focus on comparative advantages as an initial force of growth (Dawkins, 2003). Perroux (1950) argued that at first stage, growth occurs considering the comparative advantages. Myrdal (1957) further added that naturally advantageous region grows at a more substantial pace and regions lack advantages shrinks gradually.

2.3.1.2. Demand and supply based exogenous factors

Exogenous theories argue that regional economic growth is mostly determined by the region's response to the exogenous demand. This response generates growth in both the economic base (possibility of an export sector), and non-basic (or residentiary) sectors to serve the basic sector (North, 1955). Tiebout (1956) argues that there is also a significant impact of supply-side factors as they ultimately affect the demand based (or export based) economy. For example regional population size, easier access to input factors such as availability of input resources and labour determined the response efficiency to the exogenous demand. Thus, North-Tiebout model argues that there is always a bidirectional feedback effect between regional (economic) growth and export demand (Dawkins, 2003). The neoclassical exogenous growth theories also focus on the supply-side approach and argue that if the production parameters in a production function are uniform across the regions, then there will be an absolute convergence in production and economic growth (Solow, 1956; Swan, 1956). These models allow for substitutability among production inputs in context of production functions (Barro & Sala-i-Martin, 2004; Dawkins, 2003). Borts and Stein (1964) revise the model to apply at the regional level by allowing open regional economies with net exogenous labour and capital inflows.

2.3.1.3. Endogenous factors

Recent urban and regional growth theories have increasingly demonstrated that growth is endogenous (Huggins, 2016; Lucas Jr, 1988). Endogenous growth theories have only recently begun to incorporate the role of space and geography in shaping the pattern of regional growth (Dawkins, 2003). The fundamental argument of endogenous growth theory is that endogenous

assets such as production capital (Despotović & Cvetanović, 2017), human capital (Despotović & Cvetanović, 2017; Lucas Jr, 1988), innovation and creative capital (Florida, 2004; Jones, 2016; Romer, 1990), entrepreneurship capital (Audretsch & Keilbach, 2008), network capital (Huggins, 2016; Huggins & Thompson, 2013; Storper, 2017), social capital (Coleman, 2003; Despotović & Cvetanović, 2017), ecological capital (Despotović & Cvetanović, 2017; Duranton & Puga, 2014; Roback, 1982) provide the capability to encourage long-term growth (Capello & Nijkamp, 2011; Huggins, 2016). Thus, the endogenous growth theories reject the view of only the three underlying factors of regional economic growth (Despotović & Cvetanović, 2017). The new economic geography (NEG) theory argues that concentration of economic activities resulted through the endogenous process, and concentration of workers and firms are induced by the scale of economies (Krugman, 1991; Storper, 2017).

2.3.1.4. Institutional factors

A range of literature argues that the institutional and structural factors shape the regional and economic growth pattern and process through constraints, incentives and organisational arrangements (Acemoglu & Robinson, 2012; North, 2005). The political and economic institutions primarily try to resolve operational cost dilemmas (Dawkins, 2003). North (1991) and Rodrik (2000) demonstrate that the institutions establish the 'rules of the game' for growth. Institutional adaptations may either promote or discourage growth, and the result depends on the compatibility of the institutions to the demand (North, 1991) and the efficiency of the institutions to facilitate the development of factors that allow capital accumulation (Huggins, 2016). The flexibility of the institutional structures also determines the response to emerging shocks. Cities or regions with strict structures and networks may not be able to respond to exogenous shocks by choosing alternatives and thus experience declining growth (Huggins & Izushi, 2007; Martin & Sunley, 2006). In general, the endogenously emerged institutions are relatively sticky compared to the institutions emerged exogenously (Boettke & Fink, 2011).

To sum up, there is an unequal distribution of growth factors over spaces that gives some regions or cities comparative advantages to grow faster than others. Some factors are geographically created, and some are emerged through the interaction between actors and they further influence the comparative advantages. Some factors are exogenously created, and some emerge endogenously. Institutional structure and strategy also play a crucial role to generate growth through the efficient use of resources the region or city has.

2.3.2. Growth process: how region grows?

This section illustrates the process of growth by focusing on how the factors play a role in different settings. Moreover, this section demonstrates how some additional forces emerge within the region during the growth process and how they affect further growth process in

particularly densification of the core, and spatial expansion of cities to accommodate the incoming firms and population.

2.3.2.1. The process of non-spatial components growth: Core (region or city) development

The growth is localised, aggregated and propulsive in nature and reflects the forces the region has. In the first stage, regions grow by utilising comparative advantages (Albert O Hirschman, 1958; Myrdal, 1957; Perroux, 1950) and space acts as a force of spatial interaction and network creation (Perroux, 1950). In growth-pole (or core-periphery) theories, these forces are considered as the centripetal forces of core development (Friedmann, 1967; Krugman, 1991; Perroux, 1950) that attracts firms, labours and capitals from periphery regions. This process of accumulation in a particular region is seen as the *wave of polarisation* in the growth-pole theory, *backwash effect* in the cumulative causation theory. Such accumulation process leads to agglomeration of economic activities and people, generates external economies, and create network or linkages which eventually act as additional forces for further growth. Comparative advantages create external economies, and the accumulation process intensifies scale of economies. Hirschman (1958) demonstrates that firms try to concentrate toward a common centre rather than periphery to use a competitive platform because there is already a good infrastructure environment and potentiality, and in future, the potentiality will increase more. Friedmann (1967) pointed out that large urban agglomerations have the initial advantages in the competition of extending demand-based growth. Krugman (1991) argues that firms try to locate in the existing industrialised area to access the workers and support services. There is circular causation of location choice, where there is already a robust industrial belt, it will tend to stay in existence. Thus, economies of scale, agglomeration, accumulation of people and activities go parallelly to shape the growth of the region. Sometimes, negative externalities can be generated through the growth process which also shapes the pattern of agglomeration (Perroux, 1950). For example, pollution created by some industries may force to grow other industries or residential areas far from the polluting factories.

During the growth process, networks or linkages (either inter-industry or intra-industry, or industry-institution) increase along with growing economies of scale, agglomeration, specialisation and innovation (Perroux, 1950). These kinds of networks are termed as 'communication externalities' that play an important role in agglomeration economies and sit in conjunction with externalities relating to human capital (Charlot & Duranton, 2006; Huggins, 2016). The networks help to access the new knowledge and innovations. It also helps to respond to external shocks cumulatively and grow together in a particular location by forming an efficient industry cluster (Porter, 1990, 1996, 2000). Thus, large urban agglomerations and cities are considered to be critical locations for high rates of network formation due to the high density of actors (Glaeser, 2011; Huggins, 2016). There is growing evidence that industries are growing through generating specialisation. Hoover and Fisher (1949) demonstrate that specialisation starts from the mature stage of industrialisation as they become more competitive for certain

types of production. He argues that development of a region from the self-dependent agriculture to the export-oriented economy can be seen regarding internal changes through the division of labour and specialisation of production. Henderson (1974) argues that external economies are mostly industry specific which in turns lead to a concentration of similar firms in a specific location and over time the city become specialised of that production and that industry dominates the economy.

2.3.2.2. The process of spatial growth: Expansion of cities towards the periphery

The growth of the city depends on a significant number of unique and emerged factors that attract firms and labour to be localised through the backwash effects. Over time, increased number of firms and labour in the city creates demand for more space force to continue the growth and to retain the competitive position. However, physical land resources are limited, and there is a threshold capacity of the land. In response to increasing demand, the city expands spatially to accommodate the activities and economy. This process of spreading of the city is termed as '*wave of dispersion*' in Perroux's growth-pole theory (1950), '*spread effects*' in Myrdal's growth theory (1957), '*trickle-down effects*' in Hirschman's theory (1958). Perroux argues that while the wave of polarisation creates growth of pole, the wave of dispersion is responsible for the transmission of development to their zone of influence (mostly surrounding areas). In a long-run, surrounding areas of a flourishing region's comparative advantages increase than the remote periphery for being located near a growth pole. Myrdal demonstrates that fast and dynamic growth of the flourishing region promotes more development within the region. Hirschman argues that the polarised region will grow at a fast rate through expanding its spatial extent (towards immediate periphery or hinterlands). The strength of polarity determines the intensity of dispersion. North (1955) argues that when the economy becomes mature, they are more diversified and in long-run, the region loses its initial spatial identity. Vernon (1966) argues that when the firms demand large-scale production and cheaper production cost to compete in the market, then the underdeveloped area (mostly near the core area) become more preferred location for production to utilise both the economies of scale from the core city and cheaper land and labour from the periphery (Dawkins, 2003; Vernon, 1992). Krugman's core-periphery model (1991) demonstrates that there are always two different directional forces active in the growth process. When centripetal forces (influenced by market size, developed labour pool, positive externalities etc.) overpower, it results in high degree of regional inequalities (divergence) and when centrifugal force (immobile production factors, land rent, negative externalities etc.) overpower, it results in redistribution of activities which in long-run leads to spatial expansion of city.

2.4. What are the spatial implications of growth?

Growth is happening, and it has a significant impact on space where localising. The generalised effects of the growth from the above discussion are an agglomeration of population and economics, the emergence of externalities, spreading or spatial extension of growth space. The city size grows in relation to local human capital growth (Black & Henderson, 1999), and the demographic growth is also economically important for the city (Duranton & Puga, 2014). Like the inter-regional growth process, a similar argument can be made for the intra-city growth and development process that all locations within the city do not offer similar potential and not all the actors choose location similarly. Thus, city formation and city ecology (also termed as the land use pattern) result from a trade-off between the benefits and cost of each actor's decision of location choice. This section starts with the generalised theory of urban ecology or land use pattern and then demonstrates how location decision of users are determined to form a city ecology.

2.4.1. *Urban ecology*

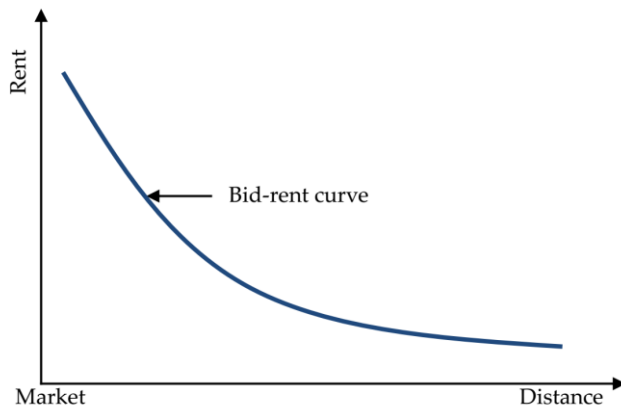
Urban ecological models argue that the land use and evolution of urban ecology are primarily determined by the market forces (Chapin, 1965; Cilliers, 2010; Herbert, 1973) and access to market and services (Johnson, 2013; Pacione, 2009; Waugh, 2005). The initial ecological models focus on the monocentric pattern of land use distribution where central business district (CBD) locates in the centre. The Burgess Concentric Zone model argues that different type of land use emerges with the increase of distance from the CBD that forms a ring-shaped pattern. This model is oversimplified that hardly represent the reality (Friedmann, 1967; Pacione, 2009). The sector model (Hoyt, 1939) incorporates the influence of transport networks and argues that the sectors radiate outward along the transport network from the CBD (Mayer, 1969; Pacione, 2009) and compatible land uses lie next to each other. Harris and Ullman (1945) and Vance (1964) criticise the monocentric concept by arguing that when the city becomes larger, they create multiple centres rather than one to ensure the maximum accessibility and to keep certain types of land use apart (Chapin, 1965; Lang & Nelson, 2007). As the activities and growth have externalities and differentiated location demands, Mann (1965) argues that heavy industrial land use occurs along the main communication lines and high-class housing usually located away from the industry. He also argues that local government plays an important role to shape the land use and land allocation pattern (Waugh, 2005). Recent urban ecological forms demonstrate that the CBD expands vertically rather than horizontally, some enclaves develop for both elite and poor group within the city, and the middle-income group is dispersed all over the city (White, 1988). Such distribution creates epicentres, and these epicentres tend to be located along the major access corridors (White, 1988).

Although there are limitations of generalised urban ecological models, all of them demonstrate some common phenomena that – centre-based growth (either single or multiple centres), co-location of compatible activities, segregated land uses, and transport accessibility determines the location of activities, as well as land use.

2.4.2. Explanatory framework: Land-rent and land allocation

Why and how different urban ecology (or structure) emerges and changes over time? Ricardo (1817) observed that the difference in rent between two land parcels should be equal to the revenue differences derived from these parcels. The Von Thunen model argues that goods that are costlier to transport should be located near the market (Duranton & Puga, 2015). Both the Ricardo and Thunen's concepts assume that the highest bidder will be located in a particular location in the free market (Cilliers, 2010). This assumption leads to a new theory of location choice and land allocation, known as the bid-rent theory. The bid-rent theory argues that the land rent is higher for a competitive location that is closer to the market and falls gradually as the distance from the market increases (Figure 2.2) (Fujita, Krugman, & Venables, 2001; McCann, 2013; Pacione, 2009). The most expensive land is in the centre (CBD) as the access cost and time to market is lowest and the competition is higher due to a shortage of land.

Figure 2.2. The bid-rent curve for an individual firm



Source: Adapted from McCann (2013)

The modern approach to urban land use pattern originated from the concepts of Alonso (1964), Mills (1967) and Muth (1969), who incorporated transport and population in a monocentric land use model (Duranton & Puga, 2015). Alonso's framework demonstrates the interaction between land values and land uses and argues that when an individual enters the market, he has to choose between land size and distance from the city to buy a piece of land. He assumes that buyer has perfect knowledge of the costs of choosing any land and by assessing the costs he takes a decision (Pacione, 2009; Waugh, 2005). He also argues that bid-rent curve is unique to each individual (or use) and thus individual will choose that location which is associated with the highest level of satisfaction as well as the best price for him (Waugh, 2005). Finally, the theory demonstrates that

the bid-rent curve will be steepest near the centre and the steepness decrease with the increase of distance from the city for all individuals or activities (Kaiser, Godschalk, & Chapin, 1995).

2.4.2.1. Framework for residential location choice

Duranton and Puga (2015) argue that residents choose the location of their residences (as well as allocate their disposable income) optimally through negotiating between the housing and the numeraire to access the better utility. Commuting cost is considered as the critical determinants of residential location choice. Within the city, some locations can enjoy better access to the CBD by using radial highways (Anas & Moses, 1979; Baum-Snow, 2007; Duranton & Puga, 2015). Functional characteristics of the labour market (Zenou, 2009), access to local amenities (Brueckner, Thisse, & Zenou, 2002; Duranton & Puga, 2015); households and parcels heterogeneity (Burchfield, Overman, Puga, & Turner, 2006; Duranton & Puga, 2014, 2015) also significantly affect the land and housing price and thus the land uses.

2.4.2.2. Framework for agglomeration and commercial land use

Production theory suggests that firm substitutes non-land inputs in favour of land while moving away from the market, or substitute land inputs in favour of non-land inputs while moving towards the market. The process of substitution, as well as the land allocation, depends on the firm's production flexibility, market access and ability to pay rents for compatible land (Duranton & Puga, 2015). Thus, the bid-rent curve for service sector tends to be very steep than retail and manufacturing sectors. Agglomeration economies force the firms to compensate their workers for commuting costs. In such context, if agglomeration benefits dominate the commuting cost compensation, a purely commercial zone will exist, and in the opposite, there will be a mix-use area of residential and commercial use where firms and workers will close to each other. However, Glaeser and Khan (2001) and Anas, Arnott and Small (1998) found that the reality does not too extreme as the theories claim.

2.5. Regulation as a determinant of growth localisation and land use pattern

Regulations have a significant impact on the growth localisation and determination of land use through influencing the land price and housing price (Green, Malpezzi, & Mayo, 2005; Huang & Tang, 2012; Jackson, 2016; Kok, Monkkonen, & Quigley, 2014; Saiz, 2010). Ihlanfeldt (2007) and Glaeser and Ward (2009) found that greater land restrictiveness increases the housing price but decrease the land price. Regulation induced increases in housing construction costs (Brueckner, 1990; Ellickson, 1977; Glaeser, Gyourko, & Saks, 2005) reduce the value of undeveloped restricted land (Ihlanfeldt, 2007). Thus, zoning benefits homeowner and hurts owners of undeveloped land and low-income renters (Blöchliger, Hilber, Schöni, & von Ehrlich, 2017; Hilber & Robert-Nicoud, 2013). However, regulation may restrict the supply of developable land in some part of the cities which may lead to an increase in land values. Land use regulations may create a land

use externality on adjacent parcels, in particularly, regulations that preserve open space create positive amenity benefits and increase the land price of nearby developable lands (Irwin & Bockstael, 2004).

According to bid-rent theory, the users substitute some factors for getting the better utility from localising in a certain place. If industries are affected by the regulation in the inner city, they will try to move outside to minimise the effects; if households are affected, they relocate themselves to other areas. Helsley and Strange (1995) argued that restricting growth in one community through regulation will also negatively impact the neighbouring community where regulation is low by pushing the growth onto that community. Thus, local government decision with regards to land supply and land use may exacerbate the sprawl problem because land developers and households can easily avoid growth controls restriction by moving out to another area (Glaeser & Kahn, 2004; Kearsley, 1983; Pacione, 2009).

2.6. Regional growth process and pattern in the developing countries

Recent trend shows that the developing countries are urbanising at a rapid pace. The share of developing countries to the global urban population was about 63.6 percent in 2015 (UN DESA, 2015). It was only 50 percent in 1970, and it is expected to be 79.2 percent by 2030 and 82.4 percent by 2050 (UN DESA, 2015). The rapid urbanisation in many developing countries has been going together with extremely high levels of urban population concentration in large cities (V. Henderson, 2002; UN Habitat, 2016). This pattern is found to be prominent in Asian megacities (Choe & Roberts, 2011). In the early stage of growth, most of the developing countries focus on few existing large agglomerations, in particular on the megacities (Cohen, 2006; V. Henderson, 2002) as they have comparatively better infrastructures than the other small and medium cities. Hansen (1990) argues that in the early stage, it is not possible for the developing countries to invest in infrastructure to support widespread urban agglomeration as the resources are scarce and they must allocate much of their national income to provide basic needs to their population. Thus, urban concentration in many developing countries increases in the initial stage of economic growth and generates increasing regional disparities (Wheaton & Shishido, 1981). Although it is assumed that at the mature stage with accompanying the growth, they will invest in the hinterland regions allowing other urban agglomerations to grow but, in many cases, it becomes challenging as de-concentration may be delayed too long due to lack of financing, lack of political will, and lack of regional strategies (J. V. Henderson, 2000b). Thus, many large urban agglomerations are growing spatially to accommodate the growth rather than developing other agglomerations. The statistics show that 24 among 31 megacities of the world are in the less developed regions or the “Global South” and by 2030 it is expected that ten more cities will emerge as megacity in the world and all of them will be in the Global South (UN Habitat, 2016).

Henderson (2002) argues that there is appearing to be strong biases towards excessive concentration in the developing countries and the countries are favouring primate city-oriented growth. The economy might not be able to benefit from the urbanisation if it focuses on excessive concentration (J. V. Henderson, 2000b). However, they might face enormous negative consequences due to increasing density. Excessive concentration significantly reduces the economic growth (J. V. Henderson, 2000a, 2000b) as the infrastructures do not grow at the same pace as the demands increase. Thus, the gap between the infrastructure demand and supply is increasing which results in problems with congestion, groundwater contamination, poor air qualities, and increased infectious diseases (J. V. Henderson, 2000b). Moreover, increased density of population degrades the quality of life in the cities (V. Henderson, 2002). Thus, the speed and scale of growth in the large cities create enormous pressures on the immediate and surrounding environment (Cohen, 2006). Many studies set some benchmark characteristics for the urbanisation in the developing countries focusing on; agglomeration and its spillover effects (Becker & Henderson, 2000; Deichmann, Kaiser, Lall, & Shalizi, 2005; V. Henderson, 2002), accelerated cost of living (V. Henderson, 2002; Timmins, 2006), inefficient traditional migration (Lall & Selod, 2006; Mazumdar, 1987), primate or large city favouritism (Choe & Roberts, 2011; J. C. Davis & Henderson, 2003), inefficient internal market access (Deichmann et al., 2005; Lall, Koo, & Chakravorty, 2003; Timmins, 2006) etc.

The concentration of population in the cities are migration induced and people from the rural areas moving to the cities for betterment their life standards (De Haas, 2010; Mazumdar, 1987). However, the high cost of living due to increased rent and utility costs, and increased competition for livelihoods sometimes trap the new inhabitants in poverty rather than improving life standards (V. Henderson, 2002). A study estimates that more than one-third of the people of the developing country cities are living in slums and squatters (Keeble & Walker, 1994) and living in such a condition exposes them to social and health risks (J. V. Henderson, 2000a). Rapid and unplanned urbanisation also results in urban violence and social unrest. It has been found that planning efforts are not sufficient to manage the urban growth and growth induced risks. Thus, the quality of life and public service issues are exacerbated by the lack of planning and governances in the developing countries.

2.7. Conclusions

A significant number of literature argue that the cities of developing countries have been experiencing similar growth pattern the developed country faced a century before. However, this argument can be challenged by bringing the differential contexts and pace of growth in the developing countries. Moreover, as the developing countries' economy is highly dependent on the external markets and they become specialised in some sectors to compete in the global market, thus the externalities that emerge through the growth process might not be similar across countries. Thus, the impact of the urban and economic growth on the large cities and their

surrounding suburban areas may not be uniform. However, to date, little attention has been paid to understand *the relationships between specialised industrialisation induced growth and its impact on the space* in the developing countries. Although literature argues that many of the developing countries are favouring excessive growth in the primate city or the capital city, there is also a reasonable gap found in the existing literature on - *how the suburban areas are affected by the growth in such a country that focuses on the primate city favouritism for growth*. Lack of financial and infrastructure provisions, and inefficient planning and poor governance are found to be big challenges to manage the urban growth dynamics in the developing countries. To date, little is known about the impact of those challenges on the suburban growth process. However, it can be assumed that excessive pace of growth along with the management limitations may produce more risks to the suburban environment and living conditions.

3. Methodological Framework

3.1. Introduction

This chapter illustrates the context of selecting the Greater Dhaka Region (GDR) as the case from the Global South and the methodological framework followed to conduct the study. The study followed objective approach and positivist epistemology. From deductive theoretical standing, a mix-method approach was used as it requires both quantitative and qualitative strategies to collect and analyse the data. Based on the research design, a detail discussion is made on the process of data collection and analysis. For the first objective, quantitative techniques were employed to analyse secondary data. Primary data were used for second and third objectives, and both quantitative and qualitative techniques were employed to collect and analyse the primary data.

3.2. The context of selecting the Greater Dhaka Region (GDR) as the case from the Global South

Like other developing countries in Asia, Bangladesh has been experiencing rapid economic growth along with urbanisation (Hossain & Nazem, 2016; Nazem, Chowdhury, & Hossain, 2014a). Large-scale rural-urban migration (Islam, 1996; Nazem & Hossain, 2012), high demand for labours in industries have been playing a crucial role for such growths (Hossain & Nazem, 2016; Nazem et al., 2014b). Urban areas, especially the large cities are hubs of diversified economic activities, were always found to be the catalyst for progressive growth (Fan & Scott, 2003). If cities are the engine of growth (Campbell, n.d.; European Union, 2011; Vliet, 2002; World Bank, 2009), the country should take full advantages of urbanisation (Choe & Roberts, 2011) by encouraging its planned and sustainable growth.

In Bangladeshi economy, there is clear evidence of primate city favouritism. Dhaka, the capital city of Bangladesh, accommodates a significant proportion of economic growth and thus has been experiencing rapid urban growth in last three decades (Islam, 1999, 2005; Nazem et al., 2014b). The share of Dhaka to national urban population was about 35 percent in 2011 (BBS, 2014) and to national GDP was about 15 percent in 2001 (BBS, 2005). In recent decades, Dhaka has

emerged as a hub manufacturing clusters (Choe & Roberts, 2011; Islam & Hossain, 2013) and become one of the most competitive manufacturing agglomerations in Asia (Choe & Roberts, 2011). Diversified economic opportunities, especially manufacturing industries attract people from rural areas (Nazem et al., 2014b). Dhaka is growing spatially to accommodate activities and incoming population (Dewan, Kabir, Nahar, & Rahman, 2012; Dewan & Yamaguchi, 2009b, 2009a; Dewan, Yamaguchi, et al., 2012). Several studies (Dewan, Kabir, et al., 2012; Dewan & Yamaguchi, 2008, 2009b, 2009a; Dewan, Yamaguchi, et al., 2012) found that spatial expansion is occurring towards suburban areas following major transport networks. During the growth, the region is losing its agricultural lands, wetlands and natural habitats (Dewan, Kabir, et al., 2012; Dewan & Yamaguchi, 2008, 2009b, 2009a; Dewan, Yamaguchi, et al., 2012). Besides, due to the lack of proper policy and growth control strategy, unplanned growth is creating pressure on land, housing, infrastructures and environment. Unplanned growth leads to the development of poor housing: slums and squatters (Islam et al., 2006). A comprehensive study in 2005 found that more than one-third of the population of Dhaka Metropolitan Area (DMA) were living in slums (Islam et al., 2006). Most of the slum dwellers were either involved in informal activities or the manufacturing industries (Islam et al., 2006).

Although it has not been studied yet, how significantly industrialisation impacts the spatial growth of Dhaka but considering the above transition phenomena of Dhaka, it can be assumed that the growth process and growth induced spatial impacts on suburban areas are influenced by market-oriented industrialisation. Many of the contemporary studies on Dhaka have considered the availability of developable land, land level, transport networks as the determinants of urban expansion; manufacturing agglomerations and specialisations as the engine of economic growth; lack of proper plan along with poor governance as the determinants of unplanned and uncontrolled growth. However, there is hardly any study that focuses on the economic growth process as a determinant of physical and population growth localisation. Under such circumstances, this study has been undertaken to address the role of industrialisation in the growth localisation and suburban transformation in the Greater Dhaka Region (GDR).

The Greater Dhaka Region (GDR) consists of six administrative districts: Dhaka, Narayanganj, Gazipur, Narsingdi, Manikganj and Munshiganj. A substantial part of the area is fully urbanised, while some pocket areas are semi-urban, and some are still rural. It contains the Dhaka Mega City, one of the fastest and densely growing urban agglomeration in Asia. The Greater Dhaka Region contains about 15.78 million urban population, comprising over 35% of the national urban population (BBS, 2014). Within the GDR, the level of urbanisation is about 67.28%, the highest in the country if we consider the region. The GDR, as an urbanised region, is growing at a rate of 4.1% per year –way above the national urban population growth. Figure 3.1 shows the map of the GDR along with different institutional boundaries.

Figure 3.1. Administrative map of the Greater Dhaka Region (GDR) with different institutional boundaries



Source: Author (2018)

3.3. Research philosophy and theory

The perspective of objectivity in research assumes that independent functional entities create the reality (Bryman, 2015; Flick, 2015). It assumes that there are factors exist that drive to concentrate population and activities, urban expansion, and suburban transformation. Thus, the ontological perspective of the study is more towards the objective as it intends to investigate the nature of the relationship exists between industrialisation and urbanisation process. The objective perspective generally leads towards the positivist epistemology (Bryman, 2015; Gray, 2013) that offers researcher to retain control over the research process as it is essential when the research demands a significant amount of data to be collected and processed (Flick, 2015; Gray, 2013). This study was designed to explain the process of urban expansion and suburban transformation under the influence of industrialisation process based on observable facts through positivist approach. The present study has been conducted under deductive framework as the study is more about testing association rather than making theory.

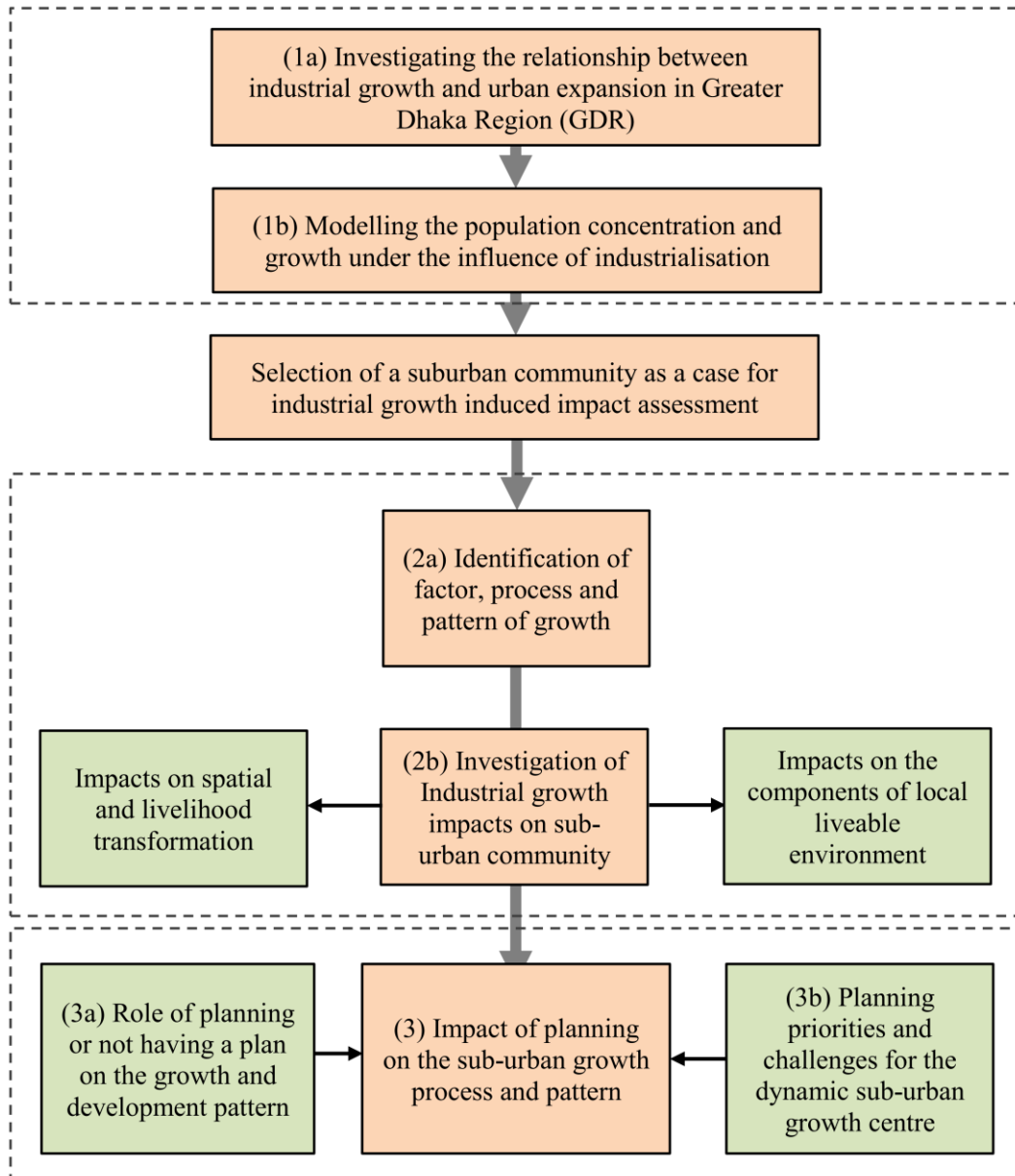
3.4. Research design and strategy

3.4.1. Research design

Figure 3.2 shows the conceptual design of the study. The research has been done under two inter-related phases. Firstly, the focus was on the assessment of the nature of the relationship between

industrialisation and urbanisation (concentration of population and growth). Initially, drivers of urbanisation and suburban growth were listed and then assessed the impacts of those drivers on population concentration and growth process. Then, cross-sectional and longitudinal models were developed and assessed to identify the potential contribution of industrialisation to the urbanisation process.

Figure 3.2. Strategic framework of the study



Source: Author (2018)

Secondly, the focus was on the assessment of the impact of industrialisation induced growth on the transformation of suburban land, and living environments (Objective 2), and role of planning in growth process (Objective 3). For this, one suburban community was selected as a case. In this stage, the emphasis was given to identify the population concentration and growth factors,

growth-induced spatial transformation, changes in the environmental and infrastructure parameters and role of planning on the nature of growth.

3.4.2. Research strategy

This study employed a mixed method approach comprising both qualitative and quantitative strategies. For the first objective, a quantitative strategy was followed as it focuses on the nature of industrialisation-population nexus. On the other hand, both qualitative and quantitative strategies were employed for the second and third objectives. The qualitative strategy focuses on the investigation and assessment of the nature and level of impacts of industrialisation induced growth. The quantitative strategy was employed to find out the evidence to assess the findings from the qualitative assessment and to supplement the findings from the qualitative study. The detail about the data and methods used for the study are presented in Section 3.5 and Section 3.6, and a triangulation strategy is presented in Section 3.7.

3.5. Assessing and modelling the spatial pattern of population concentration and growth in the Greater Dhaka Region (GDR)

This section illustrates the data and method were used to model the population growth localisation in the GDR. It also presents the context of selecting the spatial units, processing of data along with the data limitations.

3.5.1. Setting the spatial administrative units for analysis

Selection of the spatial units for data gathering and analysis is a big challenge for Bangladesh as the administrative units are changing continuously (especially in urban settings). Although changes in units do not affect the cross-sectional study, severely challenge the longitudinal study. This study demands very detail level data for accurate analysis. Considering the data limitations, the study has fixed the spatial units as city corporation or municipality for the urban areas and *union* for the rural areas based on the Population Census 2001. Then, the Population and Housing Census 2011 data were transformed into administrative units defined in the Population Census 2001. Finally, data were compiled for total 379 administrative units for the GDR.

3.5.2. Sources of data

3.5.2.1. Geospatial data

The spatial data (GIS shape) for administrative boundary used in the Population and Housing Census 2011 was collected from the Bangladesh Bureau of Statistics (BBS). Then it was transformed into the structure of the Population Census 2001 (discussed in earlier Section 3.5.1). Transit network data was collected from OpenStreetMap (www.openstreetmap.com) and updated by using the information collected from the Roads and Highway Department. All

spatial data were checked and transformed into the same coordinate system (WGS 1984 Zone 46N) for consistency in analysis.

3.5.2.2. Population and Industry data

Population data were collected from the Census Reports (the Community series of Population Census 2001 and Population and Housing Census 2011) published by Bangladesh Bureau of Statistics (BBS). Industry data were collected from another report of BBS named 'Register of Establishment' which includes a list of all macro size (number of employees 10 and above) businesses at four-digit level. The list is updated until 2010. It provides data on the location of industries (at *mouza* level), number of employees, and year of inception (or birth). There are some limitations to use this industry database in the longitudinal analysis because it provides data on current employment. Considering this, number of employment created by the newly established businesses (or factories) between 2000 to 2010 was used as a proxy for the employment growth.

3.5.2.3. Proximity data

Two types of proximity data were used in this study: (a) distance from the central (core) city area, and (b) distance from the major transit network. Distance from the central city area was generated through calculating the Euclidian distance from the boundary of the former Dhaka City Corporation (currently divided into two separate City Corporations). On the other hand, data on proximity to major transit network was generated through calculating the Euclidian distance from the nearest national highway.

As the administrative units are a polygon in nature, the average distance of each unit was calculated. For this, firstly, 500-meter interval fishnet points were generated for the whole GDR, and then proximity data for each point from the Euclidean distance rasters were extracted. Finally, average distances (proximity to the city and national highway) for each unit were calculated through spatial join technique available in the ArcGIS 10.5.

3.5.3. Empirical approach

The study employed Pearson's correlation analysis to test the cross-sectional and longitudinal association between population concentration, and proximity factors and industrial employment concentration. For modelling, multivariate regression (OLS) was done at several levels to estimate the population concentration and growth. The indicators were used in this analysis are listed in Table 3.1.

Pilot investigations using these data found that the analysis demands '*log*' transformation of data because data range is too high and in linear analysis few outliers which effects the results severely. Use of logarithm is a common practice in the demographic and spatial analysis as it converts a nonlinear (multiplicative) effect to a linear (additive) one for linear modelling. There

are also some limitations in log transformation as it does not allow 0 (zero or negative values). For industry data, about half of the administrative units do not have any industry as well as industrial employment. Thus, exclusion of these units questions the quality of output. Considering such issue, the study has used $\text{Log}(x+1)$ instead of $\text{Log}(x)$ while transforming the industrial employment data. The effect of such transformation found very insignificant as the minimum employment is ten where there is at least one macro business. Summary statistics of the indicators are attached in Appendix – 5.

Table 3.1. List of indicators and measures used in correlation and regression analysis

Domain	Indicators	Measures (x)
Population	Population concentration in 2001 and 2011	Population density per square kilometre
	Population growth between 2001 and 2011	Population growth rate (annual) in percent
		Population density change (decadal)
Industry	Employment concentration in 2000 and 2010	Density of industrial employment (all)
		Density of manufacturing employment
		Density of Readymade Garments employment
	Employment growth between 2000 and 2010	Change of density of industrial employment (all)
		Change of density of manufacturing employment
		Change of density of Readymade Garments employment
Proximity	Distance from central city	Average distance from the DCC (in metres)
	Distance from major transit network	Average distance from the national highway (in metres)

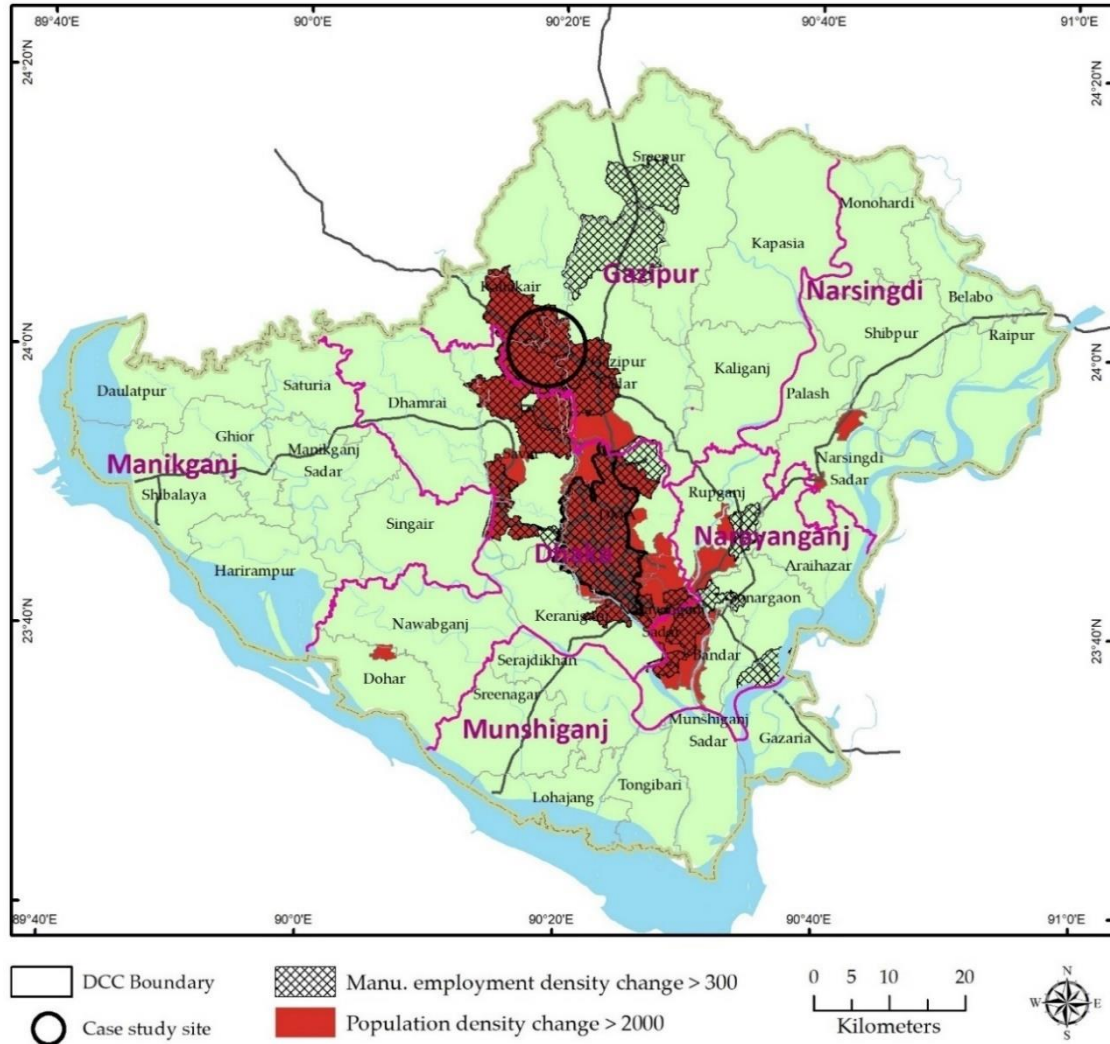
3.6. Assessing the impacts of industrialisation induced urbanisation process on the nature and pattern of the suburban growth in the GDR

This section illustrates the context of selecting the suburban case site to study the impact of industrialisation induced growth on suburban areas. It also presents the methods that were used to collect and analyse the data along with the sample selection procedures.

3.6.1. Selection of the case site

To assess the nature of impacts of industrialisation induced urbanisation process on suburban areas at the micro level, a suburban community was selected as a case considering the research scopes and following criteria: (a) located in the rural-urban fringe region, and (b) experiencing high growth of population and industrial employment. Based on the criteria mentioned there are several suburban agglomerations can be identified such as; *Savar-Ashulia* area, *Gazipur Sadar* area, *Shiddirganj*, *Konabari-Kashimpur* area etc. Considering the above criteria, and flexibility and scope to conduct the fieldwork, *Konabari-Kashimpur* area was selected for this study. Figure 3.3 shows the location of case study site with other potential candidate sites.

Figure 3.3. Case study site (Konabari-Kashimpur area) with other potential candidate sites



Source: Author (2018)

3.6.2. Data collection and analysis: objectives and methods

To collect the primary data both qualitative and quantitative approaches were employed. First, qualitative data was collected through structured interview survey and then a questionnaire survey was conducted to collect quantitative data.

3.6.2.1. Structured interview survey

This study demands data on factors and process of population concentration, and potential impacts of growth on the socio-economic, environmental and infrastructural components of the community. Moreover, the assessment study needs both the present and past (beginning of the industrialisation) states of the selected components to assess how they were affected by the industrialisation induced growth. Some of the components are quantifiable and assessable through scientific techniques but due to the limited scope of the study and lack of historical data, a subjective (qualitative) assessment approach was chosen over objective (quantitative)

approach. Thus, a structured interview survey was conducted as the data requirement is very specific.

The interview survey was divided into three major parts. Firstly, the participants were asked to share their perceptions on the growth process and pattern of the area. Secondly, they were asked to assess the state of some predefined components of the liveable environment (socio-economic, environmental and infrastructural) based on their experiences (Table 3.2). They were asked to assess both the present condition and the past condition using a scale of 1 to 5, where '1' denotes worst or very bad condition, and '5' denotes very good or best condition. Finally, some open-ended questions were asked to explore the impact of the plan or not having a plan on the nature of growth, and the potential challenges for plan making and implementation in such a dynamic condition. The structured interview questionnaire used in this study is attached in Appendix – 1.

Table 3.2. List of components assessed with interview survey

Themes	Environment	Infrastructure and services	Social
Components	1. Air quality 2. Water quality 3. Underground water level 4. No of water bodies 5. Waterlogging 6. Green coverage	7. Road networks (no. and lengths) 8. Quality of road 9. Transport services (modal) 10. No. of education institutions 11. Number of healthcare facilities 12. Sewerage management 13. Waste management 14. Open space 15. Playground 16. Security	17. Drug problems 18. Illegal activities 19. Social bonding and harmony 20. Values and humanity

Selection of participants for interview

The interviews were conducted on key informants. The key informants were selected based on the criteria that they are living in this area at least for ten years and they must be educated and informed. Considering these, local school teachers were interviewed who fulfil the above criteria. An attempt was also made to interview the local political representatives, but they were not willing to participate as the local government election was approaching.

To select the informants, first, the list of schools with contact number was collected from the Bangladesh Bureau of Educational Information and Statistics (BANBEIS). Then the principals or concerned persons were contacted over phone. The schools were chosen considering the geographical location to provide a holistic picture of the locality. Sixteen interviews were conducted from five schools at three different locations: *Kahimpur* (southern part), *Konabari* (central part) and *Ambagh* (northern part).

Processing and analysing the interview data

The interview data were collected by taking notes on the interview questionnaires and recording the conversations. Ten interviewees allowed to record the conversation. After the end of each interview, the interviewee was asked to check the notes taken and signed if they agree. The interview survey followed two strategies: (a) the perceptions on the factors and process of growth, and (b) evaluation of the impacts of growth on the social, environmental and infrastructure components, and thus two separate methods have been used to process the collected data. For the former one, responses to each question were coded manually. Initially, codes for each question were listed and then updated during the coding process. For the latter part, the evaluation scores and impact of growth process on the change of the state of the assessed components were collected by using a predefined scale, and thus no new coding was required.

The data collected on the factors and process of growth and the role of planning in the growth process were analysed through interpretive approach. The focus of the analysis is to provide a meaningful cause and effect relationship. The impact assessment data was in Likert-scale. The objective of that Likert-data is to test the significance of the change of the components' states due to population growth. The Paired t-test was done to evaluate the significance of the changes at 0.05 significant level.

3.6.2.2. Questionnaire survey

The assessment of the population concentration and growth (Chapter 4) in the region (GDR) found that there is a significant impact of the growth of manufacturing sectors in particularly garment sector on the spatial pattern of population growth localisation. Thus, it was assumed that there might be an impact of manufacturing industrialisation especially garment sector on the migration induced growth of population in the *Konabari-Kashimpur* area. The participants of the interviews also claimed that flow of immigrants increased along with the growth of garment sector in this area. To assess the assumptions and interviewees' perceptions on the growth process, the study demanded data on immigrants, their temporal pattern of migration, their occupational pattern, and primary sources of family income. Migration pattern indicates when this area has started to receive a high influx of immigrants. Occupational pattern and primary sources of family income indicate the key sector that offers more jobs and economic opportunities than others to attract population to be concentrated. Causes of migration both from the origin and to the study area are also necessary to connect whether there is any influence of certain types of economic opportunities to their migration decision toward this area. Besides, it was also assumed that some workers might have migrated from central city area to this area and if so, it is needed to identify the forces that influence them to be migrated from the central city. Considering the assumptions and a considerable amount of data requirement, a questionnaire survey was conducted on the households. As the survey objectives are concrete and need

representative sample size, a short questionnaire (see Appendix – 3 for questionnaire) was used to collect those data at the household level.

Sample size and sample households' selection procedures for questionnaire survey

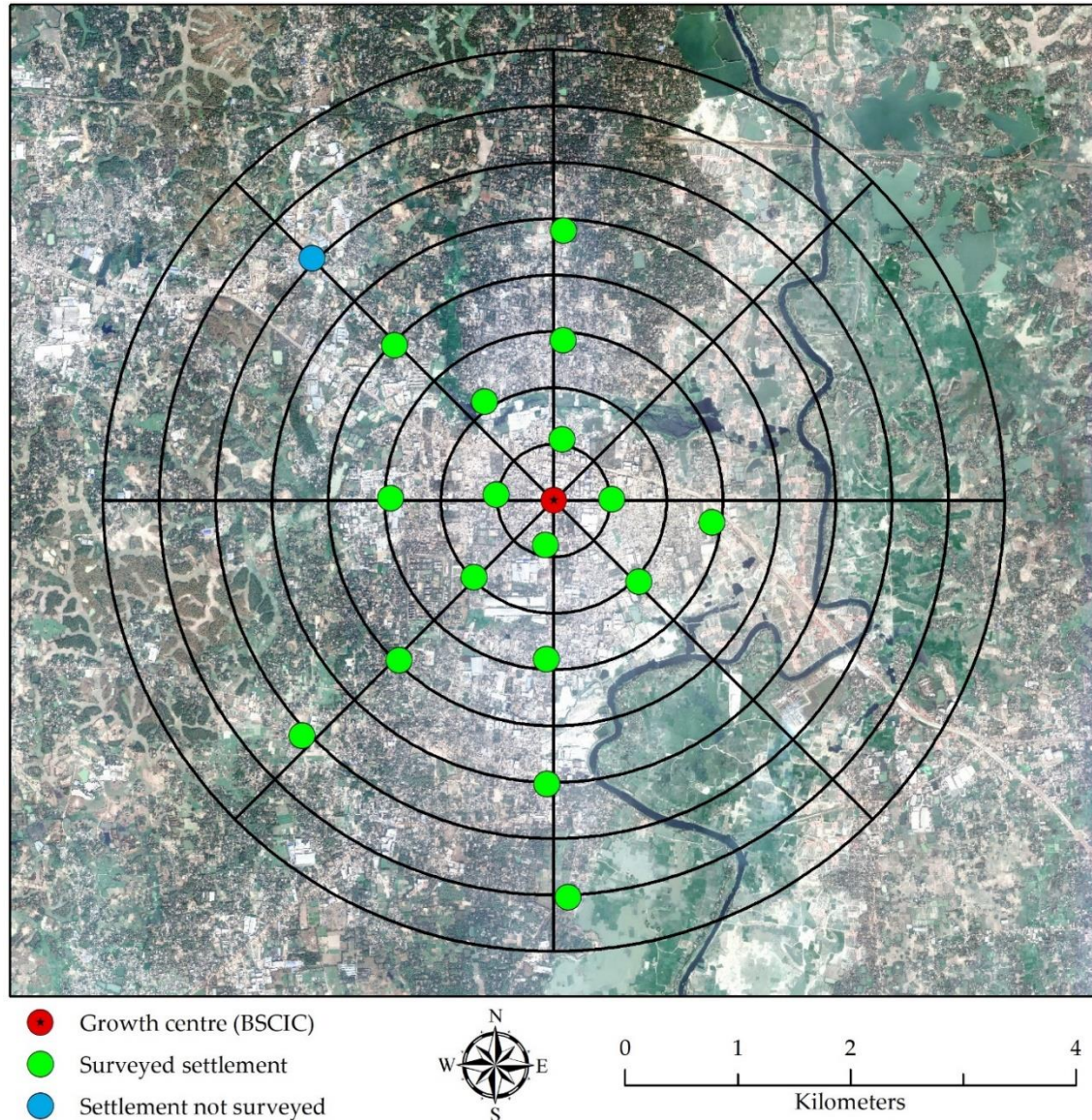
The interviewees claimed that the flow of immigrants increased since 1990 and they are living mostly in semi-concrete houses. Thus, to capture a high proportion of samples from immigrants' household, it was needed to survey the semi-concrete dwelling units where they preferred to live. For this purpose, Google Earth historical images between 2004 and 2017 were assessed to identify the cluster (settlements) of semi-concrete dwelling units. Then, filtering had been done to identify the settlements those were constructed between 2004 and 2017 because it was assumed that in the newly constructed settlements there is a high possibility to find immigrant households.

A purposive cluster sampling method was employed to identify the samples. The selection of the clusters was done in such a way that it can provide representative samples from all over the area. The procedure of selection of the clusters and sample households' is presented below:

- Firstly, a growth centre was identified through consultation with the interviewees as the study does not consider the administrative boundary rather than a growth area. The growth of this area started with the establishment of a BSCIC (Bangladesh Small and Cottage Industries Corporation) in 1988 at *Konabari*, and the interviewees suggested to consider the BSCIC as the growth centre.
- Secondly, considering the BSCIC as a centre, eight circles were drawn at 500 metres radius interval, and eight rays were drawn at 45-degree intervals from the centre (Figure 3.4). Then, the circles and rays were overlapped on the 2017 Google Earth image. Then settlements (or clusters) were identified which are located close to the intersection of circles and rays.
- Finally, eighteen settlements were selected considering the presence of settlements in the selected intersections (Figure 3.4). Higher representation from the dense area (especially around the growth centre) was ensured while selecting the sample settlements.

During the survey, at first, the number of households were counted in each settlement. If the number of households found to be between 15-30, then all households were surveyed. If the number of households is more than 30, then first 20 households were surveyed starting from the settlement's entrance to clock-wise. Finally, total 359 households in 17 settlements were surveyed. The sample size is statistically representative at 95% confidence level and confidence interval of 5.2.

Figure 3.4. Location of growth centre and sample settlements nominated for questionnaire survey



The center of the study area is identified based on the field information. It was the first industrial estate in the study area established by Government in 1988. The circle are drawn with 0.5 kilometer radius increament. First one is half kilometer radius circle and biggest one is 4 kilometers radius circle. The rays are drawn at 45-degree angular intervals.

Image source: Google Earth (2018)

Processing and analysing the questionnaire survey data

The data collected through the questionnaire survey were imputed to a Microsoft Access Form. During the survey, a predefined list of codes was used to collect the data for most of the variables, and thus they were inputted accordingly. For the migration data, the predefined list of codes was updated as the respondents were asked to provide an exact reason if this was not on the list provided. Data collected on the origin of the migrants and first destination of the migrants were coded according to the Census geo-code. The numeric variables (age, income, rent, time of

migration etc.) were imputed precisely (without any code) to protect the detail of the data. The data collected through questionnaire survey were analysed mainly by descriptive statistics (frequency table, central tendency, standard deviations etc). Data classification followed national or the Census classification schemes to make comparisons with secondary statistics.

3.6.2.3. The survey team mobilisation and training

To conduct the questionnaire survey, six teams of twelve surveyors (two surveyors in each team) were mobilised. Each team consisted of a male and a female surveyor because it is easier for the female to access the settlements and presence of male ensure the security in an unfamiliar place. The surveyors were the master's students of Geography and Environment in the University of Dhaka. Day-Long training was conducted on the field survey procedures beforehand. A map of the study area marked with the location of sample settlements was provided to each team to identify the settlements accurately and efficiently in the field.

3.7. Triangulation

Triangulation is required when more than one methods were used to collect the data for the same research. Data triangulation strengthen the findings through increasing validity and reliability of the research outputs (Hales, 2010). The present study uses both qualitative and quantitative techniques. Although it has been explained several times why two different methods were used, in this section, a clear explanation is provided through the Table 3.3 to connect the research objectives, methodological approach, data collection methods, sampling and sample size.

Table 3.3. Methodological triangulation

Objectives and targets		Research method	Data collection method or sources	Respondents	Spatial scale & sample size
Objective 1	Impact of proximity and industrialisation on the population concentration and growth	Quantitative	Census reports, geospatial data from respective organisations		Spatial scale: Region (GDR) Sample: All units
Objective 2	Factors, process and pattern of growth	Qualitative	Structured Interview: structured questions	Key informants	Spatial scale: Community Sample size: 16
	Impact of growth on the space and liveable environment		Structured interview: assessment in Likert-scale		
	Factors and pattern of migration, occupational pattern, main sources of family income, quality of housing	Quantitative	Questionnaire survey	Households	Spatial scale: Community Sample size: 359
Objective 3	Impact of the plan or not having a plan on growth, and planning challenges	Qualitative	Structured interview: structured questions	Key informants	Spatial scale: Community Sample size: 16

3.8. Ethical Considerations

The research has been conducted according to the ethical principles. Before the survey and interview, the researcher informed the participants about the research aims and took verbal consent to conduct the survey or interview. The researcher did not do anything which may harm the participants. Confidentiality has been maintained strictly, and collected data is protected. Selection of the samples and interviewees was done with a systematic approach according to the scope of the research. During data collection, input and processing, the researcher avoids doing anything illegal which may bias the findings of the study.

3.9. Limitations

The impact of growth can be found mostly on the land and its uses. Initially, it was planned to assess the land use change in the case study site to identify physical growth pattern under the influence of industrialisation force, but due to lack of time and resources, a qualitative assessment was done to understand the change. Another major limitation is the selection of key informants. Interviewed informants do not represent the involvement of all stakeholders (especially the local political representatives), but it can be assumed that the results might not vary from the reality significantly as the interviewees were local and knowledgeable.

4. Modelling the Spatial Pattern of Population Concentration and Growth in the Greater Dhaka Region (GDR)

4.1. Introduction

This chapter presents the results of the experiment on the assessment of the spatial pattern of population concentration and growth in the Greater Dhaka Region (GDR). It finds that the nature and pattern of the population distribution and growth are significantly affected by the proximity to the central city area, Dhaka City Corporation (DCC) and proximity to a major transit network. The study also finds a significant association between localisation of industrial employment and urban population growth. Regression models show that industrialisation factors can significantly contribute to explaining the urbanisation pattern and suburban growth in the GDR.

4.2. Role of proximity factors on population concentration and growth

The cross-sectional and longitudinal association tests show that there is a significant and robust association exists between the proximity factors and demographic measures in the GDR (Table 4.1). The concentration and densification of population decrease with the increase of both the distance from the central city area ($r = -0.634$ for population density and $r = -0.535$ for density change), and distance from the national highway ($r = -0.500$ for population density and $r = -0.522$ for density change). Thus, it can be argued that *areas located either near to the city or highway or both have the higher potentiality to accommodate more population and experience higher growth of population.*

Table 4.1. Results of association tests between the proximity measures and population concentration and growth in the Greater Dhaka Region

Demographic measures		Distance from Dhaka (LOG_DIST_Dhk)	Distance from national highway (LOG_DIST_NH)
Population density per square kilometre (LOG_dPOP_11)	r	-.634**	-.500**
	Sig.	.000	.000
	N	379	379
Population density change between 2001 and 2011 (LOG_dPOP_CH)	r	-.535**	-.522**
	Sig.	.000	.000
	N	341	341
Decadal population growth rate (%) between 2001 and 2011 (POP_GRR)	r	-.333**	-.448**
	Sig.	.000	.000
	N	341	341

** . Correlation is significant at the 0.01 level (2-tailed).

Figure 4.1a shows that 29.3 percent of the population was concentrated in the DCC in 2011, which covers only 1.97 percent of the GDR area. It indicates the very high density of population in the DCC (46,303 persons per sq.km) compare to the average density in the GDR (3,122 persons per sq.km). More than half of the population (51.1%) lived in the areas located within an 8-kilometre distance from the city boundary in 2011 although these areas occupy only about 11 percent of the GRD's land.

The spatial pattern of population growth in the GDR shows that about half of the growth (48.4%) has occurred in the core city and those surrounding areas which are located within only 6 kilometres from the city boundary (Figure 4.1c). Although the share of the DCC to the regional population was 31.2 percent in 2001, had contributed only 24.1 percent to the regional population growth between 2001 and 2011. On the other hand, the areas located beyond the city boundary to up to 10 kilometres distances were accommodated 20.7 percent of the GDR population in 2001 but had contributed about 41.1 percent to the regional growth. These results indicate that *population are concentrated within, or nearby peripheries of the core city and growth are relatively higher in the areas beyond the city boundary but near to the central city.*

Figure 4.2 shows the concentration and growth of population in the context of the proximity to the transit network. In 2011, more than two-thirds of the population were living in those areas which were located within 3 kilometres from the national highway, and density sharply decreases with the increase of distance from the national highway. There are also several small peaks (Figure 4.2c) indicates that there are some areas where concentration is high but not located close to the national highways. These are mainly some other urban agglomerations (Narayanganj, Munshiganj etc.) connected to regional highways. Population growth pattern indicates that the areas located within 3-kilometres were accommodated 62.2 percent of the regional population in 2001 but contributed about 82.6 percent to the regional population growth. Figure 4.2c clearly shows that the population growth is very high near the transit connectivity.

Figure 4.1. Proximity to Dhaka City and (a) cumulative distribution of population and population growth (top), (b) population density (middle), and (c) population density change and growth rate (bottom)

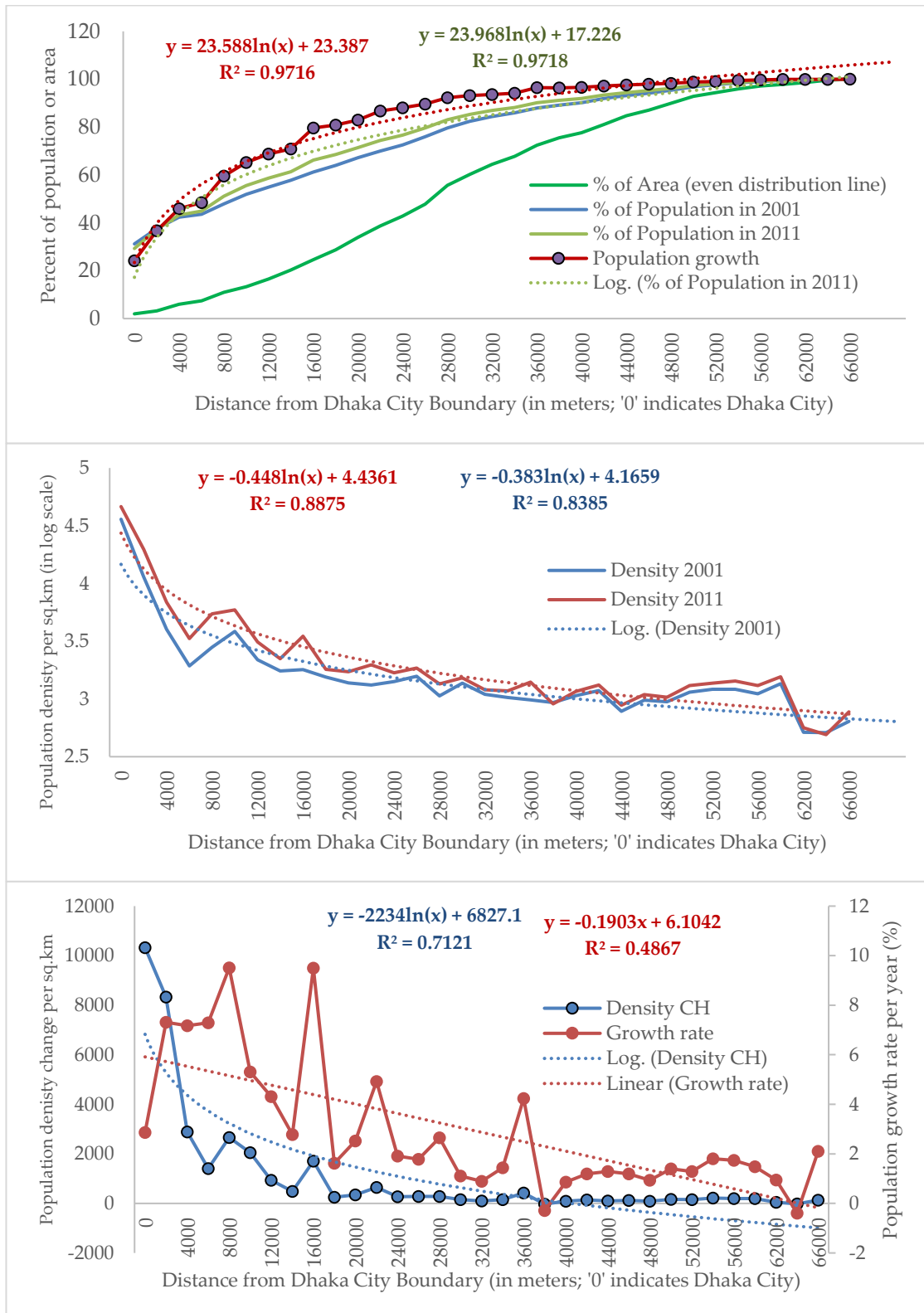
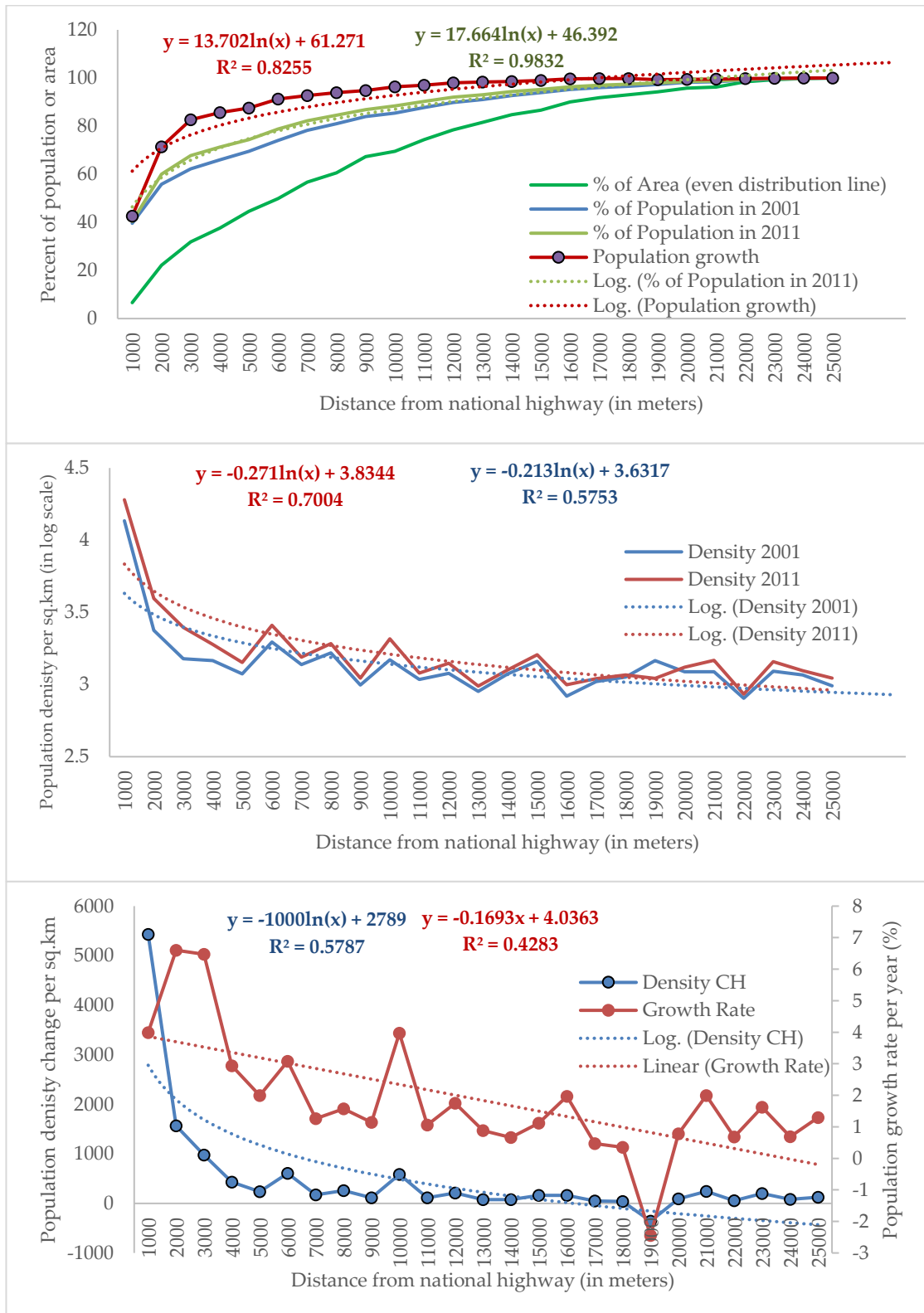
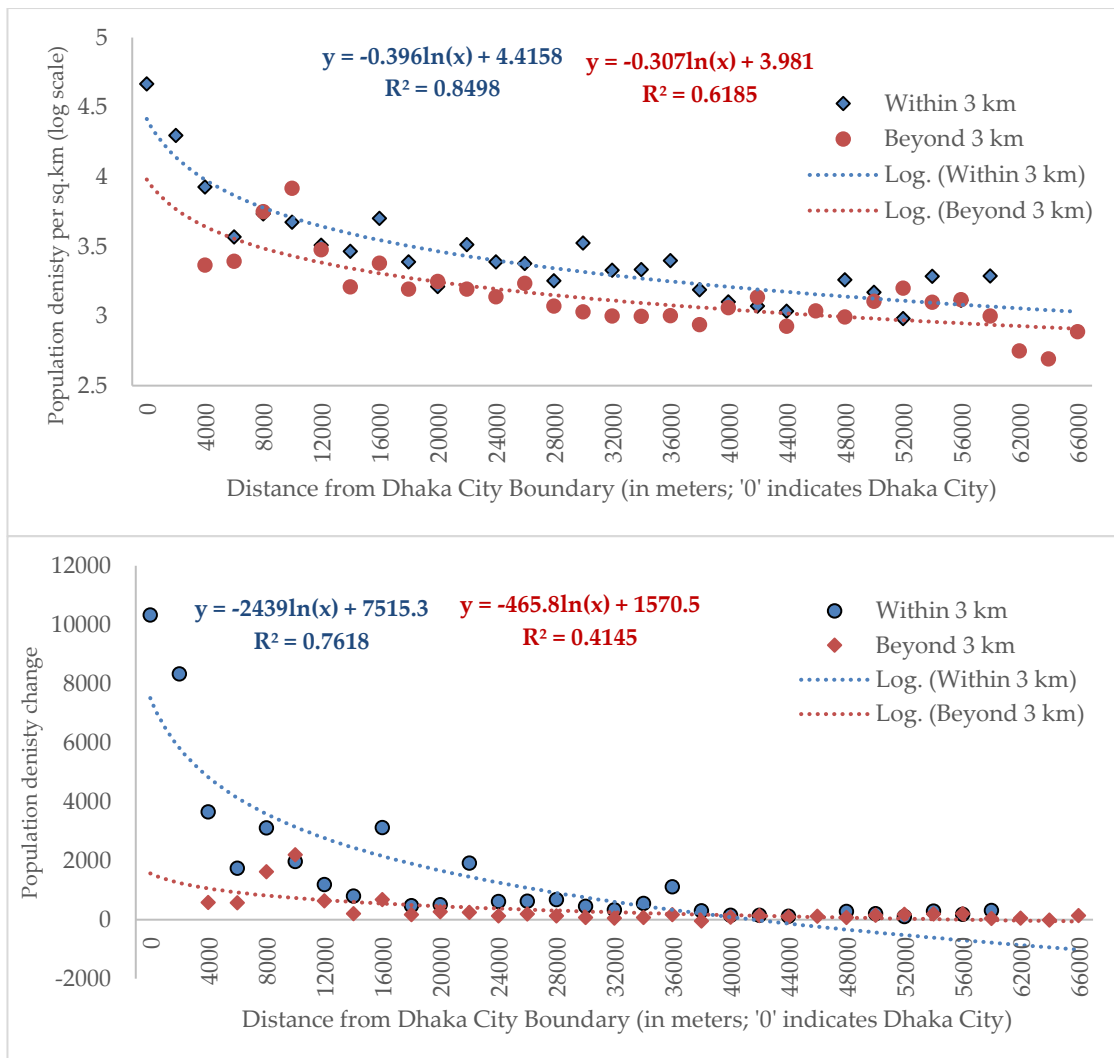


Figure 4.2. Proximity to national highway and (a) cumulative distribution of population and population growth (top), (b) population density (middle), (c) population density change and growth rate (bottom)



To sum-up the above findings it can be argued that population concentration and growth in the GDR decrease with the increase of distance from either the DCC or the major transit networks. Figure 4.3 presents the interactive effects of both proximity factors on population concentration and growth. Figure 4.3a shows that population concentration is high in those areas which are located nearer to the DCC and close to national highways. The concentration of population (or density) is found higher in those areas which are located within the range of 3-kilometres to national highway compare to rest of the areas that are located at any distance from the central city (DCC). Figure 4.3b shows that without proper access to a transit network, the effect of the proximity to the city in the growth is up to about 15 kilometres, but if there is transit access, the growth can be extended up to 30-km from the centre.

Figure 4.3. Proximity measures and (a) population density in 2011 (top), (b) population density change between 2001 and 2011 (bottom)



4.3. Role of industrialisation on population concentration and growth

Industrial employment concentration and growth were assessed at three levels: all industries, manufacturing industries and readymade garment industry. These three levels of industry were used in this assessment because a significant number of literature argues that manufacturing sectors more specifically labour intensive garment sectors have been creating a significant number of jobs that attract population to the Dhaka (Islam & Hossain, 2013; Nazem et al., 2014b). Preliminary analysis (Table 4.2) shows that the macro size manufacturing industries contribute three-fourths of the total industrial employment to the GDR while garment sector alone contributes about two-thirds. On the other hand, manufacturing and garment sectors were contributed 85.7 percent and 73.5 percent respectively to the total industrial employment growth in the GDR. This result indicates that the employment growth in the GDR is profoundly influenced by the growth of manufacturing industries, more specifically by the garment sector.

Table 4.2. The spatial pattern of distribution and growth of employment in industry (all), manufacturing sectors and garment sector

Indicators	GDR			DCC			GDR-DCC		
	All	Man	Garment	All	Man	Garment	All	Man	Garment
Employment in 2010	2741927	2074879	1745595	1195502	676005	569112	1546425	1398874	1176483
Employment growth between 200 and 2010	1033661	886293	759878	323364	201598	173588	710297	684695	586290
Share of employment in 2010	100.0	75.7	63.7	100.0	56.5	47.6	100.0	90.5	76.1
Share of employment growth between 2000 and 2010	100.0	85.7	73.5	100.0	62.3	53.7	100.0	96.4	82.5

Source: Calculated by the author from BBS (2010)

Table 4.3 shows the correlation test results between demographic measures and industrial employment concentration and growth measures. The cross-sectional correlation result clearly shows that population density is strongly and significantly associated to the industrial (all three levels) employment concentration (r-value for industrial, manufacturing and garment sectors are respectively 0.710, 0.689 and 0.697).

The longitudinal analysis shows that population densification has a strong and positive association to industrial employment density change ($r=0.632$), manufacturing employment density change ($r = 0.617$), and garment sector employment density change (0.625). It also shows that population density growth is higher where there is already a large concentration of industrial employment. Thus, it can be argued that *population concentration and growth are higher in those areas where the industrial employment concentration and growth are higher.*

Table 4.3. Results of association tests between demographic and industrial employment measures

Industrial employment measures		Population density (LOG_dPOP_11)	Population density change (LOG_dPOP_CH)	Population growth rate (LOG_POP_GRR)
Industrial (all) employment density (LOG_dIND_10)	r	.710**	.760**	.509**
	Sig.	.000	.000	.000
	N	379	379	379
Manufacturing employment density (LOG_dMAN_10)	r	.689**	.706**	.511**
	Sig.	.000	.000	.000
	N	379	379	379
Garment sector employment density (LOG_dGAR_10)	r	.697**	.714**	.528**
	Sig.	.000	.000	.000
	N	379	379	379
Industrial (all) employment density change (LOG_dIND_CH)	r	.695**	.632**	.567**
	Sig.	.000	.000	.000
	N	379	379	379
Manufacturing employment density change (LOG_dMAN_CH)	r	.696**	.617**	.572**
	Sig.	.000	.000	.000
	N	379	379	379
Garment sector employment density change (LOG_dGAR_CH)	r	.695**	.625**	.582**
	Sig.	.000	.000	.000
	N	379	379	379

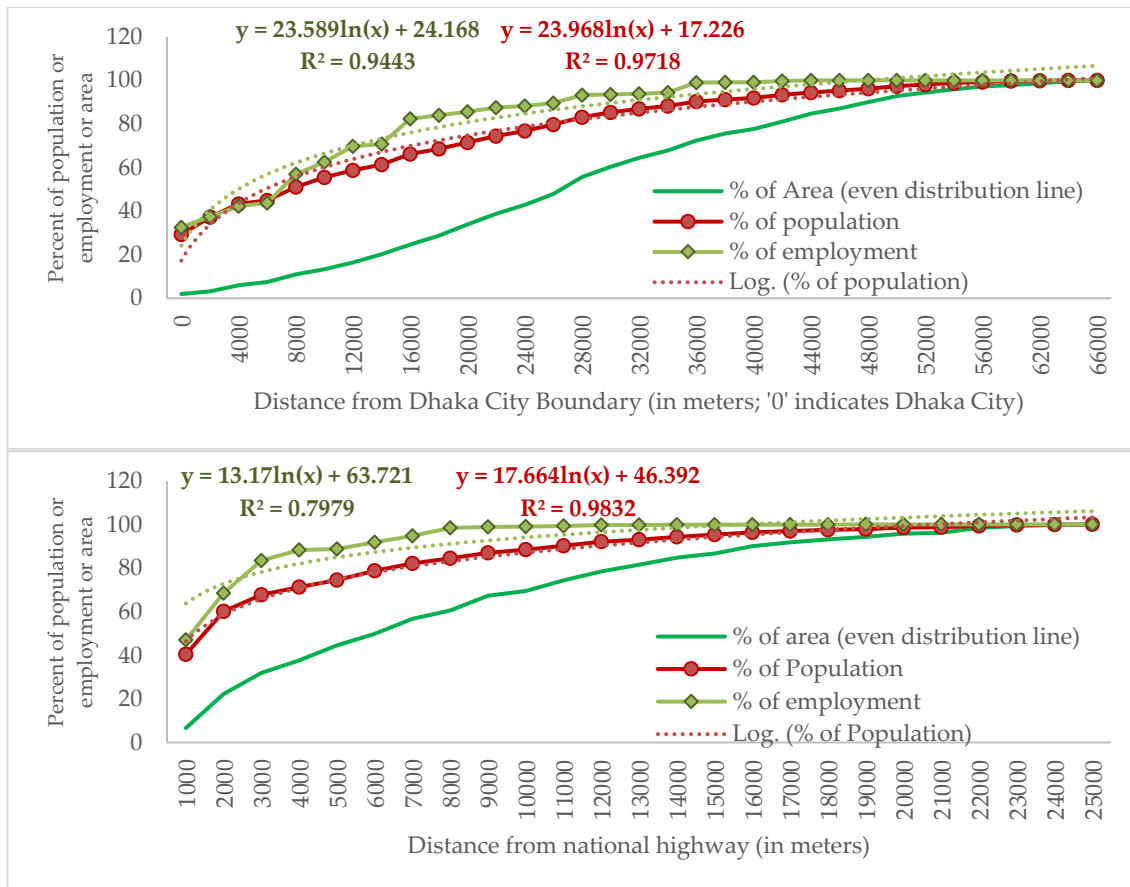
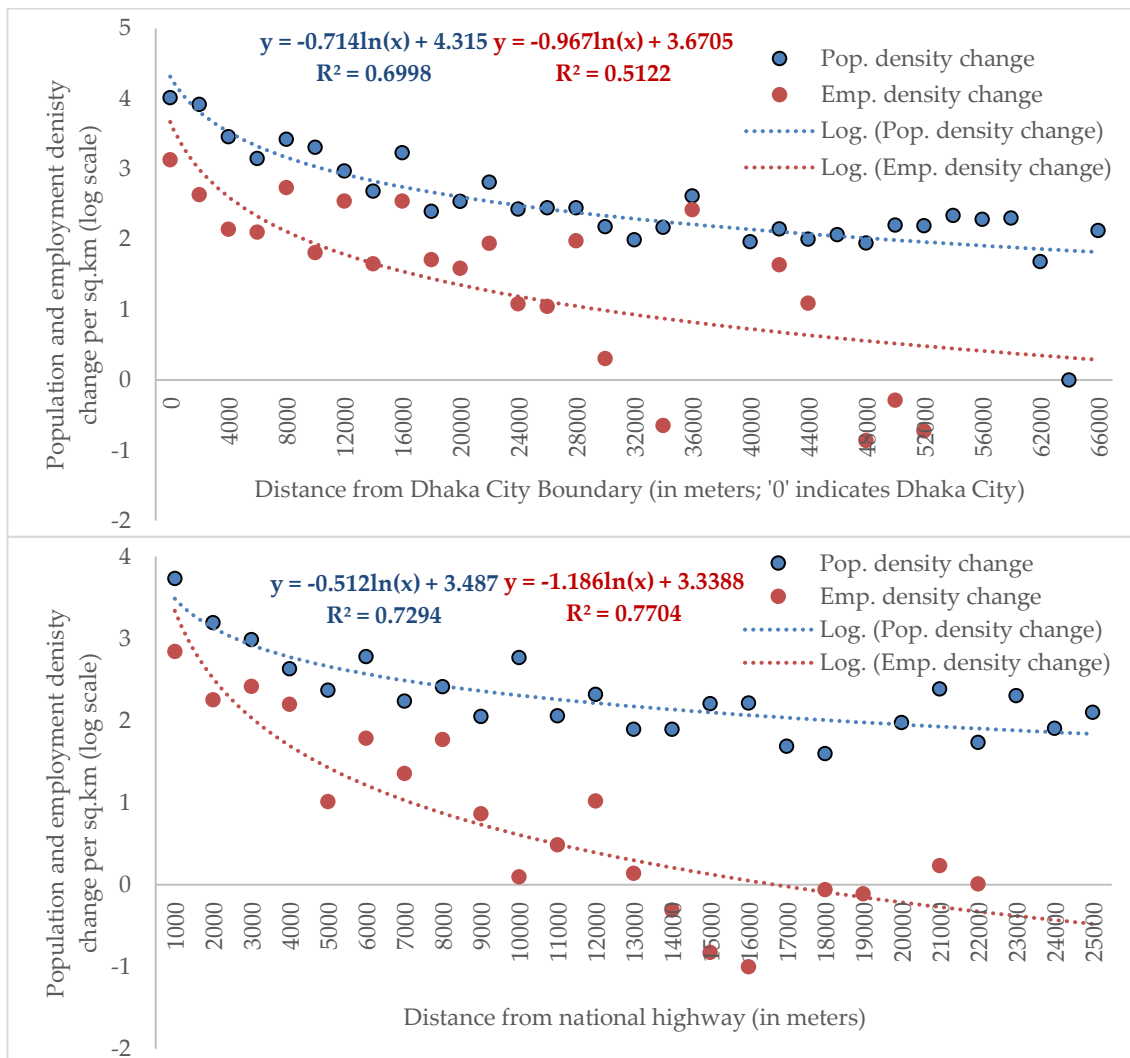
Figure 4.4. Cumulative distribution of population and manufacturing employment with the distance from (a) central city (top) and (b) national highway (bottom)

Figure 4.4 shows that the concentration of population both in context of proximity to the central city or national highway is higher in those areas where the concentration of manufacturing employment is also high. The growth (density change) of population and employment also show a similar pattern. Figure 4.5 clearly shows that population growth is higher in those areas where the growth of manufacturing employment is high. From the above findings, it can be demonstrated that *the potentiality of population concentration is higher in those areas located near to central city or national highway and have a higher concentration of manufacturing employment (or industries). Moreover, those areas are experiencing high population densification which is located close to the central city or national highway and experiencing the higher birth of industrial employment.*

Figure 4.5. Population and manufacturing employment density change (in log scale) with the distance from (a) central city (top) and (b) national highway (bottom)



4.4. Modelling population distribution and growth in the GDR

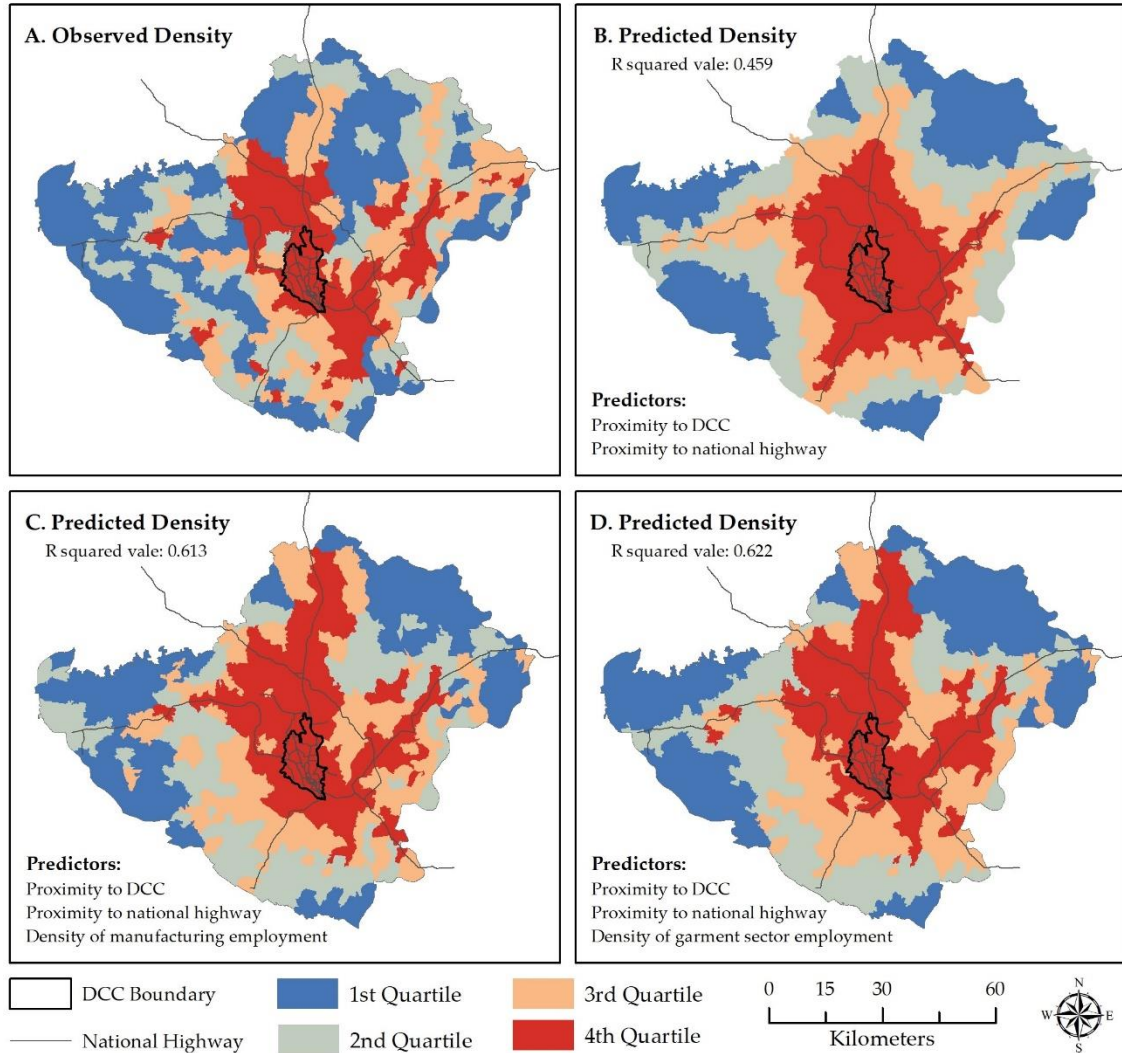
4.4.1. Population concentration or distribution modelling (Cross-sectional model)

The cross-sectional regression models (Table 4.4) show that proximity to the central city (DCC) can explain 40.1 percent of variances (Model 1) while proximity to the national highway can explain 25 percent (Model 2). On the other hand, proximity to the central city and national highway together can explain 45.9 percent of the variances (Model 3). Model 4 and Model 5 show that either concentration of manufacturing employment or garment sector employment can explain more variance (Manufacturing employment 49.9% and garment sector employment 51%) than the Model 3 which indicates that there is a significant influence of manufacturing or garment sector employment concentration on the distribution of the population. Model 6 and Model 7 shows that proximity factors along with either manufacturing or garment employment concentration can explain over 60 percent of the variances. The R^2 values for Model 6 and Model 7 are found to be 0.613 and 0.622 respectively. Figure 4.6 shows the observed population density map and predicted density maps based on Model 3, 6 and 7 presented in Table 4.4.

Table 4.4. Models to explain population concentration and distribution in the GDR

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	5.842 (0.000)	4.945 (0.000)	6.250 (0.000)	3.031 (0.000)	3.078 (0.000)	4.841 (0.000)	4.877 (0.000)
LOG_DIST_Dhk	-0.599 (0.000)		-0.484 (0.000)			-0.336 (0.000)	-0.325 (0.000)
LOG_DIST_NH		-0.456 (0.000)	-0.245 (0.000)			-0.079 (0.027)	-0.093 (0.007)
LOG_dMAN_10				0.250 (0.000)		0.173 (0.000)	
LOG_dGAR_10					0.256 (0.000)		0.177 (0.000)
R	0.634	0.500	0.677	0.706	0.714	0.783	0.789
R^2	0.401	0.250	0.459	0.499	0.510	0.613	0.622
Adjusted R^2	0.400	0.248	0.456	0.498	0.409	0.609	0.619
e	0.308	0.345	0.293	0.282	0.279	0.248	0.245
Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	379	379	379	379	378	379	379

Figure 4.6. Observed and predicted density in the GDR in 2011. (A) Observed density in 2011, (B) Predicted density based on Model 3, (C) Predicted density based on Model 6, and (D) Predicted density based on Model 7. (Administrative units are classified as quartile from low to high density)



Source: Author (2018)

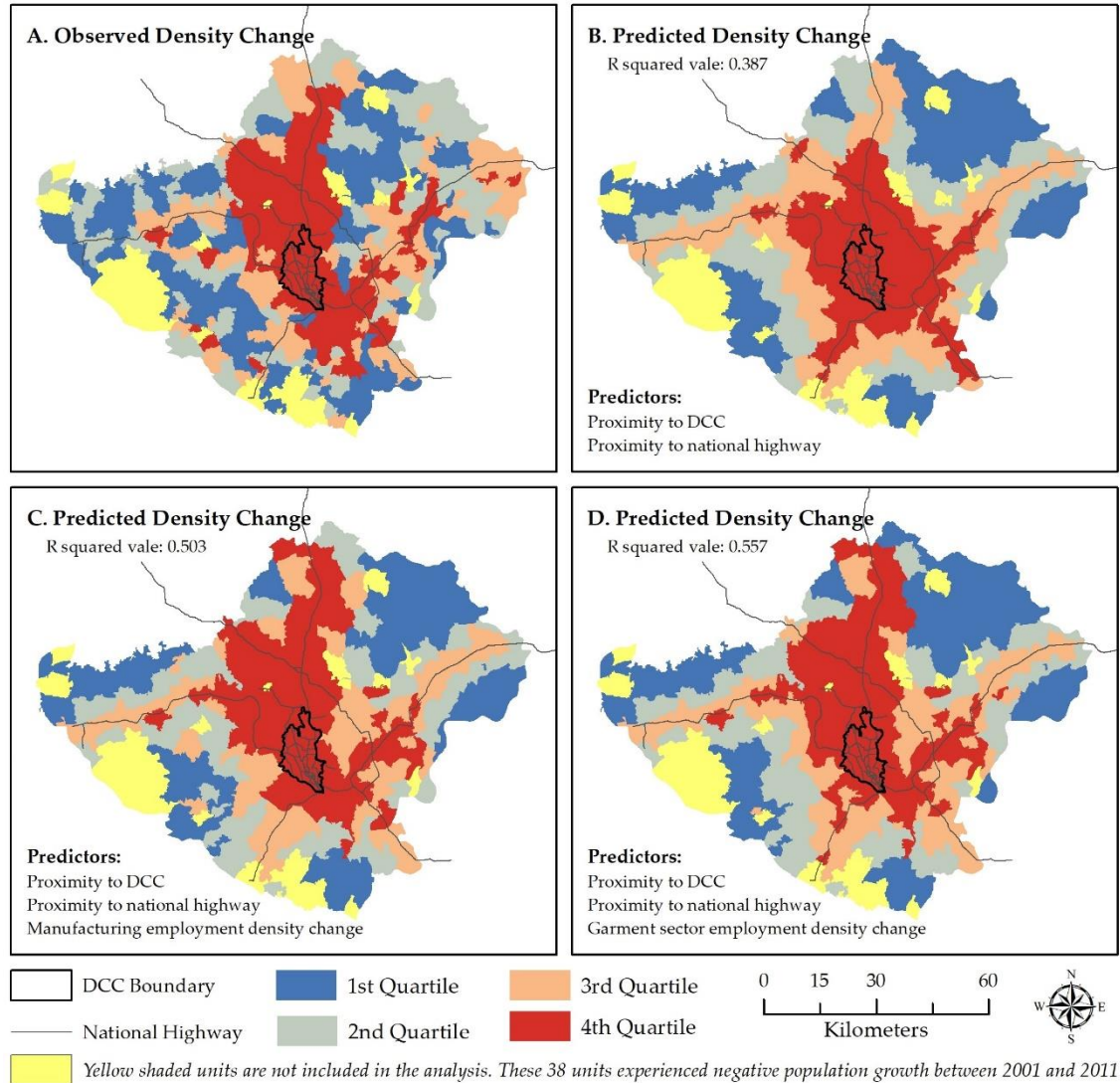
4.4.2. Population growth or densification modelling (Longitudinal model)

The population growth or densification models show that proximity to the central city or national highway can explain 28.6 percent and 27.3 percent variances respectively (Model 1 and Model 2) (Table 4.5). Proximity factors together can explain 38.7 percent variances (Model 3). However, employment growth either in the manufacturing or garment sector alone can explain more variances than the proximity factors (Model 4 and Model 5). Proximity factors and growth of manufacturing sector employment together can explain 50.3 percent variances (Model 6). On the other hand, proximity factors and growth of garment sector employment can explain 55.7 percent of the variances. Thus, the growth of manufacturing employment highly and significantly influences population growth or densification. Figure 4.7 shows the observed population density change map and predicted density change maps based on Model 3, 6 and 7 presented in Table 4.5.

Table 4.5. Models to explain population densification (density change) in the GDR

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	6.143 (0.000)	5.525 (0.000)	7.169 (0.000)	2.108 (0.000)	2.150 (0.000)	5.005 (0.000)	4.664 (0.000)
LOG_DIST_Dhk	-0.875 (0.000)		-0.617 (0.000)			-0.322 (0.000)	-0.344 (0.000)
LOG_DIST_NH		-0.856 (0.000)	-0.582 (0.000)			-0.388 (0.000)	0.285 (0.000)
LOG_dMAN_CH				0.469 (0.000)		0.310 (0.000)	
LOG_dGAR_CH					0.496 (0.000)		0.318 (0.000)
R	0.535	0.522	0.622	0.644	0.646	0.709	0.747
R ²	0.286	0.273	0.387	0.414	0.417	0.503	0.557
Adjusted R ²	0.284	0.271	0.383	0.412	0.415	0.498	0.553
e	0.604	0.610	0.561	0.547	0.546	0.506	0.477
Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000
N	341	341	341	341	341	341	341

Figure 4.7. Observed and predicted density change in the GDR in between 2001 and 2011. (A) Observed density change, (B) Predicted density change based on Model 3, (C) Predicted density change based on Model 6, and (D) Predicted density change based on Model 7. (Administrative units are classified as quartile from low to high-density change)



Source: Author (2018)

4.5. Summary

The study found that the concentration and growth of the population are higher within or close to the central agglomeration (DCC). Compare to the central city; the growth is higher in the areas located beyond the central city and within about 15-kilometres of from the city boundary. On the other hand, the areas which are connected or located within 3-kilometres from the major transit networks (national highways) accommodate higher population growth. The study also found that the growth can be extended up to 30-kilometres from the city boundary following the transit networks and can be narrowed less than 15-kilometres without access to the transit network. The study found that not all the areas located close to the city and national highway have been

experiencing population growth, but only those who are generating higher manufacturing jobs. Some areas far from the city and not connected to the national highway has also been experiencing higher population growth due to higher growth of manufacturing industry and jobs. Further investigation considering the composition of the manufacturing industry, the study found that garment sector created more than 85 percent of jobs during 2000 to 2010 in the region, and the population growth, as well as employment growth, is higher in those areas which are creating jobs in the garment sector.

5. The Impact of Industrialisation Induced Growth on the Transformation of Suburban Land, Livelihood and Environment

5.1. Introduction

This chapter presents the results of the experiment conducted on the impacts of industrialisation induced growth on the transformation of suburban areas. Based on the evidence on the role of industrialisation to the suburban growth in Chapter 4, the *Konabari-Kashimpur* area, a small suburban community was selected to study the industrialisation induced growth impacts. The focuses of this chapter are: (a) to identify the causes of rapid population growth, (b) to assess the impact of industrialisation on migration decision, (c) to assess the impact of industrialisation induced labour concentration on the environment, infrastructure and societal issues, and (d) to explore the role of planning on the suburban growth dynamics.

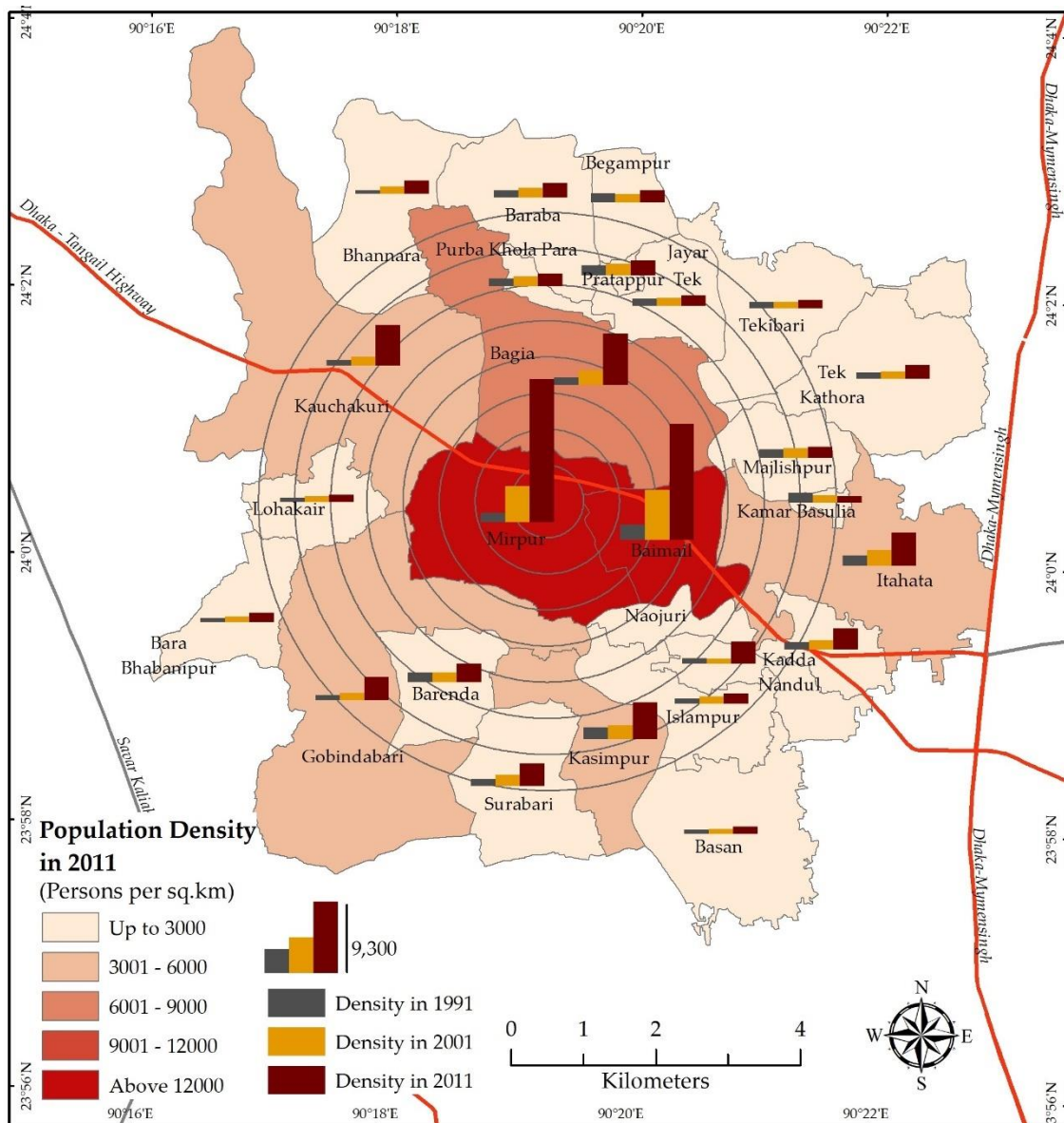
5.2. Evidence of concentration and growth

In the case site (*Konabari-Kashimpur* area) there about 83 thousand people lived in 1991 (BBS, 1993), which increased to 143 thousand in 2001 (BBS, 2006) and 408 thousand in 2011 (BBS, 2012a) (Table 5.1). The annual population growth rate between 1991 and 2001 was about 5.59 percent, and it increased to 11.03 percent between 2001 and 2011. The growth rate was very high in the case site compare to average regional (GDR) growth (4.1% per year) (Nazem et al., 2014b). Rapid growth results in population density increase. The population density per sq.km increased from 921 in 1991 to 1587 in 2001 and 4518 in 2011. Figure 5.1 shows the population densification pattern in the case site at *Mouza* (cadastral unit) level, and Figure 5.2 shows the satellite view of settlement growth between 2004 and 2017 in the case site. From the figures, it can be identified that central area, *Konabari* (*Mirpur and Baimail Mouza*) and northern area (*Bagia Mouza*) have been accommodating most of the growth.

Table 5.1. Demographic transition in the study area

Year	Population	Population growth rate (% per year)	Population density (persons per sq.km)
1991	83,178		921
2001	143,338	5.59	1587
2011	408,124	11.03	4518

Source: BBS (1993, 2006, 2012); The annual growth rate was calculated by the author using the geometric growth estimation formula

Figure 5.1. Population density in 1991, 2001 and 2011 in the case site (*Konabari-Kashimpur* area) by *Mouza* (cadastral unit)

Source: Author (2018)

Most of the interviewees claimed that the government established a BSCIC (Bangladesh Small and Cottage Industries Corporation) at *Konabari* in 1988, and that intervention is considered as the starting point of the evolution of a densely industrialised area. Both the local people and

people from outside of this area were worked in the BSCIC. Due to lack of good transport connectivity, many of the outsiders permanently moved here, bought land and settle themselves in this locality. Although the area started to receive immigrants from 1990, until around 2000 the flow of population was very few and only the BSCIC oriented. Initially, *Konabari* area had received the immigrants, followed by *Kashimpur* area (southern part of the study area). The northern part, *Ambagh* had started to grow after 2005, when *Konabari* area had started to face a developable land crisis.

Figure 5.2. Settlement growth in the case site between 2004 and 2017 (satellite view)



Source: Google Earth historical image (Downloaded on May 13, 2018)

The growth of in the study site was migration induced. The household survey results show that about 97 percent of the surveyed families are immigrant (Appendix – 7.12). Ninety-eight percent of the surveyed families came to *Konabari-Kashimpur* area after 2000, and about 70 percent came after 2010 (Table 5.2). Thus, the survey result strongly supports the Census statistics and interview findings that this area has been receiving a massive influx of immigrants in recent time.

Table 5.2. Temporal pattern of migration in the study area

Year of migration	No. of respondents	Percent of respondents
Before 1990	1	0.29
1990-1994	1	0.29
1995-1999	6	1.74
2000-2004	35	10.14
2005-2009	53	15.36
2010-2014	103	29.86
2015 and later	146	42.32
Total	345	100.00
No data	3	
Not applicable	11	

Source: Sample household survey (2018)

5.3. Factors of growth

5.3.1. Physical factors

The physical factors give this area some location advantages. Availability of developable flood free land attracted industries and population to come here. Presence of river nearby also provides easier access to soft water for the industries. Proximity factor especially being located between two industrial agglomerations (*Tongi-Gazipur* in the east and *Savar* in the south-west) has increased the economic potentiality of this area. Moreover, the presence of Dhaka - Tangail highway (N4) gives an efficient connection to the central city as well as the northern part of Bangladesh.

5.3.2. Economic opportunity

The interviewees argued that industrial development followed by increased economic opportunities attract migrants for jobs and small businesses. The household survey result shows that 72 percent of the immigrants came here from their origin to search jobs (Table 5.3). Other causes include migration due to marriage (13.01%), migration with family (6.94%), disaster-induced (3.47%) etc.

Table 5.3. Causes of migration from the origin

Reason	Number of respondents			Percent of respondents		
	Family living	Dormitory living	Total	Family living	Dormitory living	Total
To search works	202	47	249	68.47	92.16	71.97
Due to marriage	45	0	45	15.25	0.00	13.01
Family migration	23	1	24	7.80	1.96	6.94
Affected by disaster	12	0	12	4.07	0.00	3.47
Job placement	7	1	8	2.37	1.96	2.31
For business	2	0	2	0.68	0.00	0.58
Others	4	2	6	1.36	3.92	1.73
Total	295	51	346	100.00	100.00	100.00
No data	2	0	2			
Not applicable	11	0	11			

Source: Sample household survey (2018)

Table 5.4 shows the major causes of migration to this area. Most of the respondents (37.90%) found that work opportunity is better here. The human agency also plays a crucial role in taking the migration decision. About 24.20 percent of the respondents came here because they had relatives or friends here. Besides, 5.83 percent of them move here with relatives or friends. About 12.83 percent came here due to marriage or with the spouse.

Table 5.4. Reasons for migration to this area

Reason	Number of households			Percent of households		
	Family	Dormitory	Total	Family	Dormitory	Total
Better work opportunity	113	17	130	38.70	33.33	37.90
Had relatives or friends here	72	11	83	24.66	21.57	24.20
Marriage or with spouse	43	1	44	14.73	1.96	12.83
With jobs	16	10	26	5.48	19.61	7.58
With relatives or friends	19	1	20	6.51	1.96	5.83
Comparatively low living cost	2	0	2	0.68	0.00	0.58
Low wage in Dhaka	1	1	2	0.34	1.96	0.58
For business	1	0	1	0.34	0.00	0.29
Others (including multiple answers)	25	10	35	8.56	19.61	10.20
Total	292	51	343	100.00	100.00	100.00
No data	5	0	5			
Not applicable	11	0	11			

Source: Sample household survey (2018)

The household survey found that about 15 percent of the respondents came here after spending a reasonable time in the Dhaka City (the core area). All respondents were asked to address the advantages of living here compared to Dhaka. Seventy-six (about 22 percent of migrants) respondents respond to this question. About half of them (48.68%) consider the the living cost is low here (Table 5.5), followed by better living environment (34.31%), lower transport cost due to lower workplace-residence distance (23.68%), high wage and better work opportunity (21.05%), and easy access to housing facilities and low rent (11.84%) etc.

Table 5.5. Advantages of living in suburban area compare to Dhaka city (multiple responses)

Advantages compare to Dhaka	Responses	
	Number	Percent
Low living cost	37	48.68
Better living environment	26	34.21
Lower workplace distance/ transport cost	18	23.68
High wage and work opportunity	16	21.05
Easy access to housing facilities and low rent	9	11.84
Better work environment	5	6.58
Better business opportunity	2	2.63
Total responses	76	100.00

Source: Sample household survey (2018)

5.4. Manufacturing industrialisation induced economic opportunities that have accelerated the growth

The interviewees claimed that manufacturing industries attract population to concentrate and grow in the *Konabari-Kashimpur* area. Capitalising the physical advantages (flood free land), the growth of nearby *Tongi*, *Gazipur* and *Savar* regions, and access to *Dhaka-Tangail* highway, the

industrial growth has become rapid since 1990. They claimed that garment and apparel sector has been creating a significant number of jobs that attract poor and unskilled workers. Recently, poultry, cosmetic manufacturing, and shoe manufacturing industries are also increasing. Moreover, traditionally, there are many brick-manufacturing factories (known as *brickfield*) in this area, and they were established to supply bricks to the nearby growth hubs (i.e. Dhaka, Gazipur) for construction. Availability of land for this land-intensive industry and nearby river network to transport bricks have created a comparative advantage for this industry. This sector has a seasonal demand for labours. Interviewees claimed that after the end of the season, those seasonal migrants search for new works and most of the time, they engage in the garment sector.

The household survey results also indicate the significance of garment sector to the employment creation and population growth. The survey found that more than three-fourths of the respondents' occupation is in manufacturing sectors. More than seventy percent of the respondents who are employed are directly involved in the garment sector followed by small businesses (10.54%) (Table 5.6). The survey results also show that about two-thirds of the employed members of the surveyed households work in garment sector (Table 5.7) and 58.38 percent of the surveyed families' main income comes from garment sector (Table 5.8). Moreover, 77.5 percent of the families have at least one earning member who is working in the garment sector. Thus, it can be argued that growth of this area is manufacturing industry induced, more precisely garment industry driven.

Table 5.6. Major occupational sector of the employed respondents

Sector	Number of respondents			Percent of respondents		
	Male	Female	Total	Male	Female	Total
Agriculture	4	0	4	2.21	0.00	1.36
Construction workers	10	0	10	5.52	0.00	3.40
Garment manufacturing	108	98	206	59.67	86.73	70.07
Other manufacturing	5	5	10	2.76	4.42	3.40
Business	29	2	31	16.02	1.77	10.54
Services	5	3	8	2.76	2.65	2.72
Day labour	7	2	9	3.87	1.77	3.06
Transport	7	0	7	3.87	0.00	2.38
Others	6	3	9	3.31	2.65	3.06
Total employed respondents	181	113	294	100.00	100.00	100.00
Not employed	10	55	65			
Total respondents	191	168	359			

Source: Sample household survey (2018)

Table 5.7. Major occupational sectors of the employed members of surveyed households

Sector	Employed members	
	Number	Percent
Agriculture	6	1.00
Construction workers	31	5.16
Garment manufacturing	395	65.72
Other manufacturing	21	3.49
Business	63	10.48
Services	16	2.66
Day labour	29	4.83
Transport	27	4.49
Others	13	2.16
Total employed	601	100.00

Source: Sample household survey (2018)

Table 5.8. Primary sources of household income of the surveyed households

Source of income	Households	
	Number	Percent
Agriculture	2	0.56
Construction workers	21	5.87
Garment manufacturing	209	58.38
Other manufacturing	18	5.03
Business	50	13.97
Services	7	1.96
Day labour	13	3.63
Transport	26	7.26
Rent	7	1.96
Others	6	1.68
Total	359	100.00

Source: Sample household survey (2018)

With the formal large-scale industries, small businesses such as; grocery shops, daily food business, clothing and bedding stores, restaurants, cottage industry, pharmacies etc. have increased proportionally to the formal employment to support the demand of growing population and industrial activities. The household survey result shows that 10.5 percent of the employed persons of the surveyed households do small business (Table 5.7) and 13.97 percent of the families' significant portion of the income comes from small businesses (Table 5.8). The study also found that construction works, transport and freelance sectors also offers a significant number of jobs to the immigrants.

5.5. Impact of growth

Most of the interviewees claimed that there is hardly any component of the liveable environment of this community can be found that has not been affected by the growth. From the economic point of view, the industries and population have brought blessings to the community, especially for the local people. However, on the other hand, from environmental and sustainability perspective it is becoming catastrophic. This section presents the impact of industrialisation induced growth on the different components of the community.

5.5.1. Impact on the livelihood of local people

Most of the interviewees pointed out that the development requires land and land was the only asset most of the local people had for their livelihoods. Previously, agriculture was their main livelihood strategy, but during the growth, the land becomes more valuable. The incoming people created demand for housing, and the local people had an abundant supply of land. Then, who had savings, invested in developing housing for the industrial workers, and who did not

have any savings, sold some of their lands to invest in housing development. Most of the interviewees argue that majority of the local people now rely on the rental income and have taken it as the primary strategy for their livelihood.

Figure 5.3. Impact of a new garment factory on the surrounding areas land development



Yellow-circle indicates the location of under construction garment factory and red-circle indicates the location of increased new businesses.

Source: Google Earth historical image (Downloaded on May 13, 2018)

5.5.2. Impact on the housing development pattern

Most of the newly constructed houses are semi-concrete in nature where the workers mostly live. Some houses are made of concrete and mainly the landlord or the upper class employed people (officials or executives of the industry and other service sectors) live there. The main reason for such housing development pattern is to provide affordable housing for the industrial workers. The income of the industrial workers or the small business workers is very low, and they demand low-cost accommodation for a living. They compromise with the accommodation to ensure the other costs like food, children's schooling, and savings for future. To provide low-cost housing and to make more profit, the landlords have been constructing very dense houses. The interviewees argued that most of the workers' households live in a room with all family members and use common facilities (kitchen, toilet, bathroom). The rooms are very small, and the size varies from 60 sqft to 150 sqft. Thus, the room density is found to be very high. The household survey result shows that about 83 percent of the surveyed families live in a single room dwelling unit (Table 5.9). The room density is found to be 2.76 persons per room which is much higher than the average room density in urban areas of Bangladesh, 1.73 (BBS, 2012b). If the floor space is considered, average floor space per household found to be only 176 sq.ft. The study found that more than 28 percent of the families live in a small room, sized less than 100 sqft (Table 5.10).

The interviewees claimed that except for own living, the landlords do not go for construction of entirely concrete multi-storied structure because at the same floor space they could earn two to three times higher if the rent them to workers. On the other hand, more investment needs to construct the concrete houses and if they do not have enough investment they have to sell some of their lands. In the context of increasing the land price, they are not willing to sell any land.

Table 5.9. Number of living rooms in the surveyed households (for family dwellings)

Number of Rooms	Number of Households	Percent of Households	Number of Population	Total Rooms
1	256	83.12	805	256
2	38	12.34	159	76
3	13	4.22	70	39
5	1	0.32	8	5
Total households	308	100.00	1042	376

Source: Sample household survey (2018)

Table 5.10. Floor space of the houses they are living (for family dwellings)

Floor space (in sq.ft)	Number of families	Percent of families
<60	6	1.99
60-79	31	10.30
80-99	48	15.95
100-119	76	25.25
120-139	78	25.91
140-159	22	7.31
160-179	15	4.98
180-200	5	1.66
>200	20	6.64
Total response	301	100.00
No data	7	
Total households	308	

Source: Sample household survey (2018)

5.5.3. Impact on environment

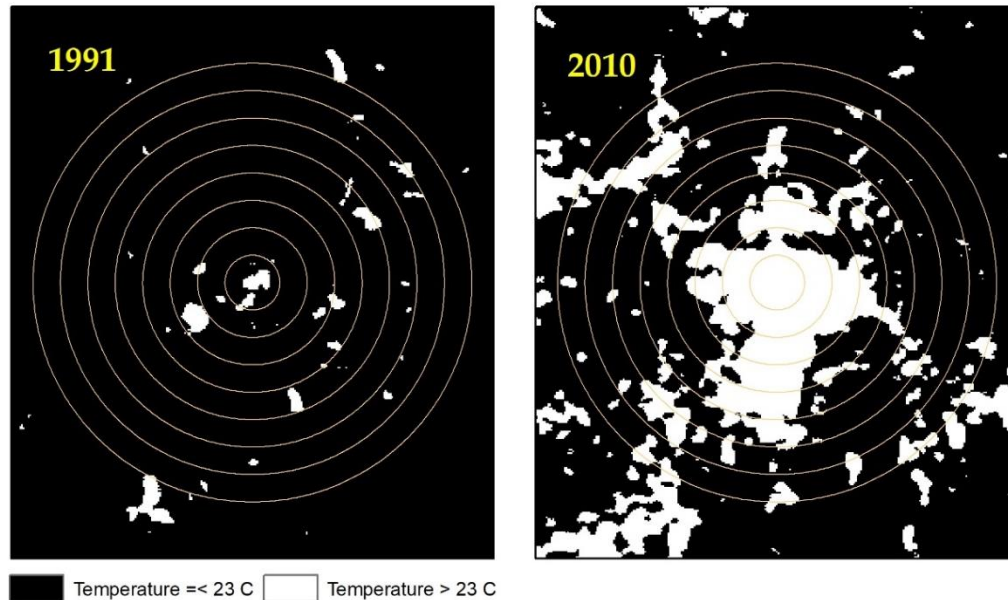
5.5.3.1. Air quality

All interviewees claimed that the quality of air degraded significantly. The median score of the air quality in the past found to be 4.0 (Figure 5.5) as most of the interviewees (15 of 16) perceive that the quality of air was immaculate and pleasant in the past. They argued that the quality worsen rapidly, and currently, it is too unhealthy (12 of 16 claimed that bad or very bad). Thus, the score of the current air quality decreased to 2.0, and the change is found significant ($p=0.000$).

The interviewees claimed that the growth of industries and population is the key reason of air quality degradation. Fine particles from industries, dust from construction works and roads are polluting the air. Besides, odour from the solid waste disposed of in the open places, from the polluted water due to the discharge of toxic industrial effluents, and from the overflow of sewerage make it difficult to walk through some places. The brick manufacturing industries are also polluting the air. Most of the *brick-fields* are located in the north-eastern corner of the community, and during the winter when wind flows from north-east, bring the polluted smoke to the community. The increase of built-up land and density creates urban heat island effect

(UHI) by increasing the local temperature compare to the surrounding areas. An assessment (Figure 5.4) of the surface temperature change shows that the developed area is experiencing higher temperature than surrounding areas which indicate the creation of an extreme microclimatic condition.

Figure 5.4. Increase in surface temperature at case study site between 1991 and 2010.



Source: Author (2018)

5.5.3.2. Water quality

Probably the impact of industrialisation is severe on the water quality and wetlands. Most of the Interviewees claimed that quality of drinking water is still good but degraded from the past. There is a growing concern in this area about the underground water level. The underground water level has degraded very significantly ($p=0.000$) during the urbanisation process. They claimed that the underground water was easily accessible in the past and now it is almost inaccessible. Some of the interviewees claimed that during 2000, the underground water level was at around 100 feet from the surface, but now the depth increased to more than 300 feet in some areas. Both increases of garment factories and resultant population concentration have accelerated the problem. Garment factories need soft water (either from river or underground) for dying. As the river water is polluted and needs purification, they use underground water. On the other hand, growing population demands more water, and they rely mostly on the underground water for drinking and other household purposes. There is no central piped water supply unit and no water treatment plant to make surface water usable. All the above processes result in severe degradation of underground water level in this area.

The industrial waste and household wastes pollute surface water. Most of the industries do not have industrial effluent treatment plant thus discharging toxic effluents to the nearby rivers and

canals. On the other hand, solid waste from industries and household activities are also polluting the surface water because there is no waste management system in this area. People are dumping their household wastes in the open spaces. During monsoon, these wastes go to the nearby river through surface runoff of rainwater and pollute the river water.

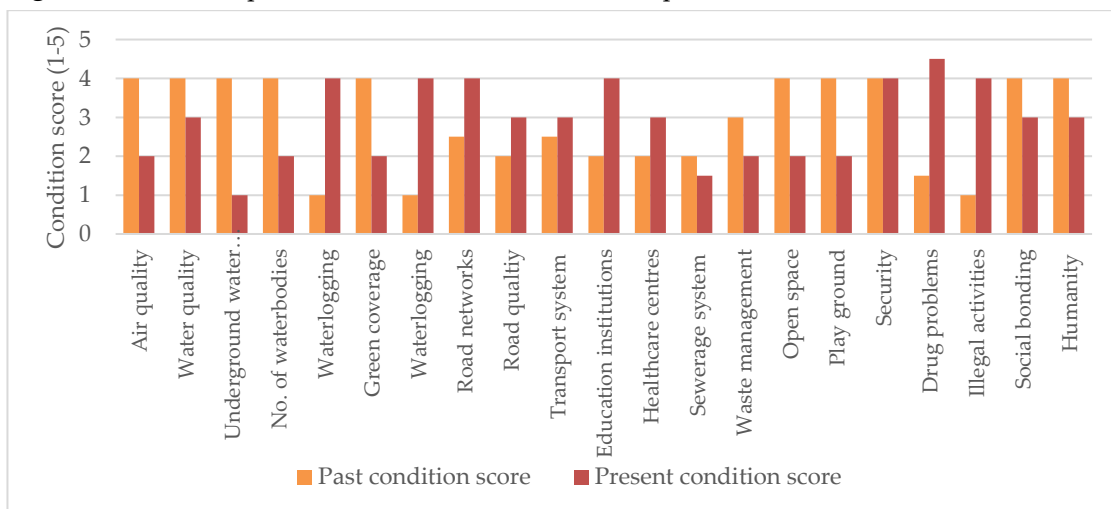
5.5.3.3. Wetlands

Both the number of wetlands and coverage of wetland have decreased in last two decades. Fourteen interviewees argued that the number of waterbodies was sufficient in the past, but now it is insufficient. They claimed that number of waterbodies (especially ponds) were lost due to the residential development. Owner of those waterbodies filled them up and then developed houses on it to rent them. On the other hand, the river also encroached. Some large factories are responsible for this. Besides, the *brick-fields* which were previously located near the central area now shifted to the periphery and sometimes near the river. They are also responsible for destruction and encroachment of shallow wetlands and rivers.

5.5.3.4. Waterlogging

Nine interviewees (among 14) claimed that in the past they did not face any waterlogging problem, but at present most of the interviewees (11 of 14) claimed that the waterlogging problem is severe, especially in the central (*Konabari*) and northern (*Ambagh*) parts of the area. The condition score of the waterlogging problem increased from 1.0 to 4.0, and the change found highly significant ($p=0.000$) (Table 5.11). In the past, there was natural drainage system such as ponds, canals and rivers. Moreover, infiltration of water was also high as the proportion of impervious surface was low. At present, canals are disconnected, ponds are filled up for development, impervious surface covers lands, and thus the rain water even the household waste water logged in.

Figure 5.5. Past and present condition scores of the components of the liveable environment



Source: Interview survey (2018)

Table 5.11. Significant test results on whether the past and present condition differ significantly?

Pair	Indicators	Mean difference	Standard deviation	t	df	Sig. (2-tailed)	Results
Pair 1	Air quality	2.313	1.138	8.126	15	.000	Decrease
Pair 2	Water quality	1.500	1.461	4.108	15	.001	Decrease
Pair 3	Underground water level	3.333	.707	14.142	8	.000	Decrease
Pair 4	Number of waterbodies	2.188	.834	10.490	15	.000	Decrease
Pair 5	Vegetation	2.313	.793	11.662	15	.000	Decrease
Pair 6	Open space	2.688	.793	13.553	15	.000	Decrease
Pair 7	Waterlogging	-2.2857	1.7289	-4.947	13	.000	Increase
Pair 8	Number of roads	-.875	.806	-4.341	15	.001	Increase
Pair 9	Quality of roads	-.125	1.258	-.397	15	.697	Increase
Pair 10	Transport	-.875	.806	-4.341	15	.001	Increase
Pair 11	No. education institutes	-1.438	.892	-6.446	15	.000	Increase
Pair 12	No. of healthcare centres	-.938	.772	-4.858	15	.000	Increase
Pair 13	Sewerage system	.313	1.250	1.000	15	.333	Decrease
Pair 14	Waste management	.400	1.404	1.103	14	.288	Decrease
Pair 15	Play ground	2.125	.342	24.885	15	.000	Decrease
Pair 16	Security	.063	1.124	.222	15	.827	Decrease
Pair 17	Drug problems	-2.2500	1.6533	-5.444	15	.000	Increase
Pair 18	Illegal activities	-2.1250	1.4549	-5.842	15	.000	Increase
Pair 19	Social bonding	1.063	.998	4.259	15	.001	Decrease
Pair 20	Humanity	1.375	.719	7.652	15	.000	Decrease

Source: Analysis of interview survey (2018) data

5.5.3.5. Green coverage

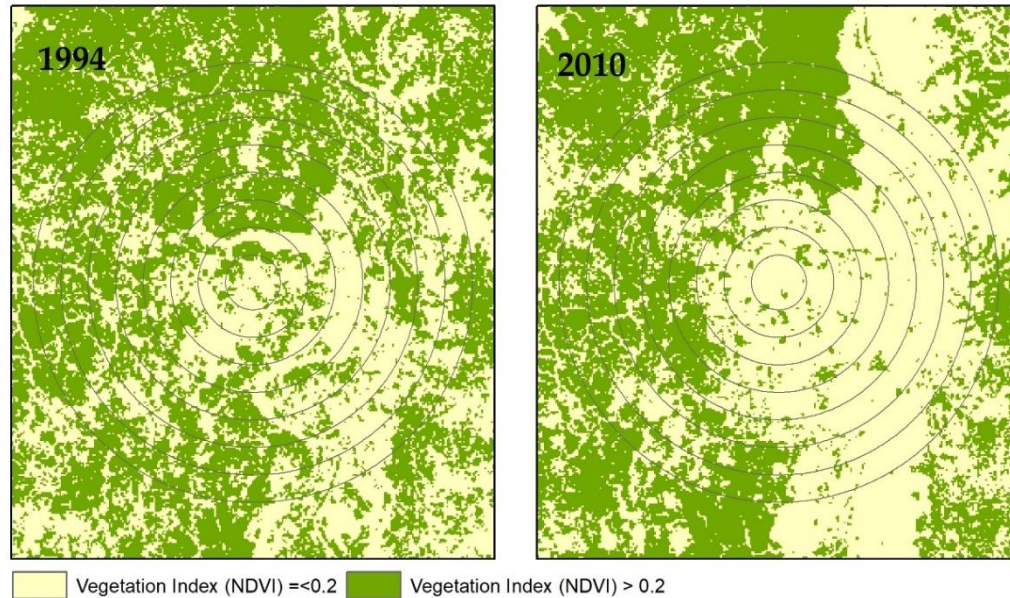
Most of the interviewees (15 of 16) claimed that in the past the green coverage was sufficient to serve the community, but it decreased drastically, and thirteen of them claimed that the coverage is insufficient now. The green coverage quality score decreased from 4.0 to 2.0, and the change is found statistically significant ($p=0.000$). Figure 5.6 shows the change in vegetation coverage in the case site based on NDVI value¹ from 1994 to 2010.

Most of the interviewees claimed that most of the vegetation coverage was destroyed by the landowners to supply the housing to the workers. In the past, there was some vegetation around the ponds or waterbodies. As the waterbodies were transformed to urban uses, the vegetation

¹ NDVI is used to represent the vegetation intensity.

coverage was also destroyed. Most of the interviewees were concerned that near future rest of the vegetation would be destroyed due to the growth force.

Figure 5.6. Vegetation coverage (based on NDVI) change between 1994 and 2010



Source: Author (2018)

5.5.4. *Impact on infrastructure and services*

5.5.4.1. Road networks and transport

The study found that the transport sector has affected positively by the growth. While fourteen of the interviewees (of 16) claimed that the road networks were insufficient to moderately sufficient in the past to serve the community, fifteen of them now believe that the networks are moderately sufficient to sufficient. The condition score has increased from 2.5 to 4.0 during the growth process (Figure 5.5).

Although the interviewees argued that the road network has increased sufficiently, they are not satisfied with road quality because the quality of the road is poor as previous. On the other hand, transport services specifically the modal services improved from the past. The transport service quality score has increased from 2.5 to 3.0 (Figure 5.5).

The road network increased firstly to support the incoming industries to this area. The owners of the factories are powerful, and they influence the authority to build new roads. On the other hand, industries are also responsible for poor road quality. The industries use heavy vehicles to transport the raw materials and finished goods, and the roads are not strong enough to support the heavy vehicles. Thus, most of the roads are broken, and during the monsoon, they become so muddy that it is almost impossible to walk on some roads. Transport system improved in the private sector to provide commuting facilities. The auto-rickshaws, minibuses and rickshaws

provide intra-zonal services. On the other hand, there are also new services that directly connect this area to the central Dhaka.

5.5.4.2. Education and health

Most of the interviewees (11 of 16) claimed that the number of education institutions was insufficient in the past (score = 2) and now they (12 of 16) find it sufficient (score =4) to support the growing population. The improvement is found to be significant ($p=0.000$). Although the institutions are increasing, the interviewees seem not happy with that because most of the institutes have developed privately focusing on making a profit by utilising the crisis of public institutions. Most of the new schools developed by renting buildings which have no criteria to be a school rather than a training centre. They also claimed that most of the institutions are not registered and thus do not follow the teacher recruitment regulations. Majority of the teachers are relatives of the owner or management body, and their education level is very low, and even they do not have any training to teach. The students of those institutions participate in the public examinations through the public schools as no students can participate from those unregistered schools. The public schools also allow this because they do not have the capacity to admit them. One of the interviewees argue that

“You will find some teachers in those schools who completed only Higher Secondary level (Grade 12) but teaching in Grade 9 or 10. In the public institutions, even in the primary schools, you have to complete at least your bachelor to be a teacher.”

Most of the interviewees claimed that the health care facilities increased (from score of 2.00 to 3.00) from the past though they are not sufficient. Most of the garments have a temporary doctor who provides consultation to the workers. They claimed that the number of pharmacies have increased significantly in this area, and junior doctors from Dhaka come to these pharmacies for 3-4 hours in the afternoon or evening to provide consultation.

5.5.4.3. Sewerage and waste management

All the interviewees claimed that there is no planned sewerage and waste management system in this area. In the past, it was not a problem as they rely on the natural process and they have been using the septic tank to manage sewage. Sewage generation increased as the population concentration became very high. During the monsoon, in most of the settlements septic tank overflow and pollute the nearby areas and water bodies. Due to lack of waste management system, industries and households dump their waste to the open spaces and pollute the environment. Increased industries and population have increased the generation of waste.

5.5.4.4. Open space and playground

Fifteen interviewees (of 16) claimed that in the past there were sufficient open spaces and playgrounds (past score=4). However, now the open spaces and playgrounds are insufficient (present score=2) and in some areas, there is hardly any open spaces or playgrounds (Figure 5.5). The change is found statistically significant ($p=0.000$). The crisis of open spaces and playgrounds are severe in the central area (*Konabari*). Most of the interviewees argued that there are only some playgrounds remains which are the property of the public schools. They argued that due to the rapid growth of population and high demand for housing, the private owners convert their every inch of lands to residential use.

5.5.4.5. Security

All the interviewees claimed that this area is secured, and it has not been changed much. The significant test does not find any significant changes of the security condition of this area. The condition scores for past and present found to be same as 4.0.

5.5.5. Impact on social and community issues

5.5.5.1. Drug problems

Most of the interviewees (14 of 16) claimed that in the past there were no (or very low) drug problems, but it has increased very significantly ($p=0.000$), and now an issue to be concerned. They believe that some powerful men run the drug business by using some of the immigrants. They claimed that many youths become drug addicted because of the lack of guidance from the families. In most of the migrant families' adults are working and they work overtime to earn more. Thus, they do not find enough time to look after their children during the day. Most of the time, those youths are influenced by other youths to take drugs.

5.5.5.2. Illegal activities

Illegal activities especially the prostitution has become a severe problem in this area. While all the interviewees claimed that there was no (or very low) such problem in the past, now at least ten of them finds the problem is severe. They claimed that many of the immigrants are solo migrants and they are the target group. In this area, the majority of the residential hotels are involved in these activities. One of the interviewees claimed that there are at least twenty residential hotels in this area and all are blacklisted as they involved in illegal activities.

5.5.5.3. Social bonding, values and humanity

Most of the interviewees argued that the social bonding weakens from the past. Most of them believe that this is a natural process not much affected by the growth forces. However, one

interviewee claimed that there is also an impact of growth process on the social bonding and harmony. He said

“In the past we all local people are living together, sharing our problems and joys. But now, when land becomes very precious, the neighbours are becoming competitors. Many of the people clashes with neighbours for lands. No one is willing to provide some lands for the access roads. They are now focusing more on their interests than community interests.”

In the context of values and humanity, one interviewee argued that

“In the past, all the neighbours are very cooperatives as their economic conditions and social positions were more or less similar. But now, they become the owner of the productive land, and they treat the tenants like an object, and they always behave like their superior.”

They argued that maybe there is no direct impact of growth on the people's values and humanity but transforming to economic man weaken the values and behaviour.

5.6. Role of planning in the growth process and pattern

5.6.1. Role of planning in the growth process and pattern

There is no spatial plan for this area and not having a spatial plan is one of the fundamental reason for such growth process. Appendix – 6.10 shows a list of factors that influenced the unplanned growth of this area. The growth was spontaneous, and the area has developed based on individuals' interests. The local who had land transformed them into residential uses. They are not concerned about the liveable environment, and they are focusing only on making money rather than long-term sustainability. Lack of land zoning has resulted in mix-use development. On the other hand, uncontrolled industrial development has also been fostering the unplanned growth. One interviewee was frustratedly saying that -

“This area is now urbanised, but this is not a product of a proper urbanisation process. You cannot find any urban values and behaviour here.”

Interviewees claimed that this area is not under any planning authority and thus, there are minimum development regulations like other rural areas of Bangladesh. Recently (in 2013) this area has been taken by the Gazipur City Corporation Authority, but they do not have any planning power. They have some controlling power over development through issuing permission, but the authority is not capable enough to monitor the development due to lack of resources. They also claimed that there is no initiative from the government yet and the local political leaders are not also raising this issue as they are not concerned, or they are in political indecision.

5.6.2. Challenges to make and implement a plan in an unplanned growth area

All the interviewees claimed that they need a plan as earliest possible time. They think it is already late but not too late to overcome the problem. They indicate some potential challenges the planning authority might face during the planning and implementation (Appendix – 6.12).

- Acquiring the land for widening the roads will be a big challenge because road-side lands are already developed and are mainly used for commercial and industrial purposes. Thus, the land price is comparatively higher, and the government must spend a significant portion of the investment to compensate.
- The area is densely developed with no infrastructure. Moreover, there is no public land here. Thus, redevelopment over a densely developed area will be expensive and local people might protest not to give any land.
- Administrative weakness always a pivotal issue to be concerned in Bangladesh. Most of the interviewees claimed that like other areas, there is a lack of coordination among the authorities working here. Besides, there is always a rivalry situation among the political leaders and administrative bodies, and that results in a delay of any process.
- They argued that financing will also be a big challenge. The area is already dense and needs an implementable plan in a short period. Planning and providing infrastructure in a dense area need colossal finance which may not be manageable for the local authority. However, they claimed that if the central government takes special project for this area than it will be easier, and financing will also be smoother.

5.7. Summary

To sum-up, the selected community has been experiencing rapid migration induced population growth and garment manufacturing sector plays the key role to attract the population. With the formal sectors, other small and informal businesses are also increasing. The garment industry-driven growth results in mix-use development along with dense and poor-quality housing. The impact of growth found severe on the environmental components, i.e. air and water are polluting, green coverage and wetlands are decreasing. Although there is some improvement in the physical infrastructures, they are not sufficient both in quantity and quality to meet the growing demands. Moreover, the growth impacts the social harmony negatively and increases the drug problems and illegal activities. The study found that lack of planning authority and land use regulations intensify the problems emerged through growth.

6. Discussions and Conclusions

The study explores (a) the significance of the manufacturing industrialisation on the urbanisation process and pattern, (b) the impact of manufacturing industrialisation induced growth on the suburban transformation process, and (c) the role of planning on the suburban growth dynamics in the developing countries. The Greater Dhaka Region (GDR), has been studied as the case from the Global South. This chapter presents a discussion on the findings followed by a concluding remark and recommendations for further research potentialities.

6.1. Discussions

The study findings show that the growth is extending towards the suburban areas from the core city in the GDR. In general, the growth is found to be higher in those suburban areas which are located adjacent or close to the core city and have better access to major transit networks. However, the findings provide convincing evidence demonstrating that localisation of growth does not result only from the proximity to the core city or the transit networks, but significantly influenced by the distribution of manufacturing job growth. In the GDR, population growth is found to be higher in those areas which are experiencing higher job growth in manufacturing sectors, particularly in the garment sector. There are also some suburban growth centres which are located far from the core city and not connected to major transit networks but experiencing higher population growth due to the localisation of the manufacturing job growth. Figure 6.1 shows a conceptual diagram of the pattern of population growth distribution in the GDR based on the study findings.

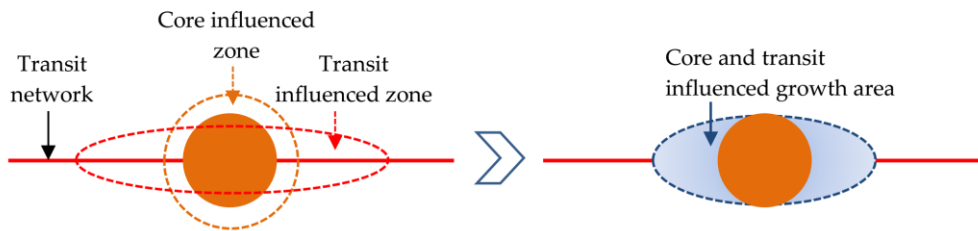
The population growth in the suburban areas is migration induced. The study found that manufacturing industry, in particularly the garment sector plays the key role to attract the migrants in the studied suburban community. Most of the immigrant workers find job opportunity is comparatively better in the suburban growth centres than the central city. Moreover, they prefer suburban areas, as the living cost especially the housing cost is lower, living environment is better, and commuting cost is lower. Human agency also has a significant impact on choosing the migration destination.

Figure 6.1. Conceptualising the spatial distribution of population growth in the GDR

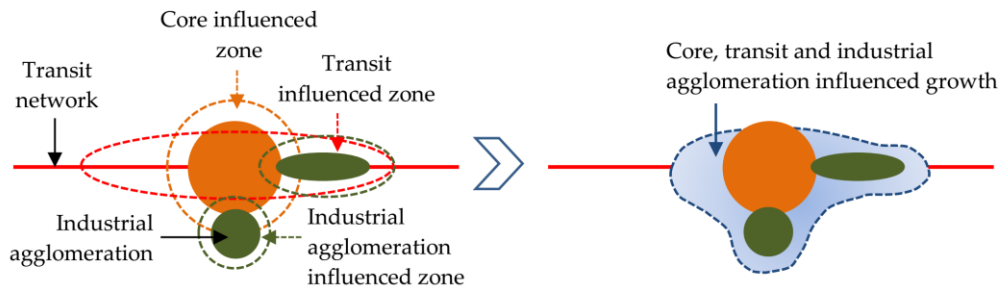
A. Influence of proximity to core city on growth localisation



B. Influence of proximity to core city and proximity to transit network on growth localisation



C. Influence of proximity to core city and transit network, and industrial agglomeration on growth localisation



Source: Author (2018)

The manufacturing industry induced growth results in mix-use spatial development in the suburban areas dominated by industrial use and dense working-class housing. The population concentration and growth have been attracting other small and informal businesses. The implications of industrialisation induced rapid growth on the suburban areas found to be; increased informality, environmental degradation, loss of natural habitats, increased pressure on infrastructures, degradation of service quality, and declining social harmony. Due to lack of planning authority and land use regulations, the spatial development of the suburban area is found to be spontaneous and characterised by the individual's choice. Thus, accommodating the dense and unplanned growth in the planning process will be a big challenge for the authority.

The study findings reveal that growth is unevenly distributed and migration induced. It is found to be the most common phenomena of the Global South cities as wealth, economy and opportunities are agglomerated in the large cities (Locay, 1990; Todaro, 1969; Zhang, 2002). Higher concentration of economic opportunities in large cities through industrialisation process

play as a pull factor to attract people and activities, and lack of employment and poverty in the rural areas play as push factors to encourage migration from rural areas (Mazumdar, 1987; Nazem et al., 2014b). Such pattern of polarised growth is profound in the Global South development process, and those large agglomerations are considered as the engine of growth (Campbell, n.d.; European Union, 2011; Vliet, 2002; World Bank, 2009). Like other developing country cities, the economy of Bangladesh is characterised and shaped by the globalisation forces. Low production cost due to availability and cheaper labour capital gives a unique advantage to compete in the global market. The garment sector has emerged as the base of Bangladeshi economy by capitalising the market demand and cheaper labour supply; which contributes more three-fourth to the export earnings and generates more than 100 thousand jobs each year (Nazem et al., 2014b). This sector attracts labours, mostly unskilled or low-skilled, and the supply of labours come from the rural areas where there is a lack of employment opportunities.

The study findings also reveal that existing urban agglomeration attracts more growth as there is already an established platform (Albert O Hirschman, 1958) that gives easier access to the works, workers and support services (Krugman, 1991), and provides advantages in the competition to extend demand-based growth (Friedmann, 1967). However, due to the threshold capacity of the physical resources especially the land, the city loses its spatial identity (North, 1955) through spreading towards surrounding areas, mostly within the zone of influence (Perroux, 1950). Excessive concentration induced externalities push some activities especially the low-productive, land and labour intensive production sectors (Vernon, 1992) towards the periphery. In the case of GDR, currently, the growth of manufacturing jobs especially in garment sector is higher in the adjacent surroundings areas of the core city which indicates that the growth is moving towards suburban or periphery areas from the core city. During the dispersion, the suburban areas which have comparative advantages of being connected to the core city through efficient networks receive the growth first as they can easily access both the economies of scale from the core city and cheaper land from the suburban areas (Dawkins, 2003; Vernon, 1992). The results show that the population growth localisation follows the growth of manufacturing activities, which resemble the contemporary argument that manufacturing industry growth contributes to the aggregated (both economy and population) urban growth in the Global South (Kaldor, 1966; Rodrik, 2009; Szirmai, 2012; Szirmai & Verspagen, 2015).

The study findings reveal that although the growth is redistributing to the suburban areas, the process of growth remains similar to the earlier growth process of the core city. Manufacturing industry growth dominated by the garment sector offers most of the jobs and generates population growth in the suburban areas. Although it is certain that the population growth follows the growth of activities, there are also some externalities that emerge in the existing core such as high living cost, higher competition for jobs, high commuting cost. Those externalities

discourage the low productive and low-skilled labour to come and stay in the core city. As the workers are mobile, and their attachment to the place is weak, they move to those places where they can find better opportunities (Zhang, 2002). Thus, new immigrants who are seeking job start their urban life where living cost is low. They find the suburban areas are the preferable location as they offer low-skilled jobs and low-cost living. Spillover effects of industrialised growth are very high (Guerrieri & Meliciani, 2005; Szirmai & Verspagen, 2015) because they encourage other businesses to be localised, particularly small and informal businesses to meet the growing demand due to population growth.

There are always spatial implications of growth, and this study argues that the implications vary depending on the growth factors and process. The labour-intensive and low productive industry growth encourages mix-land use and informal development in the cities and their suburban areas. Most of the dwelling units are small and overcrowded as the workers demand cheaper accommodation due to their low-income level followed by lack of affordability (Sultana, 2013). Growth demands land and in the suburban areas (predominantly rural) land supply comes from the local people. The study findings show that livelihood strategies of the local people are still land resource based, but in the past, they were using the land for agriculture, and now they are using it to develop housing for the immigrants to earn from renting.

For many developing county cities, environmental, infrastructure and social risks have become a major concern (Choe & Roberts, 2011) as the growth within and outside of the cities embrace the natural resources, infrastructures, and the labours. Industry dominated growth degrades air and water quality that affect the human health, destroys the rivers and flood flow zones (Dewan, Kabir, et al., 2012) which creates waterlogging and urban flooding, destroys vegetation coverage that results in Urban Heat Island (UHI) effects. Moreover, poor infrastructure provision in the suburban areas increases the sewerage and waste management problems. There are also some positive externalities that emerge during the growth process such as; improvement in transport infrastructure and increase in the number of service institutions. However, it is also apparent from the study that the increase in number of services not necessarily ensures the quality. With the growing population, social risks are also increasing as the community is losing its cultural identity and social harmony.

It has been argued in significant number of literature that institutional and regulatory factors shape the growth and growth process (Huang & Tang, 2012; Jackson, 2016). If any activities or the people affected directly or indirectly by the regulations in the inner city, they try to relocate themselves where the regulation is low (Glaeser & Kahn, 2004). In most of the developing countries, physical, economic and social development is not well planned and thus may become dysfunctional (Choe & Roberts, 2011). The study results also show that lack of regulatory authority and physical plan leads to impulsive and unplanned suburban growth in the GDR. Moreover, lack of an integrated plan by focusing on the economic and environmental

sustainability, lack of land use zoning to protect the natural habitats, poor implementation of environmental regulations and inefficiency of implementation and monitoring authorities have been accelerating the environmental and infrastructure risks.

6.2. Conclusions

The industrialisation forces significantly influence the growth of large cities and their suburban areas in the developing countries. Large urban agglomerations in particularly the metropolitan regions accommodate such growth as they have the comparatively better business environment and infrastructures than the small agglomerations. In many developing countries the growth (either the economic or the demographic) is localising in the capital city, and over time the city emerges as the primate city. The growth of the most cities results from external market demand (mostly export-oriented manufacturing products), the internal supply of production inputs (mostly cheaper labour and land), strategies focusing on the primate city favouritism, and migration of labour from rural peripheries for better opportunities. Moreover, spillover effects of industrialisation induced growth encourage local suppliers to be agglomerated in the city and create informal activities that further accelerate the accumulation of labour in the city. During the growth, the region becomes specialised in some sectors based on the market demand and the input supplies they have. These specialised sectors generate economic prosperity for the respective countries. More focus on the economic gain embraces the labour and city's habitats thus living, and environmental condition in the city degrades. There is a lack of strategic infrastructures to provide the efficient business environment and better-quality living in the developing countries. Moreover, the demand for strategic infrastructure is increasing with the growth of activities and population. The gap between the demand and supply of infrastructure is continuously increasing as the city fails to provide infrastructures with the growth pace.

The cities expand spatially towards their immediate peripheries to accommodate the activities and population growth, and it is found to be certain in the urbanisation process. The study results show that – the suburban growth is mostly driven by the strategic industry sector(s) of the economy – the garment sector in the case of the GDR. In the GDR, more than 82 percent of the macro industrial jobs are created by only the garment sector outside of the core city area. The study findings reveal that although the suburban areas or immediate peripheries are urbanising fast, there is hardly any urban infrastructures and services available. Moreover, due to lack of a plan and regulatory controls, the growth is found to be spontaneous and haphazard.

There is substantial evidence in the study that low skilled labour-intensive sector encourages mix-use development as the workers tend to live close to the workplace to reduce the commuting cost. The spillover effects of low-income group concentration in the suburban areas attract small and informal businesses. It can be argued from this study that the growth in a place where there

is no or very few infrastructures and services results in declining the quality of life, degradation environment and increased social instability.

To wrap-up, the suburban growth dynamics is profoundly influenced by the key or strategic industry sector(s) the economy has. Moreover, the impacts on the suburban land, livelihoods and environment found to be associated strongly with the nature of industrialisation as well as economic growth forces. Lack of regulatory controls intensify the negative externalities that emerge from the growth process.

6.3. Recommendations

The suburban areas are considered as the future urban growth area, which is significantly affected by the dynamic urban behaviours. In such context, for sustainable and efficient growth in the long-run, it is necessary to understand and manage the urban growth process to ensure both economic prosperity and restricting adverse effects on social and environmental components. Thus, an integrated regional planning approach might offer; a great place to live and work; an instrument to ensure the efficient use of infrastructure and services to the authorities; a liveable and saleable property to property developer; and, a dynamic and competitive business environment for industries. Moreover, there is a need for land use regulation to guide the growth localisation, restrict haphazard development and protect natural habitats. Thus, the authority should be proactive rather than responsive to ensure the sustainability of growth. Finally, if the country wishes to decentralise the growth, it would be better to take strategies by focusing on the key industry sectors as there is hardly any influence of internal market accessibility in the bid-rent. Thus, the sectors can be localised anywhere if they find access to production inputs as the sectors entirely depend on the export market.

There is a clear notion that the impact of demand-oriented specialised industrialisation on the developing countries' suburban growth process has not been getting much attention in the contemporary growth literature. Most of the literature focuses on the agglomeration as an engine of growth, challenges of overconcentration in the large agglomerations, challenges of growth governance or role of urban expansion on urban environment from a macro perspective. Thus, most of the time, the complexity of urban and suburban growth process are not reflected adequately. This study is a small initiative that connects the regional (macro) level growth pattern to the community (micro) level growth dynamics. It found that the macro level growth factors and dynamics severely affect the micro level growth process and generates even more negative externalities as there is no infrastructure and inadequate regulatory controls outside of the core city (or designated planning boundary). Based on the findings of the study, the following research questions or hypothesis are developed which demands further investigations to understand the suburban growth process in the developing countries:

- Literature suggests that firms are benefitted from agglomeration and specialisation being in existing growth centre. However, the study found that key industries are also localising far away from the existing agglomerations although the infrastructure supports are inferior in that areas. Thus, it is essential to investigate the factors that determine the localisation of the key (or specialised) industry sectors outside of the existing agglomeration.
- The study found that industrialisation induced growth in the suburban areas forms a mix-use urban ecology dominated by the industrial and residential uses. Urban ecology models argue that land-rent determines the use of lands, and location of CBD and accessibility play a vital role to determine the land-rent. However, in many cases, there is no CBD in the suburban areas, or even there is no retail centre. Thus, studying the evolution of suburban land allocation determinants may provide a new dimension to the theories of urban ecology.
- The study found that informalities (either activities or the use of land) are associated with the suburban growth. However, it can be assumed that different types of specialised industrialisation may result in different process and pattern of informal development. As the informalities is a mainstreamed development feature of the developing country cities, thus demands a further investigation to understand how informalities occur within the specialised agglomerations.

Moreover, the impact of suburban growth determinants and processes on the environment and infrastructure might not be similar across the regions. Thus, more studies are needed to understand - how different types of industrial clustering affect the suburban environment and infrastructure conditions to provide a demand-based solution for sustainable urbanisation.

6.4. Limitations

There are always some limitations associated with research, and this study also does not free from constraints. Firstly, the study has faced some problems with the secondary data. Lack of data at community level restricts to do a more sophisticated analysis that has a potential to give a better understanding of the spatial distribution of growth. For example, land level and real estate market plays a crucial role in the growth localisation; they were not used in this study due to lack of data. Secondly, only one suburban community was studied to assess the growth dynamics and growth impacts. However, it would be better if the study could take two communities (one with high industry concentration and one with low concentration) because it would give very concise results on the impacts of industrialisation induced growth on land, livelihood and environment. Thirdly, to capture more immigrant households, the questionnaire survey was conducted on those settlements where the immigrant's workers prefer to live. Thus, in this study, all other upper-class migrants (i.e. skilled, educated, industrialists etc.) were excluded. Although the proportion of this type of immigrants is low, the inclusion of them in

this study have a potentiality to increase the strength of the study findings. Finally, the recommendations have been made based on the results are not easy to implement as the developing economy do not have financial and technical strengths. Moreover, many studies argue that the regulations may restricts the growth.

References

- Acemoglu, D., & Robinson, J. (2012). *Why Nation Fails*. New York: Random House. Google Scholar.
- Alonso, W. (1964). Location and Land Use: Towards a general history of land rent. *Cambridge, Mass.*
- Anas, A., & Moses, L. N. (1979). Mode choice, transport structure and urban land use. *Journal of Urban Economics*, 6(2), 228–246.
- Audretsch, D. B., & Keilbach, M. (2008). Resolving the knowledge paradox: Knowledge-spillover entrepreneurship and economic growth. *Research Policy*, 37(10), 1697–1705.
- Barro, R. J., & Sala-i-Martin, X. (2004). *Economic Growth*: MIT Press. *Cambridge, Massachusetts.*
- Baum-Snow, N. (2007). Suburbanization and transportation in the monocentric model. *Journal of Urban Economics*, 62(3), 405–423.
- BBS. (1993). *Bangladesh Population Census 1991, Zila: Gazipur*. Dhaka.
- BBS. (2005). *2004 Statistical Yearbook of Bangladesh*. Dhaka.
- BBS. (2006). *Population Census 2001, Community Series, Zila: Gazipur*. Dhaka: Bangladesh Bureau of Statistics.
- BBS. (2010). *Register of Establishment, Size: 10+*. Dhaka.
- BBS. (2012a). *Population and Housing Census 2011, Community Report: Gazipur*. Dhaka.
- BBS. (2012b). *Population and Housing Census 2011, National Series, Volume - 4: Socio-economic and Demographic Report*. Dhaka.
- BBS. (2014). *Population and Housing Census 2011, National Volume 3: Urban Area Report*. Dhaka: Bangladesh Bureau of Statistics.
- Becker, R., & Henderson, J. V. (2000). *Intra-industry specialization and urban development*. *Economics of Cities: Theoretical Perspectives*. Cambridge: Cambridge University Press.
- Black, D., & Henderson, V. (1999). A theory of urban growth. *Journal of Political Economy*, 107(2), 252–284.
- Blöchliger, H., Hilber, C., Schöni, O., & von Ehrlich, M. (2017). Local taxation, land use regulation, and land use: A survey of the evidence. *OECD Economic Department Working Papers*, (1375), 0_1.

References

- Boettke, P., & Fink, A. (2011). Institutions first. *Journal of Institutional Economics*, 7(4), 499–504.
- Borts, G. H., & Stein, J. L. (1964). Economic growth in a free market.
- Brueckner, J. K. (1990). Growth controls and land values in an open city. *Land Economics*, 66(3), 237–248.
- Brueckner, J. K., Thisse, J., & Zenou, Y. (2002). Local labor markets, job matching, and urban location. *International Economic Review*, 43(1), 155–171.
- Bryman, A. (2015). *Social research methods*. Oxford university press.
- Burchfield, M., Overman, H. G., Puga, D., & Turner, M. A. (2006). Causes of sprawl: A portrait from space. *The Quarterly Journal of Economics*, 121(2), 587–633.
- Campbell, J. (n.d.). World development report 1999/2000-entering the 21st century: summary.
- Capello, R., & Nijkamp, P. (2011). 15. Regional growth and development theories revisited. *Endogenous Regional Development: Perspectives, Measurement and Empirical Investigation*, 301.
- Chapin, F. S. (1965). *Urban Land Use Planning*. Retrieved from <https://books.google.co.uk/books?id=zeRpivQqOHYC>
- Charlot, S., & Duranton, G. (2006). Cities and workplace communication: some quantitative French evidence. *Urban Studies*, 43(8), 1365–1394.
- Checkland, S. G. (1981). The New International Division of Labour: Structural Unemployment in Industrialised Countries and Industrialisation in Developing Countries. JSTOR.
- Choe, K. A., Nazem, N. I., Roberts, B. H., Samarappuli, N., & Singh, R. (2011). A comparative analysis of the competitiveness of the ready made garment industry clusters in Colombo, Delhi and Dhaka. *Journal of Competitiveness*, 1(1), 5–25.
- Choe, K. A., & Roberts, B. H. (2011). *Competitive cities in the 21st century: Cluster-based local economic development*. Asian Development Bank.
- Cilliers, D. P. (2010). The development and use of a land–use suitability model in spatial planning in South Africa. North-West University.
- Cohen, B. (2006). Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability. *Technology in Society*, 28(1), 63–80. <https://doi.org/https://doi.org/10.1016/j.techsoc.2005.10.005>
- Coleman, J. S. (2003). Social capital in the creation of human capital. *Networks in the Knowledge Economy*, 57–81.
- Cornwall, J. (1977). *Modern capitalism: its growth and transformation*. Martin Robertson.
- Cox, W. (2017). *Demographia world urban areas: 13th Annual Edition*. St. Louis: Demographia. Retrieved from <http://demographia.com/db-worldua.pdf>
- Davis, J. C., & Henderson, J. V. (2003). Evidence on the political economy of the urbanization process. *Journal of Urban Economics*, 53(1), 98–125.
- Davis, K. (1965). The urbanization of the human population. *Scientific American*, 213(3), 40–53.

- Dawkins, C. J. (2003). Regional development theory: conceptual foundations, classic works, and recent developments. *Journal of Planning Literature*, 18(2), 131–172.
- De Haas, H. (2010). Migration and development: A theoretical perspective. *International Migration Review*, 44(1), 227–264. <https://doi.org/10.1111/j.1747-7379.2009.00804.x>
- Deichmann, U., Kaiser, K., Lall, S., & Shalizi, Z. (2005). Agglomeration, transport, and regional development in Indonesia.
- Deng, X., Huang, J., Rozelle, S., & Uchida, E. (2008). Growth, population and industrialization, and urban land expansion of China. *Journal of Urban Economics*, 63(1), 96–115.
- Despotović, D., & Cvetanović, S. (2017). The theoretical explication of the factors of regional growth and the economic convergence (divergence) of the region. *Ekonomski Horizonti*, 19(2), 109–123.
- Dewan, A. M., Kabir, M. H., Nahar, K., & Rahman, M. Z. (2012). Urbanisation and environmental degradation in Dhaka Metropolitan Area of Bangladesh. *International Journal of Environment and Sustainable Development*, 11(2), 118–147.
- Dewan, A. M., & Yamaguchi, Y. (2008). Effect of land cover changes on flooding: example from Greater Dhaka of Bangladesh. *International Journal of Geoinformatics*, 4(1).
- Dewan, A. M., & Yamaguchi, Y. (2009a). Land use and land cover change in Greater Dhaka, Bangladesh: Using remote sensing to promote sustainable urbanization. *Applied Geography*, 29(3), 390–401.
- Dewan, A. M., & Yamaguchi, Y. (2009b). Using remote sensing and GIS to detect and monitor land use and land cover change in Dhaka Metropolitan of Bangladesh during 1960–2005. *Environmental Monitoring and Assessment*, 150(1–4), 237.
- Dewan, A. M., Yamaguchi, Y., & Rahman, M. Z. (2012). Dynamics of land use/cover changes and the analysis of landscape fragmentation in Dhaka Metropolitan, Bangladesh. *GeoJournal*, 77(3), 315–330.
- Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDCs, 1976–1985. *Economic Development and Cultural Change*, 40(3), 523–544.
- Duranton, G. (2009). Are cities engines of growth and prosperity for developing countries? *Urbanization and Growth*, 67–113.
- Duranton, G., & Puga, D. (2014). The growth of cities. In *Handbook of economic growth* (Vol. 2, pp. 781–853). Elsevier.
- Duranton, G., & Puga, D. (2015). Urban land use. In *Handbook of regional and urban economics* (Vol. 5, pp. 467–560). Elsevier.
- Easterlin, R. A. (2009). *Growth triumphant: The twenty-first century in historical perspective*. University of Michigan Press.
- Edwards, S. (1998). Openness, productivity and growth: what do we really know? *The Economic Journal*, 108(447), 383–398.

References

- Ellickson, R. C. (1977). Suburban growth controls: An economic and legal analysis. *The Yale Law Journal*, 86(3), 385–511.
- European Commission. (2017). Metropolitan Regions. Retrieved February 25, 2018, from <http://ec.europa.eu/eurostat/web/metropolitan-regions/data/database>
- European Union. (2011). *Cities of Tomorrow: challenges, visions, way forward*. Brussels.
- Fan, C. C., & Scott, A. J. (2003). Industrial agglomeration and development: A survey of spatial economic issues in East Asia and a statistical analysis of Chinese regions. *Economic Geography*, 79(3), 295. <https://doi.org/10.1111/j.1944-8287.2003.tb00213.x>
- Farrell, K. (2017). The Rapid Urban Growth Triad: A New Conceptual Framework for Examining the Urban Transition in Developing Countries. *Sustainability*, 9(8), 1407.
- Flick, U. (2015). *Introducing research methodology: A beginner's guide to doing a research project*. Sage.
- Florida, R. (2004). *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life* (Paperback). Basic Books, New York.
- Fox, S. (2011). Understanding the origins and pace of Africa's urban transition. *Crisis States Research Centre Working Paper (Series 2) No. 98*.
- Frankel, J. A., & Romer, D. H. (1999). Does trade cause growth? *American Economic Review*, 89(3), 379–399.
- Friedmann, J. (1967). A general theory of polarized development.
- Fujita, M., Krugman, P. R., & Venables, A. J. (2001). *The spatial economy: cities, regions and international trade*. MIT Press.
- Fujita, M., & Thisse, J.-F. (2013). *Economics of agglomeration: cities, industrial location, and globalization*. Cambridge university press.
- Glaeser, E. L. (2011). *Triumph of the city: How urban spaces make us human*. Pan Macmillan.
- Glaeser, E. L., Gyourko, J., & Saks, R. E. (2005). Why have housing prices gone up? *American Economic Review*, 95(2), 329–333.
- Glaeser, E. L., & Kahn, M. E. (2004). Sprawl and urban growth. In *Handbook of regional and urban economics* (Vol. 4, pp. 2481–2527). Elsevier.
- Glaeser, E. L., & Ward, B. A. (2009). The causes and consequences of land use regulation: Evidence from Greater Boston. *Journal of Urban Economics*, 65(3), 265–278.
- Gray, D. E. (2013). *Doing research in the real world*. Sage.
- Green, R. K., Malpezzi, S., & Mayo, S. K. (2005). Metropolitan-specific estimates of the price elasticity of supply of housing, and their sources. *American Economic Review*, 95(2), 334–339.
- Greenaway, D., Morgan, W., & Wright, P. (1998). Trade reform, adjustment and growth: what does the evidence tell us? *The Economic Journal*, 108(450), 1547–1561.
- Grimm, N. B., Faeth, S. H., Golubiewski, N. E., Redman, C. L., Wu, J., Bai, X., & Briggs, J. M. (2008). Global change and the ecology of cities. *Science*, 319(5864), 756–760.

References

- Guerrieri, P., & Meliciani, V. (2005). Technology and international competitiveness: The interdependence between manufacturing and producer services. *Structural Change and Economic Dynamics*, 16(4), 489–502.
- Hales, D. (2010). An introduction to triangulation. *Geneva: UNAIDS Monitoring and Education Division*.
- Harris, C. D., & Ullman, E. L. (1945). The nature of cities. *The Annals of the American Academy of Political and Social Science*, 242(1), 7–17.
- Harris, J. R., & Todaro, M. P. (1970). Migration, unemployment and development: a two-sector analysis. *The American Economic Review*, 60(1), 126–142.
- Hawksworth, J., Hoehn, T., & Tiwari, A. (2009). Which are the largest city economies in the world and how might this change by 2025. *UK Economic Outlook*, 20–34.
- Helsley, R. W., & Strange, W. C. (1995). Strategic growth controls. *Regional Science and Urban Economics*, 25(4), 435–460.
- Henderson, J. V. (1974). The sizes and types of cities. *The American Economic Review*, 64(4), 640–656.
- Henderson, J. V. (1991). *Urban development: Theory, fact, and illusion*. OUP Catalogue.
- Henderson, J. V. (2000a). *How urban concentration affects economic growth* (Vol. 2326). World Bank Publications.
- Henderson, J. V. (2000b). *The effects of urban concentration on economic growth*. National bureau of economic research.
- Henderson, J. W. (1989). *The Globalisation of High Technology Production: Society, Space and Semiconductors in the Restructuring of the Modern World*. Routledge.
- Henderson, V. (2002). Urbanization in developing countries. *The World Bank Research Observer*, 17(1), 89–112.
- Herbert, D. T. (1973). *Urban geography: a social perspective* (Vol. 758). Praeger.
- Hilber, C. A. L., & Robert-Nicoud, F. (2013). On the origins of land use regulations: Theory and evidence from US metro areas. *Journal of Urban Economics*, 75, 29–43.
- Hirschman, A. O. (1958). *The strategy of economic development*. Boulder and London. Westview Press [first publ. 1958].
- Hirschman, A. O. (1958). *The strategy of economic development*.
- Hoover, E. M., & Fisher, J. L. (1949). Research in regional economic growth. In *Problems in the study of economic growth* (pp. 173–250). NBER.
- Hossain, M. A., & Nazem, N. I. (2016). Cluster Based Urban Economic Growth in Chittagong Metro Region: A Case of Manufacturing Industries. *Oriental Geographer*, 57, 1–26.
- Hoyt, H. (1939). The structure and growth of residential neighborhoods in American cities.
- Huang, H., & Tang, Y. (2012). Residential land use regulation and the US housing price cycle

References

- between 2000 and 2009. *Journal of Urban Economics*, 71(1), 93–99.
- Huggins, R. (2016). Capital, institutions and urban growth systems. *Cambridge Journal of Regions, Economy and Society*, 9(2), 443–463.
- Huggins, R., & Izushi, H. (2007). *Competing for knowledge: creating, connecting and growing*. Routledge.
- Huggins, R., & Thompson, P. (2013). A network-based view of regional growth. *Journal of Economic Geography*, 14(3), 511–545.
- Ihlanfeldt, K. R. (2007). The effect of land use regulation on housing and land prices. *Journal of Urban Economics*, 61(3), 420–435.
- Irwin, E. G., & Bockstael, N. E. (2004). Land use externalities, open space preservation, and urban sprawl. *Regional Science and Urban Economics*, 34(6), 705–725.
- Islam, N. (1996). *Dhaka: from city to megacity: perspectives on people, places, planning, and development issues*. Urban Studies Programme, Department of Geography, University of Dhaka.
- Islam, N. (1999). *Urbanisation, migration and development in Bangladesh: recent trends and emerging issues*. Centre for Policy Dialogue Dhaka, Bangladesh.
- Islam, N. (2005). *Dhaka now: contemporary urban development*. Bangladesh Geographical Society.
- Islam, N., Angeles, G., Mahbub, A., Lance, P., & Nazem, N. I. (2006). Slums of urban Bangladesh: mapping and census 2005.
- Islam, N., & Hossain, M. A. (2013). Spatial Pattern of Manufacturing Industries in the Greater Dhaka Urban Region (GDUR). *CUS Bulletin of Urbanization and Development*, 63–64, 18–20.
- Jackson, K. (2016). Do land use regulations stifle residential development? Evidence from California cities. *Journal of Urban Economics*, 91, 45–56.
- Jiang, L., Deng, X., & Seto, K. C. (2013). The impact of urban expansion on agricultural land use intensity in China. *Land Use Policy*, 35, 33–39. <https://doi.org/https://doi.org/10.1016/j.landusepol.2013.04.011>
- Johnson, J. H. (2013). *Urban geography: an introductory analysis*. Elsevier.
- Jomo, K. S. (2016). *Growth and structural change in the Malaysian economy*. Springer.
- Jones, C. I. (2016). The facts of economic growth. In *Handbook of macroeconomics* (Vol. 2, pp. 3–69). Elsevier.
- Kaiser, E. J., Godschalk, D. R., & Chapin, F. S. (1995). *Urban land use planning* (Vol. 4). University of Illinois Press Urbana, IL.
- Kaldor, N. (1966). *Causes of the slow rate of economic growth of the United Kingdom: an inaugural lecture*. Cambridge University Press.
- Kaldor, N. (1970). The case for regional policies. *Scottish Journal of Political Economy*, 17(3), 337–348.
- Kaza, N. (2013). The changing urban landscape of the continental United States. *Landscape and*

References

- Urban Planning*, 110, 74–86.
- Kearsley, G. W. (1983). Teaching urban geography: The Burgess model. *New Zealand Journal of Geography*, 75(1), 10–13.
- Keeble, D., & Walker, S. (1994). New firms, small firms and dead firms: spatial patterns and determinants in the United Kingdom. *Regional Studies*, 28(4), 411–427.
- Kok, N., Monkkonen, P., & Quigley, J. M. (2014). Land use regulations and the value of land and housing: An intra-metropolitan analysis. *Journal of Urban Economics*, 81, 136–148.
- Krugman, P. (1991). Increasing returns and economic geography. *Journal of Political Economy*, 99(3), 483–499.
- Kuang, W., Liu, J., Dong, J., Chi, W., & Zhang, C. (2016). The rapid and massive urban and industrial land expansions in China between 1990 and 2010: A CLUD-based analysis of their trajectories, patterns, and drivers. *Landscape and Urban Planning*, 145, 21–33.
- Lall, S. V, Koo, J., & Chakravorty, S. (2003). *Diversity matters: The economic geography of industry location in India* (Vol. 3072). World Bank Publications.
- Lall, S. V, & Selod, H. (2006). *Rural-urban migration in developing countries: A survey of theoretical predictions and empirical findings* (Vol. 3915). World Bank Publications.
- Lang, R. E., & Nelson, A. C. (2007). Beyond the metroplex: examining commuter patterns at the “megapolitan” scale. Cambridge, MA: Lincoln Institute of Land Policy. White Paper.
- Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The Manchester School*, 22(2), 139–191.
- Lichtenberg, E., & Ding, C. (2008). Assessing farmland protection policy in China. *Land Use Policy*, 25(1), 59–68.
- Locay, L. (1990). Economic development and the division of production between households and markets. *Journal of Political Economy*, 98(5, Part 1), 965–982.
- Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3–42.
- Martin, R., & Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of Economic Geography*, 6(4), 395–437.
- Mayer, H. M. (1969). The spatial expression of urban growth. Association of American Geographers.
- Mazumdar, D. (1987). Rural-urban migration in developing countries. In *Handbook of regional and urban economics* (Vol. 2, pp. 1097–1128). Elsevier.
- McCann, P. (2013). *Modern urban and regional economics*. Oxford University Press.
- Mills, E. S. (1967). An aggregative model of resource allocation in a metropolitan area. *The American Economic Review*, 57(2), 197–210.
- Montgomery, M. R. (2008). The urban transformation of the developing world. *Science*, 319(5864),

761–764.

- Muth, R. F. (1969). Cities and Housing: The Spatial Pattern of Urban Residential Land Use.
- Myint, M. M., Rasiah, R., & Singaravelloo, K. (2015). Globalization of industrialization and its impact on clothing workers in Myanmar. *Journal of the Asia Pacific Economy*, 20(1), 100–110.
- Myrdal, G. (1957). Economic theory and underdeveloped countries. London: Duckworth.
- Nazem, N. I., Chowdhury, A. I., & Hossain, M. A. (2014a). A Case of Competitiveness of the Greater Dhaka Region. *CUS Bulletin on Urbanization and Development*, 69–70, 5–10.
- Nazem, N. I., Chowdhury, A. I., & Hossain, M. A. (2014b). *Cities in Asia Pacific and Latin America: Case Study on Dhaka, Bangladesh*.
- Nazem, N. I., & Hossain, M. A. (2012). Mapping Poor Settlements in 27 Cities and Towns of Bangladesh: UPPR Experience. *CUS Bulletin on Urbanization and Development*, 60–62, 16–20.
- North, D. C. (1955). Location theory and regional economic growth. *Journal of Political Economy*, 63(3), 243–258.
- North, D. C. (1991). Institutions. *Journal of Economic Perspectives*, 5(1), 97–112.
- North, D. C. (2005). Understanding the process of institutional change. *North: Douglass*, 89–108.
- Office for National Statistics. (2017). Regional GVA(I) by Local Authority in the UK. Retrieved February 25, 2018, from <https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/regionalgvaibylcalauthORITYINtheUK>
- Pacione, M. (2009). *Urban geography: a global perspective*. Routledge.
- Park, S.-H., & Chan, K. S. (1989). A cross-country input-output analysis of intersectoral relationships between manufacturing and services and their employment implications. *World Development*, 17(2), 199–212.
- Perroux, F. (1950). Economic space: theory and applications. *The Quarterly Journal of Economics*, 64(1), 89–104.
- Pickett, S. T. A., Cadenasso, M. L., Grove, J. M., Boone, C. G., Groffman, P. M., Irwin, E., ... Nilon, C. H. (2011). Urban ecological systems: Scientific foundations and a decade of progress. *Journal of Environmental Management*, 92(3), 331–362.
- Porter, M. E. (1990). The competitive advantage of nations. *Competitive Intelligence Review*, 1(1), 14.
- Porter, M. E. (1996). Competitive advantage, agglomeration economies, and regional policy. *International Regional Science Review*, 19(1–2), 85–90.
- Porter, M. E. (2000). Location, competition, and economic development: Local clusters in a global economy. *Economic Development Quarterly*, 14(1), 15–34.
- Ricardo, D. (1817). *On the Principles of Political Economy and Taxation*: London.
- Roback, J. (1982). Wages, rents, and the quality of life. *Journal of Political Economy*, 90(6), 1257–

1278.

- Rodrik, D. (2000). Institutions for high-quality growth: what they are and how to acquire them. *Studies in Comparative International Development*, 35(3), 3–31.
- Rodrik, D. (2009). *Growth after the Crisis*. World Bank.
- Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5, Part 2), S71–S102.
- Rostow, W. W. (1959). The stages of economic growth. *The Economic History Review*, 12(1), 1–16.
- Sachs, J. D., Warner, A., Åslund, A., & Fischer, S. (1995). Economic reform and the process of global integration. *Brookings Papers on Economic Activity*, 1995(1), 1–118.
- Saiz, A. (2010). The geographic determinants of housing supply. *The Quarterly Journal of Economics*, 125(3), 1253–1296.
- Scott, A., & Storper, M. (2003). Regions, globalization, development. *Regional Studies*, 37(6–7), 579–593.
- Seto, K. C., Güneralp, B., & Hutyrá, L. R. (2012). Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proceedings of the National Academy of Sciences*, 109(40), 16083–16088.
- Smith, D. W., & Scarpaci, J. L. (2000). Urbanization in transitional societies: an overview of Vietnam and Hanoi. *Urban Geography*, 21(8), 745–757.
- Solé-Ollé, A., & Viladecans-Marsal, E. (2004). Central cities as engines of metropolitan area growth. *Journal of Regional Science*, 44(2), 321–350.
- Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65–94.
- Song, H., Thisse, J.-F., & Zhu, X. (2012). Urbanization and/or rural industrialization in China. *Regional Science and Urban Economics*, 42(1–2), 126–134.
- Storper, M. (2017). Explaining regional growth and change. In R. Huggins & P. Thompson (Eds.), *Handbook of Regions and Competitiveness: Contemporary Theories and Perspectives on Economic Development* (pp. 35–48). Edward Elgar Publishing. Retrieved from https://books.google.co.uk/books?id=3DX_oAEACAAJ
- Sultana, S. (2013). *Study on the Needs and Affordability of Housing of the Garment's Workers in the Dhaka Metropolitan Area*. University of Dhaka.
- Swan, T. W. (1956). Economic growth and capital accumulation. *Economic Record*, 32(2), 334–361.
- Szirmai, A. (2012). Industrialisation as an engine of growth in developing countries, 1950–2005. *Structural Change and Economic Dynamics*, 23(4), 406–420.
- Szirmai, A., & Verspagen, B. (2015). Manufacturing and economic growth in developing countries, 1950–2005. *Structural Change and Economic Dynamics*, 34, 46–59.
- Tiebout, C. M. (1956). Exports and regional economic growth: Rejoinder. *Journal of Political*

References

- Economy*, 64(2), 169.
- Timmins, C. (2006). Estimating spatial differences in the Brazilian cost of living with household location choices. *Journal of Development Economics*, 80(1), 59–83.
- Todaro, M. P. (1969). A model of labor migration and urban unemployment in less developed countries. *The American Economic Review*, 59(1), 138–148.
- UN DESA. (2015). *World urbanization prospects: The 2014 revision*. New York, NY, USA.
- UN Habitat. (2013). *State of the world's cities 2012/2013: Prosperity of cities*. Routledge.
- UN Habitat. (2016). *World cities report 2016 Urbanization and Development: Emerging Futures*. New York.
- UN Habitat. (2018). Economy. Retrieved February 24, 2018, from <https://unhabitat.org/urban-themes/economy/>
- Vamvakidis, A. (1999). Regional trade agreements or broad liberalization: which path leads to faster growth? *IMF Staff Papers*, 46(1), 42–68.
- Vance, J. E. (1964). *Geography and urban evolution in the San Francisco Bay area*. Institute of Governmental Studies, University of California.
- Vernon, R. (1992). International investment and international trade in the product cycle. In *International Economic Policies and their Theoretical Foundations (Second Edition)* (pp. 415–435). Elsevier.
- Vliet, W. van. (2002). Cities in a globalizing world: from engines of growth to agents of change. *Environment and Urbanization*, 14(1), 31–40. <https://doi.org/10.1177/095624780201400103>
- Wallerstein, I. (1979). *The capitalist world-economy* (Vol. 2). Cambridge University Press.
- Warr, P. G. (1987). Export promotion via industrial enclaves: the Philippines' Bataan export processing zone. *The Journal of Development Studies*, 23(2), 220–241.
- Warr, P. G. (1989). Export processing zones: The economics of enclave manufacturing. *The World Bank Research Observer*, 4(1), 65–88.
- Waugh, D. (2005). *Geography: An Integrated Approach*. Nelson Thornes.
- Wheaton, W. C., & Shishido, H. (1981). Urban concentration, agglomeration economies, and the level of economic development. *Economic Development and Cultural Change*, 30(1), 17–30.
- White, M. J. (1988). *American neighborhoods and residential differentiation*. Russell Sage Foundation.
- Wijaya, H. B., Kurniawati, H., & Hutama, S. (2018). Industrialization Impact on Worker Mobility and Land Use in Peri Urban Area (Case study of Semarang District, Indonesia). In *IOP Conference Series: Earth and Environmental Science* (Vol. 123, p. 12037). IOP Publishing.
- World Bank. (2009). *World Development Report: Reshaping Economic Geography*.
- World Bank. (2018a). Land area (sq.km). Retrieved February 23, 2018, from <https://data.worldbank.org/indicator/AG.LND.TOTL.K2>

References

- World Bank. (2018b). Urban land area (sq.km). Retrieved February 23, 2018, from <https://data.worldbank.org/indicator/AG.LND.TOTL.UR.K2>
- Wu, J. (2014). Urban ecology and sustainability: The state-of-the-science and future directions. *Landscape and Urban Planning*, 125, 209–221.
- Yang, X. (1990). Development, structural changes and urbanization. *Journal of Development Economics*, 34(1–2), 199–222.
- Zenou, Y. (2009). *Urban labor economics*. Cambridge University Press.
- Zhang, J. (2002). Urbanization, population transition, and growth. *Oxford Economic Papers*, 54(1), 91–117.

Appendix

Appendix 1: Interview questionnaire (Translated)

Key Informant Interview Questionnaire

This questionnaire is intended to gather data on mentioned study. You are not obliged to take part in this study. All responses will be kept confidential.

Please tick or write your answer in appropriate area. If there are multiple answer, please tick or write them all.

Part A: Respondent's personal and migration information

1. Respondent's Name: 2. Age: years
3. Sex ☐ Male ☐ Female; 4. Education:
5. Residential Address
.....
6. Occupation and Workplace:
.....
7. Origin: Sub-district: District
8. How long you are living here and why you came here?

Part B: Information on Industrialisation and Development

9. When the flow of people increased here?
10. Why increased? ☐ Industrialisation, ☐ Transit network ☐ Influence of nearby growth ☐ Government plan and initiatives ☐ Others:
11. Which industry plays key role to attract people to come here? (write according to the importance?
.....
12. Which other occupational growth occurs along with industrialization and population growth? And why?
.....
.....
13. In which settlement most of the industrial workers are living?
☐ Concrete building ☐ Semi-concrete building ☐ Semi-concrete slum ☐ Katcha ☐ Jhupri
14. Is there impact of the demand of industrial workers on the development of housing pattern or housing quality? If yes, what kind of impact?
.....
.....

Part C: Impact of Industrialisation and population growth on environment and infrastructure

Elements		Past and Present Quality (Tick the answers)					Change in last 10 years				Is there any impact of industrialization and population growth				
							Increase	Decreased	Similar	Don't know	No	Low	Average	High	V. High
Environment	Air quality	V. Good	Good	Average	Bad.	V. Bad									
	Water quality	V. Good	Good	Average	Bad.	V. Bad									
	Waterbodies	Abundant	Sufficient	Average	Insufficient	Nill									
	Vegetation	Abundant	Sufficient	Average	Insufficient	Nill									
	Open space	Abundant	Sufficient	Average	Insufficient	Nill									
	Waterlogging	Nill	Few	Average	High	V.High									
Infrastructure and Service	Number of roads	Abundant	Sufficient	Average	Insufficient	Nill									
	Quality of roads	V. Good	Good	Average	Bad.	V. Bad									
	Transport	V. Good	Good	Average	Bad.	V. Bad									
	Education facilities	Abundant	Sufficient	Average	Insufficient	Nill									
	Health facilities	Abundant	Sufficient	Average	Insufficient	Nill									
	Sewerage system	V. Good	Good	Average	Bad.	V. Bad									
	Waste management	V. Good	Good	Average	Bad.	V. Bad									
	Play ground	Abundant	Sufficient	Average	Insufficient	Nill									
	Security	V. Good	Good	Average	Bad.	V. Bad									
Others	Drug problems	Nill	Few	Average	High	V.High									
	Illegal activities	Nill	Few	Average	High	V.High									
	Social bonding	V. Good	Good	Average	Bad.	V. Bad									
	Humanity	V. Good	Good	Average	Bad.	V. Bad									

Please include other comments (if any):

Part D: Information on Sustainable Development and Planning

15. Do you think the development is planned? ☐ Yes ☐ No

16. If not, why unplanned?

.....

.....

17. Do you think, a plan is needed for sustainable development? And when? ☐ Yes ☐ No

18. Which issues needed to emphasize in the plan?

.....

.....

.....

19. What will be the challenges for planning and its implementation in this area?

.....

.....

.....

20. What are the causes of failure of a plan?

.....

.....

.....

Thank you for your kind cooperation

Respondent's signature and date

Contact Number (if you wish):

Appendix 2: A completed interview questionnaire with notes

2
Record

ঢাকার উপনগরীয় বা গ্রামীণ-নগর প্রান্তিক এলাকার পরিবর্তনে
শিল্পায়নের প্রভাব এবং ঐ সকল এলাকার টেকসই উন্নয়নে
পরিকল্পনার ভূমিকা বিষয়ক গবেষণা

গবেষণার বিষয়বস্তু ও উদ্দেশ্য:

পরিসংখ্যান ও অন্যান্য উপাত্ত থেকে আমরা দেখতে পাচ্ছি, গত দুই দশক ধরে কানাবাড়ি-কাশিমপুর এলাকায় ব্যাপক পরিবর্তন এসেছে। শিল্পকারখানা বেড়েছে এবং বেড়েছে মানুষজন। শিল্পকারখানা এবং জনসংখ্যার বৃদ্ধি স্বাভাবিকভাবেই এই এলাকার ভূমি, ভূমি ব্যবহার, আর্থ-সামাজিক অবস্থা ও পরিবেশের উপর প্রভাব ফেলেছে। অত্যন্ত দ্রুত বর্ধনশীল ও পরিবর্তনশীল এলাকায় সাধারণত অপরিকল্পিত উন্নয়ন লক্ষ্য করা যায়। সাময়িকভাবে, অর্থনৈতিক বিবেচনায় এই এলাকার জন্য এ প্রক্রিয়া লাভজনক হলেও দীর্ঘ পরিক্রমায় তা অনেক সমস্যার তৈরি করতে পারে যা আমরা ঢাকা শহরে দেখতে পাচ্ছি। এ প্রেক্ষিতে টেকসই উন্নয়নের জন্য প্রয়োজন সমন্বয়যোগ্য এবং স্থানীয় চাহিদা ও গতিধারার সাথে সামঞ্জস্যপূর্ণ পরিকল্পনার, যা একদিকে এলাকার অর্থনৈতিক উন্নয়নের জন্য সহায়ক হবে এবং অন্যদিকে এলাকাটিকে সবার জন্য বাসযোগ্য করে গড়ে তুলতে সাহায্য করবে। আমাদের মত উন্নয়নশীল দেশে অনেকসময়ই দেখা যায় নগর বা অঞ্চল পরিকল্পনায় স্থানীয় চাহিদার প্রতিফলন ঠিকমত হয়না। অন্যান্য অনেক কারণের সাথে পর্যাপ্ত তথ্য ও গবেষণার অভাবও এর জন্য দায়ী। এই আলোকে বর্তমান গবেষণাটি একটি ক্ষুদ্র প্রয়াস মাত্র। এই গবেষণায় মাধ্যমে কতগুলো প্রশ্নের উত্তর খোঁজার চেষ্টা করা হবে। প্রশ্নগুলো হচ্ছে- কেন এবং কিভাবে মূল শহরের (ঢাকা) বাইরে শিল্পায়ন ও নগরায়ন হচ্ছে? এই প্রক্রিয়া কেন এবং কিভাবে এলাকার ভূমি, ভূমি ব্যবহার, আর্থ-সামাজিক ও পরিবেশের উপর প্রভাব ফেলেছে? এই প্রক্রিয়ায় স্থানীয়ভাবে কি কি নতুন চাহিদা তৈরি হচ্ছে? এবং কিভাবে স্থানীয় এই প্রক্রিয়াটিকে একটি বৃহৎ পরিকল্পনায় বিবেচনা করা যায়?

এই গবেষণাটি যৌথভাবে যুক্তরাজ্যের কার্ডিফ বিশ্ববিদ্যালয় এবং নেদারল্যান্ড এর রেডবাউড বিশ্ববিদ্যালয়ের অধীনে আমার এমএস প্রোগ্রামের অংশ হিসেবে করা হচ্ছে। গবেষণাটির গুরুত্ব বিবেচনা-পূর্বক আপনার স্বতঃস্ফূর্ত অংশগ্রহণ কামনা করছি এবং আশা করছি আপনি আপনার সাধের মধ্যে পর্যাপ্ত উপাত্ত/ তথ্য দিয়ে সহায়তা করবেন।

যে কোন প্রয়োজনে যোগাযোগের জন্য

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সাক্ষাৎকারের প্রশ্নপত্র

এই প্রশ্নপত্রের মাধ্যমে উল্লিখিত বিষয়ে গবেষণার জন্য উপাত্ত সংগ্রহ করা হচ্ছে। এতে অংশগ্রহণ করার জন্য আপনি বাধ্য নন। আপনার উত্তরগুলো গবেষণার নৈতিকতা মেনে সংরক্ষণ করা হবে এবং গোপন রাখা হবে। সকল প্রশ্নপত্রের উপাত্ত পর্যালোচনা করে প্রাপ্ত ফলাফল গবেষণা রিপোর্টে উপস্থাপন করা হবে। সরাসরি আপনার নামে কোন তথ্য গবেষণায় উপস্থাপন করা হবে না।

আপনার উত্তর খালি জায়গায় লিখুন অথবা উত্তরের পাশে টিক চিহ্ন দিন। কোন প্রশ্নের একাধিক উত্তর হলে সবগুলো কমা দিয়ে লিখুন অথবা একাধিক উত্তরের পাশে টিক চিহ্ন দিন।

অংশ - কঃ উত্তরদাতার ব্যক্তিগত ও অভিজ্ঞতামূলক তথ্য

১। উত্তরদাতার নাম: [Redacted] ... ২। বয়স: ৪৮ বছর

৩। লিঙ্গ: ☒ পুরুষ ☐ মহিলা; ৪। পেশা: ... ৪। শিক্ষাগত যোগ্যতা: MSS

৫। আবাসিক ঠিকানা (বাড়ি নং ও রাস্তার নাম সহ): গ্রাম- মুরারি, ৫২০ জয়পুর

গাঙ্গীপুর গ্রামস্থান

৬। পেশা ও কর্মস্থলের ঠিকানা (প্রতিষ্ঠানের নাম সহ): প্রধান শিক্ষক ফারুকুল হক উচ্চ বিদ্যালয়

৭। উৎপত্তিস্থলের (গ্রামের বাড়ি) ঠিকানা: উপজেলা: গাঙ্গীপুর সদর জেলা: গাঙ্গীপুর

৮। এই এলাকায় কবে থেকে বসবাস করছেন এবং কেন এসেছিলেন? বনামুয়ে

অংশ - খঃ এলাকার শিল্পায়ন ও উন্নয়ন সম্পর্কিত তথ্য

৯। এই এলাকায় কবে থেকে মানুষজনের আসার পরিমাণ বেড়েছে? ১৯৯০ ... সাল থেকে

১০। কেন বেড়েছে বলে মনে করেন? ☒ শিল্পকারখানার বৃদ্ধি, ☒ মহাসড়কের কারণে ☐ পার্শ্ববর্তী এলাকার উন্নয়নের প্রভাবে

☐ সরকারী পরিকল্পনা বা উদ্যোগের কারণে ☐ অন্যান্য: কর্মসংস্থান

১১। যদি শিল্পায়নের কারণে হয় তাহলে কোন কোন শিল্পকারখানা মানুষজন আকৃষ্ট করার জন্য মুখ্য ভূমিকা পালন করেছে বা করছে? (সবচেয়ে গুরুত্বপূর্ণটি প্রথমে লিখুন): ... ১। গার্মেন্টস (চাটালু গ্রাম), ফুলনা গ্রাম, জোয়াদপুর ... ২। মাটির পাতাল খনন কারখানা

১২। শিল্পায়ন ও এর ফলে মানুষজনের আগমনের কারণে আর কি কি ধরনের পেশাজীবী এখানে বেড়েছে? ... ২। চাষিদের জন্য ব্যবসায়ী, ব্যবসায়ী, মালিকানা, মালিকানা, মালিকানা

১৩। বেশীরভাগ শিল্পকারখানায় কর্মরত মানুষজন কোন ধরনের বসতিতে বসবাস করছে? বাড়ি

☐ পাকা দালান ☒ আধা পাকা ☐ আধাপাকা বস্তি ☐ কাঁচা ☐ ঝুগড়ি

১৪। এলাকার আবাসিক উন্নয়ন ও ধরনের (যেমনঃ ঘনবসতিপূর্ণ বাসা, বস্তি, নিয়ন্ত্রণীয় লোকজনের বাসা বাড়ি ইত্যাদি) পেছনে শিল্পকারখানা আগত মানুষজনের চাহিদার কোন প্রভাবে আছে বলে মনে করেন? কি ধরনের প্রভাবে? ...

চাহিদা অনুযায়ী বাড়ি ... ১। চাহিদা অনুযায়ী বাড়ি ... ২। চাহিদা অনুযায়ী বাড়ি ... ৩। চাহিদা অনুযায়ী বাড়ি ... ৪। চাহিদা অনুযায়ী বাড়ি ... ৫। চাহিদা অনুযায়ী বাড়ি ... ৬। চাহিদা অনুযায়ী বাড়ি ... ৭। চাহিদা অনুযায়ী বাড়ি ... ৮। চাহিদা অনুযায়ী বাড়ি ... ৯। চাহিদা অনুযায়ী বাড়ি ... ১০। চাহিদা অনুযায়ী বাড়ি ... ১১। চাহিদা অনুযায়ী বাড়ি ... ১২। চাহিদা অনুযায়ী বাড়ি ... ১৩। চাহিদা অনুযায়ী বাড়ি ... ১৪। চাহিদা অনুযায়ী বাড়ি ... ১৫। চাহিদা অনুযায়ী বাড়ি ... ১৬। চাহিদা অনুযায়ী বাড়ি ... ১৭। চাহিদা অনুযায়ী বাড়ি ... ১৮। চাহিদা অনুযায়ী বাড়ি ... ১৯। চাহিদা অনুযায়ী বাড়ি ... ২০। চাহিদা অনুযায়ী বাড়ি ...

জীবন যাত্রার মান বেড়েছে, দক্ষিণে গমি অনেক ছিল, খেতে কষ্ট করত, গমির দল অনেক বেড়ে গেছে, বাড়ি চরকার বেড়া দিয়ে আশ করছে।

খানীম মোকব্বেরের স্বামী আশ আশম এটিও বলে থেকে।

অংশ - গঃ কোনাবাড়ি-কাশিমপুর এলাকার পরিবেশ ও অবকাঠামোগত মান, মানের পরিবর্তন এবং পরিবর্তনে শিল্পায়ন ও জনসংখ্যা বৃদ্ধির প্রভাব (উত্তরের পাশে বা খালি অংশে টিক চিহ্ন দিন)

উপাদান	ঘরের এবং বর্তমান মান বা অবস্থা (উত্তরের পাশে টিক চিহ্ন দিন)				গত পাঁচ-দশ বছরে অবস্থা/মানের পরিবর্তন				শিল্পায়ন ও জনসংখ্যা বৃদ্ধির প্রভাব আছে কিনা?				
					বেড়েছে	কমেছে	আগের মতই	জানা নেই	নেই	সামান্য	মোটামুটি	বেশ	অনেক বেশ
পরিবেশগত উপাদান	বায়ুর শুনাতণ	খুব ভাল	ভাল	মোটামুটি	খারাপ	খুব খারাপ							✓
	পানির শুনাতণ	খুব ভাল	ভাল	মোটামুটি	খারাপ	খুব খারাপ							✓
	জলাধার/জলাশয়	প্রচুর	পর্যাপ্ত	মোটামুটি	অপর্যাপ্ত	নেই						✓	✓
	সবুজ আবরণ/গাছপালা	প্রচুর	পর্যাপ্ত	মোটামুটি	অপর্যাপ্ত	নেই						✓	
	খোলা জায়গা	প্রচুর	পর্যাপ্ত	মোটামুটি	অপর্যাপ্ত	নেই						✓	
	জলাবদ্ধতা	নেই	সামান্য	মোটামুটি	বেশ	অনেক বেশ		✓			✓		
অবকাঠামো এবং সেবা উপাদান	রাস্তাঘাটের পরিমাণ	প্রচুর	পর্যাপ্ত	মোটামুটি	অপর্যাপ্ত	নেই	✓						✓
	রাস্তাঘাটের মান	খুব ভাল	ভাল	মোটামুটি	খারাপ	খুব খারাপ		✓				✓	
	যাতায়াত ব্যবস্থা	খুব ভাল	ভাল	মোটামুটি	খারাপ	খুব খারাপ	✓					✓	
	শিক্ষা প্রতিষ্ঠান	প্রচুর	পর্যাপ্ত	মোটামুটি	অপর্যাপ্ত	নেই		✓					✓
	স্বাস্থ্য সেবা প্রতিষ্ঠান	প্রচুর	পর্যাপ্ত	মোটামুটি	অপর্যাপ্ত	নেই		✓				✓	
	পয়ঃনিষ্কাশন ব্যবস্থা	খুব ভাল	ভাল	মোটামুটি	খারাপ	খুব খারাপ		✓				✓	
	বর্জ্য ব্যবস্থাপনা	খুব ভাল	ভাল	মোটামুটি	খারাপ	খুব খারাপ		✓					✓
	খেলার জায়গা	প্রচুর	পর্যাপ্ত	মোটামুটি	অপর্যাপ্ত	নেই		✓					✓
অন্যান্য	নিরাপত্তা ব্যবস্থা	খুব ভাল	ভাল	মোটামুটি	খারাপ	খুব খারাপ		✓					
	মাদক সমস্যা	নেই	অতি সামান্য	সামান্য	বেশ	অনেক বেশ	✓						✓
	অনৈতিক কর্মকাণ্ড	নেই	অতি সামান্য	সামান্য	বেশ	অনেক বেশ	✓						✓
	সামাজিকতা ও বন্ধন	খুব ভাল	ভাল	মোটামুটি	খারাপ	খুব খারাপ		✓				✓	
	মানবিক মূল্যবোধ	খুব ভাল	ভাল	মোটামুটি	খারাপ	খুব খারাপ		✓			✓		

অন্য কোন বিষয়ে মতামত থাকলে এখানে লিখুন:

পারস্পরিক সম্মান ও সহযোগিতা
করে গিয়েছে

বাবা বৃদ্ধক ছিলেন যা দিয়ে
পরিবার চালান।
যাদের তাকি খেলে তারা
চরকাভি তৈরি করেছেন।

৭/৮ টি গুরুত্বপূর্ণ ছিল এখন ঘরে গেছে (জেকি) কানি এখন নিচ থেকে গেছে।

২০০০ টি গুরুত্বপূর্ণ দান (২০০০ টি গুরুত্বপূর্ণ দান)

যাওয়ার সময় এখন অনেক বড় ট্রাকের ক্যামিওন যোগাযোগে আনতে গেছে।

২০০০ টি গুরুত্বপূর্ণ (২০০০ টি গুরুত্বপূর্ণ দান)

একটি/একটি গুরুত্বপূর্ণ দান/কম খেলে বসে থাকা দান মতলাই গুরুত্বপূর্ণ/দান

২০০০ টি গুরুত্বপূর্ণ (২০০০ টি গুরুত্বপূর্ণ দান) মতলাই গুরুত্বপূর্ণ (২০০০ টি গুরুত্বপূর্ণ দান)

বেশি

মাদক সমস্যা: তিন তিন লোকের এতিমের দান, এতিমের দান দিতে গিয়ে ও এতিমের দান
দিয়ে গিয়েছেন (২০০০ টি গুরুত্বপূর্ণ দান) মতলাই গুরুত্বপূর্ণ (২০০০ টি গুরুত্বপূর্ণ দান)

অংশ - দ্বঃ এলাকার টেকসই উন্নয়ন ও পরিকল্পনা সম্পর্কিত তথ্য

১৫। এই এলাকার উন্নয়ন পরিকল্পিতভাবে হয়েছে বলে আপনি মনে করেন কি? ☐ হ্যাঁ ☒ না

১৬। যদি না হয়ে থাকে তাহলে কেন হচ্ছেনা? ... ১) সময় অনুসারে থানা ২) কোন এলাকা
আগে ছিলনা ৩) অসুবিধা অনুযায়ী

১৭। যদি না হয়ে থাকে তাহলে টেকসই উন্নয়নের জন্য পরিকল্পনার প্রয়োজন মনে করেন কি? ☒ হ্যাঁ ☐ না কিন্তু প্রকৃতি পরিবর্তন
এখানে

১৮। পরিকল্পনায় কোন কোন বিষয়ে বেশি গুরুত্ব দেওয়া উচিত (বিষয় বা উপাদানের জন্য পূর্ববর্তী পৃষ্ঠার সাহায্য নিতে পারেন)?

১। কৃষিক্ষেত্র ২। পরিবহন ৩। শিক্ষা
৪। স্বাস্থ্য ৫। বাস্তবায়ন

১৯। এই এলাকার জন্য পরিকল্পনা করা এবং বাস্তবায়নের জন্য প্রধান চ্যালেঞ্জগুলো কি হবে বলে মনে করেন?

১। অর্থের অভাব ২। অসুবিধা

২০। পরিকল্পনা সঠিক ভাবে কাজ না করার পেছনে বা বাস্তবায়িত না হওয়ার পেছনে মূল কারণগুলো কি বলে মনে করেন?

১। অর্থের অভাব ২। অসুবিধা
৩। অসুবিধা ৪। অসুবিধা

আন্তরিক সহযোগিতার জন্য আপনাকে অসংখ্য ধন্যবাদ

২২/৬/২২

উত্তর

যোগাযোগের নম্বর (যদি দিতে চান)

Appendix 3: Household survey questionnaire (Translated)**Household Survey Questionnaire**

This questionnaire is intended to gather data on mentioned study. You are not obliged to take part in this study. All responses will be kept confidential.

Please tick or write your answer in appropriate area. If there are multiple answer, please tick or write them all.

Settlement ID and address:

1. Respondent's Name: 2. Age:

3. Sex: ☐ Male ☐ Female 4. Education Level:

5. Family members: Male: Female: Total: Children: School going: ...

6. Earning members: Male: Female: ... 7. Family income: 8. Rent:

9. Residency type: ☐ With family ☐ Dormitory 10. No. of rooms and size:

11. Settlement type:

12. Information of earning members:

Sex	Edu	Occupation	Workplace	Distance	Income

13. Origin: Sub-district: District:

14. Why you leave your origin?

15. First migration: Where When Why that area

.....

16. When you came here? Why?

.....

17. Ever lived in Dhaka? ☐ Yes ☐ No; When? Why leaved Dhaka?

.....

18. Why you directly come here?

19. What are advantages and disadvantages to live here compare to Dhaka?

Advantages:

Disadvantages:

Thank you for your kind cooperation

Respondent's signature and date

Contact Number (if you wish):

Appendix 4: A completed household survey questionnaire

2-1

Settlement - 2
(৯: ১)

শুমারি জরিপের প্রশ্নপত্র

এই প্রশ্নপত্রের মাধ্যমে উল্লিখিত বিষয়ে গবেষণার জন্য উপাত্ত সংগ্রহ করা হচ্ছে। এতে অংশগ্রহণ করার জন্য আপনি বাধ্য নন। আপনার উত্তরগুলো গবেষণার নৈতিকতা মেনে সংরক্ষণ করা হবে এবং গোপন রাখা হবে। সকল প্রশ্নপত্রের উপাত্ত পর্যালোচনা করে প্রাপ্ত ফলাফল গবেষণা রিপোর্টে উপস্থাপন করা হবে। সরাসরি আপনার নামে কোন তথ্য গবেষণায় উপস্থাপন করা হবে না।

বসতির আইডি ও নাম:

১। উত্তরদাতার নাম: [Redacted] ২। বয়স: ২৬ বছর

৩। লিঙ্গ: ☒ পুরুষ ☐ মহিলা; ৪। পেশা: চাকুরী ৪। শিক্ষাগত যোগ্যতা: অসম

৫। পরিবারের সদস্য সংখ্যা: পুরুষ: ... মহিলা: ... মোট: ... শিশু: ... স্থলগামী শিশু: ...

৬। উপার্জনকারী সদস্য সংখ্যা: পুরুষ: ... মহিলা: ... মোট আয়: ২২,০০০ ৮। বাড়িভাড়া: ২৭০০ (২/২)

৯। বসবাসের ধরণ: ☐ পরিবারের সাথে ☒ মিস; ১০। রুম সংখ্যা ও আকার: ২, (৬০২.৫) ১১। বসতির ধরণ: ২

১২। উপার্জনকারী সদস্যদের তথ্য:

লিঙ্গ	শিক্ষা	পেশা	কর্মস্থলের নাম ও ঠিকানা	কর্মস্থলের দূরত্ব	মাসিক আয়
পুরুষ	প্রাইমারি	অসহযোগিতার জন্য	অসহযোগিতার জন্য	২৫ মি.	২২,০০০

১৩। উপস্থিতির (গ্রামের বাড়ি) ঠিকানা: উপজেলা: কুমিল্লা জেলা: কুমিল্লা

১৪। গ্রাম থেকে কেন অভিজ্ঞান করেছিলেন? ২

১৫। প্রথম অভিজ্ঞান: কোথায়? নারায়ণপুর কবে? ২০০৭ কেন অভিজ্ঞান করেছিলেন? চাকুরী

কেন এ এলাকায়? ৪

১৬। এই এলাকায় কবে থেকে আছেন? ২০০৯ কেন এসেছিলেন? চাকুরী ও এ. চাকুরী ও চাকুরী

১৭। কখনো ঢাকা শহরে ছিলেন? ☐ হ্যাঁ ☒ না; কখন? কেন ছেড়েছেন?

১৮। ঢাকা না গিয়ে সরাসরি এখানে কেন এসেছেন? ৭

১৯। ঢাকা থেকে এখানে কি সুবিধা বেশী বা কম বলে মনে হয়?

বেশী: ঢাকা, চাকুরী, ২৫ মি. তাই জানাই

কম:

আন্তরিক সহযোগিতার জন্য আপনাকে অসংখ্য ধন্যবাদ

উত্তরদাতার স্বাক্ষর ও তারিখ: [Redacted] যোগাযোগের নম্বর (যদি দিতে চান)

Appendix 5: Descriptive statistics of the indicators and measures

Indicator/ Measure	N	Range	Minimum	Maximum	Mean	Std. Deviation
Area in sq.km	379	147.43	0.65	148.08	19.78	13.68
Distance from the core city in metres	379	64518.00	0.00	64518.00	26260.40	14504.25
Distance from the national highway in metres	379	23830.00	351.00	24181.00	7433.74	6008.03
Population density in 2011 (people per sq.km)	379	112688.20	61.32	112749.52	3639.70	9204.94
Population density change between 2001 and 2011 (people per sq.km)	379	56916.16	-2082.71	54833.45	1074.74	4002.80
Industrial employment density in 2010	379	11881.54	0.00	11881.54	304.18	1119.95
Industrial employment density change between 2000 and 2010	379	6501.34	0.00	6501.34	107.33	458.85
Manufacturing sector employment density in 2010	379	6380.88	0.00	6380.88	99.87	442.83
Manufacturing sector employment density change between 2000 and 2010	379	9128.14	-2747.26	6380.88	89.03	461.75
Garment sector employment density in 2010	379	11287.00	0.00	11287.00	225.87	954.71
Garment sector employment density change between 2000 and 2010	379	6326.83	0.00	6326.83	85.52	426.25

Appendix 6: Tables generated from interview data

Appendix 6.1. When the flow of immigrants increased (Section B Question 9)

Time	Total response
1990	5
1995	1
1999	1
2000	4
2002	2
2007	2
2011	1

Table 6.2. What are the main reasons for population growth (Section B Question 10)

Reasons	First	Second	Third	Total response
Industrial development	16			16
Employment opportunity		3	3	6
Access to highway		3	2	5
Land level		3		3
Effects of nearby areas		2	1	3
Scope for small business		1	1	2
Near to Dhaka			1	1

Table 6.3. Which industry(s) plays key role in attracting population (Section B Question 11)

Industry sectors	First	Second	Third	Total response
Garment	16			16
Brick manufacturing		3	1	4
Poultry		2		2
Cosmetics		1	1	2
Metal		1		1
Shoe		1		1
Other small business			1	1

Table 6.4. What another occupational group has been increased to this area along with the industrial workers (Section B Question 12)

Occupation sectors	First	Second	Third	Forth	Fifth	Total response
Small business	12		1			13
Business to support basic needs		8			1	9
<i>Jhut</i> (Garment wastage business)	3					3
Transport		2	1			3
Education	1		1			2
Pharmacy			2			2
Cottage industry		1				1
Mason		1				1
NGO		1				1
Financial			1			1
Restaurant			1			1
Mechanic				1		1

Table 6.5. In which type of dwelling structure, the most migrants are living? (Section B Question 13)

Structure type	First	Second	Total response
Semi-concrete	16		16
Concrete		5	5
Slum		2	2

Table 6.6. What is the influence of industry-driven population growth on housing development pattern (Section B Question 14)

Influence on housing development	First	Second	Third	Total response
Affordable settlement for worker	12			12
Dense settlement	3	1		4
Rent increase		1	2	3
Housing development pattern	1			1
Building for high class		1		1
Education institution		1		1
Land price increase		1		1
Loss of agricultural land		1		1
Low open space			1	1
Pollution			1	1

Table 6.7. What are reasons for such kind of housing development pattern? (Section B Question 14)

Cause	Total response
Demand	12
Low income	4

Table 6.8 Participants' assessment on the change of condition of the components assessed (Section C)**A. Air quality** (response = 16)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB						0
	B						0
	M		1				1
	G		4	4			8
	VG	3	4				7
	T	3	9	4	0	0	16

B. Water quality (response = 16)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB						0
	B						0
	M						0
	G	1	4		5		10
	VG	2	1		2	1	6
	T	3	5	0	7	1	16

C. Underground water level (n = 9)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB						0
	B						0
	M						0
	G	4	1				5
	VG	4					4
	T	8	1	0	0	0	9

D. No. of waterbodies (n = 16)

Past condition	Present condition						
		N	IS	M	S	AB	T
	N						0
	IS						0
	M	1	1				2
	S	1	7	2			10
	AB	1	3				4
	T	3	11	2	0	0	16

E. Waterlogging (n = 14)

Past condition	Present condition						
		N	L	M	H	VH	T
	N	1		1	3	4	9
	L				3		3
	M				1		1
	H		1				1
	VH						0
	T	1	1	1	7	4	14

F. Green coverage (n = 16)

Past condition	Present condition						
		N	IS	M	S	AB	T
	N						0
	IS						0
	M		1				1
	S	1	8	1			10
	AB	1	2	1	1		5
	T	2	11	2	1	0	16

G. Road networks (n = 16)

Past condition	Present condition						
		N	IS	M	S	AB	T
	N						0
	IS			5	3		8
	M		1	1	4		6
	S				2		2
	AB						0
	T	0	1	6	9	0	16

H. Road quality (n = 16)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB						0
	B		3	5	1		9
	M	1	1	1	2		5
	G		2				2
	VG						0
	T	1	6	6	3	0	16

I. Transport system (n = 16)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB						0
	B			5	3		8
	M			3	4		7
	G			1			1
	VG						0
	T	0	0	9	7	0	16

J. Education institutions (n = 16)

Past condition	Present condition						
		N	IS	M	S	AB	T
	N						0
	IS		2	1	7	1	11
	M			1	2	1	4
	S					1	1
	AB						0
	T	0	2	2	9	3	16

K. Healthcare centres (n = 16)

Past condition	Present condition						
		N	IS	M	S	AB	T
	N		2	1			3
	IS		4	5	3		12
	M			1			1
	S						0
	AB						0
	T	0	6	7	3	0	16

L. Sewerage management (n = 16)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB	6					6
	B			2	1		3
	M	1		1			2
	G	1	1	2	1		5
	VG						0
	T	8	1	5	2	0	16

M. Waste management (n = 15)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB	3					3
	B		1	1	2		4
	M	1	3	1			5
	G	1	1	1			3
	VG						0
	T	5	5	3	2	0	15

P. Open spaces (n = 16)

Past condition	Present condition						
		N	IS	M	S	AB	T
	N						0
	IS						0
	M	1					1
	S	3	7				10
	AB	3	2				5
	T	7	9	0	0	0	16

G. Playgrounds (n = 16)

Past condition	Present condition						
		N	IS	M	S	AB	T
	N						0
	IS						0
	M	1					1
	S	2	13				15
	AB						0
	T	3	13	0	0	0	16

H. Security (n = 16)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB						0
	B			1	1		2
	M				2		2
	G		2	3	6	1	12
	VG						0
	T	0	2	4	9	1	16

Q. Drug problems (n = 16)

Past condition	Present condition						
		N	L	M	H	VH	T
	N		2		2	4	8
	L		1	1		4	6
	M			1			1
	H			1			1
	VH						0
	T	0	3	3	2	8	16

R. Illegal activities (n = 16)

Past condition	Present condition						
		N	L	M	H	VH	T
	N	2	2		3	3	10
	L		1	1	2	2	6
	M						0
	H						0
	VH						0
	T	2	3	1	5	5	16

S. Social bonding (n = 16)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB						0
	B						0
	M			2			2
	G		3	4	4		11
	VG		1	2			3
	T	0	4	8	4	0	16

T. Values and humanity (n = 16)

Past condition	Present condition						
		VB	B	M	G	VG	T
	VB						0
	B						0
	M			1			1
	G	1	4	9			14
	VG			1			1
	T	1	4	11	0	0	16

VB=Very bad; B=Bad; M=Moderate; G=Good; VG=Very good; T=Total responses

N=No or very low; IS=Insufficient; M=Moderate; S=Sufficient; AB=Abundant; T=Total responses

N=No or very low; L=Low; M=Moderate; H=High; VH=Very high; T=Total responses

Table 6.9. Do you think the development of this area was planned? (Section D Question 15)

Response	Total response
Yes (Fifth-year plan)	1
No	15

Table 6.10. If not, why the growth was not planned? (Section D Question 16)

Causes	First	Second	Third	Fourth	Total response
Development based on individual interest	3	5			8
No planning authority	5				5
Lack of monitoring authority		2		1	3
People are not aware of the importance of the plan		1	2		3
No initiative from the government	1		1		2
Spontaneous development	2				2
Lack of land management system	1				1
Mixed development	1				1
No long-term thinking	1				1
Traditionally failure of the plan	1				1
Uncontrolled industrial development		1			1
Lack of responsibility		1			1
No proper implementation		1			1
Peoples greed for money			1		1
Lack of coordination			1		1
Leaders are not concerned				1	1
Political indecision				1	1

Table 6.11. What should be the priority in the plan? (Section D Question 18)

Planning priorities	First	Second	Third	Fourth	Fifth	Total responses
Industrial development plan	3		1	1		5
Drainage	1	2	1			4
Quality education		3			1	4
Public participation			1	1	2	4
Road infrastructure	3					3
Transport infrastructure	3					3
Waste management	1	1	1			3
Drug control		1		1	1	3
Housing development plan		1	2			3
Physical infrastructure		3				3
Liveable environment	1	1				2
Industrial pollution control		2				2
Healthcare			2			2
Land zoning and restriction			1	1		2
Sewerage management			2			2

Planning priorities	First	Second	Third	Fourth	Fifth	Total responses
Land management plan	1					1
Long-term plan	1					1
No brickfield near the settlement	1					1
Security	1					1
Development monitoring			1			1
Issue-based development			1			1
Fire hazard management				1		1
Increasing green spaces				1		1
Recreational facilities				1		1
Reduction of inequality				1		1

Table 6.12. What will be the challenges for the authority to deliver an implementable plan?
(Section D Question 19)

Challenges	First	Second	Third	Fourth	Total response
Acquiring lands for road	4	1	1		6
Densely developed	2				2
Compensation for land	1	1			2
Political indecision	1	1			2
Time-consuming	1	1			2
Power politics		1	1		2
Coordination	1				1
Financing	1				1
Local protest	1				1
Not willing to provide land	1				1
Redevelopment on unplanned growth	1				1
Controlling industrial pollution	1				1
Accommodating unplanned development	1				1
Corruption		1			1
No public land			1		1
Redevelopment expensive				1	1

Table 6.13. What are the reasons behind the failure of a plan? (Section D Question 20)

Causes of plan failure	First	Second	Third	Fourth	Total response
Corruption	1	3	1		5
Lack of coordination	3		1	1	5
Lack of awareness	1	1	1	1	4
Lack of public participation	2	1	1		4
Administrative failure	3				3
Lack of responsibility	1	1	1		3
Not reflecting local demand	1	1	1		3
Power politics	1		1		2
Lack of information		1		1	2
Lack of monitoring programme		1	1		2
Local protest		2			2
Lack of patriotism	1				1
Low compensation	1				1
Time-consuming	1				1
Lack of transparency		1			1
Lack of willingness		1			1
Personal interest		1			1
Cost-benefit			1		1
Lack of education				1	1

Appendix 7: Statistical tables generated from the household questionnaire survey

Table 7.1. Age-sex structure of the respondents

Age group	Number of respondents		Percent of respondents		Total respondents	
	Male	Female	Male	Female	Number	Percent
10-14	1		0.28	0.00	1	0.28
15-19	20	19	5.57	5.29	39	10.86
20-24	32	44	8.91	12.26	76	21.17
25-29	47	39	13.09	10.86	86	23.96
30-34	28	28	7.80	7.80	56	15.60
35-39	26	13	7.24	3.62	39	10.86
40-44	18	13	5.01	3.62	31	8.64
45-49	9	7	2.51	1.95	16	4.46
50-54	2	3	0.56	0.84	5	1.39
55-59	1	1	0.28	0.28	2	0.56
60-64	4	1	1.11	0.28	5	1.39
65-69	3		0.84	0.00	3	0.84
Total	191	168	53.20	46.80	359	100.00

Table 7.2. Respondent's level of education

Level of education	Number of respondents	Percent of respondents
No education	73	20.33
Grade 1 to 5	86	23.96
Grade 6 to 8	80	22.28
Grade 9 to 10	30	8.36
SSC	45	12.53
HSC	26	7.24
Bachelor	13	3.62
Masters	5	1.39
No data	1	0.28
Total	359	100.00

Table 7.3a. Respondent's occupation (Detail)

Major code	Occupation	Number of respondents		Percent of respondents		Total respondent	
		Male	Female	Male	Female	Number	Percent
5	Business	12	0	3.34	0.00	12	3.34
5	Business-Fruits	1	0	0.28	0.00	1	0.28
5	Business-House Owner	1	0	0.28	0.00	1	0.28
5	Business-Milk	1	0	0.28	0.00	1	0.28
5	Business-Seasonal	1	0	0.28	0.00	1	0.28
3	Computer Operator - Garment	1	0	0.28	0.00	1	0.28
10	Cook	2	2	0.56	0.56	4	1.11
7	Day labour	4	0	1.11	0.00	4	1.11
6	Electrician	2	0	0.56	0.00	2	0.56
3	Engineer - Garments	3	0	0.84	0.00	3	0.84
1	Farmer	4	0	1.11	0.00	4	1.11
6	Govt. Service	1	0	0.28	0.00	1	0.28
99	House Owner	3	0	0.84	0.00	3	0.84
99	Housewife	2	53	0.56	14.76	55	15.32
5	Jhut Business	2	0	0.56	0.00	2	0.56
7	Jhut Worker	2	2	0.56	0.56	4	1.11
2	Mason	10	0	2.79	0.00	10	2.79
10	Mechanic	1	0	0.28	0.00	1	0.28
10	Poultry	1	0	0.28	0.00	1	0.28
8	Rickshaw puller	3	0	0.84	0.00	3	0.84
10	Settlement Manager	1	0	0.28	0.00	1	0.28
5	Shopkeeper	6	1	1.67	0.28	7	1.95
5	Shopkeeper - Fish	1	0	0.28	0.00	1	0.28
5	Shopkeeper-dish	1	0	0.28	0.00	1	0.28
5	Shopkeeper-Street food	1	0	0.28	0.00	1	0.28
5	Shopkeeper-Tea stall	1	0	0.28	0.00	1	0.28
99	Student	3	2	0.84	0.56	5	1.39
5	Tailor	1	1	0.28	0.28	2	0.56
6	Teacher	2	3	0.56	0.84	5	1.39
8	Transport driver	4	0	1.11	0.00	4	1.11
99	Unemployed	2	0	0.56	0.00	2	0.56
7	Worker	1	0	0.28	0.00	1	0.28
10	Worker-Bedding	0	1	0.00	0.28	1	0.28
4	Worker-Brickfield	0	1	0.00	0.28	1	0.28
4	Worker-Chair Factory	1	0	0.28	0.00	1	0.28
3	Worker-Garment	104	98	28.97	27.30	202	56.27
4	Worker-Plastic factory	2	0	0.56	0.00	2	0.56
10	Worker-Restaurant	1	0	0.28	0.00	1	0.28
4	Worker-Shoe factory	1	4	0.28	1.11	5	1.39
4	Worker-Timber	1	0	0.28	0.00	1	0.28
	Total	191	168	53.20	46.80	359	100.00

Table 7.3b. Respondent's occupation (summary of Table 7.3a)

Code	Occupation sector	Number of respondents			Percent of respondents		
		Male	Female	Total	Male	Female	Total
1	Agriculture	4	0	4	2.21	0.00	1.36
2	Construction workers	10	0	10	5.52	0.00	3.40
3	Garment manufacturing	108	98	206	59.67	86.73	70.07
4	Other manufacturing	5	5	10	2.76	4.42	3.40
5	Business	29	2	31	16.02	1.77	10.54
6	Services	5	3	8	2.76	2.65	2.72
7	Day labour	7	2	9	3.87	1.77	3.06
8	Transport	7	0	7	3.87	0.00	2.38
9-10	Others	6	3	9	3.31	2.65	3.06
	Total employed	181	113	294	100.00	100.00	100.00
99	Not employed	10	55	65			

Table 7.4. Type of dwelling

Type of dwelling	Number of households	Percent of households	Total population
Family	308	85.79	1042
Dormitory	51	14.21	51
Total	359	100.00	1093

Table 7.5. Household size (family dwelling)

Household size	Number of Households	Percent of Households	Total Population
1	7	2.27	7
2	75	24.35	150
3	96	31.17	288
4	80	25.97	320
5	37	12.01	185
6	4	1.30	24
7	5	1.62	35
8	3	0.97	24
9	1	0.32	9
Total	308	100.00	1042

Table 7.6. Households by number of earning members

Number of earning members	Number of households		Percent of households		Total population	Total earning member
	Family	Dormitory	Family	Dormitory		
1	114	51	37.01	100.00	416	165
2	148		48.05	0.00	472	296
3	35		11.36	0.00	148	105
4	10		3.25	0.00	53	40
No earning member	1		0.32	0.00	4	0
Total	308	51	100.00	100.00	1093	606

Table 7.7a. Primary source of family income by dwelling type (Detail)

Major code	Sector	Number of households		Percent of households		Total households	
		Family	Dormitory	Family	Dormitory	Number	Percent
1	Agriculture	2		0.65	0	2	0.56
5	Barber	1		0.32	0	1	0.28
5	Business	39	2	12.66	3.92	41	11.42
5	Business - Jhut	3	1	0.97	1.96	4	1.11
10	Cook	2	1	0.65	1.96	3	0.84
7	Day labour	11		3.57	0	11	3.06
3	Garment	176	33	57.14	64.71	209	58.22
5	Hawker	1		0.32	0	1	0.28
4	Job	12	6	3.9	11.76	18	5.01
6	Job - Electrician	2		0.65	0	2	0.56
6	Job - Govt	1		0.32	0	1	0.28
7	Job - Jhut	1	1	0.32	1.96	2	0.56
10	Job - Printing	1		0.32	0	1	0.28
6	Job - Sales	1		0.32	0	1	0.28
2	Mason	20	1	6.49	1.96	21	5.85
9	Rent	3		0.97	0	3	0.84
9	Rent - Agriculture	1		0.32	0	1	0.28
9	Rent - Business	1		0.32	0	1	0.28
9	Rent - Garment	2		0.65	0	2	0.56
8	Rickshaw puller	5		1.62	0	5	1.39
10	Security	1		0.32	0	1	0.28
5	Tailor	2	1	0.65	1.96	3	0.84
6	Teacher	3		0.97	0	3	0.84
8	Transport	16	5	5.19	9.8	21	5.85
10	Other	1		0.32	0	1	0.28
	Total	308	51	100.00	100.00	359	100.00

Table 7.7b. Primary source of family income (Summary of Table 7.7a)

Code	Main source of income	Households	
		Number	Percent
1	Agriculture	2	0.56
2	Construction workers	21	5.87
3	Garment manufacturing	209	58.38
4	Other manufacturing	18	5.03
5	Business	50	13.97
6	Services	7	1.96
7	Day labour	13	3.63
8	Transport	26	7.26
9	Rent	7	1.96
10	Others	6	1.68
	Total	359	100.00

Table 7.8. Number of garment workers by dwelling type

Number of garment workers in an HH	Number of households			Percent of households			Total garment workers	
	Family	Dormitory	Total	Family	Dormitory	Total	Number	Percent
0	69	12	81	22.40	23.53	22.56	0	0.00
1	141	39	180	45.78	76.47	50.14	180	45.57
2	81	0	81	26.30	0.00	22.56	162	41.01
3	15	0	15	4.87	0.00	4.18	45	11.39
4	2	0	2	0.65	0.00	0.56	8	2.03
Total	308	51	359	100.00	100.00	100.00	395	100.00

Table 7.9. Level of family income by earning members

Income range (BDT)	Number of HH by earning member					Percent of HH by earning member					Total HH	
	1	2	3	4	ND	1	2	3	4	ND	No	%
No data	1	0	0	0	0	0.28	0.00	0.00	0.00	0.00	1	0.28
0-4999	2	0	0	0	0	0.56	0.00	0.00	0.00	0.00	2	0.56
5000-9999	31	2	0	0	0	8.64	0.56	0.00	0.00	0.00	33	9.19
10000-14999	58	18	0	0	0	16.16	5.01	0.00	0.00	0.00	76	21.17
15000-19999	42	58	3	1	1	11.70	16.16	0.84	0.28	0.28	105	29.25
20000-24999	16	43	15	1	0	4.46	11.98	4.18	0.28	0.00	75	20.89
25000-29999	4	15	8	1	0	1.11	4.18	2.23	0.28	0.00	28	7.80
30000-34999	7	8	8	3	0	1.95	2.23	2.23	0.84	0.00	26	7.24
35000-39999	0	2	1	1	0	0.00	0.56	0.28	0.28	0.00	4	1.11
40000-44999	1	1	0	2	0	0.28	0.28	0.00	0.56	0.00	4	1.11
45000-50000	1	1	0	0	0	0.28	0.28	0.00	0.00	0.00	2	0.56
>50000	2	0	0	1	0	0.56	0.00	0.00	0.28	0.00	3	0.84
Total	165	148	35	10	1	45.96	41.23	9.75	2.79	0.28	359	100.00

Table 7.10. Number of living rooms (for family dwellings)

Number of rooms	Number of households	Percent of households	Number of population	Total rooms
1	256	83.12	805	256
2	38	12.34	159	76
3	13	4.22	70	39
5	1	0.32	8	5
Total	308	100.00	1042	376

Table 7.11. Type of housing

Type of housing (materials)	Number of households			Percent of households		
	Family	Dormitory	Total	Family	Dormitory	Total
Pucka (Concrete)	5	0	5	1.62	0.00	1.39
Semi-pucka (Semi concrete)	260	46	306	84.42	90.20	85.24
Tin shaded	7	2	9	2.27	3.92	2.51
Katcha (Temporary materials)	36	2	38	11.69	3.92	10.58
No data	0	1	1	0.00	1.96	0.28
Total	308	51	359	100.00	100.00	100.00

Table 7.12. Origin of the households by the district

Origin District		Number of households			Percent of households		
Geo-code	Name	Family	Dormitory	Total	Family	Dormitory	Total
0	Local	11		11	3.06	0.00	3.06
1		3		3	0.84	0.00	0.84
4		2	1	3	0.56	0.28	0.84
6		3		3	0.84	0.00	0.84
9		2		2	0.56	0.00	0.56
10		10	2	12	2.79	0.56	3.34
12		1		1	0.28	0.00	0.28
13		12	3	15	3.34	0.84	4.18
18			1	1	0.00	0.28	0.28
19		2	1	3	0.56	0.28	0.84
26		3		3	0.84	0.00	0.84
27		5	1	6	1.39	0.28	1.67
29		5		5	1.39	0.00	1.39
32		4	3	7	1.11	0.84	1.95
33		11		22	3.06	0.00	3.06
35		1		1	0.28	0.00	0.28
38		2		2	0.56	0.00	0.56
39		33	4	37	9.19	1.11	10.31
42			1	1	0.00	0.28	0.28
44		1		1	0.28	0.00	0.28
46		1		1	0.28	0.00	0.28

Origin District		Number of households			Percent of households		
Geo-code	Name	Family	Dormitory	Total	Family	Dormitory	Total
47		1	2	3	0.28	0.56	0.84
48		2	2	4	0.56	0.56	1.11
49		19	5	24	5.29	1.39	6.69
50		3		3	0.84	0.00	0.84
51		2		2	0.56	0.00	0.56
52		11	3	14	3.06	0.84	3.90
54		3		3	0.84	0.00	0.84
55		1		1	0.28	0.00	0.28
56		2		2	0.56	0.00	0.56
61		31	2	33	8.64	0.56	9.19
64		3		3	0.84	0.00	0.84
67		1		1	0.28	0.00	0.28
68		2		2	0.56	0.00	0.56
69		6		6	1.67	0.00	1.67
72		4		4	1.11	0.00	1.11
73		7		7	1.95	0.00	1.95
75		1		1	0.28	0.00	0.28
76		8	2	10	2.23	0.56	2.79
77		5		5	1.39	0.00	1.39
78		1	1	2	0.28	0.28	0.56
79		2		2	0.56	0.00	0.56
81		5	1	6	1.39	0.28	1.67
85		23	2	25	6.41	0.56	6.96
86		1	1	2	0.28	0.28	0.56
87		1		1	0.28	0.00	0.28
88		27	6	33	7.52	1.67	9.19
89		2		2	0.56	0.00	0.56
90		3		3	0.84	0.00	0.84
93		19	7	26	5.29	1.95	7.24
Total		308	51	359	85.79	14.21	100.00

Table 7.13. Destination of first migration by districts

Destination		Number of households			Percent of households		
Geo-code	Name	Family	Dormitory	Total	Family	Dormitory	Total
	Study area	237	31	268	79.80	60.78	77.01
	Dhaka City	24	8	32	8.08	15.69	9.20
13		1		1	0.34	0.00	0.29
26		4	4	8	1.35	7.84	2.30
27		1		1	0.34	0.00	0.29
33		26	4	30	8.75	7.84	8.62
61			1	1	0.00	1.96	0.29
67		2	2	4	0.67	3.92	1.15
68		1		1	0.34	0.00	0.29
91		1		1	0.34	0.00	0.29
93			1	1	0.00	1.96	0.29
Total migrants		297	51	348	100.00	100.00	100.00
Not applicable		11		11			

Table 7.14a. Reasons for migration from the origin (Detail)

Reason (s)		Number of households			Percent of households		
Code	Description	Family	Dormitory	Total	Family	Dormitory	Total
1	To search works	196	46	242	66.44	90.20	69.94
2	Due to marriage	45		45	15.25	0.00	13.01
3	Family migration	22	1	23	7.46	1.96	6.65
4	Affected by disaster	10		10	3.39	0.00	2.89
5	For education	1		1	0.34	0.00	0.29
6	Poverty	1		1	0.34	0.00	0.29
7	Job placement	5	1	6	1.69	1.96	1.73
8	For business	2		2	0.68	0.00	0.58
9	Family problem	1	1	2	0.34	1.96	0.58
13	To search works & with family	1	1	2	0.34	1.96	0.58
14	Affected by disaster then for works	4		4	1.36	0.00	1.16
15	For education and works	1		1	0.34	0.00	0.29
16	Poverty and for works	1		1	0.34	0.00	0.29
17	Poverty and job placement	1	1	2	0.34	1.96	0.58
36	Poverty and family migration	2		2	0.68	0.00	0.58
46	Affected by disaster and poverty	1		1	0.34	0.00	0.29
10	Others	1		1	0.34	0.00	0.29
Total responses		295	51	346	100.00	100.00	100.00
8888	No data	2		2			
9999	Not applicable	11		11			

Table 7.14b. Reasons for migration from the origin (Summary of Table 7.14a)

Reason	Number of respondents			Percent of respondents		
	Family living	Dormitory living	Total	Family living	Dormitory living	Total
To search works	202	47	249	68.47	92.16	71.97
Due to marriage	45		45	15.25	0.00	13.01
Family migration	23	1	24	7.80	1.96	6.94
Affected by disaster	12		12	4.07	0.00	3.47
Job placement	7	1	8	2.37	1.96	2.31
For business	2		2	0.68	0.00	0.58
Others	4	2	6	1.36	3.92	1.73
Total responses	295	51	346	100.00	100.00	100.00
No data	2		2			
Not applicable	11		11			

Table 7.15. Temporal pattern of migration in the study area

Year of migration	No. of respondents	Percent of respondents
Before 1990	1	0.29
1990-1994	1	0.29
1995-1999	6	1.74
2000-2004	35	10.14
2005-2009	53	15.36
2010-2014	103	29.86
2015 and later	146	42.32
Total responses	345	100.00
No data	3	
Not applicable	11	

Table 7.16a: Why you came here? / Reasons for coming to this area

Reason (s)		Number of households			Percent of households		
Code	Description	Family	Dormitory	Total	Family	Dormitory	Total
1	Better work opportunity	113	17	130	38.70	33.33	37.90
2	With jobs	16	10	26	5.48	19.61	7.58
3	With relatives or friends	19	1	20	6.51	1.96	5.83
4	Has relatives or friends here	72	11	83	24.66	21.57	24.20
5	Comparatively low living cost	2		2	0.68	0.00	0.58
7	Marriage or with spouse	43	1	44	14.73	1.96	12.83
10	Low wage in Dhaka	1	1	2	0.34	1.96	0.58
11	For business	1		1	0.34	0.00	0.29
13	Better work opportunity & with friends	1		1	0.34	0.00	0.29
14	Better work opportunity and had relatives here	8	1	9	2.74	1.96	2.62

Reason (s)		Number of households			Percent of households		
Code	Description	Family	Dormitory	Total	Family	Dormitory	Total
15	Better work opportunity and low living cost	1	1	2	0.34	1.96	0.58
17	Better work opportunity and with spouse	4		4	1.37	0.00	1.17
24	With job and had relatives	1		1	0.34	0.00	0.29
25	With jobs and low living cost		1	1	0.00	1.96	0.29
45	Low living cost and had relatives	2	1	3	0.68	1.96	0.87
101	For business	1		1	0.34	0.00	0.29
102	Others	2	1	3	0.68	1.96	0.87
103	Land purchase and built house	2		2	0.68	0.00	0.58
104	Change of accommodation	2		2	0.68	0.00	0.58
105	High wage and workplace is close		5	5	0.00	9.80	1.46
145	Better work opportunity, low living cost and had relatives	1		1	0.34	0.00	0.29
	Total responses	292	51	343	100.00	100.00	100.00
8888	No data	5		5			
9999	Not applicable	11		11			

Table 7.16b. Why you came here? / Reasons for coming to this area (Summary of Table 7.16a)

Reason	Number of households			Percent of households		
	Family	Dormitory	Total	Family	Dormitory	Total
Better work opportunity	113	17	130	38.70	33.33	37.90
Had relatives or friends here	72	11	83	24.66	21.57	24.20
Marriage or with spouse	43	1	44	14.73	1.96	12.83
With jobs	16	10	26	5.48	19.61	7.58
With relatives or friends	19	1	20	6.51	1.96	5.83
Comparatively low living cost	2		2	0.68	0.00	0.58
Low wage in Dhaka	1	1	2	0.34	1.96	0.58
For business	1		1	0.34	0.00	0.29
Others (including multiple answers)	25	10	35	8.56	19.61	10.20
Total responses	292	51	343	100.00	100.00	100.00
No data	5		5			
Not applicable	11		11			

Table 7.17. Ever lived in Dhaka?

Response	Number of households			Percent of households		
	Family	Dormitory	Total	Family	Dormitory	Total
Yes	36	16	52	10.03	4.46	14.48
No	272	35	307	75.77	9.75	85.52
Total	308	51	359	85.79	14.21	100.00

Table 7.18. Why you left Dhaka

Reason		Households	
Code	Description	Number	Percent
1	High living cost	6	11.76
2	Lower work opportunity	7	13.73
5	For better opportunity	11	21.57
6	Marriage	7	13.73
7	With family	1	1.96
8	Job placement	4	7.84
9	For business	2	3.92
10	Job lost	4	7.84
58	Better opportunity and job change	1	1.96
101	To live in own house	2	3.92
102	Separation from the family	1	1.96
103	For better environment	1	1.96
104	Completion of study	1	1.96
136	High living cost, high rent	1	1.96
158	High living cost, better opportunity	1	1.96
187	High living cost and with family	1	1.96
	Total responses	51	100.00
8888	No data	1	
9999	Not applicable	307	

Table 7.19. Why you directly came here?

Reason		Households	
Code	Description	Number	Percent
1	Had relatives or friends	136	48.06
2	Near to origin	3	1.06
3	With job/work	10	3.53
4	Higher job opportunity	62	21.91
5	Marriage	33	11.66
6	With family	15	5.30
7	Job placement	2	0.71
8	Higher wage	2	0.71
10	Family live here	2	0.71
14	Had relatives & high job opportunity	7	2.47

Reason		Households	
Code	Description	Number	Percent
17	Had relatives and job placement	1	0.35
19	Had relatives & low living cost	1	0.35
34	Job placement & higher job opportunity	1	0.35
41	Had relatives & high job opportunity	1	0.35
46	Higher job opportunity & with family	2	0.71
47	Higher job opportunity & job placement	1	0.35
48	Higher job opportunity & high wage	1	0.35
49	Higher job opportunity & low living cost	1	0.35
56	With family	1	0.35
146	Had relatives, high job opportunity and with family	1	0.35
	Total responses	283	100.00
8888	No response	65	
9999	Not applicable	11	

Table 7.20. What are the advantages of living here compared to Dhaka city?

Advantages		Households	
Code	Description	Number	Percent
1+9	Low living cost	37	48.68
4	Lower workplace distance/ transport cost	18	23.68
8	High wage and work opportunity	16	21.05
101	Easy access to housing facilities and low rent	9	11.84
102	Better living environment	26	34.21
103	Better business opportunity	2	2.63
104	Better work environment	5	6.58
	Total	76	100.00