Urbanisation and inequalities in China and India. Overview and comparative study

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Abstract. *The purpose of the present study is to evidences the overview of urbanisation and inequalities that arise from urbanisation in India and China.*

Design/Methodology/approach. The study uses linear regression model and graphical tools for deriving study conclusions.

Findings. The study finds that both the countries are at different level of urbanisation and both the countries are yet to achieve fully positive synchronisation advantages from urbanisation. The study further finds that both the countries yet to achieve the social and environmental sustainability completely from urbanisation. Government of both of these countries are effective and efficient in providing advanced water resources to its citizens but in terms of providing advanced hygiene to its citizens both of these countries are par below as compared to other nations and need serious attention. Population and pollution are the other major reasons that challenged sustainable development for both of these countries. Empirically study finds HDI significant at 5% level and at 10% levels ES becomes significant for urban population growth percentage.

Research Implications. The findings of the study would have high social implication for the policy makers and other decision makers in emerging nations.
Originality/Value. The study is Unique in several senses: The present study discuss about the operational efficiency of government of both the countries in providing basic facilities like water resources and sanitation. The study set up a benchmark for the other BRIC nations or other emerging nations to learn about the success and failure of urbanisation.

Keywords: urbanisation, inequalities, HDI, agglomerations, sustainable growth, environmental sustainability.

JEL Classification: R11, I24, O1, O2, O57, P25.

1. Introduction

Among the BRIC countries especially China and India are always a topic of interest for researchers, investors and policy makers. For the past few decades these two countries among the BRIC nations shows rapid development and have huge potential to develop in the future. Goldman Sachs analysts predicted that by 2050, China and India become the first and third largest economies followed by Brazil and Russia at fifth and sixth place. Due to rapid technological advancement and globalisations both of these countries seen high growth in their economies and have capability to become the future superpower (Klasen and Nestmann, 2006). As a consequence of it, large number of human shift or concentration observed in the urban areas. The process of gradual shift of people from rural to urban areas is known as the urbanisation. Urbanisation leads to swift and rapid changes in the human predominant culture. Urbanisation opens up avenues for various dangerous anthropogenic activities those results into serious impact in the geography, society, economy, urban planning and public health etc. (McKinney, 2002). Due to urban transition several challenges emerges and leads to unsustainable development and inequalities that retard the growth (Castells-Quintana and Royuela, 2015). Among BRIC countries China and India is growing at very high speed and are state of urban transition state. Hence, there raises a question that whether China and India able to achieve sustainable urbanisation or not?

Presently both of these countries have taken stock of deficiencies in urban structure, various aspects of smart city development, expanding slums and the need for ensuring liveable and sustainable human settlements, financing urban infrastructure and reforms required to enable urban renaissance in member countries. Both these countries are at different levels of urbanisation and the government of both these countries facing problems in managing urbanisation (Acolin et al., 2014). Hence, the present study will evidence the individual country experiences and approaches to emerging challenges. The study will discuss about the operational efficiency of government of both the countries in providing basic facilities like water resources and sanitation etc. Further study will investigate about the several inequalities arises due to urbanisation in these countries as the nature or intensity of the inequalities are not same in these countries. The study will set up a benchmark for the other BRIC nations or other emerging nations to learn about the success and failure of urbanisation. Hence, the government and policy maker of the emerging nations will gain advantage from the study result and enable them to well-planned and guided urbanisation to take advantages of urbanisations. Literature of review discussed immediately end of this section. The Section 2 of the paper deals with the data and methodology, followed by Section 3 that discuss about the overview of urban population. Section 4 discusses about the government operational efficiency followed by the social and environmental sustainability in Sections 5 and 6 then empirical justification covered in Section 6 and the paper concluded with discussing the policy implications and lesson to the other nations.

Literature review

Cali (2008) empirically studies on the urbanisation on the India's states and town and concludes with three aspects of Indian urbanisation. In the first part of the study it addresses the rural-urban parities and its effect on economic development and found that the results support the U shaped relationship between rural-urban disparities in socio-economic indicator with the level of economic development. The part two of the study finds that there is a negative correlation between the growth of the country and urbanisation. Finally study finds that there are convergences in growth rates among all Indian towns over the century and more agglomerations towards the biggest cities. Kanbur and Zhuang (2003) study on the urbanisation and inequalities in Asian four Asian countries namely China, India, Indonesia and Philippines. The find that urbanisation increases inequality by 15% in India whereas China mange to reduce the inequalities. Due to urbanisation income inequalities increases in both India and China by 50% and 33%, respectively. The study also answer how the urbanisation will affect in future in these countries and found that China has reach the turning point and holding urban-rural inequalities and income ratio will reduce the income inequalities at the level and is just reverse in case of India. The study uses four inequality variables due to urbanisation out of them rural-urban income parity is going to affect most both of these countries. Tripathi (2013) study tries to understand the past and current trend of urbanisation of India. The study evaluates the outcome of various government policies and programmes on urbanisation of India. The study finds that higher urbanisation leads to reduction of poverty and inequalities and in turns leads to overall economic development. Hence, government should incline its policy towards higher urbanisation. Colmer (2015) study on urbanisation in India finds that after the independence urbanisation happens at slower rate than other countries at the same level of urbanisation. Study also finds that the population in India is mostly concentrated in the big cities. The study uses six big cities and finds there is a spatial inequality in India. The study concludes that the urbanisation is bit complicated and policy makers need to be very careful while designing the policy. After 1978 China experience the highest flow of human capital from rural to urban and Zhang and Shunfeng (2003) study give empirical justification to the urban shift during 1978-99 in China. The study find that inter and intra rural-urban gaps encourage migration in China for the study period. On the other hand geographical distance discourages migration from rural to urban in the period in China. Sicular, Ximing, Gustafsson and Shi (2007) study evaluates size of the urban-rural gap, its contributions to overall inequalities and the factors for urban-rural gap in China during the period 1995 and 2002. The study find that the rural-urban gap size in China is more than global average and its contribution to the overall inequalities is also large. The major factor behind the rural-urban inequalities is education and location of the house hold is important factor for urban-rural inequalities but not to family size, landholdings etc. Chaudhuri and Ravallion (2008) study addresses the uneven growth in India and China and its effect on poverty and inequality. The study finds that there is indeed uneven growth in sectors, geography and at house level in these countries. Later study try to

understand the reason for inequalities and found few inequalities are good and few are not. Hence suggest for structure of policies to preserves these good inequalities and investment should be made to innovate. On the other hand to mitigate the bad inequalities investment should be made in infrastructure development and human capital development. Form the last few decades' structural transformation seen in case of both India and China. There is a shift from tradition agricultural economy to services and manufacturing economy. Hnatkovska and Lahiri (2015) study address on the urbanisation, structural transformation and rural – urban inequalities in India and China. The study finds significant difference between the rural-urban wage inequalities in these two countries. From the above literature review it is concluded that the urbanisation and inequalities in India and China is very different. Hence, the present study will overview the urbanisation and inequalities arises from it by doing a comparative study between India and China.

2. Data and methodology

All data that are used in the study are taken from the United Nations online database and World Bank online databases. Population density (people per sq. km of land area), Urban population (% of total population), Urban population growth (annual %), Population in urban agglomerations of more than 1 million and Population in the largest city (% of urban population) yearly data from 1960-2015 are used. Improved water source, urban (% of urban population with access), Improved sanitation facilities yearly data used from 1990-2015 are used. Urban (% of urban population with access), Human development Index, CO_2 emission per capita (tonnes) and Natural resource depletion (% of GNI) yearly data used from 1980-2015 are used. Simple regression model and various graphs are used to derive the conclusions. The regression model used is defined as follows:

$$(\text{Urban Population Growth Rate})_t = a + b\,(\text{HDI})_t + s\,(\text{ES})_t + e_t \qquad (1)$$

Where:
Urban Population Growth Rate is the dependent variable;
HDI is Human Development Index;
ES is Environmental Sustainable index constructed from equal weight of CO_2 emission per capita (tonnes) and Natural resource depletion (% of GNI);
e_t is error term;
a, b are constant.

3. Overview of urban populations in China and India

### 3.1. Population density (people per sq. km of land area)

Figure 1 below shows the trend of population density measured in terms of people per square kilometre of land for China, India and world between the periods of 1961-2015.

Figure 1. *Trend for China, India and World Population density (people per sq. km of land area)*
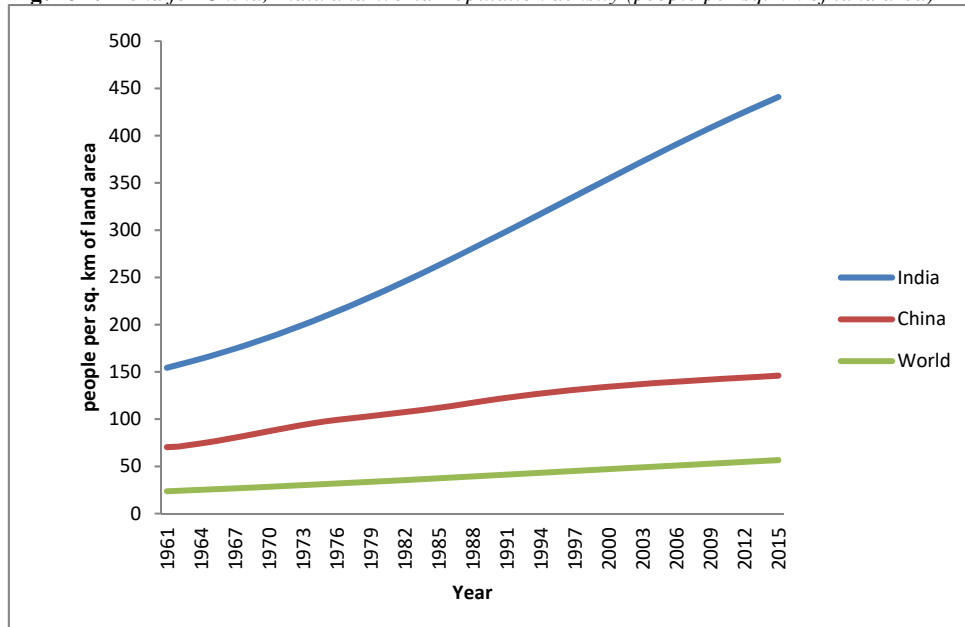
From the above picture is it clear that there is increase of population all over the world since 1961. India shows very high step slope of growth as shown in blue colour line. It is also observed that average population density of both India and China is well above the average population density of the world. It is observed that growth rate of population density is highest for India followed by China due to technological changes (Klasen and Nestmann, 2006). This uncontrolled population growth become major problem for both these countries and directly affected the economic performance of these countries (Lozeau, 2007; Lakshmana, 2013).
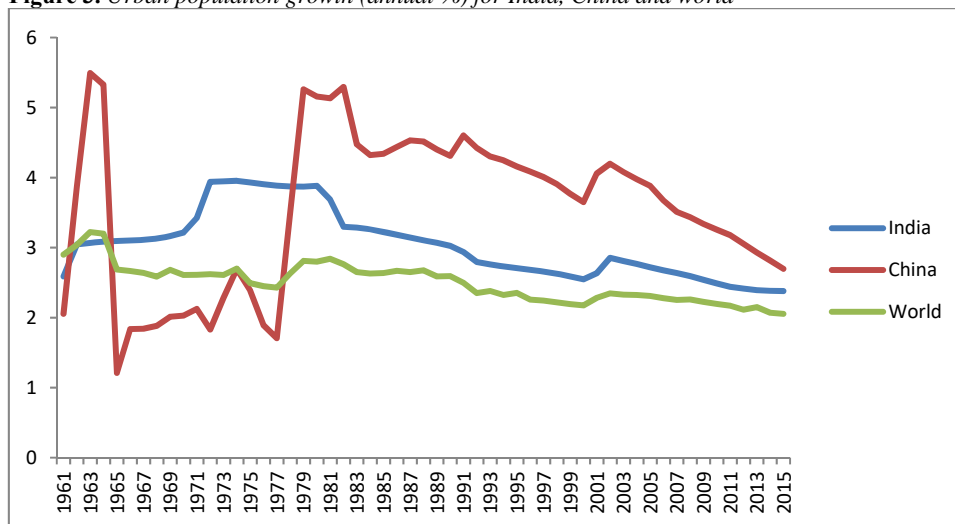
3.2. Urban population (% of total population)

The below Figure 2 shows the percentage of urban population as a total population for India, China and world. Urban population percentage as percentage of total population increases over the year for India, China and world as a whole and will continue (White and Subedi, 2008). Significant growth in the percentage of urban population or urban shift is observed for China since 1978 due to massive industrialisation and in the year 2013 it crosses world average of (52.94%). From the below graph it is concluded that there is high inequality persists in India in terms of urban and rural population. Only 32% of the total population of India resides in cities (Indian online pages) whereas in most of the developed countries more than 80% population resides in cities.

Figure 2. *Urban population (% of total population) for India, China and world*
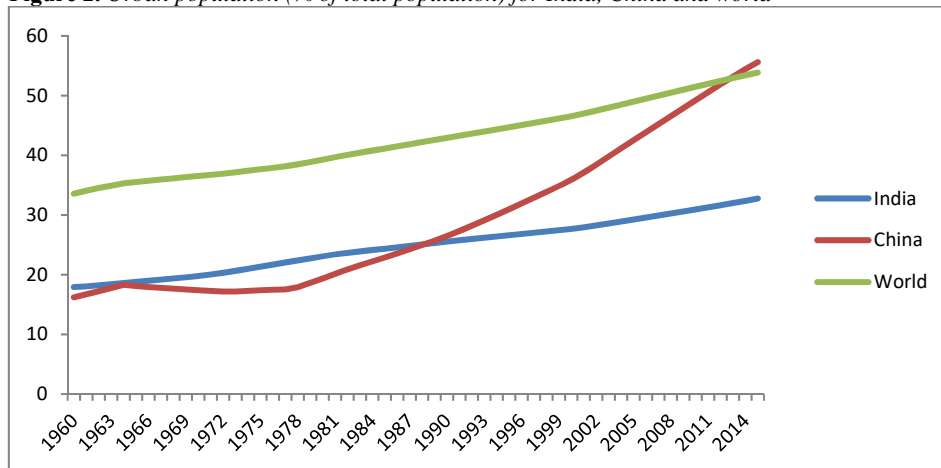
3.3. Urban population growth (annual %)

It is important to look into the urban population growth percentage annually and also need to analyse whether the urban population is aggregated in some places and makes it very much overpopulated. It is not always possible to extract the relationship between the urbanisation and urban population growth (Peng et al., 2011) due to several constraints. Figure 3 below shows the urban population growth (annual %) for India, China and world.

Figure 3. *Urban population growth (annual %) for India, China and world*


Overall there is a decrease in the urban population growth percentage observe for China, India and world. Between the year 1963 and 1980 China shows peculiar growth pattern as it was in the initial transition state. From 1990 onwards sharp decrease seen in the urban

population annual growth percentage due to several reasons like migration to other cities, environmental issues etc. Similar situation observed in case of India also due to short migration and return in migration (Chandrasekhar and Sharma, 2015).

3.4. Population in urban agglomerations of more than 1 million

Urban agglomerations (UN Report, 2014) are very important to understand because it gives an indication about the synchronisation. The positive effect of urban agglomerations is that country will get economies of scale in productions and important for the sustainable development. On the other hand negative effect of the urban agglomerations is that environment pollutions and inequalities. So, it is important to understand the effect of urban agglomerations and its effect on China and India. The Figure 4 below shows the population in urban agglomerations of more than 1 million for China and India. The figure indicates that over the period of time since 1960 the population in urban agglomerations of more than 1 million for both China and India is increasing. Higher slope observed in case of China from 2000 onwards. Gujuraj and Sudhira (2012) study find many new cities formed in India due to urban agglomerations. Due to the positive effect of urban agglomerations China is able to produce cost effect products or in other words China achieves economies of scales in production. Similarly on the other hand India in terms of services has economies of scales and can provide reliable and cheaper services. The bad effect of urban agglomerations is that harness of the natural resources and leads to several anthropogenic activities that in terms lead to severe pollutions.

Figure 4. *Population in urban agglomerations of more than 1 million (% of total population) for India and China*
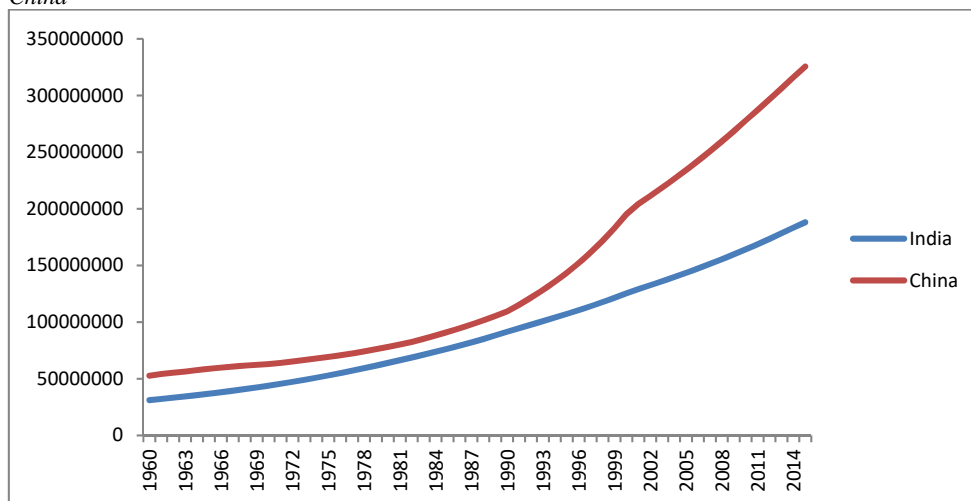

Due to urban agglomerations negative effect China is having the most polluted cities and need of sustainable development. Parallel to China, India's urban agglomerations also increase and due to which the pollution level is increasing but presently at very much lower than China. The ill effect of urban agglomerations is Beijing in China and New Delhi in

India is listed among the most polluted cities. These two cities are also having a high population density and now a segment of the population of the city is migrating to other parts. Due to which one can see inequalities presides in both this countries.

3.5. Population in the largest city (% of urban population)

It is clear from the above paragraphs that population in urban agglomerations of more than 1 million for the both the countries are increasing Y-O-Y. Next it is important to understand whether the percentage of urban populations that are actually residing in the big cities of these countries. Population in the largest city (% of urban population) for India and China are shown in the Figure 5 below. From the figure it is observed that in India more percentage of the total urban population resides at the big cities. The reason might be India is having very few numbers of big cities with all amenities and facility as needed by a human to survive. On the other hand China only very few percentage of the total urban population resides in the big cities and the living pattern of population in Chinese big cities is bit complicated (Chan, 2012). The reasons may be pollution, excessive harness of the natural resources, infertility, millionaire effect, development of sub big cities etc.

Figure 5. *Population in the largest city (% of urban population) for India and China*
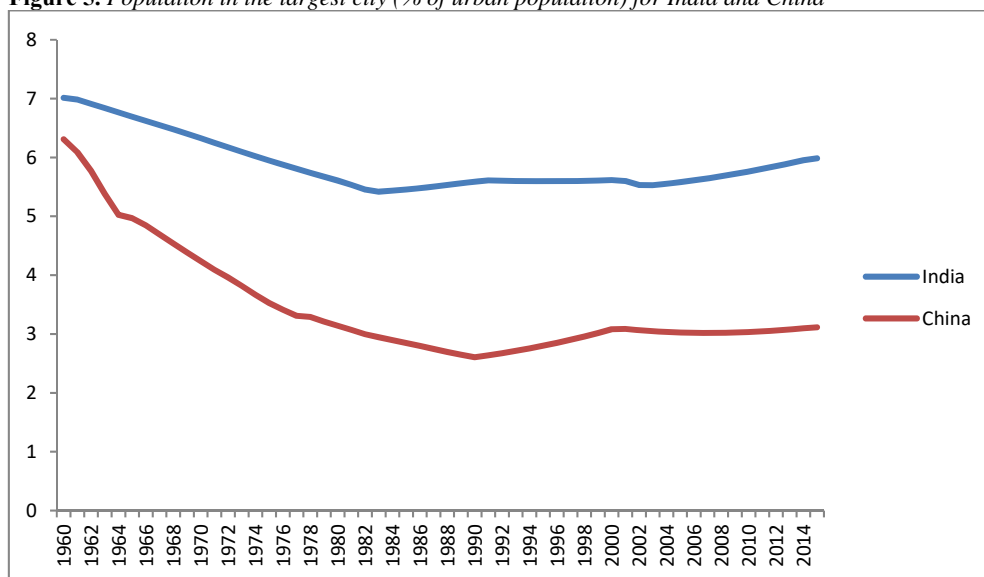

In the above paragraphs it is discussed about the overview of the urban population of both the countries and in the next paragraphs the operational efficiency of government of India and China studied in terms of providing basic amenities like water resources and sanitations is discussed.

4. Government efficiency in providing basic needs

### 4.1. Improved water source, urban (% of urban population with access)

With rapid urbanisation there is scanty of water and many developed countries are also facing the same problem (UN Report 2014 on 'drinking water and sanitation'[1]; UN Habitat report on 'sick water'). In such a scenario it is very much important to evaluate how efficient is the government polices of both these countries in providing them and trends (International planning and urban policy draft paper[2]). The below Figure 6 explains the efficiency of the government in providing the improved water resources for China and India. The government of both the countries are very much efficient in providing the improved water resources to the urban population. Significant growth rate observed in case of India since 1990 that the era of LPG (Liberalization, Privatization and Globalization).

Figure 6. *Improved water source, urban (% of urban population with access) for India and China*

	1990	2000	2010	2015
India	88,9	92,3	95,7	97,1
China	97	97,2	97,4	97,5
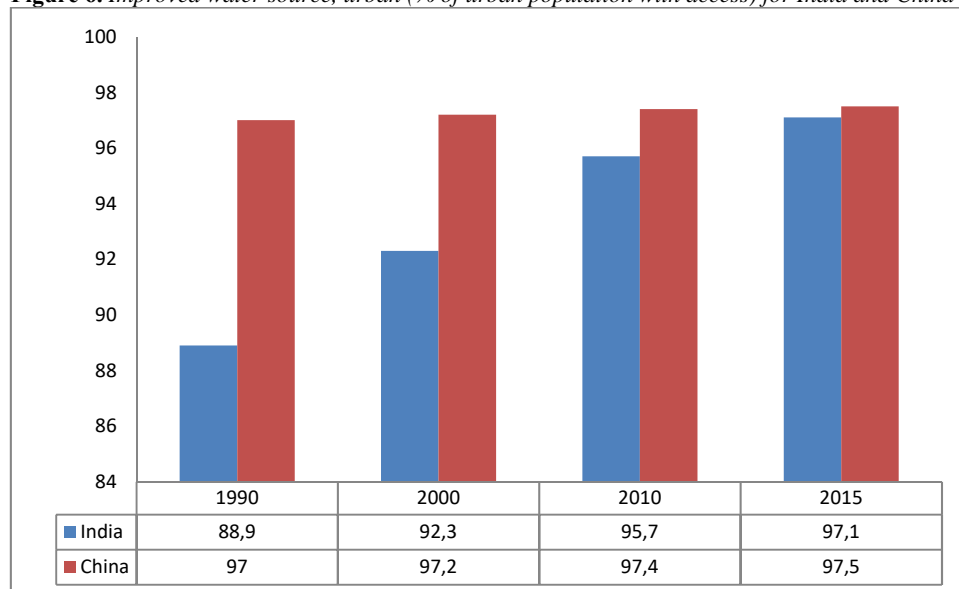
4.2. Improved sanitation facilities, urban (% of urban population with access)

Figure 7. *Improved sanitation facilities, urban (% of urban population with access) for India and China*

|	1990	2000	2010	2015
■ India	49,3	54,5	60,3	62,6
■ China	67,8	75,3	82,9	86,6
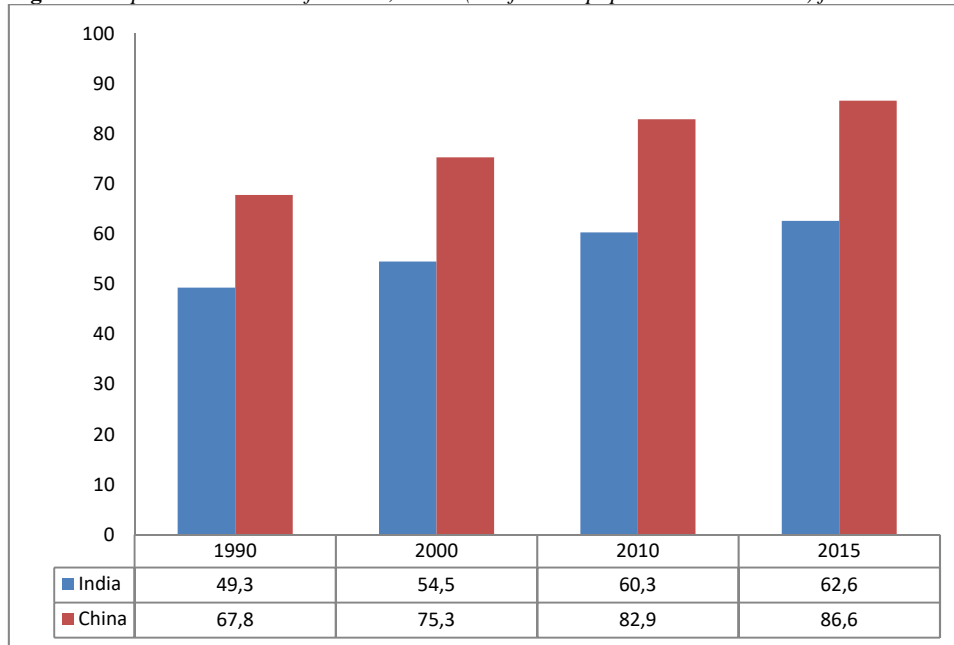
Similarly sanity conditions are also important for a country and for sustainable development improved sanitation facilities are needed as more than millions of children are died below 5 years of age due to unsafe water and basic sanitation problems (WHO and UNICEF report 2006). The Figure 7 below shows the efficiency of the government in providing the improved sanitation facilities for China and India. In terms of improved sanitation facilities to the urban population both India and China lagging behind of other emerging economies like Brazil that achieves (100%) etc. among India and China, India's performance is worst as only 62.6% of the urban population are accessed with the improved sanitation facilities and need serious attention (CEEW 2013 Report[3]).

From the above paragraphs it is very much clear that both the countries are at different level of urbanisation and both the countries lack proper synchronization in achieving full benefits from the urbanisations. Zeng, Deng, Dong and Hu (2016) comparative study on BIC nations raises the same question about the issue of sustainability development associated with urbanisation. That leads to no synchronisation in urbanisation several inequalities may arise and our concern with that inequalities that are bad for sustainable urbanisation those are inequalities in term of social sustainability (human development) and environmentally sustainability are discussed in the next paragraphs.

5. Urbanisation and social sustainability (human development)

Several studies by (Rathi, 2006; Shen et al., 2011; Li et al., 2009) find significant relationship between urbanisation and social sustainability. Human development index is one of the powerful indicators to measure the social sustainability. The Figure 8 below shows the Human development Index for the India and China from 1980 to 2014. From the above figure it is seen that since 2007 onwards the HDI for both countries increases and urbanisation is one such reason. HDI indicates among India and China, China able to create greater intensity of sustainable development from urbanisation than India.
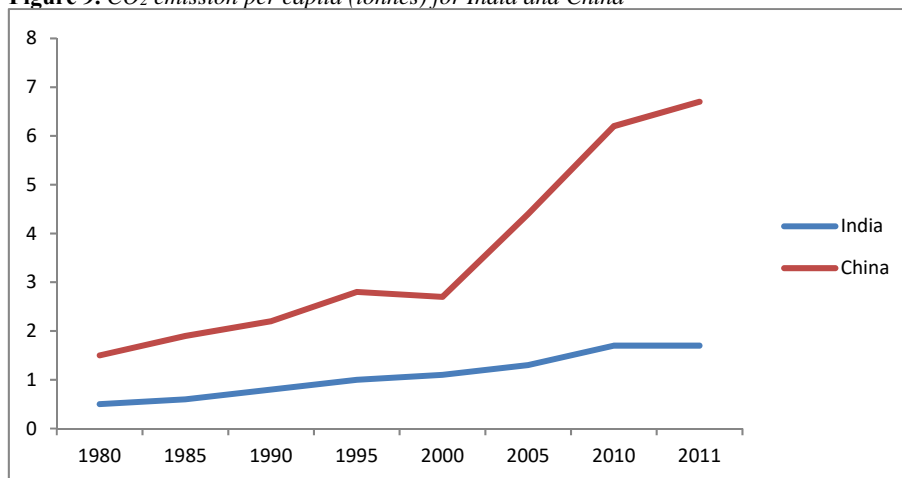
Figure 8. *Human development Index for India and China*
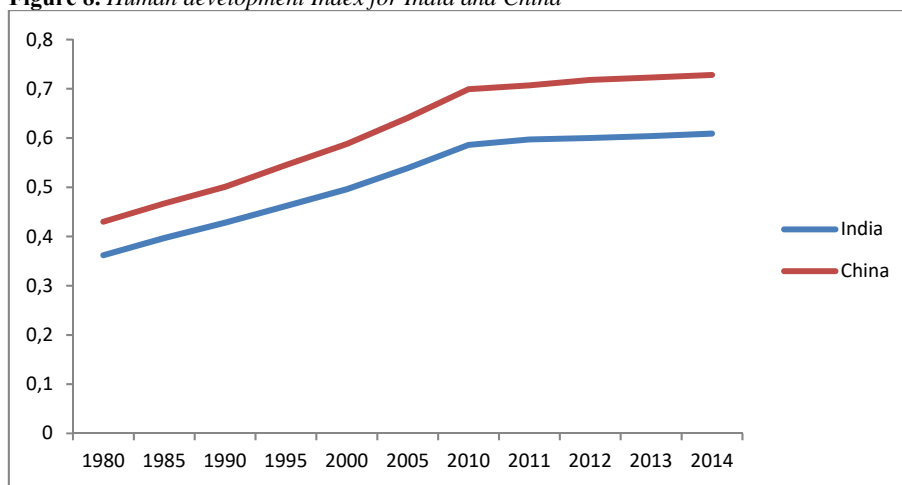
6. Urbanisation and Environmental sustainability

6.1. CO_2 emission per capita (tonnes)

**Figure 9.** *CO_2 emission per capita (tonnes) for India and China*

BRIC countries are drawing special attention regarding the amount of air pollution they causes due to rapid development as it affect overall environment condition (Klafke et al., 2015). There is always a direct relationship between CO_2 emission per capita (tonnes) and economic growth (Cheng and Huang, 2013), and it is also true in case of urbanisation. For sustainable development environmental sustainable development is compulsory. Due to which many developed nations are investing in the developing nations in CDM projects to earn carbon credits in terms of capital and technology transfer. Due to technological advancement and investment more and more projects are implemented but at the same time it is necessary to investigate whether the project is environmental sustainable or not? An organisation that emits more carbon emissions induces a social cost and pollutes the environment that is undesirable for the sustainable growth. Hence, a nation's aim is to reduce the CO_2 emission per capita. The Figure 9 above shows the amount of CO_2 emission per capita for India and China. After 2000 the amount of CO2 emission per capita increases rapidly in case of China. Direct usage of energy in both India and China leads to more emissions of CO2 emission per capita (Ahmad et al., 2015). Hence the sustainable energy practices and renewable energy practices by the government of these countries will promote sustainable urbanisation.

6.2 Natural resource depletion (% of GNI)

The Figure 10 below shows the amount of Natural resource depletion (% of GNI) for India and China.

Figure 10. *Natural resource depletion (% of GNI) for India and China*
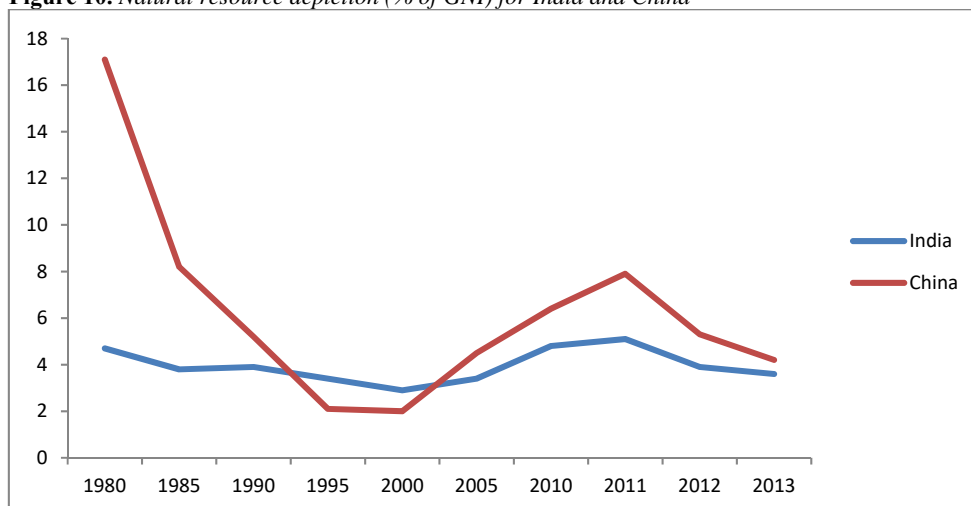
Rapid urbanisation leads to depletion of natural resources and climate change all over the globe (Steer, 2013). From the above diagram it is clear up to 1990 China has highly depleted their natural resources and still the level is higher than that of India. That implies that China is using more primary source of material to   produce goods and less usage for the tertiary goods. Similar in case of India due to rapid urbanisation natural resources like water resources, mineral resources depleted due to high consumption (Nagdeve, 2007).

7. Empirical results

From the above paragraphs we find that the urban population growth rate is having some relationship with certain parameters like HDI and environmental sustainability. To be prove it empirically the regression with urban population growth rate as dependent variable and HDI, environment sustainable index as independent variable for a period of 36 years from 1980 to 2016. Environmental sustainability is composed of CO_2 emission per capita (tonnes) and Natural resource depletion (% of GNI) in equal ratio. The regression results are shown as below:

(Urban population Growth rate)$_t$ = a + b (HDI)$_t$ + s (ES)$_t$ + e$_t$

Table 1. *Regression results*

	C	ES	HDI	R-squared
India	4.350	0.064**	-3.837*	0.761
China	7.390	0.002**	-6.085*	0.874

Note: * significant at 5% level; ** significant at 10% level.

From the above regression result it found that HDI is significant at 5% level and at 10% levels ES becomes significant for India and China.

8. Policy implications and lessons for other countries

It is a challenge to the government of both the countries to balance urbanisation and sustainable development or growth (Acolin et al., 2014). From the above study it is found that over population is one of the problem in both the countries that is actually creating several problems and government of both the countries have taken several measure to control it. Also need further similar kind of steps to continue. Going in depth further it is seen that percentage of urban population is very less in case of India and well below the average of world. China is able to achieve majority of the agglomeration economies of scale and in case of India it far away from it. Comparing India and China it is found that in India more percentage of the urban population prefer to resides in the big cities. So, it is challenge for the Indian government that whether to improve the existing infrastructure or to develop several other cities as a part of smart cities project etc.? (See IIHS report on cities as engines of inclusive development, 2014).

It is right to say that both the countries have achieved some extent of urbanisation but the question which is unanswered is whether it is sustainable development or not? To answer these question two parameters has been evaluated a) government operational efficiencies in providing basic amenities like water and sanitation facilities to the urban population and b) social sustainability and environmental sustainability. On first part it is observed that both the countries government policies are efficient in providing the improved water resources to the urban population. Whereas both the countries still struggling to provide the improved sanitation facilities to the urban population. Both the countries have huge number of population resides in the urban slum. In case of India it is worst. Hence, present initiative of Indian government programme like Swatch Bharat Abhiyan,

bathroom in every household will yield better result in long run. On second part in term of Human Development Index though China ranked much higher than the India but China still have to achieve a lot to become at par of developed nations. Y-O-Y the HDI of India is improving. The ill performance of HDI represents that there exists an inequalities in income, education and health in this countries. Government of both the countries should think of development of sustainable infrastructure and public participations to gain maximum from the urbanisation by synchronisation with the development of human capital. At the same time it is to be noted whether the synchronisation supports environmental sustainability or not. In terms of environmental sustainability China has harness and depleted the natural resource at high rate during the initial phase of urbanisation during 1978 but then onwards it is moving towards sustainability. On the other hand India still have not utilised its natural resources effectively and efficiently. Hence, Indian government should incline their policy for maximum utilisation of the natural resources with less usage of it. The policy should be to develop more products from tertiary goods as like developed nations. To meet the unplanned and unsustainable demand China has emitted the maximum amount of CO_2 in the environment and resulting into high social cost. On that part India's position is still better. But recently New Delhi is listed among the high polluted cities in the world raising a high alarm for the Indian government. So, the decision of Indian government to align its policy towards renewable energy is good for long run. As this project will be mostly funded by the private companies therefore policies should be designed in such a manner so that it should not impose much of restriction as it may kill innovations. Further study evaluates out of a) government operational efficiencies in providing basic amenities like water and sanitation facilities to the urban population and b) social sustainability and environmental sustainability is more related to the urban growth and the regression result found that HDI is significant at 5% level for both India and China. The government of both the country should incline their policy measures to improve the parameters or sub components of the HDI along with measures for environment sustainability. Hence, the present study has provided ample of evidences on urbanisation and its impact on India and China. The study result will help policy makers of both the countries in designing the policy for sustainable growth. To take it for further studies one can do comparative studies for BRICS nations. Also in the present study health factor index was not taken. So, the third factor can be added as the health factor index and how it is related to the urban percentage of population growth for future studies.

Notes

(1) World Progress on drinking water and sanitation 2014, United Nations report published by WHO & United Nations (2014).
(2) World urbanisation prospects 2014, United Nations report published by department of economic and social affairs-United Nations (2014).
(3) Sugam & Ghosh, Urban water and sanitisation in India, CEEW report November 2013 published by council on energy, environment and water (2013).

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