

The Emergence of Smart Growth in Developed and Developing Countries and Its Possible Application in Kabul City, Afghanistan

Bashir Ahmad Amiri, Nsenda Lukumwena

Abstract—The global trend indicates that more and more people live and will continue to live in urban areas. Today cities are expanding both in physical size and number due to the rapid population growth along with sprawl development, which caused the cities to expand beyond the growth boundary and exerting intense pressure on environmental resources specially farmlands to accommodate new housing and urban facilities. Also noticeable is the increase in urban decay along with the increase of slum dwellers present another challenge that most cities in developed and developing countries have to deal with. Today urban practitioners, researchers, planners, and decision-makers are seeking for alternative development and growth management policies to house the rising urban population and also cure the urban decay and slum issues turn to Smart Growth to achieve their goals. Many cities across the globe have adopted smart growth as an alternative growth management tool to deal with patterns and forms of development and to cure the rising urban and environmental problems. The method used in this study is a literature analysis method through reviewing various resources to highlight the potential benefits of Smart Growth in both developed and developing countries and analyze, to what extent it can be a strategic alternative for Afghanistan's cities, especially the capital city. Hence a comparative analysis is carried on three countries, namely the USA, China, and India to identify the potential benefits of smart growth likely to serve as an achievable broad base for recommendations in different urban contexts.

Keywords—Growth management, housing, Kabul city, smart growth, urban-expansion.

I. INTRODUCTION

THE global trend indicates that more people live and will continue to live in urban areas than in rural, in 2014, 54 percent of the world's population residing in urban areas and by 2050, 66 percent of the world's population is projected to be urban [1]. Urban population is growing at a rapid pace across the globe, especially in developing countries but in nowhere the process is more pervasive than in India, China, and the United States because of their population size, rapid urbanization and economic growth, and geopolitical importance. China, India and the US accounts for almost half of the world's total population and urbanization is considerably high in these countries than most of the other countries in the world which substantially have important implications for the entire planet. Urbanization and population

growth contribute to many of today's biggest problems in both developed and developing countries by exerting intense pressure on environmental resource specially farmlands in order to accommodate new housing and public services. Since, conventional planning approach with low density (sprawl development) tends to expand the city and convert the farmlands to urban land in a very broad scale, Accordingly, following the current development trend finding space to accommodate the rising urban population will be one of the greatest challenges of this century.

Urbanization in Afghanistan is not unique and is very similar to the worldwide phenomenon, Afghan Cities have expanded rapidly without effective spatial plans and limited access to formal land and housing and has led to the development of informal, low-density sprawl; increasing socio-spatial inequality; and significant infrastructure deficiencies [2]. Kabul the capital city, is the largest and fastest growing city in Afghanistan and ranking fifth in the world [3], Kabul city is dominating with an estimated 41% of the urban population of the country and is seven-time larger than Herat city which is the next largest city of Afghanistan, in term of urban population and primacy ratio, Kabul city listed among the globally-recognized primate cities such as Manila, Dhaka, Bangkok, and Istanbul [2].

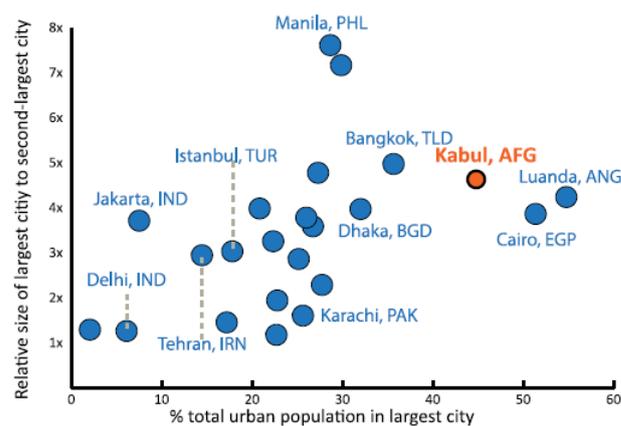


Fig. 1 Primacy ratio of Kabul City compared to some highly-urbanized cities [2]

Kabul became the largest city of Afghanistan in 1962 and thereafter the urban area has expanded 14 times from 68.2 km² to 1,022 km² and its population has increased from approximately 380,000 in 1964 to around 4.9 million by 2015

Bashir Ahmad Amiri is a Graduate student of Information Technology, Kobe Institute of Computing, Japan (e-mail: bashirahmad.amiri@gmail.com).

Nsenda Lukumwena is Associate Professor, Kobe Institute of Computing, Japan (e-mail: nsenda@kic.ac.jp).

[4]. The city has added 9,313 hectares of built-up area to its urban extent between 2000-2014, meanwhile, edge extension accounts for 62% and was the primary mode of urban expansion followed by 23% infill, 15% inclusion, and 1% leapfrog respectively. The extensification of the city resulted that the density of built-up area in Kabul city to fall from 173 persons per hectare in 2000 to 155 person in 2014 at an average rate of -0.8% annually [5]. Lack of effective planning policies to guide the growing urban population means that Kabul city is developing with inefficient spatial patterns and the city is expanding in form of informal with sprawl land use pattern which represent a threat to its future sustainability.

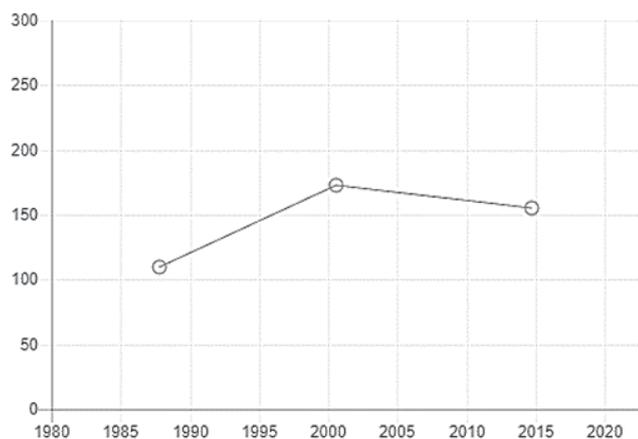


Fig. 2 Built-up area density (persons/hectare) [5]

Land use conversion has been the major concern of urban expansion. Whereas sprawling and informal development resulted in the conversion of hundreds of hectares of farmland to urban/built-up areas annually which is by far the most significant land use conversion in Kabul city. Today, these informal settlements account for 69% of all residential areas in Kabul and provide shelter to about 80% of its population [9]. The problem of housing in Kabul city (formality, choice, affordability, and demand) still remains on a broad scale, whereas the vast majority of the housing stock in Kabul city is single-family detached or attached almost 92% and the share of the apartments is only 7.8% including 2% mixed-use residential and commercial uses [2]. The given figures confirm the argument of sprawling development and absence of compact urban form within Kabul city. Following the current development pattern, finding space for new housing and required urban facilities will be the great challenge for the local government of Kabul city.

Apart from that, this sprawling land use pattern with inadequate access to urban services especially public transportation made Kabul city an automobile-dependent city and as result the vehicle population increases by approximately 11% annually from 341,000 in 2005 to 1,224,000 in 2010 [6]. According to United Nation Regional Information Networks (IRIN) 2008, every month around 8,000 new vehicles are registered in Kabul traffic department regardless of thousands of unregistered and illegal cars which

most of them are over 10 years old and are more polluter than modern vehicles. This sprawling urban form in line with automobile dependency led the city to be one of the most polluted cities in the world which the contribution of motor vehicles and population growth is 52% [8].

To cope with this rapid urban growth and as result sprawling development trend the conventional planning policies and growth management must be reoriented to meet the fundamental needs of Kabul city. For this propose the policies, strategies, and action must be led by an approach that aims at positive social, economic and overall environmental impact: Smart Growth, Smart Growth is a new concept in the world, which emerged as a proactive growth management and planning tool in the United States to mitigate the ruling sprawl and followed by many countries. Kabul city, being the highly urbanized city in the country, is encounter to urban sprawl and informal settlement in broad scale and Smart Growth is an approach that worth to emulate, for the adoption of the basic principles into planning policies.

II. WHAT IS SMART GROWTH:

The term Smart Growth, generally, refers to a set of urban planning and transportation policies that mainly focus on the type and location of development by encouraging infill and redevelopment projects, compact and mixed land use development, providing alternative transportation modes (walking and cycling), community participation, farmland and open space preservation. By adopting Smart Growth principles, environmental and economic resources do not consume aggressively since it promotes environmental protection policies and limit the growth within the city and decline the cost of infrastructure by compact design. Smart Growth changed the development debate away from whether or not new development should be allowed to how and where the new development should take place [10].

Smart Growth has proven to embody a confidence in being able to address the challenge of urban growth and accommodate the growing urban population. It emphasizes infill and (re)development, transit-oriented development, mixed-use and a land-use pattern of high density that optimize land use efficiency with conservation strategies to protect the natural environment. Proponents of smart growth tout its more compact, less automobile-dependent development as a superior alternative to the prevailing pattern of sprawl [12].

III. METHODOLOGY

The purpose of this study is to assess the smart growth principles and the extent to which urban planning policies in different countries can ensure a sustainable urbanization and growth management, compare the performance of these planning and management policies to learn from the successful implementation. Hence, the method used in this study is a literature analysis method through reviewing various international journals and related research papers and reports to highlight the potential benefits of Smart Growth and to what extent it can be a strategic alternative for Afghanistan's

cities, especially the capital city. A comparative analysis is carried on the USA, China, and Indian cities to identify the potential benefits of smart growth likely to serve as an achievable broad base for recommendations in different urban contexts. The following case studies will explore the potential of smart growth policies to cope with rapid urban growth.

SMART GROWTH PRINCIPLES:

- Mix land uses
- Take advantage of compact building design
- Create a range of housing opportunities and choices
- Create walkable neighborhoods
- Foster distinctive, attractive communities with a strong sense of place
- Preserve open space, farmland, natural beauty, and critical environmental areas
- Strengthen and direct development towards existing communities
- Provide a variety of transportation choices
- Make development decisions predictable, fair, and cost-effective
- Encourage community and stakeholder collaboration in development decisions

These principles are flexible and adaptable and have been successfully applied in many cities.

Fig. 3 Smart Growth Principles [11]

US Cities: Since the late 60s, most of the states in the US have initiated various growth management to come up with suitable development pattern. From land division program in Hawaii to urban growth boundary in Oregon and as result in many other states of U.S, all these initiatives were to respond to the threats of sprawling and to protect the environment sensitive areas specially farmland and forestland, considering, sprawling development patterns have become the leading land-use concern in the United States [13] and finally it ends up with Smart Growth initiative in Maryland state.

The smart growth program in Maryland has two main parts: (1) The Smart Growth Areas Act and (2) The Rural Legacy Program. The program is usually an incentive-based, rather than a regulatory, which intend to provide state fund for infrastructure development in Priority Funding Areas (PFAs) and also provide funds for other incentive to protect the environmental resources outside the PFAs [14]. Smart Growth was considered as an innovative way for states to combat the ruling sprawl and preserve the environmentally sensitive areas. However, the program is new and just slightly a few years old but performed much effectively for this proposes. Accordingly, for the PFAs, all the areas have been mapped and state's funds for infrastructure development has been targeted the PFAs. for instance, 84% of the state's school construction funding was earmarked for rebuilding and repairing existing schools, roughly 95% of state sewer and water funding was being spent on PFAs, 72 applications have

been submitted for the cleanup of more than 1500 acres of brownfields, and for The Rural Legacy Program the state already features 23 designated areas covering well over 100,000 acres and has committed to preserving 26,000 acres within these Rural Legacy areas [15].

According to SONG and Ding [16] Smart Growth in the US grew out of growth management movement of 1970s and 1980, but unlike other growth management which tends to slow the growth to manage, smart growth is focusing on the following issues:

- The location of development (encouraging compact growth, preserving farmland and open spaces, investing in established communities)
- The design of development (providing a range of housing opportunities, fostering distinctive communities and mixed uses)
- Transportation and land use connections (creating walkable communities with transportation choices); and
- Urban development procedures (encouraging stakeholder participation and making development decisions fair and predictable).

Chinese Cities: Smart Growth is a new approach in the world, but many have argued that China is growing already smart in many extents. Chinese cities by any standard, like most of the other Asian cities, are in the phase of rapid growth and have slightly high urban density characterized by intensively mixed land uses [17]. However, evidence suggests that new development in China is not following the principles of smart growth, most of the new developments in China are profit-oriented which do not consider the principles around social and environmental sustainability, Chinese cities despite being extremely dense, they are limited to residential uses and failed to provide enough open space and commercial area, alternative transportation modes (walking and cycling) are falling down, public participation has never been a feature of development process and most of the decision is taking behind the closed doors before dissemination to the public. Smart growth encourages development patterns that are not only dense but also combine land uses in a way that creates a feeling of community and a distinctive sense of place [18]. As elsewhere, most of the urban problems in China, are the direct result of improper policies, especially management and regulation in market process and some other like farmland protection policies which force the urban spatial growth into preserved cultivated land. To cope, the Lincoln Institute of Land Policy in 2007, managed a conference titled "Smart Growth for China", in order to understand and evaluate the issues of rapid urbanization and hoped that smart growth will be an alternative approach to remedy the unsustainable development pattern in China. Nevertheless, Acknowledging the problem of rapid urban growth, the government of China initiated a movement called the Scientific Outlook on Development, to stresses the importance of creating a harmonic society, with sustainable and balanced development as its basic requirement and coordinated and comprehensive growth as its fundamental approach [18].

Many smart growth principles, such as mixed land uses, walking communities, and a sense of place and attractive communities are crucial in urban area to improve the quality of life, and tend to establish a harmonious living environment which is important especially for China with highly urbanized cities and high population density [19].

Indian Cities: The rapid urbanization and population growth in India have led to the sprawl development as elsewhere in the world. But the sprawl manifests in Indian cities is different than, say, in the US and Chinese cities. Ani Dasgupta (2016) explains: “India isn’t sprawled in the traditional way; Indian cities are among the densest in the world. But the problem is that it is not productive density. Instead of multi-level buildings organized into accessible neighborhoods, many Indian cities are filled with short, overcrowded buildings, and lack public transit and pedestrian spaces. So for each square mile of space, there’s a lot less room to live” [20]. But just like elsewhere sprawl, Indian urban dispersion had negative economic, social and environmental consequences.

Since the 1990s, urbanization of India has been rapid, sprawled and unplanned resulted in the conversion of millions-hectares of farm and forest land to the urban area. Currently, the number of million-plus cities/urban agglomerations have reached 54 in India [21]. Urban practitioners and researchers evaluated the implication of rapid urbanization and sprawl development and suggested to formulate appropriate planning and management policies to control the haphazard spatial growth of Indian cities, therefore, million-plus cities need to be priority targets of smart growth, since they are the primary centers of population and economic growth and represent a well-organized administrative jurisdiction thereby tend to be appropriate for policy analysis [22]. Hence the government of India has undertaken several initiatives which the 74th Constitutional Amendment was one such, that all state governments must empower the municipalities to incorporate planning with economic development, social justice and environmental preservation. As part of efforts, the India government introduced the Jawaharlal Nehru National Urban Renewal Mission (JnNURM) in 2005, mainly to focuses on governance and improvising the urban infrastructure by targeting urban renewal and development projects. The program supports 63 cities including 7 mega cities across the country for specifying the infrastructure gaps and deficiencies in housing and basic services. [23]. According to Kiranmayi Raparathi (2014), who Assessed Smart Growth strategies in development plans of 53 million-plus cities of India, seven out of 53 cities namely, Mumbai, Delhi, Bangalore, Kolkata, Chennai, Hyderabad, and Ahmadabad are focusing more on smart growth. By analyzing the policy framework in 53 cities, he argues that urban planning policies in India are following the principles of smart growth in their development plans.

IV. DISCUSSION

By comparing the three examples, the study comes to the following findings. The USA, the pioneer, has been

implementing the smart growth principles on a variety of fronts to its new development in most of the states. Recently Virginia, North Carolina, Oregon, Maryland and Colorado have awarded the Overall Excellence in Smart Growth (OESG) as a National Award for Smart Growth Achievement by the US Environmental Protection Agency (EPA).

TABLE I
 THE COMPARATIVE ANALYSIS OF THE PREVIOUSLY DISCUSSED CASE STUDIES

No	Principles of smart growth	US cities	Chinese cities	Indian Cities
1	Mixed land uses	O	X	O
2	Take advantage of compact building design	O	O	X
3	Create walkable communities	O	X	O
4	Provide a variety of transport choices	O	X	O
5	Foster distinctive, attractive communities with a strong sense of place	O	X	O
6	Strengthen and direct development toward existing communities	O	O	O
7	Preserve open space, farmland, natural beauty, and critical environmental areas	O	X	X
8	Create a range of housing opportunities and choices	O	O	-
9	Make development decisions predictable, fair, and cost effective	O	X	-
10	Encourage community and stakeholder collaboration in development decisions	O	X	-

Note: ‘O’: present; ‘X’: needed to improve.

Many have claimed that Chinese cities are already growing smart. But the evidence, however, suggests that China to some extent is not following smart growth principles more specifically, mixed land use and pedestrian-oriented development, farmland and open space preservation, high-density residential with few commercial, rising of car ownership and finally public participation.

Overall, Indian cities are incorporating specific policies to promote smart growth. However, the performance of Indian cities in smart growth is well-suited but variations among the smart growth principles highlighted that the compact development and farmland protection are not emphasized by these cities. Accordingly, as seen they must promote policies to limit the growth, within the city and restrict new development in environmentally sensitive areas.

The performance of smart growth in the studied cases shares several similarities. All three countries performed well on direct development toward existing communities which is the essence of any development plan. The results also show that although, they all adopt and promote smart growth principles to some extent, but for the principles that need improvement in China and India Incentive-based practice in USA to some extent can help them to preserve the environmentally sensitive areas out of the urban boundary and to cope with the current ruling sprawl development.

V. CONCLUSION:

Smart Growth has proven to achieve sustainable development in many cities across the globe, it served to mitigate the negative impacts of rapid urbanization on the urban environment. As the main objective of this study was to

assess to what extent smart growth would mitigate the adverse trend of urban growth in Afghanistan's cities especially the capital city. Afghanistan's major cities are in the rapid growth phase and sprawling is their major problem. Kabul is the dominant city, with 5% annual growth and 41% of the total urban population of the country. Due to this rapid growth, Kabul city expanded 14 times. The current urban growth in Kabul city has by far exceeded the capacity of infrastructure and services, local government is facing the daunting challenge of meeting the needs of all citizens. development of new housing, infrastructure, and other required urban facilities has not yet to keep pace with the rapidly growing population. And this rapid urbanization, along with city expansion, changed the configuration of Kabul City, proliferated the slums, converted farmland to urban use and decreased the connectivity and permeability. Therefore, smart growth can be an alternative approach in reorienting the ruling development trend of the city. Since housing represents a significant proportion of urban development and is the main driver of urban expansion which leads to land use conversion. Today almost 70% of Kabul houses are built informally and illegally mainly on farmland and areas which, in the master plan, have been preserved as recreational and open spaces. To cope with this, several townships have been developed by the private sector and government but all these efforts did not help the city to supply the adequate housing (formal housing with adequate infrastructure) since most of these new cities were not in line with sustainable development principles. Today formal housing supply only meet 5-10% of the total need, therefore informal settlements have been the only large-scale solution to the growing population. Despite the fact that the formal housing is unaffordable for the majority of the people, there is no housing deficit in Kabul city. As long as housing deficit is not the major challenge of urban sector in Kabul city but the quality, there is no need for further expansion of the city which is encouraged by centrifugal forces, Smart growth is a series of policies aimed to promote centripetal forces which leads to compact urban form and densification.

Kabul city is covered with steep mountains with the limited flat area which could be suitable for development, farming and so on. The remaining developable lands especially the farmland and vacant plots require proper management policies to preserve and to use. The current conversion of farmlands of Kabul city to urban uses is the direct result of sprawling and improper planning policies and management tools. The smart growth legislation in the case studies developed in this paper can be a good example to preserve the remaining farmland and environment sensitive areas and encourage government, the private sector and other related stakeholders to efficient use of available vacant land by infill development and redevelopment. Unlike, the current development trend and growth management in Kabul city which is seeking for suitable lands outside the city for new development, Smart Growth encourages development within existing city's boundaries through infill and redevelopment. Smart Growth balances the development and environmental protection in an affordable way by allowing the same amount of development

that would take place under conventional growth, but it uses a more compact design, takes advantage of existing infrastructure, and directs the development to locations where it is more efficient to provide public services and away from environmental resources [8].

This literature review highlighted the current development challenges in Kabul city which include informal sprawl, pollution (air, water, land, and noise) and farmland conversion into built-up area, all of which, are due to improper planning policies and management tools. In addition to above this study explained the potential benefits of smart growth to cope with this ruling sprawl. Therefore, there is a vital need to promote and regulate policies pertaining to land conversion and compact urban form by adapting and or adopting smart growth principles which mainly focuses on centripetal forces and strongly encourage/recommend infill development and revitalization/redevelopment of existing areas within the urban growth boundary and preserve the farmlands and critical environmental areas outside the urban growth boundary.

In light of the adverse consequence of urban expansion and the finite nature of resources especially urban land the key argument of this study is that conventional and outward development pattern must be reoriented to smart growth in order to achieve positive social, economic and overall environmental sustainability. In sum, this literature review and assessment on smart growth principles in these highly urbanized countries gave a clear understanding of smart growth, which allows this study to wrap up its findings and recommend smart growth as potential growth policies and management tool for the future development of Kabul city which could be extent to other cities of Afghanistan.

REFERENCES

- [1] United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352).
- [2] Ministry of Urban Development and Housing (MUDH), (2015), The State of Afghan cities: Volume one, Kabul, Afghanistan.
- [3] City Mayors: World's fastest growing urban areas (1). (2018). Citymayors.com. Retrieved 2 December, 2017 from http://www.citymayors.com/statistics/urban_growth1.html.
- [4] Ahmadi, A. S. & Kajita, Y. (2016), Evaluating urban land expansion using Geographic Information System and Remote Sensing in Kabul, Afghanistan, Vol:10, No:9, 2016.
- [5] Atlas of Urban Expansion - Kabul. (2018). Retrieved 10 January 2018, from <http://www.atlasofurbanexpansion.org/cities/view/Kabul>
- [6] Safi, Z. U. (2011), Survey Report of Causes of Vehicles Traffic Problem in Kabul Afghanistan, Research Unit-Afghanistan Institute of Rural Development, MRRD.
- [7] IRIN, (2008), Kabul's air pollution putting people's health at risk, viewed 21 December 2017, <https://www.irinnews.org/fr/node/240808>.
- [8] Osman, M. (2015), PM2.5 Emission Sources, Health Effects and Possible Control Strategies in Kabul, the Capital of Afghanistan, Maseeh college of engineering & computer science, Portland, USA.
- [9] The World Bank, (2008), Housing Finance in Afghanistan: Challenges and Opportunities, South Asia Region.
- [10] conversiontools.org, (2012), Economic Benefits of Smart Growth and Costs of Sprawl, Pennsylvania Land Trust Association.
- [11] Smart Growth Online, Smart Growth Principles, viewed on 2 January 2018, <https://smartgrowth.org/smart-growth-principles/>
- [12] Robert W. Burchell, David Listokin, and Catherine C. (2000), Smart Growth: More Than a Ghost of Urban Policy Past, Less Than a Bold New Horizon, Housing Policy Debate · Volume 11, Issue 4.

- [13] Freilich, R. (1999). *From Sprawl to Smart Growth: Successful Legal, Planning, and Environmental Systems*, Chicago, IL: American Bar Association, Section of State and Local Government Law.
- [14] Indicators of Smart Growth in Maryland
- [15] *Smart Growth: A New American Approach to Regional Planning*
- [16] Song, Y. & Ding, C. (2009), *Smart Urban Growth for China*, Lincoln Institute of Land Policy, Cambridge, Massachusetts.
- [17] Kenworthy, J., and G. Hu. 2000. Threat to global survival? A case study of land use and transportation patterns in Chinese cities. http://www.istp.murdoch.edu.au/ISTP/casestudies/Case_Studies_Asia/china/chinese.html (accessed on September 5, 2008).
- [18] Appleyard, B. et al., 2007. *Smart Cities: Solutions for China's Rapid Urbanization*, New York: NRDC (Natural Resources Defense Council).
- [19] Chen, X. 2008, 'The Evaluation of the Implementation of Smart Growth in Chinese Official Plans: a case study of Xuzhou City, China', Master of Arts in Planning Thesis, Waterloo University, Waterloo, Canada.
- [20] Dasgupta, A. (2018). CityLab, Sprawl Will Cost India \$1.8 Trillion Per Year by 2050, Retrieved 15 January 2018, from <https://www.citylab.com/solutions/2016/12/sprawl-will-cost-india-18-trillion-per-year-by-2050/509573/>
- [21] Census of India. (2011). "Registrar general and census commissioner." Ministry of Home Affairs, Government of India, New Delhi, India.
- [22] Raparathi, K. (2014), *Assessing Smart-Growth Strategies in Indian Cities: Grounded Theory Approach to Planning Practice*, Journal of Urban Planning and Development, © ASCE, ISSN 0733-9488/05014031(10)/\$25.00.
- [23] NIBF, Affordable Housing, Retrieved 15 January 2018, from <http://www.nibf.in/Blog/Articles?Id=17>