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Smart Urbanization – Key to Sustainable Cities

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1 ABSTRACT

Urbanisation is a major change taking place globally. It is estimated that 500 million people will be urbanised by 2030 which is around 60% of the world's population will be living in cities. Cities fuel economic development through mobilizing capital, work force, knowledge/information and technology and offer better chances of wealth generation, better health facilities, education and a good quality of life with better services and facilities. This has led to the increase in "megacities" (urban areas with a population of 10 million or more) and primate cities (leading cities in the region disproportionately larger than others in the urban hierarchy) across the globe. Urbanization propelled by economic reforms are putting cities under perpetual pressure of population concentration and energy intensive growth model. The cities are often confronted with a multitude of key problems like high urban densities, traffic congestion, energy inadequacy, unplanned development and lack of basic services. Due to high land values, migrants often have no choice but to settle in shantytowns and slums, where they lack access to decent housing and sanitation, health care and education thus adding to urban poverty. Urbanisation is also contributing significantly to climate change as 20 largest cities consume 80% of the world's energy and urban areas generate 80% of greenhouse gas emissions worldwide. The challenges of rapid urbanisation are to deal with the social, economic and environment development through more effective and comprehensive land administration functions, supported by efficient per capita infrastructure supply , resolving issues such as climate change, disaster management, insecurity, energy scarcity, environmental pollution, and extreme poverty. Urbanization must be able to support urban planning to achieve sustainable development in order to meet the growing energy and housing demands, reliable public transportation systems and be able to meet essential urban services without putting pressure on resources. Therefore it needs to support innovative urban planning policies and strategies beyond traditional urban planning paradigms. Urbanisation on the positive side provides an unparalleled urban planning opportunity to pre-address social and environmental problems, including reduction of greenhouse gas emissions combined with the retrofitting and upgrading of facilities and networks in existing urban centres, as well as smart urban planning of cities can provide better education, healthcare and high-quality energy services more efficiently and with less emissions because of their advantages of scale, proximity and lower geographic footprints. Thus "Smart Urbanisation" is the key to safer cities of tomorrow. Building cities sustainably using smart growth principles, compact development planning form, using eco-city concepts, concept of low carbon electricity ecosystem etc, provides an opportunity to avoid future sources of greenhouse emissions, while developing more liveable and efficient urban centres. It could also alleviate population pressure on natural habitats and biodiversity thus reducing the risks to natural disasters. High-level integration of existing technologies to deliver a smart energy network, enhanced electricity transmission, energy efficient transportation, and low carbon building footprints, will make it easier to manage the unfolding urbanisation, and could have much positive impact on energy use and consumption. Policy interventions and government investments are important determining tools to its success. This paper attempts to discuss the principles of "smart urbanisation" in light of sustainable cities of tomorrow.

2 INTRODUCTION

Urbanisation is a global phenomenon occurring all around the world (Doytsher et al. 2010). Around 70% population is expected to be living in urban areas by 2030. It is advantageous to be urbanised as it brings prosperity and increases economic development. But the pace of urbanization is far more than the local and civic authorities can cope and there is a lack in demand and supply of basic urban services (Kingsley 1955; Doytsher et al. 2010). As a result there are greater negative impacts in the form of insufficient urban infrastructure, uncontrolled population concentration, haphazard planning of urban centres, which in turn is

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energy exhaustive and creates a greater pollution. The problems are innumerable and un-accountable. But we need a solution. The solution to be able to cope up with the pace of urbanization, sustainable use of resources, sustainable urban development coupled with smart technology and energy efficient urban systems. Thus we need to adopt smart urbanisation. Smart urbanization strategies shall look into smart growth, using the power of urbanized areas to increase GDP rather than getting affected by them (Dobbs et al. 2012). There are many ways of achieving smart urbanisation. Intelligent cities, adaptive and eco-sensitive development, and to begin with change in the system by green retrofit of existing infrastructure are some steps towards it. Cities need to adopt green growth to improve the day-to-day lives of residents. "Smart cities" can reconcile growth and sustainability (Hoornweg & Freire 2013). It can be tool in dealing with global issues like poverty reduction, climate change, and disaster management. But at the same time, the impact and sustainability of smart technology is a major question. Thus there is a need of holistic and integrated approach (Hall 2002). We explore these in the subsequent sections. To start with it is necessary to know what urbanization trends speak.

3 URBANISATION TRENDS

Urbanization refers to a process in which an increasing proportion of an entire population lives in cities and the suburbs of cities. It is estimated that 500 million people will be urbanised by 2030 which is around 60% of the world's population will be living in cities (Unfpa.org; UN 2014) Economic drivers make cities the ideal places to work and live (Bouton et al. 2013). Modern urbanized life has produced a new environment, creating new prob¬lems of adaptation in comparison to rural areas where community development is in relation to their immediate environment. With the present pace of urbanization 1.5 million more square kilometres of land will be urbanised by 2030, an area comparable to that of France, Germany and Spain combined. That indicates that average 1 million more city dwellers every week for the next 38 years, with the world's total urban population forecast to increase from present 3.5 billion to 6.3 billion by 2050, (according to Planet Under Pressure 2012 conference organizers.) (Burger 2012). These trends are impossible to stop, and not desirable also as everyone wants a modernized civic life; which means that the question is how best to urbanize, states Dr. Michael Fragkias of Arizona State University, in "Planet Under Pressure 2012" conference held at London in March 2012. It is clear that the path to sustainable development is has to be smart and adaptable to future demands of energy supply. Cities play a vital role in the process.

4 CITIES

Accounting for approximately 70% of global GDP, cities drive the world's economy and are vibrant engines of opportunity, commerce, culture, and an improved quality of life (Sensiable.mit.edu, 2014).Cities has better economies and thus offer increased job opportunities, improved health and education facilities, a good quality of life with better services and facilities etc. these are major pull factors inviting more and more people in urban areas or cities. The increasing urbanisation has led to the increase in "megacities" (urban areas with a population of 10 million or more) and primate cities, many a times these cities are held responsible for regional economic imbalance due heavy concentration of investment, job opportunity, higher level of goods and services. Though megacities are economic hubs, and have modern technologies, high standard of living with greater comfortable life, but the economic disparity is wider between rich and poor in these areas. They have some mega issues like poverty, poor health, social issues and environmental degradation. Thus the negative impact of urbanization is seen greater. The cities are often confronted with a multitude of key problems like high urban densities, traffic congestion, energy inadequacy, unplanned development, lack of basic services, illegal construction, creation of slums, poor natural hazards management, crime and public safety issues, water, soil and air pollution leading to environmental degradation, aging infrastructure and environmental impact (Little 2012; Homeland Security 2010) on climate change coupled with poor urban governance. These can be seen as:

4.1 Increase in poverty and deterioration of quality of life and health

Cities generaaly lack access to decent housing and sanitation, health care and education thus adding to urban poverty (Grayson et al., 1994). Intensive urban growth can lead to greater poverty. Large volumes of uncollected waste due to concentrated populations and lack of basic services create multiple health hazards and deteriorate quality of life. As per a study, The Regional lifestyles 1992 report it has been found people don't prefer cities, for example, the two-thirds of its 1,000 sample would prefer to live in the country rather

than the city because of its open space, cleanliness, quietness and lack of stress. This has been anticipated to urban problems rather than any other issue. Another study in the early 1960s by the geographer Peter Hall showed that the "desired future place" of residence of 59% of people lay in the countryside. Nearly 30% favoured the suburbs, and only 8% the town egestas.

4.2 Increase in climate change and disasters- a global concern:

Urbanisation is also contributing significantly to climate change as 20 largest cities consume 80% of the world's energy and urban areas generate 80% of greenhouse gas emissions worldwide(Chauhan 2008). Urban development can magnify the risk of environmental hazards such as flash flooding.

4.3 Environmental pollution and Degradation of eco system:

Concentrated energy use leads to greater air pollution with significant impact on human health. Automobile exhaust produces elevated lead levels in urban air. Pollution promotes loss of urban tree cover. Animal populations are inhibited by toxic substances, vehicles, and the loss of habitat and food sources. According to the World Health Organization's air quality standards, the concentration of suspended particulates (made up of airborne smoke, soot, dust, and liquid droplets from fuel combustion) should be less than 90 micrograms per cubic meter. Indian megacities like Mumbai (240), Calcutta (375) and Delhi (415) cubic metres of suspended particulates, are some of one the highly polluted cities (World Bank 1995).

4.4 Increase in Housing crisis:

The authorities are often fail to meet the housing demands. The shortage of houses leads to overcrowding; insanitary conditions and it result in slums (Dalal et al. 2013). In Indian context There is shortage of 18.78 million houses in urban areas most of which is from economically weaker section (EWS) and lower income group (LIG) section of the society (HPEC & MoUD 2011) . The concentrated population of cities also leads to many transport problems like traffic jams, accidents, etc. The inhabitants of the cities also become unsocial. They lack social feeling and sympathy.

4.5 Cities fail to meet the infrastructure and urban services:

Over population in cities always create problems for the Municipal authorities such as water shortage, electricity breakdowns etc. In certain cities water is available for few hours only (Economist 2015). Sometimes the water gets contaminated. It is also a problem to keep the streets, roads, etc properly cleaned. As per the studies, 2.5 billion have unreliable or no access to electricity and 2.8 billion lives in areas of high water stress, by 2035 energy consumption will increase by 35% which will increase water consumption by 85% (World Energy Council 2010).

4.6 Problem of counter urbanization:

in developed countries, more and more people are choosing to live on the edge of urban areas. They try to escape these problems by moving away from the city - a process called counter-urbanisation (Islam 2009). Long term, solution must be to make cities more sustainable.

4.7 Problems of urbanization is concentrated in city cores or CBDs (Central Business Districts)

The CBD of a city is economic hub, where business, commercial and economic activities are predominant. This invites more movement of people and vehicles as many people work here. Thus there is severe problem of traffic congestion. Since there are limited residential areas around this people come from far and this increases the trip to work, increasing more motor vehicles, which means more CO2 emissions (Olayiwola et al. 2014).CBDs are linked up with smaller, older, narrower roads. This further causes bottleneck and congestion. These areas are also having poor and older construction resulting in sudden accidents at times.

4.8 Social problems and Problems of inequality:

Inequality means extreme differences between poverty and wealth. Other social problems may include crime, safety and security of women and children (Stephens 1996). Cities have higher crimes rates. Thus uncontrolled urbanization creates many social and criminal problems in cities. Unemployment and incidents of long-term illness are seen on rise.

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4.9 Urbanisation is eating up Brownfield and Greenfield sites:

The housing demand and supply shortage forces people legally or illegally to settle for Brownfield and Greenfield sites around habitations. Brownfield sites are often disused or derelict land; they are valuable as existing site has already been developed. Greenfield sites Are sites which have not previously been built on. This includes the greenbelt land around cities. These are cheaper to build on but are not favoured by environmentalists, as it encourages urban sprawl.

4.10 High infrastructure demand:

Global urbanization is creating demand for an estimated $40 trillion in infrastructure over the next two decades, and a broad range of stakeholders - the IT industry, real estate developers, citizens and civic leaders – are looking for new opportunities to address the urban problems using "intelligent" systems (Wagner.nyu.edu, 2014).

Some cities have tried to manage these problems by introducing many strategies that include traffic management schemes. These schemes may include: park and ride schemes, cycle lanes, congestion charging schemes, such as those in Durham and London, car-pooling, as used in the USA, to encourage people to share cars, Low Emission Zones, as in London, Local councils have also tried to make the roads in urban areas safer by introducing traffic calming, pedestrian zones, vehicle-exclusion zones and permit-only parking schemes (European Commission 2004)(Heydecker 2009). But the solutions to these problems need to be planned even before they occur, right at the inception stage. We need to learn lessons and strategize the solutions to it.

5 CHALLENGES OF URBANIZATION

The challenges of rapid urbanisation are to deal with the social, economic and environment development through more effective and comprehensive land administration functions, supported by effective Infrastructures, resolving issues such as climate change, disaster management, insecurity, energy scarcity, environmental pollution, and extreme poverty(Doytsher et al. 2010). Yet present cities have complicated these challenges. In the Global South and East, the scale and pace of urbanization is straining physical infrastructure, fiscal capacity, and natural resources in many places. It is challenging institutional and political structures that often lack the capacity and flexibility to respond to fast-paced growth. Meanwhile, cities in the Global North and West are also facing challenges, including finding efficient ways of retrofitting and upgrading outdated infrastructure. Regardless of the region, the main issues of cities are climate change; achieving economic stability, social and environmental sustainability; and building a better quality of life (Senseable.mit.edu,2012). These factors form the framework, in which everything else is embedded and must operate. Economic growth needs to emphasize creativity and innovation and to strengthen the environmental, social and cultural amenities of the city. Community-oriented sustainable urban design principles are needed to be adopted in urban development (Kenworthy 2006). Strong city planning will be essential in managing the problems of urbanization and coping with its pace of development. There is thus a need for sustainable development with smart, policies adaptive to the future needs and energy efficient.

6 CONCEPT OF SUSTAINABLE DEVELOPMENT

There have been many concepts of sustainable development but most accepted definition of sustainable development is the one given by Brundtland[1] report, which says sustainable development as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs. It aims at assuring the on-going productivity of exploitable natural resources and conserving all species of fauna and flora",(World Commission on Environment and Development 1987). There is a need to understand the deeper meaning of it. And to bring this definition into practice, it is important to understand the sustenance of people and resources in the present context, and trends of their future needs and requirements. The sustainable development needs to be smart in the present context. "Smart cities make urbanization more inclusive, bringing together formal and informal sectors, connecting urban cores with

[1] Brundtland Commission formerly known as World Commission on Environment and Development (WCED) was formed in 1983, chaired by Javier Pérez de Cuéllar, former Secretary General of the United Nations. It had the mission to unite countries to pursue sustainable development together. They released Brundtlant Report also called "Our Common Future" which was published by Oxford University Press in 1987, and talks about sustainable development.

peripheries, delivering services for the rich and the poor alike, and integrating the migrants and the poor into the city. Promoting smart cities is about rethinking cities as inclusive, integrated, and liveable." "Smart cities" can reconcile growth and sustainability, says Joshi-Ghani (urban sector manager at the World Bank.). Cities need to adopt green growth to improve the day-to-day lives of residents. Thus urbanization provides a great opportunity to make sustainable development. Sustainable growth needs to house the many generations to come (Greencitiesbysheila.blogspot.in, 2012).

7 URBANISATION AS AN OPPORTUNITY

With increasing urbanization there is a tremendous opportunity for economic development. Since cities offer opportunities they need to have environment to sustain development by having clean air and water, sustainable food choices, and carbon-neutral transportation and energy (UNDESA 2013). Due to scale and proximity and lower geographic foot prints of cities and mega cities-Urbanization provides an opportunity to deal with these problems in an effective way as well as it provides opportunity for urban planning, urbanization can be used for reducing green house gas emission, retrofitting and upgrading of facilities and network in exiting urban centres, delivering of high quality energy services, energy efficient transportation, enhanced electricity transmission. Urban densification in which policymakers working in growing cities and regions with policy options to accommodate population growth without vast urban sprawl. Even in Stockholm, Europe's green capital in 2010, there are possibilities for policy improvements in shaping the urban form while accommodating population growth. For example, a continuation of current planning policies will require that Stockholm's urban form is expanded by 155 km2 between 2000 and 2050 to accommodate the growth. But if the policies were intensified in a realistic way, this could be reduced to 65 km2 (NORDREGIO 2010). 'Smart' planning of the urban environment have significant potential to improve quality of life and to reduce the carbon footprint of cities (Falconer & Mitchell 2012). The step towards sustainable development starts with present, by planning cities more energy-smart, by renewal of ageing infrastructure (for ex. Inner-city redevelopments have been taken up in London's Docklands or Manchester's Salford Quays, to improve the physical environment of the area and improve the quality of housing). Reinventing the urban landscape by design and good planning, offers a powerful incentive to incorporate innovations in energy efficiency and renewable energy generation (Wgsi.org).

The concept of "Smart urbanisation" could make cities more efficient and reduce their overall carbon footprints. The expansion of cities provides an urban planning opportunity to pre-address social and environmental problems, including reduction of greenhouse gas emissions. Combined with the retrofitting and upgrading of facilities and networks in existing urban centres, as well as good planning and enlightened governance, many cities could deliver education, healthcare and high-quality energy services more efficiently and with less emissions than less densely settled regions, simply because of their advantages of scale, proximity and lower geographic footprints (Wagner.nyu.edu, 2014) (Falconer & Mitchell 2012). This is referred to as smart urbanisation. Smart urbanization is a set of smart strategies. Some have been discussed below.

8 STRATEGIES OF SMART URBANIZATION:

Smartness of urbanization begins with the strategic urban planning principles, where smart city planning will be a tool for managing and coping urbanization. Well-planned dense urban areas can alleviate population pressure on natural habitats and biodiversity. Experts estimate that as a consequence of urbanization over $40 trillion dollars will be invested in urban infrastructure over the next 20 years mainly in transport, housing, hospitals and other social amenities all of which will be consuming energy. This may also produce adverse impact on climate change due to increased CO2 emissions. The challenge for urban policy makers is - to meet the demand of growing energy and to go for alternative renewable sources for efficient energy generation as this will help in reducing the carbon footprint.

8.1 Use of renewable sources of energy:

The use of renewable resources like wind energy, thermal power energy, solar energy etc. are known for a long time, but needs a smart implementation to reduce our growing energy demands (Erec & Greenpeace 2010). Technologies can replace our reliance on the burning of fossil fuels to renewable sources for generating reliable 'base-load' power in electrical systems. This can be done by use of grid-scale battery

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storage to support renewable energy expansion; the developing enhanced geothermal power potential; and by accelerating the development of advanced nuclear power technologies. Reducing green house gas emissions is the wholesome need of sustainable development. Ex. According to New York Times 2011, the Federal Department of Energy financed a solar map of the city, an innovative approach which identified that two-thirds of New York City's rooftops are suitable for solar panels and that together they could generate 5,847 megawatts, enough energy to meet half the demand for electricity during peak periods and 14 percent of the city's annual electricity use . Another example is of China. The Chinese city of Rizhao, north of Shanghai, has pioneered another innovative way of deploying solar panels. By funding research and development instead of end-user subsidies the city's council was able to encourage the local solar industry to increase efficiency and lower unit costs. As a result, 99 percent of households in the central district purchase a solar water heater for no more than the cost of a conventional electric water heater, saving $120/year per household on running costs. Innovative business models have emerged to overcome concerns about prohibitive investment costs. SunEdison in the US owns, finances, installs, operates and maintains solar panels for customers and charges them for the power in return, just as a traditional power utility does. Conversely, community led schemes, such as One Block off the Grid and Energy Share, are becoming increasingly popular ways for residents to pool their knowledge and resources to help generate or source their own renewable energy.

8.2 Smart grid for a smarter city

Electricity is one the major energy consuming sectors and need to be stratified for smart urbanization (Iea 2009). To make electricity efficient, larger-scale use of smart grids and superconductors are needed for transmission and distribution of electricity in dense urban settings. This would reduce their overall carbon footprints. The challenge of grid technology is- to provide Energy storage solutions, which would allow excess power to be used in less favourable weather conditions, Power trading- as greater number of transmission interconnections across regions would help dissipate excesses and alleviate shortfalls in electricity supplies and to adopt Energy demand response mechanisms- advanced metering infrastructure and intelligent controls for buildings to help monitor and modulate energy demands reducing the strain on power networks (Ondrik 1999). Smart, information-rich energy network that uses superconductors for enhanced electricity transmission capacity and allows transportation needs to be met by multiple approaches not reliant on private vehicles. Widespread adoption of such technologies will make it easier to manage the unfolding urbanisation, and could have much positive impact on energy use and consumption. Ex.Stockholm, for example, construction has begun at the new Royal Seaport district, where a smart grid will link homes and offices as well as ships in the harbor to renewable energy (including solar and wind power) impacting many sectors with the joint ambition of creating a fossil fuel free district by 2030. The UK Power Networks, which supplies power to over eight million homes and businesses in the UK, has develop a dynamic energy storage solution powered by local wind power plant and also ensures that energy reserve to regulate power flow to compensate for the intermittence of wind power and to support power quality in the event of a fault. Together, these high-power density modules can store up to 200 kilowatt hours kWh of electrical energy (Abb-conversations.com, 2012).

8.3 Urban Planning - Smart growth

"Smart growth" is a collection of land use and development principles that ensure that growth is fiscally, environmentally and socially responsible. It preserve the natural environment, recognizes the connections between development and quality of life by placing priority on infill, redevelopment, and densification strategies."(Smartgrowth.bc.ca, 2014). There are 10 principles of smart growth- 1. Mix land uses- a mixture of homes, retail, business, and recreational opportunities; 2. Compact development design- where people choose to live, work, shop and play in close proximity; 3. Transportation choices - walking, cycling and transit, driving; 4. Create diverse housing opportunities-where People of life stages and income levels can afford a home in the neighbourhood of their choice; 5. Encourage growth in existing communities. Investments in infrastructure (such as roads and schools) are used efficiently, and developments do not take up new land; 6. Create walk able neighbourhoods; 7. Protect and enhance agricultural lands and Preserve open spaces, and environmentally sensitive areas; 8. Utilize smarter infrastructure and green buildings. They can save both money and the environment in the long run; 9. Foster distinctive, attractive communities with a strong sense of place-Places belong to those who live, work, and play there. 10. Encourage community and

stakeholder collaboration in development decisions and citizens participating in community life and decision-making (Abb-conversations.com, 2012). Example: New York City is considered one of the top 3 global cities. With nearly 8.1 million people living in the city, walking the streets, the city still manages to make positive strides towards reducing the pollution and making the city "green". By offering alternative forms of transportation, Transit Orientated Developments, people are not subject to only driving their car, Central Park of New York City provides large efforts for the preservation of open space, farmland, and natural beauty, and it takes advantage of compact building designs by building several brownstones and skyscrapers throughout the city (Sustainability of New York, 2011).It meets almost all 10 Smart Growth Principles. Other cities need to learn this lesson.

8.4 Eco Cities for environment friendly cities;

"Eco cities" can be used to define new settlements adopting a sustainable approach to urban development or municipalities that have implemented regulations for restoration and further construction as part of integrated environment policy (Driversofchange.com, 2014). Ex: Tianjin Eco-City, China's blueprints for future urbanization. This is a project carried out by Chinese and Singapore government on an infertile, highly polluted wasteland in an attempt to create an environmentally sustainable and smart eco city. It has clear goals, strong political backup, absolute expertise and huge investments into it. Since last the planners have been putting all efforts to bring the clear water efficiently into the city and driving away its polluted and salty water by efficient means which included ways like monitoring pipeline leakage, harvesting rainfall and reusing the gray water by colleting, treating and sending this treated grey water back to families for flushing toilets. Tianjin city has been equipped to deal with GHG emissions. City planners have rejected carbon-intensive industries; The Dutch technology giant recently announced it will pilot its latest energy-saving lighting solutions in the city, General Motors electric cars will drive from the company's lab to the street of the city. Nearly half of Tianjin Eco-City's received investments in 2010 came from Singapore clean-tech companies who plan to manufacture green products and provide all sorts of environmentally friendly services, like recycling materials in urban waste, for instance. Other than this every building has double glass window to save energy. Almost one fifth of the city's power is emission-free, coming from solar, wind and geothermal sources. This is a role model for Eco cities (Whatsontianjin.com, 2014).

8.5 Intelligent cities:

This is a concept beyond Smart growth. Integrating Data and information technology with urban planning impact the way cities look, feel, and function. This can be notified from the history of technology and urban form, the telephone, the computer, mass media, and their impacts on human settlement and society (Secure2.convio.net, 2014). World Intelligent Cities Summit, September 2012 in turkey, discussed and notified by eminent professionals from sectors that the future development of cities require intelligent integration of communications technology, with changing behaviour in how we use this technology, to make our cities and regions smarter and more energy efficient. This will offer Turnkey opportunities for research, new job creation, increased competitiveness, with the added bonus of sustainable living (Wicsummit.com, 2014). Large concentrations of people can generate positive outcomes. They provide personal and professional opportunities, and stimulate local and national economies and enhance productivity. Accenture[2] argues for the need to develop intelligent cities that use sophisticated open technology platforms to deliver higher-quality services more consistently to citizens and businesses at reduced cost—and that can adapt to risks like climate change, growing populations and aging infrastructures (Accenture.com, 2014). There is a deep-rooted connection between technology and ever expanding cities (TIME.com, 2014a). Technology has always shaped the city, changing our relationship to time, space, nature and each other. Information communication technologies (ICT) such as smart-phones, tablet computers, and digital books, are changing the way we interact with the built environment and our fellow citizens. For Ex: New York City's Bryant Park sits behind the great main branch of the public library, has cafes, entertainment, a reading library, lawn games — all amenities tuned to contemporary urban life. A cloud of wifi over the park is making a place to share, read, write, gossip, and debate and communicate (TIME.com, 2014b).

[2] Accenture is a global management consulting, technology services and outsourcing company, with 257,000 people serving clients in more than 120 countries. Accenture collaborates with clients to help them become high-performance businesses and governments.

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8.6 Smart urbanization efforts policy level:

The U.S. Green Building Council (USGBC), the Congress for the New Urbanism (CNU), and the Natural Resources Defense Council (NRDC)— have come together to develop a national set of standards for neighbourhood location and design based on the combined principles of smart growth, new urbanism, and green building. In 2009 LEED- rating system decided to certify development projects that perform well in terms of smart growth, new urbanism, and green building (Welch et al. 2011). Projects may constitute whole neighbourhoods, fractions of neighbourhoods, or multiple neighbourhoods. The goal of this partnership is to establish these standards for within the rating framework of the LEED (Leadership in Energy and Environmental Design) Green Building Rating System."(Ibm.com, 2014).

8.7 Smart transportation

Transportation- movement of people and goods from one place to another is the life force of economy. Cities would come to a halt without efficient transportation. It has been a leading driver behind globalization: shrinking distances, leading to the emergence of entire new economies and improving the quality of life for millions of people (Falconer & Mitchell 2012). As the present transportation system is inefficient for 21st century, we need to make it efficient, reducing its energy requirements, making it sustainable by integrating technology and intelligence into the physical transportation infrastructure. We can improve capacity, enhance the traveller experience and make our transportation systems more efficient, safe, and secure (TIME.com, 2014b). Example: Transport officials in Singapore, Brisbane and Stockholm are using smart systems to reduce both congestion and pollution. Public safety officials in major cities like New York are able not only to solve crimes and respond to emergencies, but to help prevent them. City managers in Albuquerque have achieved a 2,000% improvement in efficiency in sharing information across agencies, keeping citizens informed and providing critical municipal services, from residential and commercial development to water to public safety. Italy, Malta and Texas are applying smart meters and instrumentation to make the power grids in their cities more stable, efficient and ready to integrate renewable energy sources and electric vehicles. These solutions and many more, are making a real impact today. But they are just the first step toward a true smart city (Ibm.com, 2014). These are few major areas where the principles of smart urbanization play a key role. There are innumerable smaller strategies which form a part of the key strategies.

8.8 Inclusive and Liveable Cities

Regional inequalities are many a time is attributed because of rapid urbanization. Urban poor and marginalized people deprived of basic facilities are common characteristic of growing cities. Cities need to be more inclusive in terms of people's participation so that they can also contribute back to society. Cities need to create engaging public spaces activities and places with meaningful chances, making cities more cohesive and vibrant. The key ingredients of a successful economy include not only strong growth and job opportunities, but also a highly livable environment that is attractive. Cities need to optimize the development and use of all forms of "capital", including environmental and human capital. There is a need to overcome threats such as "hollow urbanization" – urbanization without vibrancy, caused by large, dense single-use developments being segregated from other parts of the city. Cities ought to create places to entice people to gather and stay and these do not necessarily need to be complicated e.g. in the Philippines, bringing people together around simple shared interests such as food and music.

8.9 Urban integration a Case of Ahmadabad BRTS

Well-integrated transit and land development create urban forms and spaces that reduce the need for travel by private motorized vehicles. Areas with good access to public transit and well-designed urban spaces that are walk able and bike able become highly attractive places for people to live, work, learn, play, and interact. Such environments enhance a city's economic competitiveness, reduce local pollution and global greenhouse gas emissions, and promote inclusive development. To promote integrated development in Ahmadabad metropolitan Bus Rapid Transit System (BRTS) was conceived as spine of the city in year 2007. Preliminary impacts of BRTS projects were very positive which included -Ahmadabad Plan 2005: Comprehensive urban mobility plan, including BRT implementation; parking meters in spaces along BRTS corridor; 9 PPP arrangements for BRTS, Financing schemes supporting integration. Approximately 18% two wheelers and 6% ridership change was noticed (Iuchi 2011).

9 CONCLUSION:

Our world is undergoing changes due to globalization, urbanization and technological advancements and it forces us to think and change our ways of living. Urbanization is a global phenomenon that is influencing all aspects of the world economy from power generation through to power consumption. New technologies designed to limit both the environmental and negative economic impact of this global trend are emerging with the potential to transform not only our electricity networks but also entire industries in the process. We need to adopt these and be adaptive in development. Since this built environment lasts a long time, strong infrastructure and services will sustain cities. Planning a city is not merely replicating past practices but needs to adapt based on evidence and analysis of sustainable growth of cities.

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