
Digitized Cities and Sustainability:

A Study on the role of ICT in development of sustainable cities

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ABSTRACT

India's urban population has increased from 26 million in 1901 to 337 million and it is expected to increase to 590 million by 2030. This rapid urbanization is at the expense of the loss of valuable ecosystems and land for satisfying the urban needs. Providing adequate housing, safe drinking water, employment opportunities and pollution free environment is a daunting task for many cities. Indian cities are lagging behind in terms of wealth generation, strategic influence, standard of living and sustainability. Therefore, there is an urgent need to focus on sustainable urbanization. Many of these problems faced by the cities could be effectively and efficiently solved by ICT and would make cities livable. New technology created by ICT has potential to adopt innovative and creative measures in urban planning, management and governance. With the development of information and communication technology a new city is emerging, digital city.

The paper intends to understand the role of ICT in sustainable city development and analyze the innovative and sustainable solutions offered by ICT.

Key words: Sustainability, ICT, Digital City, GIS, GPS.

Introduction:

As the twenty first century unfolds, the cities are experiencing explosive growth geographically as well as demographically. Cities today are becoming dense network of interchanging information, goods and services, investments and people as well as center of creativity, connectivity and innovation. There are approximately 400 cities with more than 1 million populations and is

estimated that by 2030 60 % of the world population will reside in city. Most of this spectacular growth is experienced by the cities in the developing world. According to Brum and Ghosh by 2050, more than one in four urban dwellers will be living in Asian cities will have same number of city residents, while US and Canadian urban population will be almost equal in number to those of West Africa.

It is projected that by 2050 Dhaka will be the world's most populated agglomeration with 48 million people residing in it followed by Delhi with 41 million and Mumbai 38 million people. These explosive growth poses serious questions like what implication it will have on human and natural resources and the future of humanity.

Even though the world population may eventually stabilize somewhere around 9 and 10 billion but the cities in developing world will continue to expand due to rural migrate, posing threat like crime, pollution, crumbling infrastructure and so on.

Urbanization Scenario in India:

India's urban population has increased from 26 million in 1901 to 377 million in 2011 and it is expected to increase to 590 million by 2030. This seismic shift in the speed of urbanization will be less inclusive for marginalized groups like women and poor and would also pose challenge to the city manager and policy makers. The liberalization, privatization and globalization processes are leading to negative process of urbanization because urbanization in India is due to rural push and not due to urban pull. The large cities in India are swelling with population resulting in collapse of infrastructure and other problems like pollution, poverty, housing shortage, water problems, urban conflict the list is endless.

According to David Satterthwaite a successful cities need to fulfill three goals; provide a healthy living and working

conditions, rubbish collection and disposals, drains, paved roads and other essential infrastructure for health and economic development and should remain in ecologically balanced relationship with local and global ecosystems. Given the present scenario Indian cities more livable there is an urgent need to focus on sustainable urbanization. Many of these problems faced by the cities could be effectively and efficiently solved by ICT and would make sustainable city development possible.

Digital cities:

The functions that cities perform, the forms that cities are taking, and the mixes and distribution of activities that the cities exhibits today are greatly influenced by the capabilities of their underlying network infrastructures. Cities always redefine itself with the introduction of new infrastructure. For example we cannot visualize Los Angeles without its freeway, similarly Delhi without its metro and Mumbai without its life railway. Today a new type of infrastructure network is evolving- the high speed digital telecommunications.

With the development of information and communication technology a new city is emerging, digital city. Digital city exists along side the real city in most of the developed countries. The functions of digital city are to improve the efficiency of city management, to evaluate the quality of life of its citizens, to improve services, to manage the city environment and thus promote sustainability development. The

construction of digital city involves integrated application of modern technologies, spatial information grid, location based services etc., Since 1960s the use of GIS in urban panning became very common in North America, Western Europe, Japan and Australia due to its application in land use, zoning transpiration, site-sustainability analysis and economic development . Now the GIS are also penetrating in developing countries like India, China, Mexico, Brazil, South Africa, Ghana and Senegal.

GIS is an excellent technology that enables urban planners to integrate variety of data from multiple sources with capability for input, storage, manipulation, analysis and displaying of spatial information. The important features of GIS are:

1. Easy entry and integration of Multi-source data.
2. Maintaining of Data consistency.
3. Data updating easier.
4. Flexibility in data storage and retrieval of data.

Due to above mentioned features GIS finds an important place in urban planning. The planners and researchers use the data from GIS to perform a wide range of statistical and spatial analysis like modeling, visualization, designing, planning and mangling urban environment and device future scenario. Thus GIS is useful and very powerful tool for urban planning and urban management. As a system GIS consists of people, software, Data

Procedures, Hardware and applications. Remote sensing and Global positioning systems act as sources of input data for a GIS.

Foundation of GIS in urban development programs like JNNURM of Ministry of Urban Development aims at creating efficient, productive, equitable and responsive cities.

Significance of Digitalization :

The concept of digital cities is to build an arena in which people in regional communities can interact and share knowledge, experience and mutual interests. Digital cities integrate urban information (both achievable and real time) and create public spaces in the internet for people living /visiting at the cities. Each digital city has its own goal. For instance Digital city Amsterdam aims to provide public communication space to people living in the city.

The traditional manual based urban planning is not suitable for explosive urban growth; therefore, there is need for involving information and communication technology to match pace of urban planning with rapid urbanization. The digitalized technology has ability to respond more quickly and conveniently in understanding urban questions and issues. The digitalization of urban planning in India would enhance the efficiency of the plan supervisory work, increase the information content, and would sharpen the analysis ability and the accuracy of the urban planners. It would also enable for the

planner to be more fore-sighted, scientific in their approach and give timeliness to urban planning and design.

“The Digital City” is not only a pure technical concept; it also means a big transformation of city management and plan system. For example, the urban planners in an accurate coordinates, time and object properties of the five dimensional virtual urban environment planning, decision-making and management like walks in the real city space arrangement, combines and disposes the city resources, improves transportation system activity. The digital city regulates the city without doubt, forecast the city, will provide the revolutionary method to supervise and manage the city. To traditional method it will be huge challenge, at the same time, this method is one kind sustainable, adapts the city change method, thus has provided the powerful tool for the city sustainable development improvement and the regulation.

Role of ICT in development of Sustainable cities:

Cities sustainability rests on competitiveness, quality of life, good governance and environment. To be competitive the cities need to attract investment and it requires modern, efficient infrastructures killed the manpower, information and communication technologies, access to quality education, housing and basic services such as safe drinking water, electricity, waste

management and pollution free environment.

Indian cities are facing host of problems such as shortage of housing, safe drinking water, transportation problems, congestion, pollution, and waste management.

Sustainable urbanization demands greater use of alternative energy resources as well as more energy efficient transportation, housing and steps to reduce congestion, CO₂ emissions, renewal energy, recycling of water and so on.

Adoption of ICT in urban planning and development offers a solution for dealing with urban problems with completely new approach. Usually ICT solutions are implemented in order to optimize process. This optimization includes approaches regarding higher efficiency, evidence based decision making, improved target grouping addressing and much more. Exemplary project: GRID2 Smart I Freiburg in Breisgau .3

The 12th plan stresses on the significance of more inclusive, innovative, equitable and sustainable growth through ICT. It aims to develop cities free of slums, full of employment opportunities and decent quality of life for the city dwellers. To attain these goals of ICT can play a vital role in leveraging IT systems and innovations. This will require coordination, cooperation and collaboration of all the agencies, organizations, departments and the stakeholders involved in the process of urban development. Thus effective and

efficient adaptation of ICT would support cities- healthcare, transportation and communication, security, power supply for industries, e-commerce for businesses, e-governance and entertainment industries and so on.

Benefits of ICT in sustainable cities development:

Transportation: It is an important infrastructure element for urban development and is life line of cities as it allows connectivity and movement on people, goods, and traffic within the cities and between cities. Data from the satellite can be used for decongesting the roads, widening of the roads and so on. This would enhance urban development and network management. Use of such data will assist in formulating the strategies to mitigate traffic related noise pollution and air pollution and will help in implementing stricter automobile emission standards.

For instance Shanghai has introduced Bus smart information system whereby the city buses have devices on them which allow real time communication between the operators, vehicles and bus stop.

Competitiveness:

For cities to be competitive high speed broadband services is a prerequisite. The role of digital city is to provide core ICT infrastructure so that the business could function effectively and the authorities should be able to offer efficient public services to business through on-line e-government system. "ICT needs to be considered in

the same category as water, electricity, roads and public transport" says Peter Siggins, a mobile business expert at PA consulting group. "And if business is being attracted, governments need to consider what speeds and capacity are needed and how that can be built into the urban planning process"

Sustainable environment: ICT can play a crucial role in sustainable city development. For instance by adopting smart meters and smart sensors cities can save water lost due to leakages and pilferage from pipelines. A real time monitoring of water supply system can also be adopted by using ICT tools that would enable fast detection, prediction and prevention of problems such as water clogging, sewage overflow, leaks, thefts, nontransparent billing and so on. Similarly, real time management of power flows and bi-directional metering would bring transparency to consumers and would lead to energy efficiency. Similarly benefits can also be derived from ICT for waste management.

Community services: ICT tools and techniques can be applied in the field of health care, educational sector and recreation and entertainment. For instance on-line admission.

E – Governance: the aim of e-governance is to make the interaction between government and citizen more fruitful and make the relationship between the government and business and the inter agency.

ICT for city Management, 2010 A research project conducted by the Economist Intelligence Hong Kong, Siemen AG more friendly, inexpensive, transport and convenient. For example, MCGM has launched Citizen Portal that enables online delivery of more than 100citizens services such as registration of birth and death, issuance of permits, licenses, payment of property tax through P-tax etc.

Cities, thus all over the globe are undergoing transformation in their structure as the 21st century is unfolding. This transformation which is due to technological revolution is in fact opening up a new era in the history of mankind: the information era, this has led to the emergence of digital cities, smart cities, smart regions, and others. These are developing as information infrastructure, communication facilities, tool for local democracy and participation, space for virtual expressions and experience and as resource for everyday life and for problem solving.

References:

- Census of India 2011. Provisional Census 2011, Government of India.
- Gore. A. 1998, the digital Earth: Understanding Our planer in the 21 century, CSC, LOSAngels.
- Government of India, 2013 , Twelth five year plan, Planning Commission, Sage , New delhi.
- Mc.Kinsey Global institute .2010 , India's Urban Awakening –Building Inclusive cities- sustaining Economic Growth
- Ry Hutchison, Encyclopedia of urban studies.
- Sansyal Sanjeev, 2008 the Indian renaissance –India's raise after thousand years of decline, Penguine.
- Stanley D. Brunn, Jack F. Williams and Donald J. Zeigler, cities of the world: world regional urban development.
- The United Nations, world population prospects: the 2007 revision population database .
- P.Van des Besselaar and S.Koizumi (ed): Digital cities 2003, LNCS 3081, pp. 166-187-2005, Springer- Verlag Berling Heidelberg, 2005.
- Zhao Jing Li Hongwei, Digital Urban Planning Management Emerges in city Development.
- Willi Wendtetal, Smart Cities and ICT- Insights from the Morgenstadt project, proceedings REALCORP 2014 Tagungsband, 21-23 may, Vienna, Australia.

