



SMART CITIES: ISSUES AND CHALLENGES IN URBAN INFRASTRUCTURE

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ABSTRACT

The announcement of '100 Smart Cities' falls in line with the vision of providing ample living space in the urban regions of India. This also allows for investment opportunities in the infrastructure sector in India. When it comes to benefits or advantages which a Smart City has over a normal one is that these cities are highly advanced in terms of overall infrastructure, sustainable real estate, communications and market viability. The Smart City aims to make optimal and sustainable use of all resources, while maintaining an appropriate balance between social, environmental and economic costs. In the Smart City, maximum use is made of ICT to improve the functioning, management, and supervision of the variety of systems and services, with an emphasis on saving energy, water, land and other natural resources. The main categories that define smart cities include the quality of the environment, energy, water and wastewater, transportation and traffic, information and communication systems, quality of life, government, economics, human resources, housing and land use, homeland security, and emergency preparedness.

KEYWORDS :Urban growth, Urban planning, Urban transport, ICT, Smart cities layered model, Quality of service, Communication requirements, Low-power wireless area network, Power line communication.

INTRODUCTION

Nowadays we are witnessing a rapid urbanization because of which there has been a steady increase in migration from rural to urban areas. It is expected that about around 70 per cent of the global population will be living in cities by the year 2050. We need about 500 new cities to accommodate the inundation. India is a no exception to this urban migration. There has been an increase in the load on rural land due to the expansion in the urban population. Indian government has now realized the need of hour i.e., to build new cities that can cope up with the challenges of urban living. Most of the world's population today lives in cities. Due to resource constraints, there will be a problem in the future to provide all the services to the residents. To continue to serve and improve the standard of living of the growing population, it is necessary to develop smart cities.

A city can be defined as 'smart' when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic development and a high quality of life, with a wise management of natural resources, through participatory action

The core infrastructure elements in a smart city would include:

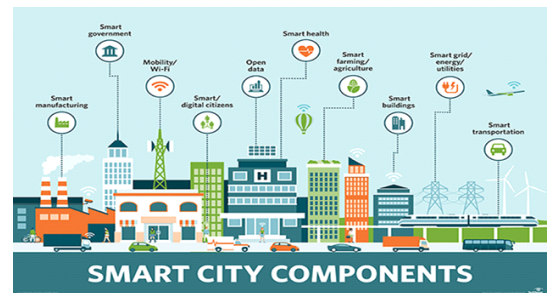
- Adequate water supply,
- Assured electricity supply,
- Sanitation, including solid waste management,
- Efficient urban mobility and public transport,
- Affordable housing, especially for the poor,
- Robust it connectivity and digitalization

There are many advantages in promoting smart cities in terms of national benefits: creating competitiveness, promoting the business sector, improvement of living standards, proper utilization of resources, and the like. There are examples of smart cities in the world, and a lot can be learned from their experience and achievements. In a debate, the Forum participants expressed the opinion that the proper planning of a City requires a holistic approach that coordinates the various branches. The city has to be looked at as a living organism, of which all the systems have to work in coordination with each other in order that it should continue to live. A wide variety of subjects has to be dealt with, as described above, and these pose serious challenges.

WHAT IS A "SMART CITY"?

As consumers of private goods and services we have been empowered by the Web and, as citizens, we expect the same quality from our public services. In turn, public authorities are seeking to reduce costs and raise performance by adopting similar approaches

in the delivery of public services. However, the concept of a Smart City goes way beyond the transactional relationships between citizen and service provider. It is essentially enabling and encouraging the citizen to become a more active and participative member of the community, for example, providing feedback on the quality of services or the state of roads and the built environment, adopting a more sustainable and healthy lifestyle, volunteering for social activities or supporting minority groups. Furthermore, citizens need employment and "Smart Cities" are often attractive locations to live, work and visit. But the concept is not static: there is no absolute definition of a smart city, no end point, but rather a process, or series of steps, by which cities become more "liveable" and resilient and, hence, able to respond quicker to new challenges.

**VARIOUS ISSUES PERTAINS TO SMART CITIES:**

Every project has to go through many restrictions, hardships, hurdles and challenges to reach the successful outcome. The Smart City projects are no exception to this. The success of a smart city depends on its residents, entrepreneurs who are actively involved in energy saving and implementation of new technologies.

There are a number of ways in which the sustainability of residential, commercial and public spaces be achieved by using advanced technology. But the choice of using these technologies to reduce energy usage is in the hands of the end users itself.

Successful completion of these Smart City projects in the given time with the required quality is also one of the major challenges which infrastructure sector is facing.

Nowadays there is a technological gap between low-income groups and the urban elite. This gap is actually reinforcing the disparity of wealth. Smart cities initiatives can bring about inclusion and participation by launching training plans on technology management for city inhabitants while avoiding polarisation among the segments of population. The lack of technological instruction is one of the main reasons of unemployment across

European Union and other regions of the world. The access to information is clearly leading to segmentation within societies. As long as you are not able to get access to quality/essential information instantly on the move through Internet/ smartphones/ apps, you may be considered “poor” and missing the boat.

Smart cities proposal is crucial as long as it is supported by relevant targets in different sectors bringing together goals of a wide variety of stakeholders. Indeed, one’s plan would be as follows: Increasing the Smartness of a city enables the Smartness of the citizens by boosting connectivity, morale, cooperation, knowledge sharing and, as a result of this, generating efficiency and effectiveness by the optimal use of technologies. Citizens, not only consumers, should be involved in political as well as business processes through technology.

Smart Cities are defined along six dimensions:

1. Smart Governance: Entails public, private and civil organisations so the city may work at its best as one organism fuelled by Infrastructures, Hardware, Software and Data Mining. Smart Governance is about transparency and open government enabled by apps in terms of citizens’ decision-making and e-public services.
2. Smart Economy: Entails e-business processes and e-commerce to boost sustainable growth and productivity.
3. Smart People: People fed since childhood by e-skills that promote creativity, critical thinking and Independence fostering innovation by all means.
4. Smart Mobility: Smart Mobility means integrated transport and logistics systems supported by Wise Infrastructures, Hardware, Software, Data Mining and Clean Energies.
5. Smart Living: Smart Living means healthy and safe living through smart technologies and apps that enable responsible life styles, behaviour and consumption.
6. Smart Environment: this means renewable and clean energies managed by ICT (Information and Communication Technology) monitoring. The main objective is a clean environment with pollution and trash disposal under control.

Three powerful concepts are strongly connected to Smart cities initiatives: Technology, Institutions (Private/Public) and the complexity of humans. The complexity of humans has been dealt with by disciplines like Philosophy, Psychology, Sociology, Cybernetics, and so on but it seems that their results are not really plausible to offer solutions for the majority of the population, as witnessed by increasing of mental diseases to the date.

CHALLENGES FACED BY CITIES AND THE NEED FOR SMARTER APPROACHES

Our starting point is the wide range of challenges that are driving change in cities:

- Economic restructuring, combined with the economic downturn, has raised levels of unemployment, particularly among young people, and so economic growth and building a resilience to further change is a key priority for city authorities;
- The urban infrastructure has grown piecemeal and rising urban populations are putting pressure on housing and transport;
- Concerns about climate change, and the fact that 80% of the population live in cities, inevitably means that cities have a key role in improving energy efficiency and reducing carbon emissions, while promoting energy resilience in terms of security of supply and price;
- The paradigm shift towards online entertainment and online retail/consumer services is beginning to change the nature of the Street;
- An ageing population is placing an increasing burden on adult social care, to the point where it is absorbing an ever-increasing proportion of local authority budgets;
- Notwithstanding recent flexibility accorded to Local Authorities in relation to Tax and Business Rates, grants from Government Departments are still the main source of local authority funding, especially for cities, and local authorities consider this to limit

their ability to provide integrated responses to the challenges they face.

Smart energy - Smart metering - Demand response and demand-side management - Distribution automation - Distributed generation - Integration of renewables and decentralised energy - Network monitoring and control	Smart buildings - Light control - Heating control - Energy efficiency - Local energy generation - Security, occupancy control - Synergies between energy efficiency, comfort and safety and security - Building as a network: integration of multiple technologies (HVAC, lighting, plug loads, fire, safety, mobility, renewable, storage, materials, IAQ, etc.) - Software: Efficiency, automation and control, analytics and big data management	Smart transportation - Vehicle-to-everything (V2X) - Driver behaviour management - Mobile applications based on open data - Traffic and fleet monitoring and control - Services for drivers and passengers based on real- or near-real-time information - Integrated public transportation	Smart water - Pressure management - Remote control and predictive maintenance - Integrated platforms for water management - Smart metering - Water conservation and efficiency
Smart waste - Waste Management - Wastewater treatment - City cleaning - Sorting of waste - Waste tracking	Smart physical Safety/security - Video surveillance and video analytics - Seamless communication during natural and man-made disasters	Smart health care - Adequate sanitation - Disease control and mitigation - Smart hospitals - Real-time health care including analytics - Home and remote health care including monitoring - Electronic records management	Smart education - Flexible learning in an interactive learning environment - Accessing world class digital content online using collaborative technologies - Massive open online course (MOOC)

SMART CITIES INFRASTRUCTURES AND ROLE OF ICT

Setting up a smart city is more than improving the old system with technology by simply adding sensors, remote supervision, and control to essential city services. It should be a complete shift of a paradigm in daily life when using new technologies, especially new ICT leading to smart outcomes. If that is the case, some major questions must be asked about the adoption of any transformation strategy to retrofit smart city ideas into the existing city: What are particular opportunities and threats on the existing infrastructure and services? How to redesign and integrate ICT in a smart way? How to manage the risk of growing volumes of all the gathered information? How could that transform and automate information usage in business processes? How to use ICT to enhance the quality of life and to better engage residents to such integrated vision for the improvement? Cities greatly contribute to environmental degradation on local, regional, and global scales. Studies have demonstrated that they are accountable for 70% of global greenhouse gas emissions as well as 60–80% of global energy consumption. Thus, the challenge for the humanity is that the governments and any decision-maker is to find solutions and means to make roadmaps into execution to answer the question: how can cities be made smart and sustainable under such underlying conditions?

CONCLUSIONS

The smart cities is a set of applications, processes, and services that make use of engineering advancement to make an optimal use of the available infrastructures and foreseen the need in the future. The applications and processes of smart cities make use of massive data and information collecting, processing, and sharing. Therefore, a reliable communication and networking infrastructure should build the backbone of the smart cities, in order to make the data transmission possible. Wireless technologies are the most desired solution, because of all the economic and societal benefits they promise, particularly flexibility and ease of deployment. However, there are still challenges that wireless communication has to cope with, like power consumption, ease of installation, great indoor coverage. To overcome these challenges, equipment manufacturers and mobile network operators have unified their activities to develop and deploy a new wave of wireless technologies, named low-power wireless area network.

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