



SMART CITY TECHNICAL & GENERAL PERSPECTIVE

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Abstract:

A city is a system of interconnected systems set in a specific environmental and societal context. It is considered to be the base of the nation's development. In order for it to flourish, all the key city factors need to work together, utilizing all of their resources, to overcome the challenges and grasp the opportunities that the city faces. Developing Smart Cities can benefit synchronized development, industrialization, informationization, urbanization and agricultural modernization and sustainability of cities development. Various Agencies, International and National are involved presently in framing the standards for the development of the Smart Cities. The main target for developing Smart Cities will be the convenience of the public services, Delicacy of city management, live ability of living environment, Smartness of infrastructures, Long-term effectiveness of network security. In this paper, we have explored the various key aspects to be developed under the four major pillars of the Smart city.

Key Words: Smart Cities, ISO, City Infrastructure & Smart Development

1. Introduction:

Ideally smart city is the safe, secure, environmentally green and efficient urban center of the future, which is equipped with intelligent technologies such as sensors, electronics and networks to stimulate sustainable economic growth and a high quality of life in a competitive and sustainable environment ensuring citizens centrality. What truly makes a city "smart" isn't just the technology, but the use of technology to solve a city's most pressing issues. It's a city that addresses the right pain points and leverages the best opportunities for all stake holders' viz. communities, individuals and businesses. "Smart" development is about putting potential resources and synergies in the right places in order to realize optimum benefits.

2. Smart City Published Standards & Standards Under Development:

2.1 Global Initiative:

Various International standards organizations are working on smart city frameworks independently because of the complexity of Smart Cities, a collaborative effort is needed for greater simplicity and to clearly map all relevant standards, to identify and address standardization gaps. In order to create a 'Smart City architecture model' for enhancing integration. First such initiative was The World Smart City Forum, which was held on 13 July 2016 in Singapore representatives of IEC, ISO, ITU, IEEE, CEN-CENELEC and ETSI gathered for a meeting initiated by the IEC, over the coming months, the organizations will work together to develop a viable framework for cooperation in order to optimize outcomes and reduce duplication, wasted time and expense. A follow-up meeting organized by ISO is planned for 2017.

2.2 ISO 37120:

Presently ISO 37120 standard for smart city indicators is already developed as part of an integrated suite of standards for sustainable community development. It is a milestone in the development of smart city indicators and will help city Planners to

guide their smart city decisions and investments. These clearly defined performance indicators and a standard for measuring each Indicator will also be more helpful for cities as they can now consistently apply these indicators and accurately benchmark their city services and quality of life against other cities.

2.3 Bureau of Indian Standards Initiative:

Bureau of Indian Standards (BIS) Technical Committee CED-59 is also developing standards on Smart City. BIS has circulated a framework in Sept 2016 for comments of experts which are to be received by end Nov.

3. Smart City Development:

City Infrastructure which needs to be addressed can be mainly categorized into following four pillars.

- ✓ Institutional Infrastructure
- ✓ Physical Infrastructure
- ✓ Social Infrastructure
- ✓ Economic Infrastructure

3.1 Institutional Infrastructure:

The institutional infrastructure has participatory systems of governance, e-governance, inclusive governance, the sense of safety & security and the opportunities for creativity with citizen participation. It has various agencies of governance that are able to cater to the needs of the public. Enforcement of various laws to be able to give a speedy service delivery by maintaining transparency in its working is essential for good governance.

3.2 Physical Infrastructure:

The physical infrastructure comprises of interrelated system providing commodities and services essential to enable, sustain, or enhance societal living conditions such as rail, road and air transport, water supply and water resources, waste water management, solid waste treatment and disposal, electric power generation and transmission, telecommunications and waste management etc with the sustainable and clean environment

3.3 Social Infrastructure:

Social infrastructure includes the components that work towards developing the human and social capital, such as the educational, healthcare, entertainment, good sports activities and proactively engaging all citizens in the mainstream development.

3.4 Economic Infrastructure:

Economic infrastructure is responsible for generating the economic activities and would comprise of the industrial parks and export processing zones/IT/BT parks/trade centers/service centers/skill development centers/financial centers and services/logistics hubs, warehousing and freight terminals/mentoring and counseling services.

To evolve a composite holistic system there is a need for better collaboration between technology providers, town planners, Urban Local Bodies (ULBs), and consultants in developing a vision toward achieving the Smart Cities as all four pillars mentioned earlier have to be addressed simultaneously and synergistically.

4. Key Issues for Smart City Infrastructure:

Some of key issues which will be required to be addressed in the smart city infrastructure are discussed in succeeding paragraphs:

4.1 Energy Efficiency:

There is a requirement of Energy efficient techniques to be adopted in various ways as all public goods and services that a city provides its inhabitant's and possibly

every other sector, including critical ones such as water, transport, and industry makes Energy one of the topmost priorities when addressing the Smart Cities requirements. Basically three types of efficiency exist in context to energy: Technology Efficiency, System Efficiency and Behavioral and Lifestyle Efficiency. Energy efficiency should enable effective use of local energy supplies and storage capabilities with improved interaction between the local energy networks within the city. Before implementation begins, there should be a cogent mechanism design, a definitional framework with well-defined standards and standardized systems that are suitably modified only to meet regional and local objectives or constraints.

4.1.1 Technology Efficiency: is to develop the high performance building envelope with efficient appliances and lighting, heating, Ventilation, building automation and control systems with solar powered dehumidification processes.

4.1.2 System Efficiency: is to maintain high efficiency distributed energy systems with tri generation, load leveling, thermal storage and advance management of waste heat for generation of electricity.

4.1.3 Behavioral and Lifestyle Efficiency: It is important to recognize that dwellings are heterogeneous and therefore a strategy that works well for one dwelling may not work for another. It is the complex interaction of variables occurring at the dwelling level that ultimately determines the optimal solution. Further Every city demography is different therefore in every case research should take into account the important ways in which socio-demographic and psycho-demographic variables are likely to mediate the relationship between feedback and energy conservation or energy efficiency behaviors. Such research could provide critical insights for program and policy designs and improve the accuracy of energy demand projections. Policy instruments therefore need to reflect the diversity within the building and in the city so that energy efficiency can be maximized.

4.2 Demand Management:

Once the Economic activities are completed, it becomes necessary to manage the supply demand chain with an organized methodology to predict the demand and then manage it. Accurate forecasting remains central to the success of a demand management initiative, but demand management is much more than just forecasting. Traditionally, forecasting involves looking at past demand data to predict future demand. Demand management goes beyond the static forecasting of yesterday, replacing it with a more dynamic mode of determining demand that involves all demand-chain constituents. Currently there is a thrust towards real-time synchronization of the supply chain to the demand signals. This collaborative method enhances the accuracy of forecasting since all factors affecting that forecast can be viewed by all stakeholders, including customers. For better demand management in smart cities: presence of accurate intelligence along with collaboration and automation must be ensured.

4.3 Ease of Information:

We are in the era of information and ICT which has led to information explosion. Internet has played a role of transmitting the information from the experts to the common public. As the smart cities will have many services that will be far more advanced than the traditional services, the information related to these services should be able to reach the public with ease. Easy access to information is closely related to the transparency of government activities and huge quantities of information that government holds and creates Access to information is also important for education and

improving lives. Access to information is vital for liberty and also helps in Better Accountability and Public Services Delivery.

4.4 Environmental Controls & Sustainability:

It is the long-term prosperity and ecological interdependence on each other. Environmental sustainability allows our future needs to be met without jeopardizing the ability of future generations to meet their needs. In other words, sustainability can be described as the actions which are ecologically sound, economically viable, and socially just and more humane. Appropriate measures to control air and water pollution have to be built in the initial design by identifying the likely generators of pollutants and suggest measures for controlling pollution. It may be more economical to evolve systems to ensure that all emissions and wastages are minimized, recycled and reused.

4.5 Use of Clean Technologies:

Clean Technologies refer to a set of technologies that either reduces or optimises the use of natural resources, whilst at the same time reducing the negative effect that technology has on the planet and its ecosystems. It must be ensured that clean technology solutions are economically viable and have the potential to be profitable. Foundation for the development of clean technologies is developments in information and communication technology, materials science and nanotechnology, semiconductors and electronics. Technologies using Solar, wind, Hydel, Geothermal Energy, clean coal, Biofuels energies and photo voltaic etc are some examples of green energy.

4.6 Use of ICT:

4.6.1 Deployment of Broadband Networks: First step is to foster the development of a rich environment of broadband networks that support digital applications, ensuring that these networks are available throughout the city and to all citizens. This plan for easy access to broadband should include a broadband infrastructure that combines cable, optical fiber, and wireless networks. This will offer maximum connectivity and bandwidth to citizens and organizations located in the city. With these fiber-optic cables connectivity increases in critical areas around the city such as universities, business centers, technical and research institutes, government offices and emergency response units. These fiber optic networks are fundamental in acting as a backbone for ensuring high-speed access to the Internet. Additionally, they facilitate the installation of sensors, which are key to the development of intelligent solutions for the city. The long term goal of setting up such an infrastructure is to facilitate, once broadband access is widespread enough, an open broadband network that the entire city population, i.e. organizations, companies, municipalities and individuals can use.

4.6.2 Use of Smart Devices and Agents: The second step for smart city planners to consider when implementing a smart ICT plan for a city is to ensure that the physical space and infrastructures of the city are enriched with embedded systems, smart devices, sensors, and actuators, offering real-time data management, alerts, and information processing for the city administration. The presence of these devices combined with wireless connectivity throughout a city facilitates a richer and more complex digital space within the city, which in turn can increase the collective embedded intelligence of a city. This collective embedded intelligence allows relevant stakeholders of the city to be informed about the city's physical environment and facilitates the deployment of advanced services like spatial intelligence. It also paves the way for developing other innovative ecosystems that help to link the city with its people and visitors through technology. Additionally, the extensive and ubiquitous use of ICT is empowering the development of essential services for health, security, police and fire departments, governance and delivery of public services.

4.6.3 Developing Smart Urban Spaces: Developing smart urban spaces, by connecting the embedded systems, sensors and smart devices located across the city together to form a cohesive and integrated ICT infrastructure for the city, is the third essential step along the way to smarter cities. Smart urban spaces are areas of a city that leverage ICT to deliver more efficient and sustainable services and infrastructures within that specific area. These smart urban spaces comprise a wide range of innovations that can be of enormous environmental and economic benefit to both the district and the city at large. The latest developments in cloud computing and the emerging IoT, open data, semantic web, and future media technologies have much to offer cities looking to become smart.

4.6.4 Developing Web-based Applications and e-Services: The availability of ubiquitous ICT infrastructures stimulates the development of new services and applications by various types of users, and allows for the gathering of a more realistic assessment of users' perspectives by conducting acceptability tests directly on the infrastructures already in place and functioning in the smart city.

4.6.5 Opening up Government Data: Open Government Data (OGD) initiatives, and in particular the development of OGD portals, have become widespread since the mid-2000s both at central and local government levels across the globe. The efficient and effective implementation of these initiatives is essential for growing cities and especially cities looking to become smart. This is true in terms of the role played by OGD in relation to Open Government policies in general. The effective use of government data can precipitate the smart evolution of a country's cities, creating national competitive advantage for the country in question. Two civil society movements are campaigning for greater openness of information, documents and datasets held by public bodies. The first is the Right to Information movement, which promotes a public right of access to information from a human rights perspective. The second is the Open Government Data movement, which uses predominantly social and economic arguments to encourage the opening up of government data. The latter claims that putting such information into the public domain can benefit society by creating conditions for more social inclusive service delivery and for more participatory democracy.

4.7 Smart Governance:

A comprehensive and secure online citizen engagement platform connecting citizens with one another and with city officials enables a positive and open dialogue between citizens and city officials, offering a two-fold citizen engagement approach combining bottom up and top down participatory channels. System must fulfill four requirements information gathering, dialogue enablement, decision making and assessment while storing data for ongoing queries, monitoring, evaluation and reporting. System offer advanced security features that protect the consultative process integrity as well as citizen privacy.

4.8 Citizen Participation:

Smart city without the citizen participation is not possible. While they are the implied beneficiaries of programs, various tools should be developed to provide an ample opportunity to them to actively participate in not only the implementation but also framing of the policies and services. Smart phones can improve the collaboration between the government and the residents .The citizens can give their feedback which should be intelligently classified into class labels and then directed suitably for consideration to the concerned department or agency to take an appropriate action. New applications and innovative solutions should be developed to address the urban challenges using ICT platform.

5. Conclusion:

Each city in India is unique and different therefore each will require an exclusive approach, by providing localized solutions using global best practices. The requirement is to offer Technology Solutions and System Integration with an expertise and the capability to customize the solutions as per a city's requirement, and integrate these with supporting technologies of Data/Social Analytics, IT Infrastructure Management, IoT, System Integration and Hosting & Cloud Services to enable Automotive & Transportation Companies/Operators, manufacturers, Government bodies, Energy & Utility companies, and City authorities, to derive enhanced value from their technology decisions and investment.

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