Overview on Smart City

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Abstract:
Cities are responsible for 60-80% of the total energy consumption worldwide and they also cause 75% of the total greenhouse gas emissions. Given that over half of the world’s population lives in cities today and that the population is rising on the whole, with dwindling resources as a result, sustainable urban development and its evaluation by means of indicators are becoming more and more important. However, there have been no transnational standards for the comparable and transparent measurement, evaluation and control of urban development processes to date. Although work on the definition of requirements, guidelines and methods for the achievement of sustainability and environmental compatibility in communities of any kind is now being undertaken by ISO International Organization for Standardization, technical committee for “sustainable development in communities”, the activities are still in their early stages. The aim of the project is, therefore, to support standardisation processes to help promote the sustainable development of cities and communities and to involve the main stakeholders and actors in these processes. In this context, the project is essential for bridging the gap between users (and the parties concerned, e.g. the cities) on the one hand and those who develop the standards on the other hand. Moreover, the project is intended as a contribution to establishing an Austrian position to be adopted when participating in international standardisation processes.

Keywords: Old city, Smart City, Urban, Economy, Social, Physical Infrastructure, Governance, Sustainability, Quality of life.

I. INTRODUCTION

The first question is what is meant by a ‘smart city’. The answer is, there is no universally accepted definition of a smart city. It means different things to different people. The conceptualisation of Smart City, therefore, varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents. A smart city would have a different connotation in India than, say, Europe. Even in India, there is no one way of defining a smart city. Some definitional boundaries are required to guide cities in the Mission. In the imagination of any city dweller in India, the picture of a smart city contains a wish list of infrastructure and services that describes his or her level of aspiration. To provide for the aspirations and needs of the citizens, urban planners ideally aim at developing the entire urban eco-system, which is represented by the four pillars of comprehensive development: institutional, physical, social and economic infrastructure. This can be a long term goal and cities can work towards developing such comprehensive infrastructure incrementally, adding on layers of ‘smartness’. In the approach of the Smart Cities Mission, the objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of ‘Smart’ Solutions. The focus is on sustainable and inclusive development and the idea is to look at compact areas, create a replicable model which will act like a light house to other aspiring cities. The Smart Cities Mission of the Government is a bold, new initiative. It is meant to set examples that can be replicated both within and outside the Smart City, catalysing the creation of similar Smart Cities in various regions and parts of the country. The core infrastructure elements in a smart city would include:

i. Adequate water supply,

ii. Assured electricity supply,

iii. Sanitation, including solid waste management,

iv. Efficient urban mobility and public transport,

V. affordable housing, especially for the poor,

Vi. Robust IT connectivity and digitalization,

vii. Good governance, especially e-Governance and citizen participation,

viii. Sustainable environment,

ix. Safety and security of citizens, particularly women, children and the elderly, and

x. Health and education.

As far as Smart Solutions are concerned, an illustrative list is given below. This is not, however, an exhaustive list, and cities are free to add more applications. Accordingly, the purpose of the Smart Cities Mission is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes. Area based development will transform existing areas (retrofit and redevelop), including slums, into better planned ones, thereby improving liveability of the whole City. New areas (green field) will be developed around cities in order to accommodate the expanding population in urban areas. Application of Smart Solutions will enable cities to use technology, information and data to improve infrastructure and services. Comprehensive development in this way will improve quality of life, create employment and enhance incomes for all, especially the poor and the disadvantaged, leading to inclusive Cities.

II. SMART CITY FEATURES:

Some typical features of comprehensive development in Smart Cities are described below.
i. Promoting mixed land use in area based developments—planning for ‘unplanned areas’ containing a range of compatible activities and land uses close to one another in order to make land use more efficient. The States will enable some flexibility in land use and building bye-laws to adapt to change;

ii. Housing and inclusiveness - expand housing opportunities for all;

iii. Creating walk able localities –reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists, and necessary administrative services are offered within walking or cycling distance;

iv. Preserving and developing open spaces - parks, playgrounds, and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects in Areas and generally promote eco-balance;

v. Promoting a variety of transport options - Transit Oriented Development (TOD), public transport and last mile para-transport connectivity;

vi. Making governance citizen-friendly and cost effective - increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing services without having to go to municipal offices. Forming e-groups to listen to people and obtain feedback and use online monitoring of programs and activities with the aid of cyber tour of worksites;

vii. Giving an identity to the city - based on its main economic activity, such as local cuisine, health, education, arts and craft, culture, sports goods, furniture, hosiery, textile, dairy, etc; viii. Applying Smart Solutions to infrastructure and services in area-based development in order to make them better. For example, making Areas less vulnerable to disasters, using fewer resources, and providing cheaper services.

II. STRATEGY:

The strategic components of area-based development in the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (green field development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city. Below are given the descriptions of the three models of Area-based smart city development:

A) Retrofitting will introduce planning in an existing built-up area to achieve smart city objectives, along with other objectives, to make the existing area more efficient and liveable. In retrofitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens. Depending on the existing level of infrastructure services in the identified area and the vision of the residents, the cities will prepare a strategy to become smart. Since existing structures are largely to remain intact in this model, it is expected that more intensive infrastructure service levels and a large number of smart applications will be packed into the retrofitted smart city. This strategy may also be completed in a shorter time frame, leading to its replication in another part of the city.

b) Redevelopment will effect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density. Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens. For instance, a new layout plan of the identified area will be prepared with mixed land use, higher FSI and high ground coverage. Two examples of the redevelopment model are the Saifee Burhani Upliftment Project in Mumbai (also called the Bhendi Bazaar Project) and the redevelopment of East Kidwai Nagar in New Delhi being undertaken by the National Building Construction Corporation.

c) Greenfield development will introduce most of the Smart Solutions in apreviously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor. Greenfield developments are required around cities in order to address the needs of the expanding population. One well known example is the GIFT City in Gujarat. Unlike retrofitting and redevelopment, green field developments could be located either within the limits of the ULB or within the limits of the local Urban Development Authority (UDA).

d) Pan-city development envisages application of selected Smart Solutions to the existing city-wide infrastructure. Application of Smart Solutions will involve the use of technology, information and data to make infrastructure and services better. For example, applying Smart Solutions in the transport sector (intelligent traffic management system) and reducing average commute time or cost of citizens will have positive effects on productivity and quality of life of citizens. Another example can be waste water recycling and smart metering which can make a huge contribution to better water management in the city. The smart city proposal of each shortlisted city is expected to encapsulate either a retrofitting or redevelopment or green field development model, or a mix thereof and a Pan-city feature with Smart Solution(s). It is important to note that pan-city is an additional feature to be provided. Since smart city is taking a compact area approach, it is necessary that all the city residents feel there is something in it for them also. Therefore, the additional requirement of some (at least one) city-wide smart solution has been put in the scheme to make it inclusive. For North Eastern and Himalayan States, the area proposed to be developed will be one-half of what is prescribed for any of the alternative models - retrofitting, redevelopment or green field development.

IV. SMART CITY CHALLENGES:

This is the first time; a MoUD programme is using the ‘Challenge’ or competition method to select cities for funding and using a strategy of area-based development. This captures the spirit of ‘competitive and cooperative federalism’. States and ULBs will play a key supportive role in the development of Smart Cities. Smart leadership and vision at this level and ability to act decisively will be important factors determining the success of the Mission. Understanding the concepts of retrofitting, redevelopment and green field development by the policy makers, implementers and other stakeholders at different levels will require capacity assistance. Major investments in time and resources will have to be made during the planning phase prior to participation in the Challenge. This is different from the conventional DPR-driven approach. The Smart Cities Mission requires smart people who actively participate in governance and reforms. Citizen involvement is
much more than a ceremonial participation in governance. Smart people involve themselves in the definition of the Smart City, decisions on deploying Smart Solutions, implementing reforms, doing more with less and oversight during implementing and designing post-project structures in order to make the Smart City developments sustainable. The participation of smart people will be enabled by the SPV through increasing use of ICT, especially mobile-based tools.

V. SMART CITY PROPOSAL AND PREPARATION

The Government is not prescribing any particular model to be adopted by the Smart cities. The approach is not ‘one-size-fits-all’; each city has to formulate its own concept, vision, mission and plan (proposal) for a Smart City that is appropriate to its local context, resources and levels of ambitions. Accordingly, they have to choose their model of Smart city and answer the question: What kind of Smart City do they want? For this, cities will prepare their Smart City Proposal (SCP) containing the vision, plan for mobilisation of resources and intended outcomes in terms of infrastructure up-gradation and smart applications. Essential features of SCP: It may be noted that even though a particular model is not being prescribed, it is expected that the SCPs will include a large number of infrastructure services and smart solutions highlighted in paras 2.4 and 2.5. In particular, the elements that must form part of a SCP are assured electricity supply with at least 10% of the smart city’s energy requirement coming from solar, adequate water supply including waste water recycling and storm water reuse, sanitation including solid waste management, rain water harvesting, smart metering, robust IT connectivity and digitalization, pedestrian friendly pathways, encouragement to no motorised transport (e.g. walking and cycling), intelligent traffic management, no vehicle streets/zones, smart parking, energy efficient street lighting, innovative use of open spaces, visible improvement in the Area (e.g., replacing overhead electric wiring with underground wiring, encroachment-free public areas, and ensuring safety of citizens especially children, women and elderly. Cities will have to add more ‘smart’ applications to this list in order to improve their SCP. In the case of redevelopment and green field models of smart cities, in addition to the essential features mentioned above, at least 80% buildings should be energy efficient and green buildings. Additionally, of the total housing provided in green field development, there should be at least 15% in the affordable housing category. It must be emphasized that, since cities are competing with each other for selection under the Smart Cities Mission, the SCPs have to be prepared with great care and the proposed smart city made ‘smart’ enough. Cities will prepare SCPs using the principles of strategic planning process and the proposal will contain area-based development plans and Pan-city initiatives. The SCP is collaborative because the objectives and funds of all government departments, parastatals, private agencies and the citizens are dovetailed during the process of preparing the SCP. It is realized that the task of preparing the SCPs is quite challenging and States/ULBs will require assistance of experts. There are two ways of obtaining technical assistance support - by hiring consulting firms and engaging with handholding agencies.

Consulting Firms: The Ministry of Urban Development will technically qualify a panel of consulting firms and the States/UTs are at liberty to draw upon this panel. As considered necessary, the States/UTs may request financial proposals from these firms in the template RFP given in the Toolkit and do a selection based on applicable procurement rules and guidelines. The scope of work for the Smart City Consulting firms is given in Annexure 1 of the guidelines. The States have the option of appointing a consulting firm outside the panel by following transparent and fair procedures as per State financial rules.

Handholding Agencies: During the preparation of the Smart Cities Mission, a number of foreign Governments have offered to provide Technical Assistance (TA) support. Additionally, other external organizations, including bilateral and multilateral institutions, as well as domestic organizations have suggested to the Ministry of Urban Development that they can give technical assistance support. These include World Bank, ADB, JICA, USTDA, AFD, KfW, DFID, UN Habitat, UNIDO, etc. Such organizations, which have experience in the field of smart city development, can also extend support to the States/UTs as hand-holding agencies in preparing the SCPs. The Ministry will assist in tying up the arrangements. The implementation of the Mission at the City level will be done by a Special Purpose Vehicle (SPV) created for the purpose. The SPV will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects. Each smart city will have a SPV which will be headed by a full time CEO and have nominees of Central Government, State Government and ULB on its Board. The States/ULBs shall ensure that, (a) a dedicated and substantial revenue stream is made available to the SPV so as to make it self-sustainable and could evolve its own credit worthiness for raising additional resources from the market and (b) Government contribution for Smart City is used only to create infrastructure that has public benefit outcomes. The execution of projects may be done through joint ventures, subsidiaries, public-private partnership (PPP), turnkey contracts, etc suitably dovetailed with revenue streams. The SPV will be a limited company incorporated under the Companies Act, 2013 at the city-level, in which the State/UT and the ULB will be the promoters having 50:50 equity shareholding. The private sector or financial institutions could be considered for taking equity stake in the SPV, provided the shareholding pattern of 50:50 of the State/UT and the ULB is maintained and the State/UT and the ULB together have majority shareholding and control of the SPV. Funds provided by the Government of India in the Smart Cities Mission to the SPV will be in the form of tied grant and kept in a separate Grant Fund. These funds will be utilized only for the purposes for which the grants have been given and subject to the conditions laid down by the MoUD. The State Government and the ULB will determine the paid up capital requirements of the SPV commensurate with the size of the project, commercial financing required and the financing modalities. To enable the building up of the equity base of the SPV and to enable ULBs to contribute their share of the equity capital, GoI grants will be permitted to be utilized as ULBs share of equity capital in the SPV, subject to the conditions given in Annexure 5 of the guidelines. Initially, to ensure a minimum capital base for the SPV, the paid up capital of the SPV should be such that the ULB’s share is at least equal to Rs.100 crore with an option to increase it to the full amount of the first installment of Funds provided by GoI (Rs.194 crore). With a matching equity contribution by State/ULB, the initial paid up capital of the SPV will thus be Rs. 200 crore (Rs. 100 crore of GoI contribution and Rs. 100 crore of State/UT share). Since the initial GoI contribution is Rs.194 crore, along with the matching contribution of the State Government, the initial paid up capital can go up to Rs.384 crore at the option of the SPV. The paid up capital may be enhanced in the subsequent years as per project requirements, with the provision mentioned above ensuring that ULB is enabled to match its shareholding

International Journal of Engineering Science and Computing, April 2017

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in the SPV with that of the State/UT. The structure and functions of the SPV are given in Annexure 5 of the guidelines and the Articles of Association will contain such provisions. A model Article of Association is given in the Toolkit. After selection of the cities in Stage II of the Challenge, the process of implementation will start with the setting up of the SPV. As already stated, it is proposed to give complete flexibility to the SPV to implement and manage the smart city project and the State/ULB will undertake measures as detailed in Annexure 5 of the guidelines for this purpose. The SPV may appoint Project Management Consultants (PMC) for designing, developing, managing and implementing area based projects. SPVs may take assistance from any of the empanelled consulting firms in the list prepared by MoUD and the handholding agencies. For procurement of goods and services, transparent and fair procedures as prescribed under the State/ULB financial rules may be followed. Model frameworks as developed by MoUD may also be used for Smart City projects.

VI. Structure and Functions of SPV in Smart City:

1. Structure of the SPV:
The City level SPV will be established as a Limited Company under the Companies Act, 2013 and will be promoted by the State/UT and the ULB jointly, both having 50:50 equity shareholding. This shareholding pattern has to be maintained at all times. The private sector or financial institutions could be considered for taking equity stake in the SPV, provided the State/UT and the ULB share are equal to each other, and together the State/UT and ULB have majority shareholding and control of the SPV (e.g. State/UT/ULB: Private sector shareholding can be in the ratio 40:40:20 or 30:30:40. Ratios such as 35:45:20 or 40:30:30 are not permitted since State/UT and ULB shares are not equal. Ratios such as 20:20:60 are also not permitted since the State/UT and the ULB together do not have majority shareholding). In addition to equity, the State/UT can provide its contribution to the Smart Cities Mission as grant to fulfil the Government responsibility for ensuring availability of funds for the mission and for ensuring the financial sustainability of the SPV.

2. Raising and utilization of funds by the Company (SPV):
The funds given by the Central Government to the SPV will be in the shape of tied grants and kept in a separate Grant Fund. These funds will be utilized only for the purposes given in the Mission Statement and Guidelines and subject to the conditions laid down by the Central Government. The ULBs may, through the State Government, request MoUD to permit utilization of GoI grants as ULB’s equity contribution to the SPV, subject to the following conditions:

i. The State Government has made adequate contribution to the SPV out of their own funds.

ii. The approval will be limited to the GoI grants that have already been released. Since future instalments of Smart City funds are subject to performance and are not guaranteed, the ULB will not be permitted to earmark future instalments to meet its equity contribution.

iii. The utilization of GoI grants as equity contributions will not alter the relative shareholding of the State Government and the ULB, which will remain equal as per Mission guidelines.

iv. It is clarified that the Government of India contribution to Smart Cities is strictly in the form of grant and the ULB is exercising its own discretion in utilizing these funds as its equity contribution to the SPV. The SPV will also access funds from other sources such as debt, loans, user charges, taxes, surcharges, etc.

3. Board of Directors:
The Board of Directors will have representatives of Central Government, State Government, ULB and Independent Directors, in addition to the CEO and Functional Directors. Additional Directors (such as representative of parastatal) may be taken on the Board, as considered necessary. The Company and shareholders will voluntarily comply with the provision of the Companies Act 2013 with respect to induction of independent directors. Below, are given the broad terms of appointment and role of the SPV Board.

3.1 The Chairperson of the SPV will be the Divisional Commissioner/Collector/Municipal Commissioner/ Chief Executive of the Urban Development Authority as decided by the State Government.

3.2 The representative of the Central Government will be a Director on the Board of the SPV and will be appointed by the MoUD.

3.3 The CEO of the SPV will be appointed with the approval of the MoUD. The CEO will be appointed for a fixed term of three years and will be removed only with the prior approval of MoUD. The functions of the CEO include:

a. Overseeing and managing the general conduct of the day-to-day operations of the SPV subject to the supervision and control of the Board.

b. Entering into contracts or arrangements for and on behalf of the Company in all matters within the ordinary course of the Company’s business.

c. To formulate and submit to the Board of Directors for approval a Human Resource Policy that will lay down procedures for creation of staff positions, qualifications of staff, recruitment procedures, compensation and termination procedures.

d. Recruitment and removal of the senior management of the Company and the creation of new positions in accordance with the Company’s approved budget and the recruitment or increase of employees in accordance with the Human Resource Policy laid down by the Board.

e. Supervising the work of all employees and managers of the Company and the determination of their duties, responsibilities and authority;

3.4 The Independent Directors will be selected from the data bank(s) maintained by the Ministry of Corporate Affairs and preference will be given to those who have served as independent directors in the Board of Companies fulfilling Clause 49 of the listing agreement of Securities and Exchange Board of India (SEBI).

4. Delegation of powers to the SPV:
4.1 One of the primary reasons for the creation of an SPV for the Smart City Mission is to ensure operational independence and autonomy in decision making and mission implementation. The Smart City Mission encourages the State Government and the ULB to adopt the following best practices to create
empowered SPVs to the extent and as provided under the municipal act.

5. The key functions and responsibilities of the SPV are to:

i. Approve and sanction the projects including their technical appraisal.

ii. Execute the Smart City Proposal with complete operational freedom.

iii. Take measures to comply with the requirements of MoUD with respect to the implementation of the Smart Cities programme.

iv. Mobilize resources within timelines and take measures necessary for the mobilisation of resources.

v. Approve and act upon the reports of a third party Review and Monitoring Agency.

vi. Overview Capacity Building activities.

vii. Develop and benefit from inter-linkages of academic institutions and organizations.

viii. Ensure timely completion of projects according to set timelines.

ix. Undertake review of activities of the Mission including budget, implementation of projects, and preparation of SCP and co-ordination with other missions / schemes and activities of various ministries.

x. Monitor and review quality control related matters and act upon issues arising thereof.

xi. Incorporate joint ventures and subsidiaries and enter into Public Private Partnerships as may be required for the implementation of the smart cities programme.

xii. Enter into contracts, partnerships and service delivery arrangements as may be required for the implementation of the Smart Cities Mission.

xiii. Determine and collect user charges as authorised by the ULB.

xiv. Collect taxes, surcharges etc. as authorised by the ULB.

The above provisions will be included in the Articles of Association of the SPV.

VII. REFERENCES:


