Smart Cities in India

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Abstract

Smart City is the product of accelerated development of the new generation information technology and knowledge-based economy, based on the network combination of the Internet, telecommunications network, broadcast network, wireless broadband network and other sensors networks where Internet of Things technology (IoT) as its core. The main features of a smart city include a high degree of information technology integration and a comprehensive application of information resources. The essential components of urban development for a smart city should include smart technology, smart industry, smart services, smart management and smart life.

Keywords—smart city; IOT; India; Internet; communication

INTRODUCTION

MORE THAN HALF OF THE WORLD'S POPULATION NOW LIVES IN URBAN AREAS. THIS SHIFT FROM A PRIMARILY RURAL TO A PRIMARILY URBAN POPULATION IS PROJECTED TO CONTINUE FOR THE NEXT COUPLE OF DECADES SUCH ENORMOUS AND COMPLEX CONGREGATIONS OF PEOPLE INEVITABLY TEND TO BECOME MESSY AND DISORDERED PLACES. CITIES, MEGACITIES, GENERATE NEW KINDS OF PROBLEMS. DIFFICULTY IN WASTE MANAGEMENT, SCARCITY OF RESOURCES, AIR POLLUTION, HUMAN HEALTH CONCERNS, TRAFFIC CONGESTIONS, AND INADEQUATE, DETERIORATING AND AGING INFRASTRUCTURES ARE AMONG THE MORE BASIC TECHNICAL, PHYSICAL, AND MATERIAL PROBLEMS. ANOTHER SET OF PROBLEMS ARE MORE SOCIAL AND ORGANIZATIONAL IN NATURE RATHER THAN TECHNICAL, PHYSICAL OR MATERIAL. PROBLEMS OF THESE TYPES ARE ASSOCIATED WITH MULTIPLE AND DIVERSE STAKEHOLDERS, HIGH LEVELS OF INTERDEPENDENCE, COMPETING OBJECTIVES AND VALUES, AND SOCIAL AND POLITICAL COMPLEXITY. IN THIS SENSE, CITY PROBLEMS BECOME WICKED AND TANGLED. ENSURING LIVABLE CONDITIONS WITHIN THE CONTEXT OF SUCH RAPID URBAN POPULATION GROWTH WORLDWIDE REQUIRES A DEEPER UNDERSTANDING OF THE SMART CITY CONCEPT[1]. THE URGENCY AROUND THESE CHALLENGES IS TRIGGERING MANY CITIES AROUND THE WORLD TO FIND SMARTER WAYS TO MANAGE THEM. THESE CITIES ARE INCREASINGLY DESCRIBED WITH THE LABEL SMART CITY. ONE WAY TO CONCEPTUALIZE A SMART CITY IS AS AN ICON OF A SUSTAINABLE AND LIVABLE CITY. ALTHOUGH THERE IS AN INCREASE IN FREQUENCY OF USE OF THE PHRASE "SMART CITY", THERE IS STILL NOT A CLEAR AND CONSISTENT UNDERSTANDING OF THE CONCEPT AMONG PRACTITIONERS AND ACADEMIA. ONLY A LIMITED NUMBER OF STUDIES INVESTIGATED AND BEGAN TO SYSTEMATICALLY CONSIDER QUESTIONS RELATED TO THIS NEW URBAN PHENOMENON OF SMART CITIES. THIS PAPER ATTEMPTS TO START FILLING THIS GAP BY IDENTIFYING IMPORTANT TRENDS AND SUGGESTING RESEARCH AGENDAS ABOUT CITIES AS THEY INVEST IN NEW WAYS TO BECOME "SMART." BY EXPLORING AN EXTENSIVE ARRAY OF LITERATURE FROM VARIOUS FIELDS SUCH AS E-GOVERNMENT, INFORMATION SCIENCE, URBAN STUDIES, AND PUBLIC ADMINISTRATION, WE IDENTIFY AND DISCUSS CHALLENGES, SUCCESS FACTORS, AND IMPACTS OF GOVERNMENT-DRIVEN INITIATIVES TO THAT MAKE A CITY SMART. WE IDENTIFY EIGHT CORE COMPONENTS OF SMART CITY INITIATIVES, AND PROPOSE AN INTEGRATED CONCEPTUAL FRAMEWORK TO GUIDE FUTURE "SMART CITY" STUDIES.

THE MEANINGS OF "SMART" IN THE SMART CITY CONTEXT

Tracing the genealogy of the word smart in the label smart city can contribute to an understanding of how the term smart is being loaded. In marketing language, smartness is centered on a user perspective. Because of the need for appeal to a broader base of community members, smart serves better than the more elitist term intelligent. Smart is more user-friendly than intelligent, which is limited to having a quick mind and being responsive to feedback. Smart city is required to adapt itself to the user needs and to provide customized interfaces. In the urban planning field, the smartness in smart growth is treated as a normative claim and ideological dimension. Being smarter entails strategic directions. Governments and public agencies at all levels are embracing the notion of smartness to distinguish their new policies, strategies, and programs for targeting sustainable development, sound economic growth, and better quality of life for their citizens[2]. They associate smart with achieving policy success in their jurisdictions. The smartness in smart technologies also merits attention. The technologies had permeated into the commercial application of intelligent-acting products and services, artificial intelligence, and thinking machines. Smartness in the technology context implies the automatic computing principle like self-configuration, self-healing, self-protection, and self-optimization. Smart homes, smart buildings, and larger smart ensembles like airports, hospitals or university campuses are equipped with a multitude of mobile terminals and embedded devices as well as connected sensors and actuators. Smart ecosystem is a conceptual extension of smart space from the personal context to the larger community and the entire city.

SMART CITY SURVIVES ON THE DATA IT GENERATES

Smart city survives on the amount of data it generates. Health conditions are monitored with smart devices which we wear and carry like watches and mobiles[3]. These devices captures data such as body temperature, blood pressure, sugar level and communicates it to respective servers and the data gets logged.

In homes we have devices which controls room temperature, and also security systems, all these devices generate data such as number of people in house and amount of time they spend in each room, electricity consumption etc. All these data are logged and analyzed.

I. SMART DEVICES IN SMART CITIES

As the name itself suggests smart it implies any action or process that takes place in the governance of a smart city should be smart[5]. Internet of things plays an important role in making this happen. Few things that has to be addressed are,

1.Smart roads: Management of traffic and avoid accidents is the important task of a smart road. Installing sensors that sense a vehicle once its speed exceed a threshold and stop on sudden appearance of objects using image processing and slowing down once the vehicle approaches a speed breaker can be incorporated into a smart road.

2.Smart House: "Nest" was a startup which builds thermostats for houses and this startup was acquired by Google. Till now search engines were able to look at our preferences based on the search we perform. Now the thermostats which will be installed in a smart home will be able to detect number of people in a house, amount of time they spend in each room and based on the body temperature and the room temperature gets adjusted. All the above mentioned data gets logged and can be analyzed to determine people preferences with respect to temperature and also amount of time spent on different activities in the house.

3.Smart Power: The power/electricity that will be required to run a smart city will be either nuclear powered or solar power in majority. Smart devices like nest thermostats will help manage the house interior devices based on number of people.

V. PROBLEM WITH SMART CITIES

The stage is ready for this ambitious mission that aims to make Indian cities sustainable and competitive. The journey so far has a few lessons and concerns that need attention. Apart from criticism on the quality of proposals and public participation, there were indications of a few cities hesitant to submit their proposals. One of the main reasons for the apathy of urban local bodies of some cities pertains to the Special Purpose Vehicle (SPV)[4], which is to be mandatorily constituted for the implementation of their respective Smart City Plans. SPVs with private investments have been increasingly encouraged as an efficient mechanism for infrastructure projects. This would be ideally seen as an attractive option for urban local bodies struggling to meet investment requirement. Then why have these local bodies been so disapproving of the smart city SPVs, According to media reports, the local bodies of Greater Mumbai, Navi Mumbai, Pune, Kochi and Nashik have indicated that the essence of 'local self-governance' will be defeated with specific focus on private sector driven SPVs.An SPV is a

legal entity created for a specific purpose, which can theoretically be shut down after the specified purpose has been achieved. The major advantage of an SPV is that it allows investors to limit their risks and maximize profits, and bypass cumbersome legal and regulatory issues. In India, SPVs have come to dominate the infrastructure landscape. A prominent example of this would be road construction, operations and maintenance. In certain other cases, like metro rail projects, the private-public partnership efficiencies are yet to be realized.One of the reasons for setting up SPVs in smart cities is to ensure objective and efficient decision making, independent of municipal councils, which are subject to local politics. The Smart Cities Mission (SCM) guidelines mandate an equal share of equity contribution by the state government and urban local body, thereby making them the majority shareholders. Nevertheless, urban local bodies are disturbed by the idea of an SPV bypassing the elected municipal council as proposed in the SCM guidelines. It threatens to chip away at the notion of decentralized and democratic decision making. A demonstration of this contestation was noted when the Greater Mumbai Municipal Corporation mandated that there would be no private sector participation, and the mayor would have veto power over the SPV's decisions. Although the central government may not honor this resolution, it signals that empowering an SPV will not be easy.Currently, according to the SCM guidelines, cities are required to create an SPV once they have been selected. However, in the absence of clarity on specific projects and assured revenue streams, it would be very difficult for private companies to participate. This, combined with a lack of management control, may reduce the attractiveness of SPVs for private investors.The SCM guidelines also stipulate that government funding can only be used for projects that have public benefit outcomes. What are the criteria to decide the degree of public benefit of projects? Such distinction could lead to a tiered hierarchy of projects based on a user's ability and willingness to pay in the context of cities with a significant percentage of urban poor.Finally, there is the issue of convergence at city level. There are cities that are covered under more than one such flagship programme. For example, Varanasi is included under both SCM and the Heritage City Development and Augmentation Yojana (HRIDAY). The manner in which a smart city SPV interacts with the implementing agency for HRIDAY, and how two projects under the two separate programmes complement each other, is yet to be seen.

Clearly, there are issues regarding SPVs which need to be clarified. An important first step would be to build safeguards to protect the democratic nature of governance structures. There is merit in understanding the mindset behind some of the caveats voiced by unhappy urban local bodies. A robust governance structure, which allows for sharing of power and financial resources between urban local bodies and the private sector stakeholders, would go a long way towards assuaging fears.The second important aspect would be for the government to clarify the financial nature of SPVs and how the private sector can contribute effectively. The nature of the asset and price sensitivity of citizens towards that asset could be used as a factor in deciding issues of charging user-fee.Critical issues of capacity and skill building for local bodies need to be addressed in parallel. Matters related to intellectual property rights, open standards and technology transfer should be enshrined at the highest level of government since it is difficult for individual urban local bodies to negotiate with private parties. The current SCM guidelines do not cover these aspects. Only when these issues are addressed can SPVs be truly successful.

VI. CONCLUSION

Though the smart cities are announced and lot of initiatives is taken to start the same, few issues have to be addressed. Improving the skill of people to work in this smart city is taken care by programs like skill India and APPSDC in state. Land acquisition, solid waste management, water resource and

electricity remain the concern. If the project is successful large scale migration from rural to urban will happen which will provide good living condition for most in our country.

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