DEVELOPMENT OF SMART CITIES

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Abstract—Making a city "smart" is emerging as a strategy to mitigate the problems generated by the urban population growth and rapid urbanization. Yet little academic research has sparingly discussed the phenomenon. To close the gap in the literature about smart cities and in response to the increasing use of the concept, this paper proposes a framework to understand the concept of smart cities. Based on the exploration of a wide and extensive array of literature from various disciplinary areas we identify eight critical factors of smart city initiatives: management and organization, technology, governance, policy context, people and communities, economy, built infrastructure, and natural environment. These factors form the basis of an integrative framework that can be used to examine how local governments are envisioning smart city initiatives. The framework suggests directions and agendas for smart city research and outlines practical implications for government professionals

Keywords—**Smart Cities**

1. INTRODUCTION

More than 50% of the World's population now lives in urban areas [18-20]. This shift from a primarily rural to a primarily urban population is projected to continue for the next couple of years . Such enormous and complex congregations of people inevitably tend to become dirty and disordered places. Populated areas, megacities, generate new kinds of problems. Another set of problems are more social and organizational in nature rather than technical, physical or material. Problems of such 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 high and tangled. Ensuring habitable conditions within the context of such rapid urban population growth worldwide requires a in depth understanding of the digital & smart city concept. 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 minimum 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 digital & smart cities. Now we are paying more attention to electric vehical& solar power also for our daily power usage. we should develop electrical charging stations.Traffic collapse, parking lot emergency and fine dust alarm. Intelligent use of energy. Secure data for citizens and administration. More voice and transparency in decisions.Designing the city of tomorrow to be liveable and sustainable. Decision-makers, concepts and solutions are in demand. SMART CITY SOLUTIONS provides inspiration for the city of tomorrow. Difficulty in waste management, scarcity of resources, air pollution, human health problems, traffic clogging due to more number of vehicles, deteriorating and aging infrastructures are among the more basic technical, physical, and material problems. we should use solar roof, electrical or solar power vehicles for environment & energy safety. We should also use PNG(Piped Natural Gas) system in colonies. we should use face recognition techniques for minimum vehicle accidents. No Helmet, No seat belt, No Fuel policy should be adopted. Underground parking system should be used. E-Ricksha should be implemented in every city of the world. Public should also share their vehicles.
Green waste and plastic waste should be seprated from homes itself. Awareness programs should be conducted.

2. CONCEPTUALIZING A SMART CITY

As discussed above, the concept of a smart city itself is still new, and the work of defining and conceptualizing it is in progress. The concept is used all over the world. we are replacing smart cities with digital cities. Many researchers are recognizing the use of digital city as an urban labeling phenomenon noting that the label smart city is a concept and is used in ways that are not always regular. Many working definitions have been put forward and adopted in both practical and academic use. Cacophony of definitions is resulting in calls for conceptual research in this regard .

3. SUCCESS FACTORS OF SMART CITY INITIATIVES

Drawing on the rich, but quite different, conceptual definitions of a smart city presented above, this paper proposes a comprehensive set of factors that are essential to understanding smart city initiatives and projects. We have to consider these factors for smart city initiatives or projects. Our goal is not to produce a set of components to rank smart cities, but to create a framework that can be used to characterize how to envision a smart city and design initiatives, which advance this vision by implementing shared services, and navigating their emerging challenges.In addition to sustainability and livability, our framework addresses several internal and external factors that affect design, implementation, and use of smart cities initiatives

The eight clusters of factors include (1) management and organization, (2) technology, (3) governance, (4) policy, (5) people and communities, (6) the economy, (7) built infrastructure, and (8) the natural environment.

3.1. MANAGEMENT AND ORGANIZATION

Only a few studies in the academic literature on smart city initiatives address issues related to managerial and organizational factors. In contrast, a wide array of previous research on IT initiatives and projects has highlighted these issues as important success factors or major challenges. Thus managerial and organizational concerns in smart city initiatives need to be discussed in the context of the extensive literature on e-government and IT projects success.

For instance, Er.Ashok Anand&Er. Ravi Kamboj suggested a list of success factors and challenges for egovernment initiatives Smart city initiatives might differ from more general egovernment initiatives in the context and in some of the characteristics of specific projects, but there is much in common between those two types of initiatives because most smart city initiatives are also driven by governments and leveraged by the intensive use of ICTs to better serve citizens.

3.2. TECHNOLOGY

A smart city relies, among others, on a collection of smart computing technologies applied to critical infrastructure components and services. Smart computing refers to a “new generation of integrated hardware, software, and network technologies that provide IT systems with real-time awareness of the real world and advanced analytics to help people make more intelligent decisions about alternatives and actions that will optimize business processes and business balance sheet results”.

ICTs are key drivers of smart city initiatives. The integration of ICT with development projects can change the urban landscape of a city and offer a number of potential opportunities ,they can enhance the management and functioning of a city.

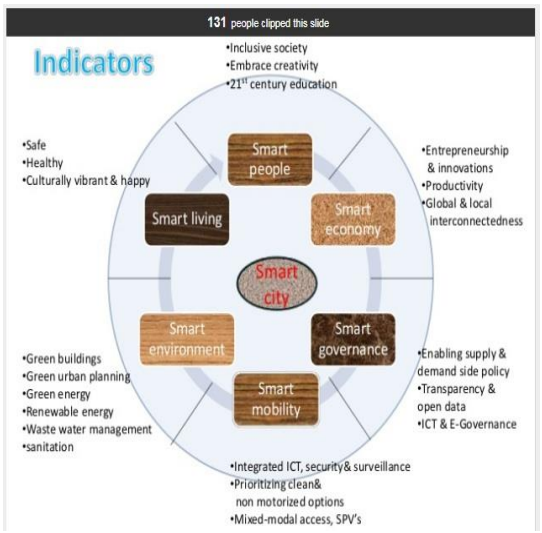
Despite proclaimed advantages and benefits of ICTs use in cities, their impact is still unclear. Indeed, they can improve the quality of life for citizens, but they can also increase inequalities and promote a digital divide. Thus, city managers should consider certain factors when implementing ICT with regard to resource availability, capacity, and institutional willingness and also with regards to inequality, digital divide and changing culture and habits.

3.3. GOVERNANCE

Several cities have started transformational projects and initiatives called smart city initiatives to better serve citizens and to improve their quality of life. These projects involve multiple stakeholders. Thus, several cities have felt an increased need for better governance to manage these projects and initiatives. In general, (public) governance has been defined “as regimes of laws, administrative rules, judicial rulings, and practices that constrain, prescribe, and enable government activity, where such activity is broadly defined as the production and delivery of publicly supported goods and services.” Governance, hence, involves the implementation of processes with constituents who exchange information according to rules and standards in order to achieve goals and objectives.

Several cities have benefited from the emergence of ICTs that improve their governance. This ICT-based governance is known as smart governance. It widely represents a collection of technologies, people, policies, practices, resources, social norms and information that interact to support city governing activities. Thus, it represents an important challenge for smart city initiatives. Little literature on smart cities addresses issues related to governance. According to Er.Anand the presence of leadership is important for good governance. In the same way, Er.Kamboj emphasized on the presence of a “champion” that collaborate with all stakeholders as an essential factor for good governance. Smart governance is described as an important characteristic of a smart city that is based on citizen participation and private/public partnerships.

According to Anand and Monu, smart governance depends on the implementation of a smart governance infrastructure that should be accountable, responsive and transparent. This infrastructure helps allow collaboration, data exchange, service integration and communication.



3.4. POLICY CONTEXT

Transformation from an ordinary (non-smart) city to a smart city also entails the interaction of technological components with political and institutional components. Political components represent various political elements (city council, city government, and city major) and external pressures such as policy agendas and politics that may affect the outcomes of IT initiatives]. Institutional readiness such as removing legal and regulatory barriers is important for smooth implementation of smart city initiatives.

The policy context is critical to the understanding of the use of information systems in appropriate ways. Hence, an innovative government stresses the change in policies, because a government cannot innovate without a normative drive addressed in policy. Whereas innovation in technology for a smart city can be relatively easily observed and broadly agreed upon, subsequent changes in the policy context are more ambiguous. The policy context characterizes institutional and non-technical urban issues and creates conditions enabling urban development.

3.5. PEOPLE AND COMMUNITIES

Addressing the topic of people and communities as part of smart cities is critical, and traditionally has been neglected on the expense of understanding more technological and policy aspects of smart cities. Projects of smart cities have an impact on the quality of life of citizens and aim to foster more informed, educated, and participatory citizens. Additionally, smart cities initiatives allow members of the city to participate in the governance and management of the city and become active users. If they are key players they may have the opportunity to engage with the initiative to the extent that they can influence the effort to be a success or a failure.

3.6. ECONOMY

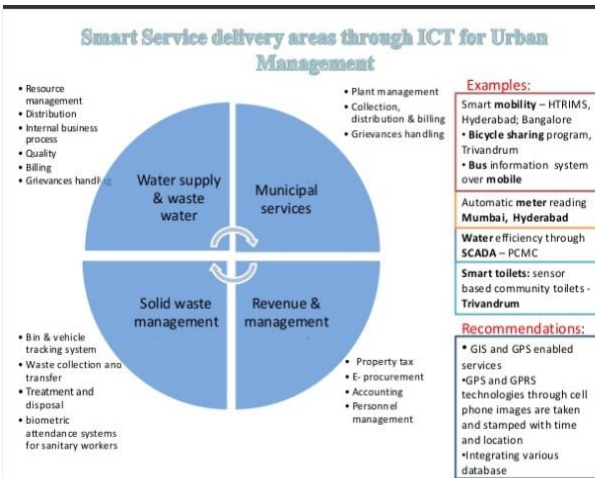
Economy is the major driver of smart city initiatives, and a city with a high degree of economic competitiveness is thought to have one of properties of a smart city. As well, one of the key indicators to measure growing city competition is the capacity of the

City city as an economic engine Er.Anand suggest a smart city framework consisting of six main components (smart economy, smart people, smart governance, smart mobility, smart environment, and smart living). Their operational definition of a smart economy includes factors all around economic competitiveness as innovation, entrepreneurship, trademarks, productivity and flexibility of the labor market as well as the integration in the national and global market. A series of studies released by the IBM Institute for Business Value identify business as one of core systems of smarter cities, which comprise city services system, citizens system, business system, transport system, communication system, water system, and energy system. Capacities for smart business systems include ICT use by firms, new smart business processes, and smart technology sectors. The smart city initiatives are designed to develop information technology capacities and establish an agenda for change by industry actions and business development. Creating an environment for industrial development is pivotal to a smart city. The economic outcomes of the smart city initiatives are business creation, job creation, workforce development, and improvement in the productivity.

3.7. BUILT INFRASTRUCTURE:

The availability of infrastructure includes wireless infrastructure (fiber optic channels, Wi-Fi networks, wireless hotspots. The implementation of good infrastructure is

fundamental to a smart city's development and depends on some factors related to its availability and performance. There is a little literature that focuses on main infrastructure barriers of smart cities initiatives.



3.8. NATURAL ENVIRONMENT

Smart city initiatives are forward-looking on the environmental front. Core to the concept of a smart city is the use of technology to increase sustainability and to better manage natural resources .

4. INTEGRATIVE FRAMEWORK

Drawing on the conceptual literature on smart cities and the factors outlined above, we have developed an integrative framework to explain the relationships and influences between these factors and smart city initiatives. Each of these factors is important to be considered in assessing the extent of smart city and when examining smart city initiatives. The factors provide a basis for comparing how cities are envisioning their smart initiatives, implementing shared services, and the related challenges. This set of factors is also presented as a tool to support understanding of the relative success of different smart city initiatives implemented in different contexts and for different purposes. Similarly, this framework could help to disentangle the actual impact on types of Variables (organizational, technical, contextual) on the success of smart city initiatives.

It is expected that while all factors have a two-way impact in smart city initiatives (each likely to be influenced by and is influencing other factors), at different times and in different contexts, some are more influential than others. In order to reflect the differentiated levels of impact, the factors in our proposed framework are represented in two different levels of influence. Outer factors (governance, people and communities, natural environment, infrastructure, and economy) are in some way filtered or influenced more than influential inner factors (technology, management, and policy) before affecting the success of smart city initiatives. This counts for both direct and indirect effects of the outer factors. Technology may be considered as a meta-factor in smart city initiatives, since it could heavily influence each of the other seven factors. Due to the fact that many smart city initiatives are intensively using technology, it could be seen as a factor that in some way influences all other success factors in this framework.

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