

UNDERSTANDING THE CONCEPT OF SMART CITY AND ITS SOCIO-ECONOMIC BARRIERS

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ABSTRACT

The development of Smart city is acquiring substantial appreciation and recognition all over the world. The Smart City is an integrated framework of city infrastructure and technology to address the complexities of cities. The study objects to get an insight into the concept of Smart Cities and also to identify the social and economic barriers in the smart Cities. This study combined the definitions and characteristics given by various authors. Though there are many barriers and challenges in the development of Smart City but as the literature suggests that sustainability is the fundamental objective of Smart City which falls under social issue, hence, at foremost social barriers are discussed and then supplemented with economic barriers.

KEYWORDS: *Smart City, Urban Development, Infrastructure, Technology, barriers, Challenges*

INTRODUCTION

Cities are the core place for social, economic, and cultural development of human beings. Cities are the centres of human's economic, social, and cultural activities. Due to urbanisation and employment perspective people from villages are migrating towards Cities. This leads to withstanding issues and challenges of population, pollution, inadequacy of water supply, electricity supply and inadequate infrastructure, traffic, etc. (IEEE 2015) to overcome these challenges faced by the city in the process of urbanisation, there is a high need of a well-defined system. This has come in the form of Smart City. As the urban populations is increasing day by day, the cities become more complex to live. In this situation proper management and organisation of the cities is the need of the hour. The concept of Smart Cities is dispersing all over the world as an innovative and improved concept of cities to solve the complexities (Monzon, 2015). We are surrounding by the Smart Phones, Smart TV, Smart Refrigerator, Smart PC etc. This Smart Adjective is indicating the need of the users.

The essence of the concept of smart cities lie down with Information and Communication Technologies (ICT) that is supposed to enhance the performance of Cities and overcome the aforementioned challenges and barriers of Cities (Gates, 2015)

A handful of studies have been conducted in the field of barriers and challenges in developing Smart Cities. Very few studies focused on Indian context, rest of the studies are shielded with the country and region-wise challenges. The challenges of the cities need to be seriously addressed so that the economic, social, and population growth can be aligned.

Smart city development is gaining considerable recognition in the systematic literature and international policies throughout the world. The study is intended to recognise the key barriers of smart cities by reviewing existing literature. This work will study the Socio-economic barriers that hinder the development of Smart Cities. Though there are many categories of barriers, but this study is centred on the social and economic barriers.

Purpose Statement

The current study deals with understanding the concept of Smart Cities including the characteristics, and dimensions of a Smart City. Another objective of the study is to identify and discuss about the social and economic barriers while executing Smart Cities.

LITERATURE REVIEW

The main focus in the framework of Smart City is towards well-execution of economy, people, governance, environment, and living Giffinger et al. (2007). Hollands (2008) distinguished that Smart City is combination of information and communication technology to support urban and social growth through refining the economy, citizens' involvement, and governmental efficiency. According to Caragliu et al. (2009), smart cities lead to sustainable economic development through providing secure and safe environment and advance urban infrastructure.

Yigitcanlar and Kamruzzaman (2018) opined that sustainable and ideal city can be established through Smart City concept. There are three fundamental dimensions of Smart City as defined by Nam and Pardo (2011), these are technological factors, human factors, and institutional factors. Ruhlandt (2018) explained that the multi-dimensional factors of Smart Cities are merged and coordinated to address socio-economic and environmental problems.

The combination of knowledge society and digital city results in the development of Smart City. The notion of smart city is established from the combination of the knowledge society and digital city (Komninos, 2008). Better city planning and achievement can be obtained through Smart City and it leads to sustainable urban development (Monzon, 2015).

The essential elements of infrastructure of a smart city shall include the development of the following 1. Adequate water supply. 2. Efficient urban mobility & public transport 3. Sanitation, including waste management. 4. Assured electricity supply. 5. Affordable housing especially for the poor. 6. Safety and security of citizens particularly of women, children, and the elderly. 7. Good governance, especially e-governance & citizen participation. 8. Robust IT connectivity & digitization 9. Sustainable environment. 10. Health and education (Report of the Smart City Mission 2015).

Definitions of Smart City

Table 1. Smart City Definitions

Smart City Definitions	Source
“multi-layer territorial system of innovation” made up of digital networks, individual intellectual capital, and the social capital of the city, which together constitute collective intelligence”.	(Komninos, 2008)
“A city is smart when investments in human and social capital and traditional and modern communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.”	Caragliu, Del Bo and Nijkamp. 2009
“Smart cities are also instruments for improving competitiveness in such a way that community and quality of life are enhanced”	Batty et.al.2012
“The idea of smart city is rooted in the creation and connection of human capital, social capital and information and communication technology infrastructure in order to generate greater and more sustainable economic development and a better quality of life”	European Parliament. 2014
“A Smart City connects human capital, social capital and ICT infrastructure in order to address public issues, achieve a sustainable development and increase the quality of life of its citizens”.	Manville et al. 2014
“brings together technology, government and society to enable the following characteristics: smart economy, smart mobility, smart environment, smart people, smart living, and smart governance”	(IEEE 2015)
“After reviewing the above definitions, the authors of this report proposed the following definition: “a smart city is characterized by its ability to integrate people, technology and information to create an efficient, sustainable and resilient infrastructure that provides high quality services while improving the quality of life of its residents”.	Albino et al. (2015)

Though there is no unified definition of Smart City, but it can be concluded through the various definitions in table that the core concept of Smart Cities lies in the technology, and it is associated with the development of social and human capital. Technology acts as a facilitator that enhance the efficiency of the project.

There are six characteristics defined by IEEE, 2015 and the definition also consists of these characteristics as following-

- Smart economy;
- Smart mobility;
- Smart environment;
- Smart people;
- Smart living; and
- Smart governance.

Table 2: Characteristics and Description of Smart City

Characteristics	Description
Smart Governance	Use of technology to identify the ongoing activities in other municipalities and also to coordinate with them. To collaborate with other stakeholders to improve the public services for citizens.
Smart Economy	Innovation and productivity are adapted in the market and new business model and global model is being developed and used by the workers
Smart Mobility	Meant to provide efficient transport network for people, and data and in this allow to restructure the urban mobility pattern
Smart Environment	Smart City uses data collection utility network for urban planning and city infrastructure in order to achieve sustainable environment and quality of life to citizens.
Smart People	The citizens must be able to participate in the smart urban life and also able to adapt new, creative, and innovative solutions to their community.
Smart Living	Using ICT, there is smart management of public space, management facilities so that the accessibility can be improved, and Citizens needs can be fulfilled.

(Source - IEEE, 2015)

BARRIERS OF SMART CITIES

Economic Barriers



Figure 1: Conceptual Diagram 1.-Economic Barriers (Author's Own).

Lack of IT Infrastructure and Intelligence Deficit-

A smart city depends on the smart computing technologies which is to be applied on infrastructural components. The combination of IT and project can change the urban scene of the city. In the Lack of IT infrastructure entails of lack of facilities like solar based electrical systems, cloud computing) and lack of capabilities of artificial intelligence comprises lack of intelligent transport system, smart communities, smart grids, smart energy solutions, e-health etc. Monzon (2015). Even there is lack of employees with integration of skills and culture. The availability and compatibility of system, software and application is a challenge. Poor -developed integration capabilities of internal existing systems (Chourabi et.al.,2012).

Lack of Competitiveness

It is related with the challenges appeared in the development of the smart cities (Monzon,2015).

Cost of IT Training and Skills Development

High cost occurred when paid to IT professionals for training and skill development (Chourabi et al. ,2012).

Global Economy Volatility

The global economy is highly volatile and uncertain and is a key barrier in the way of Smart City development (Ferrara,2015).

Higher Operational and Maintenance Cost

IT professionals cost in training and development and consultancies, installation charges, operation and maintenance and training are usually high, which is a concern in order to develop smart cities (Chourabi et al.,2012).

SOCIAL BARRIERS



Figure 2: Conceptual diagram-Social Barriers (Author's Own).

Lack of Involvement of Citizens

Citizens do not participate in realising and suggesting how the Smart City could closely appear. They should be encouraged to contribute to the evaluation of and submission of innovative ideas for Smart City(Komninou et al.,2013); (Kogan and Lee, 2014).

Low Awareness Level of Community

general public is unable to get insight of the smart city, and its implications on their quality-of-life(IET,2017); (Kogan and Lee,2014).

Geographical Diversification Problems

regional disparities in various geographical locations can be a big obstruct in Smart City development (Monzon,2015).

Degree of Inequality

when the citizens' education, income, skills etc. are unequal, it can hamper the smart cities development (Glaeser et al. ,2009); (Monzon,2015).

CONCLUSION

Smart Cities is an approach towards urban way of life, although it is not a solution to urban development. Smart City provides solution for urban sustainable living. Though there are many definitions of Smart Cities, but all relies around technology, sustainability, and society. The concept and characteristics of Smart Cities is based on six dimensions like smart governance, smart economy, smart mobility, smart environment, smart people, and smart living. Existing literature identified various barriers and challenges in the development of Smart Cities, but this study focussed on mainly social and economic barriers. Under economic barriers- lack of IT Infrastructure and Intelligence Deficit, lack of competitiveness, cost of IT training and skills development, global economy volatility, higher operational and maintenance cost is discussed. Under Social Barrier- Lack of involvement of citizens, Low awareness level of community, Geographical diversification problems, Degree of inequality

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