

Rating Systems for Smart Cities

**Rohit Deshmukh, Shubham Chauhan, Mo Saim Bhatt, Anujay Singh Chauhan, Nikhil Chugh,
Suraj Valecha**

Asst. Prof. Rohit Deshmukh, Dept. of Civil Engineering, DYPIEMR, Maharashtra, India

Shubham Chauhan, Dept. of Civil Engineering, DYPIEMR, Maharashtra, India

Mo Saim Bhatt, Dept. of Civil Engineering, DYPIEMR, Maharashtra, India

Anujay Singh Chauhan, Dept. of Civil Engineering, DYPIEMR, Maharashtra, India

Nikhil Chugh, Dept. of Civil Engineering, DYPIEMR, Maharashtra, India

Suraj Valecha, Dept. of Civil Engineering, DYPIEMR, Maharashtra, India

Abstract - A smart city is an urban development vision to incorporate multiple information and communication technology solutions in a secure way to manage a city's assets which include, local departments' information systems, libraries, schools, hospitals, transportation systems, power plants, water supply networks, law enforcement, waste management, and other community services. The goal of constructing a smart city is to enhance quality of life using urban informatics and technology to upgrade the efficiency of services and meet the needs of the resident. Building cities sustainably using smart growth ideologies, compact development planning form, using eco-city concepts, concept of low carbon electricity ecosystem et cetera, provides an opportunity to avoid future sources of greenhouse emissions, while evolving more livable and efficient urban centers. It could also alleviate population pressure on natural habitats and biodiversity thus reducing the risks to natural disasters. Our goal is to develop a rating system which can analyze not only the efficiency and performance of every individual element of the developed infrastructure, but also motivate to develop new systems to reduce human efforts with suitable dimensions. Hence, our rating system should be able to analyze these progresses also. Therefore, a degree of flexibility in the rating manual is needed to be provided.

Key Words: Smart city, Rating system, SELF rating system, ICT, smart growth ideologies

1. INTRODUCTION

Smart City is a city which uses information and communication technologies so that its critical infrastructure as well as its components and public services provided are more interactive, efficient and reliable so that citizens can be made more aware of them. Whenever investments in human and social capital, and in communication infrastructure, specifically encourage sustainable economic development

and a higher quality of life along with judicious management of natural resources through participatory government.

The Smart City itself becomes a genuine digital platform that make best use of the economy, society, environment and welfare of the cities and facilitates the shift towards more sustainable behavior among all stakeholders: users, companies and administration. It also seeks to maximize the public budgets specifically owing to the improvement of processes of the city themselves and its inhabitants. On the other hand, it enables new business models, therefore constituting an excellent platform for innovation in their environment.

The rating of these Smart cities will let the designers, builders and contractors and the stakeholders to make their decisions grow more productive and enhancing. Also the levels of their services to a higher level for the long run by making these cities competing in themselves and improve from each other.

The Smart city ratings will focus on the special core infrastructural elements that makes it to stand differently on comparison to that of the other cities. These are:

- i. Sufficient water supply
- ii. Affirmed electricity supply
- iii. Sanitation, including solid and e-waste management
- iv. Efficient urban mobility and public transport
- v. Affordable housing, especially for the poor
- vi. Strong IT connectivity and digitalization,
- vii. Better governance, especially e-Governance and citizen participation
- viii. Sustainable environment
- ix. Safety and security of all citizens, particularly women, children and the elderly
- x. Health and education.

- xi. Applicability and Installation flexibility for the emerging technologies and grades in their specific regions whenever and wherever needed.
- xii. Equality and brotherhood among the residents irrespective of caste, language, colour, religion and income.

2. RATING SYSTEM

After understanding the Smart cities, its each and every aspect it is based upon, roles of every infrastructural elements developed, our goal is to develop a rating system which can analyze not only the efficiency and performance of every individual element of the developed infrastructure, but also motivate to develop new systems to reduce human efforts with suitable dimensions.

Smart city provides the feasibility of continuous development of the infrastructural elements by making use of the very new emerging technologies by the involvement of information and communication technology.

Hence, our rating system should be able to analyze these progresses also. Therefore, a degree of flexibility in the rating manual is needed to be provided.

Four major dimensions for rating the performance and efficiency of these infrastructural elements identified are as:

Safe & Sustainable, Efficient, Livable and Functional

2.1 SELF Rating System of Smart Cities

SELF is an abbreviation for Safe & Sustainable, Efficient, Livable and Functional. This are the factors over which each element of the Smart City will be judged. On the basis of the performance of each infrastructural element on these factors, every element will be given the rating in terms of stars likely as 5 star, 4 star, 3.5 star and so on. These stars will be awarded to every functional property of an element. And based on the submission of number of these stars awarded, the performance of each of the element will be evaluated.

And then, as a submission of the rating of all the elements, Smart city will be rated. This rating will be based on the percentile factor, which depends on the rating of individual performance of every element in a Smart city with comparison to other smart cities.

Percentile factor is needed to be introduce to rate these cities:

(i) To make a comparison between all the smart cities developed and those which are developing.

(ii) Help in keeping the improvements needed in certain element and also to involve the researches to go on in making the life more smoother.

(iii) Involvement of the new technologies developed in certain field and making its best use.

(iv) Motivation for providing more livable conditions to its citizens.

2.2 Philosophy behind SELF

SELF support majority of the important factor needed for getting an element to show its high performance. Same as GRIHA Ratings for green buildings, SELF also supports the philosophy of 5R's to be included in any Smart City as:

1. Refuse – to blindly adopt international trends, materials, technologies, products, etc. Specially in areas where local substitutes/equivalents are available.

2. Reduce – the dependency on high energy products, systems, processes, etc.

3. Reuse – materials, products, traditional technologies, so as to cut the costs incurred in designing buildings as well as in operating them.

4. Recycle – all the possible wastes generated from the building site, during construction, operation and demolition.

5. Reinvent – engineering systems, designs, and practices such that India crafts global examples that the world can follow rather than us following international examples.

3. CONCLUSIONS

The main objective behind the development of this rating system is to thoroughly study and understand the basic Infrastructural elements of Smart city. It also intended to identify the factors over which all the elements of the Smart city can be rated on the basis of their performance on a common platform and detailed structure formulation for the Rating System. It aimed at selecting Infrastructural elements so as to set an example for rating its performance using the factors identified and specifying formulation and its rating.

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