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IMPACT ON SMART SOLUTIONS TO SMART CITIES TOWARDS SUSTAINABLE TOMORROW: AN OVERVIEW

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ABSTRACT

India is showing the spurt of development to catch up with the developed countries. Smart cities are redefined as those cities where the land and other facilities are used judiciously. Along with the development of smart cities come salary range of IoT devices which creates cyber security and privacy concerns. Hence it is very is important to study the implications of the smart cities on the social life of the people, as draws upon the theoretical insights such as resources depletion, environmental degradation and socio-economic disparities. This paper focus on the concept of smart city its features, selection and evaluation criteria. Besides these, this paper examines the present status with the comprehensive study on urban innovations including renewable energy adoption, efficient transport system and green infrastructure implementation needed for sustainable smart city in India

Key words: (smart city, sustainability, socio- economic problems, challenges & Opportunities)

1. INTRODUCTION

The cutting-edge technological advancements made it true to realize long awaited dream of if utopian world that aims to blend between conventional systems with modern technological breakthroughs. This ideal world is possible because of the technologies including Artificial Intelligence (AI), the Internet of Things (IoT), Machine Learning (ML), deep learning (DL), cognitive computing, and big data analytics Balakrishna, C. (2012), Guelzim, T., Obaidat, M. S., &Sadoun, B (2016), Obaidat, M. S., &Nicopolitidis, P. (2016). One such ambitious idea that has gained traction worldwide is the "smart city," which has been adopted globally with an aimto bring the life of habitants more convenient and inclusivity. The concept involves utilising contemporary technologies to transform each entity within a traditional city into an autonomous object that functions independently without significant external assistance. All routine processes, such as governance, policies, services, and feedback, are automated, and users can access them via smart devices from any location in the world. This automation has helped reduce environmental hazards through the implementation of economical and environmentally friendly techniques. In fact, it is estimated by the experts by the year 2050, eighty six percent of world population will live urban areas.

As far as India is concerned it started with Narendra Modi‘s campaign for Prime Ministership in 2014, however, turned around the concept of smart city development in India. In his campaign, the smart city focus shift from greenfield development of new cities for the upper class to redevelopment of existing cities for all. He intended creating at least 100 smart cities. The term "smart" describes an automated system that is used to carry out the intended task inside a domain. For instance, every gadget and piece of electrical equipment found in a smart home, such as fans, tube lights, washing machines, air conditioning systems, ovens, and so on, is equipped with tiny sensory devices that can sense their surroundings, gather data, and send that data to processing hubs where it is processed and decisions are made using dynamic rules and regulations. Small, handheld smart devices can be used to operate automated processes like locking and unlocking doors and windows and turning on and off gadgets.

Smart city enablers: A smart city's ultimate goal is to connect everything to one another using best-in-class advancements. This will make a vast amount of information available, which can then be used to improve city benefits as well as nature and residents' personal satisfaction. Since smart and sustainable city planning affects everyone, it's important that one understand some of the advancements associated with structuring smart cities of things to come.

5G technologies: An absolute ground-braking system is a must for connecting everything to one another in a keen city. Expert organisations are experimenting with 5G innovations and determining how they will be useful in powering smart city systems.

Sensors: Every physical device that makes up the Internet of Things has sensors. Nowadays, a lot of the things you interact with have sensors that collect and send data to the cloud so that it can be prepared. Every device is connected to a network of sensors, which enables seamless cooperation between them.

Internet of Things: The Internet of Things (IoT) is what keeps the residents and gadgets associated in the astute city. IoT offers the availability of smart gadgets, home machines and services, connected vehicles, smart structures, smart public mobility, smart horticulture, and smart city framework. A large portion of everything that you are in contact with today has sensors, which gather and transmit information to the cloud for preparation. The system of sensors

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interconnects all of the gadgets making them flawlessly cooperate.

Artificial Intelligence: Artificial intelligence forms and investigates information created with regards to a smart city, smart stores, smart buildings, smart agribusiness, and city foundation. Besides, the utilization of Artificial insight permits to have a comprehension of how the city is functioning. Artificial intelligence can help in diminishing the mishaps by giving savvy traffic the executives, open transport course arranging, control framework the board, or self-sufficient postal administrations just to make reference to of few of various applications inside the keen city setting.

Electric vehicles: In addition to offering prosumers and other energy market participants value-added services, the digitalization of the power grid to create a smart grid has the potential to disrupt the supply of electricity in smart cities. Utilising electric vehicles (EVs) not only puts the smart grid's sustainability in jeopardy but also encourages and stimulates its modernization.

Besides, there are some smart enabler‘s structure to create solutions to sustainable smart cities. Figure 1 clearly depicts the structure into six sectors such as e-governance and citizen service, waste management, water management, energy management, urban mobility and others.

Figure 1 Smart enablers Solutions to smart cities

2. REVIEW OF LITERATURE

A systematic search of literature was carried out through a data base on Scopus, google scholar, and IEEE Xplore. The literature search on the six major necessities or sectors such as health, security, water, waste, energy and mobility. In recent years, a number of frameworks and initiatives for expanding the idea of an efficient smart city have surfaced. The most recent suggestions and solutions for the same are reviewed in this section. In order to create smart cities and offer their users a diverse range of activities, the authors of Zanella et al., (2014) talked about the idea of urban IoT.In 2012,Batty et al., discussed the role of ICT in enabling the concept of smart cities by integrating ICT with the legacy infrastructure for providing services, developing policies and governance to the masses. The authors specifically identify seven domains regarding the urbanization and realization of a smart city

and discussed how these domains can be interlinked to provide a seamless connected infrastructure necessary for the smart city.To shed light on the meaning of "smart" in "smart cities,‖ Albino et al. (2015) examined the literature. They located and examined a number of smartness matrices inside smart cities, and then they outlined the variations, parallels, and characteristics of smart cities according to these matrices. Karuppaiah Alagar, Banupriya and Vethirajan (2015) , the study has been made an attempt the theoretical view of Approaches Corporate Value-based management practices in India. Value-based management can be defined as an integrated management control system that measures, encourages and supports the creation of net worth. Batty,M(2013) emphasised the importance of big data in an urban setting that is gathered from several sources to realise the idea of a smart city. The significance of short-term planning was also covered in the study in relation to the concerns and challenges that are changing quickly in smart cities. The author emphasised that while information gathered over a longer time span is extremely significant, information gathered over a shorter time span is also very significant. IoT-based platform for creating smart cities was offered by Buiet al., (2014). Baskaran (2018) describes the term MOOC has been around since 2008, but the concept began to generate significant media attention and debate in 2012 with the launch of MOOCs offered by or in association with prestigious US institutions through providers such as EdX, Coursera, and Udacity. The framework encompassed a full cyber-physical system by integrating a number of elements and components of an urban smart city, including sensors, networking, infrastructure, governance, policy, and security.

With the following Objectives the sustainable smart cities can be constructed. 1.To revisit and redefine the Smart cities in making it as a sustainable smart cities

2. To address the main issues of health, security, mobility, water and waste management and energy efficiency
3. To identify the common challenges and opportunities of smart city deployments
4. To build a roadmap in achieving the sustainable smart cities.

Sustainable smart city challenges and opportunities: Cities nowadays are becoming more and more concerned with sustainability challenges, and they are attempting to discover ways to protect their natural and financial resources. The topic of city sustainability to be discussed, but in recent years, there has been a growing interest in the concept of "smart cities" and how it may help reach sustainability targets. A number of performance measuring tools have been created to help cities gauge their level of advancement towards their goals of becoming smart cities. Moving towards the transformative landscape, with the digital changes as an engine driving towards the innovation in following ESG as a compass, guiding the cities towards ethical and sustainable practices the smart cities undergo some issues and the challenges in the ecosystem. They are broadly categorised in Environmental, socio economic, technical issues. The objective is to investigate the degree to which the sustainable city idea and the smart city concept tackle similar problems. Despite the fact that a great deal of research has been done on the definition of the smart city idea, comparing smart cities to sustainable cities

Environmental Factors: The widespread implementation of 5G technology is already facing a number of obstacles. In an ecosystem of smart cities, dealing with natural disasters is undoubtedly difficult. Natural disasters such as earthquakes, landslides, and floods have a greater likelihood of causing damage to underlying infrastructure, which might have a severe effect on the ecosystem of the entire smart city. The lack of efficient greenhouse gas emission management is another issue. During the height of global warming, the abrupt and inevitable variations in climate also present significant risks to the ecosystem of smart cities. E-waste, or electronic garbage, is yet another urgent issue that need attention. The rapid development of new gadgets and technologies is rendering outdated legacy systems and equipment obsolete. There are currently no established procedures for disposing of these outdated systems and equipment in an environmentally responsible way.

Socioeconomic Factors: The realisation of a smart city ecosystem is greatly dependent on the thinking of its residents. A real smart city cannot be imagined if its citizens are unwilling to embrace the digital advances they are experiencing. Users must accept the changes and make use of the services for their own benefit for it to be implemented successfully. A number of governments are still unable to supply the necessary infrastructure to enable the development of smart cities. The network of smart cities is supported by infrastructure, without which it would be impossible to consider creating a smart city.

Technological Factors: Since security is the first priority for all parties involved in a smart city, including its residents, it is crucial to fostering acceptance and trust. The adoption of smart city initiatives has been severely hampered in recent years by a number of instances of data theft and cybercrimes. High implementation is a result of the new technologies' high adoption costs. The

technologies must be smart, well integrated, cost effective and resource efficient. Besides it should have environmental sustainability along with well-being and financial sustainability.

Roadmap towards sustainable smart cities: This section describes the roadmap for attaining a sustainable smart city ecosystem in a true sense.

Localization of Resources and Services using Local Hubs: Policies for smart cities must address the local relevance of services and the use of local resources to respond to development demands. Local hubs enhance awareness and operational control while optimising the use of scarce resources in the city when they are integrated into the infrastructure of a smart city.

Improved Last mile Connectivity: By connecting individuals directly to the main public transit network from a transportation hub, improved last mile connection guarantees that people reach their destination or vice versa and will help prevent crime.

Promoting Environmental Friendly Commuting: (Smart Mobility): Smart mobility employs data on traffic patterns gathered from multiple sources to enable faster, greener, more affordable, sustainable, and less congested transportation at local, national, and international levels.

Promote Localised Urban Farming: The growth of localised urban farming, increased reliance on locally produced food, and the utilisation of local resources for sustainable urban development should be the progressive priorities of smart cities. The confluence of human welfare and environmental sustainability results in a localised understanding of influences through urban farming.

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Improved Bio-diversity: By comprehending how urbanisation affects biodiversity and urban ecology and then incorporating this information into the planning, development, and upkeep of the smart city, biodiversity can be enhanced while simultaneously creating a resilient and sustainable smart city.

Innovative Waste Management and Decompositions Mechanisms: To reduce the environmental impact of the wastes generated in a smart city, innovative waste management and decomposition programmes should be established in addition to the development of municipal solid waste landfill facilities for recycling plastic, glass, biomass, and hazardous waste.

360 Degree Feedback System: In smart cities, a 360-degree feedback loop should be implemented to gauge resident satisfaction by examining the output of various industries. By providing an anonymous feedback system, smart city services may be made more user-friendly and flaws could be found.

Multi-tiered globalized security system: Smart city utility systems will be shielded from regional and international security threats by an extensive multi-layered security system with several levels of defense. Additionally, the security framework could employ human knowledge to defend against dangers that are invisible through intrinsic defense mechanisms.

Figure 2. The view of a smart city.

3. CONCLUSION

For many developing nations, the utopian world of a smart city remains a faraway dream. Nevertheless, with the introduction of contemporary technical breakthroughs, these nations have an inherent platform to strive toward realizing this. Several cutting-edge technologies are emerging to meet the varied and dynamic needs and difficulties of a smart city. One of the main tenets of a smart city is security. Novel lightweight security rules and protocols are being created to secure the components of the ecosystem of smart cities. A smart city's development and sustainability are significantly influenced by the CPS. Researchers from all over the world are already working on creating novel CPS frameworks and architectures. The Development firms and businesses are developing affordable, inclusive, and environmentally sustainable solutions for smart cities while keeping in mind the Sustainable Development Goals (SDGs).Thus, it may be said that the contribution of several enabling technologies to the creation of smart cities is essential to demonstrating a comprehensive environment that is open, automated, inclusive, expandable, safe, adaptable, and simple to administer. One of the innovative measures for lowering.

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