

Chapter 8

Smart Waste Management: Issues and Adoption Challenges

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ABSTRACT

Waste has become a major concern in the current era. Most nations across the globe have also become more concerned about a safe and healthy environment, and they are working on the issue continuously. Therefore, waste management has emerged as a major challenge, and smart waste management is proving very helpful in dealing with waste, especially in developing countries. However, the implementation of smart waste management systems is not without its challenges. This chapter aims to identify and analyse the key issues and challenges in smart waste management.

INTRODUCTION

Smart waste management has gained increasing importance in recent years, as it promises to revolutionize the way waste is managed and reduce the negative impacts of waste on the environment. Smart waste management involves the use of technology and data to optimize waste collection, sorting, and disposal, resulting in more efficient and sustainable waste management practices. As we move towards sustainable development, a lot of innovations and fresh infrastructure is being developed to make conventional cities the smart cities. To fulfil this goal, proper management of all the resources needs to be ensured so that a better quality of life for everyone on this planet can be achieved (Albino et al., 2015). Waste has become a major concern in the current era. Most of the nations across the globe have also become more concerned about the safe and healthy environment, and they are working on the issue continuously. Therefore, the waste management has emerged as a major challenge and smart waste management is proving very helpful in dealing with the waste (Verma et al., 2020) especially in the developing countries (Islam, 2015).

DOI: 10.4018/978-1-6684-8117-2.ch008

Smart Waste Management

Emerging economies have been successful in the implementation of the smart waste management, but the developing economies are still struggling with this concern as it is difficult to store and dispose-off the waste generated by the population. The transportation and disposal of the waste is costing heavily to the governments of these nations. Moreover, it is a matter of safe human existence (Tania, 2014). The waste needs to be managed in a way that it saves the cost of management with no or little impact on the existence (Kshirsagar et al., 2018). It is the high time that we handle the waste in a way so that the planet becomes safer to live.

The waste is of numerous types, such as domestic, recyclable, medicinal, toxic and radioactive. The waste can be generated due to the manufacturing of commercial and domestic goods. It is combination of multiple types of garbage and rubbish (Ihsanullah, 2022), which is generated in the form of plastic, glass, metal among other stuff. The annual waste production is around eight billion tons across the globe and the municipal waste alone accounts for two billions tons (Wilson and Velis, 2015).

A smart waste disposal idea has been presented by Saha et al. (2017) using solar powered sensors to monitor and control waste accumulation in a smart bin. It was also discussed that the accumulated waste can also be reduced by processing it multiple times. The remote sensors will share the information regarding the amount of accumulation and the waste will be processed via using wireless communications. The smart bin also functions as an internet access point and it can easily be fitted in to any size and shape of containers. These bins can be tracked using tracking devices and they are also capable to send real time data of the waste filled in them. It is claimed that this approach helps organisations to minimise the number of trash vans, reducing energy usage and increasing the collection time, while minimising the running costs.

Smart waste management is an emerging concept that involves the use of advanced technologies and data analysis techniques to optimize waste collection, processing, and disposal (Ilankoon et al., 2018). While this approach has the potential to improve the efficiency and sustainability of waste management systems, it also presents several challenges that must be addressed to achieve its full potential (Esmaeilian et al., 2018). Implementing smart waste management techniques and systems are still in the initial stage and it has a long way to go (Fuss et al., 2018).

Waste management depends upon the numerous factors and most importantly, it depends upon the economic condition of the country. This is further dependent upon the state governments as it is mostly a decentralised process (Nowakowski and Pamula, 2020). It is not just about the implementation by the centre and state governments but it is majorly dependent upon the citizen' understanding of the concept and their behaviours (Aljerf, 2018). A sustainable solution requires behavioural modifications and demands an overall renewal of the existing waste management systems (Zhang et al., 2019). Therefore, a lot of efforts are required before we actually achieve this goal of waste management. Nonetheless, the modern technologies and products seems efficient to deal with the problem. When it come to the smart waste management, the use of gadgets is a must and it also poses a threat to the data security of the citizens (Schafer, 2014).

Smart Waste Management Benefits

Smart waste management is a modern and innovative approach to dealing with waste. It involves the use of technology and advanced systems to manage waste in a more efficient, environmentally friendly, and cost-effective manner. Smart waste management has numerous benefits that make it an essential aspect of sustainable development.

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